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EFFECTS OF FEDERAL REGULATION ON THE FINANCIAL STRUCTURE AND PERFORMANCE OF THE DOMESTIC MOTOR VEHICLE MANUFACTURERS

(SOURCE DOCUMENT)

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for

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Memorandum

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

SUBJECT: Effects of Federal Regulations on the Financial Structure and Performance of the Domestic Motor Vehicle Manufacturers

DATE: September 7, 1979

In reply refer to: NRD-13

FROM : Acting Chief
Technology Assessment Division
Office of Passenger Vehicle Research - RD

TO : Reader of Report

The attached document is a November 1978 working paper entitled, "Effects of Federal Regulations on the Financial Structure and Performance of the Domestic Motor Vehicle Manufacturers."

The paper was prepared by the Department's Transportation Systems Center for use by the National Highway Traffic Safety Administration in developing the 1980-1981 Truck Fuel Economy Standards in early 1978. A later updated version was produced in November 1978 to provide supporting information for the 1979 Annual Report to the Congress on the Fuel Economy Program. The discussion on pages 93-108 of that report was based in large part on this working paper.

The paper is a cash flow analysis of the four domestic automotive manufacturers covering the period from 1978-1985. The analysis is based upon publicly available financial information such as annual reports, Securities and Exchange Commission's reports, and the manufacturers' statements concerning their program plans and planned capital investments. The conclusion of this analysis was that the domestic automobile manufacturers might not be able to finance their planned investments through the future years with internally generated funds and would be required to borrow. The analysis employs a standard cash flow pro forma technique which matches assets required to projected levels of sales activity and reveals the nature of financing required for this level of operation.

The analysis explores financial and marketing actions which the companies might use to counter any projected cash shortfall, but it does not explore major strategic shifts such as penetration of new geographic markets or dropping major product lines. Nevertheless, the report has been valuable to the Department in assessing the impact of motor vehicle regulations with particular attention paid to the effect of the fuel economy standards on the financial positions of the manufacturers. The paper has placed in the proper perspective statements of the manufacturers concerning their anticipated spending to meet the standards.

Samuel F. Powel

PREFACE

This Source Document was prepared by the U.S. Department of Transportation, Transportation Systems Center. It is a deliverable under PPA HS 827 with the U.S. Department of Transportation, National Highway Traffic Safety Administration.

The author wishes to gratefully acknowledge the work performed by Joseph Blair and David Martin, of the Transportation Systems Center, in the areas of financial and economic analysis. Their efforts have greatly expanded understanding of these topics, and have proven highly valuable to research for this document.

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1. INTRODUCTION

1.1 PURPOSE OF THE STUDY

The increasing government regulation of automative transportation industries in the United States has produced the need for financial and economic studies of the effects of such policies. The purpose of this document is to survey the effects of pending regulation upon the corporate financial systems of the domestic motor vehicle manufacturers. In many respects, this study, or at least the methods applied in it relates new analysis to the regulatory process, and borrows from other analyses performed previously. Because of the complex nature of corporate finances and the vast array of data available on topics considered in this document, it is important to emphsize the survey nature of much of this study. Undoubtedly, certain specific topics do not receive enough attention, and some vital areas are not entirely considered.

For these reasons, it is important to note the primary goals of this study:

1. To establish the actual financial environment in which government regulatory spending takes place, and to define some of the major limits upon this system in order to help assess the capabilities for future corporate spending programs,

2. To illustrate that regulatory costing must be performed, at least on one level, within this corporate context if it is to more fully measure costs and financial pressures which are likely to arise in the future,

3. To survey briefly the financial histories of these corporations, and to measure, in more detail, the corporate effects and financial risks produced in the new regulatory environment, and

4. To provide a survey of some of the most important corporate-related costs of regulation, and to illustrate that the corporation can only absorb these costs within bounds defined by financial performance and legal or accounting realities.

This study deals primarily with corporate level financial operations, which, in the case of the domestic motor vehicle companies, requires analysis of some of the largest financial systems in the world. Background research into financial performance, and the methods of analysis derived in this study were both aimed at summing collective pressures from a variety of governmental sources to illustrate how these pressures are likely to interact with normal conditions of business in affecting corporate level financial performance.

This corporate level perspective is necessary for two reasons. First, this is where financial risks are truly important, because the corporate financial system allows some cross-subsidization of projects. Secondly, this perspective is necessary, because the regulatory spending programs are so large that they are producing financial pressures of corporate scale and, therefore, should be measured in this context.

1.2 WHAT THIS STUDY IS NOT INTENDED TO BE

Because of the complexity of issues and the variety of studies being issued on topics of motor vehicle regulation, it is important to recognize explicitly items this study is not intended to address.

<u>This is not an engineering costing survey</u>. It is not at all the intention of this document to cost out individual items of technology or to measure the incremental costs of any single component. This is a study of corporate level finances, and corporate level pressures instigated by massive collections of technologies and regulations.

This is not a prediction of sales, market performance, or competitive dynamics. Although all of these topics have been researched extensively in preparation of this document, and even though the financial analysis was performed with an open eye upon the contingencies of the market, this is by no means a forecast of actual annual sales. The financial analyses in this document explicitly depend upon the sales forecasts shown, but it is extremely important to note that the purpose of this document is to estimate the sensitivity of finances to sales volatility, not to forecast explicitly the year or month of such sales volatility. The conclusions of financial analysis in this document are based on a broad range of market behavior, and have been tested for sensitivity in that manner, but they do not necessarily depend upon the exact timing of sales, as will be discussed in sections to follow.

This is not an investment analysis. It is not the purpose of this study to analyze the stocks of these companies in such a way as to make investment decisions. Although the very important topics of investment value and equity problems are discussed within the context of regulatory spending, this should not at all be read as a prediction of stock prices or investment performance.

This is not a prediction of a company's ability to meet a specific regulatory schedule in a specific year and it is not a policy alternative study. In general, the spending plans treated in this analysis directly relate to existing regulations for the 1978 through 1985 period, but no attempt is made in this document to translate numerical changes in regulatory schedules into financial performance numbers. Therefore, this is not a policy study of alternatives.

This is not the introduction of an econometric or computer modelling technique. Although extensive computer applications have been derived for this analysis, this is not an attempt to put all financial analysis of regulations into a single policy study computer model. Financial analysis is far too complex for such methods, and although computer methods are often necessary to track data and to estimate costs, they cannot reflect the variety of interpretations which can and must be made in proper financial analysis.

1.3 SOURCES OF GOVERNMENT COSTS

Although there are literally thousands of single regulatory items of cost pertaining to this industry, from safety signs in factories, to recordkeeping costs in personnel programs, to major expenditures for new capital equipment, it is possible to classify the major financial pressures into areas of Emission, Safety, and Fuel Economy. These are the regulatory areas which pertain primarily to the product being produced, and which, therefore, have the potential for the most substantial effects upon the corporate financial system. Note that other areas such as OSHA regulations and stationary manufacturing pollution control regulations will have significant local cost effects, but it is clear that product related expenses will have a much larger financial effect, because of their higher cost, in general, and because they relate directly to the consumer's willingness to pay in the market.

The specific technologies and regulations which produce the financial effects enumerated in this document can be studied much more appropriately in other portions of the regulatory literature. Readers should refer to rulemaking support documents, corporate statements, and the vast array of independent literature available on the topics and timetables of regulation. For purposes of this introduction, only a few major classes of regulatory sources are mentioned.

1.3.1 Emissions

Auto makers have had a respite from the earlier established regulatory schedule on emissions, but during the next few years, they will have to comply with increasingly stringent standards. This will produce costs derived from new electronic engine controls, new catalytic cleanup devices, and new designs built into the basic driveline technology to accommodate the fuel economy standards, because, in many cases, the manufacturer will be making some performance, design, or manufacturing tradeoff between the two related technological areas.

It appears that many of these costs will take the form of research and development recovery, increased variable costs paid to outside suppliers who are usually involved in the development stages of new auto technologies, and, in some cases, increased capital spending to set up internal manufacturing facilities to make the required components.

1.3.2 Safety

Corporate safety-related pressures would be derived primarily through design costs in new vehicle development, and in the component areas affected by such pending requirements as passive restraints. Side impact beams, new bumper configurations, pedestrian safety protection, and the extension of existing passenger car safety items into trucks will all be part of the increasing manufacturing costs related to safety regulation schedules.

1.3.3 Fuel Economy

In total dollar terms, this will be the most expensive area for the corporations during the next few years. In addition, the nature of this regulatory schedule will cause the greatest behavioral pressure upon the financial systems of these companies, because it will be demanding a steady and constantly increasing product development schedule which, in spending terms, is peaked in the early years of regulation.

Fuel economy regulations, although they will be totally intertwined with regulations on emissions and safety, will enforce the most drastic change in financial performance, at least on a capital spending level, if future projections of spending are even partially correct. All corporate products must be redesigned to meet the fuel economy schedules on a corporate basis, unless the companies are willing to perform a drastic mix shift to smaller and less profitable vehicles.

This product development includes enforced spending on engines and drivelines, which are traditionally the most expensive technology items, as well as spending on lighter and more aerodynamically efficient bodies.

Because of the pervasive nature of these regulations, and because they cover almost every part and performance characteristic in the motor vehicle, almost every U.S. manufacturer's product offerings will be completely redesigned to meet the three regulatory schedules. In essense, manufacturers will have to turn over almost all of their capital assets in the process, which means capital turnover and expensing of perhaps $60 to $80 billion dollars in eight years.

1.4 FINANCIAL NATURE OF THIS SPENDING FOR REGULATIONS

The aggregate spending and design efforts mentioned above will have two major financial effects:

1. Total spending on product development will rise above all previous levels, not only in nominal, but also in inflation-adjusted terms,

2. Perhaps more importantly, this spending will take place according to a regulatory schedule which is divorced from market economics and cyclicality of business. This translates directly, in financial terms, into increased downside risk.

In the past, even under some regulatory conditions, the product spending of these auto companies could be adjusted to meet the cash flowing from the markets as well as the competitive realities faced by the industry. Now, under far more pervasive regulatory schedules if markets turn downward in volume or upward in costs, companies will not have the option of deferring product development spending.

If product spending were deferred, future regulatory schedules would not be, and the manufacturer would not have products available in future periods which could be legally sold in North America. This essentially forces a higher fundamental line of risk into the corporate financial structure, and corporate performance will suffer in periods of declining sales or rising costs (both of which are not strangers to the industry).

1.5 SPECIFIC EFFECTS OF THIS FINANCIAL PRESSURE

This basic shift in risk and financing patterns will be visible in a number of cost areas, and will exert several significant corporate pressures.

The primary and most important effect, in terms of corporate financial risk, is a very large and sustained charge to corporate cash flow which may force large financial actions to meet this drain of corporate funding. Cash flow will be affected first, by the very large purchases of assets required to make the new vehicles and components, and second, by a number of financial inefficiencies which may arise from the nature of this spending. Many new investments will be made in areas which may not provide high returns which means that as multiple new products are put on line, they may not contain enough cash generators to subsidize early cash losers. This means corporate cash flow can be diminished both by the size of the outflows and by the nature of their return.

This return problem will also show up in the very important areas of corporate profitability which may easily continue the declining pressures in North America. The first major effect of new spending on profitability will derive from the large fixed expenses corresponding to new model introductions, or to introductions of new technologies. It costs as much as several million dollars per day to get a new model running smoothly through a factory, even after all of the development costs have been incurred and the capital equipment purchased. These high launch and preproduction (or direct engineering) expenses are not necesarily related to annual production volume, and, therefore, can cause significant reduction in annual profits as many new technologies or products are introduced in a single year.

The second effect upon corporate profitability relates to the low return nature of some capital projects mentioned above. Company spokesmen and other analysts point out that many of the innovations or new technologies added by regulation are somewhat "invisible" to consumers, and, therefore, their costs might not be directly translated by the consumers into a willingness to pay more for the vehicle. For example, some emissions equipment might not be viewed as valuable by the consumer, and, in fact, it might even be viewed as a negative attribute if any of the EPA's recent data on catalytic converters and the use of leaded fuel are substantially correct. In this case, the company would still incur costs of the technology, but the consumer might not be willing to bid up the price of the car, and corporate margins would slip.

Arguments can be made on both sides of the issues of pricing, but it must at least be kept in mind that a number of technological changes may not produce substantial returns from the market, and this effect could certainly be compounded if a number of new items were to be added in a single year.

In addition to, and because of the profit and cash flow pressures of the increased spending programs, companies will most likely experience increased regulatory costs in the form of <u>finance charges on new capital</u> which would not have been needed under lower or more deferrable patterns of spending. It appears almost certain that the companies will have to obtain greater amounts of short term debt, and it appears very likely that all four domestic automakers will have to obtain some additional long term funding, which amount would depend upon the nature of any sales declines under the new spending levels. It is entirely certain that Chrysler and AM will need such external capital to fund their planned spending programs, and it seems quite likely that GM and Ford will require some external capital if sales decline at any time during the spending period. These higher levels of financing will produce charges directly deducted from income, and will, therefore, create a greater cost pressure against the market's ability or willingness to pay increased vehicle prices.

In addition to these finance charges, any substantial increments of new financing will add to cash flow pressures by establishing new repayment or refinancing schedules in the future.

Other financial effects of the increased spending plans can be measured by their impact upon the shareholders or investors. Even under favorable sales projection, it is clear that the new spending requirements will place a heavy pressure on the abilities of these companies to pay dividends to investors. Chrysler is already experiencing such problems, and under the high fixed charges of the new spending plans, it would not take severe sales declines to put strong pressures upon the dividend streams of GM and Ford. These spending effects could result in lower shareholder value and potentially higher future costs of capital to the companies.

Other immediate effects of the regulatory schedules could be felt by company workers whose jobs might be threatened as new technologies cause rapid changes in the production base. For example, the requirements for lighter weight vehicles could easily result in reductions of iron casting capacity in favor of new aluminum castings. Or, pending conversions to front drive vehicles, one development associated with a number of regulatory standards, could force the obsolescence of facilities which manufacture driveshafts and rear axle assemblies. If all of these functions could not be translated smoothly in terms of skills required and geographical locations needed, a number of workers could lose jobs, and communities with concentrations of auto related jobs could suffer.

Because the domestic manufacturers must quickly assimilate small car technologies in the domestic manufacturing base, they have turned to the only traditional sources of these technologies which reside overseas. Owing to the rapid increase in all capital spending, a number of components, which would have normally been manufactured by domestic companies, will be purchased from overseas suppliers. This results in a second trend toward lost American jobs, and may have effects on balances of trade and payments. Since the return on foreign investment may actually be higher than the return on investment in the United States, there appears to be a general financial incentive to invest capital beyond the the North American market, in addition to this specific technological requirement to send money offshore.

A more subtle set of financial effects will result from increased spending plans in addition to the more easily charted costs described above. Because the companies will be experiencing a higher level of risk in annual operations, they will have to allow enough slack in their financial systems to absorb fluctuations in sales or costs. In the regulatory environment, companies must be financially prepared to cover shortfalls between fixed spending requirements and cyclical sales. They must be prepared for recall expenses and warranty costs especially in light of the numbers of new technologies being introduced. Furthermore, there is evidence that other product liability issues could arise or be extended which would cause further costs coincident with new product introductions.

In financial terms, this requires contingency reserves and an explicit higher cost attributed to new capital spending projects owing to the increased risk of these projects. In practical terms, this means a company can incur costs owing directly to risk, and not necessarily to the final actual spending incurred on a project; the risk must be anticipated in funding terms even though the higher risk costs might not be incurred. This is most likely not a major consumer of funds, but it affects the corporate ability to manage working capital in cash short periods.

It must be emphasized that it is not the purpose of this report to comment upon the validity or nature of the regulations discussed, or to comment upon the social goals which these regulations are intended to achieve. It is very important, however, to observe that these regulations, whatever their overall effects, will have specific effects upon the motor vehicle manufacturers. The purpose of this study is to evaluate and describe some of the most important costs enumerated above, regardless of extra-corporate effects of regulations.

1.6 METHODS OF MEASURING FINANCIAL EFFECTS OF REGULATION

In general, the premise of this analysis is to place the regulatory pressures into the corporate financial system to measure the corporate effects of regulation and to sense what actions the company will have to take to counter the cost pressures. This forces analysis according to the actual corporate financial accounting and legal operating restrictions which will determine the ultimate effects of regulation upon the corporate system.

None of this analysis is cast explicitly in terms of social utility if social utility is defined as general societal effects like fuel savings, and no attempt is made to provide a cost/benefit policy analysis of the entire regulatory policy network. If some cost saving accrues to the consumer, but does not appear on the corporate books, it is not explicitly included in this analysis, because the corporation can only make use of effects accruing within its structure, at least in financial terms.

Under this set of assumptions, only the relevant financial effects upon the corporation are charted, and although this type of analysis could be used in a broader cost/benefit or social utility analysis, financial analysis is not cast in these terms for this study.

1.6.1 Modification of Previous Regulatory Financial Methods

One of the major aspects of the analysis in this document is that it departs from previous methods of costing and financial analysis used in the regulatory process by a number of parties. When research first started into the topics of financial analysis for this report, it was felt that, for the most part, single elements of financial pressure owing to specific single regulations or technologies could be distinguished, and that the specific incremental financial costs of these incremental pressures could be directly tracked. This would have involved some form of accounting proxy model, extending previous regulatory cost estimates into further detail, and then aggregating them up to a corporate level for appropriate measurement of corporate risk. After much study, however, it became clear that this approach was not satisfactory for the pending regulatory period for a number of reasons, primarily arising from sheer corporate size and the volatility of all financial and regulatory elements.

This financial analysis does not at all retreat from the problems of measuring regulatory pressures in the financial system; rather, it applies methods which more fully measure the aggregate pressures of regulation, and it recognizes that this aggregate pressure is the relevant measurement at this time, because the volume of regulatory impacts upon the companies is so large.

The primary impetus to development of new analytic methods was the fact that <u>government regulation is no longer an isolated influence on specific parts of the corporation; it is a very large and pervasive part of the operating environment</u>. Almost every new facility or technological application contains some element of planning for government regulatory goals. Design goals must be fitted to bumper height, dollar damage, and pedestrian safety criteria. Component parts must be individually certified, and changes in critical parts must pass through time consuming recertification processes, adding governmental lead times to those defined by profits and capacity. Costs must be increased for quality control on more complex manufacturing, and operating reserves allocated for possible warranty or recall charges. Assumptions about future products must not only consider consumer taste, engineering capacity and lead times, and productivity problems, but also anticipated decisions by government agencies of a variety of types and with a variety of often changing mandates.

This is not to condemn government regulation, or to say that the auto companies are being run into the ground by regulatory costs. Social goals and actions are necessary in a changing world, and the auto companies have not been at a loss for profits in all recent years (with some very notable exception years). But, it is strongly argued that strategic and tactical planning must now explicitly consider government regulation as one of the significant environmental influences, and that all product and business decisions must have some component of regulatory goals built into them.

This leads to a problem in costing out of effects of government regulation. <u>Because multiple goals are now subliminally a part of the planning, product development, manufacturing, and service processes, the amount of "overlap" between government regulatory costs and "normal" business has increased to the point where the two cannot be effectively separated in any accounting system</u>. This does not at all argue that government cost has become irrelevant because it is part of normal business, because the government regulation has clearly pushed levels of spending to very high amounts; but, it does suggest that a disaggregated cost accounting approach is no longer feasible, or even meaningful without a firm analysis of the large corporate effects of regulation. The corporate effects are so large, that minute cost accountings do little to enhance understanding of the problem.

In addition, this type of micro-cost accounting is no longer feasible on a timely, practical basis. How much of the cost of downsizing should be allocated to government regulation, and how much should be allocated to the rising cost and scarcity of oil? Because government policy is at least partially driven by the price of oil, the balance of payments, and the hold the OPEC nations had over the United States in 1973, how possible is it to even differentiate government policy from the market behavior of oil?

In the case of a bottom-up accounting for the cost of regulation, the primary problem lies in defining the cost components of regulation at all. A general example illustrates the accounting problem inherent in this approach. A number of years ago, Porsche apparently had plans to make a mid-engine sports car at the top-of-the-line of Porsche marques. At the same time, the company entered into a long range strategic plan to expand penetration in world markets. This world strategy required, in part, an efficient allocation of working capital to world inventory supplies. As design on the new car and world expansion continued, it became apparent that the car would not satisfy two sets of critiera; its mid engine design would cause problems in exhaust routing for pending noise and emissions standards, and would not allow parts compatibility and, therefore, inventory efficiency with other models. As a result of these and other factors, the company changed its product design to front-engine/rear-transaxle. This required a new hood configuration to couch the engine aerodynamically, and, of course, the design would have to meet bumper and crash standards. In this case, does one count the difference between early design and final design as the government inspired increment of cost? Or, does one only count part of this cost, because the company may have saved some inventory working capital investment in the change? Does one count the entire new hood as government cost, or only some part of it?

To aggregate government costs from the bottom up in a corporation, one would have to define these increments at every level within the company. By the time such questions were resolved and the details aggregated, the products at the base could have easily changed again.

In addition to the intermingling of government and corporate standards within the financial system, another behavioral effect inhibits a disaggregated cost accounting approach. <u>Government regulations are often produced from so many sources and they are so open to change, that the regulatory pressures, when they can be defined at all, are often quite volatile</u>. Illustrative examples include the seat belt interlock, the current truck brake standards, changes in fuel economy and emissions schedules, historical development of passive restraints, possible pollution problems with diesels, and changes in EPA fuel economy measures. When this volatility interacts with uncertainty in the corporate environment, it is incumbent upon any analyst to estimate costs in probabilistic terms and to accept the fact that volatility, and not certainty, will control the corporate financial effects of regulation.

Several examples illustrate the problem of volatility and the errors inherent in static definitions of cost. In early 1978, once fuel economy standards for light trucks had been firmed up, Chrysler began planning around these new requirements. At that point, the company was faced with a decision from the EPA concerning methods of painting, which raised Chrysler's estimates of necessary capital spending perhaps $20 million above the estimates submitted earlier during the light truck regulatory process. Ford, at the same time, faced development problems in its variable displacement engine, which would have been applied to meet fuel economy standards in light trucks. Therefore, the company faced a new set of product development expenses which interlocked with other R&D projects, spending on smaller displacement engines, marketing plans for vehicles of a specific weight and configuration, and a number of other corporate-wide financing decisions. In each of these cases, a static estimate of government inspired cost would have missed relevant items of financial pressure, and the true effects of regulation would not heve been charted.

Another major problem impedes explicit definition of government regulatory costs. This results from the fact that <u>accounting and economic measurements can be designed and interpreted according to the perceptions and needs of the particular analyst</u>. Some corporate measurements of costs might, very necessarily, include allocations of overhead or other charges which were critical to proper operation of the business, but other analysts, not concerned with divisional overhead, might feel other figures were more appropriate. Financial standards and corporate laws allow variations in costing of investments, credits, expenses, depreciation, foreign earnings, and other items, all of which could easily be influenced by government regulation. In a static disaggregated costing approach, such variations and definitions of terms could easily obscure actual corporate financial effects, even if internal corporate data were available to all analysts.

1.6.2 Modified Methods Used in this Document

Because of the pragmatic impossibility of assessing corporate financial effects according to a disaggregated accounting method, this analysis deals more explictly with corporate level effects of regulation. As mentioned earlier, this is not only feasible but is required and accurate, because the magnitude of regulatory pressures has risen to corporate scale, and must rightfully be measured in corporate terms.

The primary framework of analysis in this document is a proforma financial accounting method which allows the charting and sensitivity testing of important corporate financial performance indicators. Many interpretations of proforma analysis are possible, but, in general, the format used in this document will be applicable to all of the companies, because their ultimate business performance will be displayed in this fashion in their public financial statements. The core of this analysis is an investigation of the publicly available accounts, and an analysis of the effects of regulatory spending upon them. Detailed discussion of the methods used in this document are contained in following sections.

In general, all major financial accounts are evaluated according to historical behavior patterns and expected future events to show what probabilistic effects can arise from economic and regulatory forces. This includes analysis of internal and external funding, pressures on profits and related investment return measures, measures of stockholder and investor value, and evaluation of cost pressures on the sales side of the corporation.

The methods of analysis used in this approach explicitly recognize financial flows and funding problems which are a normal part of new investment and which would occur under any regulatory program, in addition to the elemental first cost measured in the factory. This includes assessment of working capital, financing reserves, capital structure issues, and other less tangible financial costs.

A major facet of this analysis is explicit recognition of volatility as the supreme dictator of financial performance and cost. Even the best static costing approach cannot properly estimate the financial pressures upon the auto companies, because sales fluctuations and other uncertainties will determine the actual performance figures in the corporate books. It is important to realize that any mandated spending program will also face the volatilities of business, and, therefore, the estimated effects of regulation should be properly cast in terms of their ultimate effects. This requires explicit attention to probabilities and risks in all directions.

1.6.3 Summary Costing Methods and Assumptions

Although this proforma method is not geared toward incremental component costing or incremental costing of specific items of regulation, it does allow such analysis to be performed in a more fully descriptive financial content. At the base of analysis, incremental costing is not critical, because the spending for regulation has already reached such large proportions that the cost of an incremental carburetor is almost totally irrelevant to corporate financial performance. However, once the larger corporate pressures have been charted, it is entirely possible to explore specific incremental technology costing within this framework.

This analysis takes one step in the incremental costing direction by summarizing collective pressures, and, then, by applying some of these in a unit costing context. Costing in Section 11 can be viewed as one estimate of the regulatory component of pending financial investment costs. Given the large regulatory pressures on the corporate system, it became necessary to illustrate the unit cost pressure this would imply. For this reason, a costing method was devised which would estimate an incremental investment costing pressure according to the investment criteria and limitations facing the corporation.

In one sense, this was an attempt to estimate the government inspired cost pressure on the sales sides of the financial system, by defining government regulatory cost as the cost produced by all investment occurring in excess of trend level investment. Since it is no longer practical to define cost accounting increments of government regulation, it was necessary to cost out regulations in another fashion.

This increased investment cost was defined conceptually in the following manner. It was clear that government regulation was increasing the spending of the auto makers, but it was equally clear that other market and economic forces were similarly consuming funds. Much evidence suggests that consumers were not the driving force in this accelerated capital spending surge. Because large cars are still in demand at solid prices, and because consumers are turning to trucks despite higher fuel costs, it seems safe to assume that it is not the entire market which is dictating the spending for fuel economic vehicles. It also appears that if consumers had the choice, they would not voluntarily demand the new catalytic converters and complex emissions hardware appearing under the hood. This general trend can also be seen in the heavy shift of market demand away from lighter emissions-equipped trucks to the heavier, less practical, yet unregulated trucks over 6500 pounds GVW. (Note also the recent announcements by the EPA concerning use of unleaded gasoline in converter cars, and the comments made by participants in the interim consumer studies performed under contract to NHTSA, presented at a contractor's coordinating meeting in April 1978.) This suggests that it is reasonable to conclude that a profitable number of consumers would have allowed the large, traditionally inefficient, American vehicles to be sold, and that they would probably not have minded the simpler mechanics of older engine designs.

Auto makers would be exhibiting poor strategic thinking if they did not feel the need to create more fuel efficient vehicles; resources are getting scarcer, and manufacturers would be locking themselves out of a long term future if they did not respond to these long term pressures. But, it seems clear that consumers are not demanding the accelerated product introduction schedule, and, in fact, they may actually be resisting it (see again the NHTSA consumer interim reports of April 1978). This suggests that government regulations are indeed the primary, if not sole, instigator of product spending above trend spending levels, and this further provides one measure of estimating costs of regulation.

Section 11 of this document summarizes a costing approach based on measurement of spending above trend historical levels. It must be emphasized that this estimate only measures part of the regulatory costing pressure, and may easily ignore specific components of spending which can legitimately be measured in other ways. But, this method, nevertheless, indicates that regulatory cost pressures can be as large an annual cost pressure as the influence of general price inflation.

1.7 SUMMARY

The following sections explain, often in considerable detail, the methods and assumptions of analysis, the issues facing the corporations, and the results of analysis of regulatory pressures. Because the topics are so complex, and because this document was written for persons of a variety of backgrounds and disciplines, it often intentionally errs on the side of more explanation rather than less, and it may, at times, overemphasize certain points. It is important that critical assumptions be explicitly recognized, and it is important that analytic methods be clearly grounded in these assumptions.

Although some sections of analysis have been written to stand alone, all sections are ultimately required for understanding of the financial pressures facing the industry and for interpretation of the results of this analysis. The issues treated in this document are not on-off, black-and-white examples of clarity, and interpretation of results will, unfortunately, require assessment of conflicting pressures and apparently paradoxical financial phenomena. It is hoped that the issues raised and the results derived in this analysis will provide useful grounds for further examination of the issues, and that this document can properly characterize the basic nature of government regulatory financial pressures.

2. INTERNATIONAL ISSUES AND THE WORLD MARKETS

2.1 GENERAL

Although the primary focus of this analysis is upon the U.S. automakers, it is important to note that these companies truly compete on an international scale, and, further, that world competition will play an important role in the financial futures of the U.S. based companies. This section briefly surveys some of the major issues which impinge on this financial performance.

Perhaps the most critical fact facing the U.S. companies is that the North American market has become relatively saturated and mature, leaving these companies little room for unit growth on their home ground. Most long term forecasters discuss growth rates in the American markets in the order of 2 percent per year over the long term. Some analysts postulate larger replacement growth if fuel economy becomes more necessary than ordinarily assumed, or if there are similar systemic changes, but, in general, the U.S. market is not seen as an area of growth.

Several sources of data summarize this point. The Motor Vehicle Manufacturer's Association (MVMA), in its *Motor Vehicle Facts and Figures '78*, indicates that the U.S. market is becoming less dominant in the world. As indicated in the table below, the growth rate of registrations in the United States has been considerably slower than for the world during the past ten years.

REGISTRATION GROWTH RATES
(millions of units)

	1966	1976	Annual Growth Rate
U.S. Registered cars	78.353	110.351	3.48%
Other Registered cars	70.256	159.228	8.52%
U.S. Share of Total	52.7%	40.9%	

This suggests that the demand for automotive transportation has shifted quite heavily away from the United States, a trend which strategic decisionmakers would have to consider in order to ensure corporate growth. A number of analysts suggest that competition will be severe as world companies compete for shares of the burgeoning markets in the "less developed" areas of the world. For example, Eurofinance, in its Latin American Automobile Industry Prospects to 1985, suggests growth rates for Latin America of approximately 7-10 percent per year through 1985. New car demand in Latin America is approximately 900,000 units per year now, but it could rise to as many as 2.0 million units per year in 1985. Commercial vehicles, currently selling at a rate of about 250,000 units per year, could experience a similar rate of increase. These are attractive figures for many companies, and because much competition is expected, potential competitors will have to fight continuously i they are to sustain or gain market share in the face of such growth.

This raises another critical point: competition will be very strong on all fronts, and the U.S. companies will have to maintain and increase their investments not only in the United States, but in all parts of the world in which they intend to compete. If the U.S. companies concentrate only on the U.S. markets, they will be losing a world wide strategic position, because it is clearly the intention of foreign producers to capitalize on the increasing worldwide demand for vehicles. If the U.S. automakers "lose" in Europe and the developing markets, they risk losing in the United States also, because new consortia of foreign producers will have gained financial resources which may cause problems for current U.S. producers.

This pending competition can be seen in a number of areas. Both Fiat and VW, leading world contenders, have increased their capital spending swiftly, signalling expansion and product development. Between 1976 and 1977, Fiat's annual investment in fixed assets increased 70 percent, and VW increased its spending by approximately 62 percent. VW should be spending, perhaps, $800 million to $1.0 Billion per year in the near future on fixed assets, which can have significant effects in a number of markets.

Other companies have increased their spending plans and will be allocating significant funding to new investment over the next five years. While it is difficult to determine the precise amounts of new product investment these companies will be making, Exhibit 2-1 gives estimates of current spending for several of the most important world producers. Note that reporting requirements are different for the various countries involved in this list, and that some product spending will not be directly comparable on an account-by-account basis to American financial statements. Note also the important fact that a number of these companies receive either direct or indirect subsidies from their respective governments, which increase their abilities to invest beyond the cash flow amounts available from operations, or the amounts traditionally viewed as available to American corporations from the private capital markets. It is also important to keep in mind that capital spending is only one part of new product spending, and that some foreign producers receive subsidies beyond capital spending which allow them to bring new products to market. These companies will be producing freshly competitive products for the world market, and their U.S. counterparts will have to match this effort if they are to maintain their current positions.

Another illustration of pending competition is the current trend toward formation of rationalized consortia, such as the AM/Renault agreement, and the recent decision on the part of Peugeot to purchase Chrysler's facilities in Europe (note also the recent merger between Peugeot and Citroen). A number of analysts have mentioned that this could be a necessary method of competing in the world markets, and similar arrangements could creat new market powers, forcing the U.S. companies to spend money to keep up with their world competitors.

This competition is getting closer to home with the establishment of manufacturing facilities in the United States by foreign based firms. Volkswagens are already being built in the United States. Renault may assemble cars here through its arrangement with AM, and several Japanese firms are scouting facilities in a number of states. This form of manufacture is significant because it will tend to isolate the foreign car producers from the fluctuations in world monetary values which currently hold them at a price disadvantage in the United States. In addition, this will help them maintain a stronger service network for their U.S. sales, possibly reducing the competitive advantages American producers hold in this area now.

World competition will also become increasingly important if the American producers actually pursue a "world car" strategy of standardizing car models across several geographic boundaries. But, the world car is by no means a certainty. Although much press coverage discusses the world car concept, a number of analysts, including the automakers themselves, see problems with implementation of such an effort. Because consumer tastes still vary significantly by country, and because the regulatory structures are currently so disparate across world market regions, it is conceivable that the world car cannot be economically produced, until these barriers are reduced.

Whatever the outcome of the world car concept, it is clear that foreign operations are becoming important at the <u>component</u> level of the industry. Both Ford and GM use technology in the United States which has been developed or sold previously overseas. The Ford Fiesta is entirely comprised of foreign technology, and the GM Chevette contains a number of components developed in foreign markets. Chrysler is currently importing VW engines for application in the Omni/Horizon models, and there are indications that the company will be getting components such as air conditioners and electrical equipment via long term sourcing contracts with foreign producers. In some cases, foreign sourcing appears to result from technological expertise in small cars which resides with the foreign producers, and in other cases, it appears that the United States companies will not have enough capital to build manufacturing facilities in the United States, and have, therefore, chosen to purchase parts from foreign producers currently manufacturing the required equipment for small car applications.

The overall picture, then, is of a more homogenous world motor vehicle market. Foreign producers and American manufacturers will be competing for shares of the growth markets in other countries, and it seems clear that the foreign producers intend to maintain their presence in the U.S. market through a variety of new operations. As a result, the American firms will have to develop products and processes throughout the world, and it seems clear that foreign operations will not subsidize the U.S. operations. In fact, it is possible, that U.S. companies will be hard pressed to maintain the investment base on all fronts.

A survey of the current standing of U.S. producers in the foreign markets, (Section 2-2 to 2-5) reveals the significant position represented by these overseas operations in the corporate sphere.

2.2 FORD

In percentage terms, Ford is clearly the most international of all the U.S. companies. Their 1977 Annual Report indicates that Ford holds a 15 percent world market share in automobiles, and a 20 percent share of the world truck market. Each of these shares has increased approximately 1 percentage point in the past year. In 1977, approximately 32 percent of Ford's total unit sales represented foreign sales. Exhibit 2-2 further illustrates the foreign position this company holds. Fully 29 percent of Ford's dollar sales are derived from foreign markets, and, more notably, 42 percent of corporate profits are derived from the same markets. Ford earns 3.6 percent profit on its U.S. sales dollars and 6.3 percent on its foreign sales dollars, a significant incentive to maintain its foreign position. A number of observers indicate that this superior foreign performance results, in part, from the rationalized production setup used by Ford in their international operations. Other analysts suggest that it is easier to price effectively in the European markets, and that the costs of regulation are lower there. While it is difficult to attribute simple reasons to this success, it can, nevertheless, be seen that a strong world market position is advantageous to the company which can maintain it properly.

2.3 GM

Note in Exhibit 2-3 that GM's relative foreign position is quite different from Ford's. GM derives only 15 percent of its sales dollars overseas, and its return on sales is much lower at 2.9 percent of sales dollars. Note, also, that GM's return on assets (profit/gross assets) is significantly lower overseas at 5 percent than it is in the United States at 14 percent, and, further, that GM earns a much higher profit on its U.S. sales dollars with a 6.6 percent return on sales. Many observers note that GM will be playing somewhat of a catch-up game overseas, which will require significant development of capital assets in foreign markets. In one sense, the position of GM overseas indicates the power of world competition; the significant assets and resources of GM have not been enough, in themselves, to automatically assure international dominance.

2.4 CHRYSLER

Exhibit 2-4 indicates that Chrysler's overseas position is not as large as the other companies and that the company does not perform as well in foreign markets. Note that this set of operations has just changed radically with the pending sale of European operations to Peugeot, and that further changes can be expected in other geographical areas. Chrysler has been radically reorganizing its foreign operations to provide funding for operations in the United States, and given the amount of funding the company will require over the next five years, it is reasonable to expect that foreign financing and operating arrangements will be critical to corporate success.

In recent months, Chrysler has sold its equity interest in its Turkish subsidiary, has sought joint ventures in its South American operations, and, most notably, has given up its entire European operating base. There are also indications that the company will increase its dependence on foreign sources for component parts, and that it may continue to seek funding from Middle Eastern capital sources. This illustrates that even though Chrysler will be reducing its foreign presence as a manufacturer, the company will remain intricately involved in the world market.

2.5 AM

American Motors has very little in the way of foreign operations at present, but there are indications that the pending arrangement with Renault of France will open new markets to them, primarily for the successful Jeep line of vehicles. Some observers note that Renault may act in a marketing capacity for these vehicles, and there are hints that both European and Middle Eastern markets are being selected for development. In addition, AM will be tied to international fortunes and economics through its participation with Renault in the United States. In the immediate future, AM will market Renault-produced vehicles, and may start to assemble more of the Renault products in the United States within the next several years.

2.6 SUMMARY

The purpose of this brief overview is not to extensively analyze the world automotive markets, but rather to simply highlight some of the most important issues and problems presented at this macro level of business. It is necessary to maintain awareness of the global interdependencies fostered by international competition when viewing the financial performance of the four domestic automobile producers, and to realize that the U.S. companies must allocate resources beyond the United States if they are to remain competitive with the other world producers.

A number of public policy issues relate to world operations, including issues of U.S. employment, balance of trade, and foreign versus domestic investment; but is is beyond the scope of this document to consider these topics in any depth. The overriding conclusion stemming from this financial overview is that, given the current state of world business, the foreign sector cannot be simply divorced from analysis of U.S. operations. Furthermore, it cannot be simply assumed that foreign earnings will support domestic capital spending, or that foreign operations can be easily sacrificed to support domestic programs. Foreign operations require their own base of assets and capital funding, and because all world manufacturers are clearly competing on a world level, any sacrifice of foreign operations will significantly alter the overall competitive abilities of the domestically-based companies.

EXHIBIT 2-1. ESTIMATES OF CURRENT AUTOMOTIVE CAPITAL SPENDING BY SIGNIFICANT FOREIGN PRODUCERS

These data are approximate and have been derived from a number of sources. In some cases, the estimates are derived from general announcements of 5 to 8 year spending plans.

	Annual
British Leyland	$300 Million
Daimler Benz	$500 Million
Fiat	$200-300 Million
Fuji	$40-50 Million
Honda	$200 Million
Toyo Kogyo	$60 Million
Toyota	$600 Million
Volkswagen	$800-1000 Million
Volvo	$200 Million
Total	$2.9 Billion-$3.2 Billion

Missing: Saab, Peugeot, Renault, Nissan, BMW, others.

EXHIBIT 2-2. FORD 1977 WORLD PROFILE
($ Million, Unless %)

	U.S. and Canada	Overseas	Overseas % of Total
Sales	$26,719	$11,122	(29.4%)
Net Income	968	705	(42.1%)
Net Income, % Sales	3.6%	6.3%	
Assets	$11,170	$8,071	(41.9%)
Return on Assets (Net Income/Net Assets)	8.6%	8.7%	

SOURCE: 1977 10-K

EXHIBIT 2-3. GM 1977 WORLD FINANCIAL PROFILE
($ Million, Unless %)

	U.S. and Canada	Overseas	Overseas % of Total
Sales	$46,664.1	$8,297.2	(15.0%)
Net Income	$3,092.9	$244.6	(7.3%)
Net Income, % Sales	6.6%	2.9%	
Total Assets (including Current)	$21,822.1	$4,836.2	(18.1%)
Return on Assets (PAT/Assets)	14.1%	5.0%	
Employees	614,000	183,000	(22.9%)

SOURCE: 1977 10-K

EXHIBIT 2-4. CHRYSLER 1977 WORLD PROFILE
($ Million, Unless %)

	U.S. and Canada	Overseas (%	Overseas % of Total
Sales	$11,947.5	$4,760.8	28.5 %
Net Profit(Loss)	$196 (approx)	(-$32.8)	
Net Profit, % Sales	1.6%	(-0.6%)	
Total Assets	$4,841.8	$2,826.4	36.8%
Return on Assets	4.0%	(-1.1%)	

Not adjusted for tax credits.

SOURCE: 1977 10-K

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3. SALES FORECASTS: DERIVATION AND ASSUMPTIONS

3.1 GENERAL

One of the most important estimates included in any financial analysis is the forecasting of sales figures. Unfortuantely, this is also an area of great uncertainty, and forecasts issued by professional forecasters and the companies themselves often reflect this uncertainty in wide ranges and diversity of opinion. Forecasting sales for the American auto makers is quite difficult, because analysts must not only project domestic sales of a variety of products (autos, light trucks, heavy trucks and buses, parts, and non-automotive products), but they must also project sales of similar items in Canada and a number of foreign markets. Economic conditions affect sales of the different products differently, and the economic forces at work in the various world markets are by no means consistent or systematic.

Research for this analysis uncovered no consistent set of forecasts for even the U.S. markets, and, in fact, discovered wide disparity in estimates for sales in other world market areas. In addition, there is almost no systematic data available for forecasting non-automotive sales by the companies under consideration. The auto companies themselves indicate that they use a wide range of data to forecast individual elements of their sales, and that these data are evaluated using a number of different methods. Depending upon the specific policies of each company, both econometric and consensus techniques are employed to different degrees, and one of the most important elements in any forecast appears to be the expertise and experience of the forecasters involved.

Because of the complexities and uncertainties of the forecasting process, it is important to fully understand the assumptions and purposes of the forecasts used in this document. This section discusses the intended purpose of the choice of forecasts, the assumptions implied in the selection of data, and the limitations of the methods used.

3.2 PURPOSES OF THE FORECASTS

Because the central objective of this document is to assess the financial risks that face the American auto companies as a result of economics, operating characteristics, and regulatory pressures, the primary purpose of the sales forecasts is to project a reasonable range of possible sales figures through which to analyze these financial risks. Since most of the analysis described in this study is founded on probabilistic terms, it is necessary to consider a variety of possible market conditions, rather than to attempt the justification of a single "most likely" case. History has shown that all sales forecasts ultimately produce errors, especially over longer time spans, which is precisely the reason a company must maintain financial flexibility, and the reason a financial analysis should be cast in terms of risks rather than certainties.

In recent years, the use of econometric models has increased along with the sophistication and accuracy of the models, and it is recognized that econometric methods serve a very useful purpose. At the same time, it must be noted that the models, by their very own definitions, recognize the uncertainties and errors inherent in forecasting. For example, one of the central demand equations in the TSC/WEFA automobile forecasting model produces an R^2 estimate of approximately 0.46, which indicates that approximately 50 percent of the volatility of the demand variable is beyond the explicit explanatory power of the model. Similar statistical performance can be noted in almost every extant model produced by a variety of sources. This is not meant to impugn the value of these models, but it should be noted that interpretation of the models' abilities is critical to their use. Because this analysis makes considerable use of available econometric projections, and because of the limitations inherent in the models, the second major purpose of this set of forecasts was explicitly to consider the volatility of sales and to apply econometric projections only in a manner which recognized the cyclicality of the motor vehicle business.

3.3 WHAT THE FORECASTS ARE NOT INTENDED TO DO

It was not the purpose of this document to precisely forecast the most likely unit sales figures for any single year or to specify the exact timing of any likely recession. It is the judgement of many analysts that sales forecasts can only obtain reasonable accuracy for a period of 18 months or 2 years into the future, and because projections in this document extend many more years into the future, this analysis claims no greater accuracy than that afforded by the projections in the publicly available forecasts used. It is explicitly noted, in fact, that these available forecasts contain a variety of differences, and that the auto companies themselves differ in their judgements of future sales and revise their one year estimates regularly. This document is intended to illustrate the financial pressures facing the companies, assuming certain economic conditions pertain, not predicting that they will occur at the time illustrated or to the degree shown. In addition, this document does not purport to forecast precisely the market shares achieved by any of the companies during any single year in the forecast period. Historical shares have been probabilistically assessed to assure that the future projections are reasonable, and some adjustments have been made to reflect current trends, but it must be emphasized that these sales projections do not contain explicit models of competitive dynamics.

It should be noted that the reservations pertaining to the sales projections in this document do not obviate the validity of this analysis, within the bounds of its intended purpose. This document represents a risk assessment, and an assessment of risk requires explicit consideration of many possible conditions, not the elimination of them.

3.4 SELECTION OF SALES PROJECTIONS

Research into the topic of sales forecasting quickly produced a variety of estimates and forecasts, indicating that there is very little concensus among forecasters, especially beyond a period of two or three years. In a Wall Street Journal article (2/1/78), GM spokesmen were said to be sticking to their earlier forecasts of 11.7 million units to be sold in 1978, despite the late winter downturn in sales. The same article indicates that security analysts and others were speculating on sales in the lower 10 million unit range. In its July 31, 1978 issue, Automotive News quotes a spokesman of Kidder Peabody & Co., as forecasting 11.2 million autos to be sold in 1978, and 10.3 million to be sold in 1979. (p.3). In the same issue, GM President Estes was reported to have predicted that 11.5 million autos would be sold in 1978, and was quoted as saying that 1979 would also be good ("pretty much on the normal growth curve of 2 percent after fluctua tions of recent years." p. 15). On July 24, 1978, Automotive News reported William O. Bourke, an Executive Vice President of Ford, as saying that auto sales would be 11.2 million in 1978 and 11.0 million in 1979 (p.2). On page 6 of the same issue, Chrysler President Cafiero was reported predicting 11.2 million car sales in 1978 and 11.3 to 11.4 million in 1979. The same article cites a GM forecast of 11.5 million units for 1978. A variety of articles in the same published sources exhibit similar ranges in estimates of truck sales and in the share of the market projections conceded to imports.

It was obvious that sales forecasts varied between companies in their beginning-of-year estimates and had to be modified as actual yearly sales patterns began to unfold. Notice that these estimates related only to six month or one year projections, and that the variances exhibited by the various forecasters could be as much as 10 percent of each other's estimates for this short period of time. Sales forecasts for periods beyond one year could easily produce higher variances.

Similar variances were evident in the forecasts produced by other sources. The forecasts issuing from Wharton Econometric Forecasting Associates, Inc. (WEFA) and Data Resources Inc. (DRI) were fairly close to each other for the 1978 annual period, but beyond that point, they displayed considerable differences. Exhibit 3-1 compares the U.S. Retail Automobile Sales projections issued by the two companies, and indicates that by the projected 1980 year, the estimates vary by as much as 10 percent. Depending upon the assumptions chosen, this variance could suggest a difference in retail auto dollar sales of approximately $7 to $8 billion, or more than twice American Motor's current annual sales. Exhibit 3-2 shows these differences visually. Note that not only are the absolute amounts of the forecasts different, but the patterns displayed by the various assumptions range drastically.

It was obvious that no firm consensus could be found in the publicly available sales forecasts, and that forecast data would have to be chosen in such a way as to accurately reflect not only reasonable estimates but also the variety of possibilities so obviously expressed by the experienced sources. The criteria upon which this choice was made are the following:

1. The sales projections should not violently disagree with company estimates.

2. Estimates should be able to reflect the cyclical nature of this industry and include measures of a recession.

3. Estimates should include the sales of light and heavy duty trucks and buses, because although government fuel economy and safety regulations would not necessarily extend uniformly into these market areas, the sales of these products are significant to the financial performances of the companies being studied.

4. Estimates should extend at least to 1985. Even though the accuracy of such projections is, naturally, highly suspect, it was necessary to attempt a financial assessment at least throughout the period for which there are existing regulatory requirements. This would also be necessary to demonstrate how regulatory-induced spending in earlier periods would influence later corporate performance.

It was quickly concluded that the econometric projections were the only ones available beyond the short term company forecasts, so the available projections were evaluated according to the above criteria.

3.4.1 The WEFA Macro Model

The output of this model was eliminated from consideration for several reasons. Most importantly, it did not project the crucial sales of light, medium, and heavy trucks, and, therefore, could not be used to derive estimates of corporate dollar sales. In addition, the available projections displayed cyclical behavior only to 1982, providing only upward trend projections beyond that point (see Exhibit 3-2). This choice does not at all reflect on the accuracy of the WEFA model, but merely represents the need for a forecast which would approximate conditions of financial risk enumerated by the auto companies, and documented in historical analysis.

3.4.2 The DOT/WEFA Auto Demand Model

In many ways, this model would have been useful for financial risk assessment, because it is currently used for policy analysis for regulatory decisions, and because its assumptions can be changed to reflect different economic conditions. However, it, too, did not provide estimates for the important truck markets (although it is being modified to produce light truck sales estimates), and it was designed primarily to produce long term aggregate estimates, rather than year-by-year fluctuations. For these reasons, it was not chosen for this risk assessment.

3.4.3 The DRI Macro Model

The publicly available output of this model was chosen as the basis from which to derive sales forecasts, because the nature of the output most fully satisfied the demands of this financial analysis. The projections specified in the DRI U.S. Long Term Review, Summer 1978 contain estimates of light truck and other truck sales, they include forecasts with cyclical behavior patterns throughout the intended forecast period, and they could be used to derive a wide range of sales possibilities thereby satisfying the risk analysis criteria in their current form. Exhibits 3-3 and 3-4 show the nature of these total U.S. retail market projections, and display the characteristics of cyclicality which formed the basis for the tests of financial risk.

3.5 ADDITIONAL STEPS IN THE DERIVATION OF SALES PROJECTIONS

Using the various DRI U.S. Retail projections as a foundation, estimates of company sales were derived from historical market data. Canadian auto and truck sales for the companies under consideration were compared to their actual U.S. retail sales to estimate the proportional relationships. For final sales projections in the proforma estimates of Section 10, it was assumed that the current relationship between Canadian and U.S. company sales would remain the same. No attempt was made to independently assess Canadian demand, including import penetration and demographic shifts, because it was felt that the historical relationship was steady, and its application in forecasting would produce no greater variance in sales than that contained in the basic forecasts of U.S. sales. It should be noted that the Canadian market displays a lagged behavior in relationship to the American market, that is, it tends to fall more slowly during recession conditions. This behavior was not specifically modelled in the sales projections, because systematic forecasting errors from other assumptions in the projections would supercede any additional accuracy possibly afforded by a lagged assumption.

Overseas sales were examined in the historical data, and it was decided to treat these primarily as trends in the proforma projections. This method was used because few comprehensive foreign sales figures are available, especially for markets which might produce the greatest amounts of growth during the next decade. Studies of these foreign markets frequently cite the inconsistencies in statistical recordkeeping so evident in the sources describing foreign sales. Because the market-based data were poor and because it is beyond the scope of this document to derive market models for the overseas markets, it was decided to simply extrapolate the sales fractions of the American companies in their overseas market areas in calculating their financial performance.

Market shares in the North American market were derived from aggregate U.S. and Canadian historical data. It should be noted that these market shares apply to aggregate car, truck, and bus sales, so they differ slightly from frequently cited company figures which relate primarily to autos or light trucks. Because financial measurements used in this analysis are taken at the corporate level and include a variety of product costs and revenues, this aggregate market share assumption is quite satisfactory for projection of corporate financial performance. Further disaggregation of market share by segments would produce no greater accuracy in financial forecasts because average prices and costs by type of vehicle are not available in public form, and, therefore, could not be meaningfully aggregated to the corporate level. This aggregate market share assumption is also appropriate, because it is the purpose of this analysis to measure financial risk at the corporate level.

3.6 ASSUMPTIONS IMPLICIT IN THIS METHOD OF FORECASTING

The chosen method of sales projections contains a number of general assumptions listed below:

1. Under the cyclical assumptions, sales patterns will be roughly equivalent to historical patterns, with a significant recession built into the 1982-83 forecast years.

2. Market shares will remain roughly constant, although the Chrysler share has been adjusted slightly upward, assuming improved sales on models like the Omni/Horizon, and assuming a recovery from the recent slump in truck sales.

3. Import penetration will decline slightly from its recent peak, but will remain approximately in the range of 15 to 18 percent of the U.S. retail market.

4. The light truck share of the market will rise from 22 percent of the total car and truck market to approximately 25 percent of this total market, and will vary slightly around this percentage share after the first three years of the forecast period. (Note that this is total retail cars, light trucks, and heavy and medium trucks.)

5. Foreign sales will continue to grow. This assumes American producers will continue penetration of overseas markets and that there will not be a world-wide recession across all foreign market areas.

6. Canadian sales will move cyclically with the U.S. market.

Although these assumptions project a somewhat steady state market performance, primarily in the market share assumptions, they should not be viewed as limiting the financial analysis for several reasons. To the extent that these share assumptions are steady, they are financially "conservative", that is, they do not force changes in financial conditions owing to competitive gains or losses. <u>This means the proforma analysis of financial conditions will measure financial risks deriving from two sources</u>: <u>market recession conditions and the costs of government regulation as represented by capital spending and product development spending</u>. These two sources of risk are difficult to disaggregate, although an attempt is made in Section 10 to isolate the pressures stemming from each, and the market share assumptions are designed to allow investigation of these pressures. <u>If financial risk is indicated under conditions of steady market share, it can only become worse under conditions of market share deterioration, so, the somewhat steady share assumptions are quite appropriate for this analysis</u>.

In addition, market shares have remained roughly consistent over the past, with the exception of Chrysler and AM. Since the steady state financial analysis indicates the risk is extreme for these companies without further deterioration, there is little point in constructing a scenario of dropping market shares for these companies. In the case of Ford and GM, it would require a significant loss of share to produce risks of the magnitude already indicated by the steady-state market share financial assessment, so, again, there would be little point in providing a scenario of lost share. This does not imply that the risk of market share loss is absent, but merely that the financial risks induced by increased product spending and recession conditions are already so great as to make an assessment of market share loss largely superfluous.

Another point is worth noting. Although this analysis does not purport to accurately pinpoint the timing of a recession, this by no means diminishes the conclusions of the financial analysis which indicate that a recession would have serious negative effects. Given the historical patterns of sales in this industry, it is quite reasonable to expect a recessionary decline sometime during the next five years. Since the increased regulatory spending programs will continue for at least this period of time, and because the effects of current spending will be felt by the companies for many more than five years, the conclusions drawn by this financial analysis are not especially sensitive to the precise timing of a recession during the next five to eight years. Again, the timing of a recession is critical when it actually happens, especially when the companies must meet a regulatory schedule, but because regulatory schedules will be dictating the spending for product development for a long period of time, if these projections of a recession were off the mark by a year or two, the cumulative effects in terms of financial risk would not be substantially altered from the existing projections.

3.7 QUALITY OF SALES: THE REVENUE MIX

Because the sales forecast in this analysis uses aggregate revenue per unit measures derived from recent historical performance, it generally assumes there will be no radical changes in the <u>revenue</u> mix of cars sold. That is, it is assumed that the companies will be able to derive roughly the same revenues from a given mix of cars during the forecast period, with prices only corrected for inflation levels or recovery of cost increases. It is recognized that this assumption can be challenged because it appears that the companies will have to perform some alterations of revenue mix if they are to sell enough small cars to meet CAFE standards. However, it is emphasized that this revenue assumption does not at all destroy the validity of the conclusions derived from this financial analysis, because if financial risk is indicated under projected conditions of steady revenue mix, this risk can only be increased if the revenue mix shifts toward the less profitable end of the spectrum.

It is also emphasized that the proforma methods do allow for changes in revenues and costs in such a way that the steady revenue mix assumption is not entirely optimistic, if it can be deemed so anyway. Specifically, costs are adjusted to allow no more favorable profit figures than have been achieved during the past ten years (note that there has been a secular decline in profit return on sales for this period), and, furthermore, costs are escalated under unfavorable economic conditions and for inflation in the appropriate cost sectors. This means the relatively steady revenue mix assumption will still accurately reflect the influence of business conditions.

3.8 OTHER CONSIDERATIONS

The proforma financial analyses contained in later sections of this document use both unit and revenue sales projections to project cost and performance items other than gross sales. Because of this, and because of the different operating characteristics of each of the companies, it is important to note how these sales figures are translated into the cost accounts contained in the projections. Company-specific assumptions are discussed in the sections of analysis directly related to the financial projections.

EXHIBIT 3-1. COMPARISON OF DRI AND WHARTON (WEFA)

AUTOMOBILE FORECASTS: U.S. RETAIL AUTOS ONLY (MILLIONS UNITS)

	WEFA CONTROL	WEFA LOWER GROWTH	DRI TREND	DRT CYCLE	DRI PESSIM
1978	11.13	11.10	11.10	11.1	11.3
1979	11.75	11.39	10.9	11.0	10.3
1980	12.11	11.83	11.4	12.0	10.9
1981	11.45	11.33	11.4	12.4	11.5
1982	11.20	11.05	11.1	9.9	11.2
1983	12.03	11.92	11.5	9.9	10.2
1984	12.66	12.58	11.9	12.2	11.4
1985	12.74	12.60	12.1	13.1	12.2
1986	12.97	12.85	12.2	11.0	11.1
1987	13.07	12.92	12.4	10.2	8.9

(Wharton Forecast only Provides data to 1987)

Sources: The Data Resources U.S. Long-Term Review, Summer 1978

The Wharton EFA Annual Model, 1978

EXHIBIT 3-2. DRI AND WEFA FORECASTS: AUTOMOBILES ONLY, U.S. RETAIL (million units)

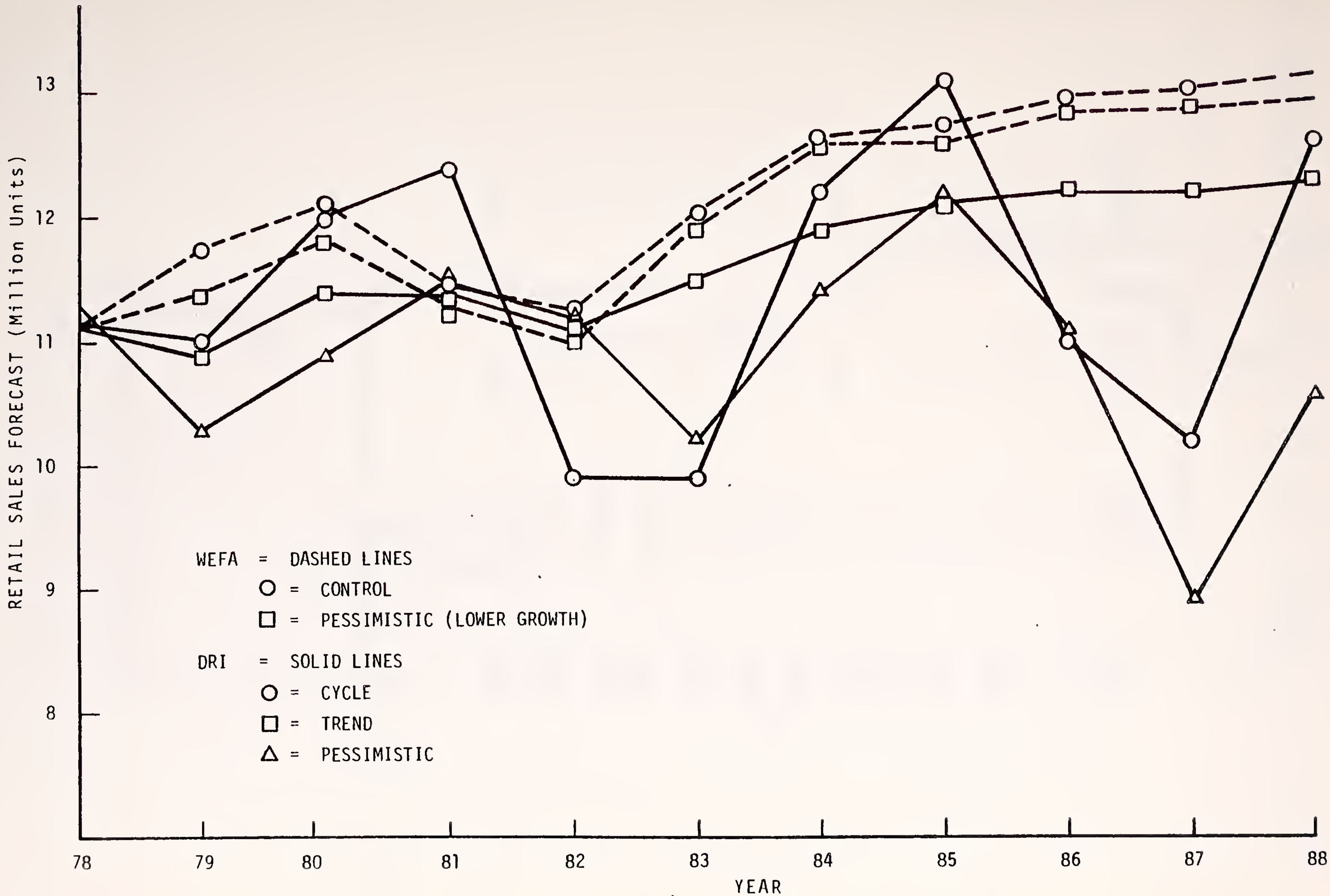


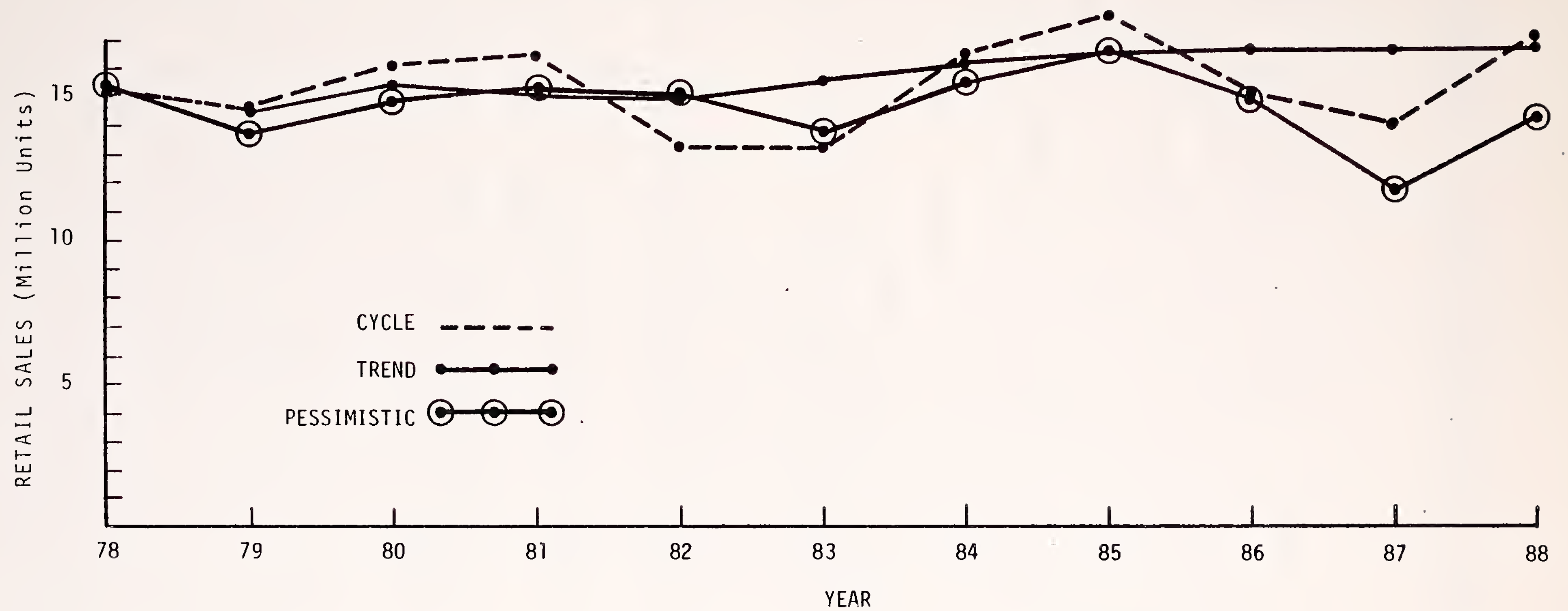
EXHIBIT 3-3. DRI LONG TERM PROJECTIONS: U.S. RETAIL CARS AND TRUCKS

(millions of units)

	TREND	CYCLE	DESSIM
1978	15.14	15.15	15.37
1979	14.55	14.48	13.65
1980	15.45	16.15	14.76
1981	15.16	16.48	15.27
1982	14.96	13.29	15.09
1983	15.58	13.31	13.86
1984	16.24	16.55	15.57
1985	16.42	17.90	16.57
1986	16.62	15.16	15.01
1987	16.76	14.09	11.90
1988	16.89	17.29	14.27
1989	17.03	18.86	15.91
1990	17.19	16.11	15.92

Source: DRI U.S. Long-Term Review, Summer 1978

EXHIBIT 3-4. DRI FORECAST: TOTAL U.S. RETAIL SALES, CARS AND TRUCKS (million units)



4. COSTING AND SPENDING: METHODS, DEFINITIONS, ASSUMPTIONS

4.1 INTRODUCTION

Research for this document has indicated that the topics of economic practicability and financial analysis have been interpreted in a variety of ways by a variety of concerned parties, and that considerably different methods of evaluation have been applied by government, industry, and other analysts, often with lack of consistency and comparability. For this reason, it is important that the assumptions and methods of this analysis be properly clarified and briefly related to other relevant methods.

This section has several purposes:

a. To discuss briefly the relevant financial concepts which apply to the topics considered in this document, and to discuss the relevant costs which the companies must consider in conducting business.

b. To review some of the currently applied costing methods, and to propose additions or modifications to them which will consider financial risk more fully.

c. To define some of the terms used in this analysis, and to relate them to the business context.

d. To discuss generally what financial analysis has been performed in this document, and to show why it is required for appropriate evaluation of financial risk.

It will be impossible to describe fully all the subtleties of financial analysis concepts and their application to the business context, so, the objective of this section is merely to highlight the most crucial elements required for interpretation of the output of this document. It should be noted that terms used in this document are largely the same as definitions that appear in basic financial analysis texts, such as those enumerated at the end of this section, and the interested reader should refer to these sources for further general elaboration of the concepts considered.

4.2 MAJOR AREAS OF ASSESSMENT

4.2.1 General

Evaluation of the performance of a corporation requires assessment of at least three major conceptual areas, which correspond to the three standard accounting reporting formats:

1. Analysis of income and expenses for the period under consideration (usually a year or quarter). This corresponds to the Income Statement documents.

2. Analysis of the assets, investments, credit arrangements, borrowings, cash holdings, value of ownership, and other items all measured at the single time of reporting, corresponding to the Balance Sheet reporting statements.

3. Analysis of the sources and uses of funds or cash, which the corporation has received or applied during the period in question (usually a year or quarter), corresponding to the Statement of Changes in Financial Position, the sources and uses documents, or similar documents which measure the flow of funds in a manner not captured directly by the Income Statement or Balance Sheets. This is often referred to as "cash flow analysis," although the term "cash flow" actually is used to describe a number of differently measured flows of money or credit. Throughout most of this document, use of the term "cash flow" will apply to the annual cash available from operations, represented by the amounts of net income, depreciation, and amortization, and to the cash consumed by operations in the form of capital spending, working capital, debt repayment, and dividends.

4.2.2 Discussion of Income and Expenses

All forms of income and all types of costs are not equivalent, and in the operation of the business, different cost items can have very different implications for financial performance.

4.2.2.1 Income or Revenue - The greatest source of income is from sales, although there are other forms including interest from securities held, capital gains on certain investments, and equity in net earnings of unconsolidated subsidiaries. Proformas in this analysis consider all types, but place most emphasis on sales.

4.2.2.2 Cost and Expenses - Although there are, literally, thousands of cost types, for purposes of this overview, they shall be classified into three categories:

a. Variable (sometimes known as Direct)

b. "Fixed" (sometimes known as Indirect)

c. Semi-fixed/Semi-variable

a. "Variable" Costs. These are costs which can be directly attributable to the production of a specific product; they are called "variable" because they generally vary in some direct way with sales (or production). For example, if it takes exactly 2 hours for one person to make a single part, this labor cost will increase directly with output. If it takes exactly two pounds of steel to make the same part, the variable material cost will also increase directly as sales increase.

b. "Fixed" Costs. These costs are theoretically independent of output. For example, if a company has to lease a facility for \$50,000 per year, it will incur expenses of \$50,000 whether it produces 100 units or 10,000 units during the year in this facility. Some of these expenses would include fixed real estate taxes, fixed insurance premiums, the cost of an accountant required at a plant no matter what level of output occurs, or similar items. This often includes an item known as "corporate overhead" which is the sum of expenses for staff and facilities which do not actually produce products in their daily work. Overhead and other "fixed" expenses are often allocated to the cost of products on a per unit basis, according to standard costing systems, set up on planned levels of production.

c. Semi-fixed/Semi-variable Costs. These are costs which remain roughly fixed for certain levels of production output, but will increase or decrease if production output exceeds some limit or boundary level. For example, if it requires one accountant to handle the paperwork in a factory for production of 100,000 to 200,000 units, this cost will remain fixed as long as output remains in this range. If output rises above 200,000 units, however, another accountant must be hired, and the previously "fixed" cost will have behaved in a somewhat "variable" manner, because it changed with the level of output.

This classification of semi-fixed costs is extremely important for understanding of the auto companies. The auto companies operate in a volatile marketing environment, and there are many costs which change in step functions as described in the previous paragraph. This means that if sales are uncertain, the company must provide enough people and facilities to cover a broad range of sales possibilities, and the firm will, therefore, often be operating in a semi-fixed, or semi-variable cost state, because a number of the production "limits" will be constantly "violated" under changing sales conditions. It is not easy to simply hire and fire critical workers under these conditions, because the companies would risk the loss of experienced and trained personnel if they fired them too early and required their services once again as sales picked up.

An example of this semi-fixed, semi-variable cost behavior can be found in data concerning labor costs in the auto industry. Labor in a manufacturing organization is commonly thought to be variable; that is, it is believed to drop with drops in production and to rise when production increases. In general, over time periods longer than one year, this is true, and over the long term, labor is indeed a variable cost. However, financial performance is critical on a much shorter time frame, and in this very important area, labor in the auto companies behaves in a more fixed fashion. For example, the auto makers are responsible for maintaining a large pension and benefits fund, and payments must be made to this liquid asset portfolio on a regular basis. The formula for determining the amounts of payment behaves like a moving average calculation, based on general employment levels. Reductions in the labor force do not necessarily reduce the payments flowing into this account, and certain types of layoffs can actually increase the dollar amounts the company must pay in, at the very time employment is decreasing. This lagging behavior is evident in the pension cost accounts of the auto companies; these costs often correlate more closely with time, than with levels of production or employment.

Other Supplemental Benefits clauses in the UAW contracts specify continued cash payments to workers during layoff periods. If a company is trimming production output through a series of short work weeks or similar measures, the companies must continue to pay a substantial portion of a worker's salary even though the worker is not producing cars. These payments are not at all discretionary and are based on moving average-type formulae which again allow no drastic falloff in labor costs even though production is falling off. (See the UAW contracts for specific conditions and formulae.)

In addition to the semi-fixed behavior of labor costs, the auto companies experience a semi-fixed pattern in materials purchases. Because these companies are involved in such high volume supply contracts, many purchases are paid effectively over a longer term. Some component or tooling contracts are paid on a percentage of completion basis, and other large lot orders require similar spreading of cash outflow over time. Although all of these cash flow behaviors do not become directly translated at the time of purchase into expenses on the income statement, the behavior of these costs, especially this cash outflow, is not directly tied to production output in many cases.

All of these complex costing and payment schedules have the ultimate effect of smoothing costs over time, rather than gearing them directly to productive output. This means the companies cannot reap a windfall cash flow, or reduction in costs by simply dropping production levels. This also means that per unit costs will be sensitive to volume levels especially during the most critical financial times when sales are changing rapidly. Traditional theories of fixed and variable costing break down under these circumstances, and such costing behavior should be explicitly recognized in any discussion of labor and material cost behavior concerning the auto companies.

This discussion of costs is grossly oversimplified, but it does characterize the fundamental financial forces facing the companies.

d. Method of Treating These Cost Classifications. There are a number of problems in classifying costs as described above when performing external analysis of the auto companies; these problems specifically relate to prior regulatory methods of costing, which will be discussed in detail later in this section. Oversimplification of fixed and variable cost classifications tends to cause miscalculation of behavior of critical costs. Therefore, cost elements are not so rigidly categorized in this analysis so that the range of financial pressures facing these companies may be more fully measured.

Fixed and variable cost classifications measured at the plant level are not necessary for a corporate level assessment of financial risk. These classifications are only required when one is trying to perform break-even calculations or when one is actually operating a business and needs to fully plan for all the details of operations. It is entirely possible to measure financial pressures accurately at an aggregate level by summing cost components, and it is also quite possible to measure aggregate effects of regulatory spending and assess its inducement of risk without a disaggregated cost accounting procedure. In fact, such aggregate analysis is required when one is not privy to the internal cost accounting records of the companies under consideration, because attempting to aggregate cost items from the factory level will produce serious aggregational errors unless one fully understands the specific techniques of allocating overhead costs and the transfer profits incurred by different profit centers.

For example, if one transmission plant is operated as a profit center and it is allowed to sell its transmissions to a corporate final assembly plant at a transfer profit, an outside observer trying to calculate the corporate risk from a change in transmission costs by aggregating upward from the plant level would face a number of different cost estimates and the potential for large errors.

Assume the plant cost structure for each transmission is as follows:

Material (purchased from suppliers, including internal ones)	\$100 (includes supplier margin)
Labor (direct)	\$ 50
Labor (indirect)	\$ 5 (allocated)
Fixed cost (heat, power, etc.)	\$ 8 (allocated)
Corporate Overhead	\$ 8 (allocated)
Total cost charged to this factory	\$171
Transfer Profit (10% markup)	\$ 17
Total cost to final assembly plant	\$188

Assume the average annual output, which would also be used as the basis for allocation of the above costs, is 400,000 units. If one wanted to calculate the direct costs of these transmissions, the total would be <u>\$60 million</u> (\$150 x 400,000). If one calculated the fully allocated costs (including overhead), the total amount would be <u>\$68.4 million</u> (\$171 x 400,000). But, if someone were monitoring the cost as transmissions arrived at the final assembly plant, the total cost would be approximately <u>\$75.2 million</u> (\$188 x 400,000). If the same cost structure applied to all other transmission facilities, the potential aggregational error for a company selling 5,000,000 vehicles per year would be <u>\$190 million</u>, or approximately 20 percent of the total possible value of the transmissions as they arrived at the final assembly plant. Note that this error would be produced only by accounting for costs in one type of facility. The transmissions passing through final assembly would incur more value added costs, and they would have actually accrued transfer profits and overhead allocations before they reached the transmission plant. This example even assumes that the outside observer had access to the internal corporate accounting methods and calculations.

The per unit disaggregated costing approach becomes even more distorted under conditions when volume changes. Assume that a recession occurs and that demand drops 25 percent. Assume further, that the cost structure truly behaves in a fixed and variable fashion. This means the transmission factory will now be selling only 300,000 units per year, and it means the standard cost allocations must be modified. (In practice, the cost accounting procedure is infinitely more complex than is displayed here, and the costs are not so easily adjusted.)

The new unit cost structure would be as follows:

Material	\$100
Labor (direct)	\$ 50
Labor (indirect)	\$ 7 (allocated)
Fixed cost	\$ 11 (allocated)
Corporate overhead	\$ 11 (allocated)
Total cost charged to this factory	\$179
Transfer profit (still assume 10%)	\$ 18
Total unit cost to assembly plant	\$197

On a per unit basis, the transmissions are now 5 percent "more expensive" than they were before, although the total aggregate cost of the year's output has declined. A static estimate of unit transmission costs, if it were used to predict the cost of transmissions to the company, would have no ability to measure the true effects on cost or profit during a poor sales year. It is difficult enough for the companies to monitor the fluctuations in costs, and it is pragmatically impossible for the outside observer to measure corporate risk using this method. (Note: the corporate effects owing only to the <u>volatility</u> of unit sales can be seen in Section 10 'MARKET RISK,' 5 year cumulative summaries.)

When evaluating such large corporations, it is incumbent upon the analyst to measure all relevant costs, and unless one has the internal information required to allocate indirect costs, this, unfortunately, cannot be done without considerable aggregation.

Statistical background analysis for this document indicates that every publicly available cost item in the auto companies' financial statements contains some element of both fixed and variable cost, with one or two exceptions. For this reason, the method of analysis chosen approximates the fixed and variable behavior of these costs through a series of statistical measurements derived from 20 year historical data. For example, the "Costs, Other Than Below" category, which is often 70 to 90 percent of sales, obviously contains both fixed and variable items. The analysis in this document uses historical behavior patterns of this item which allow part of the cost amount to drop when sales drop, but which also require part of the cost item to remain fixed as sales drop, thereby replicating the effects on profits which would be produced from a more disaggregated analysis of fixed and variable costs. This avoids some of the aggregational error which would be produced if one tried to build assumed plant costs up to total corporate expenses, (and which would understate the risk to the companies), yet still reflects the true nature of the cost items involved.

Such methods do not deny the validity of fixed and variable cost analysis, but they do reflect the fact that detailed fixed and variable analysis is neither pragmatically possible nor any more accurate when performed outside the corporation.

4.2.3 The Balance Sheet

This set of accounts measures the current standing of the business in terms of assets, credit due and owed, and the proportion of the business actually owned by the shareholders. Detailed discussion of the accounting involved in this document is beyond the scope of this analysis, but, in summary, this document measures the cumulative effects of operations over periods measured by the income statement. Any plants or machinery purchased, any credit issued, any stock issued, or similar items of business are recorded in this document, in a cumulative fashion. For purposes of analysis, the balance sheet accounts can be divided into three general levels, according to the immediacy of their behavior.

4.2.3.1 Current Accounts - The most immediate actions of the business, those which change completely within one year, are recorded in the current asset and current liability accounts. These include accounts receivable, accounts payable, cash, short term loans, and similar items.

4.2.3.2 Intermediate Accounts - The auto companies have substantial investments in areas which mix long and short term items, such as investments in subsidiaries and joint ventures with other companies. These are represented by the other investment and other liabilities accounts. These behave somewhat like permanent assets over the long term, but can be altered quickly by changing business conditions.

4.2.3.3 Long Term Accounts - These are the more "permanent" accounts whose values would only change radically with major changes in the business such as divestiture, reorganization, or growth. However, they are not at all inactive or stable in total dollar amounts for the auto companies. The auto makers are constantly adding large amounts of assets, and in the case of special tooling these assets are also retired quickly from the books. These accounts will also change with additions of long term debt or changes in stockholders' equity. It is this area of the companies which will be changing rapidly during the projected product spending forecast period, and which will be the primary instigator of financial risk. Investments in these accounts will have to produce an immediate and useful return, or the cash flow strength of the business will change drastically.

4.2.3.4 Method of Treating Balance Sheet Accounts - Unless one has access to specific planned company decisions and the precise internal company accounting records, the balance sheet accounts can only be derived from methods of estimation. Fortunately, the historical data on these accounts, in relationship with income accounts, are consistent enough to allow meaningful projection through statistical devices, as long as the analyst remains aware of the uncertainties involved. For the purposes of this analysis, 20 year historical accounting data were examined to determine the "normal" operating relationships between accounts, and to sense any changes in these relationships which should be included in the future projections.

The historical data were evaluated against indicators of company performance, against external data such as economic conditions, against conditions of industry competition, and in relationship with other historical data, such as capital market performance data. The basic result of this analysis was an accounting of the systematic behavior of balance sheet accounts and a series of probabilistic measures applicable to the balance sheet relationship. For example, it was found that GM's inventory accounts would vary in relation to sales with the following probability distribution:

Fractile:	.1	.25	.5	.75	.9	Cumulative (Probability)
% of Sales	14.45	15.09	15.75	16.42	17.06	

As can be seen from this measure, inventory has a fairly systematic behavior when compared to sales activity, with fully 50 percent of probable inventory levels between 15 and 16.4 percent of sales. In projections of the future, the 15.75 percent level would be used as the basic projection, but changing economic conditions might suggest the use of probabilistically higher or lower levels. (If Monte Carlo simulation were used, the entire mass function would be stored for application.) In this particular account, the change to LIFO accounting would also constrain the percentage measures to lower than the average historical value, because of the basic nature of accounting changes LIFO would imply.

Conceptually, the method of balance sheet projection operates in the following manner. Levels of activity and economic conditions are represented in the sales forecasts and income statement projections. The balance sheet is then constructed to show what assets must be employed and what credit structures must be used to achieve the performance indicated by sales and income projections. For example, if in the past, 9 percent of GM's sales were made on credit (Accounts Receivable), it is reasonable to expect that, in the future, GM's customers will continue to demand this proportion of credit. Therefore, Accounts Receivable would increase or decrease at approximately 9 percent of sales. This general method is applied to other accounts until the balance sheet reflects the structure of business which corresponds to the level of activity indicated in the sales and income projections.

In the cases where specific information is available on accounts, this information is directly built into the balance sheet projections. For example, the auto companies have specifically stated what they intend to spend on capital assets such as plant, equipment, and tooling, so these amounts are not projected statistically, but, instead, are plugged into the projections in the form of planned dollar amounts (using historically derived depreciation and amortization rates for income computation.

Once the structure of business is estimated in the form of the balance sheets, this structure is compared to the income available from operations to sense what the "financial need" for the period is. For example, if cash flow from operations will not fully fund the amount of asset growth specified in the balance sheet, it is necessary to see what internal sources the company could use to make up the deficit, or what external sources would have to be used (borrowings or stock issue, for example).

Suppose the first proforma estimate indicated that the company needed \$50 million above the cash flow provided by operations to finance the asset growth indicated in the balance sheet. The first step of analysis would be to investigate the other accounts to see if they implied any financial resources available in the amount of \$50 million. If the projected cash account indicated a balance of \$3.5 billion, for example, it would be clear that the company could finance the relatively small $50 million amount from ready cash, without resorting to external borrowing. Or suppose the short term credit accounts indicated that the company was currently able to borrow $1.5 billion, and that the historical probabilistic variance in this account had been as large as $500 million. In this case, it would be almost certain that the company could borrow the relatively small $50 million indicated need from its short term credit sources without seriously distorting either the credit arrangement or the methods of doing business, so, the analyst would assume that any $50 million financial need could be easily funded from short term credit sources.

If, on the other hand, the proforma estimates indicated a financial need of $900 million, with amounts available from cash or short term credit the same as illustrated above, it would be clear that a $900 million adjustment to the cash or short term credit accounts would represent a serious financial action and that the company would probably have to seek other external sources of funding, or else be forced to change its methods of doing business.

In the format used later in this document, all of the balance sheet funding pressures deriving from retained earnings, capital spending, and working capital investments, are forced to flow into or out of the "liquids" (cash) account. The "Change Cash" line on the cash flow summary sheet indicates the collective financial pressure upon the cash accounts. If this value is positive, it represents a net generation of cash for the year, and if it is negative, it indicates the company would have been forced to dip into its liquid reserves to support the financial pressures for the year.

<u>But, even if the cash flow pressure is positive for the year, this does not in itself indicate the absence of external financing need, or the lack of financial risk</u>. Because of the cyclical nature of the business and particularly because the companies will have to shut down facilities for revisions and introductions of new technology, the companies experience periods during the year when the monthly cash coming in does not support the monthly cash

flowing out. (If a plant goes down for a launch, it will not sell cars and bring in cash, but it will represent a cash drain anyway because the workers are employed and the machines are running. This cash drain also pertains to any model changeover, or any seasonality in sales.) To protect against these contigent cash shortfalls, the companies must maintain adequate liquid reserves. If, at any time, the cash flow for the year does not allow maintenance of this reserve, the company may require increased external funding, and even the positive indicated cash flow will, therefore, not suggest totally internal financing.

Furthermore, it is noted that the individual balance sheet accounts are volatile, given varying operating pressures upon the companies at different times. Because the balance sheet projections in this document are necessarily less volatile than actual annual variations experienced under conditions of stress in the past, a positive cash balance, unless it is considerably above some operating minimum, can still indicate substantial financial risk. For example, the Ford Accounts Receivable and Accounts Payable items have produced a net annual variance of 2 percent of sales in a year of change. Under the cash conditions projected in the first five years of the Ford planned spending proformas in Section 10, such a variance from just these two lines could reduce the nominal cash balance by 30 percent (about $900 million), leaving the company with only two weeks cash on hand. If simultaneous pressures arose in other balance sheet accounts, the company would certainly have to seek some external funding, and if the pressure was instigated by the long term capital spending accounts, this external funding would most likely take the form of long term debt. (Because long term assets do not normally produce short term returns, the financing structure used to purchase these assets should also be appropriately long term.)

For these reasons, it is important to note that simply positive cash flow is not at all an indicator of low risk, especially during a period of accelerated capital spending and product development expensing. In most aspects of the analysis in this document, the nominal cash balances are compared to three-week cash needs to sense the proportions of liquidity risk and the probabilities of implied external financing need. If cash balances are indicated close to three-week cash needs, then financial risk is also indicated.

To help ensure that this method of analysis more accurately represents required financial decisions, and the risk of seeking additional external capital or internal efficiencies, two major assumptions are employed:

1. Short term debt accounts, and credit items are not allowed to rise above historical relationships, so the change in cash implied in the bottom line will more appropriately reflect incremental pressures to obtain credit. It is not simply assumed that additional notes or lines of credit will be arranged. There is some room for error in this assumption, however, because some automatic extension of credit is always implied when extrapolating trade accounts in relationship with sales. The relevant assumption in this portion of extension is that credit sources have allowed this relationship of credit to sales (and earnings) in the past, so they will allow it in the future. The analysis attempts to limit short term borrowings to existing lines of credit, but it is entirely possible that other projected levels of short term credit, although appearing automatic on the balance sheet, could implicitly require new negotiations of credit arrangements or opening of new sources of credit funds.

2. No new sources of long term funding are plugged into the balance sheet accounts. This allows a cumulative pressure to arise in the cash accounts to further highlight new financing decision pressures in one line rather than adjusting these pressures through all accounts assuming specific debt or equity issues and additional costs of capital. This method does not explicitly recognize additional financing costs in the proforma projections, but illustrations of the types of cost incurred under financing examples are provided in separate analyses. The proforma balance sheet, then, is a baseline from which to calculate the likely risks and financial pressures accruing from conditions summarized in the proforma balance sheets and income statements.

The basic objective of this type of analysis is the following. If financial need (and, therefore, one type of financial risk) is indicated by the projections based upon satisfactory historic operating characteristics, then any less favorable operating characteristics could only imply greater risk. Since financial risk was indicated by all projections run in this manner, it was not felt necessary to create balance sheet projections any less favorable than those derived from historical performance including the specific modifications already noted.

4.2.3.5 Limitations of this Type of Analysis - It is specifically acknowledged that proforma analysis focussing upon external financing needs does not automatically chart all of the very relevant financial risks a company could face. External funding need is only one form of measurable financial risk, and it is emphasized that significant risks can occur before any external financial need would be indicated. For example, if income is large enough to allow the purchase of new assets, it would not necessarily indicate an external financing need. But, if this same level of income caused dividends to drop, or even caused the growth in dividends to slow in periods of inflation, the company would be incurring substantial financial risk in its value of equity without any necessary external financing need showing up on the proforma projections. (See discussion of GM in Section 10.)

For this reason, it is necessary to evaluate other factors, such as equity value and the position of lenders in the companies, to fully characterize the risk environment. This analysis evaluates the income statements and balance sheets in other financial contexts to more fully characterize the important risks which will not all show up in the bottom line of the proformas. Specifically:

1. Dividends implied by the proforma projections,
2. Pressures on pricing implied by cost structures, credit structures, and asset structures in the forecast statements,

3. The long term influences of present spending on capital assets, and

4. The fact that even internal capital has a cost, and is not "free" to the corporation.

These issues are explored along with the proforma projections and in a number of other sections of this document.

4.2.4 Sources and Uses of Funds (Statement of Changes in Financial Position)

This set of documents actually represents a summary of the income statement and balance sheets, cast in a form which more accurately represents the availability of cash or credit for the required applications of business. It is entirely possible that the income statement can show a company making a profit, at the same time the company is lacking sufficient cash or credit to purchase necessary assets or to pay off existing credit. The sources and uses of funds statements and cash flow analysis more appropriately measures the company's financial position in this manner.

This analysis does not make projections of cash flow documents in the same manner as income and balance sheet documents, but, instead, constructs sources and uses summaries from the accounts projected in the income statements and balance sheets. All of the relevant cash flow measurements are contained in the income and balance sheet projections, and the sources and uses summaries merely recast these projections to show what funds are available from operations and what uses have been made of the funds in operations during the forecast period.

Because the funds flow summaries do not, in themselves, contain forecast assumptions, but rely upon assumptions and estimates contained in the other documents explained above, the funds flow statements will not be discussed in detail here. Again, the interested reader is referred to the general sources listed at the end of this section for further elaboration of funds flow statements.

4.2.5 The Importance of Cash Flow to Financial Analysis of Regulatory Actions

One measure of financial performance is so critical to the evaluation of the effects of regulation, and has been so consistently overlooked in previous analyses, that it demands specific attention as an item of discussion. This is the measure of a business's ability to generate funds or cash from operations in order to support the investments required by regulation as well as other business operations.

Many previous analyses of corporate finances have focussed on profits, or sometimes on revenues as measures of the corporate ability to invest in new plant, equipment, and product costs. This type of analysis sometimes includes measures of previous capital spending and previous spending on product development (R&D, engineering, etc.), in relationship to sales and profits, as an additional indication of the companies' financial capabilities. While these measures are indeed important, a selective interpretation of them does not at all indicate how much a corporation can spend, or when financial risk can increase to an almost disabling point. This section of discussion relates the importance of both profit and cash flow in a financial analysis, and shows how both must be interpreted together to fully assess a company's financial capabilities.

4.2.5.1 Profit - Profit is one measure of financial performance which indicates how much funding a corporation has left after it has paid operating expenses, financial charges such as interest, and taxes to the various governments involved. This financial measure is important, because it tells how well the corporation structured its operations, how well it controlled costs, how successful it was in selling its products, and, generally, how well it performed for the year.

Profits are also vitally important, because this is the only legal dollar amount the corporation has available from the year's operations to pay out to the suppliers of capital, the investors (shareholders). Dividends can only be paid from present or historic profits, and if a corporation is to remain attractive to its investors, specific provision for dividends must be maintained. This is especially important for the auto companies, because they are essentially mature corporations without capabilities of providing extensive growth to their shareholders on a percentage basis. Investors in the auto companies know that they cannot expect doubling or tripling of earnings on any systematic basis over the long term, so they will demand that a regular portion of the profits be paid to them in the form of dividends.

A number of analysts, and the auto companies, indicate that auto stocks, especially those of GM and Ford are compared by the investment community to the returns available on bonds or similar more stable investment instruments. If corporate bonds are returning 8 percent on investment, and the auto companies are only paying out a 3 percent divident yield, and both instruments are limited on their "price" growth for the investor, why should investors put funds into auto stocks? For this reason, the dividend payout is far from a discretionary item of expense for the auto companies, but, rather, it is a necessary cost of business, which can only be paid after taxes from profits. Because of this and other intuitively obvious reasons, profit is a critical measure of performance for these companies.

4.2.5.2 <u>Cash Flow</u> - <u>But, profit is only part of the financial picture, and except for its overriding importance, it is a small part of finances in dollar terms</u>. Much of the financial system of these corporations occurs off the income statement, in the area of <u>after-tax financing</u>. Once the corporation has paid all expenses, taxes, and dividends, it still must have many millions of dollars available to pay for retirement of debt (which is not recorded as an expense), to pay for capital assets (all plant, equipment, and tooling, none of which is allowed as an expense except in the form of depreciation and amortization), and for the buildup of a rather nebulous, but very real, investment in working capital. These items are all recorded on the balance sheet accounts, but it is not obvious in this form that they behave almost as recorded expenses on the income statement, unless one performs a series of sources and uses evaluations upon the balance sheet. To illustrate the importance of cash flow and to make its behavior a bit more obvious, the following sections highlight some of the important cash flow elements and problems.

There are two basic measures of cash flowing into a corporation during the accounting period: net profit, and depreciation (along with amortization in the case of the auto companies). Profit is intuitively easy to view as an inflow of funds. Depreciation and Amortization (D&A) are not so easily viewed as such. In general, D&A are accounting entries in the income statement which recognize that a company has "used up" a portion of its capital assets (plant, machinery, and tooling) to produce the products it sold that year. If a company purchases a machine that will produce cars for ten years, and the cost of this machine is $100 million, the entire $100 million will not show up as an out-of-pocket expense on the income statement for the year in which the cash was actually paid out for the machine. Since the machine will last for ten years and will produce cars for that period, in accounting terms only 1/10 of the machine was used up during the first year of production, so, the company is allowed to deduct only $10 million from its revenues as a machinery expense in that year. This $10 million charge would be included in expenses every year for the ten years that the machine was in operation. (This assumes straight line depreciation.)

In subsequent years, the company would be deducting a charge of $10 million from revenues, but it would not be paying out this $10 million in cash for that year, so, it would actually represent an <u>infusion</u> of funds for the year; the company charged revenue for it, but did not put out cash even though an expense was recorded. Note, however, that the cash really did move out-of-pocket in the first year the machine was purchased, although the expense was only gradually recorded over ten years. (Readers desiring a more detailed explanation of depreciation and amortization should see the sources listed at the end of this section.)

If an analyst were to pay attention only to profits, he or she would miss the $100 million cash-out-of-pocket item in the first year of the machine's life, and then would not realize that the corporation actually had $10 million more cash available above and beyond profits in each of the ten subsequent years of operations. Because this after-tax financing is so large and such an important part of the corporation's financial health, it is entirely necessary to view profits not only as an important indicator of performance, but also as only one contribution to overall corporate cash flow.

The analyst paying attention to profits would not only miss the significant cash charges occurring off the income statement in the form of capital spending but would also miss the large amounts of capital consumed by an item known as "working capital". This is a measure of the current asset and current liabilities accounts on the balance sheet which should be viewed as a very necessary investment for the corporation, because this investment supports the ability to generate sales.

For example, the auto companies make many of their sales on credit; this is recorded in accounts receivable on the balance sheet. If a company sells $40 billion of products, and it makes 10 percent of these sales on credit, it has expended the labor, material, and overhead to make and sell these products, but it comes up short $4 billion in cash because 10 percent of sales were made with no corresponding cash flowing into the company. It has essentially "invested" very real dollars in the recorded sales until the credit consumer of these sales pays the credit bill. Since consumers tend to demand the same proportion of credit every year, as sales grow, so does the investment in accounts receivable. An increase in accounts receivable behaves like a charge against cash flow.

The same applies to repayment of debt. Paying off a loan is not allowed to be charged against income as an expense item, and, therefore, the repayment of debt is performed from cash flow after-tax, and off the income statement.

This is a simple, and not entirely complete description of the cash flow operations of a business, but it should serve to highlight the nature of cash flow and its importance to the financial capabilities of these corporations.

4.2.5.3 An Example of the Importance Of Cash Flow - One can see from the 1977 Summary of Changes in Financial Position for Chrysler, that the company earned $124 million from profit, and received funds infusions from D&A of $388 million, for a total cash flow from operations of approximately $512 million. Modifying this for other charges, the cash infusion from operation systems amounted to a net of $485 million. Chrysler incurred cash outflow charges for dividends, capital spending, and payment of debt which totalled approximately $882 million. This meant that cash flow from operations failed to cover these cash outflow charges to the amount of approximately $397 million. This was modified by adjustments in some balance sheet accounts in the amount of approximately $118 million, but it forced the corporation to seek external cash in the form of long term debt of $279 million. The importance of analyzing both profit and cash flow should be brought home by the fact that Chrysler was able to earn a profit of more than $124 million, but that inadequate cash flow forced them to seek external cash of more than $270 million. Simple profit analysis would have indicated a reasonably good year, but further cash flow analysis indicates quite the opposite, especially considering that the other auto companies were producing a much better cash flow pattern in the same market.

Cash flow is not only important for Chrysler. Because GM earns several billion dollars a year in profit, a number of observers assume that it can pay for just about anything it desires. But, further investigation into the elements of cash flow quickly indicates that the cash flow pattern, while still excellent, can be threatened or at least made more risky by the huge cash expenditures required to support a business of this size. The same applies to Ford's recent large profits. Cash expenditures of these companies will be much larger than profits in the coming years, so it is crucial to fully evaluate the cash flow portion of finances to evaluate corporate financial risk. (Note: the crucial differences between profit and total cash flow can be seen in the Section 10 Ford "Planned Versus Trend" 5 yr. Summary. The difference in profit is less than $2 billion, but the difference in cash flow is $5.2 billion.)

4.3 PREVIOUS METHODS OF FINANCIAL ANALYSIS, THEIR RELATIONSHIP TO THE BUSINESS CONTEXT, AND SUGGESTED REVISIONS AND ADDITIONS

The primary impetus to devising the financial methods described above was the recognition that existing methods of measuring regulatory induced risk and cost, while quite satisfactory for certain cost analyses, did not completely place the financial analysis in the business context faced by the U.S. auto makers. Any measure of financial risk or the financial effects of regulation which is removed from the overall corporate environment cannot fully assess the array of financial pressures to which companies will actually be subjected. While it is recognized that methods used in this document will still leave questions unanswered, it is noted that the proforma methods applied provide a structure which can more completely catalogue and account for the different types of risk which impinge upon corporate performance.

4.3.1 Current Methods

Background analysis for this document included a substantial review of existing costing methods used by several agencies to assess financial impact of regulation, and a review of industry responses within the context of these methods. It was noted that at several times, companies provided different methods, assumptions, and costs. It is the purpose of this document to attempt to more fully integrate the perspectives of industry and government in such a way that financial analysis can reflect the true needs and constraints of both parties in the regulatory process.

In previous financial assessments, financial impacts were measured in two groups: factors affecting "capital costs", and factors affecting "variable cost". In short, this method sums the "capital costs" necessary to produce a given number of units of the technology under consideration, and sums the additions to, or subtractions from, variable cost produced from this item of technology (such as "downsizing"). Both of these sets of costs are computed per unit and are used to estimate the costs of the changes to both consumers and companies.

If the dollar amounts used are properly constructed, this method does, indeed, capture many of the relevant costs involved in the regulatory process. However, the method does not fully consider some financial elements which may have significant impacts upon the corporation. The specific limitations inherent in this approach are the following:

1. Costs are calculated at one time and are assumed to remain steady for the duration of this technology. This does not reflect the fact that many of the measured costs, although classified as "variable" or "capital", are truly volatile over time and sensitive to the level of operations. These costs, when measured per unit, will not remain constant if sales turn down (or up), and, therefore, a static point estimate of costs can only realistically measure a present cost structure. A static point estimate of these costs, even if totally accurate for the year in which they are measured, cannot measure the impact of these costs as production volume changes (remember the original estimates are computed per unit, and per unit costs can vary by as much as 10 percent or more in any given year); nor can this estimate include the financial impact of the costs during a recession year, because the extension of costs into the future is not computed. (Depreciation, amortization, interest charges, the cost of invested capital---including internal capital---, all extend into the future beyond the initial point of investment, and this static estimate does not reflect this behavior, or, even, all of these costs. Again, see the "MARKET RISK" summaries of Section 10 to

see how volatility produces very different cumulative financial patterns.)

2. <u>The costs are estimated per "item of technology" which means that the measurements are not properly reflective of the actual operating structure of the business</u>. For example, the technological items "downsizing" and "weight reduction" are actually generic concepts, and do not reflect themselves in specific operating or accounting units of the companies involved. The single conceptual item "downsizing", for example, could involve changes in facilities, people, and processes in stamping plants, final assembly plants, engine plants, casting plants, central research staffs, corporate computer facilities, plant management staffs, component supplier operations, and a number of other operational sites. All of the involved facilities would incur changes in fixed, variable, and semi-fixed or variable costs, overhead allocation rates, and capital spending; all of these changes, if measured per unit, would be extremely sensitive to changes in production output.

   To accurately measure the costs of an item of technology, one would have to investigate the accounting at every facility to separate the costs of this specific technology from all other costs at that facility, and then, all costs would have to be aggregated at the corporate level, after sorting out all the costs of allocated overhead and transfer profits, to reach a "direct cost" of this item of technology. Even after this effort, the estimate would pertain only to that point of time, and would not be properly reflective of future economies or cost escalations, and would not measure the effects of these costs during a risky sales period.

   According to previous costing methods, this process would have to involve some separation of "business as usual" costs from "extraordinary" costs, and as was noted earlier in this document, that separation is subject to great uncertainty and interpretation.

3. The costs of technological items are removed from the corporate context when they are used to estimate the financial impacts upon the companies. The aggregated costs are compared to historical aggregate measures of revenue, profits, and previous capital spending to sense the impact upon the companies and their abilities to pay for the estimated new costs. This method cannot measure financial risk to the corporation because it does not estimate the ability of the company to generate cash in the year required for product expenditures, and because it does not measure the costs of any financing or the funds which are to be drained by other working capital investments or capital investments. (Working capital is not explicitly recognized as a consumer of funds, because the balance sheet effects of the implied spending are not part of the analysis.)

   It is entirely appropriate to compare planned expenditures with historical data to sense the ability of the firm to generate this overall level of spending, but this method cannot recognize the serious effects of simultaneous high spending and poor sales in a single year, which could prevent a company from even reaching a five year spending target.

4. Previous methods of financial assessment contain an implicit assumption derived from another area of analysis, impact of regulation upon the consumer. It is not the purpose of this document to comment upon the calculated costs to the consumer, but it is necessary to comment upon one aspect of consumer analysis which directly reflects upon assessment of financial risk for the corporation.

   Part of the impact upon the corporation has been derived from a method of calculation which relates increased costs within the company to a retail price increase to the consumer. This area of analysis is entirely necessary to public policy study, and it is not the intention of this document to comment upon the methods of consumer impact analysis. But, because this method implicitly relates to the corporate ability to pay for mandated regulatory spending, it is necessary to comment upon consumer costing as it relates to corporate market and financial risk.

In general, the costing method compares the corporate cost of an item of technology to benefits accruing to the consumer. For example, if an item of technology is estimated to cost $100 per car, but the fuel economy savings to the consumer are higher than $100, it is implied that the company can recover the cost of the technology in a retail price increase.

This method of analysis is entirely appropriate, but it contains an assumption in its present form which has the potential of distorting market and therefore financial risk. The assumption is that the consumer will <u>perceive</u> the present value of a stream of fuel savings over the 100,000 mile life of the car, and will simultaneoulsy translate this into the additional retail price he or she will be willing to pay.

The assumption can distort the affordability assessment if the consumer does not truly perceive the 100,000 mile stream of savings, or if other technologies, such as a catalytic converter, alter the perception of the stream of value. The method of analysis implicitly assumes that all items of technology have equal "consumer perception value" in relation to the dollar amount of cost, when, in fact, some items of regulatory technology, such as emissions controls or "invisible" safety features may not so easily translate to retail price increase.

Again, it is not the purpose of this document to comment upon the consumer impact studies, but because the assumptions applied in the retail price equations directly relate to financial risk, it is emphasized that methods of assessing corporate ability to pay should relate to cash flow generation abilities and to explicit market risks.

5. In addition, because the methods of analysis used to estimate cost recovery through pricing are not explicitly placed into the financial time frame of the business, it is possible for these methods to understate the financial risks accruing from sequential and accelerated introductions of new technologies. Because the cash flow of the business is limited in any single sales year, 10 technological introductions over ten years is a much less risky pattern of spending than ten introductions occurring in two years. A method of cost recovery analysis which treats items of technology as even partially independent events, can understate financial risk to cash flow, especially under recessionary conditions.

4.3.2 Suggested Revisions and Additions

While the analysis in this document does not itself fully achieve the desired objectives of the earlier cost analysis, that is, the incremental costing of single items of technology or single regulations, it does attempt to measure more fully the aggregate regulatory financial risks, including their pressures on costs. This has involved specific alterations and additions to previously used methods of financial impact analysis:

1. Costs are not measured in a static manner, which would distort the risks of future effects accruing from spending events, but, instead, are measured in relationship to actual units of output, in order to more fully sense the volatility of costs of regulation and the increased risk they induce in bad sales years. This differs from previous methods which assume no changes from planned project volume in year one of spending.

2. Estimates of capital spending and expensed product development costs are treated according to the actual accounting conventions which dictate corporate behavior and financial performance. Capital spending is not considered as a fixed investment over a fixed production volume, but is recorded as an addition to the asset accounts and as an adjustment to income through the accounting media of depreciation and amoritzation. This appropriately extends the costs of present spending into the future to show the future effects of present spending, and to show how this can produce significant risk in single bad sales years. Product development expenses are not summed as investments, but are expensed as they would be on the corporate books to more accurately characterize the cost pressures as they would be incurred.

3. Working capital, which has not previously been explicitly recognized in its relationship to capital cost, is treated as an explicit investment necessary to business. This recognizes that items other than capital spending also consume corporate cash flow.

4. Corporate ability to pay for new spending is assessed in terms of aggregate pressures, which will be the ones most important for financial risk. This assumes that corporate cash flow is basically finite, given conditions of the marketplace, and, therefore, that incremental additions to spending can only reach this limit of cash availability. This does not measure broader costs and benefits, and does not assume that benefits pertaining outside the corporation relate to costs incurred within it when limits of spending are reached. The point of this document is to sense the increased spending and to define, within this context, the corporate ability to spend; the analysis represents a corporate analysis, not a national policy assessment.

5. The analysis in this document is not meant to specifically predict consumer behavior, but it does suggest that consumer behavior will be crucial to financial performance. The effects of negative consumer behavior are therefore measured in terms of declining sales to illustrate the effects of such resistance to purchasing, regardless of its motivation.

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5. COSTS, SPENDING AREAS, AND PROCESSES AFFECTED BY NEW REGULATIONS

5.1 INTRODUCTION

Section 4 discussed the general financial analysis applied to the auto companies in this study and reviewed several of the methods used to assess financial performance and the effects of regulation. This section describes some of the most important financial areas which will be affected by pending regulations, and provides some estimates of the costs implied in these effects. In addition, the section discusses some of the major cost components included in the proforma analysis in later sections, indicating how these cost estimates were derived and how large they can be expected to be.

In general, there are three major cost areas which will be directly or indirectly influenced by regulations concerning fuel economy, safety, and emissions:

- Operating Expenses,
- Product Development Expenses, and
- Capital Spending

In addition, there are strong indications that a fourth area of costs, financial charges, will be directly affected, because there is a great likelihood that several of the automakers will have to seek external financing to provide the necessary funds for the above-mentioned costs and spending. For example, it is clear that Chrysler has already incurred significant financing charges in the form of preferred dividends on their recent stock issue (in addition to the necessity of selling their European operations), and that these charges will continue to mount as the company invests in new facilities and technologies. This area of costs will not be treated specifically in this section, but will be described more fully in the last several sections of this document.

5.1.1 Operating Expenses

Previous analyses, issued by government and industry sources, have differed in their interpretations of the regulatory effects on operating expenses. For example, previous government research reports have indicated that downsizing will reduce variable material costs because lower amounts of steel will be used to make the same number of cars. The auto companies have suggested that this is not entirely true, because simultaneous material substitution, for example, will increase variable material costs through the use of a more expensive aluminum in place of the less expensive steel.

This report does not purport to resolve this conflict, but it has been observed that, at present, the efforts of downsizing and other design changes have not substantially reduced or increased variable manufacturing costs as displayed on the corporate financial records. It appears that inflation in material costs, and the sensitivity of operating costs to sales volume are the primary influences on variable operating costs. For this reason, the methods of analysis in the report assume that the operating costs of labor and materials will remain roughly consistent with history in their relationship to sales. Adjustments are made only for explicit influences of inflation and volume changes on this set of cost accounts.

However, it has been noted that other operating costs, primarily those which behave in a more fixed manner, have been increasing recently and can be expected to increase more rapidly as new products and technologies are developed. For example, depreciation and amortization, if viewed as operating costs, are definitely on the rise and will be rapidly increasing as new capital spending increases for plant, equipment, and special tooling. In addition, there appear to be increases in other cost areas, primarily in the apparent fixed cost bases of the cost of goods; these have also been factored into future projections of financial performance by including a higher fixed cost base in cost item calculations.

Some of these cost increases obviously reflect inflationary pressures on the costs of labor, services, insurance, and other expenses, but the growth in these cost accounts is often higher than the nominal rate of inflation or the growth in output. This suggests a truly higher cost which could be the result of increased maintenance, greater stationary pollution control requirements, and similar increases in the cost of manufacturing and selling vehicles. This document does not attempt to attribute precise regulatory influences to these cost items, primarily because other costs enumerated below are more directly attributable to regulation and have much greater consequences in the form of financial risk. Suffice it to say that the increases in manufacturing operating costs are appropriately considered in the general proforma methods used.

5.1.2 Product Development Expenses

This area will be significantly affected by new regulations, because fuel economy, safety, and emissions standards will force the design and marketing of many new products and technologies. The companies have indicated that historical financial data on these costs will not be applicable to future projections of financial performance, because so many new developments will be forthcoming.

Considerable definition is required for discussion of these costs, so, in addition to the general definitions discussed here, Section 5.2 contains rather lengthy surveys of these costs. Product development costs involve both capital spending and annually expensed cost items, although for the purposes of this analysis, the two elements will be separated for discussion and evaluation because their financial behavior is very different.

It will be remembered from Section 4 that capital spending for plant, equipment, and special tooling is an after-tax charge to cash flow, not a direct charge to income for the year. It should be noted here that other components of product development spending are expensed annually, but are not considered operating (manufacturing or selling) charges for the purposes of this analysis. These annually expensed product development costs are not considered to be operating charges because they do not help produce or sell vehicles in the year they are incurred, but, rather, are incurred to develop products which will be sold after these costs are incurred.

The relevant annually expensed costs are the following:

Product Planning,
Design and Styling,
Engineering Planning (product and process),
Research and Development (both primary research and product-specific research),
Pre-production, and
Launch.

As mentioned in other areas of this analysis, these expenses are quite significant in any given year. For example, in 1976, Ford and GM each spent more than $1 billion for research and development, or approximately 2 to 3 percent of worldwide corporate sales. Increases in these product development accounts are vitally important for financial performance, because the costs are not used to produce products for the year, and, therefore, their effects on profit for the year are immediate and not related to sales for the year. In a year of slowing sales, these expenses directly reduce profits, because they are being incurred for future product development, which from this year forward will be dictated by a regulatory schedule. Ford's profits are in the neighborhood of 4 percent of sales, so it can be easily seen that any fixed cost which is three percent of sales in a good year, can have a significant influence on profits in a bad year.

It should be noted that the proforma estimates in this analysis contain specific adjustments for the above-mentioned product development expenses, but that they have been derived from a combination of historical data and publicly available company statements and are, therefore, factored into several different cost accounts. It is expected that new information will be issued by the companies in the latter part of 1978, and it is entirely possible that the revised estimates will be larger than those implied in this analysis. It is emphasized that this in no way detracts from the conclusions of this analysis, because _if financial risk is indicated by current product development expense estimates, this risk can only increase with increasing estimates of cost_.

Section 5.2 discusses product development expenses in considerable detail, including estimates of their magnitude in representative cases.

5.1.3 Capital Spending for Product Development

This area of financial performance will be most dramatically affected by regulatory standards, and it represents the most serious area of financial risk facing the auto companies. It is once again emphasized that this is a cash flow item, and that it has great importance for a company's survival. For example, Chrysler has already undergone radical changes in order to meet the first 18 months of its planned capital spending program. This has included the sale of an expensive preferred stock issue, the borrowing of many millions of dollars in foreign capital, and the pending sale of its entire European operations to Peugeot. Such are the consequences of a "cash flow crunch."

Capital spending for product development includes the purchase of the following items:

Any new buildings,
Basic renovations to existing structures,
The purchase of new machines,
New tools used in manufacture,
Transportation equipment,
Land,
Equipment for heat, light, power, or ventilation, and
Pollution control facilities.

Any time a product or technology is changed or introduced, spending is incurred for almost all of these items, with the exception of land and new buildings which are only purchased when absolutely necessary. Because government regulations will require many new products, technologies, and items such as stationary pollution control facilities, the capital spending efforts of the four domestic manufacturers will more than double for the next several years, with the possible exception of AM and Chrysler whose business futures are not entirely certain.

This analysis relies primarily upon company statements of planned capital spending for use in the proforma projections. It is emphasized that these estimates have been revised by the companies several times during the past year, and that they are still subject to uncertainty and modification. The most recent change in these estimates increased the aggregate five-to-eight year estimates by more than 40 percent, so, the volatility of these accounts should be kept in mind. This volatility reflects the fact that capital spending is extremely risky and must be constantly evaluated by the companies as available funding and market fortunes change. It should also be noted that pending regulations which are constantly revised or recalculated have a noticeable effect on these estimates.

Capital spending issues and estimates are discussed in Section 5.3.

5.2 PRODUCT DEVELOPMENT EXPENSES

This section is divided into two major parts. The first part, Section 5.2.1, "Product Expenses Overview," is a general summary of the elements of product spending. The second part, Section 5.2.2, "More detail on the Product Development Process," is actually an expanded version of the overview which moves stepwise through a typical product development process to highlight more of the subtleties of this area of business.

5.2.1 Product Expenses Overview

5.2.1.1 Introduction - Product development has always been accorded a central position in the auto companies, because competition in new products is so strong that strategic survival depends upon the ability of the company to introduce new items to the market with regularity. At the present time, this area of the business is undergoing serious change because of the changing energy climate, and because of the increased amount of regulation of automotive transportation from a number of sources. Companies have indicated that current development resources are being strained and that all persons working in product development functions are facing tasks quite different from those faced in the past. Ford has reportedly increased its number of development engineers by approximately 15 percent in the past year, and the situation is similar for the other companies. As a result of the numerous pending changes, the product development process will receive heavy investments of money and effort.

The timing of this product development process is critical to successful corporate performance. Product development consumes much funding and requires the placement of long-term fixed assets, so, it must be carefully planned to match the firm's ability to generate cash from sales. If a firm spreads its product development too widely over time, it may conserve development cash in the short run, but it can hurt its ability to compete with fresh products and, therefore, damage its long run ability to generate cash. If a company is forced by competition, regulation, or other factors, to develop a number of new products in a short period of time, the company can be easily forced into a cash short position, and it would have to depend heavily on future successful sales or external funds to balance its financial position. The auto companies emphasize flexibility in their financing to protect against this type of product development need, and to guard against economic pressures on the system (such as a recession). Borrowing reserves can be used to cover these cash shortfalls, or, in some cases, a similar "equity reserve" can be maintained by careful balancing of debt and equity structure and express attention paid to dividend payout and growth.

The important point is that product development significantly influences the basic pattern of business and its financial performance. Any major changes in the foundation of the business will affect the entire corporation.

Corporate organization reflects this central role of product development; product planning groups usually contain people experienced in all functional areas of the business, (engineering, marketing, operations, finance); product designs are constantly reviewed for their economies and ease of manufacture; a "go" order for a new product often requires approval from the major functional units.

5.2.1.2 The Effects of Regulation - Because future fuel economy, emissions and safety standards cannot be met with existing products, the auto companies will be required to develop many new autos and trucks, new technologies, and new production processes. Some pertinent examples would be the downsized GM standard autos, the pending Ford Mustang/Capri products, the Chrysler Omni/Horizon, 3 way catalyst technology, the pending Chrysler 4 cylinder engine, various other new engine types being developed by GM and Ford, and new processes of painting to comply with stationary emissions requirements. Note that the development efforts do not focus solely on new car models, but rather on a wide range of product, processes, and research ideas.

5.2.1.3 The Auto Companies Viewed as Three Businesses - It is useful to view the single auto manufacturer as a combination of 3 different "businesses" each with a unique set of operating conditions and cash flow patterns and each affected by pending regulations. Financial needs are very different for each area. These "businesses" might be characterized in the following manner:

1. Research and Development. This is the business of finding and developing new technologies, product

applications, and markets. Primarily a labor and laboratory intensive pursuit, this effort does not consume the massive investment capital of manufacturing, but it does require significant human assets in skilled engineers and other personnel, and the size and skill of the staff can be a strong constraint on the rapid development of new product.

R&D can generally be differentiated into two classes of effort. One class relates to development of <u>specific new model projects</u> and would, therefore, have an immediately applicable end product. The other class relates to more <u>exploratory research</u>: new power plants, improvements in the combustion process, the use of new fuels and similar general areas. In the following discussion, R&D will be generally defined as product-specific, but it should be kept in mind that exploratory R&D will also have to increase in scope if companies are to meet future regualtions effectively.

2. <u>Design and Manufacture of Finished Cars and Trucks</u> - This is largely the business of designing and making sheet metal, handling characteristics, interior volume, and <u>all aspects of the car but engine and driveline</u>. This is differentiated as a "business" in this discussion, because its timing of product change is faster than the "engine and driveline" business, and because the two areas are often separated organizationally and financially. Capital and labor investment is high and design turnover fairly rapid. Most public attention is focussed here, because the finished auto represents the manufacturer's competitive entry in the market place, but it does not consume all of corporate development spending by any means.

In terms of product spending, this "business" has several levels of magnitude of development:

a. Facelift: does not consume severe amounts of capital,

b. Reskin: greater changes and some structural modification, consumes more development and capital spending, and

c. New Model: total change requires large spending on product costs and capital equipment.

3. Design and Manufacture of Engines, Drivelines, and Components. - This can almost be characterized as a separate business, because design and manufacturing costs are much higher per new design, and because the time frame for development and application is longer. Typically, engines and drivelines, in their basic configurations, are built to last through multiple major vehicle model changes, for perhaps as long as 10 to 12 years. Design of engine configurations must be done with foresight, because once the basic transfer and assembly lines are set in operation, changes are inordinately expensive. For example, changing a single transfer line requires that the concrete floor be ripped out and re-poured to exacting specifications. Any flexibility in production must, therefore, be calculated and tested well in advance of production to allow minor modifications without major changes through a number of annual model changes.

   It is crucial for corporate cash flow and long run survival that the engine and driveline "business" be carefully planned for long term strategic operations. Modifications or new developments forced in rapid succession can quickly consume large portions of corporate cash flow. GM has approximately 15 basic engine designs produced domestically (although this may result in many more vehicle-specific applications since a single engine type may have as many as 50 vehicle-specific configurations). The tooling and equipment to introduce 400,000 units of the new Chrysler 4 cylinder engine are estimated to cost approximately $200 million. Assuming that this cost applied to the 15 basic GM engines, many of which are V-8 engines not 4's, new equipment would cost at least $3 billion (assuming only one line per engine) and any plant changes would be extra. This would mean that the entire corporate worldwide capital spending for 1976 would be consumed to retool 15 American engine lines, leaving no money for maintenance, vehicle development, transmissions, or any other corporate capital project anywhere in the world. (Note that these 15 basic engine models may have more than 15 lines. Fifteen lines times 400,000 units is only 6,000,000 units but GM sells approximately 7,000,000 units in the United States and Canada). Obviously, the auto manufacturers must carefully space new development of engines, transmissions, and drivelines to avoid draining cash from the remaining operations which also require large amounts of funding. This is especially important given the fact that both fuel economy and emission standards will influence engines and drivelines.

5.2.1.4 Four Phases of Product Development -

1. Product Planning - The product planning function generally provides the new product ideas which the company feels will serve its strategic future. This group would generally be working with products planned more than three years into the future. They would evaluate future market characteristics and conceive product offerings to take advantage of the expected markets and possible moves by the competition.

Ford describes this product planning area in promotional brochures, and although their methods can be expected to be tailored to their vision of business, the methods they use should be generally reflective of the same function in the other companies. Ford's product planning staff contains people with a wide variety of skills. Recruiting literature suggests that Ford desires a unique combination of engineering, business, and design talents in people selected for the staff. These people are responsible for "reading" the markets, designing products with attributes appropriate to the market, structuring the manufacturing processes necessary to produce the product, and ensuring that all facets of the product/process combination are economically sound. When the product planning group at Ford completes work on a future product development, this design and process work is submitted to the rest of the company in the "Red Book" which contains the detailed styling, engineering, and manufacturing attributes of the product conception.

It is clear that this group of people requires intensive experience in the business, and highly professional training. The ability to recruit, train, and retain this staff can be critical to each company's product future, and can provide a strong constraint on the number of new designs and processes which can be introduced in a short period of time.

2. Research, Development, Design.- While the product planning group may be a distinct working group, the companies carry on many other future oriented product development activities at a variety of sites within other functional areas of the company. A survey of facilities in the Detroit area indicates there are separate development efforts being performed for product safety, performance and handling, new powertrain technology, environmental

and energy problems, manufacturing processes, and many other areas. Some of these efforts have distinct facilities and staff, others are integrated into larger technical development and design centers.

It is difficult to disaggregate the specific cost components of research and development, but it can be easily seen that spending in this area consumes significant funds. Ford indicates that in 1977 it spent $1.17 billion on its own research and development, or approximately 3 percent of worldwide sales. Note that this amount does not contain all the various expenditures for production engineering, launch cost, or other product development spending which will be described below. During the same year, GM spent $1.45 billion, or 2.6 percent of sales on similar research and development. (Note that it may not be proper to directly compare those figures of the two companies because they may classify accounts in a slightly different manner and may have different research needs.) The amount of skilled people required for this work is also significant, and represents a real constraint on the ability of the firm to develop new products. When one considers the fact that each of these companies may have a hundred different model designs, perhaps more vehicle-specific engine and driveline configurations, and thousands of market and regulatory design and performance parameters, it can be seen that major design changes determined by external environments can present a serious cost and management challenge. Ford, GM, and Chrysler all indicate that current engineering capacity is being strained, and that they are having difficulties recruiting the necessary numbers of skilled and experienced people. This suggests that even unlimited allocation of funds applied to R&D might do little to increase aggregate ability to get new designs into production, because the ability to produce is constrained by the experience level of the labor pool.

The product planning and basic R&D functions are probably the most centralized and general aspects of the product development process. That is, they produce the ideas and designs which are fed into the other two "businesses" of finished vehicles (bodies and interiors) and components (drivelines and engines). Once these designs are approved for final introduction, the processes become more specialized and expensive.

3. Pre-Production.- Once plans have passed through the earlier phases of product development, and final vehicle and process configurations have been approved and tested in the prototype stage, the new project moves into the pre-production phase. Although every new product has a unique method of pre-production, several general characteristics would apply in all cases. Pre-production tries to answer the question: "Can manufacturing economically build the vehicle R&D has given them, at appropriate volume and line speed?" In many cases, this involves setting up some form of pilot plant to test the new system. Actual tools (hand and automated) which will be used in final production are purchased and set up in the test plant. Selected employees are trained on the pilot line. In some cases, new skills are required and new people hired.

At stamping facilities a limited number of new dies and fabrication set ups are made or purchased to supply the test assembly plant with parts for the pre-production test vehicles. For a September model introduction, this process will be in operation during the preceding spring. Small numbers of new production tools are also purchased to test their application for final production.

At assembly facilities, new assembly equipment, including hand tools, is installed to replicate the planned final production set-up. Process plans are translated to work station designs, and the line is "pre-balanced" to design specifications. At this point, workers are trained and the line begins to slowly produce pre-production vehicles, using parts from the stamping and subassembly facilities. These sample runs are used to calibrate all processes, tools, and systems, including painting, trim, chassis, and driveline attachments. Equipment vendors are usually involved in the process, and some modification in vendor tooling may be required to correct any deficiencies.

During this pilot testing, the actual final production facilities are being prepared for acceptance of the new designs, and large amounts of funds are being spent. By the end of the pre-production phase, the final assembly plants will have been set up and calibrated to run at slow speeds, and the stamping plants will have received the full complement of dies for the new models.

Pre-production consumes perhaps the largest amount of product development funding, because it involves installation of the heavy production equipment. In some cases, vendors are paid on a percent of completion basis prior to pre-production, so actual cash outlays would have started earlier in the product development process.

4. <u>Launch</u>.- The launch phase begins once the assembly and stamping facilities have been fully equipped for production and have been set to run at slow production rates. Launching encompasses the period of time it takes to bring the lines from pre-production speeds up to standard operating speeds.

Significant costs are incurred during vehicle launch with a variety of components:

a. <u>Labor</u>. Plants are run with full compliments although few vehicles are being sold. Often, the workers are on overtime owing to training and inefficiencies.

b. Materials. Direct material goes into vehicles, with a large amount of wastage owing to scrapped cars, poorly assembled parts, broken parts, etc.

c. Overhead Full heat, light, power is being used while few cars are sold.

d. Extra Transportation Charges. Because the system flow and inventory procedures may not be entirely operational, there are often costs associated with specialized transportation and handling of materials.

Launch costs are significant on a daily basis, and can run as high as several million dollars per day for a specific new vehicle. Bearing in mind that this is not entirely production for eventual sales, it can be seen that even minor delays or inefficiencies in the launch process can be directly reflected in profits for the year. Increasing complexity of new design produces a strong increase in launch costs. The launch cost for a reskin can be 2 to 3 times higher than for a facelift, and the launch costs for a new model (body only, assuming no engine change) can easily be 3 times the cost for a facelift. Launch costs are different for a body change and an engine change, with the engine producing a higher cost, and when a company introduces a new body and engine at the same time, launch costs can be more than double those for a body change.

5.2.2 More Detail on the Product Development Process

The following paragraphs describe two different product development processes, one for the "finished vehicle" business, dealing primarily with bodies and interiors, the other for the components business dealing primarily with engines and drivelines. Steps in the product development process will be elaborated for a "typical" project in each area. It is important to note that the development problems and costs associated with each project will be different because of the different natures of the production processes, the differences in project complexity, and the different time horizons applicable to each of the development areas (finished vehicles change more rapidly than engines and drivelines).

5.2.2.1 Bodies and Interiors (Finished Vehicles)

5.2.2.1.1 Level of Intensity.- It is appropriate to divide the development of finished vehicles into 3 levels of intensity of change.

1. Facelift: This would be a relatively minor change involving lights, grille, bumper, interior layout, soft trim, and minor bodywork. Typically, this would apply to the model year after a major new product introduction, or a major product change. (For example, the changes performed on the 1977 Impala to produce the 1978 version would represent a facelift.)

2. Reskin: This would allow the basic model design to be retained, but would involve more extensive design changes, primarily in major sheet metal and perhaps even in window placement. The change from the 1978 Pinto to the 1979 model could be thought of as a reskin, because basic model design remains the same while significant changes are made in the hood, fenders, and other major body components.

3. Major Model Change: This would involve a complete change in basic model design, although it does not necessarily require a totally new engine and driveline set up. The Omni/Horizon is a major new model, although Chrysler was not forced to design a completely new engine (they purchased an existing VW design). The 1977 Impala represents a major change although many of its engines are existing basic designs. In some cases, such as the pending Ford Erika project, a new model will also contain an entirely new engine/driveline configuration, but the important point is that a major body revision often occurs apart from basic changes in engine design. Engine/driveline development must be planned to allow for many model

changes around the basic drive components over a period of years.

5.2.2.1.2 Financial Effect of Regulatory Environment.- From a financial viewpoint, these levels of intensity are critical. If a company suffers financial pressure in the market place, its ability to introduce major revisions will be constrained. During the recent recession, Ford indicates that it had to shelve several planned major developments, because capital funds were simply not available. The new regulatory environment impinges directly on this financial area in two ways:

1. Product development spending is now geared toward meeting a regulatory schedule (economy, safety, emissions), which is independent of market forces. Spending must continue despite possible recession conditions or consumer resistance if regulatory requirements are to be met.

2. The amount of development capital is limited by the market. To the extent that money is spent on new methods of painting (stationary emissions), it cannot be spent on styling changes. While styling changes can obviously be incorporated into some regulatory spending such as downsizing, much money must be spent on internal design such as crash beams or emissions controls which may not be perceived as valuable by the consumer and, therefore, may not be recoverable in prices. This is the second financial risk being imposed on the body/interior end of the business; development capital must be employed in many areas which may not be visible to the consumer.

5.2.2.1.3 Phases of Development.- Whichever level of intensity is being introduced, each change must pass through a four stage process before the change reaches the market. These four stages are as follows:

1. Planning. Market and environmental analysis indicates the appropriate change and configuration. (2 to 3 years before the change is on the market.)

2. R&D. Styling and design engineering is finalized. Prototypes are created and tested at the proving ground or on the street in some cases.

3. Pre-production: Final design is chosen and production methods are developed. This usually involves a pilot plant arrangement, and equipment installation in final manufacturing facilities.

4. Launch: Once the production configuration is installed in the site of final manufacture, much effort must be expended in getting the lines up to operating speed.

The bulk of product development spending (both capital and non-capital spending) is contained in the last three steps of the process. Dollar amounts will differ according to the intensity of change, and it is important to note that minor delays and variability in engineering performance can cause major changes in dollar expenditures.

The following sections offer a step-by-step illustration of the processes, time horizons, and some costs of putting through the three levels of change for each phase of the development process.

A. PLANNING

1. Facelift: The planning for a facelift would generally be minor, and would usually be part of the planning for a new vehicle or a major reskin. This type of planning would be primarily to keep the product fresh in a competitive market where other competitors would also be introducing newer designs.

2. Reskin: Planning for a reskin would be more complex than for a facelift, because basic structural design may be modified, and because major elements of sheet metal would be changed. Explicit planning costs are not available, but company spokesmen suggest that this could involve about 6 to 18 months of time for the relevant project design, engineering, manufacturing, marketing, and finance staff.

Each functional area would have to submit its ideas to the others and receive approval from each other before the final design was sent to production.

3. <u>New Model</u>: The major difference between a new model introduction and a facelift or reskin is that the range of development efforts involves every portion of the business, and, therefore, the amount of early planning and development is significantly increased. Because the new model will be required to last in its basic form for 3 to 5 years at least, the groundwork design must consider all aspects of future performance including:

    - competitors' products,
    - economic environment,
    - government regulation (changes, additions),
    - other products within the company, and
    - supply constraints.

    Obviously, the planning task is much greater for a new model because more factors are being considered in the trade-off balance. When Chrysler produced the Omni/Horizon, they had to consider at least the following:

    - Market acceptance (completely new American design),
    - Loss of sales on Colt/Arrow,
    - Competition (VW, Honda and pending entry of other American firms into the subcompact market),
    - Lower profit, requiring higher sales volume,
    - Eventual manufacture of completely new engine and driveline,
    - Training of dealer force,
    - Lower margin to dealer force,
    - Ability to install options systems on small car (Will it fit the classic American marketing methods?),
    - Safety regulations (Will they force design changes in this capital constrained company?),

- Supplier constraints (Could they continue to purchase engines from VW?),
- Service problems (Will repair network be able to work on the new car?),
- Fuel economy (Profit/volume tradeoff: How many lower profit Omnis must be sold to allow sales of higher profit larger cars?), and
- Manufacturing constraints (the FWD concept had never been done by them in U.S.).

B. R&D

1. Facelift: Again, compared to more major changes, the incremental R&D for a facelift would be small. This would involve new styling and mock-up designs, new stamping designs, and, perhaps, minor changes in the production process design to accommodate new sheet metal or interior configurations.

2. Reskin: Depending upon the severity of change, the various R&D staffs would have to work out prototype vehicles and process plans which would be significantly more complex than those needed for a facelift. Company spokesmen indicate that the amount of testing is significantly higher for a reskin, especially if structural members or major aerodynamic configuration, for example, are involved in the design change. The difficult trade-offs between market acceptance, design cost, production capability, and regulatory criteria will all be more extensive under a reskin program.

3. New Model: With so many new technological innovations and design changes, the styling, marketing, and production development essentially starts from scratch. While R&D for a facelift or reskin could take approximately 12 to 18 months, company spokesmen indicate that even with greater application of personnel (more people involved) the R&D phase of a new model would require approximately 24 months. Again, specific R&D costs are not publicly

available for a major model change, but the increase allocation of research personnel and the longer lead times insure that the R&D cost would be significantly higher than for a lesser change.

C. PRE-PRODUCTION

1. Facelift: Even though planning and R&D might require a smaller effort for a facelift, the pre-production costs can run into several million dollars for a particular model. Because factories would have to be re-fitted, the expenditures in production engineering time and in capital equipment would be incurred, no matter how small a planning or research effort was required. New stamping dies for sheet metal would be purchased or made in-house, details of robot configurations would have to be changed, and new tools would often have to be purchased. Workers would have to be retrained to assemble slightly different parts, and some parts of the production flow might have to be altered.

2. Reskin: The pre-production engineering for a reskin is more extensive than for a facelift, because not only must stamping dies be changed, but also large process changes often must be made in the assembly plants. Work stations must be re-defined, robot configurations changed, inventory and subassembly spaces modified, and more workers retrained. In many cases, greater use must be made of the pilot plant concept, especially if new machinery is to be installed in final assembly plants. New hand tools must be purchased and custom fitted to the new vehicle applications. Calibration runs in both the pilot and final assembly plants take longer and lines must be run at slower speeds, which significantly alters later launch costs because the launch process has a longer line speed increase to accomplish before standard rates are achieved. During a reskin, production facilities may experience longer downtime for changeover, thereby incurring greater

lost sales, or requiring greater investment in inventory during the close of the production year.

3. New Model: For a new model, the production system must be essentially re-built from the ground up. In the stamping facilities, not only must exterior sheet metal dies be changed, but also complete structural changes dictate that almost all stamping dies be changed. In the assembly and sub-assembly facilities, work stations are re-defined, line lengths are changed, major inventory and sub-assembly areas are changed.

D. LAUNCH

1. Facelift: Launch costs would be incurred primarily in two places: stamping plants, and assembly plants. Launch costs would be small in the stamping facility because the basic production process would not be changed. Pre-production costs here would be incurred for shutting the plant down, purchasing or making dies, and installing the dies. Launch costs in the assembly facility, however, would be higher, because even small process changes require re-setting the entire assembly line. General company statements indicate that on the typical assembly line, the launch cost time for a facelift (time at sub-standard production rates) could be approximately 7 days, approximately equivalent to complete loss of 3 days production (see Exhibit 5-1 for general schematic). The total launch cost for the facelift would be the sum of changes for the number of plants involved. (See Exhibit 5-2.)

   It can be seen that even the minor adjustments to perform a facelift can cause considerable launch expense. Note also that launch expense is incurred entirely in the year of launch, so, if many launches occur in one year, or there is significant delay or inefficiency in any more complex launch, the resulting cost will directly affect profits for that year (as opposed to capitalized costs whose effects on profit will be pushed forward into the future).

2. Reskin: Exhibit 5-1 graphically illustrates the increase launch cost incurred during a reskin operation. Notice that starting line speed is lower and that it takes twice as many days to get up to standard speed when compared to a facelift. Lower starting speeds and higher launch time mean that the cost measured in lost full production days rises to perhaps 7 days of lost total production. Total launch cost incurred, however, can be higher than this measure indicates, because with the greater number of changes, material scrappage would be higher and engineering design miscalculations could have greater impact since more items would have been re-designed.

3. Major Model Change:

   New Model: As Exhibit 5-1 graphically indicates, the launch costs for a complete model change are significantly higher than for the two lesser changes. This results because almost all parts have been changed and because the assembly line will have been almost totally redesigned, usually requiring the breaking-in of a number of new machines and worker job positions. The cost figures estimated in Exhibit 5-2 are substantial, and could amount to as much as 10 percent of total product development expense for the new model. Note that these figures do not assume the introduction of new engines or transmissions, whose costs would be incurred in addition to those illustrated.

5.2.2.2 "Component Business" (Engine and Drivelines) - The product development cycle for new engines and drivelines is inherently slower than for new vehicle, because the cost of changing engine or driveline configurations is much greater. For example, Chrysler spent approximately $50 million to re-tool the Belvedere assembly plant to produce Omnis and Horizons, but a new engine line could cost $100 to $500 million depending upon the size of the line and the amount of brick and mortar to be changed.

5.2.2.2.1 Levels of Intensity.- Engine and driveline changes can also be conceived in three levels of intensity of change, although the distinctions between levels are harder to classify. In general, however, it is reasonable to envision the changes as minor, moderate, and new model.

1. Minor: An example of a minor change would be adding a new configuration of valve rocker arms to an existing engine. This would require changes in the stamping or forming plant which produced the rocker arms, slight variations in the machinery processes on the transfer lines responsible for cylinder heads, and revised tooling on the final assembly line, Although costs are very difficult to standardize for a minor engine change, some industry estimates suggest that a change of the magnitude described above could cost about $2 million per plant if tooling bits and gear drives had to be changed.

2. Moderate Change: A moderate level change could involve the limited re-sizing of an existing engine model. In this case, the basic block casting would remain the same, but bore size would be changed and the cylinder head would probably be modified. Piston size would be changed at the casting facility, tooling for block machining would be changed or modified, machining of cylinder heads would be changed, and final engine assembly and testing would be slightly re-configured. Depending upon the size of the engine line to be changed and the severity of the tooling change, companies have estimated the cost of moderate engine change to be in the $40 to $100 million range per plant.

3. New Model: This involves the complete construction of a new engine from theoretical conception through the installation of final assembly facilities, and it can range in cost from $100 million to perhaps $500 million depending upon the content of existing technology used, the

production volume planned, and the amount of brick and mortar construction involved. In pending new engine models, the cost of a new engine is likely to be near the higher level of the range because the companies will be devising and constructing new facilities for components such as aluminum manifolds and heads which involve new facilities and production processes.

Because of the magnitude of expenses involved, engine configurations must be carefully planned to allow useful investment lives through several stages of vehicle development and regulatory stringency. Miscalculations can be very expensive in terms of redesign costs and warranty charges.

The processes applicable to the components business are extremely complex and capital intensive. Description of the required facilities, even in outline form, is beyond the scope of this document, and the reader should see the TSC Source Document, "Materials, Labor, and Capital Requirements In the Automotive Industry for Implementation of Federal Motor Vehicle Regulations" for a more complete documentation of this area.

5.2.2.2.2 <u>New Product Development: Engines and Drivelines</u>.- The following description is only a brief summary of the financial implications of changes in the "components business" which is intended to illustrate the sources and magnitudes of some process changes in this sector. Only a new model project will be outlined, and it should be noted that minor or moderate changes would involve the same general step-wise process with a smaller cost at each step in proportion to the smaller increment of change. Again, we shall describe only an engine process, but approximately the same process would apply to drivelines.

A. DESIGN AND RESEARCH

Once the company decides that a new engine is required, the advance engineering staff begins work on a product which will satisfy a number of corporate criteria. Information from engineering, manufacturing, and marketing functions is integrated to produce a design acceptable in cost and market applicability. This design effort results in production of a prototype engine series which serves as the basis for launch and pre-production engineering. Industry sources indicate that the design phase usually takes a year to complete.

B. MANUFACTURING ENGINEERING

Once the prototype series has finalized engine design, the process of setting up manufacturing facilities begins. This phase involves a number of concurrent operations and associated costs including:

- Facility and tooling: design and purchase,
- Process design: engineering time cost,
- Installation of equipment,
- Launch Cost, and
- Pre-Production cost.

Note that in the engine/driveline sector of the business, launch and pre-production are sometimes reversed in order compared to body productions. The distinction in these terms may not hold for all companies, but it serves for description here.

1. Production System Design: Early in the manufacturing engineering stage, the production control system is designed. This includes analysis of vendor supply systems, optimization of transportation networks, and design of the various schedules for production at all levels from casting to final assembly. Depending upon the complexity of the project and issues such as plant location, this phase can require from 3 to 12 months.

2. Industrial Engineering: At roughly the same time, the manufacturing facilities are designed and evaluated for manpower requirements, practical capacity with different labor/machine configurations, and the labor content required for each operation. This results in a staffing

plan and specific designs for work station characteristics, and it requires perhaps 2 to 3 months of time.

3. Financial Assessment: Still during the early stages of engineering, the production staffs begin to explicitly cost out the developing processes and products. Detailed costing is performed in at least the following areas:

   - Labor: direct, indirect, by step and piece,
   - Material: by piece,
   - Inventory: optimum size and reorder, carrying costs,
   - Transportation: distance, amounts, methods,
   - Launch and pre-production; downtime and low efficiency, and
   - Overhead: support facilities, staff, power, etc.

   Cost determination also requires approximately 2-3 months to complete.

4. "Check-off": Once the early engineering, systems design, and costing have been performed, the relevant functional areas must sign off on the final production design before work moves into the actual production stages. Design, engineering, and marketing groups approve the final set up, and the operating groups begin full scale work. Manufacturing, purchasing, and other production-related groups obtain funds from the corporate treasury to set up the necessary equipment and inventories.

C. PRODUCTION

Once the project has been sanctioned in final form, actual steps toward full production begin on site. To this point, perhaps only 15-20 percent of total project expenses have been incurred, and the remaining funds will now begin to flow at a much higher rate. Vendor delivery of tooling moves into full swing, and large expenditures are made for site preparation. At the final engine assembly facility, floors must be recalibrated, power supplies and other service equipment are installed, and any brick and mortar additions are made. Expenses are incurred for materials and construction labor, and then for installation of tooling.

1. Launch: Once the production apparatus is in place, the plants move to launch status. Employees receive training on site, and the machines are put through their first test runs. Quality control procedures and equipment are calibrated, and final adjustments are made in the operating gear, usually with the on site cooperation of the vendor.

2. Pre-Production: Once the operating system has been set to run in a continuous cycle, the project moves into the pre-production phase. Plants are run at low volume to complete the training of workers and to optimize the various production systems, such as materials handling, quality control and testing, and batch changeover (switching production batches for different vehicle-specific engine applications). Industry sources suggest that this pre-production phase generally requires 30 to 45 days to complete.

   During the launch and pre-production phases of the project, launch costs are incurred because plant costs are near normal, but engines are not being produced for final sale at normal levels. These costs can be expected to vary dramatically in proportion to the size and complexity of the project.

5.3 CAPITAL SPENDING FOR PRODUCT DEVELOPMENT

5.3.1 Introduction

As mentioned in Section 5.2, capital spending actually occurs as an integral part of the product development process described in that section. However, because capital spending has a very different effect on finances, it is evaluated separately here. Capital spending influences cash flow in the year of spending, but its effect on income is only recorded through future years in the annual depreciation and amortization accounts. This produces several interesting financial effects.

Projects purchased with capital spending dollars are recorded on the books at cost, which means current dollars at the time of purchase. Because the company is only allowed to record subsequent depreciation and amortization of the capital project in those same dollars of cost, as inflation increases, depreciation and amortization lose their purchasing power, and, therefore, their ability to cover the necessary replacement of assets as the cost of assets inflates. This, in effect, means that the company must earn more than the simple amounts of expensed depreciation if it is to maintain and replace its asset base. During periods of accelerated purchase of new assets, this effect is somewhat countered by the accelerated depreciation schedules allowed on newly purchased assets, but this by no means solves the problem. Since inflation is not expected to go away in the foreseeable future, the constant and subtle drain on cash flow can be expected to remain.

Another effect of the capital spending accounting pattern is that capital investment in year one produces a stream of charges to income for many years thereafter. This means that the company which incurs a peak in capital spending will have to somehow price its products higher for a long period, even if capital spending declines. If it does not seek the price increase, its reported profit will decline, which affects critical items such as the ability to pay dividends. Although the effects of inflation somewhat mitigate against this price pressure, because sales dollars can be expected to inflate, the pricing effect is real and capital spending surges can distort cost/price relationships.

These effects do not occur in a vacuum, however, so recovery of capital investment is not a simple process of adjusting prices or seeking methods of gaining a higher return. First of all, prices cannot be simply raised without consideration of the competition and basic economic conditions facing the consumers. This places a greater burden on any competitor whose capital spending must increase out of proportion to that of its competitors. Chrysler is apparently in this position now. Its ability to earn is already lower than for GM or Ford, and the planned increase in capital spending is far above the amount which would normally be allowed by this ability to earn. The result shows up in the sale of Chrysler's European operations, its decision to subcontract the manufacture of components, and in the radically altered patterns of financing becoming so evident in recent months.

(A number of observers offer different opinions on the reasons for this current capital investment problem. Some say the auto makers have been inefficient and are only now paying the price. Others say that the amount of regulatory intervention has increased to the point where too much capital is "wasted." It is not the purpose of this analysis to resolve this discussion, but only to observe that the capital investment and ability-to-earn problem is very real and very immediate.)

The second reason that the solution to this problem is not simply a matter of increasing prices, can be shown by discussing the internal capital investment decision process. In general, capital within the corporation flows to the areas promising the highest possible return within corporate goals and long term strategy. As mentioned in other parts of this document, corporate funds flow through a central treasury, or equivalent body, which acts as if it were a company owned bank. Different divisions compete with each other for shares of this funding by constructing projects to meet corporate return requirements. In general, the corporation uses a "required rate of return" or "hurdle rate" to judge which projects will be funded. Projects which will provide the required return, or better, will be funded as funds are available; those projects which cannot meet this target will not receive as favorable decisions.

If projects were funded continuously below the required rate of return, overall corporate performance would quickly begin to suffer, as indicated in lower return on sales and investment. The process is really not this simple, however, because certain low return projects are required, no matter what, because the achievement of certain strategic goals or even the ability to survive may depend upon their being funded. For example, if a company was selling a product which was vital to the company's overall product line, but which essentially broke even on its own, the company might continue to put capital funding behind this product, because eliminating it might jeopardize a much larger sector of business. The single product would lower overall corporate return, but would allow other high return projects to survive.

This kind of subsidization, however, could not extend too far because then there would be no point in continuing business. It is the increasing amount of this type of subsidy which could hurt the auto companies, especially during the short to medium term (5 to 10 years). At this time, the auto companies are facing an increased amount of mandated "low return" capital projects. Capital spending will be mandated for a number of projects, including the following:

Stationary pollution control,

Some safety improvements in vehicles (side protection) bars, changes in internal structure, and similar items which are not immediately perceptible through visual inspection), and

Some emissions controls (air pollution is probably only visually or perceptibly evident to the purchasing consumer over a longer period of time. In fact, the first impression may merely be one of increased complexity under the hood.)

This analysis does not dispute the public policy goals such investments are intended to achieve, but it must note that these items are not the traditional selling points of motor vehicles, and, therefore, might not be immediately translated into a dollar amount most consumers would be willing to pay for a vehicle. In fact, the consumer resistance to the slightly higher cost of unleaded gasoline, and similar observable behavior such as the overriding of seat belt interlocks, would seem to partially support some theses of consumer resistance. Again, this is not intended to dispute the public policy issues involved, but it must be recognized that at least some financial risk accrues to capital spending whose returns might not be immediate. A corporate financial manager who ignored this fact would be remiss in his or her duties.

What this means, then, it that an increasing proportion of corporate capital funding will be allocated to projects which cannot be fully expected to meet corporate "hurdle rates." This further slows the corporate ability to generate funds, because if money is tied up in projects which will only pay for themselves out of "deflating" depreciation, there will be less money available to invest in high return projects, which could return not only depreciation, but higher profit as well.

It must be noted that some of these low return investments (such as stationary pollution control) are being specifically funded from low cost capital items such as local revenue bonds and tax incentives, but as these low return investments are increasingly applied to the vehicles themselves, increasing amounts of expensive corporate capital will be used, and corporate measures of return are placed at risk. If an investor can get a higher return in another industry, that investor might not be willing to implicitly invest in stationary pollution control or other items. (It would make more sense to put the money directly into the manufacturer of the pollution control equipment, which may not hurt the overall economy of investment but which would, nevertheless, have effects on the auto companies.)

It is the need to constantly recover capital which makes rapid increases in capital spending so risky for the corporations involved. Because this is a critical area of risk, it is important to illustrate the assumptions and methods applied to capital spending analysis in this document. The remainder of Section 5.3 describes the relevant areas of analysis and methods used.

5.3.2 Historical Spending and Projected Trends

Previous analyses of the automaker's capital spending were concerned with separating "business as usual" spending from the incremental amount required for regulations. While this document, as mentioned earlier, assumes that such costing is not productive for a variety of reasons, it, nevertheless, treats the topic of increased spending using a historical base of comparison. To sense what the increases might mean, and to assess the previous behavior of capital spending, historical analyses were conducted in a number of areas.

Capital spending was actually examined for a period of twenty-five years to sense how the basic operations of the companies might have changed and to decipher their financial requirements and decisions up to the present. Because the nature of the industry has changed radically since the early 1960's, especially in areas of import competition and inflation economics, most assumptions derived for this analysis were limited to capital spending behavior during the past ten years.

A number of analysts have commented on the importance of inflation in this type of analysis, and many previous documents concerning the regulatory impacts upon financial operations have taken opposing views on the interpretation of inflation. The auto companies have suggested that inflation will have a greater effect on future capital spending than it did on past capital spending. Some government studies have deflated previous spending amounts and have concluded that real spending is not so high as the companies have indicated. This document explicitly recognizes that inflation is important in evaluating capital spending, but, also, that it is easy to produce a variety of conflicting conclusions from the same set of data, depending upon how the effects of inflation are calculated and interpreted.

This document treats capital spending in dollars of the year of spending, and does not explicitly try to remove or explain the inflationary effects for a number of reasons.

1. Capital spending is used to purchase assets required at the time of their purchase, and the spending effects are immediately felt in cash flow of that year, also cast in dollars of that year. If a company had to issue debt or equity to meet spending requirements, this financial activity was dictated by dollars of the day, and produced its immediate effects in dollars of the day. If a

financial officer had to sell a $100 million debt issue to cover a capital item, it didn't make any difference at the point of sale whether 5 percent or 50 percent of this dollar amount represented the effects of inflation compared to some previous time; the money had to be obtained.

2. Inflation will continue to affect the cost of assets, but because capital assets will continue to be paid for only when they are actually needed, the capital spending decision will be dictated in dollars of the time of spending, and any capital which must be obtained will also be obtained in dollars of the day. The point of this document is not to suggest how many 1978 dollars will have to be spent in 1981, but rather to estimate what the financial pressure will be in 1981, in 1981 dollars, since that will be the relevant amount of pressure in that year.

3. Company estimates of capital spending already include nominal amounts of inflation. The companies are realistically considering how many 1981 dollars they will have to earn to pay for 1981 capital spending. From a long term viewpoint, the increases owing to inflation are important, because this provides some measure of the productive output a new dollar will purchase, but the emphasis of this document is on the <u>annual</u> hurdles a company must surmount, and, therefore, the entire set of proformas is inflated to approximate the dollars available to meet the already inflated capital spending amounts specified.

4. It is not intended to enter into arguments over what the "true" incremental regulatory pressure will be, cast in terms of "real" versus "only inflationary" increases. It is stipulated that a given set of assets will cost more in 1981 than it costs in 1978, and it is further noted that if the assets have to be purchased, the effect

of inflation in that year is largely irrevelant, except as it might affect the cost of external capital

Exhibit 5-3 shows the historic capital spending figures for the U.S. automakers for the past ten years; these amounts are displayed graphically in Exhibits 5-4 through 5-7. It can be seen that the dollar amounts are quite different between companies and from year to year. It can also be seen that the amounts have started to grow rapidly during the past year of the period.

Simple linear regression was used to characterize the trend of this spending pattern, which is used in other parts of the analysis to illustrate the effects of increased spending above this trend. It is interesting to evaluate some of the statistics describing this spending line. The R^2 statistics of the trend fits for the several companies are as follows:

Ford	R^2 = .383	(greatest residual errors recently as spending moves up)
GM	R^2 = .530	(greatest residual errors recently as spending moves up)
Chrysler	R^2 = .050	(greatest residual error at peaks)
AM	R^2 = .316	(greatest residual error at peaks)

These statistics indicate several interesting points. For example, they suggest that GM and Ford have the most regularity in their spending, possibly indicating a more systematically applied spending program, as well as greater integration of the production base. The residual error patterns also indicate that they are moving away from previous patterns of spending to systematically higher levels. (This could also proxy inflation, but the dollars are still flowing out at a higher rate than normal.) Chrysler's spending pattern is much more volatile, which indicates that this is a company that chooses to defer capital spending; when one views its profits and cash flow in conjunction with this spending pattern, it becomes clear that Chrysler has probably been <u>required</u> to defer spending, and, therefore, that the deferral of spending is more a matter of survival than of complete discretionary choice.

This indicates the increased risk the company faces when confronting a required spending line that cannot be successfully deferred in a bad year. AM's historic pattern is similar in residual patterns, which indicates that similar increased risk can be expected from any mandated higher and smoother spending pattern.

This indicates the critical nature of timing in financial performance. Chrysler's aggregate ten year spending amount is $4.7 billion, but it makes a very large difference whether this amount was spent in a smooth pattern or in a cyclical one. A smoothed capital spending pattern would have turned Chrysler's 1972 cash generation of approximately $190 million to a net cash drain of approximately $80 million, thereby possibly requiring increased debt, or at least a number of financial adjustments. That would have occurred in a relatively good year of profit generation. Of course, a smooth spending pattern would have probably induced extra cash generation in years when actual spending was high, but the point is that financial position is vital year-by-year, and a loss of financial flexibility can have serious consequences in a single year which may not be entirely surmounted in the following years.

Exhibit 5-3 also shows the extension of the 10 year trend into the future. In all cases, except AM's, it can be seen that planned spending, indicated in Exhibits 5-8 to 5-11 will be considerably higher than the trend pattern. (This also is indicated by deflated spending amounts, both historical and planned, so the direction of the lines drawn in current dollars is accurately representative of the "real" direction in capital spending. In the eight year proformas of Section 10, the capital spending amounts shown in Exhibits 5-8 to 5-11 are applied to the period 1978-1985.

5.3.3 Projected Future Amounts of Capital Spending

The capital spending fugires used in this analysis are the planned figures issued by the companies as of early summer 1978. These figures were revised upwards approximately 40 percent from previously lower levels announced by the companies in late winter 1978. The companies, and other analysts have indicated that the amounts recently quoted, and used in this document, could increase upwards again, owing to a variety of inflationary and product design pressures. This document does not inflate the existing figures any more than shown, primarily because the financial risk indicated by the current figures is already so strong, that any further increase in spending estimates would only indicate increased risk.

5.3.3.1 Ford - Ford indicates that it will spend approximately \$3.0 billion per year on capital projects between now and 1985. Roughly \$1.6 billion of this will be specifically allocated to North American operations, and it should be noted that they plan to spend approximately \$900 million per year in North America for expensed product development in addition to this capital spending amount. The remainder of the \$3.0 billion annual capital spending is expected to be allocated tc the overseas markets to maintain the investment required there.

5.3.3.2 GM - GM has announced that capital spending will rise from current amounts, projected to be slightly above \$4.0-\$4.2 billion to an average of \$5.0 billion per year by 1985. Announcements included in an Automotive News article (6/5/78), suggest that the total amount of capital spending will be \$38 billion. This suggests an annual average of \$4.75 billion, so for basic purposes of this analysis, the spending schedule was adjusted, as shown in Exhibit 5-9, to increase from \$4.2 billion in 1978, to annual spending of \$4.8 billion until 1985, when the amount was increased to \$5.0 billion. Note that expensed product development would be in addition to this amount, and that it was estimated that approximately 80 percent of total capital spending would be in the North American market. Note further, that this smooth capital spending line has also been adjusted in Section 10 to more realistically reflect GM's product planning schedule.

5.3.3.3 Chrysler - The Chrysler picture is not so clear at the present time, because the company is undergoing radical changes in its corporate structure. The announced product development plan totalled approximately $7.5 billion in the domestic markets, with approximately $3.7 billion of this amount to be capital spending. It was also announced that Chrysler expected to spend about $1.0 billion overseas on capital projects, and, therefore, the total capital spending amount used for the 1978 to 1983 period was $4.7 billion. Beyond that point, the total capital spending is less certain but the company indicated that it would be slightly less than $2.0 billion currently projected. Investigation into the timing of product development required to meet the fuel economy standards indicates that the Chrysler spending amount will probably not be uniform, but will produce a peak in spending around 1980. For this reason, the spending curve was adjusted to reflect higher spending in that year. The total amount could easily be higher than the amount indicated in 1980 in Exhibit 5-10, but the total dollar amount has been adjusted slightly downward for that year because that is the time the European operations are expected to be dropped and it was assumed that Chrysler would at least defer some spending then, even if the sale did not go through. This adjustment is by no means certain, but it should be noted that the amount of financial risk indicated by the present spending estimates is severe, and any further peaking would certainly not help the company at all. It is not expected that earning capacity will be increased by any more highly peaked spending, so any increase to the spending amount for any of the forecast years will simply fall directly to the bottom line and directly increase the funding need indicated.

5.3.3.4 AM - Estimates for AM are almost completely uncertain for the forecast period, both because the company's earning capacity is so limited, and because the ability to spend on capital projects will depend heavily on the exact nature of AM's operating arrangement with Renault. For purposes of this study, the amounts of capital spending announced in the June 5 issue of Automotive News, which suggest capital spending of $60 million per year, have been noted, but a general continuation of long term spending of approximately $100 million per year has been used for illustration in the simple AM proforma.

5.3.4 Disaggregation by Class of Assets

Because different types of assets, such as plant and special tooling, have different depreciation schedules, it is important to know how the capital spending will be divided. Historical analysis revealed that the proportions of spending were different for the different companies, and that there were annual variances which should be considered.

A completely accurate analysis of spending and depreciation should take every asset purchased, apply the appropriate depreciation rate and economic life to it, and then aggregate the result to the corporate level. However, because the outside observer cannot know all of these details, and because even asset classes are not always carried through their full economic lives, the sizeable portion of write downs and adjustments cannot be costed out to accurately reflect the depreciation of every asset the company purchases.

On a longer term level, however, this does not present much of a problem, because the amounts of assets purchased and the overall depreciation patterns are consistent enough to allow statistical interpretation, again with appropriate recognition of the variances built into the measurements. For each of the companies in question, it was found that classification of assets into Plant, Property, and Equipment (PPE) and Special Tooling (Tools) was sufficient to calculate the amounts of depreciation and amortization recorded in company financial statements. This classification is recorded in historic data, and the proportions of spending on each of the asset classes, while variable year-to-year, were consistent enough to allow a similar projection of proportions into the future. The specific behaviors for each of the companies are described below.

5.3.4.1 <u>GM</u> - For GM, it was found that proportions of capital spending spent on PPE were variable, and possibly cyclical with new model introductions, as well as with expansions in capacity. On the average, however, it was determined that approximately 53 percent of capital spending was allocated to PPE. This parameter has a standard deviation of 5.9 percent, and a standard error of estimate of approximately 4 percent of the mean. Because these statistics were not too distorting, this 53 percent figure was used to derive the projections of PPE spending. Please note that this could understate the level by as much as $500 million in any single year, although this is the largest historical deviation observed, and even if such a deviation should occur, it would only influence operating cash flow approximately $50 million for that year.

5.3.4.2 <u>Ford</u> - In the case of Ford, it was found that the historical averages were somewhat more consistent. Ford tends to spend approximately 60 percent of capital spending on PPE, with a standard error of estimate of only 2.3 percent of the mean average. These levels could change, but it is felt that the average assumption will hold well. This is somewhat confirmed by Ford's announcement that 60 percent of 1978 spending will be for PPE.

5.3.4.3 <u>Chrysler</u> - For Chrysler, the amount of capital spending allocated to PPE was somewhat more variable, and this variation can be expected to continue. The mean estimate was 51 percent spent on PPE, with a standard error of 4 percent of the mean. Because Chrysler's cash is stretched thinner, and because variations in PPE spending exert some leverage on the overall depreciation levels expected, deviations in this account are important for Chrysler. But, keeping this in mind, the analysis in this document assumed that average will hold roughly true.

5.3.4.4 AM - AM shows the greatest variability in this analysis, with a mean average of 45 percent PPE spending, and a standard error of estimate of more than 5 percent of the mean value. But, noting that other influences can easily have a greater effect on cash flow, it was still felt appropriate to use the mean PPE level for projection.

5.3.5 Depreciation and Amortization Rates

This area was also extensively investigated, because it will play a crucial role in the abilities of these companies to finance the required capital spending. (Depreciation and amortization are significant contributors to cash flow.) In addition to calculating the new depreciation from new assets, the increments of old depreciation which would be carried into the future were determined in order to complete the estimates of cost and cash flow.

The bulk of this task involved a series of computerized search efforts. Starting from company 10-K reports, the investigation considered several classes of variables: the proportion of asset classifications such as plant, equipment, and land; the chosen economic lives of these classes of assets; and the apparent methods of acceleration used in expensing these items to income. As noted above, it was discovered that write-offs or revisions of accounts could have effects on the reported depreciation levels, but because there is no regular pattern to these adjustments, and because the amounts of influence were not great, no assumptions have been made concerning future revisions.

Once these variables had been classified, they were subjected to automated search techniques to see what estimates might be appropriate for future use. It was discovered that for the long term, the proportion of plant assets in different categories was not especially critical to predicting the value of depreciation indicated on company financial statements. As a result, the classification of assets for 1976 were assumed to hold true, and the search procedure was extended into other areas.

Further analysis involved applying estimates of aggregate economic life and depreciation rates to each of the capital expenditures made by the companies for the past 20 years, or longer in some cases. A computer program was then used to generate depreciation amounts from these assumptions, and the values of economic life and depreciation methods were altered until the computer generated a stream of depreciation which approximated the actual amounts indicated in the financial statements. These estimates of economic life and rates were then used to generate future projections of previous capital spending and to calculate the depreciation rates for announced capital spending plans. The company-specific assumptions are described below.

5.3.5.1 GM - In the case of GM, the basic rate used is a form of 135 percent declining balance depreciation for PPE, with a 14 year aggregate life assumption, and a smoothing function including crossover to straight line rates at the point of depreciation break-even and a deferral of depreciation (50 percent of spending for 6 months). When tested against actual actual depreciation figures, this rate calculation produced the smallest amount of error. Specifically, it induced a cumulative error over the past 4 years of $200 million on a total depreciation of $3.6 billion.

5.3.5.2 Ford - The depreciation rate most accurate for Ford was a similar 135 percent declining balance rate, with a 15 year aggregate life and crossover to straight line rates at breakeven. This produced an aggregate cumulative error over the past four years of $55 million on a total depreciation of $2.1 billion.

5.3.5.3 Chrysler - In the case of Chrysler, the rate found most accurate was a similar 135 percent rate, with a life of 20 years and crossover to straight line rates. This produced a four year cumulative error of $8 million on a depreciation total of $622 million.

5.3.5.4 AM - AM historical data simply did not allow application of this computer estimation procedure, primarily because this company adjusts its accounts much more radically, and because it has been forced to reorganize both operations and finances many times during the past 10 years. For these reasons, and because the spending future of this company is so uncertain, the proforma estimates of depreciation simply use historical percentage proportions to project depreciation of plant and equipment. In general, this approximates a 135 percent rate, and an economic life of 20 to 22 years, when compared to the measures cited above for the other companies. It is emphasized that the proforma estimates for AM are not nearly as probabilistically sound as those for the other companies, and should only be considered general illustrations based on extension of historical averages into the future.

The process of discovering amortization of tooling was essentially the same, although this account is much more volatile than the PPE accounts. It was found that a simple three year straight line amortization produced the lowest cumulative error over longer periods of time, although this misses peaks and valleys in the amortization accounts. This is probably owed to the fact that special tooling purchases rise with new model introductions. Because most special tooling is off the books within five years, the cumulative errors produced by a largely straight line function of amortization will not be severe, especially if the amount of purchase is increasing, because tooling amortization tends to be effectively accelerated into the first three years after spending anyway. The greatest sort of error occurring from a three year assumption would derive if the proportion of tooling for engines was radically increased, since these are the tools most likely to be amortized over five year periods. In general terms, the three year straight line assumption tends to produce an aggregate 10 percent error in amortization over three year periods.

5.3.6 Sensitivities and Volatility of Capital Spending

In addition to the statistical uncertainties described above a number of other factors must be considered when viewing the capital spending futures of the U.S. auto producers. Research into specific items of capital spending revealed that the process is far from certain, especially when dealing with planned amounts farther than three years into the future.

This effort involved an extensive search of media files and corporate documents to list and cross reference any announced plans. A benefit of this search was that it produced greater insight into the complexities of capital spending decision making, as well as greater understanding of the general high risk nature of this corporate process.

Media accounts show that capital spending decisions often waiver "on" and "off" for as much as a year or 18 months after the companies make the possibilities public. This probably reflects the <u>constant need to plan around unfolding events and increasing risks of the various projects, and it does reveal the variety of forces which can act upon the company's ultimate placement of the project</u>. For example, the GM Shreveport plant decision was influenced for several months by decisionmaking within the EPA on pollution controls at the plant site, and there are indications that the decision was influenced even before that by several different municipalities who felt their areas could be the plant site. Chrysler's decisions on facilities for the new R-body cars evidenced similar fluctuations, most notably surrounding tooling purchases, possibly reflecting revised financial forecasts within the company as poor sales began increasing the funding risks.

Such examples show clearly that <u>individual capital projects are not only being evaluated on their own merits, but are part of a corporate complex of influences and uncertainties</u>. This further suggests that measuring costs resulting from single new facilities is difficult to perform in a vacuum, even for companies which have the most explicit internal information.

Capital spending plans are altered in a variety of ways, subject to management choices, even after plans have been apparently finalized in public statements. This means it is sometimes futile to aggregate a list of pending projects at any one time, and then explicitly extend their costs into the future. It may be entirely possible to evaluate the cost structure of a facility once it has been installed, at a given level of operations, but it is infinitely more misleading to take the announced cost of a facility and translate it into explicit product line costs at early stages in the lead time of new product areas.

For example, Ford is apparently seeking cuts in planned capital spending on its new line of cars currently designated "Erika," by purchasing finished transaxle assemblies from Toyo Kogyo in Japan. There is no explicit way of telling whether this will reduce capital spending plans announced six months ago, or whether actual expenditures on the planned project proved higher than the company anticipated thereby necessitating the capital saving move.

The exigencies of market and economic forces mean that capital spending is probably performed on somewhat of a contingency basis, and, therefore, that analysts need to be aware of the overriding dynamics of the capital spending situation rather than simply locking into estimates which could fluctuate within several months time. This does not make the analytic task easier, and much of the analysis in this document has been built around this variation by recognizing probable variances in any point estimate.

It is also clear that capacity and lead time of the capital equipment suppliers are critically important to capital spending plans. Order backlogs and the "waiting" lists of these suppliers have grown recently in anticipation of the projected industry spending levels. It appears likely that the automakers will request allocations of supplier's capacity even before final new product engineering configurations are worked out. This means the order backlog will also be subject to the variability in capital spending plans of the manufacturers.

Companies have indicated that it is sometimes difficult for them to estimate engineering costs on a proforma basis because early engineering assumptions have often proved to underestimate actual costs when new technology is finally put into production. If a component or process does not match earlier expectations, higher capital costs are incurred owing to crash program redesign. Such contingency redesign processes might easily become more expensive or even difficult to perform as supplier capacity becomes more constrained. When a company is re-designing so many products and basic technologies, this engineering risk translates directly into increased financial risk, because forecasts of capital allocation become less certain.

If this additional financial risk is incurred when a company has sufficient resources, the effects need not be more severe than a slight variation in profits. But if the additional risk occurs when capital resources are being strained, significant additional financial pressures will arise, directly owing to the risk and not necessarily to actually increased capital spending. This happens because financing cannot easily be obtained on an *ad hoc* basis, but rather must be secured in larger blocks negotiated with the various internal and external funding sources. For example, if the company will be allocating capital to risky projects, it must not only try to secure amounts commensurate with planned levels of spending, but it must allocate additional increments to cover the risk of additional capital spending for contingencies as well. In very simple external capital terms, if a company planned to issue $100 million in debt for capital spending, but was facing a probable risk factor for contingency spending which might influence the normal assessment 25 percent upward, the company would have to issue an additional $25 million in debt, thereby incurring additional interest charges to cover the additional risk, even if capital spending came in on target. (The increments of additional capital would actually be calculated by trading off the cost of carrying additional debt now versus the probable issuing cost of obtaining the $25 million increment at a later data. In a sense, some economies of scale might result in adding the increment to a large issue instead of issuing a smaller increment later.) Note that anticipatory borrowing is not at all desirable, however.

The same risk cost applies to working capital needs. If the company faces greater risk in working capital (poor sales and credit collection, outdated inventory, or similar pressures), it must sometimes negotiate higher lines of credit, and this can mean additional costs in the form of compensating cash balances, or service charges on the unused portion of short-term lines.

These general points on the explicit cost of additional risk are mentioned primarily because it has become clear that the high number of new technological processes contained in the capital spending list, combined with the greatly increased level of spending, has increased the need for all corporations to consider new risk portions of financing. It is also important to realize that the capital spending process can be quite dynamic and volatile, especially during periods of high risk and funding pressure.

EXHIBIT 5-1. GRAPHIC DISPLAY OF LAUNCH COSTS AT ASSEMBLY FACILITY

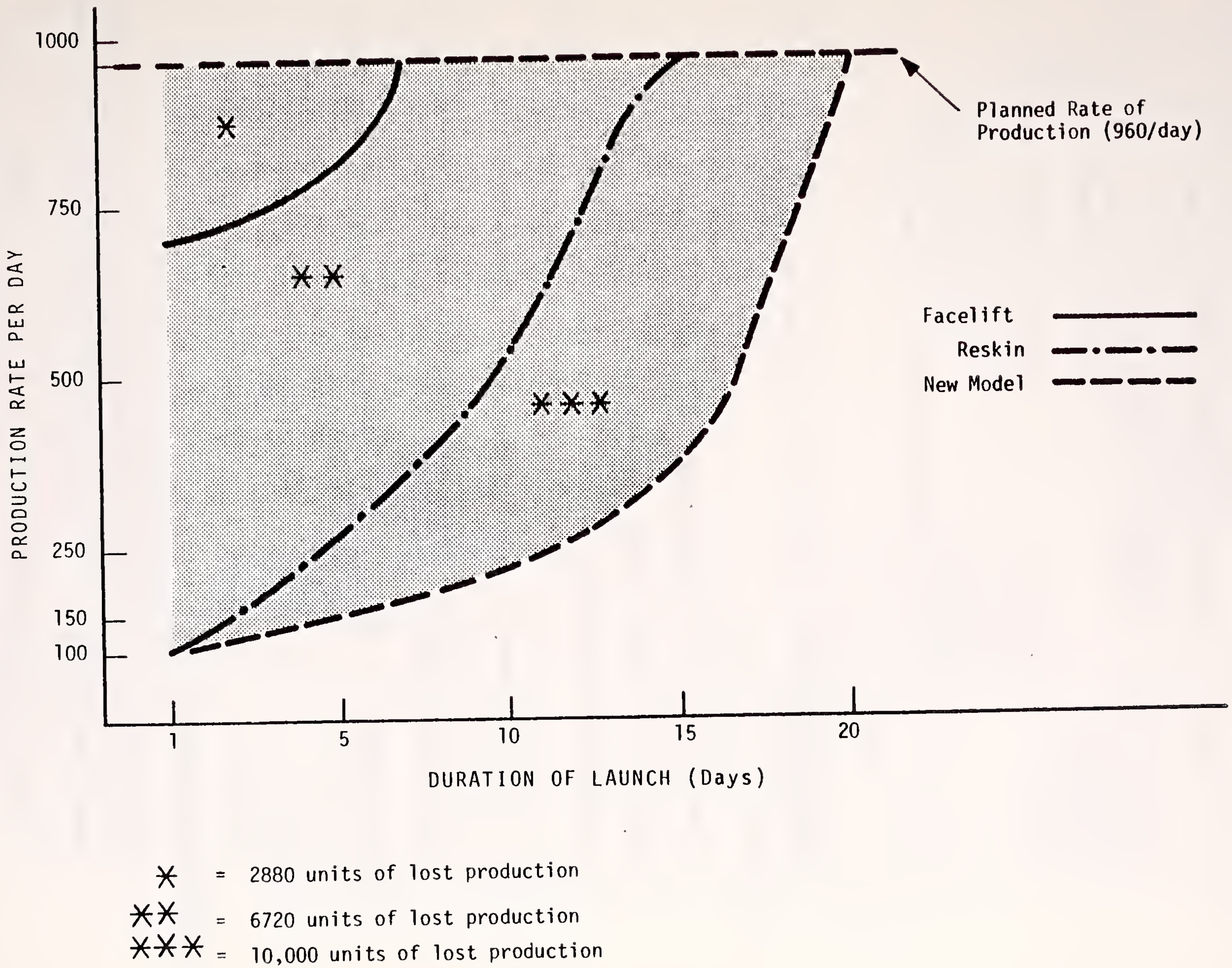


EXHIBIT 5-2. ILLUSTRATION OF LAUNCH COST USING CHRYSLER 1977 COSTS, AND EXAMPLE

1. Total Relevant Cost (assume no overhead allocation)

	$ million		
Cost, other than Below	$15,083	(assume 1/2 material)	$7,541 labor
Depreciation			165
Amortization			222
Pension			296
			$8,224

$8,224 million cost of producing vehicles, less material

2. Cost of production per unit

$$\frac{\$8{,}244 \text{ million cost}}{3{,}068{,}700 \text{ units}} = \$2{,}679 \text{ cost to produce one unit, less material}$$

3. Assembly cost per unit

Allocate total cost by proportion of assembly labor.

Assembly work force = 42% of work force.

Total Cost per unit ($2,679) x .42 = $1,098 assembly cost per unit, less material.

4. Launch cost, measured in units of production lost.

— Assume full cost of running factory still incurred during launch, so labor launch cost = unit lost x cost expended

Type of Change	Units lost	x	Cost/unit	=	Launch Labor Cost
Facelift	2,880		$1,098		$ 3.2 million
Reskin	6,720		$1,098		$ 7.3 million
New Model	10,000		$1,098		$10.9 million

<u>Another Perspective on the Same Costs</u>

— The company ran the factory during launch at a full cost of producing 960 units per day. Therefore, the out-of-pocket cost for the <u>Facelift</u> launch period was:

5 days x 960 rate x $1,098 cost per normal rate unit

or $5,270,400

EXHIBIT 5-2. ILLUSTRATION OF LAUNCH COST USING CHRYSLER 1977 COSTS, AND EXAMPLE (Continued)

Another Perspective on the Same Costs (Cont'd)

- But only 2 days of normal production or 1920 units (960 x 2) were produced for possible eventual sale.

- Therefore, only 1920 units x $1,098 cost per unit, or $2,108,160, can be recovered from sales.

- So,

out of pocket expense	$5,270,400
less, recoverable cost	(2,108,160)
Equals Launch Cost	$3,162,240

EXHIBIT 5-3. TEN YEAR CAPITAL SPENDING HISTORY, AND PROJECTED TREND

($ Million, Rounded)

YEAR	FORD	GM	CHRYSLER	AMC
1968	879	1,726	422	18.2
1969	957	1,907	647	46.7
1970	1,047	2,283	416	41.3
1971	1,039	1,643	250	27.6
1972	1,153	1,839	335	32.1
1973	1,486	2,104	629	68.4
1974	1,451	2,554	468	95.4
1975	956	2,237	384	89.4
1976	1,054	2,307	424	53.0
1977	1,762	3,645	723	46.9
TREND				
1978	1,503	2,985	533	78
1979	1,562	3,124	545	83
1980	1,621	3,262	557	88
1981	1,680	3,401	569	93
1982	1,739	3,539	580	98
1983	1,799	3,677	592	102
1984	1,858	3,816	604	107
1985	1,917	3,954	616	112
1986	1,976	4,093	627	116
1987	2,035	4,231	640	121
1988	2,094	4,370	651	126
1989	2,153	4,508	663	131
1990	2,212	4,646	675	136

EXHIBIT 5-4. GM CAPITAL SPENDING HISTORY

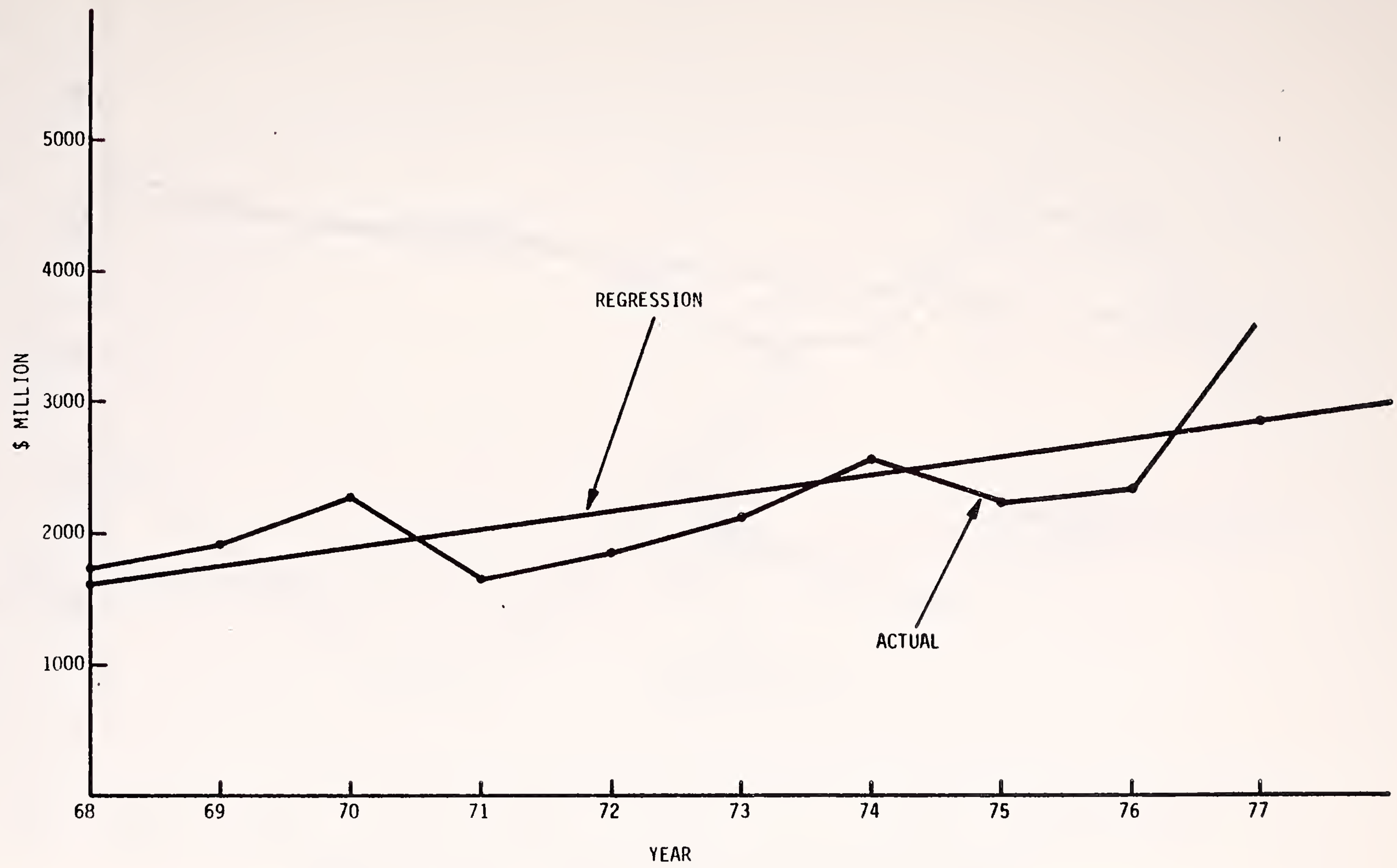


EXHIBIT 5-5. FORD CAPITAL SPENDING HISTORY

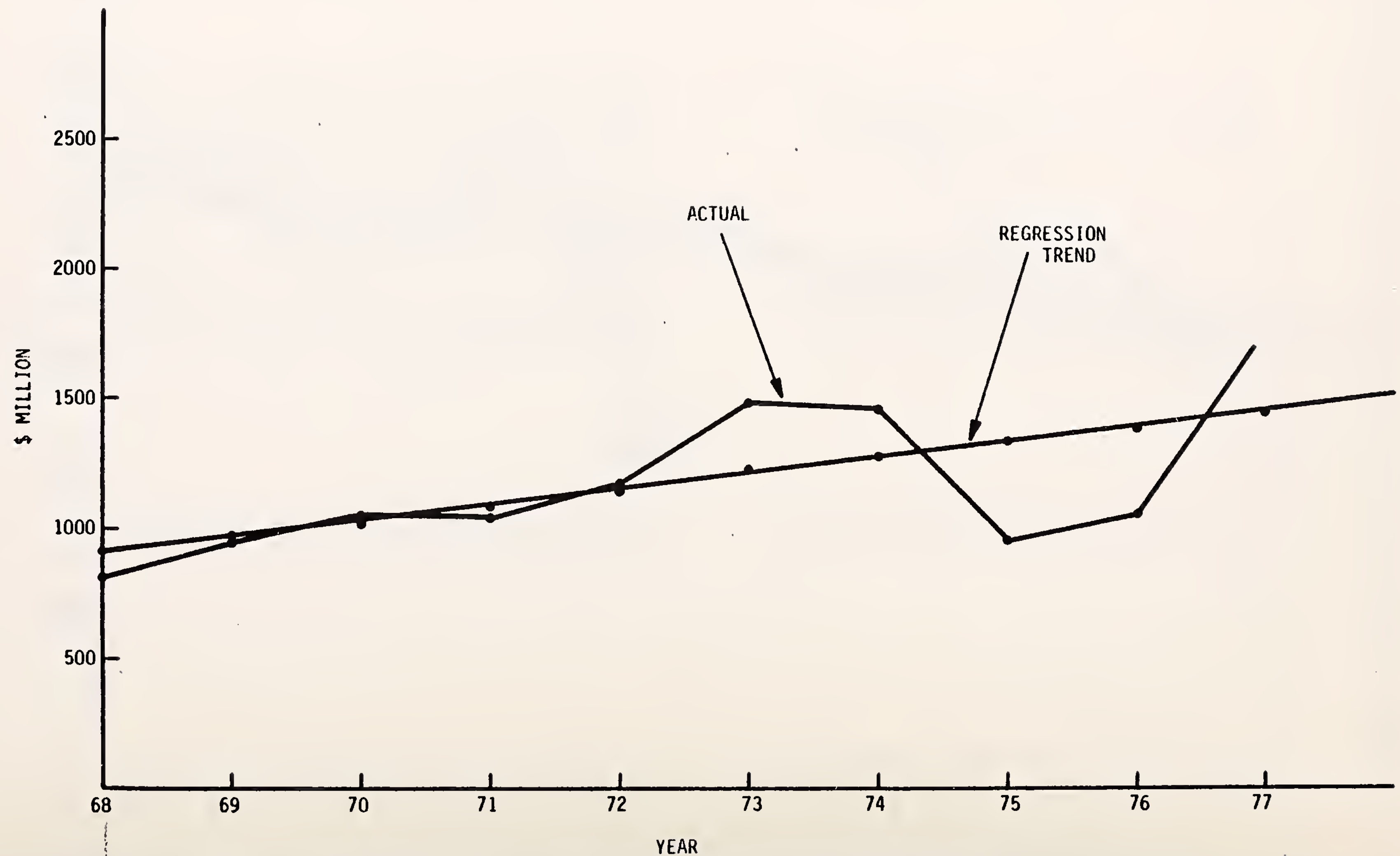


EXHIBIT 5-6. CHRYSLER CAPITAL SPENDING HISTORY

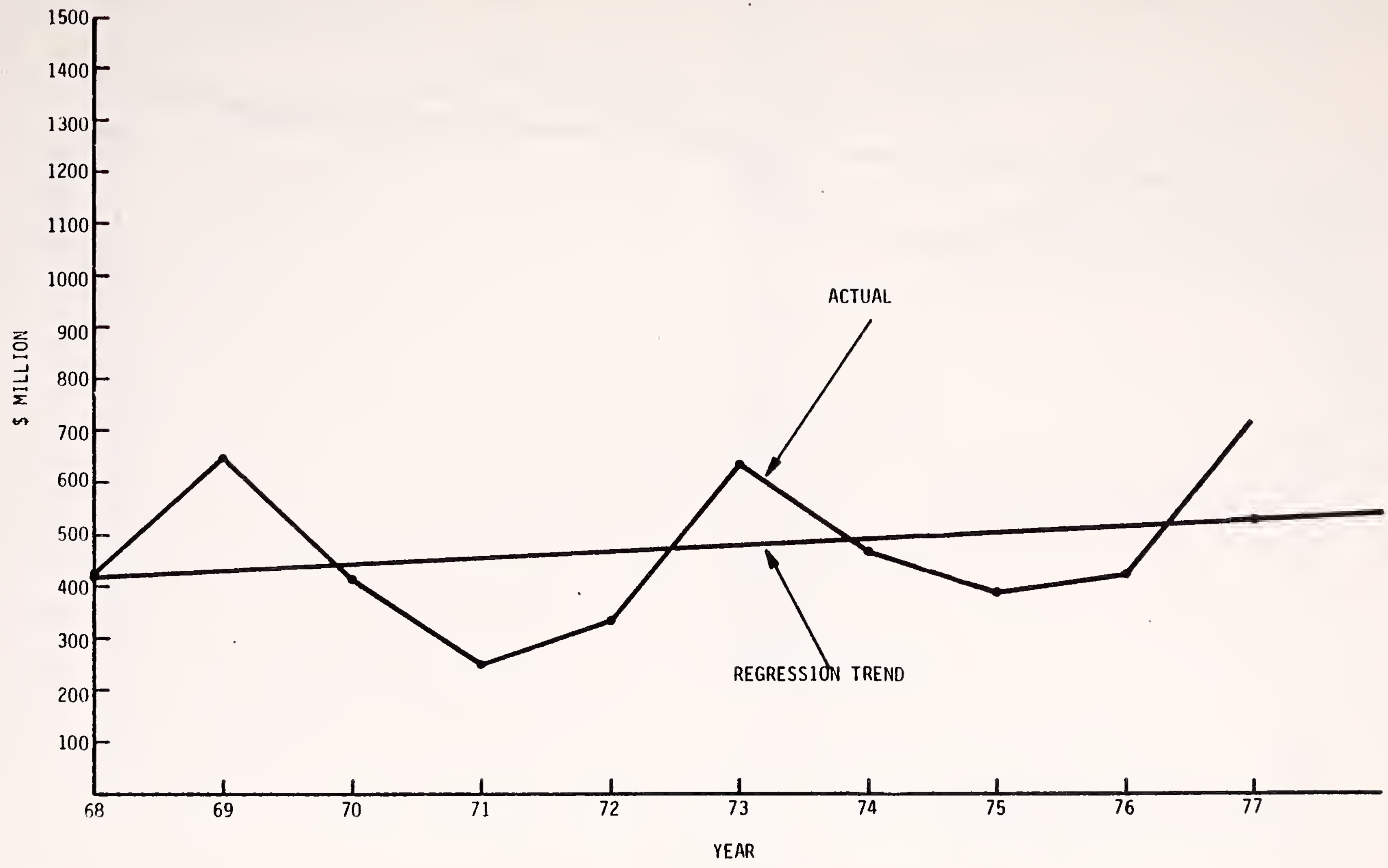


EXHIBIT 5-7. AM CAPITAL SPENDING HISTORY

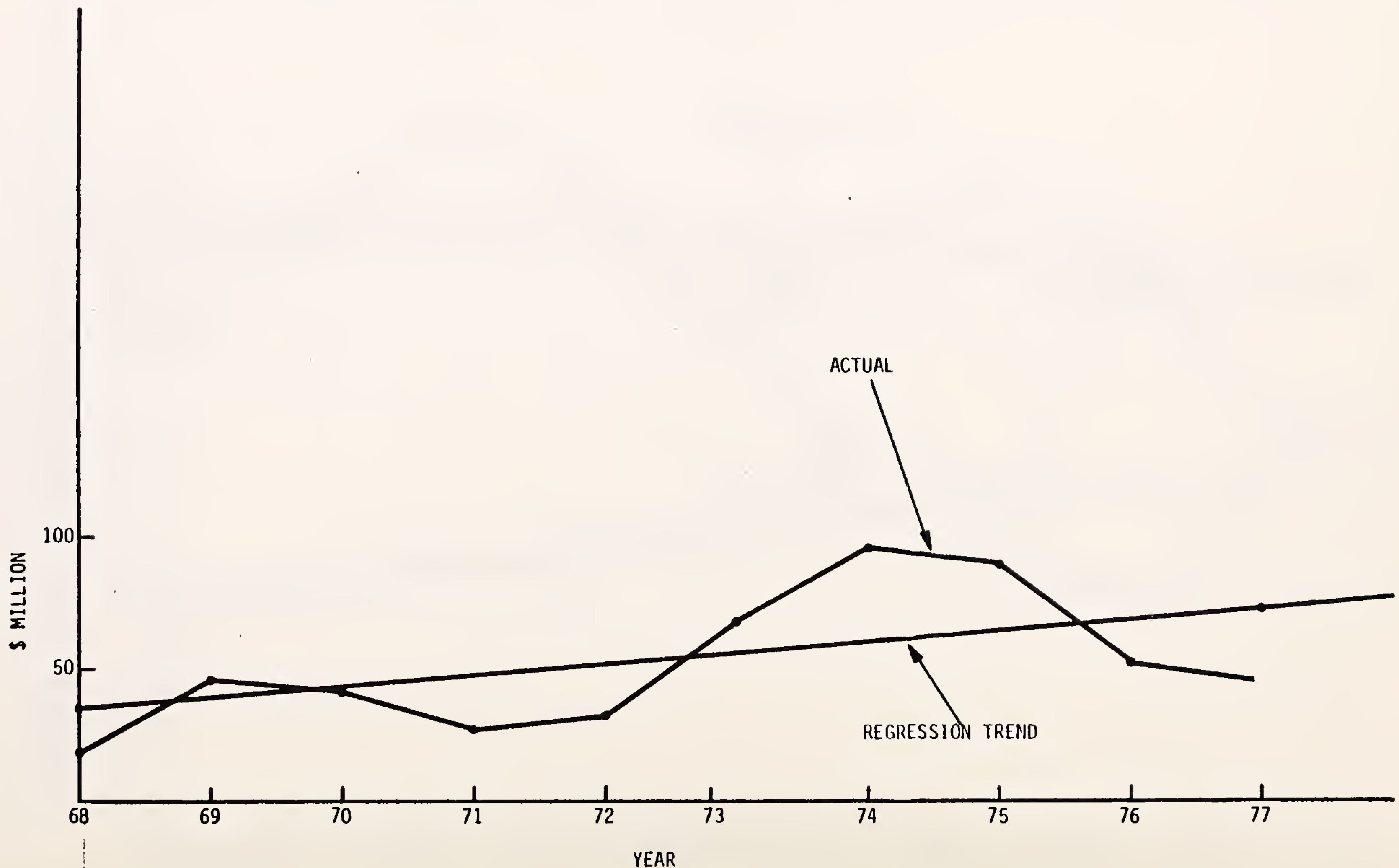


EXHIBIT 5-8. FORD CAPITAL SPENDING ESTIMATES

$ million

	TOTAL*	PPE (.60)	TOOLS (.40)
1978	3,000	1,800	1,200
1979	3,000	1,800	1,200
1980	3,000	1,800	1,200
1981	3,000	1,800	1,200
1982	3,000	1,800	1,200
1983	3,000	1,800	1,200
1984	3,000	1,800	1,200
1985	3,000	1,800	1,200

*From data available July 1978. Ford indicates that some inflation could increase, but amount not specified.

EXHIBIT 5-9. GM CAPITAL SPENDING ESTIMATES

$ million

	TOTAL*	PPE (.53)	TOOLS (.47)
1978	4,200	2,226	1,974
1979	4,800	2,544	2,256
1980	4,800	2,544	2,256
1981	4,800	2,544	2,256
1982	4,800	2,544	2,256
1983	4,800	2,544	2,256
1984	4,800	2,544	2,256
1985	5,000	2,650	2,350

*Extropolated from data available June 1978. Note that is is only the "smooth" case mentioned in Section 10. More realistic peaked cases have also been employed in Section 10 analysis.

EXHIBIT 5-10. CHRYSLER CAPITAL SPENDING ESTIMATES

(NOT FULLY ADJUSTED FOR EUROPEAN SALE TO PEUGEOT)

$ million

	TOTAL*	PPE (.51)	TOOLS (.49)
1978	800	408	392
1979	900	459	441
1980	1,030	525	505
1981	1,030	525	505
1982	1,030	525	505
1983	660	337	323
1984	660	337	323
1985	660	337	323

*Includes $1.0 Billion total for overseas to 1985. The total dollar amount is adjusted to accelerate during 1980. The 1980 peak may be higher in the U.S.

EXHIBIT 5-11. AM CAPITAL SPENDING ESTIMATES

$ million

	TOTAL*	PPE (.45)	TOOLS (.55)
1978	60	27	33
1979	60	27	33
1980	60	27	33
1981	60	27	33
1982	60	27	33
1983	60	27	33
1984	60	27	33
1985	60	27	33

*From data available June 1978. Subject to extreme uncertainty because of pending agreement with Renault.

EXHIBIT 5-12. ESTIMATED FOREIGN VS. DOMESTIC CAPITAL SPENDING

$ billion

YEAR	FORD		GM*		CHRYS.		AM
	DOM.	FOR.	DOM.	FOR.	DOM.	FOR.	
1978	1.6	1.4	3.36	.84	.64	.16	ALL DOMESTIC
1979	1.6	1.4	3.84	.96	.72	.18	
1980	1.6	1.4	3.84	.96	.83	.21	
1981	1.6	1.4	3.84	.96	.83	.21	
1982	1.6	1.4	3.84	.96	.83	.21	
1983	1.6	1.4	3.84	.96	.52	.13	
1984	1.6	1.4	3.84	.96	.52	.13	
1985	1.6	1.4	4.00	1.00	.52	.13	

These estimates are assumed and are derived from a vareity of sources, including:

- 10-K's, and Annual Reports.
- Automotive News, June 5, 1978, p. 1.
- Fortune, June 19, 1978, p. 54.

These last two sources provide good overviews of recently announced spending plans.

*Note, same ratio used for PEAK ONE and PEAK TWO in Section 10.

6. FINANCIAL OPERATIONS, GOALS, AND CAPABILITIES

6.1 INTRODUCTION

Previous sections have discussed the elements of financial performance and some of the major financial pressures facing the auto companies. Using this as a background, this section summarizes the most significant aspects of financial management before specific historic performance and future projections are evaluated in later sections. The purpose of this section is to illustrate, in a general manner, how the corporations will have to organize and confront the pressures defined in earlier sections of this document.

6.2 LEVELS OF FINANCIAL OPERATIONS

In actual practice, all corporate operations are integrated in a large operating and financial system. For purposes of analysis, however, it is useful to conceive of financial management as the control of at least three major classes of corporate behavior. These can be defined as financial control of manufacturing operations, long term asset and investment management, and management of financial operations such as relations with lenders and shareholders. The primary criteria used in this set of distinctions are the timing of actions in each area, and the demands made upon the corporate financial system by each area.

6.2.1 Manufacturing Operations

This is the most continuously demanding aspect of financial management, because it relates to the daily operations of the business. In rough terms, each of the companies must provide the following amounts of cash on a daily basis:

GM - $140 million,
Ford - $100 million,
Chrysler - $50 million, and
AM - $6 million
(cash expenses and capital spending/365 days, not including taxes)

It is entirely conceivable, because of the seasonality of sales or because of the peaked nature of some spending, that these daily cash needs cannot be met from daily operations. For this reason, a significant financial effort must be expended in controlling the infusions and outflows of cash to ensure that all operating units have the necessary cash available at all times.

Year-end cash reserve positions are often not large enough to finance the monthly or weekly exigencies of cash flow, especially during years of major model or technology introduction. As a result, each of these corporations has sophisticated methods of maintaining cash reserves and distributing them according to operating needs. During periods of flat or declining sales, this system is strained to its limits, and more permanent asset or credit accounts will have to be adjusted to provide operating cash flow.

The major components of operating cash outflow are labor expenses, including pension reserves, material expenses, heat/light/power needs, and all of the other manufacturing costs incurred. A cash flow crunch could place pressures on payrolls, payments to suppliers, and other outflows, with resulting layoffs and similar cash conservation measures. It should be noted again, that many of these expenses do not stop at the point of layoffs or slowdowns, and therefore cash conservation measures can only result in a lagged saving.

Because of these operating cash flow pressures, a significant portion of financial management relates to a semi-liquid class of assets and liabilities known as working capital. As mentioned in other sections of this document, this class of accounts includes credit relationships with customers and suppliers, inventory levels, and investments of excess operation cash in marketable securities or other fairly liquid investment vehicles.

Working capital provides the area of funding for most of annual corporate operations, and it requires almost daily attention. As mentioned earlier, working capital must generally rise with the levels of sales activity, and certain portions of it must be readily translatable into operating cash. Bank accounts and credit accounts must be carefully monitored to ensure that no cash is being wasted and that future weeks of operating activity can be funded properly. In many cases, this involves sophisticated electronic transfer of funds between operating groups and investment reserves (such as bank accounts). Many large companies will have as many as several hundred corporate staff members actively engaged in the working capital management process, and the system must remain quite flexible and responsive to operating levels.

6.2.2 Long Term Funding Management

While working capital and daily cash flow management must respond to daily fluctuations in activity, other aspects of financial management must look beyond short range contingencies to consider the long term financial performance and structure of the business. Although the immediate needs of operations cause financial management to follow an often winding and convoluted course, corporate managers must ensure that these excursions in flexibility do not jeopardize long term company direction.

The major determinants of long range financial performance are the permanent asset and investment structure and the capital structure used to maintain this base. Two major asset bases are the most important:

a. Plant and Equipment, must match long term market growth or decline, and

b. Investments in Subsidiaries, must maintain an appropriate corporate wide (and therefore worldwide) organizational structure.

These classes of assets are actually quite active on an annual basis because equipment and tooling, for example, must be constantly renovated, and because subsidiary relationships must be coordinated according to changing market conditions. However, in terms of relative proportions of the business, these asset classes do not materially change in aggregate size under "normal" operating conditions.

Because these assets do not radically depart from long term norms, and because they are so large in aggregate terms, they must be financed by funding sources properly coordinated to asset behavior. For example, if a plant is installed at the cost of $100 million and it is expected to return approximately 6 percent after taxes each year, it is obvious that the plant will not replenish the cash drain used to purchase it for 17 years, ignoring the effects of inflation. If the plant were funded from a one year loan, the cash drain required to pay the loan in year two of operation would exceed the cash infusion from the plant by approximately $95 million. (The plant would have generated only $6 million in profits, but the payment of the loan would require at least $100 million.) For these cash flow reasons, <u>long term assets must be funded from sources of capital whose repayment schedules are geared to the ability of the assets to generate cash</u> If this general principle is not followed, the corporation would quickly run into bankruptcy.

In rough terms, funding sources for capital assets will be approximately coordinated with the economic lives of the assets. Such long term capital sources are usually represented on the liability side of the balance sheet, beneath the liabilities relating to working capital. In the case of the auto companies, these <u>sources of funding</u> are included in three accounts:

a. <u>Other liabilities</u>, representing medium term subsidiary relationships,

b. <u>Long term debt</u>, representing legal debt instruments owed to a variety of lending institutions, and

c. <u>Equity</u>, representing book value of existing shareholder stock, claims to minority interest in the companies' earnings, and earnings retained from previous profits of the company.

For purposes of this document, these accounts are defined as the long term capital structures, and the debt and equity accounts are defined as "total capital". Note, that all liability accounts, including short term ones, are really sources of capital, but for purposes of this analysis, capital is defined in the longer term sense, which treats working capital as a different entity.

The "cost of capital" is a very important financial measure for any corporation, because it essentially defines the amount of return the company must provide from profits to satisfy the demands made by the suppliers of capital. In truth, any liability account will have a cost attached to it, but in later analysis of these companies, the cost of capital will refer primarily to the cost of debt and equity used to fund long term corporate operations and assets. In this sense, the "cost of capital" refers to the value growth expected by equity holders and the interest charges required by holders of the corporation's debt. In practice (and in theory), this cost is a complex and highly interdependent set of perceptions and actual cash payments in the form of dividends, interest payments, stock price growth, and other streams of value accruing to the company, the shareholders, or the lending institutions.

In general, the more risky the business becomes, the higher is its cost of capital, because the investors and lenders will demand compensation in the form of higher annual return to offset the increased risk accruing to the invested capital.

Long term financial management, then, pertains to the balancing of asset growth and application of capital used to fund this growth. Equilibrium between asset requirements and the cost of funding for these assets is the primary goal of long term financial management, and in the case of the auto companies, this equilibrium represents the primary area of risk in the next five to eight years of increased spending.

Because the companies will be expending large sums of money on permanent assets, and because this will place large pressures upon the capital structure used to fund this class of assets, long term financial management will be the major determinant of future success of each of these companies. (Note that operating cash flow pressure will be a significant contributor to this risk. Even though long and short term finances are being separated for discussion here, they are quite interrelated in practice.)

6.2.3 Financial Operations

Another level of financial management can be distinguished for discussion, although it really represents a work requirement specified by the earlier two areas discussed above. In general, this area of financial operations represents the efforts performed to service the financial system, which in turn is supporting the corporate operating systems. If one were looking for a physical embodiment of this financial function, it could be found in the corporate financial statements immediately after operating costs and operating profits on the income statement. This area of accounts includes interest charges on debt, taxes owed to various governments, and the disbursements to shareholders generally represented by dividends.

Although the ability to pay these charges and the reasons for incurring them are all founded in the operating system, the financial charges and financial operations required to meet these charges do not necessarily relate to operations in any direct fashion. Interest is instigated by earlier operating decisions, and dividends are paid according to long term investor expectations. These streams of values can, therefore, be out of step with annual operations, and can, therefore, require separate decisions and efforts.

Dividend policy, for example, must be planned and executed in a manner allowing for good and bad operating years. Investors, especially in the large auto companies, require some predictability of returns, no matter what the profit line was in any given year. The holders of corporate debt are even more restrictive in this regard, and their required interest charges are legally obligated in every year, no matter how the consuming public purchased cars and trucks. The inability to cover interest charges is perhaps the most severe shortfall which could be experienced by any corporation, because this can force the company to negotiation with banks at least, and, at worst, into bankruptcy or enforced reorganization.

Financial management, then, must appropriately draw cash from operations in such a way as to provide the right return to capital at precisely the right time. (This also includes taxes, because they are by no means a discretionary charge.) Financial officers must force operations to provide cash for dividends and interest payments, to allow operating reserves sufficient to satisfy legal agreements with debt holders, to fund assets in a manner consistent with proper capital structure and the resulting cost of capital, and to satisfy a number of other financial requirements which may not follow the timing of manufacturing operations.

In the multinational business context, this also involves extensive efforts in coordinating the operations carried out in currencies of a variety of nations. Contracts negotiated in Germany, for example, will often require payment in German currencies, and the financial managers must maintain cash reserves in such a manner that international currency fluctuations do not cause excessive distortions in the ability to pay for goods and services.

In summary, then, the financial management of the auto companies involves careful coordination of long and short term operating behaviors, and a careful balancing of the needs of capital sources with the capital available from operations. During periods of major dislocation and increased risk, such as the pending development of mandated technological and market changes, financial operations experience great strains and adherence to goals of performance becomes very difficult.

6.3 FINANCIAL GOALS

To coordinate the extremely complex operating and financial systems of these corporations, management relies upon the establishment of corporate goals, and their translation into operating behavior by all units within the corporate umbrella. To a very great extent, these goals will determine corporate behavior and decisionmaking, especially over the longer term, because if these goals are not met, the entire corporate operation is threatened.

For proper interpretation of financial analysis, it is important to note the major performance criteria which will measure the corporate financial behavior. Significant deviations from these standards of performance will affect the corporate ability to continue business in its desired form, and, in some instances, may even reflect upon the corporate ability to survive. In general, these goals can be as described in the following paragraphs.

6.3.1 Maintenance of Operating Cash Flow

This is an intuitively obvious requirement, which has many complex conditions of performance attached. As mentioned above, cash reserves must be balanced against seasonality and cyclicality in the selling and manufacturing environment. This often means establishing footholds in markets which can counteract the effects of other markets. (International Harvester, for example, trades in different hemispheres because its products relate directly to harvest season. The American auto manufacturers try to have full product lines available to ensure at least some lower amount of volatility in sales.) This also means evaluating new investments according to their timing of cash inflow and outflow. Cash draining projects can only be instigated if there are enough cash generating projects in place; this relates to the corporate hurdle rate of return mentioned in other sections of this document.

6.3.2 Maintenance of Profitability

Again, this is an obvious need, although its achievement in practice is complex. Products must be developed in a manner which allows compensation for inflation in different cost accounts, and which will allow proper pricing in market conditions. These profits are critical measures of business efficiency and allow the payment of returns to investors. In a very direct sense, then, the profitability of a company will determine the cost of funding which it can obtain to finance the asset base, and low profit means high cost of capital.

6.3.3 Maintenance of Credit Ratings

Corporate creditworthiness and, therefore, cost of capital are directly related to the above mentioned cash flow and profitability goals, but corporate creditworthiness includes further requirements of proper capital structure, and proper "images" of good performance. In truth, creditworthiness is not a strictly mechanical affair, but is often cast in terms of perceptions and judgements of those who might invest. Bond ratings are tangible measures of these forces, and the auto companies, because of their limited potential for operating growth, must carefully maintain these ratings of credit. Ford and GM both enjoy AAA credit ratings, which allows them flexibility in financing and lower costs under normal conditions. If these ratings are jeopardized or reduced, the regaining of them is difficult and will directly affect the corporate ability to finance the asset base at reasonable cost.

Chrysler provides a living example of this problem, because its ratings have just been reduced to a much lower BBB-minus level. Chrysler's high proportions of debt and low profitability have now resulted in impairment of the ability to obtain capital, and a logically higher cost of gaining any external capital allowed by funding sources. Credit ratings are highly visible and produce tangible effects in long term financial capabilities, and maintenance of credit ratings is, therefore, a primary financial goal.

6.3.4 Flexibility in Financing

Another critical financing goal is the flexibility to respond to changing operational and economic conditions. This is especially true in light of the nature of the auto markets. Sales are volatile, and the companies are mature, which means that it is absolutely necessary that the corporate financial system be able to respond to fluctuating cash needs. The volatility of cash inflows must be explicitly balanced against the volatility of cash outflows, and sufficient buffers must be maintained to cover shortfalls.

Flexibility will be seriously threatened in the next few years, owing to the fact that spending requirements will not be geared toward market environments, but toward the meeting of regulatory schedules. Such loss of flexibility makes it harder to meet all of the other corporate financial goals enumerated above, because the corporation loses the ability to make adjustments when market conditions change. In the coming years, financial flexibility will take the form of tightly stretched cash reserves and significant efforts to balance these smaller buffers of funds so that no financial requirements are violated.

6.3.5 Summary of Goals

These general goals are the ones which each auto company will be considering when making operating and investment decisions over the next few years. A significant environmental change is being posed because these financial goals will now be directly influenced by the goals inherent in pending regulations. In the past, corporate financial goals were related to a number of external requirements, so this externality is nothing new, but a new dimension has been added because external goals will now establish timetables of performance which may not be compatible with timetables of financial performance. It is entirely possible that the auto makers will have to make decisions in light of regulatory goals which will directly violate financial requirements posed by other interest groups, such as investors.

It is not at all the purpose of this document to comment upon the validity of any set of goals, but it is necessary to mention that from a financial performance standpoint, the potential for goal conflict is extremely large, and, further, that it is entirely likely that resolution of regulatory goals will be performed at the expense of financial goals.

6.4 FINANCIAL CAPABILITIES

The tools available to corporate managers in their attempts to reconcile and meet each of these sets of goals are primarily represented by sources of funding. These sources are briefly summarized here.

6.4.1 Internal Funding

Internal sources of funding represent the reasons for being in business. It is the goal of every company to provide for its own growth and stability through its own internally generated profit and cash flow, and serious deterioration of internal funding essentially means that the business will cease to exist.

Internal funding is generated through proper development of products and proper control of costs used to produce these products. Financial tools available include financial operating controls, investment decisions which produce good operating results, and factors such as adjustments to operations (i.e., layoffs, plant rearrangements, and product cutbacks).

In many cases, under heavy investment schedules or poor sales years, internal funding is not sufficient to meet corporate cash flow needs and external capital must be employed. It is important to note that internal funding performance is still the most critical corporate financial capability, not only because it should provide most corporate funding, but also because it is the primary determinant of the ability to obtain external capital. Lending sources or shareholders have no incentive to invest in a corporation unless these suppliers of capital feel that subsequent internal funding streams will allow sufficient payback on investment. For this reason, most corporate efforts will be geared toward maintenance of internal funding.

6.4.2 External Funding

Assuming a corporation has sufficient internal funding capabilities to allow access to external capital markets, the financial managers have available a variety of external sources of funds. Short term sources, such as trade credit (accounts payable) and short term loans or lines of credit are practically normal portions of business funding, because these sources are used so often to counteract the contingencies of weekly or monthly cash flow needs. In order to make use of these financial capabilities, the corporation must maintain appropriate liquid reserves in cash or other quickly liquidated assets.

Long term funding capabilities, however, must be employed with care and with careful balancing of sources and returns required. These sources take the form of debt and equity capital, in combination with internal equity capital provided from retained profits, and, collectively, this combination of sources is referred to as "capital structure". The cost of capital to a firm will depend, to a great extent, on the relative proportions of debt and equity capital employed in the capital structure, and the ability of the firm to carry or service the costs of these forms of capital from operations. Serious dislocations in capital structure or extended years of poor cash flow can cause the cost of capital to rise significantly as investors demand immediate returns to counterbalance the increased risk to investment.

The following sections of this document will survey historic sources and applications of funding, and will then compare this history to proforma analysis of the future. Specific behaviors and costs of financial capabilities will be discussed in analysis pertaining to each company. It is useful, however, to first survey some important types of long term sources of funding in this section.

a. <u>Internal equity</u>. This is the financial capability provided from annual operations of the company. Because it does not carry specific covenents of interest or dividends, it is often thought of as "free" money. However, in practice, internal funding is by no means free and carries an explicit cost of capital. This derives from the basic nature of investment in the equity of a corporation. Shareholders have a legal claim to participation in the corporate earnings, which theoretically suggests that anything earned by the company is owned by the shareholders in proportion to their stock ownership. Since the only cash return an equity shareholder can derive from corporate operations is in the form of dividends, internal retained earnings represents the ability to pay dividends.

It is intuitively obvious how dividends can be viewed as a cost of capital, but note that even earnings retained in the business from profits actually have the same cost to the company. The retained earnings represent a dollar amount "owned" by the shareholders which has been retained by the business to sustain future operations. Because the investor will still demand a return on the invested capital, these retained earnings, once invested in future operations, must earn more money in order to maintain the future ability to pay out funds to investors. In practice, if the future profits are not enough to maintain a return on the retained earnings invested to get those profits, then the ability of the company to pay out cash to the investors is seriously diminished, and the shareholders' ownership value is lowered.

Because investors are not investing for a lower value, they will demand that earnings retained in the business are retained profitably. For this reason, even internal funding has a cost, which can be viewed as approximately the cost of equity capital as measured through other financial streams such as dividends.

b. Equity capital paid into the business. In addition to generating equity capital from retained earnings, the company can obtain infusions of equity by selling stock. This type of financial capability is more closely alligned with debt in its structure and behavior, because it represents a measurable dollar input beyond earnings which have an attached explicit cost. The cost of equity capital is an extremely complex issue, and many measurements derived at this time are largely theoretical. Exceptions to the theories are the rule.

   In general, however, it can be seen that issuing new equity carries a specific cost in terms of dividends. In addition, because of the nature of the stock markets and investor perceptions of value, the cost of equity contains an additional component in the form of stock price growth. The investor will expect not only growing dividends, but also an increase or at least a maintenance of stock price. The company must provide a strong enough profit return to pay out dividends and to keep investor expectations high enough to maintain stock price value. This required rate of earnings is the cost of equity capital.

c. Debt. Another financial capability available to the corporation takes the form of debt instruments. Cost of debt is perhaps the most conceptually simple, because it involves a legal convenant to pay a specified amount of return on the original debt amount. In practice, however, debt capital interacts with equity capital in such a manner that increasing debt proportions in the capital structure can cause an increase in the cost of equity capital, owing to the higher risk pertaining to the equity capital. Debt obligations are senior to equity expectations, which means that increasing portions of debt will be pulling potential returns away from equity shareholders.

This interaction between debt and equity capital is the primary reason so much attention is focussed upon corporate capital structure. It is incumbent upon the corporation to carefully balance its debt and equity capital to minimize risk and maximize return to all parties.

This is an extremely brief survey of funding capabilities available to the auto companies, but it is beyond the scope of this document to explore all of the possible permutations and interpretations of such funding. The following sections of analysis will provide a basic overview of the financial funding histories of the major auto companies as a basis for comparison to the financial projections drawn later.

7. EQUITY VALUATION, HISTORICAL PERFORMANCE, AND THE COST OF CAPITAL

7.1 INTRODUCTION

The value of a company's equity is an extremely important part of financial analysis for several reasons. It summarizes a number of financial risks from operations in a single body of value. It represents a measure of the costs of funding for each company; equity value proxies a number of corporate investment return criteria, and can be used to show how much a company must earn above its investments to maintain corporate value. In some circumstances, equity represents a source of funding similar to debt, and if internal cash flow is not large enough to fund corporate spending, equity can <u>sometimes</u> be sold to cover the cash shortfall.

It is important to view the equity of each corporation in light of that company's particular operating and financial environments, and, in the case of the auto industry, it is necessary to define the industrial characteristics of equity. This industry is so large and firmly embedded in the American economy, and its operating characteristics are so unique, that its equity is a class apart from other broad manufacturing areas.

Equity valuation and analysis is an extremely complex and controversial area, as can be seen by the number and types of jobs available on Wall Street, and in brokerages all over the country. Equity analysts have thousands of valuation techniques available, and new theoretical measures of analysis are derived almost every day.

The analysis in this document is by no means an exhaustive study of auto company equities, and it is certainly not a prediction of stock prices or performance. The purpose of this section is to define the nature of auto company equity in the financial environment of these companies, and, more particularly, in the pending regulatory spending environment. Although both Ford and GM exhibit a strong desire to fund all future spending through internal sources, it is becoming clear that both companies face cash flow and profit risks strong enough to suggest the need for external financing. In this context, it becomes important to characterize the equity problems and opportunities available to all companies, and to evaluate the relationship of equity performance to future financial performance discussed later in this document.

The analysis in this section makes use of basic valuation and performance measurement techniques, and although many analysts will employ infinitely more sophisticated techniques, it is noted that many analyses issued by professional security analysis firms often rely upon techniques similar in their basic nature to those used here. The major trends in equity value and performance which are discussed in this section are so strong that they lie beyond the subtleties of analytic techniques, and the purpose of this section is merely to highlight the most significant aspects of these trends.

Several fundamental facets of equity valuation serve as introduction to this analysis. Many exceptions to the rules are to be found in equity performance, but several basic facts of value remain constant.

<u>The value of an equity instrument can generally be viewed as a present day dollar translation of a series of investor perceptions, feelings, and judgements concerning the future</u>. Today's stock price is an approximate summary of the investor's expectations for future dividends, earnings, and other streams of value such as potential capital gains on stock price. This bundle of perceptions will also be compared to the investor's abilities to get returns from a variety of other investment vehicles, such as bonds, bank accounts, real estate, government securities, and, perhaps, direct investment in partnerships, oil wildcatting, venture capital, and other less traditionally fixed investment sources.

<u>This stream of future values, envisioned in a stock, is also modified for the risks which the investor sees in obtaining</u>

these streams of value. For example, a number of years ago, Chrysler was able to pay dividends of $2.00 per share. If Chrysler had been able to maintain this kind of payout over the past ten years, this would be seen by investors as a relatively secure stream of cash inflows each year, and today's stock price might be closer to $20 or $30, instead of its present approximate value around $12. Obviously, investors in Chrysler's stock have been affected by the volatile series of dividend payments over the past ten years, and a steady $2.00 dividend is probably viewed as only minimally likely. This stream of risk adjusted value now allows only the present stock price, and Chrysler experiences a very expensive cost of capital on its equity. This past year, the company was only able to sell preferred stock (a much less risky form of equity than common) at an extremely high dividend rate in the neighborhood of 11 percent. Had Chrysler's future returns seemed higher and less risky to investors, Chrysler might have sold equity for a rate closer to 8 percent.

The investor makes this risk assessment through evaluation of a number of corporate performance characteristics, not only dividends or earnings mentioned above. A company which is paying out substantial dividends, and which is earning quite well, can have its equity value affected if it begins to take on higher levels of long term debt. Because debt charges are legally dictated, and because they are required to be paid before any returns can be paid to stockholders, any increase in debt above levels acceptable to shareholders' risk perceptions will tend to cause depressed stock prices and rising costs of equity. This particular phenomenon, as shall be shown below, is extremely important for the auto companies.

The most significant conclusion derived from this analysis of auto equity is that all companies face a secular decline in equity value, an increasing cost of equity, and, therefore, a future in which equity financing is not especially attactive. In addition, it appears clear that present auto equity holders will be in for a somewhat depressed period of returns, or, at the very least, a period of increasing risk to these returns. The long term investment future of Ford and GM are probably stable, although their nature has changed dramatically over the past decade, but the equity future of Chrylser and AM are not nearly so stable looking at present.

7.2 GENERAL INDUSTRY EQUITY HISTORY

Exhibits attached at the end of this section contain summaries of key equity indicators and values. Even a general reading of these data show that the nature of the industry, as measured in equity value, has changed quite substantially over the past ten years. Exhibit 7-1 contains a general survey comparison of auto equity performance to general Standard and Poors market measures. It can be seen, in line 153, that GM's equity value, even as leader of the industry, has shifted downward in its relationship to the general market index. Ford has roughly held its price performance constant against the index, but note that it has done so primarily by pushing its dividend yield up over the market in bad years, and by increasing its dividend yield against AAA bond rates (lines 156 and 164). GM has followed the same dividend yield course, although in more dramatic fashion (lines 157 and 165).

Chrysler's price has performed in a very marked declining fashion against the market (see line 151), even though in some years it has been able to beat the market dividend index. Although it is not illustrated in this exhibit, AM's price activity has shown very depressed behavior (see Exhibit 7-15).

Exhibit 7-2 further illustrates this general industry equity decline by roughly deflating equity measures against the GNP price deflator. Although this deflator is not entirely appropriate for use here, it does at least indicate some of the real decline in auto equity value over the past decade. For example, it can be seen that Ford's nominal stock price has held ground over these ten years, but the real value measured against aggregate inflation has declined 38 percent over the ten year period. GM's stock has declined in both nominal and real terms, and Chrysler's common displays a real value decline of more than 80 percent.

The most interesting pattern on this page is that such value declines have occurred despite increasing real value in earnings per share (Ford's case is most notable.), and rather steady real values in dividend payouts, barring the recent recession. The explanations for this secular decline in value are not to be found in stock price analysis, but show up very clearly in analysis of corporate financial performance. Companies have mentioned on a number of occasions that the North American market growth has cut long run potential, and that there has been an inability to recover cost increases in prices. This unit and profit sluggishness, which has instigated basic changes in capital structure, provides the most explanatory power in this equity valuation problem, as shall be shown below.

It must be noted, at this point, that some of this lower stock performance relates to performance of the equity markets in general. It is beyond the scope of this document to deal in capital market and investment economics, but it must be mentioned that equity as investment vehicle has lost favor when compared to other investments. For example, when an investor can derive risk free returns of more than 7 to 8 percent from government short term investments, why risk a substantial portion of capital in an equity market whose average returns are not much higher and whose annual returns can be much lower? When house prices are inflating at more than 10 percent per year, and that house investment can be purchased with more than 80 percent of someone else's money (mortgage), then why put savings into stocks?

But, even in the face of this investment picture, it can be seen that the auto companies, especially recently, have not even matched other equity returns and values. Such financial facts are those which make it much more attractive for auto companies to invest capital beyond the borders of the United States where unit growth and return on each unit are higher.

In addition to these trends, it has become very clear that the auto companies are changing, or are being forced to change their capital structures. Exhibits on the individual companies show very clearly that debt has taken up more of the funding base for each of these companies. Part of this is owed to the poor general equity market, but part is also derived from the nature of the U.S. auto market and the inability to recover costs in prices. Margin squeezes in the United States have forced greater pressures on cash flows, which have only been met through increased portions of debt. Owing to the self-feeding process of capital value, this increasing debt percentage makes it all the more difficult to gather equity funds and to meet all investor expectations.

Except in the case of Chrysler, this capital structure shift has not caused risk to survival, because the companies have been able to adjust operations and finances in a manner that allows somewhat steady equilibria (again barring the recent recession). However, this secular decline in value, as measured through the equity positions of these companies, will now be even further accelerated under spending conditions planned for the next five to eight years. The companies have already lost some financial flexibility, and the large increases in product development spending, forecast for the pending regulatory period, will cause significant flexibility losses in addition to those enumerated in history.

A number of industry analysts have indicated that the current spending programs will leave the auto companies rejuvenated and more efficiently capable of generating higher profits. It is not the purpose of this document to reflect on such future phenomena, but even if this were the case, this rejuventation could only be purchased by a five to eight year period of costly risk. Regardless of any future productivity gains, the equity positions of these companies will be affected primarily in downside directions over most of the spending period, and it appears clear that equity can only be used as a source of funds at high cost, or with extremely swift attention to timing if upward cycles in the market allow lower equity cost for brief periods. The following sections describe individual equity positions of the automakers, including an assessment of the equity problems faced under new regulatory spending conditions.

7.3 GENERAL MOTORS

The most important observation which can be made concerning GM's equity is that this common stock is, in its behavior, more like a bond. GM's dividend is clearly the most important value stream available to investors given the stability of price. This is a basic long term equity instrument, and it might be compared to stocks of utilities and other stable earners, except for the fact that GM is not allowed a guaranteed return on investment, and that GM's products are highly deferrable purchases.

GM exhibits at the end of this section show that price volatility, although presenting some capability for return, is not really pronounced, and does not reveal a speculative instrument. This is also borne out by the fact that much of GM's stock is held by institutional investors who are often barred by policy or law from investing in risky issues. (Approximately 25 percent of GM's stock is held institutionally, versus 40 percent for Ford, 16 percent for Chrysler, and less than 1 percent for AM). Given this stability in price, it becomes necessary for GM to provide steady and relatively risk free returns to investors in the form of dividends. The fact that GM pulled dividends from retained earnings reserves (and, therefore, from cash reserves) during the recent recession indicates GM's devotion to strong base dividends.

Because this dividend stream is the primary return available to investors in GM stock, and because the investment is purchased for its general stability, any financial crisis which would affect dividends, or the long term potential to pay dividends, would ripple quickly into the equity market. This would also have effects on overall capital funding capabilities, and would force an even larger shift toward debt in the capital structure if cash flow were not sufficient to pay for all increased spending.

Statistical analysis of GM's equity performance in relationship to indicators of operating performance further supports the value of GM's ability to pay returns and earn profits.

Simple multivariate regression analysis of GM stock price indicates that current stock price is not especially sensitive to immediate changes in dividends per share, as long as dividends are being steadily paid and as long as other indicators of corporate performance are not suffering.

When GM stock price is regressed upon earnings per share, dividends per share, and debt percent in the capital structure, the annual effects of dividends are not large and, in fact, are even negatively correlated to stock price over the ten year data period. The important statistical indicators in this equation, however, are the measures of Beta relationships, and detailed analysis of the data base. The negative ten year correlation of price and dividends per share (dps) arises because of the long term decline in general equity value, which has forced GM to increase dividends against falling stock price. When dps and stock price are compared for the last five years, it becomes very clear that GM's dividend is now a large support of equity value (see Exhibit 7-4). Regressing the five year price on dps produces a positive correlation ($6 price increase per $1 dps) and an R^2 of .818.

The most revealing aspect of this statistical analysis, however, is the comparison of stock price to changes in capital structure. The same ten year regression equation mentioned above illustrates GM's problem. When price is regressed upon eps, dps, and debt percent, and the beta weights are standarized, a series of multipliers is derived as follows:

eps = .622
dps = -.446 (note ten year effect above)
debt%= -.855

(equation R^2 = .851)

These multipliers are expressed in standard deviations. For example, a change in one standard deviation of eps will produce a change in stock price of .622 standard deviations. It is very important to note that the largest multiplier effect is derived from a change in debt percent of invested capital; every standard deviation change in debt percent will produce a .855 standard deviation change in stock price. Using the Betas from the equations, this means that if debt percent rises 1 point, stock price drops $7.48, assuming eps and dps are held constant. If all three indicators deteriorate, stock price drops that much farther. (Note again that the recent five year correlation against dividends is positive, not the long term negative expressed in this ten year equation).

This is very important for GM, because if it needs to obtain external capital, these funds will probably be in the form of debt, and this will have lasting and strong effects upon the overall cost of capital to the firm. GM's equity investors are obviously sensitive to increased levels of debt, or to the risk conditions this proxies, and, therefore, <u>any</u> external financing by this profitable company is viewed with concern if not alarm.

7.4 FORD

Ford's common equity is similar to GM's, in some respects. This equity instrument also behaves more like a bond investment than the popular view of common stocks. Exhibits 7-4 and 7-13 indicate that although Ford's stock is somewhat more volatile in price than GM's, it is still not anything like a growth stock whose value could be expected to constantly increase. In fact, as mentioned earlier in this section, Ford's real stock value has increased little over the past ten years.

Ford's equity is considerably more difficult to evaluate than GM's equity, because the company is not so large as GM, and because it is apparently following a more radical shift in overall strategic actions. Regression analysis of key GM indicators provides a rather systematic pattern of results as described in Section 7.3, but, as shall be shown below, the Ford statistics are not nearly so consistent over the ten year data period. Many of the standard statistical regression fits are lower for Ford, which indicates a higher amount of shifting relationships between indicators of financial performance.

Exhibit 7-1 shows that Ford's stock has remained roughly consistent in price behavior when compared to the overall index, but the effects of deferrable auto purchases reveal themselves in the 1969 and 1975 deflections against the market. Note, also, in line 164 that Ford has maintained this price value only by increasing dividend yields against the market rates on AAA bonds. Even though investors might experience more potential return in stock price growth for Ford, it is clear that Ford is being forced to pay a more steady pattern of dividends, and that it is being locked into the same dividend position as described earlier for GM.

Line 164 reveals that during the first five years of the period, Ford dividend yield was, on the average, .65 of the AAA bond rate, while during the last five years of the period, this annual average rose to .76 of the AAA rate. This implies that Ford is being forced into a more bond-like dividend position. The nature of this shift is also important because it reveals a basic change in the Ford financial performances and equity valuation after the 1972 year. This fundamental shift in performance will be discussed in relationship to other variables, but it should be noted in this dividend pattern which is basic to the company's financial health.

A basic ten year multivariate regression estimate reveals the difficulty of evaluating Ford equity, as well as revealing some of the more pronounced influences on equity value. A regression equation regressing stock price on eps, dps, debt percentages, and AAA interest rates produces the following set of standardized multipliers:

eps	=	.572
dps	=	-.368
debt %	=	.482
AAA rate	=	.531

$R^2 = .757$

This reveals the same apparently nonsensical result in the dps estimate which, at first, suggests that increasing dividends decreases stock price; this effect is, however, also modified when one splits the data for the past five years (see also Exhibit 7-2 lines 119.9 through 121). The influence of debt percentage also does not make sense in ten year aggregate form, although this ten year estimate ultimately makes sense, as will be shown in later paragraphs. The important finding of this equation, however, is that the two best fitting variables are earnings per share and the AAA bond rate, both of which have higher explanatory power and a logical direction of movement. This is further enhanced by dropping dps from the equations with a resulting new set of statistics:

eps	=	.465
debt %	=	.368
AAA rate	=	-.580

$$R^2 = .622$$

Note that the overall explanatory power of this equation drops as indicated by R^2, but this drop is not really severe given other statistical measures of 10 year data (most of which produce R^2 figures in the neighborhood of .2 to .4, using variables such as eps and dps alone or in combination). Although the fit in this equation is still not ideal, it is important to note the direction of shift in the multipliers when dps is dropped from the original equation. Both eps and debt percentage lose some of their power in these standardized betas, while the apparent influence of AAA increases as a predictor of stock price. This suggests that some of the dps behavior is proxied in the AAA rate comparison, and it does at least suggest a statistical relationship confirming the average index comparison mentioned above even in the presence of other likely explanatory variables. In rough terms, this set of multipliers suggests that when AAA rates move up one point, Ford stock price would tend to drop by $8.00. Again, this is not a striking equation fit, but it is somewhat confirmed by other regressions which indicate price against AAA rates has a high R^2 compared to similar equations using only dps or eps (R^2's are .226, .009, and

.269 for the three independent variables respectively).

All of this suggests that Ford's equity is indeed compared by investors-at-large to other investment instruments such as AAA bonds, and, therefore, that Ford's dividend charges are becoming more and more fixed charges to after tax cash flow. This relationship was clearly borne out in the recent recession when Ford cut its dividend, and the price dropped.

It should also be noticed that Ford's basic capital structure has also changed dramatically in the recent ten years, placing a greater pressure on the equity value and cost of equity. This is one reason for the apparantly nonsensical debt percentage results indicated in regression equations above. Capital structure changes are visible in line 51 of Exhibit 7-5, and are further illustrated by comparison of debt percentage to stock price over the last ten years.

When stock price is regressed on debt percentage for the full ten year period, the equation is essentially meaningless and produces an R^2 of .010. At first glance, this suggests no influence of debt on the value of equity, but further investigation reveals that exactly the opposite is true.

When the data are split into two five year groups, pre- and post-1972, the actual influence of debt structure on equity value becomes abundantly clear. Regressing stock price on debt percentage for the two sets of data produces equations of the following multipliers and R^2's.

	Natural Beta	R^2
Pre-1972 debt %	2.01	.868
Post-1972 debt %	-2.26	.810

Note that both of these equations have a drastic increase in R^2 over the ten year .010 value, and, further, that these R^2's are higher than the earlier mentioned multivariate fits. Note also that the Betas show that increasing pre 1972 debt associates with an increasing stock price, and that when post-1972 debt increases, the stock price drops. This suggests the true nature of debt risk in the capital structure, and reveals the precise reason earlier equations appeared to indicate little influence of debt. Ford's capital structure has experienced a fundamental shift from equity to debt, with an apparently strong influence on equity value and the riskiness of returns as perceived by investors. This is also a logical explanation for earlier nonsensical results in dividends and share price, because it appears that the shift in capital structure has been more infuential on stock price than any annual influence of dividends.

This particular financial phenomenon is interesting, not only for its immediate effects on Ford, but also because it is an empirical demonstration of the classic textbook theories on the effects of leverage (use of debt) on the cost of capital and the value of the firm when future earnings potential is adjusted for risk.

Classic financial analysis holds that shareholder value is increased when debt is added to the capital structure until the debt percentage reaches the debt capacity of the corporation in the investors eyes. This results because applications of debt, up to the "debt limit," will have the effect of increasing earnings per share to common stock, as long as the company experiences good earnings. This is known as "debt leverage," because under conditions of increasing debt, an increment of profit will produce an increasing large increment of earnings per share. However, the leverage process works in exactly the opposite manner when earnings decline, and if debt is increased to the corporate debt limit, it becomes more and more likely that the earnings stream is not large enough when compared to debt charges to avoid the downside leverage effects on stockholders earnings.

This is a simple description of a complex issue, but the overall direction of the process is as described. Debt is generally a good thing for shareholders, as long as the corporation is not near a debt limit. The analysis of Ford's equity history in light of capital structure seems to bear this out in actual practice. Ford started from a relatively low debt percentage in the 1960's, and shareholders didn't seem to mind that Ford added debt, until the debt portion of the capital structure began to grow too large in comparison with pre-tax earnings. At that point, the value of equity apparently was adjusted downward in response to the increased risk in the capital structure.

It must be noted that this relationship is not entirely deterministic, but the statistics at least suggest a very strong relationship. This suggests further, that Ford faces a debt limit, at least as defined by shareholders, in the range of 15 to 20 percent debt. If Ford were to violate this limit, without a very strong increase in earnings, it seems clear that equity value would suffer, and Ford would have to pay out greater returns on a steady basis to maintain common equity value.

It should also be mentioned that debt capacity is not a fixed measurement and is related to a variety of risk variables. Looking back at GM's equity analysis, and noting the influence of debt at lower levels, it can be seen that GM faces a sort of debt limit at much lower relative percentages of debt in its capital structure. GM went without debt for so long that small percentage increases are somewhat disconcerting, and indicate a relative shift in corporate risk. This reflects the dynamic and sensitive nature of the cost of capital, and reveals why each of these companies would be hesitant to add even the amounts of debt which might be allowed by lenders on a coverage basis.

This equity analysis indicates that Ford also faces a somewhat expensive equity future, especially in light of future spending plans. Cash flow and profits will definitely come under pressure, and there is a strong likelihood that Ford will have to seek some external capital. Because of the expensive dividend charges on equity, and the relatively low share value in the market, Ford would most likely issue debt for any future financing. This would have the effect of keeping the debt structure high, and would not especially relieve the risk pressures apparently perceived by investors at this time. For all of these reasons, it is clear the new increments of product development spending will have significant effects on the finances of equity.

7.5 CHRYSLER

The analysis of Chrysler's equity reveals that Chrysler's position is far less favorable than the other two companies. Exhibit 7-1 indicates that Chrysler's equity has lost approximately 80 percent of its value over the past ten years, measured against the market index. Chrysler's dividend pattern has become quite erratic, and Chrysler has recently been put in the position of cutting its dividend altogether. Market price is very low, compared to history, which means Chrysler could only issue common stock at extremely expensive costs in terms of dilution, if not in terms of dividends.

Chrysler's recent preferred stock issue reveals the actual effects of the changing cost of equity capital. Because preferred stock is less risky than common stock, it usually sells at rates lower than common. Note that Ford and GM currently pay about 6 to 9 percent dividend yields on their common stock price, but that Chrysler had to pay approximately 11 percent overall on its preferred issue. This dramatically indicates Chrysler's relatively expensive true cost of equity, and shows that the issuance of common stock to cover any future funding needs (which are substantial), is a pragmatic impossibility under normal financial criteria for equity funding.

This equity situation, in combination with future spending requirements, places Chrysler in an extremely difficult financial situation. As will be discussed later, Chrysler has recently performed a number of radical financial actions, which indicate the company's debt capacity <u>as defined by lenders</u>, not only by the shareholders, has been used up. The fact that Chrysler floated an expensive preferred equity issue when the prime lending rate was lower suggests that Chrysler had been essentially denied debt terms. Given the new spending requirements and the low ability to cover this spending from cash flow, Chrysler is clearly in the position of needing more funding. This means that Chrysler will have to squeeze increments of funding from debt lenders who are not entirely willing to float more debt, and from stock markets which are demanding an extremely expensive return on investment relative to Chrysler's cash flow.

In essense, Chrysler is theoretically locked out of both debt and equity markets, but, simultaneously, required to get money from both. Chrysler management faces a demanding task of balancing its capital structure and pushing all funding capabilities to the limit. The following discussion of equity necessarily includes considerable analysis of debt, because all financial pressures can be seen and must be viewed simultaneously in these equity values.

Analysis of equity value in comparison to the normal financial performance statistics, quickly reveals Chrysler's tight capital structure. When stock price is regressed upon the proportion of debt in the capital structure, the equation produces an R^2 of .880 which is quite high for this kind of single variable analysis. The critical nature of this debt-laden capital structure becomes clear when eps is added to the same equation----the R^2 rises almost imperceptibly to .881.

This is a disturbing statistic, because it suggests that Chrysler's equity value is not responding to exigencies of performance, but rather to an extreme perception of risk. In purely mechanical terms, it suggests that Chrysler's stock price will drop $4.41 from its current 12 dollar level for every increase of 1 percent debt in the capital structure, even if earnings recover. This is obviously an extreme interpretation, but the statistics clearly contain this basic direction.

The severity of this equity situation is reinforced by pro-forma analysis later in this document which suggests Chrysler may exceed 30 percent debt (from current 28 percent levels), and could even move much higher if cash flow does not improve, or if a recession hits. Similar debt percentage analyses have been issued by Wall Street analysts in recent months (see Section 10).

Given this near crisis equity situation, there is little point in speculating about the near term future of Chrysler equity.

Clearly, there is some attraction in outstanding stock, primarily owing to its fluctuations with the market and pending reorganization of the company, but the basic influences on equity value will not improve under projected spending conditions, and most pressures on equity will be downward.

This leads Chrysler to somewhat innovative methods of obtaining equity capital. The most striking action is the sale of European operations, which includes reduction in corporate debt. If all of the conditions of the sale pertain at closing, then Chrysler should have some additional room in the capital structure for debt, because terms of the sale allow some infusion of equity. In a nutshell, this is a very expensive way to obtain equity funding: it is being obtained <u>not</u> by selling stock, but by selling major parts of the company.

Given the pressures of future capital spending, this trend can be expected to continue, and Chrysler will, most likely, seek infusions of non-debt capital by selling operating positions in foreign subsidiaries. Activity along these lines is currently taking place in South America, and it appears a distinct probability in Australia as well.

This somewhat brief analysis of Chrysler's equity position reaches one inescapable conclusion. Chrysler has very little capability in the normal equity markets, unless it is willing and capable of sustaining high costs of equity. Chrysler must conserve every bit of equity value because the company uses equity as part of its compensation package for workers, and because existing shareholders cannot sustain any significantly greater pressures on value. Chrysler will have to maintain its equity position, at even this not very attractive level, by executing efficient marketing plans in a capital conservative way (this is another way of saying it cannot make any mistakes in its product plans because it needs every dollar of cash flow it can get), and by tapping an increasingly untraditional set of equity sources.

7.6 AMERICAN MOTORS

As in other sections of this analysis, it is not especially appropriate to compare AM to the other companies. AM's equity has clearly lost most of the traditional response to dividends, because it has paid only one in eight years, and it is not even totally responsive to earnings, because the long range pattern is so poor. Exhibit 7-15 reveals the action of AM stock, and it can be seen that it has even lost much of its speculative quality in terms of large swings in price.

At this time, however, as with the rest of the company, the stock could move in new directions depending upon final arrangements with Renault. Even with favorable agreement in this area, however, it seems clear that AM's equity value will never approach the value displayed by the other companies in the next few years. In percentage growth terms, there is some value here, and it is feasible that AM's equity could become part of some financing deals to obtain capital, but it does not seem likely at the moment that AM's earning potential will support strong equity value, and, therefore, it appears that AM will be looking primarily at debt for most of its financing.

7.7 COST OF EQUITY CAPITAL

Calculation of cost of equity is perhaps one of the most difficult areas of financial analysis, because it is very difficult to translate an essentially emotional issue into dollar terms. The "actual" cost of equity is whatever the next investor feels the stock is worth, translated into percentage returns on that perceived value. However, even though this cost is somewhat judgement based, it has a very real, and often volatile effect upon the company in dollar terms. If a corporation is not earning and returning dollar amounts in line with the investors' expectations, the investors will demand more immediate "proof" that the stock has value by demanding an increased immediate payout in dividends. This is a simplistic view, but it is a rule of financing which cannot be ignored if a company is to maintain its corporate value.

Many theoretical and empirical methods have been derived to characterize this investor expectation and corporate return process, and all have serious limitations in their ability to forecast the cost of capital. However, several well researched techniques do perform well in estimating the returns which a company must provide in light of investor expectations at large. One currently used technique, which is relatively new in practice, but which shows excellent results in many cases, is called the "Capital Asset Pricing Model." The assumptions used to derive this model are extremely complex and are beyond the scope of this document to describe. However, several key conditions and assumptions of the model display the general manner in which it is applied.

The Capital Asset Pricing Model (CAPM) essentially says that a stock will be valued in relation to other investments open to investors. It further implies that a stock (and a company) exhibits two basic types of risk. One risk relates to the stock's movement with the general market of investments. The other risk relates to characteristics within the company or some appropriately defined non-market environment which produces value changes in relation to something other than the market at large. The theory (and much empirical observation) indicates that an investor can counteract effects of the market by holding a portfolio of stocks which move in countercyclical fashion. When one stock is moving up against the market, others will be moving downward, and the investor's base investment remains approximately constant.

One of the central measures used in this model is commonly referred to as the "Beta," which is actually a measure of the stock's volatility against market averages. For example, if a stock's Beta is 1.5, for every value 1 change in the market, the stock will move 1.5 value units. Stocks with low volatility against the market have a Beta of less than 1.0; stocks with higher volatility against the market have Betas approaching 2.0.

The CAPM method compares the stock's systematic market related movement to other measures of value to define the increased payout a stock must provide over the risk free rates available to investors. In general terms, if an investor can put money into a bank or government securities (essentially risk free) and get a 6 percent return, a stock which has higher volatility may have to pay a premium rate of, say, 6 percent <u>in addition</u> to the risk free rate in order to maintain investor interest. The CAPM model calculates the premium rate a stock must pay above the risk free rate, given that stock's relative volatility against the market.

This is an overly simplistic description of the CAPM model, but it does capture the basic tenets of its use. To summarize the CAPM approach, the model can be expressed in the following equation form:

Cost of Equity = RF + B (KM-RF) where,

RF = the risk free rate available to investors
KM = the overall stock market return available
B = the Beta of the individual stock

Obviously, all three terms are critical to the proper valuation of cost of equity, and they can be defined in a variety of ways. For purposes of this analysis, the following definitions are applied.

The risk free rate is defined as the interest return available on short term government securities, computed at 6.5 percent during early 1978. The return available from the stock market in general is defined as the long term historical return on the market, including price gains and dividend yields. This KM term is quite controversial, and historic rates are not always appropriate choices, but for purposes of this analysis, a rate of 12.9 percent is used for several reasons. Basic literature on the subject indicates market return rates ranging from 10 percent to more than 15 percent, depending upon the historic time period used for calculation. The 12.9 percent rate used in this analysis is based on a ten year observation of S&P market data used to evaluate the auto company performances in previous areas of this Section. In general terms, this percentage defines investor expectations as the potential for price growth expressed in average market eps growth, plus the returns available from dividends, expressed in dividend yield averages. The sum of these two averages for the period measured is 12.9 percent, and this is used as the value investors would like from the market as a whole.

Obviously, this calculation is open to argument, but because it lies approximately in the middle of the ranges calculated by other methods, it was felt to be an appropriate choice for illustration. Some investors may expect lower returns and some may expect higher.

The B value, or Beta, was applied from Value Line estimates of auto company Betas. Value Line calculates the comparative movement of stocks against the market, and updates these Beta figures when any systematic shifts occur. The following Betas were used in this analysis:

GM	1.05
Ford	1.05
Chrysler	1.10
AM	0.90

These Betas indicate that both Ford and GM move fairly systematically with the market, and that AM and Chrysler move somewhat more independently of market values.

Applying the CAPM method, using the above definitions, resulted in the following approximate after tax costs of equity for the auto companies:

GM	13.22%
Ford	13.22%
Chrysler	13.54%
AM	12.44%

It should be noted that these costs are based on market and stock <u>averages</u>, and that the actual dollar cost of equity in any given year for these companies could be higher or lower, depending upon the annual effects of dividend policy, investor expectations, and financial performance of the company as a whole. However, for purposes of illustration in this analysis, these costs estimates are at least satisfactory at the base.

In a technical, or mathematical sense, these cost figures imply that the companies should give investors an average expected return of approximately 13 percent. Because dividend yields are only providing 5 to 9 percent of this return, and because the return available from price growth is limited, investors are implicitly not receiving the expected value from these stocks at present. This is consistent with the observation that these stocks are currently valued lower than the market, and it shows how equity value responds to potential for payout (expected return is not being realized, so investors value price downward). This costing of equity also reaffirms the importance of dividends in the auto companies' financing arrangements. Dividend yields are providing the largest portion of expected equity return as measured by the CAPM approach, and, therefore, any threats to dividends, which would result from profit declines, will strongly affect the investors. (Note also that if the costs of equity as calculated using CAPM above are over-estimated, the importance of dividends is even further increased. A lower imputed cost of equity means a larger proportion will be satisfied only by dividends, and the sensitivity of investors to dividend changes could be increased.)

Even if these cost of equity calculations differ by several percentage points, it is very clear that equity is not cheap for the auto companies, and that dividends must take a place of prominence in any financial planning. Auto company dividends are far from discretionary charges, they are almost totally fixed charges over the long term.

It is also clear that capital costs are sensitive to proportions of debt in the auto company capital structures, and because increased debt is a certainty for Chrysler, and a distinct possibility for GM and Ford under new spending conditions, it can be seen that the pending spending programs will have great importance to investors and to the corporate cost of capital.

7.8 AVERAGE WEIGHTED COST OF CAPITAL

Because of the dynamic effects of different funding proportions in the capital structure, and because different sources of capital have different costs, it is necessary for a company to include all costs of capital when investing in new projects. This section of analysis will briefly summarize average weighted cost of capital estimates for the four companies, using simple mathematical averaging techniques.

As can be seen in Exhibits 7-8 through 7-11, the companies have different implied costs of average capital in the capital structure, owing to several factors:

Cost of individual components,
Proportions of components, and
Tax rates.

In addition, there are a number of other factors which can influence the true cost of capital at any one time. It is very important to note that this analysis only deals with long range average rates, not the very important marginal costs of obtaining capital experienced by each of these companies. It is entirely possible, especially given the high prime rate at the time of writing, that the marginal cost of debt could be higher than the rates expressed in this average summary.

Even under these, perhaps, optimistic assumptions, it can be seen that the companies experience a high cost of using funds in new projects. The before-tax rates of cost expressed in these exhibits, are the rates of retail return which each company would have to make on each new project in order to maintain the value of the corporation. If new projects do not match these rates, or, more appropriately, the exact marginal rates experienced by each company, then performance begins to suffer, and the circular systems of declining value begin to operate.

In approximate terms, these cost rates are the rates to be applied in pricing out the incremental costs on new investment amounts. If sales and pricing functions do not allow recovery of these percentages, then the companies will experience slipping margins and poor performance. These estimates are only used for illustration. It is explicitly recognized that they do not properly reflect <u>marginal</u> cost, but <u>do</u> reflect <u>long term average</u> costs.

EXHIBIT 7-1. STOCK PERFORMANCE AGAINST MARKET

LINE NO		1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
151.0	CHRY PRICE OVER INDEX	.63	.45	.31	.29	.30	.25	.16	.13	.19	.17
152.0	FORD PRICE OVER INDEX	.44	.38	.45	.52	.51	.43	.42	.36	.44	.46
153.0	GM PRICE OVER INDEX	.82	.78	.85	.83	.72	.61	.52	.55	.68	.70
154.0											
155.0	CHRY DIV YLD OVER INDEX	1.05	1.43	.63	.67	.95	1.55	2.28	0.00	.43	1.15
156.0	FORD DIV YLD OVER INDEX	1.44	1.59	1.36	1.24	1.34	1.84	1.70	1.58	1.33	1.45
157.0	GM DIV YLD OVER INDEX	1.73	1.74	1.26	1.33	2.01	2.60	1.82	1.19	2.13	2.12
158.0											
159.0	CHRY P/E OVER INDEX	.59	1.39	0.00	.98	.46	.43	0.00	0.00	.34	.91
160.0	FORD P/E OVER INDEX	.55	.55	.60	.60	.48	.48	1.20	1.44	.52	.36
161.0	GM P/E OVER INDEX	.79	.76	2.08	.71	.61	.60	1.42	1.00	.67	.66
162.0											
163.0	CHRY DIV YLD OVER AAA	.52	.65	.30	.28	.37	.63	1.16	0.00	.19	.67
164.0	FORD DIV YLD OVER AAA	.71	.73	.65	.53	.53	.75	.86	.77	.59	.85
165.0	GM DIV YLD OVER AAA	.86	.80	.60	.57	.79	1.06	.92	.58	.95	1.23

EXHIBIT 7-2. STOCK PERFORMANCE DEFLATED

LINE NO		1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
100.0	IMP GNP DEFLATOR	.826	.867	.914	.960	1.000	1.058	1.164	1.272	1.338	1.418
101.0											
109.9	CHRY STOCK NOM.	62.52	43.94	25.95	28.39	33.31	27.36	13.55	10.95	19.07	16.77
110.0	CHRY STOCK 72	75.72	50.67	28.40	29.57	33.31	25.86	11.64	8.61	14.26	11.82
110.8											
110.9	CHRY DPS NOM.	2.00	2.00	.60	.60	.90	1.30	1.40	0.00	.30	.90
111.0	CHRY DPS 72	2.42	2.31	.66	.62	.90	1.23	1.20	0.00	.22	.63
111.1											
112.0	CHRY DIV YLD 72	.032	.046	.023	.021	.027	.048	.103	0.000	.016	.054
113.1											
114.0	CHRY EPS 72	7.50	2.16	-.16	1.74	4.27	4.54	-.79	-3.70	4.07	1.46
115.0	CHRY EPS NOM.	6.19	1.87	-.15	1.67	4.27	4.80	-.92	-4.71	5.45	2.07
119.0											
119.1											
119.9	FORD STOCK NOM.	43.15	37.39	37.05	51.38	55.92	45.99	34.61	30.61	45.14	45.31
120.0	FORD STOCK 72	52.25	43.11	40.56	53.51	55.92	43.47	29.73	24.06	33.74	31.95
120.8											
120.9	FORD DPS NOM.	1.92	1.92	1.92	2.00	2.14	2.56	2.56	2.08	2.24	3.04
121.0	FORD DPS 72	2.33	2.21	2.10	2.08	2.14	2.42	2.20	1.63	1.67	2.14
121.1											
122.0	FORD DIV YLD 72	.045	.051	.052	.039	.038	.056	.074	.068	.050	.067
123.1											
124.0	FORD EPS 72	5.56	4.64	4.18	5.14	6.82	6.90	2.65	1.53	6.25	9.99
125.0	FORD EPS NOM.	4.59	4.02	3.82	4.94	6.82	7.30	3.09	1.95	8.36	14.16
129.0											
129.1											
129.9	GM STOCK NOM.	81.27	76.16	70.43	81.98	78.85	65.89	43.16	47.09	69.55	68.56
130.0	GM STOCK 72	98.43	87.82	77.09	85.38	78.85	62.27	37.08	35.00	51.99	48.35
130.8											
130.9	GM DPS NOM.	4.30	4.30	3.40	3.40	4.45	5.25	3.40	2.40	5.55	6.80
131.0	GM DPS 72	5.21	4.96	3.72	3.54	4.45	4.96	2.92	1.89	4.15	4.80
131.1											
132.0	GM DIV YLD 72	.053	.056	.048	.041	.056	.080	.079	.051	.080	.099
133.1											
134.0	GM EPS 72	7.29	6.86	2.29	7.00	7.51	7.88	2.81	3.39	7.53	8.19
135.0	GM EPS NOM.	6.02	5.95	2.09	6.72	7.51	8.34	3.27	4.32	10.08	11.62

EXHIBIT 7-3. STANDARD INDEXES OF MARKET PERFORMANCE

LINE NO		1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1.0	STANDARD INDEXES OF MARKET PERFORMANCE										
1.1	S&P 500 STOCKS INDEX	98.7	97.8	83.2	98.3	109.2	107.4	82.8	86.2	102.0	98.2
2.0	AAA BOND INT. RATES	6.17	7.03	8.04	7.39	7.21	7.44	8.57	8.83	8.43	8.02
2.3	TRES BIL RATES	5.69	7.12	6.90	4.88	4.96	7.31	8.18	6.76	5.87	6.09
3.0	S&P 500 DIVID. YIELD	3.06	3.21	3.82	3.15	2.83	3.04	4.35	4.30	3.76	4.68
4.0	AVG. MKT. P/E RATIO	17.1	16.9	16.2	17.3	17.1	13.2	9.3	10.9	10.3	8.9
5.0	AVG. INFLATION	2.65	3.29	3.89	4.18	4.11	4.06	5.59	7.40	7.22	6.46

EXHIBIT 7-4. GM EQUITY PERFORMANCE

LINE NO		1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
70.0	GENERAL MOTORS EQUITY PERFORMANCE										
71.0	MEAN HI/LO PRICE	81.25	74.45	70.45	82.25	78.05	64.75	42.20	45.20	68.35	69.80
72.0	EARN PER SHARE	6.02	5.95	2.09	6.72	7.51	8.34	3.27	4.32	10.08	11.62
73.0	DIV PER SHARE	4.30	4.30	3.40	3.40	4.45	5.25	3.40	2.40	5.55	6.80
73.1	DIV PAYOUT/PROFIT,%	72.0	73.0	162.0	51.0	59.0	63.0	104.0	56.0	55.0	59.0
73.2											
74.0	AVG DIV YIELD,%	5.3	5.6	4.8	4.2	5.7	7.9	7.9	5.1	8.0	9.9
75.0	AVG P/E RATIO	13.5	12.8	33.7	12.2	10.5	7.9	13.2	10.9	6.9	5.9
75.1											
76.0	AVG PRICE	81.27	76.16	70.43	81.98	78.85	65.89	43.16	47.09	69.55	68.56
77.0	SHARES OUT,COMM	285.8	285.8	286.1	286.2	285.9	285.7	286.4	286.7	286.2	285.6
77.1											
78.0	LT, DEBT	284.3	317.0	281.2	615.6	790.7	756.5	876.6	1223.1	1069.8	1068.2
79.0	TOT EQUITY	9757	10228	9854	10805	11683	12567	12530	13082	14385	15767
80.0	TOT CAPITAL	10041	10545	10135	11421	12473	13323	13407	14305	15455	15767
80.1											
81.0	DEBT % TOT CAP	2.8	3.0	2.8	5.4	6.3	5.7	6.5	8.5	6.9	6.8
82.0	PAT	1720.5	1700.3	597.9	1923.5	2147.3	2383.0	936.5	1238.5	2885.1	3318.3
83.0	PAT RET ON CAP	.171	.161	.059	.168	.172	.179	.070	.087	.187	.210

EXHIBIT 7-5. FORD EQUITY PERFORMANCE

LINE NO		1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
40.0	FORD EQUITY PERFORMANCE										
41.0	MEAN HI/LO PRICE	43.25	37.60	37.45	50.85	56.35	48.40	33.25	31.05	42.20	45.35
42.0	EARN PER SHARE	4.59	4.02	3.82	4.94	6.82	7.30	3.09	1.95	8.36	14.16
43.0	DIV. PER SHARE	1.92	1.92	1.92	2.00	2.14	2.56	2.56	2.08	2.24	3.04
43.1	DIV PAYOUT/PROFIT, ALL	42.0	48.0	50.0	40.0	31.0	35.0	83.0	107.0	27.0	21.0
43.2											
44.0	AVG. DIV. YIELD,%	4.4	5.1	5.2	3.9	3.8	5.6	7.4	6.8	5.0	6.8
45.0	AVG. P/E RATIO	9.4	9.3	9.7	10.4	8.2	6.3	11.2	15.7	5.4	3.2
45.1											
46.0	AVG. PRICE	43.15	37.39	37.05	51.38	55.92	45.99	34.61	30.61	45.14	45.31
47.0	SHARES OUT,MIL	136.5	135.3	134.9	129.3	125.9	123.5	116.5	117.4	117.7	118.4
47.1											
48.0	LT.DEBT,$	341.8	304.6	456.8	802.2	993.9	977.0	1476.7	1533.9	1411.4	1359.7
49.0	TOT EQUITY	4946.6	5222.0	5467.9	5547.2	5961.3	6405.1	6241.3	6376.5	7107.0	8456.9
50.0	TOT CAPITAL	5288.4	5526.6	5924.7	6349.4	6955.2	7382.1	7718.0	7910.4	8518.4	9816.6
50.1											
51.0	DEBT % TOT CAP	6.5	5.5	7.7	12.6	14.3	13.2	19.1	19.4	16.6	13.9
52.0	PAT	626.4	544.0	515.3	638.6	858.4	901.4	359.9	228.9	984.1	1677.0
53.0	PAT ERET ON CAP	.118	.098	.087	.101	.123	.122	.047	.029	.116	.171

EXHIBIT 7-6. CHRYSLER EQUITY PERFORMANCE

LINE NO		1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
10.0	CHRYSLER EQUITY PERFORMANCE										
11.0	MEAN HI/LO PRICE	60.40	44.75	25.95	28.95	34.80	29.55	13.55	10.95	16.40	17.25
12.0	EARN. PER SHARE	6.19	1.87	-.15	1.67	4.27	4.80	-.92	-4.71	5.45	2.07
13.0	DIV. PER SHARE	2.00	2.00	.60	.60	.90	1.30	1.40	0.00	.30	.90
13.1											
14.0	AVG. DIV. YIELD , %	3.2	4.6	2.4	2.1	2.7	4.7	9.9	0.0	1.6	5.4
15.0	AVG. P/E RATIO	10.1	23.5	0.0	17.0	7.8	5.7	0.0	0.0	3.5	8.1
15.1											
16.0	AVG. PRICE	62.52	43.94	25.95	28.39	33.31	27.36	13.55	10.95	19.07	16.77
17.0	SHARES OUT	47.0	47.9	49.5	50.9	52.4	54.4	59.3	60.1	60.2	60.3
17.1											
18.0	LT. DEBT	535.3	587.0	791.1	818.4	789.6	955.9	995.4	1067.4	1047.7	1240.3
19.0	TOT EQUITY	2110.0	2154.0	2156.0	2268.9	2489.0	2727.7	2660.4	2409.2	2815.3	2924.6
20.0	TOT CAPITAL	2645.3	2741.0	2947.1	3087.3	3278.6	3683.6	3655.8	3476.6	3863.0	4164.9
20.1											
21.0	DEBT % TOT CAP	20.2	21.4	26.8	26.5	24.1	26.0	27.2	30.7	27.1	29.8
22.0	PAT	290.9	89.6	-7.4	85.1	223.6	261.3	-54.5	-283.1	328.4	124.8
23.0	PAT RET ON CAP	.110	.033	-.003	.028	.068	.071	-.015	-.081	.085	.030

EXHIBIT 7-7. COST OF EQUITY CAPITAL USING CAPITAL ASSET PRICING MODEL APPROACH.

Assume:

- Expected market return = 12.9%
- Risk free rate 6.5% (short term Treasury bills early 1978)

Then: Cost of Equity Capital equals,

Cost = Risk free rate + Beta (Market rate - Risk free rate)

Company	Beta*	Cost of Equity Capital
GM	1.05	13.22%
FORD	1.05	13.22%
CHRYSLER	1.10	13.54%
AM	.90	12.26%

*Value Line

EXHIBIT 7-8. GM AVERAGE WEIGHTED COST OF CAPITAL ESTIMATE

1977 Long-Term Capital		Weight	Cost %	Average Weighted Cost
*Long-Term Debt	1,068.2	.063	**4.04	.254
Pfd. Stock	283.6	.017	4.55	.077
Other Equity	15,480.3	.920	13.22	12.66
TOTAL	16,832.1	1.000		12.49%

Average Weighted Cost after Tax = 12.49%

Implied Before Tax Cost = 23.43% (@ 46.7% rate)

*Ignore current LTD

**7.6% Before Tax, 1977 10-K, After tax = 4.04% @ 46.7% tax rate

EXHIBIT 7-9. FORD AVERAGE WEIGHTED COST OF CAPITAL ESTIMATE

1977 Long-Term Capital		Weight	Cost %	Average Weighted Cost
*Long-Term Debt	1,359.7	.136	**4.3	.585
Minority Int.	147.9	.015	13.22	.1983
Equity	8,456.9	.848	13.22	11.21
TOTAL	9,964.5	.999		11.99%

Average Weighted Cost after Tax = 11.99%

Implied Before Tax Cost of = 21.41% (@ 44% rate)

*Ignore current LTD

**7.6% before tax, 1977 10-K, After tax = 4.3% @ 44% tax rate.

EXHIBIT 7-10. CHRYSLER AVERAGE WEIGHTED COST OF CAPITAL ESTIMATE

1977 Long-Term Capital		Weight	Cost%	Average Weighted Cost
*Long-Term Debt	1,240.3	.280	**4.3	1.204
Min. Int.	19.3	.004	13.54	.054
Pfd. Stock	240	.054	11	.594
Other Equity	2,924.6	.660	13.54	8.94
TOTAL	4,424.2	.998		10.79%

Average after Tax Cost = 10.79%

Implied before Tax Cost = 18.60% (@42% rate)

*Ignore current LTD

**7.4% before tax, 1977 10-K, After tax = 4.3% @ 42% tax rate.

EXHIBIT 7-11. AM AVERAGE WEIGHTED COST OF CAPITAL ESTIMATE

1977 Long-Term Capital		Weight	Cost%	Average Weighted Cost
*Long-Term Debt	86.3	.212	**3.55	.753
Equity	320.8	.788	12.26	9.66
TOTAL	407.1	1.000		10.41%

Average after Tax Cost = 10.41%

Implied before Tax Cost = 20.82% (Assume 50% tax rate)

**Before tax 7.1%, 1977 10-K, After tax = 3.55 @ 50% rate (This is understated owing to tax credits.)

EXHIBIT 7-12. GM EQUITY HISTORY

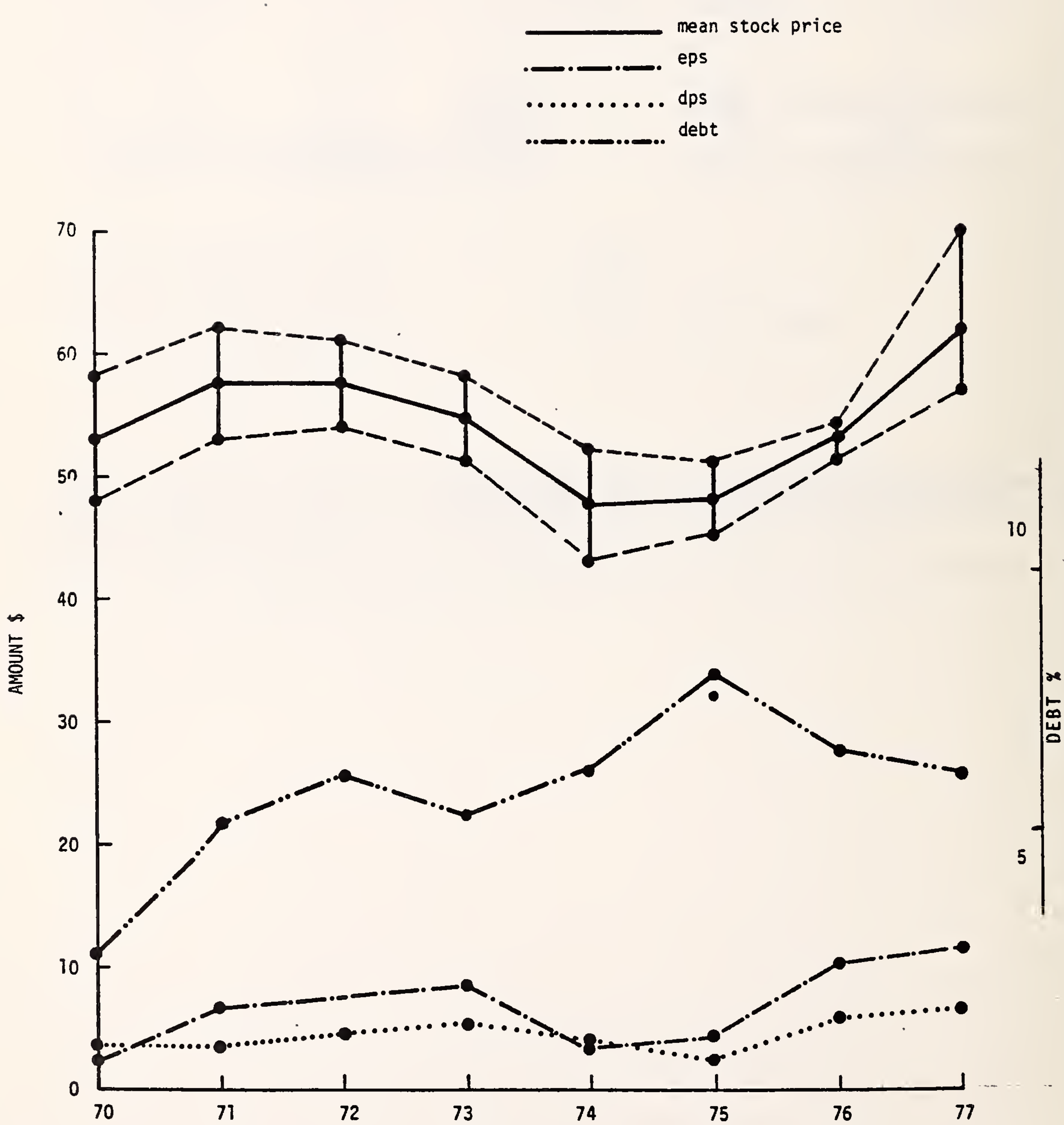


EXHIBIT 7-13. FORD EQUITY HISTORY

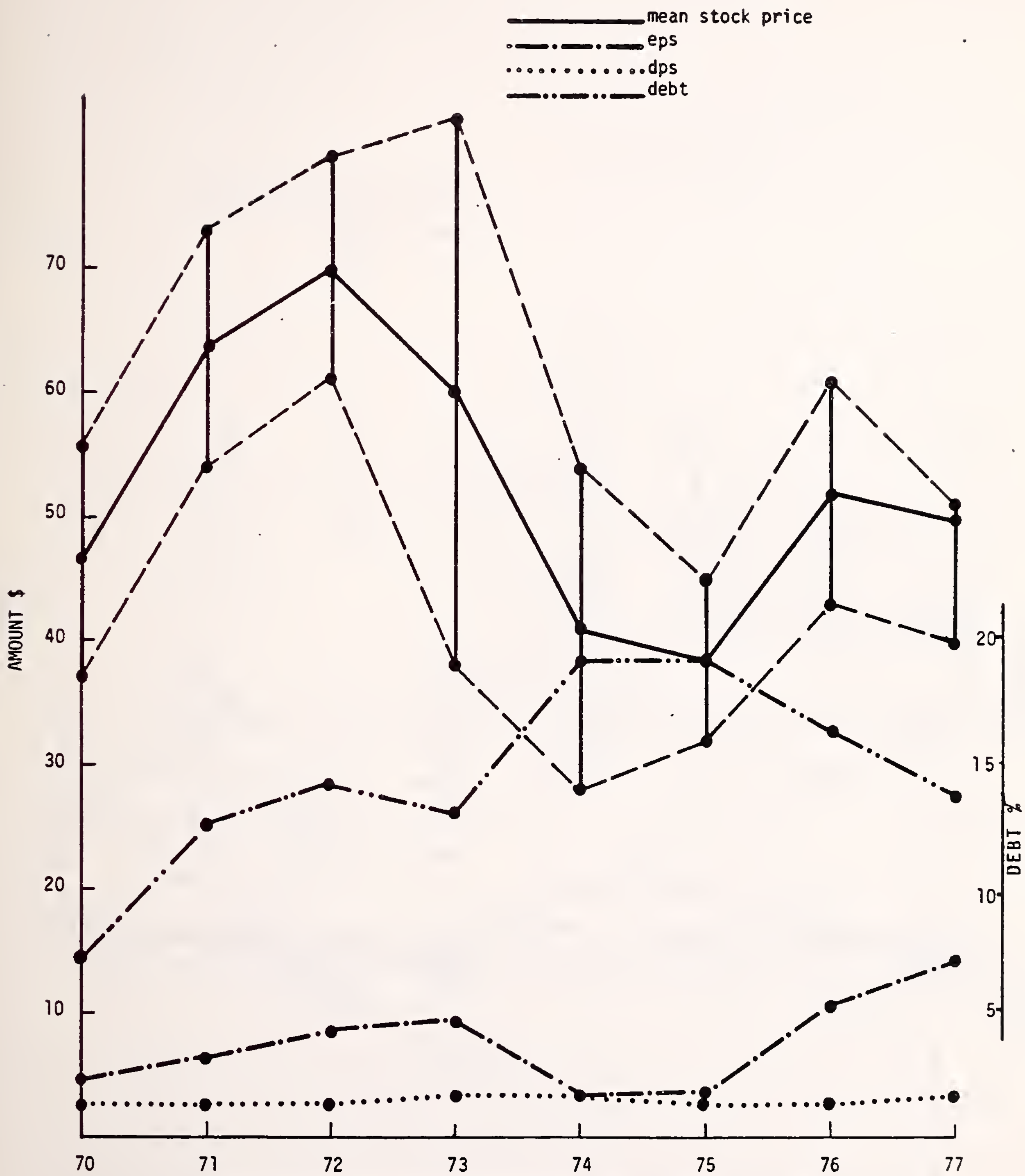


EXHIBIT 7-14. CHRYSLER EQUITY HISTORY

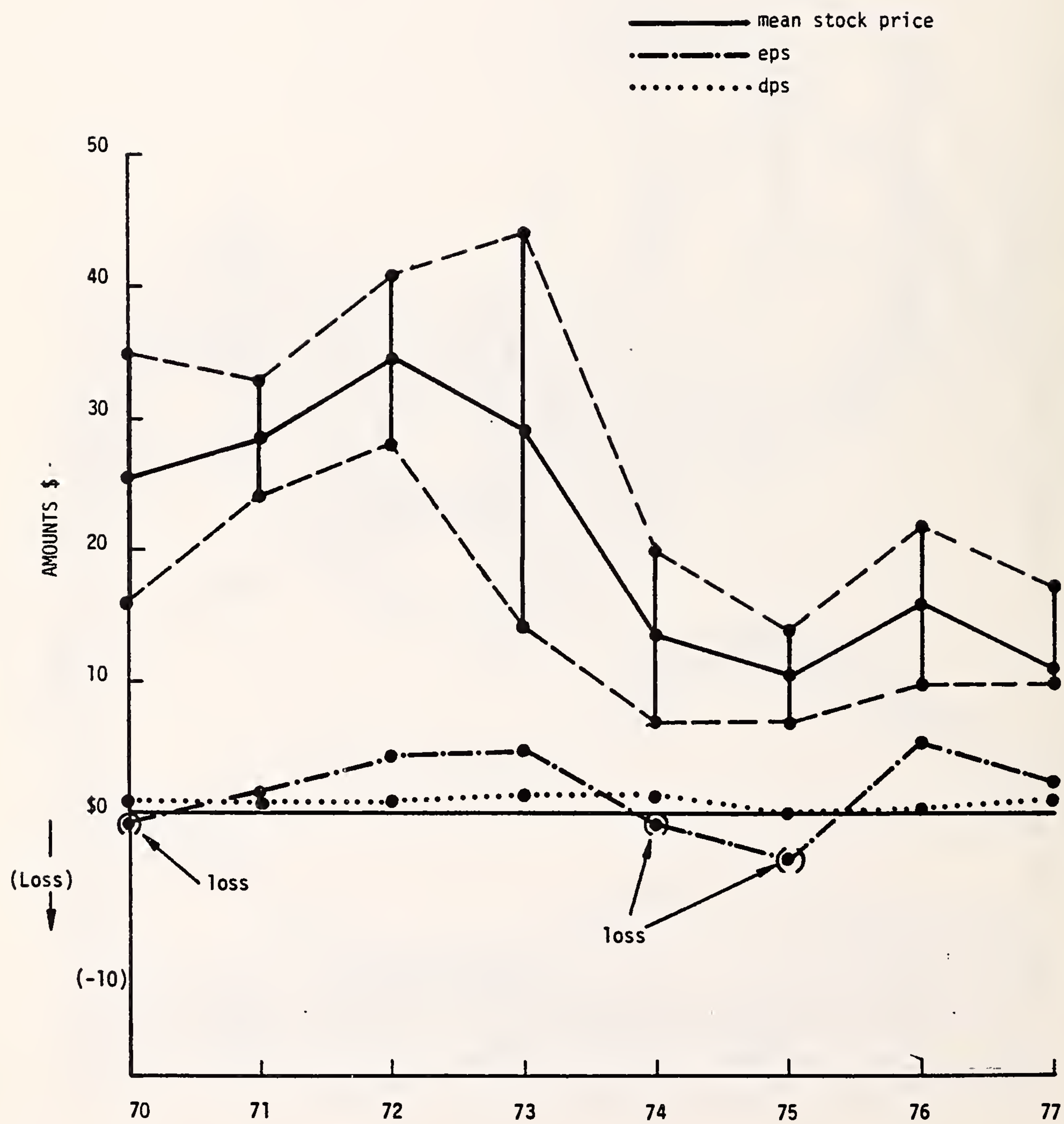
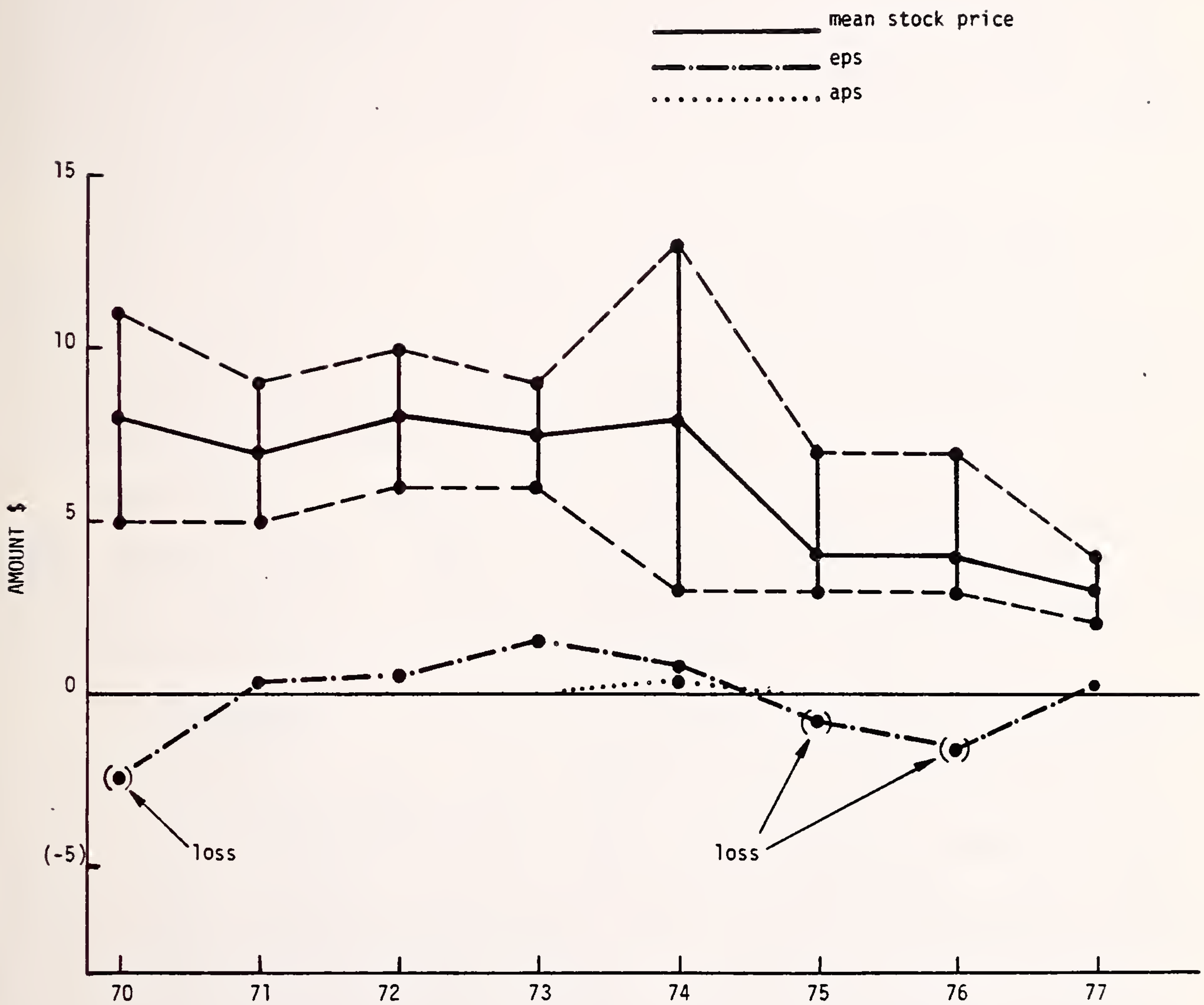


EXHIBIT 7-15. AM EQUITY HISTORY



8. HISTORICAL CASH FLOWS: SOURCES AND USES

8.1 INTRODUCTION

Earlier sections of this document highlighted the importance of cash flow in business operations. Later sections will project company cash flows into the future under conditions of regulatory spending. The purpose of this section is to survey briefly the behavior of cash flow elements in the auto companies during recent history, in order to provide a basis for later analysis of changes pending under regulatory spending conditions.

The analytic format used in this section is taken from the Statement of Changes in Financial Position for each of these companies, which is contained in the 10-K annual reporting form. Slight modifications have been made to this format for illustration of the major sources and uses of funding, but all major flows are substantially as reported in the 10-K form.

Cash flows, or funds flows as they are sometimes called, take several basic forms. There are two classes of events which represent infusions of funds, as measured on the balance sheet, and there are two classes of events representing funds drains.

a. Infusions. (Also called sources or additions to working capital.) One class of funds, infusions, derives from reduction in assets. When a plant is sold or written off, the corporation experiences an infusion of funds. When the company collects some credit outstanding, this reduces the Accounts Receivable asset account, and brings funding into the financial system. The second class of events representing funds infusions is any increase in liabilities. When a company borrows more money or obtains trade credit, the liability accounts increase and cash or funds flow into the company.

b. Funds drains. (Also called applications, uses, or disbursements.) The first type of cash or funding outflow is produced by any increase in assets. If a company purchases new plant or equipment, the asset accounts increase, and funds naturally flow out of the financial system. If a company extends more credit to customers, Accounts Receivable increase, and the funds flow out to credit sales. The second type of funding drain is represented by any reduction in liabilities. This happens when a company pays down a loan or trade account, and uses funds for this purpose.

In actual practice, these infusions and drains happen daily and simultaneously in small increments of all accounts; in the sources and uses document issued at year end, all of these minor daily flows are summed and traced through the balance sheet accounts to summarize net changes for the year.

Once all of these cash and funds flows have been summarized in sources and uses form, it is relatively easy to see what financial or operating strategies the company has followed during the year, and what financial pressures it has encountered. Long range financial summaries in the form displayed in this section are very useful for charting the cumulative financial pressures upon each company, and will highlight any substantial changes in the methods of doing business.

Under the higher spending conditions expected for the next five to eight years, these financial streams will be substantially altered for each of the auto companies. Proforma analysis in Section 10 contains a number of slightly less detailed sources and uses summaries, which can be compared to statements displayed in the exhibits to this section, to sense overall changes in the proportions of funding flows. One of the most significant comparisons can be made between the profit and capital spending flows; this comparison reveals the root of financial risk facing the auto companies during the next few years.

8.2 GENERAL MOTORS

Exhibit 8-1 displays the funds flow summaries for GM over the past nine years. Note that the last column in the exhibit displays a cumulative total for each flow line to illustrate the long term aggregate sources and uses pressures on each of the financial areas.

Lines 6 through 9 provide summaries of sources from operations. This is comparable to the cash flow statements developed beneath the proforma income summaries in Section 10. As mentioned in earier sections of analysis, it can be seen that profit provides only one part of operating cash flow; the other major infusions take the form of depreciation and amortization. When displayed in the manner of this exhibit, it is very clear how depreciation policies and the acquisition of assets are major influences upon corporate cash flow.

Note in line 38 that GM has historically derived approximately 50 percent of its sources from profits, and a similar amount from depreciation and amortization. This is highly significant, because it has allowed GM considerable flexibility in financing by avoiding the heavy fixed obligations of debt or other more restrictive external sources of funds. (Note that even internally generated capital has a cost, however, owing to the nature of equity capital costs and the demands made by investors.) This exhibit reveals that GM has relied very little upon long term debt, with only about 5 percent of its funding deriving from this source.

It is important to realize that this financial picture of internal financing has changed for GM. Comparing the first five years of the exhibit to the last five year period, reveals that GM has been forced into a more regular annual debt position, even though some of this was merely to roll over old debt. This is a significant change, which shows up in calculations of interest coverage on the income statements of the last decade. At times in the past, GM had income covering interest charges more than 50 times, but this ratio has dropped to as low as 9 times in recent years. This is part of the overall decline in North American margins for the company, and the profit effect can be seen in the increasing proportions of debt in this sources and uses summary.

Given this funding background, it can be seen that any additions of debt to GM's books will be quite visible. For this reason, even though GM has high dollar profits (not necessarily percentage ones compared to other industries), the company will be sensitive to changes in the external funding of the capital structure.

Another significant financial policy shows up in lines 23 and 45. Notice that a very large portion of GM's funding flows out to investors. This is what has kept GM valuable to investors, and it reveals the importance of dividends in the financing programs of the company. The size of this line indicates the impact of the cost of capital upon the company and reveals why equity is not currently a cheap form of financing (including internally generated equity from profits).

Lines 24 and 25 represent purchases of plant and equipment. This portion of the funds flow structure will change quite rapidly during the next few years, with projected spending increasing 40 to 50 percent over long term averages expressed here. This will place strain upon all flows, and it can be seen by comparing the capital spending lines to the profit and cash flow lines, that any increasing spending when faced with slower profits will easily cause risk to the internal funding process. Note the effects of such spending increases later in Section 10.

8.3 FORD

Exhibit 8-2 displays the sources and uses summaries for Ford. Notice that Ford is also able to generate much of its capital internally, although the proportions from earnings are not as large as those for GM (line 38). It should also be noted that much of this corporate earnings stream comes from overseas operations, which in recent years have provided between 40 and 70 percent of corporate pre tax profits.

Ford, therefore, has been forced to issue larger amounts of long term debt (line 13), although it has also been able to pay down this form of financing quite readily (line 23). The pattern of debt here reveals that Ford has a lower ability to spend on products and sustain sales declines at the same time; note the cyclical behavior of all percentage calculations in lines 37 through 47. This will be the company's greatest financial risk as it increases its product spending over the next few years. Note how badly the company was squeezed in the recent 1974 to 1975 recession. At that time, the company had the ability to defer capital spending (see lines 22 and 23), but in the future, such spending follows regulatory schedules, and if the market slips, Ford could be forced into a much less favorable cash flow position.

The tighter financing also shows up in the dividend payout schedule. Note that Ford has allocated increasing amounts of cash flow to dividends, barring the recent recession, which further confirms the changing nature of Ford capital discovered in equity analysis. Ford is faced with increasing investor demands for payout in profits, which is slowly but surely enforcing a greater cash flow cost upon the company. (The cash flow percentage of dividends is declining only because Ford is buying back stock to keep the shareholder base small; the cost per investor, however, is rising. The purchase of stock is one of the charges included in line 25, which is just as strong a cash flow charge as dividends, although not so permanent.)

It can also be seen in this exhibit, that Ford must allocate large amounts of cash flow to capital spending. Note that even though the proportion of capital spending in the sources and uses summary is similar to GM's, Ford has a lower percentage of profits from which to supply this spending. This means that Ford will be more greatly affected by increases in spending, at least in terms of the need for external capital. This is important, because Ford will be increasing its product spending by almost 100 percent over long term averages here for the peak spending period ahead. The effects of this can be seen by comparing the cash generation line in this exhibit (line 29) to similar lines in proforma estimates in Section 10.

8.4 CHRYSLER

Chrysler's very different financial position shows clearly with only a brief reading of Exhibit 8-3. Note, first of all, the much lower percentage of funding provided by operations. Note the even smaller amount of funding provided (or drained) by profits, and it becomes clear what can happen to a company whose long term profit picture is becoming tighter. Line 13 reveals that Chrysler has had to seek an increasing amount of long term debt because its internal funding was simply not strong enough to support all cash flow items.

Comparing this exhibit to the ones for Ford and GM shows that Chrysler had to seek this kind of external capital during periods, such as the very recent boom market, in which the other companies were generating substantial cash flow. This is Chrysler's current dilemma, which faces no relief but only higher cash drains in the capital spending areas.

This document has often mentioned the Chrysler pattern of deferring capital spending during bad years, which shows up clearly in this exhibit. Compare the capital spending line patterns to the infusions or drains of other funds, and it can be seen how a less deferrable spending pattern would quickly force this company to sustained negative cash flow years. This type of behavior becomes dramatic when one projects future spending in the amounts planned for regulatory schedules. Section 10 reveals that under historic averages of performance, and the new spending amounts, Chrysler faces cash flow risks even larger than those displayed in this historical summary.

Because of this pending spending period, it becomes necessary to view Chrysler's long term ability to obtain external capital. Lines 13 and 14 show this historic capability. As was mentioned in the last section, the equity markets have become very expensive, and Chrysler's equity financing line reveals this effect. The company has effectively been locked into debt as the only external financing option, and it has extended itself to limits in this area. Notice that for the entire nine year period, Chrysler was able to issue about $1.4 billion in long term debt when it was still capable of issuing equity (which increases debt capacity). Section 10 proforma estimates will reveal much larger funding needs over the next five years during a period when equity capital will be hard to come by in normal fashion.

This reveals the extreme financing problem faced by Chrysler, and is one of the reasons that the company had to sell off its European operations. Chrysler's reserves are low, as revealed in this historical summary, and they will be only facing more drains, as illustrated in Section 10.

8.5 AMERICAN MOTORS

The analysis in this section will not deal, in detail, with AM's financial statements. This is not at all because regulatory spending will have little effect upon them, but rather because these statements are not easily displayed in summary fashion. AM's sources and uses history is a collection of constant and complex refinancing projects, and a long-term picture of operating losses. AM has employed every fund source available and has still come up short of cash in almost every year.

The most significant behavior of AM's funding is its constant renegotiation. For example, during this last year, AM had to exchange short term and long term credit sources and to defer the payments due on its debt. This is nothing new, and such changes in financing can only be traced thoroughly by following all notes in the company 10-K forms on an annual basis.

Such investigation merely reveals, in sum however, that AM's capital position will not change radically or swiftly unless a large source of capital can be found. AM's pending marketing partner, Renualt, has suggested strongly that it will not be a supplier of capital to AM, so, at the moment, one can only presume that AM's funding picture will remain marginal and correlated with the small ability to generate profits and new credit.

Regulatory requirements will only be met, then, by assembling the technologies designed by others in passenger cars, by continued strong sales in the Jeep line, and by borrowing capital from a variety of sources which are already heavily loaned out to AM.

EXHIBIT 8-1. GM SOURCES AND USES HISTORY

YEAR	1969	1970	1971	1972	1973	1974	1975	1976	1977	9
SALES	24295	18752	28263	30435	35798	31549	35724	47181	54961	0
SOURCES										
EARNINGS	1710	609	1935	2162	2398	950	1253	2902	3337	17256
DEPRECIATION	765	821	873	912	902	846	906	939	974	7938
AMORTIZATION	891	677	917	874	1081	858	1180	1296	1406	9180
OTHER	-36	-42	-164	-97	-149	107	66	58	-157	-414
TOTAL FROM OPERATIONS	3330	2065	3561	3851	4232	2761	3405	5195	5560	33960
OTHER SOURCES										
NEW DEBT	35	0	334	175	0	120	753	113	130	1660
REDUCE PPE	42	32	57	57	67	67	98	93	110	623
STOCK	0	0	1	0	0	0	0	3	2	6
OTHER	2	-33	1	-90	144	0	-47	42	122	141
TOTAL SOURCES	3409	2064	3954	3993	4443	2948	4209	5446	5924	36390
APPLICATIONS/USES										
DIVIDENDS	1240	983	985	1285	1514	986	701	1603	1958	11255
CAP SPEND PPE	1043	1134	1012	940	1163	1458	1201	999	1871	10821
CAP SPEND TOOLS	863	1148	630	898	940	1095	1035	1308	1775	9692
INVEST IN SUBSIDIARIES	153	28	47	9	158	13	13	94	139	654
PAY DEBT-APPROX	0	34	0	0	34	0	406	280	106	860
OTHER	-11	18	17	-173	2	51	1	0	1	-94
TOTAL APPLICATIONS	3288	3345	2691	2959	3811	3603	3357	4284	5850	33188
CHANG IN WORKING CAPITAL	121	-1281	1263	1034	632	-655	852	1162	74	3202
% OF SOURCES FROM OPS	.98	1.00	.90	.96	.95	.94	.81	.95	.94	.93
PERCENT OF SOURCES FROM:										
EARNINGS	.50	.30	.49	.54	.54	.32	.30	.53	.56	.47
DEPRCN & AMORT	.49	.73	.45	.45	.45	.58	.50	.41	.40	.47
LONG TERM DEBT	.01	0.00	.08	.04	0.00	.04	.18	.02	.02	.05
STOCK	0.00	0.00	.00	0.00	0.00	0.00	0.00	.00	.00	.00
REDUCE PPE	.01	.02	.01	.01	.02	.02	.02	.02	.02	.02
% OF SOURCES PAID TO:										
DIVIDENDS	.36	.48	.25	.32	.34	.33	.17	.29	.33	.31
CAPITAL SPENDING	.56	1.11	.42	.46	.47	.87	.53	.42	.62	.56
DEBT PAYMENTS-APPROX	0.00	.02	0.00	0.00	.01	0.00	.10	.05	.02	.02
INVEST IN SUBS.	.04	.01	.01	.00	.04	.00	.00	.02	.02	.02

EXHIBIT 8-2. FORD SOURCES AND USES HISTORY

1.0	YEAR	1969	1970	1971	1972	1973	1974	1975	1976	1977	9
1.1											
2.0	SALES	14755	14979	16433	20194	23015	23620	24009	28839	37841	0
3.0											
4.0	SOURCES										
5.0											
6.0	EARNINGS	546	515	656	870	906	361	227	983	1672	6736
7.0	DEPRECIATION	385	413	427	455	485	530	583	589	628	4495
8.0	AMORTIZATION	418	410	396	458	463	392	435	431	487	3890
9.0	OTHER	36	25	3	22	172	77	42	25	234	636
10.0											
11.0	TOTAL FROM OPS	1385	1363	1482	1805	2026	1360	1287	2028	3021	15757
11.1											
12.0	OTHER SOURCES										
13.0	NEW LONG TERM DEBT	36	228	386	401	186	578	217	186	69	2287
14.0	NEW STOCK	3	3	38	31	11	3	29	11	40	169
15.0	OTHER	-3	-4	1	7	19	16	7	15	-12	46
16.0											
17.0	TOTAL SOURCES	1421	1590	1907	2244	2242	1957	1540	2240	3118	18259
18.0											
19.0	DISPOSITIONS/USES										
20.0											
21.0	DIVIDENDS	260	259	265	273	317	298	242	263	359	2536
22.0	CAP SPEND PPE/TOOLS	950	1037	1007	1142	1403	1414	911	1024	1744	10632
23.0	PAY DEBT	73	76	41	209	203	78	160	309	121	1270
24.0	INVEST IN SUBSIDIARIES	117	211	5	51	120	33	17	34	82	670
25.0	OTHER	48	32	325	231	223	294	45	30	70	1298
26.0											
27.0	TOTAL DISPOSITIONS	1448	1615	1643	1906	2266	2117	1375	1660	2376	16406
28.0											
29.0	CHG IN WORK. CAPITAL	-27	-25	264	338	-24	-160	165	580	742	1853
30.0											
31.0											
32.0											
35.0	% OF SOURCES FROM OPERAT	.97	.86	.78	.80	.90	.69	.84	.91	.97	.86
36.0											
37.0	PERCENT OF SOURCES FROM:										
38.0	EARNINGS	.38	.32	.34	.39	.40	.18	.15	.44	.54	.37
39.0	DEPRECIATION & AMORTIZAT	.57	.52	.43	.41	.42	.47	.66	.46	.36	.46
40.0	LONG TERM DEBT	.03	.14	.20	.18	.08	.30	.14	.08	.02	.13
41.0	STOCK	.00	.00	.02	.01	.00	.00	.02	.00	.01	.01
42.0											
43.0	% OF SOURCES PAID TO:										
44.0	DIVIDENDS	.18	.16	.14	.12	.14	.15	.16	.12	.12	.14
45.0	CAPITAL SPENDING	.67	.65	.53	.51	.63	.72	.59	.46	.56	.58
46.0	DEBT PAYMENTS	.05	.05	.02	.09	.09	.04	.10	.14	.04	.07
47.0	INVEST IN SUBS.	.08	.13	.00	.02	.05	.02	.01	.02	.03	.04

EXHIBIT 8-3. CHRYSLER SOURCES AND USES HISTORY

1.0	YEAR	1969	1970	1971	1972	1973	1974	1975	1976	1977	0
2.0											
3.0	SOURCES										
4.0											
5.0	EARNINGS	99	-7	83	220	255	-41	-207	328	125	855
6.0	DEPRECIATION OF PPE	170	176	176	173	180	182	123	141	165	1486
7.0	AMORTIZATION OF TOOLS	167	172	183	196	192	139	170	261	222	1702
8.0	OTHER FROM OPERATIONS	-9	13	29	-21	72	26	-4	11	-27	90
9.0											
10.0	TOTAL FROM OPERATIONS	427	354	471	568	699	306	82	741	485	4133
11.0											
12.0	OTHER SOURCES										
13.0	NEW LONG TERM DEBT	91	241	38	41	241	227	149	87	279	1394
14.0	NEW STOCK ISSUED	40	38	59	46	52	64	8	2	0	309
15.0	RETIREMENT OF PPE	23	15	14	16	13	7	9	49	5	151
15.5	OTHER	1	12	0	16	18	-7	-7	53	123	209
16.0											
18.0	TOTAL SOURCES	582	660	582	687	1023	597	241	932	892	6196
19.0											
20.0	APPLICATIONS OR USES										
21.0											
22.0	DIVIDENDS	94	29	30	47	69	79	0	18	54	420
23.0	CAP SPEND PPE	374	174	114	169	331	226	163	227	386	2164
24.0	CAP SPEND TOOLS	271	242	136	166	298	241	220	197	336	2107
25.0	PAY LONG TERM DEBT	39	37	26	70	75	187	77	70	104	685
26.0	OTHER	44	145	132	43	61	21	115	0	2	563
27.0											
28.0	TOTAL APPLICATIONS/USES	822	627	438	495	834	754	575	512	882	5939
29.0											
30.0	CHANGE IN WORKING CAPITAL	-240	33	144	192	189	-157	-334	420	10	257
38.0											
39.0											
40.0	% OF SOURCES FROM OPERAT	.73	.54	.81	.83	.68	.51	.34	.80	.54	.67
41.0	PERCENT OF SOURCES FROM:										
41.5	EARNINGS	.17	-.01	.14	.32	.25	-.07	-.86	.35	.14	.14
42.0	DEPRECIATION AND AMORTIZA	.58	.53	.62	.54	.36	.54	1.22	.43	.43	.51
43.0	LONG TERM DEBT	.16	.37	.07	.06	.24	.38	.62	.09	.31	.22
43.0	STOCK	.07	.06	.10	.07	.05	.11	.03	.00	0.00	.05

9. RANGE OF FINANCIAL RISK

NOTE:

This Section should be viewed as distinct from the other sections in this document. The methods applied here have been derived only for the purposes of illustration, and have not been factored into analyses contained in other sections. This illustration was prepared in response to requests for analysis of financial performance under broader conditions of risk, and should not be considered predictive, except within the assumptions of the methods used.

9.1 INTRODUCTION

Because it was necessary to evaluate an uncertain and risky future, because it was noted that management had a variety of options available to meet financial needs, and for the purpose of illustrating the need for financial flexibility, it was deemed necessary to devise a method of analysis which could describe the ranges of risk which the auto companies would face in the future. The point of this analysis is to illustrate that "normal" business conditions, defined as the probabilistic measurements of history, can force a wide variety of risks and financial pressures into the companies, and to show how the levels of risk increase directly with increased product development spending.

This section, then, has three main purposes:

1. To illustrate the future risk environment which can be produced by projecting into the future the probabilities of events which have already occured,
2. To show that financial flexibility is necessary because of the ranges of possible financial performance, and
3. To show how the entire range of possibilities becomes more financially risky as capital spending increases.

9.2 OUTPUT

The output of this analytic method can be defined as "financial pressure" measured in dollar terms. This is essentially the pressure to which the balance sheet is subjected, above and beyond the strictly average historical measurements of the business in the balance sheet. The method used is a proforma framework, similar in construction to those used in other sections, but with a very different behavioral application. Proforma analysis is used elsewhere in this document as a framework within which to evaluate a number of specific financial risks and effects, but in this section, that proforma framework is used to collectively summarize all pressures which could occur, without specific regard for details.

In a strictly mechanical sense, the "financial pressure" output value from this framework is a measure of external financing need, because it indicates the amount of the balance sheet unfunded from cash flow each year. However, because of the construction of the balance sheet, this output cannot be thought of as a prediction of external need. The balance sheets are constrained to historical rates of credit and working capital, and are allowed only to increase with a linear percentage of sales. This means the "bottom line" financial need estimate includes not only true external need, but also dollar measures of the pressures on short term credit, dividends, cash reserves, and other items which exceed the historical base growth of these items.

For example, if the external need estimate on one run of the system is nominally $500 million, this could contain $200 million of true external need, but also $100 million capability (or pressure) to extend short term credit, $200 million capability (or pressure) to cut dividends, and $100 million capability (pressure) to cut cash reserves.

The probabilistic construction of the balance sheet, using historical variances is such that when the "financial pressure" measurement begins to exceed:

$500 million for GM,
$400 million for Ford,
$100 million for Chrysler, and
$30-$40 million for AM,

then, the estimate of "financial pressure" will contain a rapidly increasing amount of true external funding need. Until the above approximate limits are reached, the "financial pressure" measure can be viewed primarily as pressure to modify internal finances, which still indicates financial risk. Above these limits, it can be assumed that the company will be forced to seek some external funding or to make more radical adjustments, such as cuts in dividends or cash reserves.

It should be noted that the important point of this analysis is the spread of data, not the concentration of it. This is not an attempt to use probabilities to predict a "most likely" point estimate, but is rather an illustration of how large a range of financial conditions can be produced by previously defined business conditions, and, therefore, the range of contingencies a company must be able to meet. The financial resources of the corporation must be maintained in such a way that a variety of contingencies can be met, and anything which ties up capital and limits this ability to respond, will greatly increase the risks to financial success, or even to survival, if the cash flow problem becomes chronic.

All of the input data and output estimates in this analysis are defined in probabilistic terms, and because of this, it is important to avoid concentrating on the mean values of the output. Proper interpretation of this analysis requires viewing the entire distribution of output data, to gauge the full range of possibilities which the analysis implies. It is incorrect, in fact, to use the mean estimates of the data for anything more than a brief summary of the differences between levels of risk, for example, to summarize the increase in risk when moving from lower capital spending estimates to higher ones. The full distribution (See Exhibit 9-2) is more appropriately descriptive of the range of risks.

9.3 METHOD

This analysis uses computer simulation techniques to describe combinations of probabilistically defined data. In general, each company is represented by a set of attributes, approximately equivalent to a balance sheet. This set of attributes defines the "average" structure of business over the past ten years, removing the behavioral pressures from recessions and peak sales years. This assumes the business has some "normal" underlying structure which is only temporarily changed by boom and bust, but which has a steady relationship over longer periods of time.

The cyclical pressures are defined in the input variables which are entered into the attribute system to calculate corporate performance under a variety of conditions, all of which have existed in the past. These input variables are constructed as described below. There are three major classes of variables.

9.3.1 Sales

Historical sales data, defined in units and revenue, were examined to discover their volatility and ranges of annual growth or decline. Future projections of sales were taken from a variety of sources, including company estimates and forecasts issuing from sources described in Section 3. These behavioral expressions were then assumed to represent the range of future possibilities, and an overall distribution of annual revenue sales was derived with the approximate summary measures shown in Exhibit 9-15. Note that the ranges increase over time. Note also, that the ranges increase with different rates for the different companies. These ranges were constrained for Chrysler because of the pending European sale. The range is naturally constrained for GM because its size in relation to the total market is large. The wider range of possibilities for Ford reflects a different pattern of overseas growth. The wider range increase for AM reflects the volatility and uncertainty of its sales.

These probability distributions were entered into the simulation system to represents the ranges of likely sales. To test for recessionary or boom conditions, the basic distribution was at times essentially split into three distributions, whose means were approximately the .3, .5, and .7 fractiles indicated in Exhibit 9-15. This constrains the overall simulation to produce estimates of extreme sales in combination with the normal distributions of other input variables, which causes ultimate output to more fully measure the bounds of financial pressure.

9.3.2 Profits

Historical percentages of profits in relationship to sales were also summarized probabilistically. These percentage returns on sales were then adjusted for divident payout, and the final profit measure is really the percentage of sales contributed to retained earnings. This allows an average divident payout to investors of approximately these amounts:

40-60 percent for GM,
20-50 percent for Ford,
0-50 percent for Chrysler, and
0 percent for AM.

As can be seen from the above ranges, the divident payout is not a single distinct amount; the only desired characteristic was that there would be a dividend payout for Ford and GM, and that there would be some measure of dividend payout for Chrysler if it made more than 2 percent net profit on sales in any simulation run.

Because of the method used to enter profits into the calculations, dividends and other expenses can only be proxied in the profit estimates. If one were trying to forecast "most-likely" point estimates, this would be a limitation on the system. But, because the intent of this analysis was only to replicate a range of historical probabilities, the calculation of profits is not a limitation, because the ultimate effect is an accurate summary of historical retained earnings in a probabilistic sense. The overall historical behavior of dividends and other expenses is not violated in the assumptions of this method.

The distribution of profits was entered into the system in combination with the distribution of sales revenues to acheive the distribution of financial pressures. Extremes of the system were also tested by breaking the profit distribution into three separate distributions, while holding other data to the normal distribution. This produced extimates of extremes similar to those produced by holding sales to high and low amounts, with one major exception.

When sales were constrained to lower levels, and profits were allowed to be normal, the amount of financial risk definitely increased, but the companies could all "survive" at the lower end of the capital spending distribution. However, when profits were constrained to low levels, and sales were allowed to be normal, even at the lower levels of capital spending, all companies would generate large cash flow deficits. This suggests that, if the working capital assumptions in the basic balance sheet are correct in their relationship to sales, low profits (proxying high development expenses) will put severe pressures on dividends, and therefore on capital availability, and will, therefore, cause problems of survival in the current form of business. Because of the mechanical nature of this simulation model, this cannot be taken as a prediction, but, at least, the direction of the forces at work is probabilistically valid. (See the "Interpretation" section below for further detail.)

9.3.3 Capital Spending

The capital spending input data were treated differently in this method of analysis. In the other sections of this document, capital spending plans were used to judge financial performance and effects. In this section, capital spending was treated partly as a trend of the past and partly as a plan for the future. The net result of this was that capital spending estimates used in this analysis tend to be different, on average, from current corporate estimates of future spending. As can be seen in Exhibit 9-16, the five year estimates for Ford and GM are slightly lower than planned expenditures, and the five year estimates for AM are slightly higher. This results because the planned estimates were averaged to lower or higher values by inclusion of the previous trends in capital spending. The purpose of this was to show that financial risk increases, even when the companies were allowed to defer spending, or, in the case of AM, when it was forced to continue its trend.

Because the actual effects of planned spending are more appropriately treated in the other Sections of this document, it was the intent of this analysis to show that financial risk would still be severe even if deferrability of spending, the historical pattern of behavior, was allowed. It is more realistic to expect that future spending, because it will be performed to meet a regulatory schedule, will not be as deferrable as in the past, by any means, but it was felt necessary to also illustrate that, at the higher levels of spending projected, even deferrability could not fully counteract the increased levels of financial risk. (Note that the planned spending levels are, nevertheless, measured in this simulation by the inclusion of the higher tails of the input spending distribution. The disaggregation of results by capital spending levels illustrates this planned spending level risk in all of the "High Spending" examples of Exhibits 9-3 through 9-13.)

The Chrysler spending estimates required somewhat different treatment, because the company indicates that its spending will be more highly peaked. The other companies have also indicated that they will have some peaking of spending, perhaps in the 1979 to 1981 period, but Chrysler's announced plans have articulated a more peaked behavior. For this reason, the distributions of spending used in years 1980 through 1982 have been boosted above the average five year annual levels suggested by a strictly linear interpolation of their aggregate $3.6-$4.0 billion U.S. dollar plans. This is also consistent with observations concerning Chrysler's near term ability to generate cash, which suggest that peak spending cannot be achieved from internal or external capital sources for two years, barring further and more immediate radical measures such as the sale of European operations, (probable cash infusion in 1980).

The output distributions of this analysis were obtained by entering the combinations of input data into the balance sheet framework. The system was run in such a way that 100 to 200 estimates of proforma results were obtained for each company for each year of the five years in the forecast period. These output estimates were then disaggregated through cross-sectional analysis to reveal the overall indicators and directions of financial risk. The cross-sectional interpretation was a critical step in this analysis, because a simple "dump" of the entire system produces meaningless results. The output of all combinations, if interpreted as a whole is meaningless because too many combinations are implied in a fashion which distorts the probabilistic validity of results.

For this reason, the data were interpreted in the following manner. Questions were asked of the data such as, "Given higher levels of sales, higher levels of capital spending, and the historic distribution of profits, what is the range of financial pressure?" Comparison of output ranges derived from these single question runs indicated that there was considerable overlap in the distributions produced by varying assumptions. This is logical to expect, because a single poor cash flow value can result from a number of different combinations of sales, profits, and spending.

It quickly became apparent that there were only two meaningful approaches to interpreting the data. One was to vary the level of capital spending while allowing other variables to remain in their "normal" distributions. The other was to compare this "normal" run to <u>all other</u> "high risk" runs collectively summed together. Varying the capital spending levels produced a systematic shift in the output distributions. All "high risk" runs, such as those constraining profits to low levels, or those forcing a strong recession, tended to produce equivalently bad cash flow patterns, regardless of the combination of high risk definitions (except that low profits over five years always produced an untenable cash flow situation).

This is a logical result of the construction of the analytic method. The system of calculation is based upon averages, and, therefore, its interpretation is only useful in terms of averages. Because combinations of extreme variables will violate the assumptions of average performance, the probabilistic output will be biased and beyond the explict assumptions of the system. Because the capital spending levels are varied in a systematic way, and because the balance sheet accounting is specifically constructed to handle variations in spending, the increased risk profiles indicated by different levels of spending will be consistent when compared to each other. However, forcing the system to accept only low profits, even if sales are proxying a boom year, and forcing this relationship to hold for five years, is not an "average" phenomenon as defined by history, so, the probabilistic limits of the system's definition have been violated, and the results cannot be viewed as having distinct predictive power if the results are accumulated for five years. Such extreme combinations can be useful, however, if applied to only one particular year. Therefore, the results of this analysis are presented only in accordance with the assumptions used in its construction.

9.4 INTERPRETATION OF RESULTS

9.4.1 Influence of Capital Spending on Financial Pressure

It can be seen from the summary statistics on Exhibit 9-1 that increasing the level of capital spending directly increases the financial adjustments the corporations must make to remain profitable with a healthy cash flow. The important variances and spread of the distributions summarized in Exhibit 9-1 can be seen in the specific distributions displayed in Exhibits 9-2 through 9-13.

Note that the summary statistics in these Exhibits pertain to the peak risk years of 1979 through 1981. The statistics chosen are for the year 1980, but they are roughly the same as ranges projected for the other years. There is one important element of interpretation which must be emphasized here. The risk ranges for Ford and GM, given the assumptions of this method, drop to lower levels at the start and end of this five year projection period. But the levels of risk for Chrysler remain roughly the same as the illustrated peak year over the entire period of projection. This is crucial for two reasons:

1. Chrysler has been constrained to always break even or earn a profit. Since this is not entirely expected, the risk expressed in this projected range may be optimistic, even though it still indicates significant risk.

2. In addition, the fact that this range remains risky over the entire period of projection, indicates that Chrysler's aggregate earning power is low and constantly under financial tension, given the capital spending requirements of this analysis.

Further elaboration of the specific company analyses follows in Sections 9.4.2 through 9.4.5.

9.4.2 General Motors

It can be seen from the illustrated ranges of risk in Exhibits 9-1, 9-2, 9-3, 9-4, and 9-5, that GM's cash flow will be placed at risk under the capital spending assumptions of this analysis. Note, that GM's financial resources are larger, in absolute terms, than those of the other companies, so the relative levels of risk are slightly smaller for GM under these projections. However, it can be seen that the levels of financial pressure under the high capital spending assumption indicate a likely need for external funding, perhaps as high as their previous debt issue of $750 million in the 1974-75 recession. (This is a risk, not a prediction.) According to the assumptions of this analysis, GM could only fully mitigate against this risk by decreasing its dividend. The 1977 dividend was $1.9 billion, so it can be seen that a pressure of $1.0 billion could imply a significant pressure on dividends for the peak future spending years.

The right hand column of Exhibit 9-1 summarizes a number of the pessimistic assumptions. Although this magnitude of financial pressure is not reasonable to expect for a sustained period, it could result from a recession year combined with high capital spending. This $2.0 billion pressure would surely have significant effects on all operations of the company, and would indicate a severity of financial pressure at least as large as that instigated by the recent recession.

It is also important to note, that although this risk analysis indicates a dropping financial pressure when capital spending is lowered, GM's planned spending level is at least as high, and probably higher than the assumptions of the "HI SPEND" case. This is one indication of the flexibility afforded by the ability to defer spending, and the lack of flexibility implied in the GM spending plans.

In summary, it can be seen that the aggregate financial pressure on GM will be substantial, and that it will increase directly with the magnitude of capital spending, even if GM is allowed to earn histcric rates of profit from sales.

9.4.3 Ford

The relevant illustrations of Ford's projected financial pressures are contained in Exhibits 9-1, 9-2, and 9-6 through 9-8. Note that although the absolute amounts of these pressures are similar to GM's, the relative importance of these absolute amounts is higher for Ford, because Ford is a smaller company in terms of overall financial resources. In the past, Ford has only managed to issue approximately $500 million in external debt, so any financial pressure measure of this analysis in the range of $1.0 billion would have a significant impact on the company. Note also, that the Ford assumptions in this method proxy high profits in European operations, but because these funds, in reality, will not be available for use in the United States, the aggregate pressure measures in this section can be considered slightly optimistic. (See later discussion in Section 10 for more detail on this problem.)

The indicated cash generation figures in the summary Exhibits (indicated by parentheses), are solely a function of the reported European profits, and this must be factored into appropriate reading of these risk projections.

In the recent recession, Ford faced a critical capital availability problem because it cut the common stock dividend, thereby forcing a lower value on equity from which the company is only recently recovering. Dividends in 1977 consumed $350 million of $1.6 billion in profits, so, it can be seen that financial pressures of the magnitude indicated in this analysis will have importance for the ability to pay dividends and to maintain shareholder value. If Ford experienced the pessimistic pressure (Exhibit 9-1) of $2.0 billion in a recessionary period, they almost certainly could not borrow enough money to cover all the pressure and they would be forced to cut dividends. Note also, that in the recent recession, Ford cut capital spending for its product development in order to maintain cash flow. In the future, Ford's planned spending will be at least as high as the "HI SPEND" case in this analysis, and such ability to defer spending will not be afforded.

The summary measures of this analysis indicate that even assuming continued high profit of European operations Ford will be facing a higher level of risk, which will be maintained at a high level by the required capital spending.

9.4.4 Chrysler

Note again, that in this analysis, Chrysler was not allowed to lose money, and was forced to earn a profit after 1978 (see Exhibit 9-17). Since it is expected that Chrysler will lose approximately $120 million in 1978, and will only break even or earn a small profit in 1979, it can be seen that the risks implied in this analysis can only be accelerated. Even under such optimistic profit assumptions, it can be seen that risk is high for Chrysler. Note again that the risk indicated in the 1980 year illustrated remains roughly the same for Chrysler during the five year period. Because the assumptions of this method do not properly allow the accumulation of external needs over the forecast period, these five years of risk have not been summarized here. In Section 10, whose methods and assumptions allow such accumulation, it will be seen the Chrysler faces not only a problem of peak risk, but also a problem of accumulated risk.

The financial pressures indicated by this analytic method show a very difficult future for Chrysler. Even when given profitable operations, the financial picture is one of marginal cash flow generation. This is given an even bleaker perspective when one considers that Chrysler has always deferred capital spending in the past, and that this analysis allows a similar deferral. In the future, Chrysler will not be afforded this financial strategy, which suggests the company will be experiencing a large alteration in its methods of business. Section 10 reveals specific details on this topic.

9.4.5 American Motors

The pattern of financial pressure is also severe for AM, although this can be viewed as an extension of past conditions into the future. AM has, for recent history, always faced a limited ability to raise internal funding which is directly reflected in its limited introductions of new products. It is almost impossible to project future abilities to raise capital, and future estimates at this time can only be more speculative because of the pending joint venture with Renault.

Neverthless, it can be seen in Exhibits 9-1, 9-2, and 9-12 through 9-14 that AM's financial risks will directly increase with any capital spending increases. As is the case in the Chrysler projections in this section, the risk remains for all years of the projected five year period. This suggests, as do other analyses, that AM will spend only according to the capital it can raise, probably externally, and that financial performance can only get better with rising passenger auto sales and better profits in this sector.

9.5 SUMMARY

The output of this analysis indicates that all companies will experience increased pressures on their historically defined financial capabilities. The levels of risk implied here strongly suggest that each company could be expected to seek some additional external funding during a recession year, and that Chrysler and AM will probably have to seek such external capital even if sales trend constantly upward, and if profits return.

The systematic nature of the output clearly shows that increased capital spending, unless it unexpectedly produces <u>better</u> profits than in the past, will directly increase the financial pressures on these companies' operating systems. In terms of financial flexibility, it is also clear that once the companies have entered the period of regulatory spending for product development, their ability to respond to external factors, such as a recession, or other factors, such as consumer resistance to higher prices, will be quite limited because so much of cash flow will be directed toward the enforced capital spending curve. Spending will not be appreciably curtailed during bad cash flow years, unless the company wil be willing to accept the implied mix shift to smaller cars, which will be required to meet future CAFE standards. (If capital is cut from projects which will make large cars more efficient, the product development will not take place, and the only alternative in later, higher CAFE years, will be to alter the mix of vehicles, assuming production capacity allows such a shift.) This suggests that the financial pressures indicated in the "HI SPEND" cases will be the more likely ones. None of these cases is favorable for any company during the peak spending years.

It is also interesting to note the range of possibilities expressed in the summary distributions of the attached exhibits. In strictly probabilistic terms, the companies must consider planning for at least the middle ranges of these events, and it is noted that this suggests a wide range of contingencies, and a correspondingly broad range of financial reflexes. This is a graphic example of the meaning of financial flexibility, and it is emphasized that this is a very real problem, not simply a numerical display.

EXHIBIT 9-1. SUMMARY STATISTICS, FINANCIAL PRESSURES RISK ANALYSIS

($ Million)

	Mean Pressure	"Bad Cash" High Risk Runs
GM		
HI SPEND	$1095	Approx. $2000
MID SPEND	315	
LOW SPEND	225	
FORD		
HI SPEND	$1130	Approx. $2000
MID SPEND	240	
LOW SPEND	(139)	
CHRYSLER		
HI SPEND	$ 393	Approx. $1000
MID SPEND	118	
LOW SPEND	(20)	
AM		
HI SPEND	$ 46	N.A.
MID SPEND	25	
LOW SPEND	11	

EXHIBIT 9-2. FINANCIAL PRESSURE RISK ANALYSIS CUMULATIVE PROBABILITY OF RISK RANGE.

($ Million)

CUMULATIVE PROBABILITY	.1	.25	.50	.75	.90
GM					
HI SPEND	902	996	1095	1193	1288
MID SPEND	121	216	315	414	508
LOW SPEND	6	113	225	337	445
FORD					
HI SPEND	962	1044	1130	1216	1299
MID SPEND	71	154	240	326	408
LOW SPEND*	(308)	(226)	(140)	(53)	28
CHRYSLER					
HI SPEND	313	352	393	434	473
MID SPEND	38	77	118	159	198
LOW SPEND*	(100)	(60)	(20)	21	60
AM					
HI SPEND	41	43	46	48	50
MID SPEND	20	22	25	27	29
LOW SPEND	6	8	11	13	15

*Values in parenthesis suggest no increased risk in that particular simulation run.

<u>NOTE</u>

EXHIBITS 9-3 TO 9-14 ON
THE FOLLOWING PAGES
CONTAIN THE PROBABILISTIC
MASS FUNCTIONS OF THE
SIMULATION RUNS FOR EACH
LEVEL OF CAPITAL SPENDING.

THE VALUES SHOWN ARE THE
SIMULATED FINANCIAL PRESSURES,
IN MILLIONS OF DOLLARS.

ANY RANGE OF VALUES GREATER
THAN ZERO (0) INDICATES
INCREASED FINANCIAL RISK.

ILLUSTRATIONS ARE FOR THE
PEAK SPENDING YEARS (SEE TEXT).

EXHIBIT 9-3. GM - HI SPEND

```
 4*
  *
  *
  *
 6*
 ..*
  - *
  -  *
 8-    *
  -        *
  -              *
  -                      *
10-                              *
  -                                     *
  -                                       *
  -                                    *
12-                             *
  -                    *
  -             *
  -       *
14-    *
  -  *
  -*
  -*
16*
  *
  *
  *
18*
```

EXHIBIT 9-4. GM - MID SPEND

EXHIBIT 9-5. GM - LOW SPEND

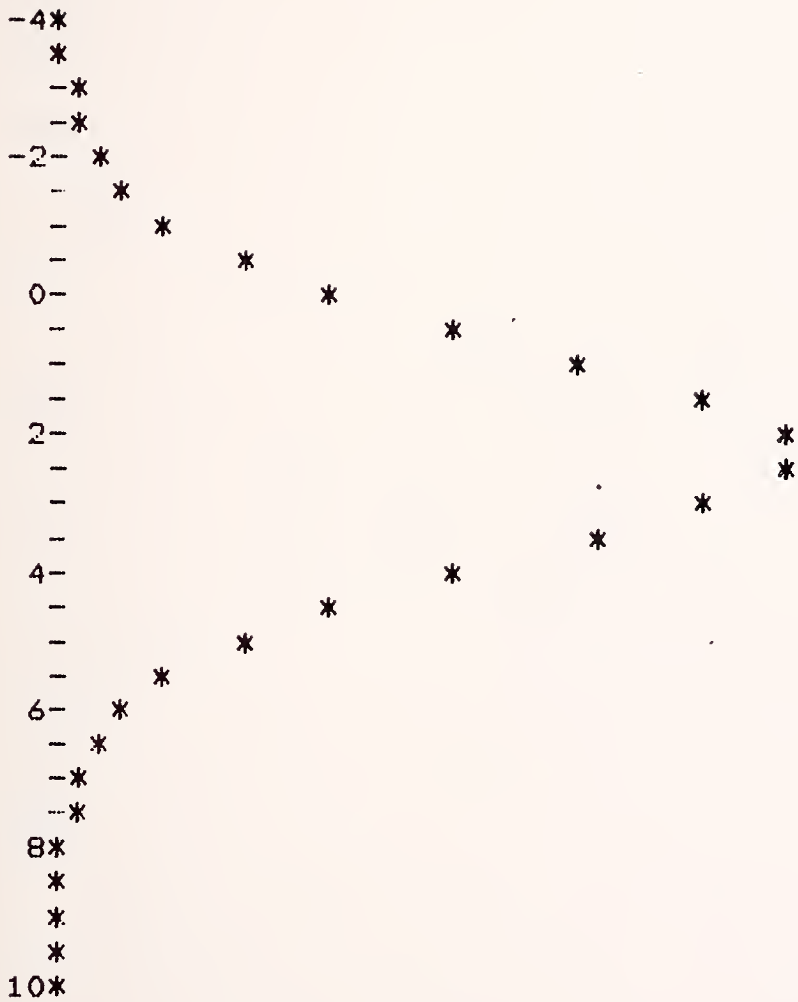


EXHIBIT 9-6. FORD - HI SPEND

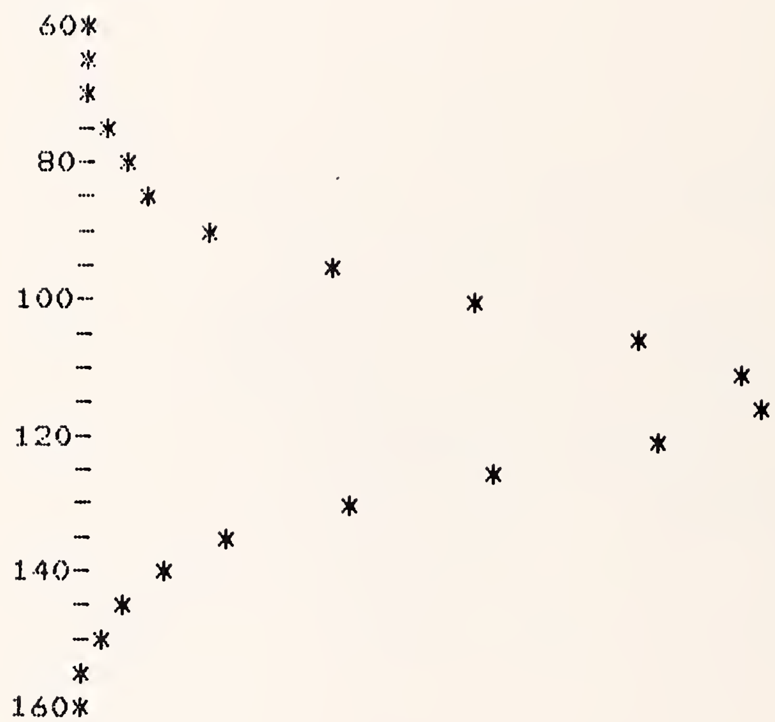


EXHIBIT 9-7. FORD - MID SPEND

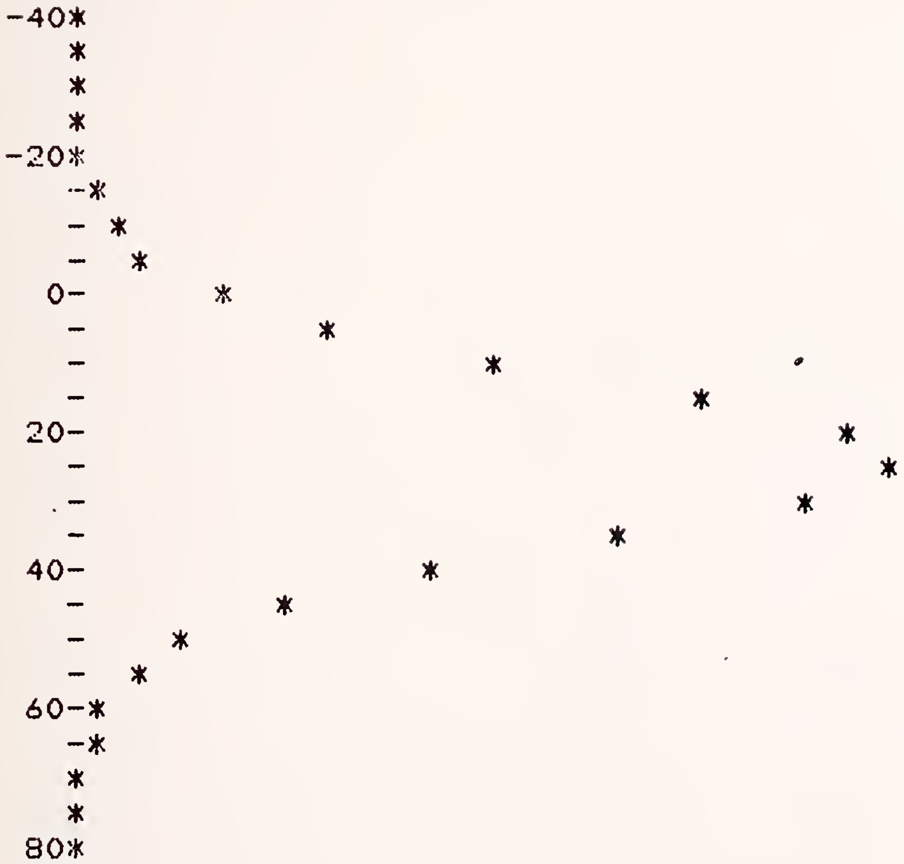


EXHIBIT 9-8. FORD - LOW SPEND

```
-60*
   -*
   -*
   - *
-40-   *
   -       *
   -             *
   -                     *
-20-                            *
   -                                *
   -                              *
   -                        *
  0-                *
   -         *
   -     *
   -  *
 20-*
   -*
   *
   *
 40*
```

EXHIBIT 9-9. CHRYSLER - HI SPEND

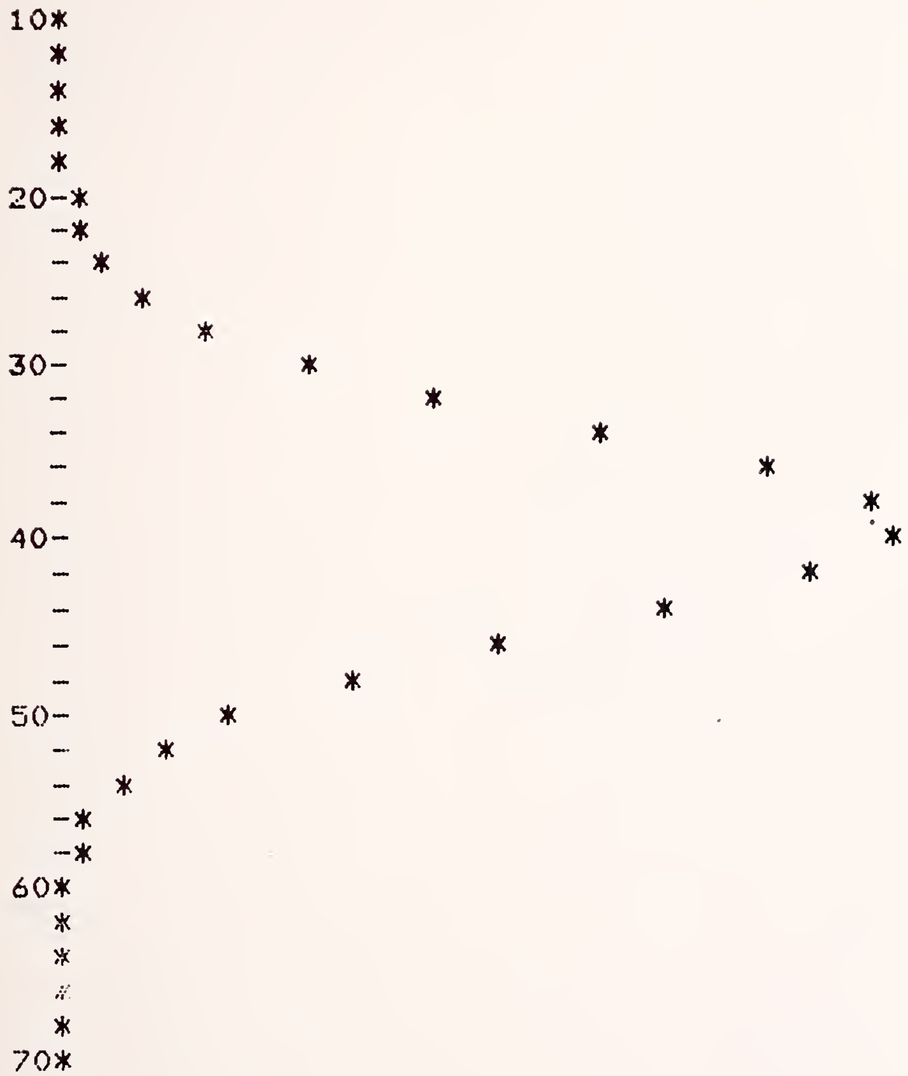


EXHIBIT 9-10. CHRYSLER - MID SPEND

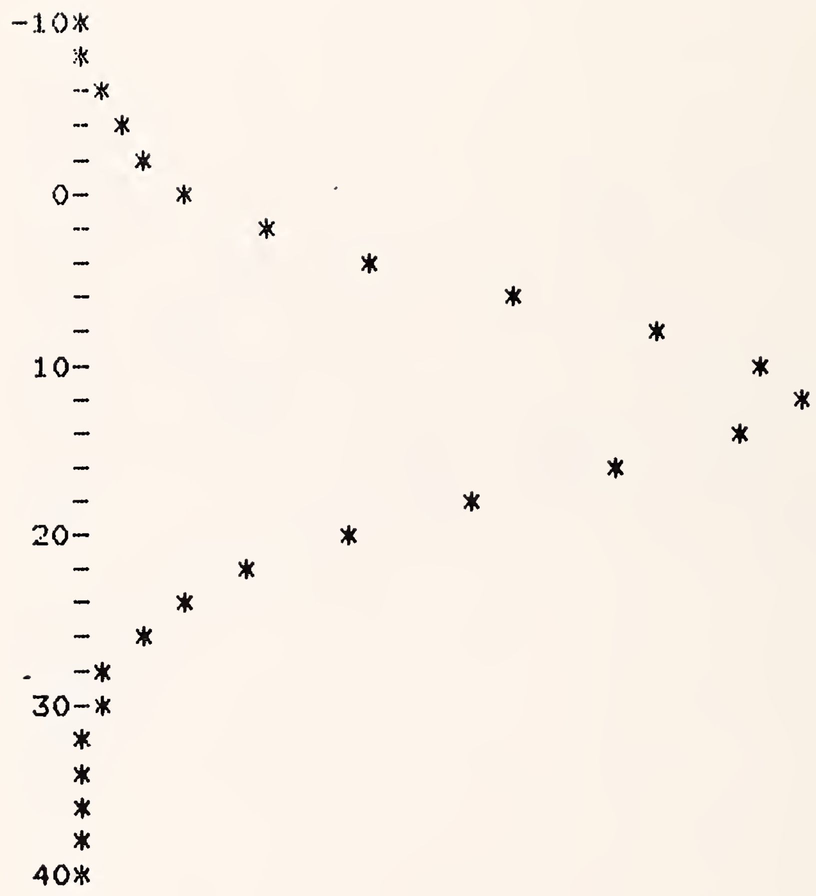


EXHIBIT 9-11. CHRYSLER - LOW SPEND

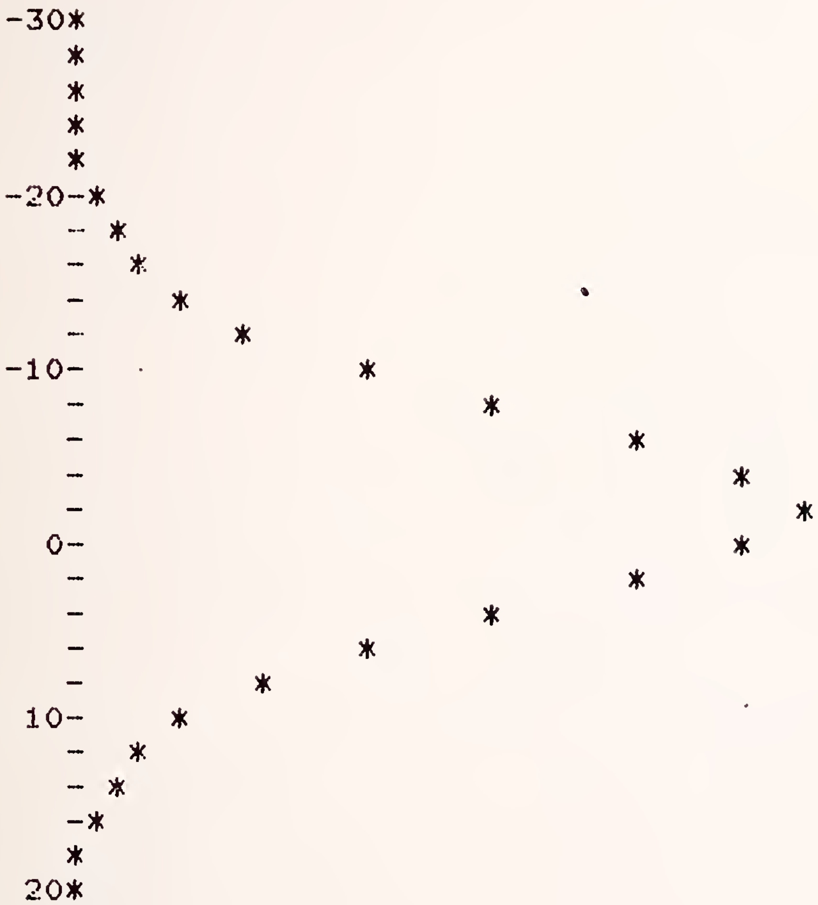


EXHIBIT 9-12. AM - HI SPEND

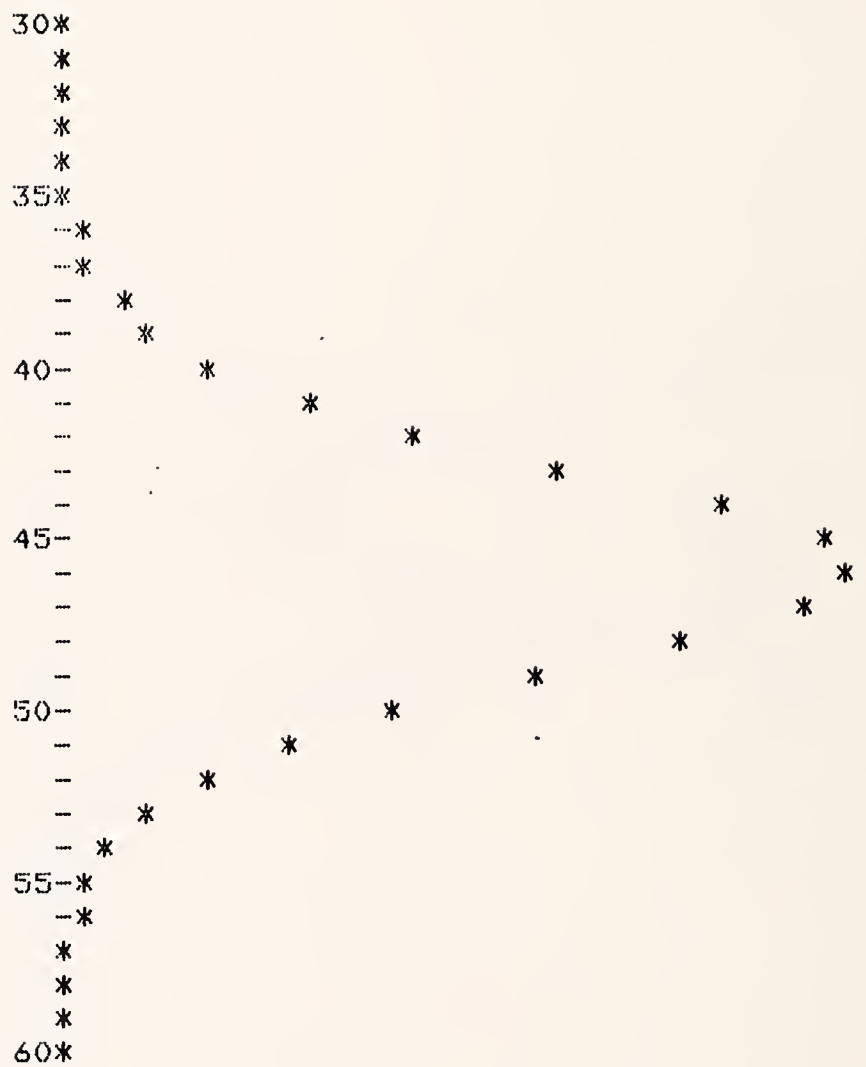


EXHIBIT 9-13. AM - MID SPEND

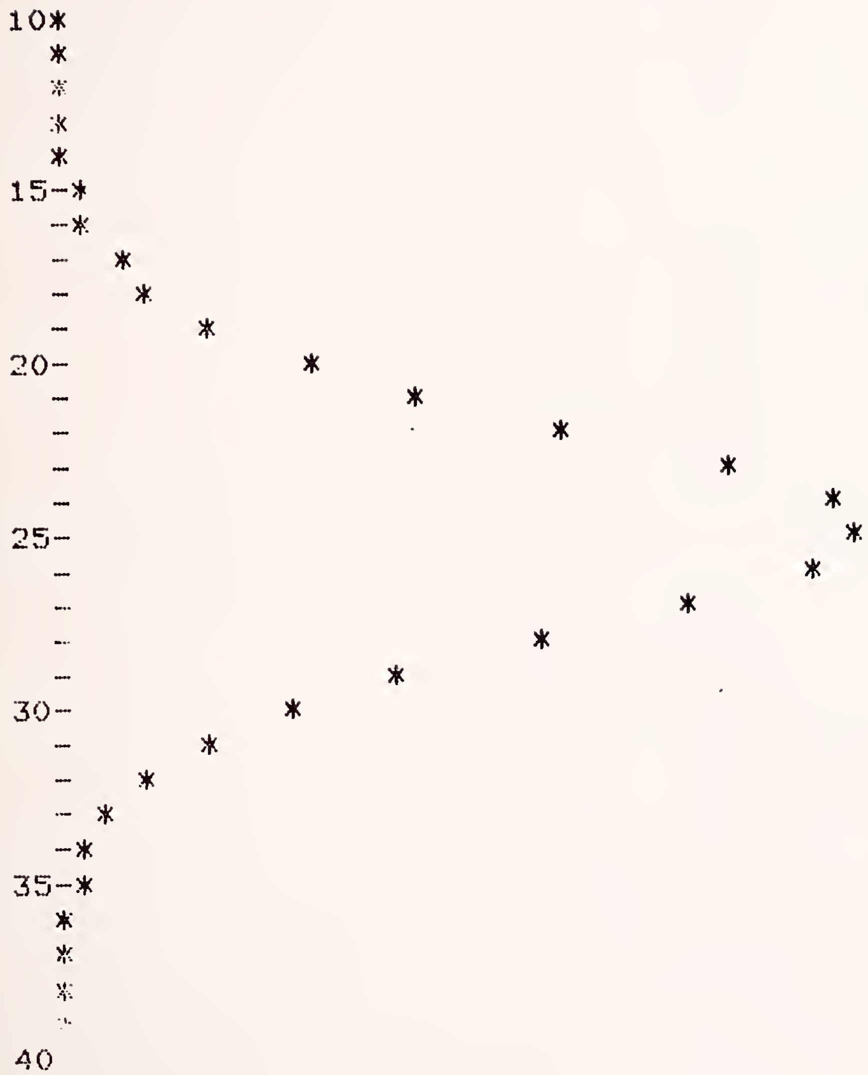


EXHIBIT 9-14. AM - LOW SPEND

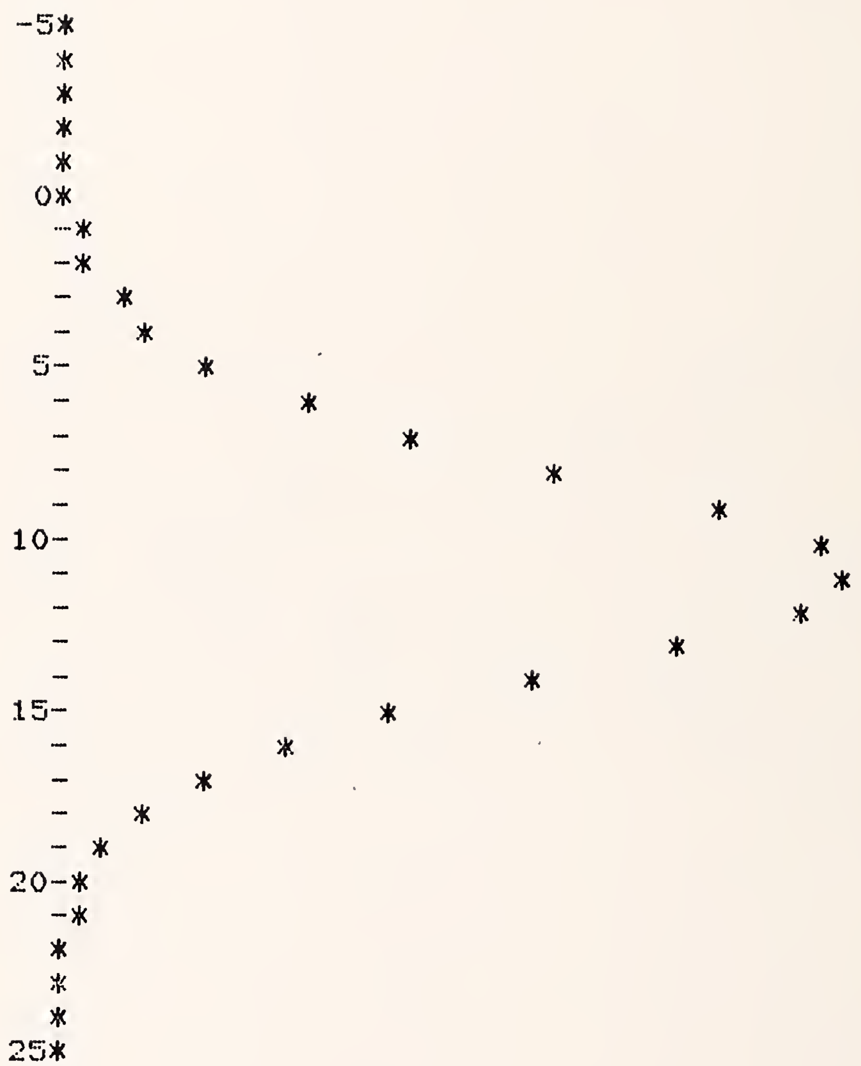


EXHIBIT 9-15. SALES INPUT DISTRIBUTIONS
($ Billion)

<u>CUMULATIVE FRACTILE</u>	<u>.30</u>	<u>.50</u>	<u>.70</u>
<u>GM</u>			
1978	$54.2	$57.2	$60.2
1979	60.2	63.5	66.9
1980	67.3	74.3	77.2
1981	72.0	80.4	86.4
1982	76.1	80.2	84.3
<u>FORD</u>			
1978	37.0	40.0	41.5
1978	37.0	41.3	45.9
1980	42.6	48.0	53.4
1981	42.6	48.0	53.4
1982	45.9	51.7	57.1
<u>CHRYSLER</u>			
1978	16.1	17.8	19.5
1979	17.8	19.7	21.6
1980	20.7	22.9	25.1
1981	23.4	25.8	28.3
1982	22.2	24.6	26.9
<u>AM</u>			
1978	1.8	2.5	3.0
1979	1.9	2.7	3.2
1980	2.2	3.0	3.4
1981	2.4	3.4	3.6
1982	2.3	3.2	3.6

EXHIBIT 9-16. CAPITAL SPENDING INPUT DISTRIBUTION AVERAGE ANNUAL TOTAL SPENDING.

($ Million)

CUMULATIVE PROBABILITIES	.30	.50	.70
GM (to 1982)	$4400	$4650	$4900
FORD (to 1982)	2534	2620	2705
CHRYSLER (1980-82)	1140	1200	1280
AM (to 1982)	103	111	118

EXHIBIT 9-17. RETAINED EARNINGS (% SALES) INPUT DISTRIBUTIONS.

		%	
CUMULATIVE PROBABILITY =	.30	.50	.70
GM	2.1%	2.4%	2.7%
FORD	1.9	2.2	2.4
CHRYSLER			
1978	0.0	0.0	0.1
1979	0.7	1.0	1.4
1980	0.9	1.2	1.5
AM	0.3	0.5	0.6

10. PROFORMA ANALYSIS OF THE FOUR U.S. AUTO MANUFACTURERS

10.1 INTRODUCTION

The primary purpose of this section is to summarize, in one place, the various topics which have been treated elsewhere in this document. An explicit element of this analysis is to place the regulatory spending plan and resulting cost analysis into the corporate financial framework, and to illustrate the simulataneous pressures which spending levels, market risks, and cost pressures place upon the entire corporate system. The methods of analysis displayed in this section do not only measure capital costs and variable cost pressures, but also recognize the financial accounting effects of these costs, the investments required in working capital, and the significant volatility of these costs when actually in effect in the corporate operating system.

The most important influences upon corporate financial performance which are measured and displayed in this section are:

- cost and pricing constraints,
- capital spending, levels and timing,
- market volatility,
- recession conditions in excess of normal volatility,
- working capital investment,
- dividends, equity value, and some effects on cost of capital, and
- possible need for external funding, or in the case of Chrysler, cutback in operations.

This is not intended to be a specific forecast of the future, although data and methods have been designed to produce reasonable long term and cumulative effects at the baseline; individual case illustrations are illustrated as realistically as possible, given the data and assumptions available. The overall intent of this analysis, however, is to measure the financial pressures which would occur from the most significant sources of risk, in combination with historical probabilities defined in analyses of past financial behavior. It is explicitly acknowledged that the methods used in this section are subject to statistical errors at least as large as the variances in historical financial accounts. It is also noted, though, that the major indications of analysis in this section are so large that they are not especially sensitive to changes in individual line item assumptions.

Sensitivity testing has been employed at a detailed level in derivation of these proforma estimates to maintain an awareness of the uncertainty inherent in this statistical approach, and conclusions have really only been drawn where such uncertainty would allow them. Because the foundation of this analysis is built from public corporate records, it cannot be expected to replicate the accuracy afforded by an analysis which is privy to internal corporate records. But, it is noted from a variety of media accounts that this analysis is within the bounds of error demonstrated by other projections of company performance (witness the earlier discussion of auto sales forecasting).

Sensitivity testing has also been employed in the presentation of analysis in this section. The proforma estimates have been derived using different spending patterns (historical rates and planned levels) and different market volatility examples (mildly cyclical trend patterns and more highly volatile cyclical patterns). It is important to note that the output results derived from these different major patterns are so different that the resulting conclusions are not especially sensitive to the statistical error inherent in probabilistic measures of the past used to estimate the future.

One of the purposes of this analysis, in its overall conception, was to segregate, in as much detail as possible, the North American corporate performance from overseas performance. It is explicitly noted that this disaggregation is extremely difficult to perform, because corporate data are not broken out in this manner (although recent reporting innovations will help subsequent analyses). Assumptions used for this partial disaggregation are contained in the documentation of Appendix A, and it must be mentioned that although segregation assumptions do produce individual line item distortions, the analysis was always reaggregated to the corporate level when measuring overall corporate risk, and this reaggregation process was constrained to satisfy overall criteria of corporate historical performance. North American disaggregation worked well at a basic level, but detailed conclusions were never drawn on a strictly disaggreated approach. This would have been misleading if presented out of context.

To more fully measure the North American effects upon the companies, the proforma methods were applied in a manner which generally holds overseas operations in a linear fashion to allow the exigencies of North American operations the most power in the final output. This meant using fairly constant rates of growth in overseas sales and profits, and a consistent versus cyclical allocation of costs to overseas operations. Because overseas operations were, therefore, primarily positive at all times, any negative influences upon the projected financial performance would be derived from North American operations. Since the bulk of output under the planned spending conditions was primarily negative, this shows the effects of the increased North American regulatory spending.

10.2 STEPS IN APPLYING THE METHOD

The proforma method is described earlier in this document. Once this framework of analysis was constructed, including accumulations of line items and their interrelationships, a number of different economic and product spending circumstances were projected. Each of the companies was analyzed under different market and spending conditions as follows:

1. Trend sales pattern: a slightly cyclical pattern of sales with slow growth in 1978, and slightly declining units in 1979.
2. Cyclical sales: a more pronounced cyclical pattern which produces a recession in 1982 just slightly short of the 1974-75 dip, and which allows faster expansion of sales in a growth year. The pattern is very close to several

historical cyclical periods in auto sales.

3. Trend spending: This extrapolates companies' historical capital and development spending into the future. It essentially assumes the companies will spend as they did during the past ten years.

4. Planned spending: This uses the companies' announced spending plans which are estimated to be necessary to meet government regulations for fuel economy, safety, and emissions. It is assumed these contain simulataneous estimates for any OSHA or other regulations.

Analyses were also performed using a variety of higher R&D and product development costs, above the levels already built into the basic cost calculations which proxy increased development spending. These higher cost proformas simply pushed additional cash drains to the bottom line of the planned spending proforma projections; because the planned spending projections already indicated so much risk, it was felt there was little point in illustrating another set of conditions. It should be kept in mind, that if product development expenses rise above the current publicly stated level, the planned spending proforma projections will simply indicate the increased risk in direct proportion to the increased fixed annual costs.

The four basic sales and spending conditions were applied in combination with each other to obtain the proforma estimates contained in this section. Projections were first derived for the planned spending levels and the cyclical sales pattern, which is considered to be the basic case for analysis, because the companies have firmly stated their spending plans, and because the historic sales patterns in the industry have been cyclical. Market risk was evaluated by running projections using historic trend spending. The resulting comparisons to the base case revealed the financial risks which are discussed later in this section.

It should be emphasized that each set of projections was evaluated line by line to sense the pertinent financial pressures to which the companies might be subjected. In general terms, the risks induced by increased spending far outweighed risks potentially derived from market cyclicality, but these gross pressures have been disaggregated further into several other classes of risk. Two major areas will be highlighted in specific company discussions:

1. Cash flow risks: This is the most generalized form of risk which summarizes collective pressures on all operations. It generally indicates the basic financial health of the companies, and in Chrysler's case is actually a measure of its ability to survive in its present form.

2. Profit risks: In general terms, this usually relates to dividends or other investment measures. Financial pressures indicate risks in profit related items before extreme risk is indicated in cash flow, so, this area of analysis is used to show how internal funding problems and cost of capital can be affected even if cash flow analysis indicates no external funding needs. It should be kept in mind that even internal capital has an explicit cost to the company, and even if the company is able to finance regulatory spending from internal sources, this does not imply the absense of risk.

Once these areas of risk are summarized for each company, the analysis focused upon any specific external financing arrangements which might have been indicated in the proforma projections. The following company-specific discussions each include an illustration of financing decisions implied by the proformas. In general, this involves a specific costing example for a debt or equity issue which might have been suggested, and it is useful to review some pertinent areas of cost here.

10.3 EQUITY

The nominal first cost of new equity capital has two major components, which are actually interrelated in their behavior, but which can be broken out as follows:

1. The explicit cost of dividends to the company. These are <u>after-tax</u> charges, which, because the auto stocks are mature as shown in earlier sections, remain relatively <u>fixed</u> charges after tax. The fixed nature of these charges also implies a growth in actual per share dividends, because if the shareholder cannot get an increased return under inflationary conditions, there is no point in holding the stock as an investment.

2. The cost of "dilution" to the shareholders, whose single share of stock will "own" less of the company's earnings as new shares are issued. (Dilution will also have a direct effect on the company or major owners if the new equity issue is large enough to reduce ownership or to reduce overall equity value to the point that a take-over by another company becomes economic. This is not likely a problem for Ford or GM, but it certainly should remain a consideration for the cash short Chrysler in this climate of major world reorganization of auto companies.)

The following company discussions will indicate that the cost of equity capital is not at all a stable or certain amount of dollars in any single year. Because the cost of equity capital is derived from investor expectations of future earning potential, and because the investor will usually be comparing an auto company investment to investments available elsewhere, the cost of equity capital is a function of company performance and relative economic or industry conditions. The financial goals of each company must consistently consider changing investment conditions and the perceptions of investors, and financial flexibility must be built into internal financing decisions in such a way that a wide variety of contingencies can be met. Investor psychology is an extremely elusive phenomenon, but, in general, it can be viewed as an expectation of continued future returns on investment.

Valuation of future streams of returns is complex, but, for the most part, the rule of "more now is better" applies. An investor might be willing to let money sit in an investment for a longer period of time if he can be assured that the returns coming in periodically will be relatively certain. If the investor perceives that the future stream of returns is becoming risky, the investor will demand more payout now. This is a simplified version of the cost of capital principles, and it can be used as a general rule of thumb. Investors know that the auto companies are not growth companies, in the sense that they will not return huge increases in stock price, so, the investors will demand a constant and relatively certain stream of dividend payments to counter the lack of stock price growth. As discussed earlier, this places great emphasis on the companies' abilities to pay out dividends from profits, and, as will be shown below, the cost of equity capital is, therefore, often quite expensive for these mature companies.

10.4 DEBT

Debt, as represented in bonds or other vehicles of senior investments, has a more easily calculated first cost, the interest rate charged by the lending party. However, debt has subtle but significant other costs when it is used in combination with equity in the company's capital structure. It is useful to highlight these areas of cost.

Interest rates are basically a product of two variables, the corporation's credit rating, and supply and demand conditions in the capital markets at the time of issue. Corporate credit ratings are kept by a variety of agencies, such as Standard and Poors and Moodys, and the ratings applied to each company reflect, in an overall manner, the ability of the company to service existing and new debt. The amount of earnings available to cover fixed interest charges, the relative proportions of debt payments to cash flow, and other measures of security indicate how much debt a company can hold at any level of operations and profits. Debt ratings of high caliber are hard to obtain and even harder to regain if they are lost. If a company has been rated at AAA (highest) but hits a profit squeeze which causes the rating to drop, that company will have to achieve strongly sustained profits for a long period before its credit rating will again be returned to high standards. Chrysler has just recently suffered a downward revision in its ratings, which means it will now be charged a higher rate of interest for any future debt it seeks from sources sensitive to credit ratings, which includes practically all traditional sources. Changes in credit ratings, therefore, are explicitly analyzed in any corporate financing plans.

Debt can also produce increased costs of equity capital, because debt is more legally obligating than equity issues. Because interest must be paid before any dividends are allowed, shareholders may easily perceive more risk in future earnings available to them when a company adds debt to its books. This could mean that under "more now is better," the shareholders would demand higher immediate dividend returns, thereby increasing the cost of equity capital. This is only a brief sketch of the effects of debt leverage upon the overall cost of capital, but it does indicate some of the most important coincidence of debt and equity risk.

The behavior of debt costs also differs from that of equity costs. Debt interest charges are generally fixed, which means they may not increase unless new debt is issued. This can mean greater ability to plan for debt cost, but, at the same time, it can mean a loss of financial flexibility. Interest cannot be legally deferred whereas, in emergency situations, equity dividends can be cut or delayed. This means that if a company increases its proportion of debt, it must be able to pay for interest every year, no matter how tight the cost/price situation can become. In the case of the auto companies, this deferrability of dividends only really applies to Chrysler. Ford and GM have equity structures which practically dictate constant obligations to dividends, so, in their cases, although some flexibility is afforded by equity over debt, equity really behaves as more expensive debt. Chrysler has not been able to maintain the same stability of equity, and it has a history of dividend deferral, so, in some sense, because it is already in a worse position, it has more flexibility from equity than from debt. It will be shown later, however, that Chrysler's flexibility is not at all a blessing, because equity is extremely expensive for them as the recent preferred stock issue indicates.

In addition to summaries of these general issues, the following company analyses contain discussions of unique problems affecting each company. Assumptions used in derivation of the proforma projections are contained in the Exhibit sections for each of the companies, and Appendix A contains a complete documentation of the assumptions and calculations used to produce the proforma summaries.

10.5 THE EFFECTS OF INFLATION

A number of analyses concerning regulatory costing have included varying treatments of inflation. In this analysis, inflation effects have been charted primarily according to the effects that inflation has upon the financial accounts of each company. It should be noted that the overall conclusions of this analysis are not especially sensitive to <u>general</u> rates of inflation in the economy, but, rather, to <u>differential</u> effects of inflation upon the individual financial accounts and spending events. That is, the indications of this analysis would not change if the general level of price inflation in 1980 were 9 percent or 5 percent , except that the cash flow numbers would simply be recast in dollars of the value of the time. As mentioned earlier in this document, it does not really make any difference what the rate of inflation is in any year because financial decisions will have to be made that year in terms of dollars of that year, no matter what value those dollars have in relationship to some base year.

However, the <u>relative</u> rates of inflation are important in specific instances. Because the auto companies' working capital accounts are turning over so rapidly each year, the effects of inflation quickly flow through them, so, most financial accounts are kept "up-to-date" in inflated dollars. There are some very significant exceptions to this, however, in the longer term financial accounts which do not turn over so rapidly.

As mentioned earlier, inflation clearly affects the permanent asset accounts and the recovery of investment through means of depreciation and amortization. The current cost of assets is usually higher than the recorded book costs of these assets, and if the company were forced to replace existing assets, historic streams of depreciation would not be sufficient to match the current replacement cost. The proforma analysis in this section specifically recognizes this by the method of accounting for depreciation, and by stating new asset purchases in current dollars of the day. Again, it must be mentioned that the asset purchases projected are so large that the analysis is not especially sensitive to rates of inflation applied to asset purchases. The spending figures used in this analysis assume an inflation in asset cost of approximately 6 to 8 percent per year, and one or two point differences in this rate do not alter the basic indications of strongly increased risk under new spending plans.

Inflation is also important for financial projections if different accounts are affected by differing rates of inflation. For example, if labor is rising by 10 percent per year, and material is only rising by 5 percent per year, long term projections should consider these differential rates.

In actual practice, the auto companies would have available extremely detailed line item account information which would allow them to chart the effects of inflation through all accounts. Because this analysis could only consider aggregated public information, such differential accounting was not possible. In general, this presented little problem because it was discovered that the aggregated accounts being measured were more sensitive to changes in volume each year than to existing general rates of inflation.

However, to ensure that future expectations of inflation would at least be considered in the proforma estimates, several steps were taken. Line items which were derived from regression analysis generally indicated some base of inflation in the line account which could be distinguished from volume changes. In such cases, the base forecast equations contain an inflation factor which roughly approximates the inflation pattern over the past eight years. Other line items are calculated using some historic cost base which is modified each year for increased or decreased operations. To proxy continuous inflation in these accounts, the historical base value was usually constrained by an inflation control in the proforma program. For example, if the basic inflation control was set at five per cent, the historical base value would be raised by five percent each year before the specified annual volume adjustment was made in the account. If sales dropped, the base value would nevertheless increase five percent before the total cost would be adjusted for volume.

An example of this is contained in the "Cost of Goods, Other Than Below" category. This cost is calculated using an historic per unit base. If sales volume changes are relatively small year by year, this per unit cost is merely inflated by the specified inflation control factor in the program. If sales volume drops farther than a small amount, however, the per unit estimate is first raised by the inflation factor, and is then increased farther still by an equation which approximates the fixed cost behavior of this line item during periods of declining sales. If sales grow beyond a specified limit, the base per unit cost is inflated by the infaltion control factor before that inflated cost per unit is then adjusted downward by the equation which approximates the fixed cost behavior of the line item in periods of rising sales. Through this method, the individual annual costs are at least inflated in some basic fashion, not simply derived by comparison to the 1977 starting point.

In all of the proforma examples illustrated in this section, the basic price and cost inflation controls were set at five percent per year. This essentially means that the base calculations of both revenues and costs will be rising in unison, and that there is no differential rate of change in the bases of these costs. At first glance, this might appear to be an optimistic assumption, because it is clear that prices have not been increasing as rapidly as costs in recent years (witness again the secular decline in North American margins). However, in actual proforma application, the optimistic base assumptions are not the controlling ones, because of the sensitivity of the cost calculations to volume changes. Even the Trend sales projections contain enough variations in annual unit volume to initiate the volume adjustments in costs, and because these volume adjustments were derived from historical periods which included an acceleration in inflation, the volume adjustments automatically proxy some effects of inflation.

It is explicitly acknowledged that this method of calculation will contain errors if volume and inflation changes are not sychronized as they were in the historical period examined. But, it is noted, first of all, that an average base inflation control of five percent is at least a realistic foundation, and, secondly, that changes in volume are now and have been more important than inflation rates. It is also strongly noted that the greatest source of financial pressure in the proforma projections derives from increased capital spending, the magnitude of which is beyond the reach of any one or two point adjustments in inflation.

It is also noted that if one were to run a more realistic set of inflation assumptions than 5 percent on prices and costs, one would have to run situations in which costs were rising more rapidly than prices. Since the risk indicated by proformas using the dual 5 percent rate is already so high, differential base inflation rates would only increase the risk above levels indicated here. For all of these reasons, and from the results of sensitivity testing, it was felt that little would be achieved by running a series of proformas using more highly differentiated inflation rates.

To summarize, then, inflation is included in this analysis in several ways:

- an adjustment to the annual cost bases,
- specific accounting for spending, depreciation, and amortization in dollars of the appropriate period,
- inflation proxies contained in the historical equation fits, and
- the calculation of working capital accounts in relationship to turnover measures against sales (and explicit recognition of LIFO for Ford and GM).

Varying the rates of inflation does not alter the indications of increased spending risk.

10.6 GENERAL MOTORS PROFORMA ANALYSIS

10.6.1 Introduction

It appears that GM will be the company with the greatest potential to meet its spending plans without resorting to the use of external capital, but proforma analysis indicates that even this very profitable company will face significantly increased financial risks in several areas which could require external funding. GM holds a strong advantage in the profitable end of the U.S. market which can be expected to remain strong even as the fleet is downsized. This should remain one of the company's primary sources of funding, although it may be expected that some profitability will be lost here, in general.

On other fronts, however, GM's position is not so strong. Although the Chevette currently enjoys a nice sales position, which some analysts expect to increase, competition in the smaller end of the auto market is also expected to increase as vehicles become more homogenous. GM's downsized front drive compacts may pick up momentum here in the spring of 1979, but over the next five years, Ford and Chrysler will be pushing into the same market area, and if any of the successes such as the Fairmont or earlier Omni/Horizon can be repeated, competition should be at least substantial.

GM is also at a relative disadvantage overseas, and company spokesmen indicate that GM might remain at some disadvantage here for several years. It should be noted that proforma projections in this analysis assume a constantly growing unit sales and profit position overseas for GM, which may be slightly optimistic. However, because GM has approximately 80 percent of its business in North America, this optimistic assumption has no great bearing on the results of proforma analysis here. Nevertheless, it should be noted that if world competition greatly increases, GM might be forced to expand its capital investment overseas, at least for replacement of current plants, which could indicate a slightly higher risk than is illustrated in this document.

In many of its public statements, GM has indicated that its primary concern over regulatory spending is that many technological developments and capital projects might not produce visible results for the consumer. If this situation occurred, the consumer might not be willing to pay a price high enough to recover capital quickly, and GM return on investment, and, therefore, its ability to provide return to investors would be strained. Under the somewhat linear assumptions of this proforma analysis, which assume no radical consumer resistance (unless the recession is viewed as a proxy for such), GM clearly faces profit and dividend pressure. This, in fact, is the primary finding of analysis, and it is quite meaningful for the company.

Recent company financial statements indicate the current state of profit pressures facing GM. In the first six months of 1977, GM earned 7.0 percent on sales. In the first six months of 1978, even though GM's unit sales increased 2.2 percent, the company earned only 6.2 percent on sales. On a quarterly basis, the same trend can be seen. In second quarter 1977, GM earned 7.4 percent on sales, but in second quarter 1978, even though units sales were 3.8 percent higher, the company only earned 6.5 percent on sales.

Unit sales have been quite good during the past year, and this could appropriately be considered a boom period, with good volume over break even levels. But, even under good conditions, it is clear that GM is not recovering all of its cost increases in prices at the market. Recent coverage in the press suggests that the situation is more pressing in passenger auto sales, because most of the growth in sales for the year is derived from light truck demand.

These recent profit pressures also reflect the longer term secular decline in auto profits mentioned earlier. In light of the current pressures, GM is clearly concerned about increases in spending projects which might not produce immediate returns on investment. In addition, it is also clear that if this profit pressure is being experienced in a good unit sales year, it could only intensify if sales turn downward.

GM's dividend policy is obviously of paramount importance, as past behavior indicates. During the last recession, GM dipped into retained earnings reserves to pay out dividends for the year, and historic analysis of stock prices indicates a strong influence of dividends. Further discussion below provides details on the dividend pressures.

The primary findings of this analysis can be summarized as follows:

1. GM will face deterioration of its cash reserves, and although it appears able to sustain a recession for one year, a slow recovery could force the company into a large borrowing position;
2. Dividend pressures will be strong, profits more volatile; and
3. Any peaking of capital spending will, very likely, force the company to borrow at least some funding if sales drop at the same time.

10.6.2 Cash Flow risks

Although GM clearly faces no risks of the order faced by Chrysler or even by Ford, it is similarly clear that the company will be forced to reduce operating reserves and will be more susceptible to changes in the economy than it has been in the past few years. Note that the incremental measures of increased spending over trend are not as pronounced for GM in the following analysis, because GM has already passed its first round of downsizing. This means that the cost of first round downsizing has been included in the trend spending projections, deflecting the curve somewhat upward in comparison to future plans.

Proforma analysis of GM's financial position was performed using several capital spending amounts, which essentially assume different new project timing configurations. Because early public statements concerning capital spending dealt only in eight year aggregate amounts, one spending estimate was derived using a linear and smooth spending pattern, rising from $4.2 billion in 1978 to $5.0 billion in 1985. This approximates the lowest public estimate announced early in June 1978, and makes a linear pattern assumption using an eight year aggregate figure.

Further research into the nature of GM's product and technology plans, as well as more recent announcements in the media, indicated that this linear and smooth pattern is not entirely realistic. GM will be introducing a preponderance of its new projects in years prior to 1983, which strongly suggests that the company's spending pattern will exhibit a peaked behavior during the 1979 to 1982 period. GM will be introducing a number of new engine, transmission, and driveline configurations during the early stages of the eight year spending period, and will be incurring spending for future weight reduction and downsizing programs. Given the timing of these product and technology introductions, it seems quite unlikely that GM's program spending will take a linear, smooth form.

To more accurately reflect the timing of project introductons, two additional planned spending levels were derived for analysis in this document. The first of these, labelled "PLANNED PEAK ONE" rises from a 1978 estimate of $4.3 billion to a three year peak of $5.2 billion per year ('80-'82), and then falls back to the $5.0 billion annual average expected over the period. The second planned spending estimate assumes a higher 1980 peak of $5.8 billion, with the other years remaining the same as in the PEAK ONE estimate; the second spending peak is labelled "PLANNED PEAK TWO" in subsequent discussion.

The PLANNED SMOOTH spending pattern, is, on average, lower than the annual $5.0 billion estimate publicly quoted ($4.7 billion), and the other two peak patterns are roughly comparable to the $5.0 billion average annual figure, although they do imply higher numbers (PEAK TWO implies $5.6 billion, while PEAK ONE implies a $5.0 billion average.) It is not the total amount of these spending lines which is critical for GM, however, but rather the peaking pattern during the first five years of the forecast period. In addition, analysis shows that all three patterns are considerably higher than a projected trend spending pattern, and, therefore, that the analysis is relatively insensitive to any but substantial changes in the comparison of planned spending to trend spending.

It is clear that GM faces increased cash flow risk over the pending spending period. Exhibit 10-1 indicates that even under the smooth spending pattern, GM faces strongly increased potential for net cash drain (see line 640). Given its typical pattern of substantial cash generation, this represents a notable change in financial position which will require a number of financial adjustments. Note also in line 660.5 that GM faces an increased probability of external funding requirements, especially under recession conditions. This is clearly a picture of tighter cash reserves and pressured cash flow, even under the conditions of smooth and linear spending.

The financial results of this spending pattern were also tested for sensitivity to market volatilty. Exhibit 10-2 indicates financial performance under a different trend sales pattern, whose volatility is considerably lower. Exhibit 10-9 summarizes this comparison to roughly display the effects of different sales patterns, holding capital spending constant at the planned smooth level. It can be seen that GM's performance is, indeed, sensitive to the pattern of sales and the resulting fixed cost penalties which arise from different annual unit sales figures under th cyclical sales pattern. Note in Exhibit 10-9 that the unit sales and dollar sales figures are basically identical over the five year period, but that the different pattern of annual sales produces a $2.2 billion lower profit and a $2.1 billion lower cash flow for the cyclical case.

This difference in results derives from the different fixed cost per unit implied for each year of the period, and it can be viewed as the error of calculation which would have resulted if one were to cost out products using a static estimate of costs. If one had costed out future GM unit sales in 1978 using a static costing approach, the difference in profit estimates per vehicle sold for the period would have been roughly $59 per vehicle after taxes. This would suggest a before-tax cost pressure of approximately $100 per vehicle. This indicates one reason for casting financial analysis in terms of volatility, and it shows the true corproate financial pressures which cannot be measured through a static costing approach.

GM clearly faces financial risks from market volatility, but further analysis indicates that the greatest risk during the pending period will derive from higher levels of capital spending. Exhibit 10-3 displays GM's financial performance under conditions which extend previous capital spending trends into the future. As can be seen in lines 640 and 660.5, if GM were to continue to spend in the future as it had in the past, it would be facing a very strong cash generation position. The recession year of 1982 shows a net cash drain, but all other years exhibit a more typical pattern of cash infusion from operations.

Exhibit 10-10 compares the results of smooth planned spending to trend spending, holding sales patterns constant to the cyclical pattern. The increased spending pattern places substantially greater pressure on all financial accounts. Note that the incremental pressure on profits from the smooth planned spending pattern is actually lower than the incremental pressure indicated by market volatility in the earlier market risk case. It should be mentioned again, at this point, that the GM trend spending pattern actually included the first round of downsizing, and, therefore, does not produce as large an increment of difference between planned spending and trend spending as in the other companies.

Despite this somewhat marginal difference in profit pressures, it is quite clear that the <u>smooth planned spending level produces a much greater cash flow pressure than any pressures on cash flow indicated by market volatility</u>. The market risk case indicated a net difference in cash flow of <u>$2.1 billion</u>, while the planned spending line, when compared to trend spending, produces a net lower cash flow of <u>$4.3 billion</u>. Clearly, then, GM's primary financial risk is instigated by the higher spending pattern, even one which is smooth and linear in shape.

Further analysis indicates that under the more realistic peaked spending patterns, this increased pressure of planned spending becomes more pronounced. Exhibits 10-4 through 10-6 present the proforma results of the PEAK ONE spending level, which approximates company statements of average $5.0 billion annual spending, and which is also fitted to the accelerated project schedule derived in other analyses. Comparing line 660.5 in Exhibit 10-4 to the same line in Exhibit 10-1 shows a substantially different cash buffer pattern, and the cash drain line in 1982 (line 640) shows the much larger cash drain under peak spending and recessionary conditions.

Differences between PEAK SMOOTH and PEAK ONE can be seen in summary form in Exhibit 10-13. <u>Note that a 6.4 percent increase in aggregate spending produces a 145.0 percent decrease in cash flow</u>. This graphically illustrates the critical nature of timing in financial performance; the aggregate spending levels are not severely different, but the cash flow pressures become magnified owing to the pattern of spending.

Exhibit 10-11 compares the PEAK ONE spending plan to the trend spending pattern. Again, it can be seen that the higher spending levels expected in the near future exert extreme pressures on financial performance, especially in net cash flow.

Exhibits 10-8 and 10-14 display the proforma results derived from the highest PEAK TWO spending estimate, which indicates the same behavioral effects of timing. This timing behavior is summarized in Exhibit 10-15 which compares the differences from trend spending produced by each successively peaked spending estimate. Note how the single incremental 1980 $600 million spending under PEAK TWO conditions produces a $324 million effect upon five year cash flow results, even though conditions of the proforma estimates allow some extra cash generation from depreciation and amortization when a spending decline is estimated.

The main point of this single peaked behavior is that <u>even a single year's peak in spending will produce a cash flow effect extending into the future</u>.

It is clear from this sequential spending analysis that GM faces an increased pressure upon cash flow. In nominal terms, these proformas indicate that even the smooth spending pattern contains strong potential for external funding requirements if sales turn downward. This external need, under sales conditions specified in the proforma estimate, could easily be as large as the external funding required during the recent 1974-75 recession, and, in the cases of the peaked spending examples, the need could easily be higher. Although it is difficult to estimate precise borrowing figures for GM five years into the future, owing to its working capital arrangements, these analyses suggest that under recessionary conditions, GM could be forced outside for capital in amounts exceeding $500 million. Given GM's previous abilities to fund spending internally, this represents a serious financial change.

Note also that the sales acceleration from the 1982 recession in the proformas is rapid. If sales did decline in this fashion and then did not recover as indicated, GM would be facing the most serious funding in at least the past ten years, and perhaps longer.

10.6.3 Profit and Dividend Risk

Proforma analysis indicates that even under the optimistic smooth planned spending level, GM will face strong pressure on profits and its ability to provide returns to investors. Comparing line 680 in Exhibits 10-1 and 10-3, shows that earnings to shareholders are reduced from 2 percent to 40 percent in any single year under the planned spending level (smooth). Comparison of PEAK ONE earnings per share to trend earnings per share indicated an even higher differential of 2 percent to 65 percent. The larger percent differentials occur during periods of sales declines; this shows how investor returns become more susceptible to volume sales fluctuations under higher spending levels.

This greater risk to investors from capital spending which exceeds usual bounds relates directly to issues of cost of capital discussed in earlier sections of this document. If investors perceived greater risk to their GM investments, they would, in all likelihood, demand a higher, or at least steadier dividend payout stream, which effectively enforces a higher cost of capital upon GM at the very time it would be experiencing difficulties in maintaining profits. This illustrates the self-feeding problems of capital structure, new investment, and cost of capital, and it should be noted that this will, most likely, be GM's chief financial problem in all years of the forecast period (which would only intensify in any year GM might be forced to borrow funds).

It is clear from these proforma estimates that GM will be facing increased financial pressure to raise prices in order to maintain appropriate return on investment. Note in Exhibit 10-6, line 476.3 how volatile GM's return on equity could become under proforma spending and sales conditions. The increased levels of spending require an almost simultaneous increase in return on this investment to keep overall corporate returns from dropping. This proforma analysis assumes that there is almost no differential in inflation effects on costs and prices (both increase approximately 5 percent per year at the base), and if, in fact, GM experienced higher cost pressures than price hike abilities, this return on investment picture would become even more difficult.

It is not the purpose of this analysis to suggest whether or not such retail price increases will be possible, given the nature of spending projected. However, the results of this analysis do strongly indicate that spending of this magnitude will demand even more than constant relationship between prices and costs if GM is to remain within the bounds of historical performance. Increased spending will put GM's profit performance at a definite risk.

10.6.4 Possible Financing

As mentioned above, it is quite difficult to forecast an explicit external financing need for GM as far into the future as 1982. But, because the proforma estimates in this analysis indicate a strong probability that GM will have to seek such funding in the event of a sales decline, it is necessary to evaluate some of the effects this might have.

Proforma analysis suggests that GM would have to seek external funding of perhaps $500 million to $800 million, under higher spending levels and recessionary conditions. This is a sizeable amount of financing, even for a company as large as GM, owing to the availability of capital in the markets. During the recent recession, GM was forced to borrow more than $500 million in one year, and this represented one of the largest single industrial debt issues ever. This set of proforma estimates indicates a likely recession need of similar proportions, and it is certain that the effects of any such issue would be no less powerful than those derived in 1975.

Given the condition of the equity markets in general, and the performance of the auto stocks in particular, it seems likely that GM would not seek any large equity financing issues. Investors have been able to derive higher and less risky returns from the bond markets and other investment areas, with the result that stocks such as GM's with little price growth potential have to pay high dividend rates. This, essentially, means a high cost of equity capital, and a disincentive to sell stock.

For example, if GM were to attempt a stock sale of approximately $500 million, it would face strong after-tax charges to cash flow. GM's stock (common) has recently traded in the neighborhood of $60 per share. Earnings are expected to flatten over the next several years (see quarterly statement again), so it is not entirely likely that GM's stock would be as high as $60 by the 1982 funding year of the proformas. But, even assuming that GM could get an asking price of $60 per share, an equity issue of $500 million would require an issue of 8.3 million shares, a 3 percent increase in GM's 1978 common share base. Assuming GM were to pay the 1978 dividend rate on common, this would produce an after tax charge of $56 million for the year of issue, which implies a before tax cost pressure of approximately $105 million. This would represent at least a permanent fixed charge for every subsequent year of operations, but, more realistically, this charge could be expected to increase as investor demands for returns increased with inflation. In addition, this equity issue would represent an earnings dilution for other common equity holders of approximately $.32 per share in the 1983 proforma year, or approximately $2 per share value assuming a roughly constant P/E ratio. Although this is a possibly acceptable charge, it assumes an optimistic stock price and no costs of selling the issue.

If GM were to sell a comparable $500 million amount of debt in 1982, it would incur similar charges, but their effects in practice would be different. The DRI assumptions for the economy, under cyclical conditions which parallel the proforma sales projections used to evaluate GM, indicate a cost of AAA debt of approximately 10 percent in 1982. Assuming these were the conditions prevailing at the time, GM's $500 million debt issue would have a before tax cost of approximately $50 million annually. This is approximately half of the assumed cost of equity estimated above, and shows how relatively expensive equity financing is for the auto companies, even one with GM's profit history.

If GM did face the borrowing requirement suggested in these proforma analyses, in all likelihood the company would choose to issue debt. If the costs were similar to those derived above, GM would then have to charge an additional $6.40 for each North American vehicle sold in every following year, just to carry the debt increment indicated in this estimate. If GM were forced to borrow the higher amounts indicated in peak spending proformas, of approximately $800 million, the incremental and permanent charge per vehicle would be somewhat larger than $10. Note again that these charges are simply to carry the financing on the books, and would be incurred in addition to the much higher investment charges calculated later in this document.

10.6.5 Summary

Given even the optimistically smooth spending pattern of this proforma analysis, GM clearly faces strong pressures on cash flow and, perhaps more importantly, on profits. Dividend cuts seem likely under these proforma estimates, and even with cuts in dividends, it appears likely that GM would have to cut into cash reserves to maintain this lower dividend if sales decline.

Under recessionary conditions approaching those indicated in the 1982 proforma year, GM would be experiencing a financial cash flow strain at least as large as any historical precedent,and the company would very likely have to seek external capital. Although GM's cash flow potential over the long run seems to indicate the ability to get external capital, this will represent a substantial financial change whose effects would be carried forward for a number of years. It is very important to note, that the proforma cases all allow a decline in spending after 1982, measured in constant dollars, and that the sales estimates allow rapid unit recovery. If GM faced the 1982 cash flow problems indicated in the proformas and did not also experience the spending relief indicated, the company would clearly face two or three years of negative cash flow, and a rapid deterioration of capital structure.

These results, when contextually compared to recent actual financial performance, indicate a very strong pressure on GM's prices, and an apparently simultaneous inability to raise these prices rapidly enough to maintain return on investment.

EXHIBIT 10-1. GM SOURCES AND USES SUMMARY, PLANNED SMOOTH, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
502.0	SALES	59487	60841	69708	74730	66431	70186	87917	98762
503.0									
505.0	BEGIN CASH	3240	3304	3115	3349	4142	2554	3382	3952
508.0									
510.0	NET INCOME	3665	3397	4438	4711	873	3307	5423	6324
530.0	DIVIDENDS	2016	1868	2441	2591	1684	1819	2983	3478
535.0	RETAINED EARN	1649	1529	1997	2120	-811	1488	2441	2846
540.0									
550.0	ADD TO PROP	4200	4800	4800	4800	4800	4800	4800	5000
560.0	DEP + AMORT	2847	3300	3595	3839	3901	3969	4049	4110
570.0	NET EXPENDITURES	1353	1500	1205	961	899	831	751	890
575.0									
590.0	CH NON-CASH WK	295	136	440	289	-283	75	561	885
600.0	DEBT PAYMENTS	112	129	74	65	47	35	30	330
610.0	OTHER USES	-176	-47	44	12	114	-281	529	-240
620.0									
630.0	CASH FLOW	64	-189	234	793	-1588	828	570	980
640.0	CHG CASH	64	-189	234	793	-1588	828	570	980
650.0									
660.0	ENDING CASH	3304	3115	3349	4142	2554	3382	3952	4932
660.1									
660.4	3WK CASH BAL	2905	3017	3380	3610	3541	3486	4265	4794
660.5	IMP. CSH NEED	-400	-98	31	-531	987	104	313	-138
665.0									
665.1	2WK CASH BAL	1946	2022	2264	2419	2372	2336	2858	3212
665.2	IMP. CSH NEED	-1358	-1094	-1085	-1723	-182	-1046	-1094	-1720
666.0	DIV IF CONST77	1945	1945	1945	1945	1945	1945	1945	1945
667.0	ADD. CSH DRAIN	-71	77	-496	-646	261	126	-1038	-1533
668.0									
670.0	CS SHARES	286	286	286	286	286	286	286	286
680.0	EPS TO CS	12.81	11.88	15.52	16.47	3.05	11.56	18.96	22.11
690.0	DPS TO CS	7.05	6.53	8.53	9.06	5.89	6.36	10.43	12.16
691.0									
692.0	IND UNIT SALES	15.15	14.58	16.15	16.48	13.29	13.31	16.55	17.90
693.0	GM NA UNITS	7.44	7.16	7.94	8.10	6.53	6.54	8.13	8.80

EXHIBIT 10-2. GM SOURCES AND USES SUMMARY, PLANNED SMOOTH, TREND SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
502.0	SALES	59455	60740	67246	69855	72907	79429	86592	92433
503.0									
505.0	BEGIN CASH	3240	3304	3107	3347	3956	4707	5622	6807
508.0									
510.0	NET INCOME	3660	3371	4168	3995	4159	4764	5278	5630
530.0	DIVIDENDS	2013	1854	2292	2197	2288	2620	2903	3096
535.0	RETAINED EARN	1647	1517	1875	1798	1872	2144	2375	2533
540.0									
550.0	ADD TO PROP	4200	4800	4800	4800	4800	4800	4800	5000
560.0	DEP + AMORT	2847	3300	3595	3839	3901	3969	4049	4110
570.0	NET EXPENDITURES	1353	1500	1205	961	899	831	751	890
575.0									
590.0	CH NON-CASH WK	294	132	326	165	168	329	66	610
600.0	DEBT PAYMENTS	112	129	74	65	47	35	30	330
610.0	OTHER USES	-176	-47	30	-2	6	34	343	-270
620.0									
630.0	CASH FLOW	64	-197	240	609	751	915	1185	973
640.0	CHG CASH	64	-197	240	609	751	915	1185	973
650.0									
660.0	ENDING CASH	3304	3107	3347	3956	4707	5622	6807	7780
660.1									
660.4	3WK CASH BAL	2903	3014	3268	3408	3558	3859	4205	4506
660.5	IMP. CSH NEED	-400	-92	-79	-548	-1149	-1763	-2602	-3274
665.0									
665.1	2WK CASH BAL	1945	2020	2189	2283	2384	2585	2817	3019
665.2	IMP. CSH NEED	-1359	-1087	-1158	-1672	-2323	-3036	-3989	-4761
666.0	DIV IF CONST77	1945	1945	1945	1945	1945	1945	1945	1945
667.0	ADD. CSH DRAIN	-68	91	-347	-252	-343	-675	-958	-1152
668.0									
670.0	CS SHARES	286	286	286	286	286	286	286	286
680.0	EPS TO CS	12.80	11.79	14.57	13.97	14.54	16.66	18.45	19.68
690.0	DPS TO CS	7.04	6.48	8.01	7.68	8.00	9.16	10.15	10.83
691.0									
692.0	IND UNIT SALES	15.14	14.55	15.45	15.16	14.96	15.58	16.24	16.49
693.0	GM NA UNITS	7.44	7.15	7.59	7.45	7.35	7.66	7.98	8.10

EXHIBIT 10-3. GM SOURCES AND USES SUMMARY, TREND SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
502.0	SALES	59487	60841	69708	74730	66431	70186	87917	98762
503.0									
505.0	BEGIN CASH	3240	4341	5378	6446	7864	6852	8067	8911
508.0									
510.0	NET INCOME	3759	3633	4807	5116	1271	3693	5795	6696
530.0	DIVIDENDS	2048	1998	2644	2814	1829	2031	3187	3683
535.0	RETAINED EARN	1692	1635	2163	2302	-558	1662	2608	3013
540.0									
550.0	ADD TO PROP	2984	3123	3261	3400	3538	3676	3815	3953
560.0	DEP + AMORT	2625	2743	2724	2882	2963	3058	3171	3232
570.0	NET EXPENDITURES	359	380	537	518	575	618	644	721
575.0									
590.0	CH NON-CASH WK	295	136	440	289	-283	75	561	885
600.0	DEBT PAYMENTS	112	129	74	65	47	35	30	330
610.0	OTHER USES	-176	-47	44	12	114	-281	529	-240
620.0									
630.0	CASH FLOW	1101	1037	1068	1418	-1011	1214	845	1317
640.0	CHG CASH	1101	1037	1068	1418	-1011	1214	845	1317
650.0									
660.0	ENDING CASH	4341	5378	6446	7864	6852	8067	8911	10228
660.1									
660.4	3WK CASH BAL	2851	2960	3352	3596	3533	3484	4269	4794
660.5	IMP. CSH NEED	-1490	-2418	-3094	-4268	-3320	-4582	-4642	-5434
665.0									
666.0	DIV IF CONST77	1945	1945	1945	1945	1945	1945	1945	1945
667.0	ADD. CSH DRAIN	-123	-53	-699	-869	116	-86	-1243	-1738
668.0									
670.0	CS SHARES	286	286	286	286	286	286	286	286
680.0	EPS TO CS	13.14	12.70	16.81	17.89	4.44	12.91	20.26	23.41
690.0	DPS TO CS	7.23	6.99	9.24	9.84	6.39	7.10	11.15	12.88
691.0									
692.0	IND UNIT SALES	15.15	14.58	16.15	16.48	13.29	13.31	16.55	17.90
693.0	GM NA UNITS	7.44	7.16	7.94	8.10	6.53	6.54	8.13	8.80

EXHIBIT 10-4. GM SOURCES AND USES SUMMARY, PEAK ONE SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
502.0	SALES	59487	60841	69708	74730	66431	70186	87917	98762
503.0									
505.0	BEGIN CASH	3240	3219	2876	2817	3371	1556	2366	2896
508.0									
510.0	NET INCOME	3657	3373	4381	4626	769	3212	5339	6266
530.0	DIVIDENDS	2012	1855	2410	2544	1654	1766	2937	3446
535.0	RETAINED EARN	1646	1518	1971	2082	-885	1445	2403	2820
540.0									
550.0	ADD TO PROP	4300	5000	5200	5200	5200	5000	5000	5000
560.0	DEP + AMORT	2865	3357	3728	4038	4148	4194	4247	4246
570.0	NET EXPENDITURES	1435	1643	1472	1162	1052	806	753	754
575.0									
590.0	CH NON-CASH WK	295	136	440	289	-283	75	561	885
600.0	DEBT PAYMENTS	112	129	74	65	47	35	30	330
610.0	OTHER USES	-176	-47	44	12	114	-281	529	-240
620.0									
630.0	CASH FLOW	-21	-343	-59	554	-1815	810	530	1090
640.0	CHG CASH	-21	-343	-59	554	-1815	810	530	1090
650.0									
660.0	ENDING CASH	3219	2876	2817	3371	1556	2366	2896	3987
660.1									
660.4	3WK CASH BAL	2909	3025	3393	3619	3546	3482	4263	4785
660.5	IMP. CSH NEED	-310	149	576	248	1990	1116	1367	798
665.0									
665.1	2WK CASH BAL	1949	2027	2274	2425	2376	2333	2856	3206
665.2	IMP. CSH NEED	-1270	-849	-544	-946	820	-33	-40	-781
666.0	DIV IF CONST77	1945	1945	1945	1945	1945	1945	1945	1945
667.0	ADD. CSH DRAIN	-67	90	-465	-600	291	178	-992	-1502
668.0									
670.0	CS SHARES	286	286	286	286	286	286	286	286
680.0	EPS TO CS	12.79	11.79	15.32	16.18	2.69	11.23	18.67	21.91
690.0	DPS TO CS	7.03	6.49	8.42	8.90	5.78	6.18	10.27	12.05
691.0									
692.0	IND UNIT SALES	15.15	14.58	16.15	16.48	13.29	13.31	16.55	17.90
693.0	GM NA UNITS	7.44	7.16	7.94	8.10	6.53	6.54	8.13	8.80

EXHIBIT 10-5. GM INCOME SUMMARY, PEAK ONE SPENDING , CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
720.0	INCOME SUMMARY								
720.1	SALES	59487	60841	69708	74730	66431	70186	87917	98762
721.0									
722.0	COSTS								
723.0	COST,OTB NA	31033	31966	36473	39079	36848	34797	45431	51593
724.0	DEP NA	931	1046	1166	1300	1363	1425	1493	1517
725.0	AMORT NA	1361	1639	1817	1930	1955	1930	1905	1880
726.0	S,G,&A NA	1797	1797	2045	2191	2191	2191	2547	2893
727.0	PENSION NA	1228	1388	1568	1772	2003	2263	2557	2890
728.0	M,R,&R NA	2755	2784	3238	3469	3365	3264	4033	4580
728.1	PROPTAX &OTH	1629	1629	1875	2008	2008	2008	2335	2652
729.0	R&D NA	1451	1465	1704	1826	1826	1826	2123	2411
730.0	DEP FOR.	233	262	291	325	341	356	373	379
730.1	AMORT FOR.	340	410	454	483	489	483	476	470
730.2	OTH FOR, COST	6985	7505	8093	8737	9471	10269	11122	12042
731.0	NONAUTO COST	2723	2890	3067	3254	3453	3665	3889	4126
732.0									
733.0	OP COST	52467	54781	61790	66375	65313	64477	78283	87433
733.1									
734.0	OP PROFIT	7020	6060	7917	8355	1118	5709	9634	11329
734.1									
735.0	NON OP INC	595	608	697	747	664	702	879	988
736.0	INT EXP	297	304	349	374	332	351	440	494
736.1									
737.0	EARN BEF TAX	7318	6364	8266	8729	1450	6060	10074	11823
738.0	TAX	3439	2991	3885	4103	682	2848	4735	5557
738.1									
738.2	COST FIT ADJUST	221	0	0	0	0	0	0	0
739.0	EARN AFT TAX	3657	3373	4381	4626	769	3212	5339	6266
739.1									
740.0	OP CASH FLOW	6522	6730	8109	8664	4917	7406	9586	10512
740.1									
741.0	DIVIDENDS	2012	1855	2410	2544	1654	1766	2937	3446
742.0	DEBT PAY	112	129	74	65	47	35	30	330
742.1	CAP SPEND	4300	5000	5200	5200	5200	5000	5000	5000
743.0	WK INVEST	295	136	440	289	-283	75	561	885
744.0	OTH USES	-176	-47	44	12	114	-281	529	-240
744.1									
745.0	CASH DRAIN	6543	7073	8168	8111	6732	6596	9056	9422
745.1									
746.0	NET CASH FLOW	-21	-343	-59	554	-1815	810	530	1090

EXHIBIT 10-6. GM BALANCE SHEET SUMMARY, PEAK ONE SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
300.0	ASSETS								
305.0	LIQUIDS	3219	2876	2817	3371	1556	2366	2896	3987
310.0	ACCT REC	5040	5159	5838	6249	5637	5895	7254	8138
315.0	INVENTORY	7664	7794	8645	9127	8330	8691	10393	11434
320.0	PREPAIDS	833	852	976	1046	1015	984	1231	1383
325.0	TOT CUR ASSETS	16756	16680	18276	19794	16538	17936	21774	24941
327.0									
330.0	INVEST + MISC	2508	2563	2917	3118	2962	2814	3646	4079
331.0	CS INC	119	122	139	149	133	140	176	198
335.0	GROSS PPE	22140	24790	27546	30302	33058	35708	38358	41008
345.0	ACCUM DEP	13843	15151	16608	18233	19937	21718	23584	25480
347.0	NET PPE	8297	9639	10938	12069	13121	13990	14774	15528
350.0	UNAMORT TOOLS	1341	1642	1815	1846	1846	1783	1752	1752
356.0	TOTAL PROPERTY	9638	11281	12753	13915	14967	15773	16526	17280
360.0	TOTAL ASSETS	29021	30645	34086	36977	34600	36664	42122	46498
370.0									
400.0	LIABILITIES								
405.0	A/P	3153	3225	3695	3961	3521	3720	4660	5234
410.0	TAX DUE	892	913	1046	1121	996	1053	1319	1481
415.0	STD	681	681	681	681	681	681	681	681
420.0	CURRENT LTD	129	74	65	47	35	30	330	25
425.0	ACCRUALS	3996	4091	4712	5063	4482	4745	5986	6745
430.0	TOT CUR LIAB	8851	8983	10198	10873	9716	10229	12976	14167
435.0									
440.0	OTHER LIAB	1223	1258	1489	1620	1404	1501	1962	2244
445.0	DEF CRED	595	608	697	747	664	702	879	988
450.0	LTD OLD	939	865	800	753	718	688	358	333
455.0	CAP STOCK	1535	1535	1535	1535	1535	1535	1535	1535
460.0	RETAINED EARN	15878	17396	19367	21449	20564	22009	24412	27231
465.0	TOTAL EQUITY	17413	18931	20902	22984	22099	23544	25947	28766
470.0	TOT LIAB	29021	30645	34086	36977	34600	36664	42122	46498
475.0	CH CASH	-21	-343	-59	554	-1815	810	530	1090
475.1									
476.0	CURRENT RATIO	1.89	1.86	1.79	1.82	1.70	1.75	1.68	1.76
476.2	DEBT %TOT CAP	.05	.04	.04	.03	.03	.03	.01	.01
476.3	PAT RET/EQ	.210	.178	.210	.201	.035	.136	.206	.218

EXHIBIT 10-7. GM SOURCES AND USES SUMMARY, PEAK ONE SPENDING, TREND SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
502.0	SALES	59455	60740	67246	69855	72907	79429	86592	92433
503.0									
505.0	BEGIN CASH	3240	3219	2868	2815	3185	3736	4633	5778
508.0									
510.0	NET INCOME	3652	3347	4111	3910	4055	4668	5194	5572
530.0	DIVIDENDS	2009	1841	2261	2151	2230	2567	2857	3065
535.0	RETAINED EARN	1643	1506	1850	1760	1825	2101	2337	2507
540.0									
550.0	ADD TO PROP	4300	5000	5200	5200	5200	5000	5000	5000
560.0	DEP + AMORT	2865	3357	3728	4038	4148	4194	4247	4246
570.0	NET EXPENDITURES	1435	1643	1472	1162	1052	806	753	754
575.0									
590.0	CH NON-CASH WK	294	132	326	165	168	329	66	610
600.0	DEBT PAYMENTS	112	129	74	65	47	35	30	330
610.0	OTHER USES	-176	-47	30	-2	6	34	343	-270
620.0									
630.0	CASH FLOW	-21	-351	-52	370	551	897	1145	1083
640.0	CHG CASH	-21	-351	-52	370	551	897	1145	1083
650.0									
660.0	ENDING CASH	3219	2868	2815	3185	3736	4633	5778	6861
660.1									
660.4	3WK CASH BAL	2908	3022	3281	3417	3564	3855	4203	4497
660.5	IMP. CSH NEED	-311	154	466	232	-172	-778	-1576	-2365
665.0									
665.1	2WK CASH BAL	1948	2025	2199	2290	2388	2583	2816	3013
665.2	IMP. CSH NEED	-1270	-843	-617	-896	-1348	-2050	-2962	-3848
666.0	DIV IF CONST77	1945	1945	1945	1945	1945	1945	1945	1945
667.0	ADD. CSH DRAIN	-64	104	-316	-206	-285	-623	-912	-1120
668.0									
670.0	CS SHARES	286	286	286	286	286	286	286	286
680.0	EPS TO CS	12.77	11.70	14.37	13.67	14.18	16.32	18.16	19.48
690.0	DPS TO CS	7.02	6.44	7.91	7.52	7.80	8.98	9.99	10.72
691.0									
692.0	IND UNIT SALES	15.14	14.55	15.45	15.16	14.96	15.58	16.24	16.49
693.0	GM NA UNITS	7.44	7.15	7.59	7.45	7.35	7.66	7.98	8.10

EXHIBIT 10-8. GM SOURCES AND USES SUMMARY, PEAK TWO SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
502.0	SALES	59487	60841	69708	74730	66431	70186	87917	98762
503.0									
505.0	BEGIN CASH	3240	3219	2876	2306	2960	1232	2062	2609
508.0									
510.0	NET INCOME	3657	3373	4334	4574	718	3202	5330	6257
530.0	DIVIDENDS	2012	1855	2384	2516	1635	1761	2932	3441
535.0	RETAINED EARN	1646	1518	1950	2058	-917	1441	2399	2816
540.0									
550.0	ADD TO PROP	4300	5000	5800	5200	5200	5000	5000	5000
560.0	DEP + AMORT	2865	3357	3838	4161	4268	4218	4268	4267
570.0	NET EXPENDITURES	1435	1643	1962	1039	932	782	732	733
575.0									
590.0	CH NON-CASH WK	295	136	440	289	-283	75	561	885
600.0	DEBT PAYMENTS	112	129	74	65	47	35	30	330
610.0	OTHER USES	-176	-47	44	12	114	-281	529	-240
620.0									
630.0	CASH FLOW	-21	-343	-570	653	-1727	829	547	1107
640.0	CHG CASH	-21	-343	-570	653	-1727	829	547	1107
650.0									
660.0	ENDING CASH	3219	2876	2306	2960	1232	2062	2609	3716
660.1									
660.4	3WK CASH BAL	2909	3025	3420	3611	3538	3480	4262	4783
660.5	IMP. CSH NEED	-310	149	1114	651	2306	1419	1653	1067
665.0									
665.1	2WK CASH BAL	1949	2027	2291	2419	2371	2332	2855	3205
665.2	IMP. CSH NEED	-1270	-849	-15	-540	1138	270	246	-511
666.0	DIV IF CONST77	1945	1945	1945	1945	1945	1945	1945	1945
667.0	ADD. CSH DRAIN	-67	90	-439	-571	310	184	-987	-1497
668.0									
670.0	CS SHARES	286	286	286	286	286	286	286	286
680.0	EPS TO CS	12.79	11.79	15.16	15.99	2.51	11.19	18.64	21.88
690.0	DPS TO CS	7.03	6.49	8.34	8.80	5.72	6.16	10.25	12.03
691.0									
692.0	IND UNIT SALES	15.15	14.58	16.15	16.48	13.29	13.31	16.55	17.90
693.0	GM NA UNITS	7.44	7.16	7.94	8.10	6.53	6.54	8.13	8.80

EXHIBIT 10-9. GM PLANNED SPENDING
(SMOOTH) CYCLE SALES VS. TREND SALES

5 YEAR CUMULATIVE (All dollars in millions)

	CYCLE SALES	TREND SALES	DIFFERENCE CYCLE-TREND
UNITS (million)	37.17	36.98	0.19
SALES	$331,197	$330,203	$994
NET INCOME	$ 17,084	$19,353	$(-2,269)
DIVIDENDS	$ 10,600	$10,644	$(-44)
RETAINED EARNINGS	$ 6,484	$8,709	$(-2,225)
CAPITAL SPENDING	$ 23,400	$23,400	0
DEP. & AMORT.	$ 17,482	$17,482	0
CHANGE CASH	$(-686)	$ 1,467	$(-2,153)
POSSIBLE NEED	$500-$700	0	$500-$700

EXHIBIT 10-10. GM PLANNED SPENDING (SMOOTH) VS TREND SPENDING, CYCLE SALES

5 YEAR CUMULATIVE (All dollars in millions)

	PLAN (SMOOTH)	TREND	DIFFERENCE PLAN-TREND
UNITS (million)	37.17 million	37.17	0
SALES	$331,197	$331,197	0
NET INCOME	$17,084	$18,586	$(-1502)
DIVIDENDS	$10,600	$11,353	$(-753)
RETAINED EARNINGS	$6,484	$7,233	$(-749)
CAPITAL SPENDING	$23,400	$16,306	$7,094
DEP. & AMORT.	$17,482	$13,937	$3,545
CHANGE CASH	$-686	$3,613	$(-4,299)
POSSIBLE NEED	$500-$700	0	$500-700

EXHIBIT 10-11. GM PLANNED SPENDING (PEAK ONE) VS. TREND SPENDING, ALL CYCLE SALES

5 YEAR CUMULATIVE (All dollars in millions)

	PLAN (PEAK ONE)	TREND	DIFFERENCE PLAN-TREND
UNITS (million)	37.17	37.17	0
SALES	$331,197	$331,197	0
NET INCOME	$16,806	$18,586	$(-1,780)
DIVIDENDS	$10,475	$11,353	$(-878)
RETAINED EARNINGS	$6,331	$7,233	$(-902)
CAPITAL SPENDING	$24,900	$16,306	$8,594
DEP. & AMORT.	$18,136	$13,937	$4,199
CHANGE CASH	$(-1,684)	$3,613	$(-5,297)
POSSIBLE NEED	$ 800	0	$ 800

EXHIBIT 10-12. GM PLANNED SPENDING (PEAK ONE) CYCLE SALES VS TREND-SALES, A TEST OF SENSITIVITY TO MARKET VOLATILITY

5 YEAR CUMULATIVE (All dollars in millions)

	CYCLE SALES	TREND SALES	DIFFERENCE CYCLE-TREND
UNITS (million)	37.17	36.98	0.19
SALES	$331,197	$330,203	$ 994
NET INCOME	$16,806	$19,075	$(-2,269)
DIVIDENDS	$10,475	$10,492	$ (-17)
RETAINED EARNINGS	$6,331	$8584	$(-2,253)
CAPITAL SPENDING	$24,900	$24,900	0
DEP. & AMORT.	$18,136	$18,136	0
CHANGE CASH	$(-1684)	$497	$(-2,181)
POSSIBLE NEED	$800 approx.	$400 approx.	$400 approx.

EXHIBIT 10-13. GM PLANNED SPENDING (PEAK ONE) VS. PLANNED SPENDING (SMOOTH) CYCLE SALES

5 YEAR CUMULATIVE (All dollars in millions)

	PEAK ONE	SMOOTH	DIFFERENCE PEAK-SMOOTH
UNITS (million)	37.17	37.17	0
SALES	$331,197	$331,197	0
NET INCOME	$16,806	$17,084	$(-278)
DIVIDENDS	$10,475	$10,600	$(-125)
RETAINED EARNINGS	$6,331	$6,484	$(-153)
CAPITAL SPENDING	$24,900	$23,400	$1,500
DEP. & AMORT.	$18,136	$17,482	$654
CHANGE CASH	$(-1,684)	$(-686)	$(-998)
POSSIBLE NEED	$800	$500-$700	$300-$100

EXHIBIT 10-14. GM PLANNED SPENDING (PEAK TWO) VS. TREND SPENDING, ALL CYCLE SALES

5 YEAR CUMULATIVE (All dollars in millions)

	PLAN (PEAK TWO)	TREND	DIFFERENCE PLAN-TREND
UNITS (million)	37.17	37.17 Mill.	0
SALES	$331,197	$331,197	0
NET INCOME	$16,656	$18,586	$(-1,930)
DIVIDENDS	$10,402	$11,353	$(-951)
RETAINED EARNINGS	$6,255	$7,233	$(-978)
CAPITAL SPENDING	$25,500	$16,306	$9,194
DEP. & AMORT.	$18,489	$13,937	$4,552
CHANGE CASH	(-2,008)	#3,613	$(-5,621)
POSSIBLE NEED	$800+	0	$800

EXHIBIT 10-15. DIFFERENCE FROM TREND SPENDING OF THE THREE PLANNED SPENDING ESTIMATES.

5 YEAR CUMULATIVE (All dollars in millions)

	SMOOTH	PEAK ONE	PEAK TWO
UNITS (million)	0	0	0
SALES	0	0	0
NET INCOME	$(-1,502)	$(-1,780)	$(-1,930)
DIVIDENDS	$(-753)	$(-878)	$(-951)
RETAINED EARNINGS	$(-749)	$(-902)	$(-978)
CAPITAL SPENDING	$7,094	$8,594	$9,194
DEP. & AMORT.	$3,545	$4,199	$4,552
CHANGE CASH	$(-4,299)	$(-5,297)	$(-5,621)
POSSIBLE NEED	$500-700	$800 approx.	$800 plus

10.7 FORD PROFORMA FINANCIAL ANALYSIS

10.7.1 General

The Ford proforma projections were performed in a manner consistent with general methods described earlier in this document. Specific assumptions included in the Ford caculations are enumerated in the introduction to the Exhibits for this section of analysis.

It is important to note several characteristics of the company before describing the output of the proforma analysis. Ford is, at year-end 1977, unique in that it has built up significant cash reserves. This is apparently a defensive strategy in light of the pending regulatory spending period, and it really represents an "accrued" regulatory cost because Ford has not yet performed the extensive downsizing such as that done by GM 1977. In a sense, Ford was only able to build these cash reserves because it deferred some major capital spending projects during the recent recession. All proforma analyses, even those performed using lower levels of future spending, indicate that this cash reserve will be quickly deployed in the development of new products.

Ford, as mentioned earlier, is the most international of all U.S. auto makers in percentage terms. This is important to note for two reasons:

1. Higher recent reported profits are largely a function of overseas investments, and not from inherently high U.S. profits. These profits do not accrue to U.S. operations, but will be, instead, the primary sources of overseas funding. It was noted earlier that world competition is increasing, especially in light of Ford's new and larger direct competitor, Peugeot, and Ford's overseas operations will not be contributing to the U.S. investment base.
2. In investment terms, Ford has a much greater incentive to invest overseas, where the return on captial is higher Any deficiencies in funding of overseas assets will

produce ripple effects upon the corporation as a whole because of the higher profit and return leverage of overseas operations. Some analysts have assumed that Ford's foreign cash flow can be used to subsidize U.S. spending, and on a single year basis, in the event of an emergency, some subsidization might be a reality. However, even assuming such subsidization were possible, it would quickly change the nature of the company in investment terms, because overall corporate performance would suffer. This ultimately would leave the company with a worse ability to provide for regulatory spending, because the overall corporate "cushion" against extreme risk would be lowered. In many ways, Ford must maintain foreign investment in order to maintain U.S. investment. This is a very complex issue, but its importance is noted here to indicate that foreign earnings will not contribute to U.S. spending in any significant manner.

Another important issue for Ford is its credit rating and cost of capital which partially depends upon it. As mentioned earlier, the 1974-75 experience indicates that Ford's ability to pay dividends is critical for stock price and cost of equity capital. In addition, Ford currently enjoys a AAA debt rating, which is important for its ability to profitably use debt. For both of these reasons, continued profitability is a paramount concern for the company, and because this profitability cannot be generated from strong volume gains in the u.S. markets, it must be generated through stringent cost control or other means here.

A significant risk to Ford which results from enforced regulatory spending is, therefore, the potentially high product development costs and large investments in capital assets because these financial pressures have the powerful ability to shave margins, with a resulting increase in the cost of capital. As will be shown below, the planned regulatory spending program produces a significant financial risk in the profitability and return areas.

Beyond the profitability risk, Ford clearly faces a cash flow risk in the event of declining sales in any year. As mentioned in in many places earlier, the major behavioral effect of the new regulatory spending is that capital spending cannot be deferred in poor market situations. Ford's planned investment is so large, that a recession of the magnitude last experienced in 1974 could easily force the company outside for funding. This means the cost of capital risks mentioned in the preceding paragraph are not merely theoretical considerations, but have the potential for significant out-of-pocket cash expenses in the next 8 years.

Ford must maintain equity value to minimize excessive dividend and other costs, and it must maintain its debt ratings to ensure the financial flexibility necessary for the increased future funding risks. These two facts mean that even if Ford is ultimately capable of using only internally generated funding, this internal funding will have an explict and direct cost which must be recovered in pricing and cost control, or it will immediately start the cyclical pattern of lost profit-to higher capital cost-to additional lost profit. This equilibrium is the required corporate financial goal, and it is evidently the source of Ford's public objections to increased regulatory spending in the form posed.

The summary of analysis derived from the proformas discussed below, then, is the following:

1. Ford will face a significantly higher cash flow risk under new regulatory spending; operating cash drains could be as high as $1.5 billion, cumulative, over the next five years. This would have to be recovered in pricing, cost control, and probably external capital if sales recess to any degree.

2. Ford is likely to borrow small amounts of money even during periods of rising sales, to fund additional peaks in spending.

3. Ford will very likely have to achieve the limits of its historic borrowing, if another strong recesssion occurs before 1985.

4. Ford faces a continuous and strong pressure on its profits, and, therefore, upon the critical ability to pay dividends. It is likely that a slowing sales growth combined with the peak spending years could cause some reduction in annual dividends, even if no major recession occurred. If such a recession did occur, Ford would either have to cut its dividend payout or dip heavily into reserves to pay a normal rate.

5. The "front end loading" pattern of spending maybe more risky for Ford than for GM, because Ford will be introducing an unprecedented number of new engines and drivelines, in combination with new model configurations. Although Ford's public statements still indicate roughly level spending patterns, it is entirely possible that the company will experience a peak during the 1979-81 period, when the bulk of introductions pile up.

6. The financial risks induced by planned levels of regulatory spending are significantly higher than the risks induced by market cyclicality. The details of this are discussed below, but the overriding indication is that the cash drain from planned spending is approximately 4 times higher than the cash drains which could be expected from market cyclicality, and its resultant fixed cost penalities.

10.7.2 Cash Flow Risk

As mentioned in earlier sections of this document, the ability of a company to generate cash from operations to pay for investments in operations is the significant business condition. If a company is forced to the limits of its cash generation ability, it will have to seek external funding and probably change or cut back certain of its normal operations. Proforma analysis of Ford indicates that the company will indeed be experiencing cash flow risk under the planned regulatory spending schedule. Given the cyclical sales pattern used in this analysis, the magnitude and periodicity of which has firm historical precedent, the risks are at the limit of Ford's ability to generate cash, and even beyond it in a recession period.

Exhibits 10-16 through 10-18 contain the relevant output of this proforma illustration; the most important highlights can be seen in the "Sources and Use of Cash" summary, and most discussion relates to this exhibit.

On line 640 of Exhibit 10-16, it can be seen that most of Ford's operations for the first five years of the forecast period produce negative cash flows. Note that these cash drains occur even under profitable conditions. This exemplifies earlier discussions concerning the need to evaluate profit as only one contributor to cash flow, and the specific output indicates that planned spending levels are so high that neither rising sales nor profits can pay for them. Note that the intervening good years of 1980 and 1981, which generate net cash, cannot begin to counter the effects of a recession such as that illustrated in 1982. Note also that those two good years do not make up for the cash drains illustrated in 1978 and 1979. Under these projections, Ford will be operating at 3 week cash levels, or slightly below, during the first three years of spending. Note also, in line 660.5, that even the first good cash year of 1980 does not fully return the company to 3 week levels. In the projected recession years, the cash reserves are strained significantly and they only recover because of the significant sales and profits growth projected into the 1983 year. If cash reserves dropped to levels indicated in 1982, and sales did not recover as quickly, the period of cash reserve risk would be extended, and the likely financing pattern would be a series of sequential short and perhaps long term debt issues on a monthly basis after a large initial financing arrangement.

It is very interesting to note how merely changing the cyclical behavior of sales patterns can produce different annual financing risks and different cumulative five year cash flow patterns. Exhibit 10-19 illustrates Ford's financial behavior under the same spending conditions, with only a variation in the pattern of sales over five years. This sources and uses summary provides the details, and the cumulative summary Exhibit 10-23 compares the market volatility projection to the trend market pattern projection.

Notice, in the five year cumulative summary Exhibit 10-23, that the unit and dollar sales are virtually identical for the five year period, but that the cumulative financial results are significantly different. For example, the cyclical sales pattern produces approximately $1.3 billion lower profits, a similarly low retained earnings, and cash drain. This is the result of fixed cost behavior under different annual sales pattern, and it reveals the need to perform financial analysis of regulatory spending in a dynamic setting. The capital spending in both of these cases is absolutely indentical, and the difference in cumulative cash flow is strictly a result of the number of units being sold over fixed costs in any single year. A static estimate of costs, if performed in 1977 and assumed to hold true for the five year period, would have produced this type of aggregate estimate error, and would have significantly understated the financial risk to the company. For this reason, it is important to note that in costing out regulatory programs, financial risk cannot be merely estimated in absolute dollar amounts, it must be cast in terms of volatility.

A more important finding is revealed in the cases which compare historical trend spending to the planned levels of spending for regulatory development. Exhibits 10-20 through 10-22 contain the proforma results which rely on sales patterns identical to the Planned Spending cases, but which contain projections of historical capital spending patterns into the future. As mentioned earlier in this document, this analysis makes no claims to separating "business-as-usual" spending from "incremental regulatory" spending, other than to observe the differences between past historical spending and the planned levels of spending. The auto companies have observed that such a comparison understates the true cost of government regulation because the companies are spending not only the increased increment over trend on regulatory requirements, but are also spending increased portions of the trend base on regulatory items. Government sources have suggested that the higher spending levels are not strictly incremental costs of regulation, because they allow simultaneous development of products beneficial to the companies, and, therefore, represent business-as-usual costs.

This analysis does not purport to argue either side, but it is clear that the planned spending levels are significantly higher, and that this increased increment has serious financial consequences for Ford. Even sensitivity analysis which drops the planned spending levels below the levels used in this analysis indicates a strongly higher risk, so, it is clear from a financial standpoint that the planned levels are not ones which produce an immediate and significant return, unless one also assumes an increase in retail price much higher than a 5 percent annual average, (approximately 8 percent) with only a 5 percent average increase in annual costs.

Exhibit 10-24 shows that the planned spending levels exert an extremely large cash flow pressure over the average spending rates of the past ten years. Notice that the unit sales figures are identical, but that net income is $1.8 billion lower over five years, that dividend payout is $224 million (11 percent lower, that retained earnings are $1.6 billion lower, and that <u>cash flow is $5.2 billion lower</u> under the planned spending levels versus the historical trends. The profit and dividend pressures indicate the strong risks posed for cost of capital, and the cash flow pressure indicates a very strongly accelerated overall corporate financial risk. Note further that the proforma projections use constantly growing overseas unit sales and consistently high profits overseas (see Appendix A), so the greatest proportion of this operating cash flow pressure is generated by North American operations. If the proforma estimates of foreign sales and profits were allowed to drop, the overall corporate cash flow pressures would only increase further, and because these projections were designed to isolate the North American contributions to corporate risk, the resulting indications appropriately reflect this risk.

Exhibit 10-25 compares the risks from market volatility to the risks from increased spending. It should be noted that these comparisons are "raw," in the sense that they could not be used to plot continuous mathematical curves comparing market risk to spending risk in the manner that one would calculate supply and demand curves or similar overall magnitudes. (A tradeoff curve could be computed by running the proforma calculations in a Monte Carlo simulation fashion, controlling for probabilistic behavior of all variables, but there would be little point in doing this given the magnitude of differences experssed here.)

This comparison clearly illustrates that the magnitude of spending risk forced upon profits, dividends, and cash flow derives from the increased spending levels. This is even more clear when one considers that all three proforma cases use virtually equal five year unit and dollar sales figures. This essentially says that given the same five year total amount of units to be sold, with roughly comparable prices even under inflationary conditions, the greatest corporate cash flow risk obtains from an increase in capital spending and associated product development expenses. <u>Ford will be pricing and financing not to combat market volatility, or not only to combat market volatility, but to pay for increased levels of spending</u>. This is a graphic demonstration of the reasons for eliminating a product-specific incremental/business-as-usual costing approach in this analysis; given the overall large spending plans indicated, such a cost accounting becomes almost a moot point.

10.7.3 Profit Dividend and Related Risks

Exhibit 10-16 quickly indicates, in line 690, that dividends per share will be declining under projected profit figures assuming an historic pattern to dividend payout. Note that this pattern is statistical and is used to show the difference between past dividend behavior under all conditions of uncertainty, and present dividend policies of Ford. That is, the statistical measure used in calculating lines 520 and 690 replicates the past overall behavior of Ford dividends under conditions of varying profits. The calculation of dividends in line 662, however, is an explicit calculation of Ford's 1978 dividend policy, which represents management's view of investor expectations, and the cost of capital. Historical evaluation of stock price behavior, (see Section 6) indicates that this dividend policy is centrally reflective of cost of capital, and, therefore, that the 1978 policy should be viewed as the standard against which to measure the historically derived pattern of dividends in lines 520 and 690. It can be seen in line 663 that for each of the first six years of the forecast period, the historical pattern of dividends is not large enough to support management's 1978 policy because of the lower levels of profit projected under the planned spending levels. If Ford actually paid dividends indicated in line 690, the value of common stock and the cost of capital would deteriorate. For this reason, the "Additional Cash Drain" estimate of line 663 should be added to line 660.5 or deducted from line 660 (cash balance) to more appropriately consider the cost of capital pressures which would add to the operating pressures already indicated in the proforma projections.

The net result of this analysis is that the dividend pressure will be strong under conditions of increased capital spending, and that maintenance of 1978 dividend levels will have an explicit cash flow cost in addition to the cash flow cost of increased spending which is reflected in the operating results. Note also that the earnings per share values (eps) in line 680 are also declining from the 1978 levels of $14.16, which means the investor would be receiving signals of lower potential dividend payout in the future even if Ford were able to maintain the dividend payout at 1978 levels. Although is is not entirely clear that eps will have an independent effect on stock price and the cost of capital, this possibility should, at least, be considered. Note also that it is not the purpose of this proforma to predict exact earnings per share figure, and that there is room for estimate error around the nominally reported figures in line 680, especially during the first year of forecasts. However, this error does not, in any way, diminish the meaning or import of the eps and dps evaluation here, because the conclusions concerning equity value and the cost of capital are made not on the basis of any single year's results but on the basis of the extended low pattern of dividends and earnings derived in this proforma. Even if single year estimates are off the mark, the pattern indicated by this overall projection is strong and is significant enough to draw long range conclusions. This can be seen by viewing the entire eps line (680) from 1978 through 1985; if the early years were indicating a normal profit picture, at least one or two of the eps estimates in the first five years would obtain the magnitude and direction of change represented in the 1985 year. The five year depressed sequence proxies sensitivity testing in that it does not allow the 1985 "release" under <u>any</u> of the proforma conditions specified for the first five years. This can also can also be viewed as an effect of the rapid increase, or "front end loaded" pattern of spending acceleration.

Note also in lines 520 and 530, that the recession conditions indicated in 1982 reveal a high probability that Ford would have to dip into retained earnings reserves to finance even the historical minimum dividends payout.

Exhibit 10-20 indicates, in line 690, the sensitivity of dividends to capital spending under proforma conditions. Given identical cycle sales conditions, it can be seen that the historical dividend payout behavior would allow dps payouts of higher than the 1978 level in the 1980 and 1981 years. Note also that the eps levels of line 680 show that historic rates of capital spending would allow increasing earnings above 1978 levels, after the initial two year period which represents a slower growth in sales and a decline of unit sales in 1979. <u>This can be viewed as the expected earnings pattern in the absence of increased regulatory spending, and comparison of this exhibit to Exhibit 10-16 shows clearly the difference in performance implied for the investor</u>, and therefore in the relative cost of capital to Ford.

10.7.4 Financing Illustration

The above analysis indicates that the corporate financial risk under planned spending levels will be significantly increasing. The purpose of the following analysis is to illustrate how these pressures translate into the financing decisions and pressures of one year of the forecast period in which it is very likely that Ford would have to seek external financing to meet its operating cash flow needs. It should be noted that Ford will be facing many similar financing decisions in each year of the forecast period, and, further, that the decisions and risks are no less pressing simply because no substantial long term external capital would be required in other years. The proforma results, even after sensitivity testing, indicate that Ford will be making a number of choices between projects of different rates of return and with different financial risks, and that many of these decisions will necessarily involve tradeoffs between increased risk and regulatory requirements.

The PROCO engine development represents one such decision. According to the literature and annual statements of one of the significant subcontract developers in the process, the empirical performance of the PROCO engine is not yet a marketable commodity. Therefore, Ford will be trading off continued development spending on this engine versus increased market risk from mix shifts or performance reduction, all in light of pending fuel economy regulations. A similar process is undoubtedly pertinent to the passive safety requirements, and other items of regulatory spending. The point of these citations is not to comment upon the social goals implied in these technological developments, but to highlight the fact that the external financing decisions illustrated below are not the only ones which have significant potential to alter corporate performance, and that the continuing internal capital allocations will also have to consider the relative risks and benefits of different regulatory compliance investments which have just as much potential for financial risk.

The following dicussion illustrates some of the major financing problems and incremental financing costs Ford would face under the planned spending conditions. It should be noted that because the historical trend spending analysis illustrated in Exhibit 10-20 indicates no such external financing need, all of the costs and decisions displayed below can be viewed as incremental results of the higher planned spending levels.

The following analysis summarizes some of the problems Ford would face if the recession conditions, or other loss of sales occurred as shown in the proforma illustration, Planned Spending-Cycle Sales. It is emphasized, once again, that the proforma projections are not especially sensitive to the timing of a sales decline as long as any such decline actually occurred during the 1979 to 1983 period of capital and product development spending. The only exception to this general premise is that if a sales decline occurred in the 1979 to 1980 period, it might be more severe in its effects than the 1982 projection indicates because research into the regulatory spending schedule indicates that Ford's least discretionary spending would occur for the 1981 and 1982 model years. At that time, Ford would be building the engine and driveline asset base from which it would derive more fuel economic vehicles in the 1981-85 period, which, as was noted earlier would mean a very critical cash flow period for the company.

The analysis here is cast in terms of the projections for the 1982 calendar year, but the magnitude of financing and the resulting behavioral effects would be very similar for any year of sales decline of the magnitude indicated in these 1982 projections. The purpose of this analysis is not to predict an exact financing arrangement, but to illustrate how such financing might be performed, and what its effects would be. It is emphasized that if the company actually faced the economic conditions projected in the proforma, the effects indicated by this analysis would be very close to actual effects, although corporate financial policy may translate these effects into different financing arrangements; the amount of pressure and the indicated costs are felt to be realistic in their overall corporate magnitude, although the actual vehicles of financing could take a variety of forms.

10.7.4.1 Determination of Basic Financing Need - The basic indicated financial need for the 1982 projections is $735 million (see Line 660.5 of the Ford Planned Spending, Cycle Sales Proforma Cash Flow Summary, Exhibit 10-16). If Ford faced a cash flow deficit of this amount, in all likelihiod, the company could find some internal or short term sources of funds to reduce the overall deficit. For example, the indicated cash ("liquids") balance at the time is $1901 million, and although this is already at a risky level, Ford might decide to lower the balance further if it felt the cash might be forthcoming to meet weekly cash flow needs. Assuming the balance could be reduced an additional $100 million, the original basic need would be subsequently reduced by the same amount, although this would involve other balance sheet adjustments and an increased operating cash flow risk. Assume further that Trade Credit (Accounts Payable), projected at 41 days of operating expenses, could be increased 2 days to 43 days, or an incremental $230 million infusion of credit funds (Increase balance from $4712 million to $4942 million, representing an additional credit infusion of $230 million.) It is noted that this $230 million estimate could also possibly be derived from issuance of additional short term debt, and it is further noted that extending Accounts Payable would probably cause the loss of marginal trade discounts, so, to more fully approximate the costs of such adjustments, the analysis below should contain an interest charge or "opportunity charge" to approximate the incrased credit cost this $230 million source would indicate. It should also be noticed that both of these possible sources of funds actually represent external funding, because they would represent a deferral of this cash drain into the future if the debt were paid down or if the Accounts Payable were returned to the earlier 41 day level. However, for purposes of this illustration, these items will be treated as "internal" sources, primarily because these accounts have been adjusted at least this amount in the past as "normal operating procedure." In this sense, the financing illustration only assumes that incremental long term debt or equity would be "external" funding.

So, if the above credit and cash balance adjustments could be made, the resulting net funding need would be:

($ million)	
$735	Original base
($100)	Cash balance reduction
($230)	A/P or Short Term Debt Adjustment
$405	Net possible need, to be funded from external long term sources.

For purposes of this analysis, a Net $400 million figure will be used.

10.7.4.2 Comparison of Equity versus Debt Financing - If Ford faced the $400 million need described above, the company would, in general terms, have two major sources of funding available. They could choose to issue new equity, or they could seek an additional debt issue. This decision is extremely complex, and it is beyond the scope of this analysis to fully describe all the details of company policy and sale of issues, but it can still be viewed as a basic problem of cost of credit and supply and demand issues in the capital market. In general, Ford would choose the lowest cost option which would still be consistent with longer term corporate goals and projected future cash flows. The company would be very desirous of maintaining its credit rating, and would not want to strap itself into a series of payments which could not be met from projected cash flow. It is extremely important to note that any long term financing issue, especially of this magnitude, will carry its effects for many years into the future and will, in some sense, dictate a number of future financial options available, such as the payment of dividends or investment in new assets. Only a few of these limitations will be explored in the subsequent analysis.

It is, first of all, important to understand the dollar costs of equity versus debt and the behavior of these charges to understand some of the complexities faced in the debt versus equity decision. The following sections show what these charges could be and how they would be likely to behave in a general manner, given the projected proforma conditions.

a. Equity

As mentioned in the earlier introduction to this section, the nominal first cost of equity has two components:

1. Explicit cost of dividends on the additional shares, and
2. Costs of dilution.

The cost of a $400 million equity issue to Ford in the projected 1982 circumstances can be calculated as follows:

Assume:

- The market price of Ford stock in 1982 is approximately $45 per share. At a P/E of 4 in 1981, with projected earnings per share (eps) of $13.66, the price would have been $55 in 1981. Although the proforma eps show a sharp drop in 1982, the projected dividend per share (dps) would have "only" dropped from $3.28 in 1981 to $2.96 in 1982. Assuming the historic 1974 dividend yield "floor" of 7 percent would hold true for the depressed 1982 year, the $2.96 dps implies a stock price of $42, but assume an optimistic $45 for illustration.
- Assume selling costs of 3 percent of price, or $1.35 per share.
- Then, net proceeds per share would equal $43.65.
- Assume no further discount on share price required to counteract potential effects of dilution which might be perceived by shareholders.

Therefore:

To finance the full $400 million from equity, Ford would have to sell 9.16 million additional shares of common stock ($400 million/ net $43.65 per share proceeds), which would represent a significant addition to the existing share base of 118.1 million shares.

The incremental costs of the new equity issue in the form of dividends would, therefore, represent a fixed after-tax charge of 9.16 million shares times the desired dividend per share return demanded by the investors at large. In practice, this produces a continuous annual charge which grows along with shareholder expectations. Equity is sometimes felt to be a "cheap" form of financing, because dividends are commonly felt to be discretionary expenses, and because the investor has returns available in the form of price growth. But, for the mature auto companies, this assumption is not pragmatic, and the dividend charge, therefore, represents a significant and perpetual cost.

Exhibit 10-26 indicates this for the Ford financing illustraton, by showing how the 1982 equity issue would affect the future projected cash flow when compared to the base case proforma projections. It can be seen that simply issuing equity in 1982 and assuming no further changes in the business beyond the base proforma projections produces an incremental cash flow need for the following three years of $115 million, and that this charge would continue to grow each year as long as the incremental 9.16 million shares remained outstanding. In 1983, according to the projections of the proforma, the new equity issue would change the nominal $38 million implied cash need to a $64 million base need owing to the new $26 million in dividends. (See line 660.5 of the cash flow summary, Exhibit 10-16.)

The cost of a 1982 equity issue would also be counted in its dilution effect on the shareholders. In 1983, the reported eps figure in the base proforma of $12.12 per share (line 680), which assumes a 6.5 percent increase in sales revenue and a $1.0 billion plus increase in profits, would drop to $11.25, purely because of the increase in the shareholder base from 118.1 million shares to 127.26 million shares. This $.87 drop in eps, if the P/E still held constant at 4, would imply a drop in the share price of approximately $3.48, again purely from the effects of dilution. Shareholders obviously would not enjoy such a loss in value, and if they felt it reflected a more permanent sense of Ford's earning potential, the dividend return they might demand could increase over historical levels, and the ultimate effect on corporate cash flow could be higher than that projected in Exhibit 10-26.

It can be seen, then, that the cost of an equity issue to Ford is not a simple matter of single year charges, but, rather, a complex and self-feeding process of value which can have long term effects on cash flow. The first year cost would be at least a direct $26 million, which would have to be recovered in prices (or reduced costs) before tax, in the amount of approximately $46 million. This represents a cost of approximately $12 per vehicle, using the estimated 3.76 million North American units for 1982, and the annual charge per auto would increase each year with dividend expectations. Note that this charge is only for carrying the equity issue and would be incurred in addition to any charges computed later in Section 11.

b. Debt

The cost of debt is a bit more identifiable and easier to trace than the costs of equity capital, primarily, because the terms of the debt instrument are more fixed and determinate in a legal sense. The intitial cost is simply the nominal interest rate charged for the issue, which is difficult to forecast, but, once it is set, is not difficult to track. A caveat is in order here, though, because the cost of debt can have a direct effect on the existing cost of equity even if no further equity shares are issued at the time. This results because the debt charges are legally obligated, which means the company can be forced into the legal consequences mentioned in the introduction to this section. Debt costs, therefore, add more risk to the stream of potential earnings available to common shareholders and, therefore, may increase investor demands for dividends, which, in Ford's case, has been shown to be an important charge.

If Ford were to finance the $400 million 1982 projected need by issuing debt, the explicit costs of debt can be calculated as follows. The DRI assumptions for the cyclical U.S. retail sales projections, which form part of the basis for the proforma calculations, indicate an interest rate for AAA corporate bonds of approximately 10.2 percent in 1982. Since this interest projection is based upon the same economic assumptions which derived the DRI sales forecasts, this is an appropriate debt cost to use in evaluating Ford debt. Ford currently (1978) has a AAA bond rating, and although the proforma projections are not especially favorable for the company, it is reasonable to assume the same debt cost would pertain in 1982. This is partially owed to the fact that the proforma assumptions indicate a low debt percentage of total capital (see line 474 on the balance sheet summary). If Ford's AAA rating had been lowered during any of the intervening years, this would have a serious effect upon the company, and the rate of interest it would be able to get from investment sources would be higher than the AAA rate.

Assuming that the $400 million debt issue could be floated at 10.2 percent, the incremental before tax charges would be approximately $40.8 million. Compare this to the estimated before tax charges under the equity option of approximately $46 million in the first year, and it can be seen how the cash cost of equity can often be higher than the cost of debt. Note also that the equity charges would, in all likelihood, continue to grow while the debt charges would probably remain fixed, unless some specific convenant were written into the agreement.

Because debt interest is tax deductible, the after tax effect upon cash flow would be approximately $23 million for this issue. Compare this to the first year equity cost after tax of approximately $26 million, and note that the equity charges, again, would probably grow on an annual basis. The effects of a debt issue would still carry forward into future periods as illustrated in the cash flow summaries of Exhibit 10-27. Note further that this debt issue would produce a cost per vehicle in the United States of approximately $10.85 for the first year. Again, this only represents the carrying charges of financing, and would be incurred in addition to the investment and product expense charges calculated in Section 11.

Given this set of economic conditions, and the resulting costs of debt and equity, Ford would, in all likelihood, choose to issue long term debt for any financial need of this magnitude. It, therefore, becomes necessary to evaluate the possibility that they could obtain such funding and to explore some of the problems surrounding this financing.

Ford has issued long term debt of approximately this amount in the past, during the 1974 recession period. This does not at all suggest such an offering is a simple matter of historical precedent. Proforma evaluations of the other companies using the same economic assumptions indicate that at least Chrysler and AM, and even possibly GM might be seeking debt funds from the capital markets. Even if the investment sources felt each company could individually support a debt issue, the fact that several companies from the same industry were into the markets at the same time would have obvious effects on the risk-taking feelings of the investors. Part of this would already be proxied in the higher AAA interest rates being charged, but if conditions were severe and other capital market drains were high, the timing of automotive debt issues would be crucially important. In 1978, the finance subsidiaries of Ford and GM hit the markets together, with some resulting concern and negotiation. This occurred during a good sales and profit year, and was not related to the direct operating earnings of the companies. In a bad sales year, the investor suppliers of debt might not be so willing to commit large amounts to one industry, especially when this capital would be placed more directly at the risk of operating results. In the proforma projections of this analysis, the companies have a strong recovery from the low 1982 year, but investors may not have the benefit of such foresight, or might not believe it, and the seeking of long term debt could become difficult.

Given the conditions projected in this set of proformas, it seems likely that Ford could issue a debt instrument of $400 million, but, as indicated above, it would be expensive, and it would require that earnings return fairly strongly in subsequent years. The auto companies are likely to disagree with the assumptions of rapidly returning earnings projected in these examples, because it is likely that continued regulatory spending would slow profit growth for at least the period until 1985. Although it is really too early to speculate on precise cost structures of the 1982-1985 period, it must be noted that the financing option deemed possible by this analysis does rely upon increased earnings beyond the 1982 recession indicated. If Ford issued a $400 million debt instrument in 1982, and earnings did not return enough to provide the cash flow suggested in the proformas, any further debt requirements in the 1982-1985 period would be much harder to obtain and would certainly be obtained only at higher cost.

10.7.5 Summary

It is clear from this comparative analysis that the increased capital spending planned to meet regulatory requirements produces an increased financial risk. This risk is relatively insensitive to statistical errors possibly derived through the somewhat linear conditions of the proforma projections, and is, therefore, not arguable in its order of magnitude. Even if the projection error is a large as 30 percent overall in the proforma estimates, the effect of increased spending will have true financial effects for Ford approximately as large as the effects derived from the recent recession. Also, note that if the statistical projection error is 30 percent, it can probabilistically be 30 percent on the downside as well as the upside when compared to the nominal estimates illustrated here. Given the sales conditions of the proformas, any such downside error, even if it occurred in only one year, would produce a financial crisis, the effects of which would exceed the 1974-75 pressures, and which may have only been duplicated in one or two historical periods, if at all.

It is not at all argued that such downside conditions, in excess of those illustrated here, are a pending reality, but merely that the levels of spending produce risks which will show up regardless of specific proforma assumptions, as long as the analysis is cast in the financial environment of the business and not abstracted from it.

It is also emphatically noted that this is not a policy analysis which seeks to determine whether Ford should or should not be required or induced to spend this amount of funds, or what social benefits might accrue from such a spending level. It is merely the point of this analysis to indicate that the risks of increased spending for Ford are real, and that they will instigate a number of financial pressures and decisions with very important consequences for the company.

EXHIBIT 10-16. FORD SOURCES AND USES SUMMARY, PLANNED SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
502.0	SALES	40441	41960	47728	51120	47120	50206	61160	68353
503.0									
505.0	BEGIN CASH	3371	2818	2204	2481	3123	1901	2598	4154
508.0									
510.0	NET INCOME	1382	1079	1411	1613	-233	1432	2187	2596
520.0	DIVIDENDS	350	350	350	387	350	350	525	623
530.0	RETAINED EARN	1032	729	1061	1226	-583	1082	1662	1973
540.0									
550.0	ADD TO PROP	3000	3000	3000	3000	3000	3000	3000	3000
560.0	DEP + AMORT	1462	1816	2244	2271	2326	2391	2442	2494
570.0	NET EXPENDITURES	1538	1184	756	729	674	609	558	506
575.0									
590.0	CH NON-CASH WK	-160	-147	53	-234	-387	-302	-204	-424
600.0	DEBT PAYMENTS	56	264	225	65	83	52	60	49
610.0	OTHER USES	154	41	-250	23	270	26	-308	-93
620.0									
640.0	CHG. CASH	-553	-614	276	643	-1223	697	1556	1934
650.0									
660.0	ENDING CASH	2818	2204	2481	3123	1901	2598	4154	6088
660.1									
660.4	3WK CSH BAL	2185	2263	2509	2680	2636	2637	3177	3540
660.5	IMP.CSH NEED	-634	58	28	-444	735	38	-976	-2548
660.6									
662.0	DIV. IF CONST.	425	425	425	425	425	425	425	425
663.0	ADDIT. CSH DRAIN	75	75	75	38	75	75	-100	-198
669.0									
670.0	CS SHARES	118.1	118.1	118.1	118.1	118.1	118.1	118.1	118.1
680.0	EPS TO CS	11.70	9.13	11.95	13.66	-1.97	12.12	18.51	21.98
690.0	DPS TO CS	2.96	2.96	2.96	3.28	2.96	2.96	4.44	5.28
692.0									
693.0	IND UNIT SALES	15.15	14.58	16.15	16.48	13.29	13.31	16.55	17.90
694.0	FD NO AM UNITS	4.29	4.13	4.57	4.66	3.76	3.77	4.68	5.06
695.0									

696.0 NOTE: LINE ITEMS MAY REFLECT ROUNDING ERROR

EXHIBIT 10-17. FORD INCOME SUMMARY, PLANNED SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
720.0	SALES	40441	41960	47728	51120	47120	50206	61160	68353
720.1									
721.0	CGS, OTB	28222	29611	33418	35818	35071	34726	42826	48054
722.0	DEPRECIATION	762	891	969	1055	1126	1191	1242	1294
723.0	AMORTIZATION	700	925	1275	1216	1200	1200	1200	1200
724.0	S,G,&A	1500	1522	1634	1698	1718	1746	1886	2025
725.0	PENSION	753	780	891	956	976	1003	1144	1283
726.0	MAINT & REPAIR	1280	1325	1515	1624	1558	1579	1944	2180
727.0	PROP TAX &OTH	1129	1170	1337	1433	1463	1505	1715	1924
728.0	R & D	1317	1364	1560	1672	1525	1626	2001	2245
729.0	NON AUTO COST	2586	2741	2906	3080	3265	3461	3668	3889
729.1									
730.0	TOTAL OP COST	38249	40330	45506	48553	47903	48036	57626	64093
730.1									
731.0	OP PROFIT	2192	1630	2223	2567	-783	2169	3534	4260
732.0									
733.0	NON OP INCOME	477	506	536	568	602	638	677	717
734.0	INTRST EXP	202	210	239	256	236	251	306	342
734.5									
735.0	EARN BEF TAX	2467	1926	2520	2880	-416	2557	3905	4636
736.0	TAX	1086	848	1109	1267	-183	1125	1718	2040
736.1									
737.0	EARN AFTER TAX	1382	1079	1411	1613	-233	1432	2187	2596
738.0									
738.1	OP CASH FLOW	2844	2895	3655	3884	2093	3823	4629	5090
738.2									
739.0	DIVIDENDS	350	350	350	387	350	350	525	623
740.0	CAP SPEND	3000	3000	3000	3000	3000	3000	3000	3000
741.0	DEBT PAY	56	264	225	65	83	52	60	49
742.0	WK INVEST	-160	-147	53	-234	-387	-302	-204	-424
743.0	OTHER S/U	154	41	-250	23	270	26	-308	-93
743.1									
744.0	CASH DRAIN	3400	3509	3379	3241	3316	3125	3073	3156
744.1									
745.0	NET CSH FLOW	-557	-614	276	643	-1223	697	1556	1934

EXHIBIT 10-18. FORD BALANCE SHEET SUMMARY, PLANNED SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
300.0	ASSETS								
305.0	LIQUIDS	2818	2204	2481	3123	1901	2598	4154	6088
310.0	A/R	2103	2182	2482	2658	2450	2611	3180	3554
315.0	INVENTORY	5202	5344	5862	6152	5809	6075	6958	7495
320.0	OTHER CURRENT	563	618	673	728	783	838	893	948
320.1									
325.0	TOTAL CURRENT AS	10686	10348	11497	12661	10943	12121	15185	18085
330.0	OTHER INVEST	2023	2164	2305	2446	2587	2728	2869	3010
330.1									
335.0	GROSS PPE	12916	14716	16516	18316	20116	21916	23716	25516
345.0	ACCUM DEPN	6878	7769	8738	9793	10919	12110	13352	14646
345.1									
347.0	NET PPE	6038	6947	7778	8523	9197	9806	10364	10870
350.0	UNAMORT TOOLS	1707	1982	1907	1891	1891	1891	1891	1891
355.0	EXCESS OVER EQ	279	279	279	279	279	279	279	279
355.1									
360.0	TOTAL ASSETS	20733	21720	23766	25800	24897	26825	30588	34135
365.0									
400.0	LIABILITIES								
405.0	A/P	4044	4196	4773	5112	4712	5021	6116	6835
410.0	TAX PAYABLE	607	629	716	767	707	753	917	1025
415.0	SHORT TERM DEBT	624	624	624	624	624	624	624	624
420.0	CURRENT LTD	264	225	65	83	52	60	49	103
425.0	ACCRUALS	2872	3159	3475	3823	4205	4626	5088	5597
425.1									
430.0	TOTAL CURRENT LI	8411	8834	9653	10409	10300	11083	12795	14185
435.0									
440.0	OTHER LIAB	1588	1648	1879	2015	1855	1978	2416	2704
445.0	MINORITY INTERES	150	150	150	150	150	150	150	150
450.0	LTD OLD	1096	871	806	723	671	611	562	459
450.1									
455.0	CAP STOCK	676	676	676	676	676	676	676	676
460.0	RETAINED EARNING	8813	9541	10602	11828	11245	12327	13989	15962
460.1									
465.0	TOTAL EQUITY	9489	10217	11278	12504	11921	13003	14665	16638
465.1									
470.0	TOTAL LIABILITIE	20733	21720	23766	25800	24897	26825	30588	34135
472.0	CURRENT RATIO	1.27	1.17	1.19	1.22	1.06	1.09	1.19	1.28
474.0	DEBT % TOTAL CA	.10	.08	.07	.05	.05	.04	.04	.03
474.1	PAT RET/EQ	.146	.106	.125	.129	-.020	.110	.149	.156

EXHIBIT 10-19. FORD SOURCES AND USES SUMMARY, PLANNED SPENDING, TREND SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
502.0	SALES	40423	41904	46355	48401	50732	55360	60421	64823
503.0									
505.0	BEGIN CASH	3371	2817	2192	2374	2754	3368	4436	5838
508.0									
510.0	NET INCOME	1381	1068	1337	1340	1506	1855	2147	2406
520.0	DIVIDENDS	350	350	350	350	361	445	515	577
530.0	RETAINED EARN	1031	718	987	990	1144	1410	1632	1829
540.0									
550.0	ADD TO PROP	3000	3000	3000	3000	3000	3000	3000	3000
560.0	DEP + AMORT	1462	1816	2244	2271	2326	2391	2442	2494
570.0	NET EXPENDITURES	1538	1184	756	729	674	609	558	506
575.0									
590.0	CH NON-CASH WK	-161	-148	21	-261	-244	-283	-316	-451
600.0	DEBT PAYMENTS	56	264	225	65	83	52	60	49
610.0	OTHER USES	155	43	-197	77	17	-36	-72	19
620.0									
640.0	CHG. CASH	-554	-625	182	380	615	1068	1402	1705
650.0									
660.0	ENDING CASH	2817	2192	2374	2754	3368	4436	5838	7544
660.1									
660.4	3WK CSH BAL	2184	2261	2439	2553	2664	2886	3139	3359
660.5	IMP.CSH NEED	-634	69	65	-200	-704	-1551	-2699	-4184
660.6									
662.0	DIV. IF CONST.	425	425	425	425	425	425	425	425
663.0	ADDIT. CSH DRAIN	75	75	75	75	64	-20	-90	-152
669.0									
670.0	CS SHARES	118.1	118.1	118.1	118.1	118.1	118.1	118.1	118.1
680.0	EPS TO CS	11.69	9.04	11.32	11.35	12.75	15.71	18.18	20.37
690.0	DPS TO CS	2.96	2.96	2.96	2.96	3.06	3.77	4.36	4.89
692.0									
693.0	IND UNIT SALES	15.14	14.55	15.45	15.16	14.96	15.58	16.24	16.49
694.0	FD NO AM UNITS	4.28	4.12	4.37	4.29	4.23	4.41	4.59	4.67
695.0									

696.0 NOTE: LINE ITEMS MAY REFLECT ROUNDING ERROR

EXHIBIT 10-20. FORD SOURCES AND USES SUMMARY, TREND SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
502.0	SALES	40441	41960	47728	51120	47120	50206	61160	68353
503.0									
505.0	BEGIN CASH	3371	4173	4758	5971	7464	7134	8546	10743
508.0									
510.0	NET INCOME	1539	1384	1854	2071	237	1913	2676	3094
520.0	DIVIDENDS	369	350	445	497	350	459	642	743
530.0	RETAINED EARN	1170	1034	1409	1574	-113	1454	2034	2352
540.0									
550.0	ADD TO PROP	1502	1561	1620	1680	1738	1798	1857	1917
560.0	DEP + AMORT	1180	1271	1453	1452	1487	1532	1568	1604
570.0	NET EXPENDITURES	322	290	167	228	251	266	289	313
575.0									
590.0	CH NON-CASH WK	-160	-147	53	-234	-387	-302	-204	-424
600.0	DEBT PAYMENTS	56	264	225	65	83	52	60	49
610.0	OTHER USES	154	41	-250	23	270	26	-308	-93
620.0									
630.0	CASH FLOW	798	585	1213	1492	-330	1412	2197	2506
640.0	CHG. CASH	802	585	1213	1492	-330	1412	2197	2506
650.0									
660.0	ENDING CASH	4173	4758	5971	7464	7134	8546	10743	13249
660.1									
660.4	3WK CSH BAL	2115	2212	2475	2651	2612	2617	3162	3529
660.5	IMP.CSH NEED	-2058	-2546	-3496	-4813	-4522	-5929	-7581	-9720
660.6									
670.0	CS SHARES	118.1	118.1	118.1	118.1	118.1	118.1	118.1	118.1
680.0	EPS TO CS	13.04	11.72	15.70	17.54	2.01	16.20	22.66	26.20
690.0	DPS TO CS	3.13	2.96	3.77	4.21	2.96	3.89	5.44	6.29
692.0									
693.0	IND UNIT SALES	15.15	14.58	16.15	16.48	13.29	13.31	16.55	17.90
694.0	FD NO AM UNITS	4.29	4.13	4.57	4.66	3.76	3.77	4.68	5.06

EXHIBIT 10-21. FORD INCOME SUMMARY, TREND SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
720.0	SALES	40441	41960	47728	51120	47120	50206	61160	68353
720.1									
721.0	CGS, OTB	28222	29611	33418	35818	35071	34726	42826	48054
722.0	DEPRECIATION	680	739	755	789	816	838	850	862
723.0	AMORTIZATION	500	532	698	663	671	694	718	742
724.0	S,G,&A	1500	1522	1634	1698	1718	1746	1886	2025
725.0	PENSION	753	780	891	956	976	1003	1144	1283
726.0	MAINT & REPAIR	1280	1325	1515	1624	1558	1579	1944	2180
727.0	PROP TAX &OTH	1129	1170	1337	1433	1463	1505	1715	1924
728.0	R & D	1317	1364	1560	1672	1525	1626	2001	2245
729.0	NON AUTO COST	2586	2741	2906	3080	3265	3461	3668	3889
729.1									
730.0	TOTAL OP COST	37967	39785	44715	47734	47064	47177	56752	63203
730.1									
731.0	OP PROFIT	2474	2175	3014	3386	56	3028	4408	5150
732.0									
733.0	NON OP INCOME	477	506	536	568	602	638	677	717
734.0	INTRST EXP	202	210	239	256	236	251	306	342
734.5									
735.0	EARN BEF TAX	2749	2471	3311	3699	423	3416	4779	5526
736.0	TAX	1210	1087	1457	1628	186	1503	2103	2431
736.1									
737.0	EARN AFTER TAX	1539	1384	1854	2071	237	1913	2676	3094
738.0									
738.1	OP CASH FLOW	2719	2655	3307	3523	1724	3445	4244	4698
738.2									
739.0	DIVIDENDS	369	350	445	497	350	459	642	743
740.0	CAP SPEND	1502	1561	1620	1680	1738	1798	1857	1917
741.0	DEBT PAY	56	264	225	65	83	52	60	49
742.0	WK INVEST	-160	-147	53	-234	-387	-302	-204	-424
743.0	OTHER S/U	154	41	-250	23	270	26	-308	-93
743.1									
744.0	CASH DRAIN	1922	2070	2094	2031	2054	2033	2047	2192
744.1									
745.0	NET CSH FLOW	798	585	1213	1492	-330	1412	2197	2506

EXHIBIT 10-22. FORD BALANCE SHEET SUMMARY, TREND SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
300.0	ASSETS								
305.0	LIQUIDS	4173	4758	5971	7464	7134	8546	10743	13249
310.0	A/R	2103	2182	2482	2658	2450	2611	3180	3554
315.0	INVENTORY	5202	5344	5862	6152	5809	6075	6958	7495
320.0	OTHER CURRENT	563	618	673	728	783	838	893	948
320.1									
325.0	TOTAL CURRENT AS	12040	12902	14988	17002	16176	18069	21774	25246
330.0	OTHER INVEST	2023	2164	2305	2446	2587	2728	2869	3010
330.1									
335.0	GROSS PPE	12017	12954	13926	14934	15977	17056	18170	19320
345.0	ACCUM DEPN	6796	7535	8290	9079	9895	10733	11583	12445
345.1									
347.0	NET PPE	5221	5419	5636	5855	6082	6323	6587	6875
350.0	UNAMORT TOOLS	1308	1400	1350	1359	1383	1408	1433	1458
355.0	EXCESS OVER EQ	279	279	279	279	279	279	279	279
355.1									
360.0	TOTAL ASSETS	20871	22164	24558	26941	26507	28807	32942	36868
365.0									
400.0	LIABILITIES								
405.0	A/P	4044	4196	4773	5112	4712	5021	6116	6835
410.0	TAX PAYABLE	607	629	716	767	707	753	917	1025
415.0	SHORT TERM DEBT	624	624	624	624	624	624	624	624
420.0	CURRENT LTD	264	225	65	83	52	60	49	103
425.0	ACCRUALS	2872	3159	3475	3823	4205	4626	5088	5597
425.1									
430.0	TOTAL CURRENT LI	8411	8834	9653	10409	10300	11083	12795	14185
435.0									
440.0	OTHER LIAB	1588	1648	1879	2015	1855	1978	2416	2704
445.0	MINORITY INTERES	150	150	150	150	150	150	150	150
450.0	LTD OLD	1096	871	806	723	671	611	562	459
450.1									
455.0	CAP STOCK	676	676	676	676	676	676	676	676
460.0	RETAINED EARNING	8951	9985	11394	12968	12855	14309	16343	18694
460.1									
465.0	TOTAL EQUITY	9627	10661	12070	13644	13531	14985	17019	19370
465.1									
470.0	TOTAL LIABILITIE	20871	22164	24558	26941	26507	28807	32942	36868
472.0	CURRENT RATIO	1.43	1.46	1.55	1.63	1.57	1.63	1.70	1.78
474.0	DEBT % TOTAL CA	.10	.08	.06	.05	.05	.04	.03	.02

EXHIBIT 10-23. FORD: CYCLE SALES VERSUS TREND SALES, AN APPROXIMATION OF MARKET RISK (Capital Spending held Constant, Planned)

5 YEAR CUMULATIVE SUMMARY "78-'82

(All dollars in millions)

	CYCLE SALES RESULTS	TREND SALES RESULTS	DIFFERENCE (CYCLE-TREND)
UNIT SALES (millions)	21.41	21.29	0.12
SALES	$228,369	$227,815	$554
NET INCOME	$5,252	$6,632	$(-1,380)
CAPITAL SPENDING	$15,000	$15,000	0
DEP. & AMORT.	$10,119	$10,119	0
DIVIDEND	$1,787	$1,761	$26
RETAINED EARNINGS	$3,465	$4,870	$(-1,405)
CHANGE CASH	$(-1,471)	$(-2)	$(-1,469)
POSSIBLE FINANCIAL NEED	Apprcx $500	Approx $50	Approx $450

EXHIBIT 10-24. FORD: PLANNED SPENDING VERSUS TREND SPENDING
(Market Risk Held Constant, Cycle sales)

5 YEAR CULULATIVE SUMMARY "78-'82

(All dollars in millions)

	PLANNED SPENDING RESULTS	TREND SPENDING RESULTS	DIFFERENCE (PLAN-TREND)
UNIT SALES(million)	21.41	21.41	0
SALES	$228,369	$228,369	0
NET INCOME	$5,252	$7,085	$(-1,833)
CAPITAL SPENDING	$15,000	$8,101	$6,899
DEP. & AMORT.	$10,119	$6,843	$3,276
DIVIDEND	$1,787	$2,011	$(-224)
RETAINED EARNINGS	$3,465	$5,074	$(-1,609)
CHANGE CASH	$(-1,471)	$3,762	$(-5,233)
POSSIBLE FINANCIAL NEED	Approx $500	0	$500

EXHIBIT 10-25. FORD: APPROXIMATE COMPARISON OF MARKET RISK TO SPENDING RISK

(All dollars in millions)

	*DIFFERENCES FROM MARKET VOLATILITY	**DIFFERENCES FROM TREND VS PLANNED SPENDING	***SPENDING RISK MAGNITUDE RATIO
UNIT SALES	0.12	0	NA
SALES $	$544	0	NA
NET INCOME	$(-1,380)	$(-1,833)	1.33
CAPITAL SPENDING	0	$6,899	NA
DEP. & AMORT.	0	$3,276	NA
DIVIDEND	$26	$(-224)	8.61
RETAINED EARNINGS	$(-1,405)	$(-1,609)	1.14
CHANGE CASH	$(-1,469)	$(-5,233)	3.56
POSSIBLE NEED	$450	$500	1.11

* From Exhibit
** From Exhibit
***Ratio of Spending Difference/Market Volatility Difference. (A raw measure of the impact of increased spending compared to market impact.)

EXHIBIT 10-26. COST FLOW FROM EQUITY FINANCING

($ are in millions)

BEFORE EQUITY IN 1982

YEAR	1983	1984	1985
EARN AT. TAX	$1432	$2187	$2596
SHARES OUT (millions)	118.1	118.1	118.1
DIV. PER SHARE	$2.96	$4.44	$5.28
TOTAL DIVIDENDS	$350	$525	$623
TO RETAINED EARNINGS	$1082	$1662	$1973

AFTER EQUITY IN 1982

EARN AFT TAX	$1432	$2187	$2596
SHARES OUT (millions)	127.3	127.3	127.3
DIV. PER SHARE (to give same payout as above)	$2.96	$4.44	$5.28
TOTAL DIVIDENDS	$376	$565	$672
TO RETAINED EARNINGS	$1056	$1622	$1924
ADDITIONAL CASH FLOW NEED AFTER EQUITY, COMPARED TO "BEFORE" CASE	$26	$40	$49

EXHIBIT 10-27. COST FLOW FROM DEBT FINANCING

(Units are in $ million)

BEFORE DEBT IN 1982

	1983	1984	1985
EBIT*	2807	4211	4977
INTEREST EXPENSE	(251)	(306)	(342)
EARN BEFORE TAX	2557	3905	4636
TAX	(1125)	(1718)	(2040)
EARN AFTER TAX	1432	2187	2596
DIVIVEND	(350)	(525)	(623)
TO RETAINED EARNINGS	1082	1662	1973

AFTER DEBT IN 1982

EBIT*	2807	4211	4977
INTEREST EXPENSE	(292)	(345)	(383)
EARN BEFORE TAX	2515	3866	4594
TAX	(1106)	(1701)	(2021)
EARN AFTER TAX	1409	2165	2573
DIVIDEND	(350)	(525)	(623)
TO RETAINED EARNINGS	1059	1640	1950
ADDITIONAL CASH FLOW NEED	23	22	23

*Earnings Before Interest and Taxes

10.8 CHRYSLER PROFORMA FINANCIAL ANALYSIS

10.8.1 Introduction

The results of financial analysis of Chrysler are unsettling, and require the presentation of considerable detail. Chrysler's future is uncertain, and a number of the individual features of this analysis are subject to change, because the company is clearly pursuing a radical financing strategy, at present, and decisions which might have seemed drastic only a year ago, have become a present reality.

Earlier research performed in the spring of 1978 suggested that Chrysler would, in all likelihood, have to sell off selected portions of its overseas operations, and cutback operations in other areas. Not only has Chrysler sold selected portions of these operations, but also it has agreed to sell off the entire European operation, which in 1977 represented 26 percent of total corporate unit sales. (This is also equivalent to losing 38 percent of United States unit sales at once.)

In 1977, Chrysler sold approximately 800,000 units in Europe. It will sell the entire operation for slightly more than $400 million in cash and equity, which, in simplistic terms, is like selling an entire company for the same price as selling a year's output of vehicles at $550 per vehicle. Of course, Chrysler is selling some losses and inefficiencies in the deal, but nevertheless, this is not an ordinary business decision by any means. Chrysler is currently in a period of operating losses; it is expected to lose approximately $120 million in 1978 and to only break even or gain a small profit in 1979. The current losses can be attributed to a number of simultaneous occurrences, including softening volume in compact sales, some earlier losses in van sales, start-up costs on new models, and the beginnings of the heavily increased capital spending plan required to meet new regulatory standards.

The Omni/Horizon, although costing heavily in launch and other expenses, was a solid sales performer until this summer, when the negative publicity surrounding some of its handling characteristics apparently dampened sales growth. (In the early portion of the summer, the sales rate dropped about 1000 units per week for a short period.) Selling rates have recovered since that time, but not at the much brisker earlier pace. Such sales performance, in addition to lower unit profits on the smaller car, will not especially help this year's operating results.

Chrysler has a freshly rennovated product line ready for the 1979 model year, which promises at least some relief from the current profit pressure. After a year's layoff in this end of the market, Chrysler will again have a full complement of top-of-the-line automobiles, which could help bring profits up. In addition, a new Omni/Horizon sport model has the potential to expand Chrysler's basic market share.

However, this new set of products will not offer automatic or easy profit and cash flow relief. The Omni sport model will be competing almost directly with the new Ford Mustang and Capri models, which are at least equally assured of success. In addition, GM's new small compact front drive series is due out in the spring of 1979, which should put pressure on the compact segment and, perhaps, even on the high end of the subcompact segment, possibly affecting the Omni/Horizon 4-door. The standard size St. Regis-type should gain some market share, but this will have to be in the face of new Ford entries into the downsized standard market. Chrysler will undoubtedly gain here, but not without the costs of increased competition. In addition, the company will have to incur substantial start up costs on these models this year.

Despite the fresh product line and potential recapture of lost market share, <u>Chrysler is in a period of serious financial problems, which has every indication of extending 5 to 8 years into the future under the new planned spending levels</u>. Cash flow is clearly not strong enough to support the levels of spending announced earlier this summer, even in light of some recent financial actions.

Chrysler's financial strategy has included a number of rapidly executed and quite radical steps. One of the first actions was the sale of the company's equity in its Turkish subsidiary, followed by similar moves, which have not yet been completed in the South American operations. Chrysler is currently seeking equity partners in those South American ventures, in order to provide some cash flow relief there. A more conventional action included an equity sale in Australia and possible future small infusions of cash from that source.

Chrysler's sale of preferred stock in late spring was popularly viewed in the media as a complete success. However, from the corporate side, this represented an extermely expensive source of capital and is clearly not the kind of efficient financing a company would like to obtain. Chrysler is locked into dividend payments of $27.5 million per year after tax, which is an explicit cost of approximately 11 percent year. In addition, the offering of preferred shares puts the common stock return at greater risk, thereby possibly increasing the implied cost of common equity capital because investors will view returns as more risky. The preferred issue also contained an equity kicker (warrants to purchase additional common) which will not only extend the explicit cost of common equity dividends, when such can be paid, but will also be costly to existing shareholders in the form of dilution of their ownership claim to earnings. Chrysler was indeed fortunate in the speed and magnitude of sale, but the cost of the issue is a heavy penalty to pay for what may ultimately only amount to a year's required funding.

The Chrysler dividend to common has also been cut over the past few years, and although this has historical precedent, it is not the healthiest of financial policies, and certainly was not a desirable move on the part of management. Dividends will not be easily paid out of future cash flows, and this lack of investor return capability will not help equity capital performance.

Quite recently, Chrysler has been forced to subcontract the manufacture of component parts which it normally would have produced internally at lower variable cost and, therefore, higher profit potential. This was clearly a decision fostered out of lack of capital funding. Chrysler simply did not have the capital to invest in the facilities and tooling to manufacture these components, and although details of the arrangements have not been clearly spelled out at this time, it appears that Chrysler will be locked into this variable cost disadvantage for at least several years.

Chrysler's financing subsidiary has just entered into a loan arrangement with Middle Eastern capital sources, in the amount of approximately $100 million. It is not yet entirely clear how, or whether, such loans will factor into the pending European sales, but there are indications that Chrysler hopes to keep this source of funding alive, again at the cost of increased interest charges and debt repayment schedules.

In what appears to be an unusual and somewhat controversial move, Chrysler has essentially entered into a factoring arrangement on its finance receivables. This is basically an agreement in which funding sources provide capital today, at a discounted percentage of the amount of credit owed to Chrysler from sales, for collection of the full amount of credit by the funding source. The deal is infinitely more complex than this description, but the essence is the same, and it has caused dealers, who make use of these receivable credits, some concern.

The European sale,as mentioned above, was clearly the most extreme action taken, because it greatly reduced Chrysler's strategic market power in a world market which is growing more consolidated and competitive. If Chrysler ever again wants to participate in overseas operations, it will have to fund a new asset base at inflated capital prices, and will have to move in against significantly retrenched competition. This could only be done in a capital-efficient action by means of acquisition, and would still depend heavily on a capital reserve which could only be built up in the U.S. market. Given the projected return on investment in the United States for the next five to eight years, this seems only a distant possibility. Chrysler has clearly sacrificed an operating arm to save the U.S. base.

Even having taken such radical actions, Chrysler faces a difficult long term cash flow future. If all of the above mentioned agreements and decisions flow smoothly, Chrysler is still cash-short over the longer term of three to eight years, because of the sizeable investment required in the United States.. It is very difficult to believe, but not too far from the mark, that the European sale is really a "short term" measure, in that it will only provide several years of cash funding at projected spending levels. The financing section of this analysis below discusses this in greater detail, but it can be seen that an eight year unfunded cash need of perhaps $2 to $3 billion is not entirely funded by a cash infusion of approximately $200 million, an equity participation of $200 million total value, and the relief from $400 million in longer term debt repayment schedules.

Even as the European sale is to become effective, Chrysler will be facing perhaps the most severe financial crunch. Because Chrysler has most of its downsizing ahead of it, and because the company will have to invest heavily in engines and drivelines (of a nature it has not developed before in the United States), the 1979-1981 period represents a severe peak in capital spending. Chrysler's reserves and financing capacity are at a low level now, and it is not entirely clear that two years of mediocre profits can properly fund this peak. Timing of cash-in and cash-out is always of paramount importance in proper financial management, but, in Chrysler's case, timing will have severe implications during this peak of spending. It is entirely likely that Chrysler will be balancing cash flow on a weekly basis, and that it will be calling upon its short term credit limits quite regularly. If the company simutaneously experiences a decline in sales at the time, the consequences will be costly, because Chrysler will have already consumed most of its financing flexibility.

In addition to the potential for acute problems, Chrysler experiences a no less difficult chronic strain on its engineering and design resources. Chrysler has historically followed a pattern of incremental technological development, primarily because its ability to marshal extensive engineering staff is limited. GM and Ford are currently hiring engineers at an unprecedented rate, and those companies have the ability to carry more development overhead. Chrysler, because of its tenuous volume position, cannot afford large allocations of fixed engineering expenses (witness the profit performance of the past few years which is an indication of Chrysler's proximity to break even levels of production). Given the amount of new products and processes which must be brought up to efficient operating levels during the next few years, Chrysler will not be capable of much wasted experimentation, and it will have to make considerable use of a relatively small department. (Note that Chrysler's research cost is roughly 28 percent the size of Ford's and 23 percent the size of GM's----while sales were roughly 44 percent and 30 percent of the larger companies' respectively.)

One phenomenon of new regulations is that many of the companies' expenditures will no longer be related to sales volume, but rather to events. That is, capital spending will not tend to be a function of volume output, but of a series of developments dependent upon time. In the past, capital spending would generally be increased with new required increments of capacity which would be coincident with volume. Now, spending for a new plant or a plant renovation will be tied to a fuel economy or safety event, no matter what sales output is at the time. Because Chrysler will have to meet the same events timetable as the other companies, and because the fixed development costs will be tied to events, Chrysler will have a somewhat disproportionate amount of annual fixed costs in relationship to sales volume. This does not show up in the aggregate five year numbers for Chrysler, but shows up very clearly in the pattern of Chrysler's spending. In the past, it could be deferred, in the future, it cannot, and the resulting financial distortion is, therefore, somewhat disproportionate when compared to the other large companies.

It must be emphasized that Chrysler is by no means doomed, expecially since it has taken forceful financial actions which give it some breathing room, but it also must be emphatically noted, that Chrysler's present situation does not allow an easy way to survival and prosperity. The following sections of analysis detail the nature of this financial problem.

10.8.2 Cash Flow Risks

In Chrysler's case, it is difficult to call the cash flow problems a "risk" because they are currently existing certainties. The risk is actually in the ability tc sustain negative operating cash flows and then to recover from them.

Exhibit 10-28 shows the proforma projections of Chrysler performance under the planned spending conditions and a cyclical sales pattern. It can be seen in lines 660, 660.6, and 660.9 that the cash drain and implied financing need are extremely serious, in the \$2 to \$3 billion range. Note that this includes the proceeds from the recent sale of preferred stock, and assumes no additional cash drain from common dividends. This set of projections does not contain all of the effects of the pending European sale, and can properly be viewed as the approximate scenario which prompted management to sell the European segment. Note further that the European sale, as will be shown in detail below, can only partially reduce this extreme cash shortfall. (A preliminary financial disaggregation of the European asset and sales base, which is not included in this document, indicates that even though capital spending would be reduced by \$600 million during the 1980 to 1985 period and there would be a cash infusion from the sale, the magnitude of North American operations and Chrysler's early profit problems would still leave \$1.4 to \$2.0 billion of cash needs unfunded by 1982, depending upon working capital disaggregation assumptions.)

Note, in addition to the large cash deficits, the fact that even when capital spending declines in the 1983 projections, there is little rapid recovery from the spending peak. (Spending drops $370 million per year.) From these basic projections, and subsequent analysis of individual accounts, it appears that Chrysler will have to find funding of $1.0 billion to $2.0 billion from a variety of non-operating sources over the next five years.

Even by borrowing to limits, Chrysler has been able to secure only $983 million in new debt during the past five years, so obviously, a $2.0 billion debt figure is untenable (note again, this already includes the proceeds from the new stock). Analysis following in the financing section illustrates the breakdown of possible funding in an extreme case.

Sensitivity testing shows that this funding deficit derives almost entirely from the increased levels of spending, both capital spending and annual product development expenses. Note in Exhibit 10-31 the behavior of the proforma projections when capital spending is held constant and the pattern of sales is changed to a smoother trend behavior. Lines 660, 660.6, and 660.9 of the trend sales exhibit indicate that some cash flow relief is provided by a smoother sales pattern, but the magnitude is not appreciably different in total terms. Note also that in all proforma cases, Chrysler's share of the total market is allowed to expand by approximately one point over the first two years (this is total truck and car market share, so a one point expansion has greater significance than a similar expansion in the often quoted passenger car and light truck shares.)

The five year cumulative summary comparison of cycle sales to trend sales in Exhibit 10-35 shows that, indeed, a cyclical pattern in sales produces comparatively negative results in profits and cash flow, but it should be noted that the differences are small percentages of the total negative cash flows. The most striking measure of sensitivity can be seen in the five year cumulative summary which compares trend historical spending to planned levels of spending (Exhibit 10-36). This indicates that the planned spending levels produce a $400 million difference in cumulative profits and retained earnings, and a $1.5 billion increase in cash drain. Also, under the trend spending projection, the retained earnings and profit lines indicate a higher ability to pay common dividends. Clearly, the risk in Chrysler's future derives from planned levels of spending. One or two point differences in inflation factors and profit percentages, which in previous years would have been significant for Chrysler, are clearly overshadowed in their financial power when compared to the negative influences of spending.

Sensitivity runs were developed to test the power of profits in this set of projections. Projections were derived which allowed Chrysler's revenues to increase 8 percent per year (constantly, in addition to the market share gain allowed earlier) while holding cost increases to 6 percent per year. This produces a set of profit percentage on sales which rise from 0 in the first year to over 3.5 percent in year six. In recent history, the only time Chrysler's return on sales exceeded 3 percent was when it equalled 3.9 percent in 1968. Since that time, Chrysler has experienced a recurring pattern of losses, between good years returning little more than 2 percent on sales. A constantly growing return on sales which rises directly to more than 3 percent, even during a highly cyclical sales pattern, does not seem entirely realistic, to say the least. But, even under these optimistic profit projections, the proformas indicate a peak unfunded cash need of $1.4-$1.5 billion. The notable event in this sensitivity test was the fact that the increasing profits reduced cash drains significantly in the 1983 period (as one might well expect), but the front end spending hurdle in 1979 and 1980 was insurmountable.

Because the Chrysler projections were so startling, another set of sensitivity tests was devised to ensure that little bias could be attributed to the trend spending projection and its influence in the indications of this analysis. The basic trend spending pattern used in the first trend runs was a linear extrapolation of ten year spending amounts into the future. This was a quite satisfactory technique for the other companies, because their historic patterns of spending were more consistently linear with time, and, therefore, could be more reasonably projected into the future as a function of time. Chrysler's spending history, however, displayed the pattern of a company unable to spend a consistently high amount, although it could spend in peaks given good profit and sales years. For this reason, it was felt that a simple linear extrapolation of past spending into the future could be viewed as biased on the low side, and, therefore, not a representative base against which to compare the increased regulatory spending plans.

To investigate this hypothesis, a new estimate of "trend" spending was constructed which would force Chrysler to spend the larger amounts in each peak year of the future that it had spent in the past. If the linear trend were overstating the effects of regulatory spending by not allowing peaks in the spending curve, this new type of trend spending projection would reveal such bias.

The linear trend, when tested to actual past spending amounts, produces a regression R^2 of approximately .050, which is not high and is quite revealing of the cyclical spending behavior. A series of multiple regression equations were derived from historical variables of spending, sales, profits, cash flow, depreciation, general market growth, and sales by competitors. Most of these produced statistical fits not much improved over the linear trend example, but several logical combinations of variables produced significantly improved equations. The final one chosen is of the following form:

Capital spending = Const. + B (sales) + B (last year profits)

A ten year fit of this equation produces an R^2 of .704, and a good pattern of residuals. Obviously, this relationship makes sense in that profits in a good year allow higher spending in the next, as long as sales are also increasing, and the statistical indications of the equation are quite sound. (Beta signs strong; more than 90 percent assurance of proper direction.)

To most accurately extend this pattern of spending into the future, one should incrementally calculate each year's spending results, given forecasted sales for the year, last year's profits, and the depreciation and amortization streams resulting from the subsequently indicated spending. However, for ease of calculation and considerations of time, and because many streams of future profits had already been calculated in deriving other sensitivity tests, it was decided to predict the new future trend spending using the profit stream generated by the previous linear trend spending case. A series of capital spending amounts was derived for the five year forecast period using this stream of profits; this series of spending was depreciated according to accounting conventions used in the other proforma runs, and a new set of proformas was generated using the profits resulting from sales and the newly calculated depreciation expenses in combination with the other cost calculations fitting the spending and sales pattern. This produced the proforma illustration contained in Exhibit 10-38; note the spending pattern in line 550.

The sensitivity of the analysis to this method was tested by also calculating capital spending in the regression equation using other profit streams. It was found that the profit stream in the first trend spending case was the most optimistic, and that it produced the highest amount of spending under the new peak and valley conditions. For the purpose of this larger test, such an optimistic profit line was appropriate, because, if anything, it would bias the trend spending line upward, showing a smaller influence of the planned levels versus the trend levels. In a sense, this would tend to understate the effect of government regulation, and since the original purpose of this test was to insure that the effects of government spending were not overstated, the direction of secondary bias was quite acceptable. It should be noted that the pattern of peak and valley trend spending, if actually calculated in an annual fashion, would produce lower profits than those summarized in Exhibit 10-38.

The "Deferrable Base" trend spending in Exhibit 10-38, then, assumes that Chrysler would spend in the next five years at the limits it would have spent in the past five years, spending as much as possible in peak years, and cutting back, as necessary, in lean years. The aggregate five year spending total under this higher trend case is $3.2 billion, whereas, in the linear trend case, it has been $2.7 billion. The planned spending cumulative amount is $4.7 billion.

As Exhibit 10-39 shows, even the new higher deferrable trend spending pattern does not diminish the earlier conclusions that Chrysler's risk is derived from the planned spending pattern. The planned spending amount still produces a larger drain on profits and significantly larger drain on overall cash flow. The earlier comparison of linear trend to planned spending showed that planned spending decreased cash flow an additional $1.5 billion. The comparison of higher deferrable trend spending to planned spending indicates planned spending produces a decreased cash flow of $1.2 billion, even though this trend estimate increases capital spending $0.5 billion over the linear trend.

Clearly, the planned spending amount is the primary risk factor for Chrysler, no matter how one interprets their "business as usual" capital spending in any manner consistent with history. This indication is beyond the reach of any of the normal sensitivities or statistical errors.

Another interesting side effect of this sensitivity test is that it shows that even if Chrysler were allowed to defer some years of the higher planned spending level, the peak required spending in early years still produces a cash flow crunch. If Chrysler cannot handle the relatively smooth proportions of the current planned spending curve, and if it is required to meet long term goals, any deferrability in planned spending still means a peak in spending in the early years which carries a cash flow drain into subsequent periods.

10.8.3 Profit and Dividend Risk

Note that the planned spending proforma (Exhibit 10-28) assumes no common dividend paid. If this policy were followed, Chrysler's common stock would have almost no value except, perhaps, as an extremely long term speculative issue. In practice, Chrysler will have to allocate some of its limited after tax cash flow to common dividends in addition to the more firmly required preferred stock dividend.

If Chrysler were to pay its recent per share dividend of $.90 per share, the additional five year cash drain would be $271 million; this assumes no exercise of the current warrants attached to the preferred stock issue. If Chrysler were to pay its peak 1974 dividend of $1.40 per share, the additional cash drain under the planned spending projections would be $422 million, which would be directly added to the existing projected cash drain of more than $2.0 billion.

Note that each of the above dividend assumptions would not allow growth in dividends, and in an inflationary environment, this would mean the shareholder's annual return would be declining. If investors were to invest the recent value of Chrysler's common stock ($13) in a risk free bank account at 6 percent per year, the gross interest return on original investment would be 33 percent over five years. If the same investors were to place the $13 in a share of Chrysler common stock, and Chrysler were somehow able to pay a constant $.90 dividend, the gross dividend return on original investment would be 34 percent. Given the fact that Chrysler's stock dividend is so risky and the bank account so free of risk, and given the fact that both could provide the same overall return, why would any investor sink money into Chrysler stock? Note that a constant dividend would not intrinsically increase the value of the stock, although the investor might gain some price owing to general market conditions. But again, unless some longer term payoff could be expected, the risk may seem too high to many investors.

If Chrysler were able to offer a constant $1.40 per share dividend on the same original investment, the gross five year dividend return would be 53 percent. This would certainly represent a reasonable enough return to pull money away from a bank account. But, note that this would require Chrysler to drain an additional $420 million from cash flow. Given the fact that Chrysler's cash flow seems overly weighted on the negative side, could the investor truly expect to be paid the full $1.40 rate on a consistent basis? Since the return is obviously risky, is this really an incentive to draw cash from a savings account? Again, price fluctuations might produce some gains on share price, but this is not at all a systematic investment, and it suggests that Chrysler's cost of equity capital, measured by investor expectations and perceptions of risk, will be extremely expensive.

It should be mentioned that the above discussion of dividends is not a forecast of Chrysler stock prices, because other issues beyond dividend yield will affect the return on a speculative stock such as Chrysler's. However, the return to investors and the internal cash flow risk to Chrysler of providing this return is a very thorny and real problem for the company. Chrysler will be investing in areas which cannot provide an immediate and high return, because as soon as cash can be drawn from one investment, it must immediately be employed in another start-up investment in order to meet all regulatory schedules. This severely limits Chrysler's ability to provide investment return on a consistant basis and, perhaps, even intermittently.

Note the differences in earnings per share patterns of the trend spending case and the planned spending case (line 665 of Exhibits 10-32 and 10-28). Clearly, the increased spending level poses a serious threat to these return measures. Even the higher deferrable trend spending estimate (Exhibit 10-38, line 665) shows a greater potential for earnings to investors than the planned spending case. Not only does the planned spending level pose a serious cash flow risk, but also it forces a heavy risk burden upon the investor, and, therefore, a self-feeding increase in the cost of capital to Chrysler.

10.8.4 Financing

It is not possible to provide a single illustration of financing for Chrysler as was provided for the Ford analysis, because Chrysler's five to eight year future will involve a constant balancing of internal and external sources of funding. It can be expected that Chrysler will have a very close relationship with its investment bankers and other capital sources over the next few years, and that this relationship will involve a variety of secured credit arrangements and operating revisions. It is also reasonable to expect several major financing issues, in addition to the sale of European operations.

This section of analysis begins from the maximum indicated cash flow funding need indicated in the proforma estimates, and then evaluates a number of incremental financing steps which might be taken to provide the necessary funding. Because it is not entirely possible to predict the timing of specific funding possibilities, beyond the pending European sale, most of this analysis will deal in five year cumulative terms. Basically, this is an illustration of the changes and decisions Chrysler will have to make if the company is to fund the level of spending planned over the next five years. The sequence of description will be to start from the base need in the five year estimate, then, to describe individually possible financing arrangements, and to summarize by describing Chrysler's implied financial structure in 1982 under the assumed financing plans.

10.8.4.1 Base Need - As can be seen in line 660.9 of Exhibit 10-28, if Chrysler is to maintain a two-week cash operating balance, by 1982, its unfunded cash need will be approximately \$3.0 billion under the cyclical proforma conditions (note in Exhibit 10-31 that the trend sales pattern displays a similar need). This suggests that Chrysler would have five years of operations which would have not provided this amount of asset funding.

10.8.4.2 Sources - The following paragraphs depict a number of possible sources which Chrysler might tap to meet the above defined need. It is emphasized that this list of sources is provided here without explicit regard for timing of issues, and with an admittedly optimistic bias. At any single point, the source of capital implied in each of the enumerated examples, could decide that operations were too risky for the amount of investment implied. For purposes of this illustration, however, it is assumed that all will progress smoothly.

a. <u>European sale</u>. Assuming no difficulty in performing this sale, such as possible objections from the British government, Chrysler stands to gain substantial financing. The most immediate effect would be a $230 million cash infusion from the purchase price: assume this adds to Chrysler's equity in the five year operational cash flow stream. A second benefit would be the $200 million in Peugeot stock Chrysler would get as part of the purchase price. Assume, for the sake of optimism, that this would directly increase Chrysler's borrowing capacity by providing security (collateral) for a loan. The equity would not represent a cash infusion unless it could be translated to borrowing capacity. Peugeot will also take over $400 million of Chrysler's long term debt. Although, in fact, this debt is most likely placed at risk against the European operations which Chrysler no longer owns, assume that this directly increases Chrysler's U.S. borrowing power by the same $400 million amount. It is expected that Chrysler could derive approximately $5 million per year in dividends on the Peugeot stock it would own, so, for the five year period, add dividend income for 1980, 1981, 1982, for a total dividend of $15 million.

   Chrysler, if it sold Europe, would also forego the requirement to spend about $600 million in planned capital spending during the 1980-1982 period (this is an optimistic maximum). Such an opportunity would reduce the originally projected cash drain by this amount.

   Chrysler might obtain one further benefit from the European sale, a forgoing of operation losses (although this is somewhat theoretical at the moment, because

European profits have been recovering). Assuming these would have still been $30 million per year, this adds $90 million to the five year cumulative sourcing (years 1980-1982).

b. Middle Eastern Debt. Chrysler has apparently been able to secure potential $100 million in debt funds, although this really accrues to financial and not operating subsidiaries. Assume, for the sake of optimism, that this benefit will flow to the operating cash flow deficit, and record it as additional long term debt.

c. Effects of the Preferred Stock Issue. The proforma projections already allow the original infusion of approximately $240 million from the 1978 sale of preferred stock. However, several other benefits might still accrue. For example, if the Chrysler common stock price rises substantially above the approximate $13 level, the warrants attached to the preferred issue might be exercised, and Chrysler could benefit from the additional sales of $65 million in common stock. Ignoring the fact that this would simultaneously increase the demand for dividends by about $5 million per year, assume the full transaction price becomes available as an infusion of funds.

Because both the original preferred issue and the subsequent equity kicker (if exercised) would represent a reduction in the percentage of long term debt in the capital structure, this can be thought of as an increase in the capacity to borrow. Although, in reality, the debt capacity might not directly match the incremental issuance of stock, assume, for the sake of this illustration, that the dollar amounts of new equity directly translate into increased ability to borrow long term money. This would represent increased debt on the books of, say, $250 million for the original issue, and $65 million for the equity kicker.

d. <u>Finance Subsidiary Arrangement</u>. As mentioned above, Chrysler has recently entered into an agreement which would allow its finance subsidiary to sell accounts receivable credit to lending sources for cash (at a discount). This was designed to allow the finance subsidiary to provide funds for itself without going to the capital markets for debt until 1980. Finance subsidiaries usually require large infusions of borrowed or equity capital, becasue they are large credit institutions, whose operations are essentially independent of the operating division. (Even GM and Ford regularly go to the market for financing cash, and this does not necessarily represent a poor sales year, in fact, it often means the opposite.)

Chrysler's finance subsidiary is being held out of the market to allow the parent company to enter the market without overly straining the market dynamics mentioned in earlier discussions of debt capital. The amount of factoring allowed in this arrangement is $615 million, and if one can assume a direct relationship between this amount and the amount of capital supply subsequently "allowed" to Chrysler parent by the markets, this could represent an additional infusion of debt capital to Chrysler parent. (Please note that this is really stretching the definitions of debt capacity, and it is infinitely easier said than done.)

e. <u>Short Term Lines of Credit</u>. At present, according to a recently negotiated agreement, Chrysler has available approximately $560 million in unused short term lines of credit. This may be viewed as a direct source of funding, with several very important limitations. Short term credit, according to its nominal conditions, must be paid off in a short period of time, actually within one year. In practice, this can be used as a longer term source, if the accounts are constantly paid off as they are simultaneously "filled up." This is very similar to a consumer bank credit card arrangement, in that the lending source will allow the total balance to remain outstanding, as long as it is constantly being "rolled over" with fresh money. In practical terms, Chrysler will be able to use this line of credit almost permanently if it is constantly maintaining a monthly cash flow portion which can be used to keep the account fresh. Unlike long term debt, this requires constant attention and activity. If sales fall off too far in any single "billing period," the lines of credit can be frozen and even called on demand in some cases.

In addition, because this is a liquid bank portfolio holding, the bank must ensure that is is able to call the existing balance at almost any time. For this reason, the bank places a legal covenant restriction on Chrysler, which dictates that Chrysler must always have a net working capital position of $600 million. If the bank had to call the line, then, presumably, Chrysler would have enough of its own cash flow reserve in the form of working capital to pay down the line of credit.

It must be noted that the proforma estimates in the base case, before any additional financing, actually indicate a <u>negative</u> working capital reserve, not a $600 million buffer. At year-end 1977, Chrysler has a $1.0 billion working capital position, which the proforma assumes is used up in the purchase of new assets and product development expenses. This again shows the importance of working capital as an investment of cash funding, because it reveals that a good portion of the financing need projected in the proforma statements is to maintain the working capital buffer.

The financing sources which have been enumerated above would be somewhat counterbalancing this projected negative working capital position, but it is still clear that Chrysler will have a difficult time keeping its net working capital position strong enough to allow use of its short term lines of credit.

At present, Chrysler has already made use of its foreign short term lines of credit, and it is not clear, at the moment, how this short term debt will be handled in the European sale. It is possible that this could somewhat hinder Chrysler's U.S. short term capabilities, but for the purpose of this illustration, it is assumed that Chrysler will be able to make use of its existing U.S. lines without problem. Note, however, that this will not be considered a long term source of funds in this illustration, because the activity required in this account makes it unrealistic to assume the full amount can remain outstanding without some risk.

e. Summary. The examples listed above are the sources potentially available to Chrysler. It must again be emphasized that this list is extremely optimistic, and it ignores almost all the specifics of cost, funding available in the market at the time of cash need, and perceptions of risk on the part of the assumed investor sources.

Because Chrysler has recently performed a number of unconventional financing arrangements, it is clear that the company no longer has free and easy access to traditional sources of capital. The examples cited above all assume that the lending sources will receive some long range probable return despite apparent short term risks. This assumption is easy to make on paper, but it will be the source of many long and difficult negotiating sessions in actual practice, and it will undoubtedly cost Chrysler a premium amount to obtain this amount of funding.

If everything above can be put into effect, Chrysler will have obtained the following amounts of long term debt: ($ million)

$400	Peugeot takeover of debt
$200	Peugeot equity collateral
$100	Middle Eastern loan
$250	Preferred stock debt capacity
$ 65	Pfd. Stock equity kicker debt capacity
$600	Finance sub factoring market opportunity
$1615	Total incremental debt

Still, assuming all goes as illustrated, the following equity additions could result: ($ million)

$ 65	Equity kicker warrants
$ 90	Forego European operating losses
$230	Cash from European sale
$ 15	Dividend on Peugeot stock
$200	Assume Peugeot stock value flows to equity
$600	Equity additions, assuming all flow to equity

The proforma projections for 1982 indicate that the long term debt balance, not including current portions, will be $558 million. The projections indicate an equity balance of $2889 million. Adding the new increments of assumed debt and equity, tha balance assuming the financing scenario described above would be $2173 million long term debt and $3489 million total equity. Together, these items indicate total capitalization of $5662, and the resulting proportion of long term debt to total capitalization would be 38 percent. Chrysler's previous recent peak in this debt percentage was 31 percent in 1975. (Long term debt/long term debt and equity.)

Clearly, the financing arrangements discussed above would place Chrysler at the highest conceivable borrowing limit, and the capital structure would reflect an extreme amount of risk.

Note, in addition, that the total sources of financing listed above, even though optimistic, total $2800 million, and the original projected cash flow need was $3000 million. This scenario leaves Chrysler with an additional unfunded need of $200 million.

One could assume that the $200 million increment could be funded from short term lines of credit ($560 million). But, it must also be remembered that the original cash flow contained no provision for dividends. If Chrysler were to pay a $.90 per share dividend, the additional cash drain would be $271 million for the 1977 outstanding shares and approximately $25 million for the equity kicker shares, for a total of $296 million. (Remember, this does not allow the dividend to match inflation, and it makes no provision for additional shares which might be issued under employee stock plans.) This would leave approximately $260 million in the short term credit line to pay for the $200 million unfunded increment mentioned above.

This is an extremely tight squeeze, even assuming a very large amount of optimistic external funding, and it does not include the additional debt interest charges implied by this heavy debt load, which could easily come to $600 million for the five year period.

This illustration demonstrates that it is at least conceivable that Chrysler could meet its funding needs with large amounts of investor cooperation, increasing market share, and an excellently coordinated sequence of financing arrangements. But, this would leave the company with an extremely risky capital structure, and, therefore, a continued risky cash flow position beyond 1982. As will be shown below, the cost of this financing would be staggering, and all of the charges would be carried forward into the second stage of regulatory requirements. If Chrysler were not able to meet the mileage standards with this level of spending, any increased spending in the following years would be just about impossible.

10.8.4.4 Costs of Financing. The five year scenario described above would cost Chrysler proportionately more, per dollar of financing, than it would the other companies. It first must be noticed that the illustration above postulates that Chrysler will issue $1.6 billion in additional debt, or an average of $320 million per year. In the past ten years, Chrysler's largest new debt issue was approximately $279 million. In essence, this spending and financing illustration is asking Chrysler to borrow in bad years as much as Ford or GM has borrowed in past years.

If Chrysler issued this amount of debt, by 1982, the incremental additions to financing cost could double their existing annual debt interest charges. Assume that the debt is issued in a relatively smooth pattern over the next five years. For the same forecast period, the DRI assumptions of the cost of AAA debt indicate an average interest rate of 8.9 percent. Since Chrysler's credit rating is considerably below AAA (it currently stands at BBB-minus), the company could easily be paying a point higher, in the 10 percent range. If this were the case, and Chrysler really did accumulate such a large body of debt, the annual interest would be $161 million, or approximately $75 per North American vehicle, using a five year average of unit sales.

The above financing illustration obviously indicates an extremely desperate case, and reason dictates that it be tested for sensitivity. This can be easily done in this case, because no company would want to borrow as much as the above illustration indicates unless it were absolutely necessary. This means that if the implied cash need of $3.0 billion were lower, the financing arrangements illustrated above would be proportionately lower also. A company will not borrow an extreme amount of debt simply to show a positive cash flow, and Chrysler would obviously borrow in direct proportion to its actual cash needs.

Suppose then, the cash need could be cut to $2.5 billion. This suggests the amount of debt could drop to perhaps $1.0 or $1.2 billion from the indicated $1.6 billion incremental debt figure. This would have appreciable effect on Chrysler's cost of debt capital, because the system will be stretched to its limit, and debt cost would still be in the 10 percent range.

Even under this "better" scenario, Chrysler would have incurred an additional annual interest charge of $100 to $120 million, which would roughly translate to $47 to $60 per vehicle in North America at average selling rates. This is still an annual charge to be placed on every car sold every year until the debt were paid off, and, again, this would only be for carrying the financing of debt.

Note also that this proportional reduction in debt still assumes Chrysler will get most of the infusion of equity described above and that this will translate into borrowing capacity. This may very well be optimistic.

The only indicated additional benefit under the reduced need assumption is that Chrysler would have some lesser risk attached to its short term credit lines. But again, the volatility of the market, or any sudden shift in fixed product development costs in one year, could place the lines of credit in jeopardy.

These cost and financing estimates can be recast in a variety of forms, but again, it must be noted that the basic indications remain largely insensitive to most adjustments. If depreciation is increased (by changing policies or classes of assets), cash flow gains some, but explicitly reported costs against income become higher, and profit-starved Chrysler has almost no leeway here. If one assumes a change to LIFO inventory methods, some working capital investment appears to be saved, but the cost of goods charged against income become more susceptible to inflation swings and similar volatilities, again taking a tradeoff cost in profits. Working capital assumptions can be dropped to lower ends of historic probabilities to show a projected cash conservation, but this might gain only $300 million over five years.

The only adjustement which can produce substantial change in this set of estimates is a drop in capital spending and product development expenses, which is essentially a return to the past.

It appears that the capital spending plans will have to be accommodated by possible further cutbacks in some overseas areas, continued farming out of component manufacture, adjustments in manufacturing which might produce layoffs (especially if more parts are sourced externally in combination with cutbacks in items such as rear drivelines), and a very heavy schedule of financing which will have to include a number of uniquely and contingently designed arrangements.

10.8.5 Summary

The analysis indicated here is obviously dealing in severe financial strains, and it reflects observations which appear to differ considerably from a number of publicly quoted observations in the press. It is emphasized, once again, that this is not intended to be a precise forecast of annual events. But, the analysis has been tested in a variety of ways, and was specifically designed to sense longer term pressures over three to five years, within the bounds indicated by extensive examination of historical performance.

The popularly quoted financial need figure for Chrysler is $1.2 billion, which, at first, appears to be somewhat different from the above examples. Careful reading of the public sources of this quote indicate that it is usually associated with a $3.5 to $3.8 billion capital spending figure for North America between 1978 and 1982. A broader reading of the public sources, however, will also uncover an additional $1.0 billion projected five year overseas spending figure, which has been included for proper measure of corporate risk in this analysis. The European sale effectively reduces this overseas figure, and the illustration above properly disaggregates the European effects on both cash drain and cash generation to illustrate the full pictures while still arriving at the North American financial pressures.

It should also be noted that in recent months, experienced auto industry analysts have projected higher unfunded cash needs for Chrysler than the $1.2 billion figure so often quoted. For an example of this, see Automotive News, August 7, 1978, in an article starting on page one, entitled "Chrysler Financing: A controversy." This article provides an interesting survey of Chrysler financing problems and the observations of analysts who are not so optimistic about Chrysler's short term cash flow. The article cites analysis issued from Research Bernstein in New York which suggests unfunded cash positions for Chrysler of about $500 million per year until 1982. In gross amounts, this sums to an approximate need of $2.0 to $2.5 billion, a figure comparable to estimates derived in the proforma examples illustrated here. In addition, this article also shows a capital structure estimate, derived by the same Research Bernstein, which, when translated to the debt percentages measures used above, totals 39 percent debt in 1981. (Long term debt/long term debt + total equity.) The number derived in this document indicates approximately 38 percent.

The indications of proforma analysis in this document are not at all favorable for Chrysler. The company appears to have the ability to *just* meet its cash needs, *if* a variety of unconventional sources can be tapped, if the profit picture on sales steadily improves, and if the planned sacrifice of 26 percent of corporate world sales can help balance Chrysler's accounts. It is equally clear that Chrysler faces every possibility of further rearrangements and even cutbacks in operations, and that the cost of the financing which it will have to obtain will be exceedingly high.

Since the time earlier analyses were issued on this subject, a number of conditions have changed dramatically, but these were only very necessary first steps. The prognosis for Chrysler is still one of extreme risk and expensive difficutly.

EXHIBIT 10-28. CHRYSLER SOURCES AND USES SUMMARY, PLANNED SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
504.0	SALES REVENUE	17510	18509	21560	23259	21596	22905	27800	31039
504.5									
505.0	BEGIN CASH	408	23	-736	-1108	-1535	-2223	-2314	-2146
508.0									
510.0	NET INCOME	-125	-2	143	85	-259	-2	422	402
520.0	DIVIDENDS	27	27	27	27	27	27	27	27
530.0	RETAINED EARN	-153	-29	115	57	-286	-29	395	374
540.0									
550.0	ADD TO PROP	800	900	1030	1030	1030	660	660	660
560.0	DEP + AMORT	465	589	727	706	751	705	651	592
570.0	NET EXPENDITURES	335	311	303	324	279	-45	9	68
575.0									
590.0	CHG N-CSH C.A.	110	194	592	330	-323	254	950	628
591.0	CHG N-CLTD C.L.	86	156	477	266	-260	205	766	507
592.0	NET CH C-LTD	358	92	89	104	41	97	46	46
593.0	NET CH LTD	358	92	89	104	41	97	46	46
600.0	DEBT PAYMENTS	91	358	92	89	104	41	97	46
612.0	OTHER USES	15	23	-22	8	82	16	-63	-26
613.0	NEW PFD STOCK	240	0	0	0	0	0	0	0
620.0									
640.0	CHG CASH	-385	-759	-372	-427	-688	-91	168	165
650.0									
660.0	ENDING CASH	23	-736	-1108	-1535	-2223	-2314	-2146	-1981
660.1									
660.5	3 WK CSH BAL	985	1036	1187	1291	1225	1259	1503	1695
660.6	IMP CSH NEED	962	1772	2295	2826	3448	3573	3648	3676
660.7									
660.8	2WK CSH BAL	657	691	791	861	817	839	1002	1130
660.9	IMP. CSH NEED	634	1426	1899	2395	3039	3153	3147	3111
661.0									
662.0	PFD DIV	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
663.0	EARN TO CS	-152.7	-29.2	115.5	57.4	-286.2	-29.4	394.9	374.1
664.0	CS SHARES	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3
665.0	EPS TO CS	-2.53	-.48	1.91	.95	-4.75	-.49	6.55	6.20
666.0	DPS TO CS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
667.0									
670.0	IND UNIT SALES	15.15	14.58	16.15	16.48	13.29	13.31	16.55	17.90
671.0	CH NO AM UNITS	2.02	1.99	2.28	2.32	1.87	1.88	2.33	2.52

EXHIBIT 10-29. CHRYSLER INCOME SUMMARY, PLANNED SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
700.0	INCOME SUMMARY								
701.0	SALES	17510	18509	21560	23259	21596	22905	27800	31039
702.0									
704.0	CGS,OTB NA	9695	10013	11807	12838	11196	11461	14554	16802
705.0	SG&A NA	424	431	473	489	450	462	528	562
706.0	PENSION NA	209	217	261	279	279	249	325	369
707.0	MR&RNA	360	373	449	481	407	428	559	635
708.0	PROPTX &OTH NA	209	217	261	279	279	279	325	369
709.0	R&D NA	349	361	434	465	394	414	541	614
710.0	DEP NA	109	127	147	164	185	198	206	210
711.0	AMORT NA	245	330	421	387	404	355	307	258
711.1	NONAUTO COST	594	630	669	709	752	798	847	898
712.0	FOR. OTH COST	5108	5621	6170	6792	7450	8040	8674	9422
714.0	FOR. DEP	45	50	54	58	61	63	61	59
715.0	FOR. AMORT	66	82	105	97	101	89	77	65
716.0									
717.0	OP COST	17413	18453	21249	23039	21959	22837	27002	30262
718.0									
719.0	OP PROFIT	97	56	310	220	-363	69	798	777
720.0									
721.0	NON OP INC	32	34	36	38	40	43	45	48
722.0	INT. EXP.	88	93	108	116	108	115	139	155
723.0									
724.0	EARN BEFOR TAX	41	-3	238	142	-431	-3	704	669
725.0	TAX	17	-1	95	57	-172	-1	282	268
726.0									
727.0	RAW EARN AFT TX	25	-2	143	85	-259	-2	422	402
728.0	(NET ADD. OPCOST	-150	0	0	0	0	0	0	0
729.0	EARN AFT TAX	-125	-2	143	85	-259	-2	422	402
730.0									
731.0	OP CASH FLOW	340	587	870	791	492	703	1073	994
731.1	NEW PFD STOCK	240	0	0	0	0	0	0	0
732.0									
733.0	DIVIDENDS	27	27	27	27	27	27	27	27
734.0	CAP SPEND	800	900	1030	1030	1030	660	660	660
735.0	DEBT PAY	91	358	92	89	104	41	97	46
736.0	WK INVEST	24	37	114	64	-62	49	184	121
737.0	OTH INVEST	15	23	-22	8	82	16	-63	-26
738.0									
739.0	NET CASH FLOW	-385	-759	-372	-427	-688	-91	168	165
740.0									
745.0	NOTE: LINE ITEMS MAY REFLECT ROUNDING ERROR								

EXHIBIT 10-30. CHRYSLER BALANCE SHEET SUMMARY, PLANNED SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
300.0	ASSETS								
305.0	LIQUIDS	23	-736	-1108	-1535	-2223	-2314	-2146	-1981
306.0									
310.0	ACCOUNTS REC	958	1013	1181	1274	1183	1255	1524	1702
315.0	INVENTORY	2734	2866	3269	3493	3274	3447	4093	4520
320.0	PREPAIDS	127	132	147	155	147	154	178	194
322.0	PREPAID TAXES	35	37	43	47	43	46	56	62
325.0	CURRENT ASSETS	3877	3312	3532	3435	2424	2587	3705	4498
327.0									
330.0	INVESTMENTS	1097	1142	1187	1232	1277	1322	1367	1412
335.0	GROSS PPE	4626	5085	5610	6135	6660	6997	7334	7671
345.0	ACCUM DEP	2618	2795	2996	3218	3464	3725	3992	4261
347.0	NET PPE	2008	2290	2614	2917	3196	3272	3342	3410
350.0	UNAMORT TOOLS	752	781	760	781	781	660	599	599
356.0	TOTAL PROPERTY	2760	3071	3374	3698	3977	3932	3941	4009
357.0	COST OVER EQUITY	37	37	37	37	37	37	37	37
360.0	TOTAL ASSETS	7771	7562	8130	8402	7715	7878	9050	9956
370.0									
400.0	LIABILITIES								
405.0	ACCT PAYABLE	1488	1573	1833	1977	1836	1947	2363	2638
410.0	TAX DUE	175	185	216	233	216	229	278	310
415.0	STD	300	300	300	300	300	300	300	300
417.0	CUR LTD	358	92	89	104	41	97	46	46
419.0	INTEREST DUE	26	28	32	35	32	34	42	47
420.0	ACCRUALS	788	833	970	1047	972	1031	1251	1397
425.0	EMP COMP	308	323	368	394	369	389	462	511
430.0	CURRENT LIAB	3443	3334	3808	4089	3766	4027	4742	5249
435.0									
440.0	OTHER LIAB	412	434	501	539	502	531	639	710
450.0	LTD OLD	884	792	703	599	558	461	415	369
453.0	MIN INT	19	19	19	19	19	19	19	19
454.0	PREF STOCK	240	240	240	240	240	240	240	240
455.0	CAP STOCK	1026	1026	1026	1026	1026	1026	1026	1026
460.0	RETAINED EARN	1746	1717	1833	1890	1604	1574	1969	2343
465.0	TOTAL EQUITY	3031	3002	3118	3175	2889	2859	3254	3628
470.0	TOTAL LIAB	7771	7562	8130	8402	7715	7878	9050	9956

EXHIBIT 10-31. CHRYSLER SOURCES AND USES SUMMARY, PLANNED SPENDING, TREND SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
504.0	SALES REVENUE	17502	18485	20932	22017	23246	25261	27462	29426
504.5									
505.0	BEGIN CASH	408	22	-738	-1164	-1660	-2126	-2095	-2093
508.0									
510.0	NET INCOME	-126	-3	79	7	8	131	214	252
520.0	DIVIDENDS	27	27	27	27	27	27	27	27
530.0	RETAINED EARN	-153	-31	51	-20	-19	104	186	225
540.0									
550.0	ADD TO PROP	800	900	1030	1030	1030	660	660	660
560.0	DEP + AMORT	465	589	727	706	751	705	651	592
570.0	NET EXPENDITURES	335	311	303	324	279	-45	9	68
575.0									
590.0	CHG N-CSH C.A.	108	191	475	210	239	391	427	381
591.0	CHG N-CLTD C.L.	85	154	383	170	192	315	345	307
592.0	NET CH C-LTD	358	92	89	104	41	97	46	46
593.0	NET CH LTD	358	92	89	104	41	97	46	46
600.0	DEBT PAYMENTS	91	358	92	89	104	41	97	46
612.0	OTHER USES	15	23	-9	21	18	1	-3	2
613.0	NEW PFD STOCK	240	0	0	0	0	0	0	0
620.0									
640.0	CHG CASH	-386	-760	-427	-495	-466	31	1	35
650.0									
660.0	ENDING CASH	22	-738	-1164	-1660	-2126	-2095	-2093	-2058
660.1									
660.5	3 WK CSH BAL	985	1035	1158	1228	1293	1380	1503	1618
660.6	IMP CSH NEED	962	1773	2322	2888	3419	3474	3597	3676
660.7									
660.8	2WK CSH BAL	657	690	772	819	862	920	1002	1079
660.9	IMP. CSH NEED	634	1428	1936	2479	2988	3014	3095	3136
661.0									
662.0	PFD DIV	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
663.0	EARN TO CS	-153.3	-30.9	51.4	-20.4	-19.3	103.6	186.4	224.9
664.0	CS SHARES	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3
665.0	EPS TO CS	-2.54	-.51	.85	-.34	-.32	1.72	3.09	3.73
666.0	DPS TO CS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
667.0									
670.0	IND UNIT SALES	15.14	14.55	15.45	15.16	14.96	15.58	16.24	16.49
671.0	CH NO AM UNITS	2.01	1.99	2.18	2.14	2.11	2.20	2.29	2.32

EXHIBIT 10-32. CHRYSLER SOURCES AND USES SUMMARY, TREND SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
504.0	SALES REVENUE	17510	18509	21560	23259	21596	22905	27800	31039
504.5									
505.0	BEGIN CASH	408	267	-192	-194	-289	-671	-806	-658
508.0									
510.0	NET INCOME	-108	50	238	202	-128	100	492	439
520.0	DIVIDENDS	27	27	27	27	27	27	27	27
530.0	RETAINED EARN	-135	22	211	174	-155	72	464	411
540.0									
550.0	ADD TO PROP	532	544	556	568	579	591	603	615
560.0	DEP + AMORT	424	481	527	459	476	490	504	513
570.0	NET EXPENDITURES	108	63	29	109	103	101	99	102
575.0									
590.0	CHG N-CSH C.A.	110	194	592	330	-323	354	950	628
591.0	CHG N-CLTD C.L.	86	156	477	266	-260	205	766	507
592.0	NET CH C-LTD	358	92	89	104	41	97	46	46
593.0	NET CH LTD	358	92	89	104	41	97	46	46
600.0	DEBT PAYMENTS	91	358	92	89	104	41	97	46
612.0	OTHER USES	15	23	-22	8	82	16	-63	-26
613.0	NEW PFD STOCK	240	0	0	0	0	0	0	0
620.0									
640.0	CHG CASH	-141	-459	-2	-95	-382	-135	148	168
650.0									
660.0	ENDING CASH	267	-192	-194	-289	-671	-806	-658	-490
660.1									
660.5	3 WK CSH BAL	973	1023	1174	1282	1218	1270	1509	1698
660.6	IMP CSH NEED	706	1215	1368	1571	1889	2076	2168	2188
660.7									
660.8	2WK CSH BAL	649	682	783	855	812	847	1006	1132
660.9	IMP. CSH NEED	381	874	977	1144	1483	1653	1665	1622
661.0									
662.0	PFD DIV	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
663.0	EARN TO CS	-135.3	22.4	210.9	174.4	-155.4	72.0	464.5	411.3
664.0	CS SHARES	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3
665.0	EPS TO CS	-2.24	.37	3.50	2.89	-2.58	1.19	7.70	6.82
666.0	DPS TO CS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
667.0									
670.0	IND UNIT SALES	15.15	14.58	16.15	16.48	13.29	13.31	16.55	17.90
671.0	CH NO AM UNITS	2.02	1.99	2.28	2.32	1.87	1.88	2.33	2.52

EXHIBIT 10-33. CHRYSLER INCOME SUMMARY, TREND SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
700.0	INCOME SUMMARY								
701.0	SALES	17510	18509	21560	23259	21596	22905	27800	31039
702.0									
704.0	CGS,OTB NA	9695	10013	11807	12838	11196	11461	14554	16802
705.0	SG&A NA	424	431	473	489	450	462	528	562
706.0	PENSION NA	209	217	261	279	279	249	325	369
707.0	MR&RNA	360	373	449	481	407	428	559	635
708.0	PROPTX &OTH NA	209	217	261	279	279	279	325	369
709.0	R&D NA	349	361	434	465	394	414	541	614
710.0	DEP NA	112	123	132	139	149	157	165	170
711.0	AMORT NA	213	248	277	217	222	227	232	236
711.1	NONAUTO COST	594	630	669	709	752	798	847	898
712.0	FOR. OTH COST	5120	5643	6211	6844	7507	8086	8705	9439
714.0	FOR. DEP	46	48	49	49	49	49	49	48
715.0	FOR. AMORT	53	62	69	54	56	57	58	59
716.0									
717.0	OP COST	17384	18367	21090	22844	21741	22668	26886	30200
718.0									
719.0	OP PROFIT	126	142	469	415	-145	238	914	839
720.0									
721.0	NON OP INC	32	34	36	38	40	43	45	48
722.0	INT. EXP.	88	93	108	116	108	115	139	155
723.0									
724.0	EARN BEFOR TAX	70	83	397	337	-213	166	820	731
725.0	TAX	28	33	159	135	-85	66	328	293
726.0									
727.0	RAW EARN AFT TX	42	50	238	202	-128	100	492	439
728.0	(NET ADD. OPCOST	-150	0	0	0	0	0	0	0
729.0	EARN AFT TAX	-108	50	238	202	-128	100	492	439
730.0									
731.0	OP CASH FLOW	316	531	765	661	348	590	996	952
731.1	NEW PFD STOCK	240	0	0	0	0	0	0	0
732.0									
733.0	DIVIDENDS	27	27	27	27	27	27	27	27
734.0	CAP SPEND	532	544	556	568	579	591	603	615
735.0	DEBT PAY	91	358	92	89	104	41	97	46
736.0	WK INVEST	24	37	114	64	-62	49	184	121
737.0	OTH INVEST	15	23	-22	8	82	16	-63	-26
738.0									
739.0	NET CASH FLOW	-141	-459	-2	-95	-382	-135	148	168
740.0									
745.0	NOTE: LINE ITEMS MAY REFLECT ROUNDING ERROR								

EXHIBIT 10-34. CHRYSLER BALANCE SHEET SUMMARY, TREND SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
300.0	ASSETS								
305.0	LIQUIDS	267	-192	-194	-289	-671	-806	-658	-490
306.0									
310.0	ACCOUNTS REC	958	1013	1181	1274	1183	1255	1524	1702
315.0	INVENTORY	2734	2866	3269	3493	3274	3447	4093	4520
320.0	PREPAIDS	127	132	147	155	147	154	178	194
322.0	PREPAID TAXES	35	37	43	47	43	46	56	62
325.0	CURRENT ASSETS	4121	3856	4445	4680	3976	4095	5192	5988
327.0									
330.0	INVESTMENTS	1097	1142	1187	1232	1277	1322	1367	1412
335.0	GROSS PPE	4489	4766	5050	5340	5635	5936	6244	6558
345.0	ACCUM DEP	2622	2793	2974	3162	3360	3566	3780	3998
347.0	NET PPE	1867	1973	2076	2178	2275	2370	2464	2560
350.0	UNAMORT TOOLS	666	623	549	556	562	568	573	579
356.0	TOTAL PROPERTY	2533	2596	2625	2734	2837	2938	3037	3139
357.0	COST OVER EQUITY	37	37	37	37	37	37	37	37
360.0	TOTAL ASSETS	7788	7631	8294	8683	8127	8392	9633	10576
370.0									
400.0	LIABILITIES								
405.0	ACCT PAYABLE	1488	1573	1833	1977	1836	1947	2363	2638
410.0	TAX DUE	175	185	216	233	216	229	278	310
415.0	STD	300	300	300	300	300	300	300	300
417.0	CUR LTD	358	92	89	104	41	97	46	46
419.0	INTEREST DUE	26	28	32	35	32	34	42	47
420.0	ACCRUALS	788	833	970	1047	972	1031	1251	1397
425.0	EMP COMP	308	323	368	394	369	389	462	511
430.0	CURRENT LIAB	3443	3334	3808	4089	3766	4027	4742	5249
435.0									
440.0	OTHER LIAB	412	434	501	539	502	531	639	710
450.0	LTD OLD	884	792	703	599	558	461	415	369
453.0	MIN INT	19	19	19	19	19	19	19	19
454.0	PREF STOCK	240	240	240	240	240	240	240	240
455.0	CAP STOCK	1026	1026	1026	1026	1026	1026	1026	1026
460.0	RETAINED EARN	1764	1786	1997	2171	2016	2088	2553	2964
465.0	TOTAL EQUITY	3049	3071	3282	3456	3301	3373	3838	4249
470.0	TOTAL LIAB	7788	7631	8294	8683	8127	8392	9633	10576

EXHIBIT 10-35. CHRYSLER: PLANNED SPENDING, CYCLE VERSUS TREND SALES, AN APPROXIMATION OF MARKET RISK (Capital Spending Held Constant)

5 YEAR CUMULATIVE SUMMARY '78-82

(All dollars in millions)

	CYCLE SALES RESULTS	TREND SALES RESULTS	DIFFERENCE (CYCLE-TREND)
UNIT SALES (million)	10.48	10.43	0.05
SALES	$102,434	$102,182	$252
NET INCOME	$(-158)	$(-35)	$(-129)
CAPITAL SPENDING	$4,790	$4,790	0
DEP. & AMORT.	$3,240	$3,240	0
DIVIDEND:			
PFD:	$138	$138	0
COMM:	0	0	0
RETAINED EARNINGS	$(-296)	$(-172)	$(-124)
CHANGE CASH (DRAIN)	$(-2,631)	$(-2,534)	$(-221)
POSSIBLE FINANCIAL NEED (or sale and cutback of operations)	$2500+	$2500+	0

EXHIBIT 10-36. CHRYSLER: PLANNED SPENDING VERSUS TREND SPENDING (Market Risk Held Constant)

5 YEAR CUMULATIVE SUMMARY '78-82

(All dollars in millions)

	PLANNED SPENDING RESULTS	TREND SPENDING RESULTS	DIFFERENCE (PLAN-TREND)
UNIT SALES (million)	10.48	10.48	0
SALES	$102,434	$102,434	0
NET INCOME	$(-158)	$254	$(-412)
CAPITAL SPENDING	$4,790	$2,779	$2,011
DEP. & AMORT.	$3,240	$2,367	$873
DIVIDEND			
PFD:	$138	$138	0
COMM:	0	0 (but possible to pay some)	0(?)
RETAINED EARNINGS	$(-296)	$117	$(-413)
CHANGE CASH (DRAIN)	$(-2,631)	$(-1,079)	$(-1,552)
POSSIBLE FINANCIAL NEED (or sale and cutback of operations)	$2,500+	$1,000 Approx.	$1,500
AMOUNT FINANCING PAST 5 YEARS	= $1,000		

EXHIBIT 10-37. CHRYSLER: APPROXIMATE COMPARISON OF MARKET RISK TO CAPITAL SPENDING RISK

(All dollars in millions)

	*DIFFERENCES FROM MARKET VOLATILITY	**DIFFERENCES FROM INCREASED SPENDING	***RATIO OF SPENDING DIFFERENCES TO VOLATILITY DIFFERENCES
UNIT SALES (million)	0.05	0	NA
SALES	$252	0	NA
NET INCOME	$(-129)	$(-412)	3.19
CAPITAL SPENDING	0	$2,011	NA
DEP. & AMORT.	0	$873	NA
DIVIDEND	0	0	0
RETAINED EARNINGS	$(-124)	$(-413)	3.33
CHANGE CASH	$(-221)	$(-1,552)	7.02
POSSIBLE NEED (or sale or cut-back)	0	$1500	INFINITELY HIGHER RISK

*From Exhibit
**From Exhibit
***A raw measure of spending risk versus market risk

EXHIBIT 10-38. CHRYSLER SOURCES AND USES SUMMARY, PEAK TREND SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982
504.0	SALES REVENUE	17510	18509	21560	23259	21596
504.5						
505.0	BEGIN CASH	408	175	-239	-320	-543
508.0						
510.0	NET INCOME	-126	37	218	113	-232
520.0	DIVIDENDS	27	27	27	27	27
530.0	RETAINED EARN	-154	10	190	85	-259
540.0						
550.0	ADD TO PROP	626	494	641	779	727
560.0	DEP + AMORT	444	489	554	631	680
570.0	NET EXPENDITURES	182	5	87	148	47
575.0						
590.0	CHG N-CSH C.A.	110	194	592	330	-323
591.0	CHG N-CLTD C.L.	86	156	477	266	-260
592.0	NET CH C-LTD	358	92	89	104	41
593.0	NET CH LTD	358	92	89	104	41
600.0	DEBT PAYMENTS	91	358	92	89	104
612.0	OTHER USES	15	23	-22	8	82
613.0	NEW PFD STOCK	240	0	0	0	0
620.0						
640.0	CHG CASH	-233	-414	-81	-223	-429
650.0						
660.0	ENDING CASH	175	-239	-320	-543	-973
660.1						
660.5	3 WK CSH BAL	978	1021	1177	1283	1213
660.6	IMP CSH NEED	803	1260	1497	1826	2186
660.7						
660.8	2WK CSH BAL	652	680	785	855	809
660.9	IMP. CSH NEED	477	919	1105	1399	1781
661.0						
662.0	PFD DIV	27.5	27.5	27.5	27.5	27.5
663.0	EARN TO CS	-153.9	9.8	190.5	85.0	-259.2
664.0	CS SHARES	60.3	60.3	60.3	60.3	60.3
665.0	EPS TO CS	-2.55	.16	3.16	1.41	-4.30
666.0	DPS TO CS	0.00	0.00	0.00	0.00	0.00
667.0						
670.0	IND UNIT SALES	15.15	14.58	16.15	16.48	13.29
671.0	CH NO AM UNITS	2.02	1.99	2.28	2.32	1.87

EXHIBIT 10-39. COMPARISON OF DEFERRABLE BASE SPENDING TO PLANNED SPENDING

5 YEAR CUMULATIVE SUMMARY
(All dollars in millions)

	RESULTS OF DEFERRABLE BASE	RESULTS OF PLANNED SPENDING	DIFFERENCE (PLAN-DEFER.)
UNITS (million)	10.48	10.48	0
SALES	$102,434	$102,434	0
NET INCOME	$10	$(-158)	$(-168)
CAPITAL SPENDING	$3,267	$4,790	$1,523
DEP. & AMORT.	$2,798	$3,240	$442
DIVIDEND:			
PFD:	$138	$138	0
COMM:	0	0	0
RETAINED EARNINGS	$(-128)	$(-296)	$(-168)
CHANGE CASH (Drain)	$(-1,380)	$(-2,631)	$(-1,251)
POSSIBLE FINANCIAL NEED	$1,500+	$2,500+	$1,000

10.9 AMERICAN MOTORS FINANCIAL ANALYSIS

10.9.1 General

Although American motors historical data were evaluated in considerable detail in background research for this document, the company is not at all treated in the same manner as the other three larger companies in this analysis. It is almost meaningless to specualte on AM's 5 year financial future for two major reasons:

1. AM's pending association with Renault will have significant effects upon the company, and financial performance in the future will directly relate to the terms and success of this deal. It is conceivable that AM's nominal sales figures could increase by 50,000 units or more if the pending arrangement works well, and it is apparent, at this time, that AM's short-term capital needs will be largely affected by credit arrangements under this joint venture.

2. AM's historical performance is so volatile and reflects so much major reorganization year-to-year, that it is essentially futile to extend statistical estimates of performance more than one year into the future. AM has always been a marginal profit performer, and its capital needs have been met by extensive revisions and sales of its fixed asset accounts. It is clear that AM should have been spending much more on product development in the past than it actually did, so any estimates of future product spending cannot be compared to some systematic history. AM will spend what it gets in the way of cash flow, and the amount of cash flow it will receive is extremely uncertain.

AM is currently capable of generating perhaps $60 to $80 million in operating cash flow from current levels of operations and profitability. Profits have been recovering recently owing to strong Jeep sales and recovery in the Concord model range. This year, AM will introduce a reskinned Gremlin type model, named the "Spirit" which should further enhance profits, but AM's overall unit sales do not allow large increases in produce spending, even assuming further increased profits.

AM's capital asset base has been trimmed to a small level over the past eight years, and even this asset base is used as security against a number of tightly stretched loans. AM has had to constantly renegotiate credit terms, sometimes converting short term debt to long term money, sometimes liquidating assets and consolidating manufacturing facilities. It seems apparent that this type of financing will still remain dominant in the future, and AM will have to remain very cash conservative.

It is also difficult to discern what AM's capital spending plans will truly be. Media accounts do not treat this topic in any great detail, and the company itself has not charted specific plans, especially not in any specific annual set of plans. So, it is hard to even establish quoted figures. In addition, it is not clear how AM will attempt to meet new fuel economy, safety, and emissions targets, in terms of product development. AM has had, and will continue to have, little capital available for internal product development. This forces AM to be primarily an assembler and, in the future, a marketer of technology developed by other companies.

Because AM has very little integrated production, it seems possible that the greatest effect of regulations could occur in the form of increased variable costs. Obviously, AM will have to fund enough of a capital asset base to assemble the advancing technologies, but it is not clear how much internal manufacturing will be required, and, therefore, it is not even useful, at this point, to use a standard historical costing approach to develop a capital spending plan for AM.

Because the earlier announcements of the Renault joint venture included some future plans for assembly of Renault designs in the United States, it is possible that AM will face some expansion in tooling and plant, and it is also possible that Renault, despite early statements to the contrary, will fund some of this type of development. But, such possibilities are not even proper material for speculation at this point, because even if such plans were in the works, they might not be employed for several years.

Several things are clear. AM is currently supported by its very strong Jeep sales. Recent profits have largely been a function of Jeep division profits subsidizing larger losses in passenger autos. This will still remain central to cash flow, and the major risk in this area appears to be fuel economy standards on light trucks, and the extension of safety features into the Jeep vehicle sector. This would force capital spending, most likely on AM's part, because this central product must survive if the company is to survive.

AM has recently gained ground in its passenger car sales, and it is entirely possible that this division could begin generating its own profits soon if it is not already doing so. Assuming an optimistic 3 percent net profit on auto sales, this could lead to cash generation for auto spending of perhaps $60 million per year. This would allow the historic rates of product development spending, which it should be noted have only allowed limited development of existing models on an annual basis. (For example, the Concord is really a reskinned Hornet. The Pacer was the only new model developed in recent years, and its introduction as a complete line was deferred over two model years; in addition, it uses a large number of existing components. AM engines are holdovers from ten and twenty year old basic designs.) Even increased profitability in passenger autos would not allow extensive new model design.

For these reasons, it seems likely that AM will depend heavily on the new Renault models it is scheduled to sell. These models may allow partial meeting of some regulatory standards, but, at the present time, it is not clear that these products will fit into fuel economy measurements. If AM can sell enough Renault models, at a high enough margin to itself, this might be an area of expanded cash generation, but it does not represent large opportunities at this time.

AM will have to continue close relationships with its investors. Both its short and long term money is held by a consortium of investors who have strong legal control over the company in terms of debt covenants. It is conceivable that these sources will provide further funding if AM's profit potential keeps improving, but any such funding will almost certainly retain restrictive convenants.

For all of these reasons, the discussion of AM's financial performance and future in this document is little more then a survey of important current trends. Once the Renault agreement is known with greater certainty, AM's financial performance can be more realistically studied, given more productive assumptions and unfolding trends.

For purposes of illustration, a very limited and simplistic proforma example was derived using average historical assumptions on performance. This can be seen in Exhibit 10-40, and it will be quickly noticed that this example is nothing more than a financial sketch or outline.

In this proforma example, all cost items and balance sheet accounts were projected on a strict percentage of sales basis. Unit sales were allowed to grow through 1978 and then were adjusted upward or downward according to the annual percentage changes in the base market projections used in evaluation of the other companies. It must be strongly noted that AM's historical percentage of sales measurement on all of these accounts was extremely volatile, and any linear extrapolation of these items into the future serves little purpose beyond demonstrating a "what if" case.

In the example illustrated in Exhibit 10-40, AM was assumed to make a marginal profit, no matter how radically sales dropped. It was also assumed that all short and long term credit arrangements could be negotiated in such a manner that all accounts would remain proportionate to each other. The capital spending assumptions used in this example approximate historical trend figures, on a linear basis. Note that this results in capital spending of approximately $100 million per year for five years, not the $60 million annual figure loosely quoted in the press during June 1978. The profitability assumption can be thought of as a counterbalancing of the higher spending figure projected. In actual practice, the capital spending amounts will be produced by the combinations of contingencies listed above.

Under this proforma illustration, it can be seen that AM faces a cash drain position, even assuming higher depreciation and higher profits. The only important conclusion which can be drawn from this is that AM is near its spending limit at present, and <u>any</u> increase, be it derived from government regulation or other forces, will simply cause the cash outflow. Any spending, even at present levels, will undoubtedly produce, or continue to produce, the need for external capital financing.

10.9.2 Summary

AM's financial future strongly depends upon the joint venture with Renault. Even so, passenger car operations cannot be expected to generate large profits or cash flow for several years, and it is unlikely that any capacity expansion will take place, except as required by the Renault arrangement.

Government regulations should affect AM's passenger autos primarily in the area of variable costs. AM is an assembler and will be buying technology from other manufacturers; the variable cost increases will come through recapture of the sources' investment in new products.

The major corporate financial risk from government regulation appears to be in the Jeep line. AM will be developing the Jeep from within, and, therefore, will be more susceptible to capital spending increases in this line. Because the company is so strongly dependent upon the Jeep, this is not a discretionary product line by any means, and it must remain profitable for overall corporate performance.

Any increase in product spending will fall through the financial system and present itself as a need for external capital. Profits, as historically derived, will certainly not mitigate against this direct relationship in any substantial manner. Therefore, AM's ability to spend on future regulation will depend almost directly on the ability of funding sources to continue supplying credit. AM has already opened non-traditional sources of funding, as exemplified in its loan from the state of Ohio, and it is entirely likely that such arrangements will become more important.

AM has no more assets to strip or business areas to cut back, unless it sacrifices a relatively small and profitable non-automotive business. It is, therefore, entirely possible that AM could seek greater integration with other companies, or an expansion of the Renault joint venture. Reason also dictates that one consider complete merger or acquisition a possibility during the next decade if intermediate steps toward profitability do not produce results.

EXHIBIT 10-40. AM PROFORMA, LINEAR PERCENT SALES ASSUMPTIONS

LINE NO		1978	1979	1980	1981	1982
1.0	AM UNITS	.410	.404	.422	.459	.427
3.0	REV/UNIT PROXY	6211	6521	6847	7190	7549
4.0	TOTAL REVENUE	2546	2635	2890	3300	3224
4.1		------	------	------	------	------
5.0	CGS	2190	2266	2485	2838	2772
6.0	S,G&A	229	237	260	297	290
7.0	AMORT	43	51	62	55	55
8.0	DEPRECIATION	21	20	23	24	24
9.0	PENSION	33	34	38	43	42
10.0	OTH REVENUE	18	18	20	23	23
11.0	INT EXPENSE	17	17	17	17	17
11.1		------	------	------	------	------
13.0	EARN BEF TAX	31	28	25	49	46
15.0	TAX	10	9	8	16	15
15.1		------	------	------	------	------
16.0	EARN AFT TAX	21	19	17	33	31
20.0	BALANCE SHEET					
20.1	ASSETS					
21.1	LIQUIDS	294	264	271	290	291
21.2	ACCT REC.	229	237	260	297	290
22.0	INVENTORY	356	369	405	462	451
23.0	PREPAIDS	13	14	15	17	17
24.1	TOTAL CURRENT	892	884	950	1066	1050
25.0	PPE GROSS	467	512	557	602	647
26.0	ACC DEP.	232	252	275	299	323
27.0	PPE NET	235	260	282	303	324
28.0	UNAMORT TOOLS	84	88	81	81	81
29.0	NET PROPERTY	319	348	363	384	405
30.0	GOODWILL	12	12	12	12	12
30.1		------	------	------	------	------
31.0	TOTAL ASSETS	1211	1232	1313	1450	1455
40.0	LIABILITIES					
41.0	ACCT PAYABLE	382	395	433	495	484
42.0	SHT TERM DEBT	57	57	57	57	57
43.0	EMP. COMP.	28	29	32	36	35
44.0	ACCRUALS	51	54	57	60	63
45.0	INT	4	4	4	4	4
46.0	TAX	13	13	16	16	16
47.0	CURR LTD	30	9	8	8	8
47.1		------	------	------	------	------
48.0	TOTAL CURRENT	565	561	607	676	667
49.0	OTH LIAB	31	38	42	48	46
50.0	LTD	56	47	39	31	23
51.0	CAP STOCK	181	181	181	181	181
52.0	RET. EARN	161	179	196	229	260
53.0	TOT EQUITY	342	360	377	410	441
53.1		------	------	------	------	------
54.0	TOT LIAB	994	1007	1065	1165	1176
55.0		------	------	------	------	------
56.0	CHG CASH	234	-30	7	19	1
57.0		------	------	------	------	------
58.0	PAT/SALES	.008	.007	.006	.010	.010

11. INCREMENTAL INVESTMENT COSTING

11.1 GENERAL

It is important to view investment analysis in terms of the market pressures generated from new investment. The purpose of this Section of analysis is to illustrate how <u>some</u> investment charges, deriving from increased product spending programs, will place incremental pressures on corporate cost structure. Basic costing measures used in this analysis show some of the major effects of incremental North American product spending on the North American cost structure.

This analysis measures the <u>additional fixed cost charges to the corporate pre-tax earnings stream, which are derived solely from the increment of planned program spending over trend program spending</u>. The costing method used only recognizes <u>investment</u> charges to this pre-tax profit stream, and does not consider any changes in variable cost or any add-on components (head restraints, passive restraints, emission controls, or other incremental items of equipment).

If all other charges of labor, material, and incremental add-ons were to remain at their 1977 level, the dollar fixed cost estimate measured in this section would be the only factory cost pressure added to the North American financial system, and it would be derived only from the increment of planned program spending over trend program spending.

However, because all other cost items such as labor, materials, and add-ons will be changing according to inflation and regulation, the corporations will actually be experiencing cost pressures in addition to the fixed cost pressures measured here. In actual practice, all inflationary costs, incremental component costs, and additional variable costs would be summed into the cost structure, and <u>then</u>, the stream of fixed charges estimated in this section would be added to all other cost pressures.

The most important aspect of this cost stream is contained in its behavior, rather than in its absolute amount. Because this cost represents incremental investment charges owing to a stream of investments well above trend investment for these companies, it represents a structural change in the finances of the business. In the past, the North American market has provided a given level of profit to cover a given cost structure and a given trend investment level. In the future, that same market will have to provide an increased amount of profit to cover a new and systemically higher investment level; a higher level of profit will have to be extracted from approximately the same number of units (the North American market is low growth).

Behaviorally, then, this incremental fixed cost stream will have to be recovered from the market in addition to the normal cost pressures of inflation, and in addition to the effects of any add-on componentry or variable cost changes. This fixed cost stream, because it will be incurred for program spending which is not tied to market volume, but to regulatory schedules, will, therefore, increase the downside financial risk in relation to sales volume. In break-even terms, the corporate fixed costs have been increased, and all companies stand to lose more money per unit of dropping sales in the future than in the past; the ability to withstand recession conditions will be lower in the future.

In strict accounting terms, the fixed charges calculated from this eight year planned spending increase will extend far into the future, until the year 2000. Also in accounting terms, the greatest pressures occur within the next 3 to 5 years. Although the costs are translated in this analysis into approximate costs per unit, it is difficult to interpret this per unit estimate, because this is really a fixed cost, and only variable costs can be easily expressed in per unit terms. Because the behavior of these charges occurs according to a fixed schedule of costs extending many years into the future, it is absolutely necessary that the per unit meaning be carefully defined.

In essence, this analysis suggests that the factory cost of all North American vehicles (including all trucks) will have to increase approximately $300 to $400 sometime during the next three to five years, or the companies will face a direct deterioration of profits of the same amount (which reduces their ability to finance the spending). This increased factory cost pressure will have to occur no matter what other costs are changed or what inflation levels pertain to other product costs. It is a fixed and permanent increase in the cost of producing vehicles for the North American market, and is independent of all other cost influences. Note that this is a factory cost, and consumer effects would have to contain additional wholesale and retail margins.

In financial management terms, apart from the accounting requirements, this price increase at the factory would have to be incurred early in the investment program. As mentioned in other sections of analysis, a long term investment can only return cash on a long term basis, and because the companies will be putting in many more long term investments than historic profits can pay for, many new projects will have to gain cash returns at the front end of their lives in order to generate cash for other required spending projects. Therefore, if price increases are not performed at the start of many of these new investments, the companies will not have investment capital available to initiate all projects required during the regulatory time frame.

The cost streams calculated in this section merely show the factory price increase pressures which would allow the companies to pay down the costs of each new investment, and this does not explicitly allow for excess cash generation from one project to provide the necessary funding for other projects. That is, even if the companies were able to obtain the price increases implied in this analysis at the time specified in this analysis, this would not at all mean the companies were generating enough cash to fund the start-up of all projects required during the next eight years.

It is entirely possible that even if the companies could get back these $300 to $400 unit costs from the market, they would not be obtaining enough cash to pay for all project initiations during this period, and they could still be forced outside the company for borrowed funds.

The cash flow analysis of Section 10 is the appropriate place to view these collective cash flow pressures upon each of the companies. This Section 11 is only presented as one illustration of incremental cost pressures from specifically defined increments of new investments.

11.2 ASSUMPTIONS

It is extremely important to note all of the assumptions implied in this method of costing. The most important conditions of this analysis are noted below:

1. The analysis only measures costs produced by investment above trend. As mentioned above, this can be expected to differ from estimates of regulatory costs which include regulatory spending in the trend base used here. It is not the intent of this document to argue in favor of one method of costing or another. The costs estimated in this analysis are significant in themselves, and represent substantial incremental cost pressures when viewed in the normal cost context.

2. The incremental investment costs in this analysis are spread over all North American

   cars,
   light trucks,
   medium and heavy trucks,
   buses,

   and other vehicles included in the North American retail sales unit base. To the extent that the investment increments are more concentrated on cars and light trucks, this analysis will underestimate unit cost pressures on these vehicles.

3. As mentioned above, these cost estimates include no provisions for changes in variable costs per unit. Other research into variable cost adjustments suggests that variable cost reductions and increases will tend to balance out in the early years of regulatory spending, but the variable costs may increase in an incremental fashion if new technologies are required for regulatory requirements in the '82-'85 years. Any such adjustments would occur in addition to the investment pressures listed here, and would not alter these investment cost estimates.

4. This analysis makes no provision for the marginal investment return of the regulatory spending projects. If some of the investment projects included in this investment analysis were low or no return projects, companies would have to legitimately include investment opportunity costs in their own internal financial estimates. This document only assumes that average cost of capital measures apply, and no adjustments are made for project risk or the timing of returns.

5. No provision is made for inflation replacement costs in this analysis. As mentioned in other sections of this document, the companies would experience loss of purchasing power in their depreciation and amortization streams, because depreciation and amortization cannot inflate in step with cost increases in the price of assets. In reality, if the companies had to replace the regulatory investment base (replacement includes normal maintenance), they would be experiencing additional pressures on the cost of vehicles which are not captured in this analysis.

   An example of this effect can be seen in the following illustration. Assume a company purchases an asset in year one which allows a depreciation stream of $100 million per year for at least five years. Assume further that the cost of this asset, in replacement value, increases at an average inflation rate of 7 percent per year. In rough terms, the company would be experiencing an additional cost pressure according to the following schedule:

Year	1	2	3	4	5
Actual Depreciation	$100	$100	$100	$100	$100
Replacement Depreciation (includes inflation)	$107	$114	$122	$131	$140
Replacement Cost Pressure	$ 7	$ 14	$ 22	$ 31	$ 40

If the asset required annual replacement of tooling for example, or if it were to be partially replaced at any point in the future after it was installed, the company would have had to charge an increasing cost to prices each year of an amount approximately equivalent to the "Replacement Cost Pressure" defined above. If this price increment were not charged in some form, the cash inflow from sales would not be properly matching the potential cash drain from inflation in asset replacement cost. The analysis in the section does not include any estimate of replacement cost pressure, but it should be kept in mind that such pressures are financial reality, and they can produce significant effects during a period of product development.

6. This analysis assumes no write offs of investment. No capital write downs or tax gains are included, although such changes could easily be expected if assets were retired before their full economic lives were spent.

7. In general, this costing series assumes no allocation of overhead or other costs which could be expected as new investments were made.

8. Methods used here assume that Direct Engineering (production related) and Launch costs will be incurred in proportion to capital investment in new projects. These fixed charges are estimated according to average industry rules of thumb, which suggest that Direct Engineering is roughly 28.5 percent of capital spending and that Launch costs are approximately 14 percent of capital spending. The analysis makes no effort to include engineering and launch costs which might be included in the trend base, and it should be recognized that this could bias regulatory spending fixed cost estimates on the low side.

9. In addition, this analysis does not include general increases in Research and Development, unless those costs are part of Direct Engineering expenses. It is entirely reasonable to expect that general corporate R&D will increase with regulatory development, and that these costs would occur in addition to investment costs estimated in this section.

10. This set of cost estimates assumes that incremental investment above trend will include a regular proportion of tooling. The amortization figures are somewhat sensitive to tooling estimates, and if the proportion of tooling in these spending estimates were actually to be higher than the average historical proportions used, the costs per unit would rise by approximately 1/9 of the incremental tooling cost in any year. Since most regulatory spending will be for technology introduction and not for plant capacity expansion, it is important to note this sensitivity.

11. This section only displays costing results for the next eight years. <u>It is very important to notice that these estimates include no costs of government</u>

regulation which has occurred before 1978, and no costs for any such spending beyond 1985.

All of these assumptions are important because of the ability of different analysts to translate costing schedules in a variety of ways. The intent of this section is to estimate investment costs in a reasonable manner using standard investment costing techniques which apply to the auto company context. Costs derived here realistically reflect at least part of the unit cost pressures which the auto companies would experience under conditions of regulatory spending.

11.3 SUMMARY OF COMPANY RESULTS

11.3.1 General Motors

Exhibits 11-1 and 11-2 indicate that GM faces a per unit cost pressure of approximately $340 to $370 for every North American vehicle, deriving from the estimated investments over trend. If GM did not or could not recover these cost pressures in pricing, the unrecovered increment would directly lower profit per car (before taxes), with a resulting effect on corporate margins. These cost pressures would be incurred in addition to any cost inflation on cost of goods in general. This cost pressure stream is only part of the cost structure, and any additional trend investment costs would also add to the pressure.

11.3.2 Ford

The incremental investment above trend also places significant pressure on Ford's North American unit cost structure. Exhibit 11-3 indicates that Ford faces an incremental investment cost pressure of approximately $300-$320 per unit, in addition to any variable cost pressures or trend base investment cost pressures. Note, that Ford's North American profit margins are somewhat smaller than GM's, so this incremental investment costing actually reflects a slightly higher percentage cost pressure. Again, if Ford were unable or unwilling to recapture these cost increases through pricing, the unrecovered amount would be directly deducted from profit margins.

11.3.3 Chrysler

Exhibit 11-4 presents the costing results for Chrysler's incremental investment above trend in North America. It should be noted that this investment increment is independent of the European sale and accrues to North American vehicles. It is also important to note that the absolute dollar amounts per vehicle are smaller for Chrysler than for Ford and GM. This results from Chrysler's different aggregate depreciation schedules, and it has the effect of producing smaller cost increments in nominal fashion during the eight year period, but it extends the per unit costs farther into the future for Chrysler. Essentially, this means Chrysler will have to feel the effects of this spending period for a longer time, at a slightly larger dollar figure per vehicle.

At any rate, Chrysler faces factory cost pressures of approximately $300 per vehicle, and given Chrysler's small percentage margin, this is a critical dollar amount. It can be seen that the incremental North American Investment cost pressure significantly pressures Chrysler's margin in comparison to the other companies. Note that Chrysler has no margin this year, and therefore any extra dollar hurts.

11.3.4 American Motors

The vast uncertainties of American Motors investment schedules and future organizational plans obviate this type of analysis. As mentioned earlier, AM's position as an assembler of components strongly suggests that this company's greatest cost pressure will occur in variable costs of supplied parts. It is also quite clear that any increased investment in this company will cause significant cost pressures on margins, and AM's ability to recover costs from the market is extremely limited.

11.3.5 Conclusions of Results

It should be clear from these estimates that the incremental capital investment above trend will produce substantial pressures on unit costing. Note, that these charges are primarily fixed and would be incurred by each company no matter how well sales were performing. This is quite significant from a financial viewpoint, because it increases pressures on profit margins the most at precisely the worst time, when sales are falling. This adds a large component of risk to the corporate earnings stream, and will have effects not only upon cash flow but very importantly upon the ability to return profits on investment.

In a practical sense, then, these cost pressures are not only important in their absolute dollar amounts, but in their financial behavior and the fact that they are added to all other normal costs of business. They represent not only a single year pressure on retail price, but a fixed stream of risk which extends over time beyond the actual investment event. The "bottom line" of this section can be viewed as the translation of incremental financial investment pressures into the realities of the market. This is the incremental financial risk translated into the corporate financial and market environment, and whatever assumptions are used to alter these figures, the fact remains that they are significant additions to the corporate risk profile.

EXHIBIT 11-1. GM PEAK ONE SPENDING INVESTMENT COSTING

LINE NO		1918	1979	1980	1981	1982	1983	1984	1985
1.0	TREND SPEND NA	2387	2498	2608	2720	2830	2940	3052	3162
2.0	PLAN SPEND NA	3440	4000	4160	4160	4160	4000	4000	4000
3.0	INCR. OVER TREND	1053	1502	1552	1440	1330	1060	948	838
4.0									
5.0	PPE INCR.	558	796	822	763	705	562	502	444
6.0	TOOLS INCR.	495	706	729	677	625	498	445	394
7.0									
8.0	DEPRECIATION	54	125	193	248	293	324	352	377
9.0	AMORTIZATION	165	400	643	704	677	600	523	446
10.0									
11.0	ANNUAL D&A_AMOUNT	219	525	836	952	970	924	875	823
12.0									
13.0	NET NEW INVESTMENT	834	977	716	488	360	136	73	15
14.0	TOTAL INCR. INVESTMENT	834	1811	2527	3015	3375	3511	3584	3599
15.0									
16.0	COST OF CAPITAL	.22	.22	.22	.22	.22	.22	.22	.22
17.0									
18.0	REQ. RETURN ON INVEST.	183	398	556	663	742	772	788	792
19.0									
20.0	DIRECT ENGINEERING COST	300	428	442	410	379	302	270	238
21.0	LAUNCH COST	150	213	220	204	188	150	135	119
21.1									
22.0	TOTAL INCR. FIXED COST	450	641	662	614	567	452	405	357
23.0									
24.0	UNIT VOLUME	7.44	7.16	7.94	8.10	6.53	6.54	8.13	8.80
25.0									
26.0	UNIT COSTS								
27.0	D&A COST/UNIT	29	73	105	118	149	141	108	94
28.0	RETURN COST/UNIT	25	56	70	82	114	118	97	90
29.0	FIXED COST/UNIT	60	90	83	76	87	69	50	41
30.0									
31.0	TOTAL ANN COST/UNIT	115	218	259	275	349	329	254	224
32.0									

33.0 NOTE: ALL COSTS ARE CALCULATED FROM INCREMENTAL INVESTMENT, AND DO NOT
34.0 INCLUDE VARIABLE COST ADJUSTMENTS OR ANY
34.1 POSSIBLE REGULATORY COSTS IN THE TREND BASE.
34.2 ALSO NOTE THAT THIS INCLUDES NO INFLATION REPLACEMENT COST

EXHIBIT 11-2. GM PEAK TWO SPENDING INVESTMENT COSTING

LINE NO		1918	1979	1980	1981	1982	1983	1984	1985
1.0	TREND SPEND NA	2387	2498	2608	2720	2830	2940	3052	3162
2.0	PLAN SPEND NA	3440	4000	4640	4160	4160	4000	4000	4000
3.0	INCR. OVER TREND	1053	1502	2032	1440	1330	1060	948	838
4.0									
5.0	PPE INCR.	558	796	1076	763	705	562	502	444
6.0	TOOLS INCR.	495	706	955	677	625	498	445	394
7.0									
8.0	DEPRECIATION	54	125	217	270	313	342	369	394
9.0	AMORTIZATION	165	400	719	779	752	600	523	446
10.0									
11.0	ANNUAL D&A AMOUNT	219	525	936	1049	1065	942	892	840
12.0									
13.0	NET NEW INVESTMENT	834	977	1096	391	265	118	56	-2
14.0	TOTAL INCR. INVESTMENT	834	1811	2907	3298	3563	3681	3737	3735
15.0									
16.0	COST OF CAPITAL	.22	.22	.22	.22	.22	.22	.22	.22
17.0									
18.0	REQ. RETURN ON INVEST.	183	398	640	726	784	810	822	822
19.0									
20.0	DIRECT ENGINEERING COST	300	428	579	410	379	302	270	238
21.0	LAUNCH COST	150	213	289	204	188	150	135	119
21.1									
22.0	TOTAL INCR. FIXED COST	450	641	868	614	567	452	405	357
23.0									
24.0	UNIT VOLUME	7.44	7.16	7.94	8.10	6.53	6.54	8.13	8.80
25.0									
26.0	UNIT COSTS								
27.0	D&A COST/UNIT	29	73	118	130	163	144	110	95
28.0	RETURN COST/UNIT	25	56	81	90	120	124	101	93
29.0	FIXED COST/UNIT	60	90	109	76	87	69	50	41
30.0									
31.0	TOTAL ANN COST/UNIT	115	218	308	295	370	337	261	229
32.0									

33.0 NOTE: ALL COSTS ARE CALCULATED FROM INCREMENTAL INVESTMENT, AND DO NOT
34.0 INCLUDE VARIABLE COST ADJUSTMENTS OR ANY
34.1 POSSIBLE REGULATORY COSTS IN THE TREND BASE.
34.2 ALSO NOTE THAT THIS INCLUDES NO INFLATION REPLACEMENT COST

EXHIBIT 11-3. FORD INVESTMENT COSTING

LINE NO		1918	1979	1980	1981	1982	1983	1984	1985
1.0	TREND SPEND NA	800	832	863	895	926	958	989	1021
2.0	PLAN SPEND NA	1600	1600	1600	1600	1600	1600	1600	1600
3.0	INCR. OVER TREND	800	768	737	705	674	642	611	579
4.0		------	------	------	------	------	------	------	------
5.0	PPE INCR.	480	461	442	423	404	385	367	347
6.0	TOOLS INCR.	320	307	295	282	270	257	244	231
7.0		------	------	------	------	------	------	------	------
8.0	DEPRECIATION	43	81	113	141	165	188	210	230
9.0	AMORTIZATION	107	209	307	295	282	270	257	244
10.0		------	------	------	------	------	------	------	------
11.0	ANNUAL D&A AMOUNT	150	290	420	436	447	458	467	474
12.0		------	------	------	------	------	------	------	------
13.0	NET NEW INVESTMENT	650	478	317	269	227	184	144	105
14.0	TOTAL INCR. INVESTMENT	650	1128	1445	1714	1941	2125	2269	2374
15.0		------	------	------	------	------	------	------	------
16.0	COST OF CAPITAL	.22	.22	.22	.22	.22	.22	.22	.22
17.0		------	------	------	------	------	------	------	------
18.0	REQ. RETURN ON INVEST.	143	248	318	377	427	467	499	522
19.0		------	------	------	------	------	------	------	------
20.0	DIRECT ENGINEERING COST	228	219	210	201	192	183	174	165
21.0	LAUNCH COST	114	109	105	110	96	91	87	82
21.1		------	------	------	------	------	------	------	------
22.0	TOTAL INCR. FIXED COST	342	328	315	311	288	274	261	247
23.0		------	------	------	------	------	------	------	------
24.0	UNIT VOLUME	4.29	4.13	4.57	4.66	3.76	3.77	4.68	5.06
25.0		------	------	------	------	------	------	------	------
26.0	UNIT COSTS								
27.0	D&A COST/UNIT	35	70	92	94	119	121	100	94
28.0	RETURN COST/UNIT	33	60	70	81	114	124	107	103
29.0	FIXED COST/UNIT	80	79	69	67	77	73	56	49
30.0		------	------	------	------	------	------	------	------
31.0	TOTAL ANN COST/UNIT	148	210	230	241	309	318	262	246
32.0		======	======	======	======	======	======	======	======

33.0 NOTE: ALL COSTS ARE CALCULATED FROM INCREMENTAL INVESTMENT, AND DO NOT
34.0 INCLUDE VARIABLE COST ADJUSTMENTS OR ANY
34.1 POSSIBLE REGULATORY COSTS IN THE TREND BASE.
34.2 ALSO NOTE THAT THIS INCLUDES NO INFLATION REPLACEMENT COST

EXHIBIT 11-4. CHRYSLER INVESTMENT COSTING

LINE NO		1918	1979	1980	1981	1982	1983	1984	1985
1.0	TREND SPEND NA	425	435	445	454	463	473	482	492
2.0	PLAN SPEND NA	640	720	824	824	824	528	528	528
3.0	INCR. OVER TREND	215	285	379	370	361	55	46	36
4.0									
5.0	PPE INCR.	110	145	193	189	184	28	23	18
6.0	TOOLS INCR.	105	140	186	181	177	27	23	18
7.0									
8.0	DEPRECIATION	7	17	29	39	49	48	46	45
9.0	AMORTIZATION	35	82	144	169	181	128	76	23
10.0									
11.0	ANNUAL D&A AMOUNT	42	99	173	208	230	176	122	68
12.0									
13.0	NET NEW INVESTMENT	173	186	206	162	131	-121	-76	-32
14.0	TOTAL INCR. INVESTMENT	173	359	565	727	858	737	661	629
15.0									
16.0	COST OF CAPITAL	.22	.22	.22	.22	.22	.22	.22	.22
17.0									
18.0	REQ. RETURN ON INVEST.	38	79	124	160	189	162	145	138
19.0									
20.0	DIRECT ENGINEERING COST	61	81	108	105	103	16	13	10
21.0	LAUNCH COST	31	41	54	53	51	8	7	5
21.1									
22.0	TOTAL INCR. FIXED COST	92	122	162	158	154	24	20	15
23.0									
24.0	UNIT VOLUME	2.02	1.99	2.28	2.32	1.87	1.88	2.33	2.52
25.0									
26.0	UNIT COSTS								
27.0	D&A COST/UNIT	21	50	76	90	123	94	52	27
28.0	RETURN COST/UNIT	19	40	55	69	101	86	62	55
29.0	FIXED COST/UNIT	46	61	71	68	82	13	9	6
30.0									
31.0	TOTAL ANN COST/UNIT	85	151	201	227	306	193	123	88
32.0									

33.0 NOTE: ALL COSTS ARE CALCULATED FROM INCREMENTAL INVESTMENT, AND DO NOT
34.0 INCLUDE VARIABLE COST ADJUSTMENTS OR ANY
34.1 POSSIBLE REGULATORY COSTS IN THE TREND BASE.
34.2 ALSO NOTE THAT THIS INCLUDES NO INFLATION REPLACEMENT COST

APPENDIX

BASIC ASSUMPTIONS FOR PROFORMA ANALYSIS

GM BASIC PROFORMA ASSUMPTIONS

Note: these may have been modified for particular runs. They represent the base case.

1. SG+A = .036 x Sales, but never less than last year.

2. Pension = grow 13%

3. MR+R = .057 x Sales, but never less than 95% of last year.

4. Property & other Tax = .033 x Sales, but never less than last year.

5. R&D = .03 x Sales, but not less than last year.

6. Cost, OTB per unit = rises with inflation, but modified for volume by following:

$$\frac{(\text{CGS/units last year}) \times 1.05}{\sqrt{\dfrac{\text{units this year}}{\text{units last year}}}}$$

7. Foreign units = grow approx. 50,000 per year.

8. Non-auto sales = grow approx. 6%.

9. Non-auto income = grow approx. 5% - 6%.

10. Income tax rate = 47%

11. Dividend = .55 x income to common, but never less than .65 x last year.

12. Accounts Receivable = .076 x Sales plus .044 x last year A/R plus 313

13. Inventory = .096 x Sales plus 1953

14. Prepaids = .014 x Sales but never less than .95 x last year, also cyclical.

15. Other Investment = .04 x Sales plus 129, but not less than .95 x last year.

16. Accounts Payable = .053 x Sales

17. Accruals = .07 x Sales - 168

18. Other Liabilities = .026 x Sales - 323

GM BASE ASSUMPTIONS, PEAK ONE SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
10.0	IND UN SALES US	15.15	14.58	16.15	16.48	13.29	13.31	16.55	17.90
15.0	MARKET SHARE	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5
20.0	GM UNIT SALE-NA	7.44	7.16	7.94	8.10	6.53	6.54	8.13	8.80
25.0	AVG REV/UNIT-NA	6492	6817	7158	7515	7891	8286	8700	9135
30.0	TOT REV -NA	48332	48839	56803	60862	51535	54194	70755	80353
40.0	FIXED COSTS								
45.0	SELLING G + A	1797	1797	2045	2191	2191	2191	2547	2893
50.0	PENSIONS	1228	1388	1568	1772	2003	2263	2557	2890
55.0	MAINT + REPAIR	2755	2784	3238	3469	3365	3264	4033	4580
60.0	PROP TAX + OTHER	1629	1629	1875	2008	2008	2008	2335	2652
65.0	RES + DEV	1451	1465	1704	1826	1826	1826	2123	2411
78.0	DEPRECIATION-NA	931	1046	1166	1300	1363	1425	1493	1517
81.0	AMORTIZATION-NA	1361	1639	1817	1930	1955	1930	1905	1880
85.0	FIXED COSTS	11152	11748	13413	14497	14711	14908	16993	18822
87.0									
90.0	OTHER CGS/UNIT	4168	4462	4596	4826	5642	5320	5586	5865
93.0	TOT OTHER CGS	31033	31966	36473	39079	36848	34797	45431	51593
97.0	NAA INC	6147	5125	6918	7287	-24	4489	8331	9938
100.0									
120.0	NNA UNIT SALES	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00
125.0	REV/UNIT-NNA	4910	5155	5413	5684	5968	6266	6580	6909
130.0	NNA REV	8101	8764	9473	10231	11041	11906	12830	13817
178.0	DEPRECIATION-NNA	233	262	291	325	341	356	373	379
181.0	AMORTIZATION-NNA	340	410	454	483	489	483	476	470
197.0	NNA INC	543	587	635	685	740	798	860	926
198.0									
199.0	NON AUTO SALES	3054	3237	3431	3637	3855	4087	4332	4592
205.0	NON AUTO INC	331	347	365	383	402	422	443	465
207.0	NON OP INC	595	608	697	747	664	702	879	988
208.0	INTEREST EXP	297	304	349	374	332	351	440	494
209.1	COST FIT ADJUST	0	0	0	0	0	0	0	0
210.0	EARN BEF TAX	7318	6364	8266	8729	1450	6060	10074	11823
215.0	INCOME TAX	3439	2991	3885	4103	682	2848	4735	5557
218.0	EARN AFT TAX-NO	3878	3373	4381	4626	769	3212	5339	6266
219.0	COST FIT ADJUST	221	0	0	0	0	0	0	0
220.0	NET INCOME	3657	3373	4381	4626	769	3212	5339	6266
225.0									
230.0	DIVIDENDS	2012	1855	2410	2544	1654	1766	2937	3446
280.0	CAP INV -PPE	2279	2650	2756	2756	2756	2650	2650	2650
285.0	CAP INV - TOOLS	2021	2350	2444	2444	2444	2350	2350	2350
290.0	TOT SALES	59487	60841	69708	74730	66431	70186	87917	98762
295.0									

GM BASE ASSUMPTIONS, PLANNED SMOOTH, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
10.0	IND UN SALES US	15.15	14.58	16.15	16.48	13.29	13.31	16.55	17.90
15.0	MARKET SHARE	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5
20.0	GM UNIT SALE-NA	7.44	7.16	7.94	8.10	6.53	6.54	8.13	8.80
25.0	AVG REV/UNIT-NA	6492	6817	7158	7515	7891	8286	8700	9135
30.0	TOT REV -NA	48332	48839	56803	60862	51535	54194	70755	80353
40.0	FIXED COSTS								
45.0	SELLING G + A	1797	1797	2045	2191	2191	2191	2547	2893
50.0	PENSIONS	1228	1388	1568	1772	2003	2263	2557	2890
55.0	MAINT + REPAIR	2755	2784	3238	3469	3365	3264	4033	4580
60.0	PROP TAX + OTHER	1629	1629	1875	2008	2008	2008	2335	2652
65.0	RES + DEV	1451	1465	1704	1826	1826	1826	2123	2411
78.0	DEPRECIATION-NA	929	1038	1146	1266	1316	1370	1434	1458
81.0	AMORTIZATION-NA	1349	1602	1730	1805	1805	1805	1805	1830
85.0	FIXED COSTS	11138	11703	13306	14338	14514	14728	16834	18713
87.0									
90.0	OTHER CGS/UNIT	4168	4462	4596	4826	5642	5320	5586	5865
93.0	TOT OTHER CGS	31033	31966	36473	39079	36848	34797	45431	51593
97.0	NAA INC	6161	5170	7025	7446	173	4669	8490	10047
100.0									
120.0	NNA UNIT SALES	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00
125.0	REV/UNIT-NNA	4910	5155	5413	5684	5968	6266	6580	6909
130.0	NNA REV	8101	8764	9473	10231	11041	11906	12830	13817
178.0	DEPRECIATION-NNA	232	260	287	317	329	343	359	365
181.0	AMORTIZATION-NNA	337	400	432	451	451	451	451	457
197.0	NNA INC	543	587	635	685	740	798	860	926
198.0									
199.0	NON AUTO SALES	3054	3237	3431	3637	3855	4087	4332	4592
205.0	NON AUTO INC	331	347	365	383	402	422	443	465
207.0	NON OP INC	595	608	697	747	664	702	879	988
208.0	INTEREST EXP	297	304	349	374	332	351	440	494
209.1	COST FIT ADJUST	0	0	0	0	0	0	0	0
210.0	EARN BEF TAX	7332	6409	8373	8888	1647	6240	10233	11932
215.0	INCOME TAX	3446	3012	3935	4177	774	2933	4809	5608
218.0	EARN AFT TAX-NO	3886	3397	4438	4711	873	3307	5423	6324
219.0	COST FIT ADJUST	221	0	0	0	0	0	0	0
220.0	NET INCOME	3665	3397	4438	4711	873	3307	5423	6324
225.0									
230.0	DIVIDENDS	2016	1868	2441	2591	1684	1819	2983	3478
280.0	CAP INV -PPE	2226	2544	2544	2544	2544	2544	2544	2650
285.0	CAP INV - TOOLS	1974	2256	2256	2256	2256	2256	2256	2350
290.0	TOT SALES	59487	60841	69708	74730	66431	70186	87917	98762
295.0									

FORD BASIC PROFORMA ASSUMPTIONS

Note: These may have been modified for particular runs. They represent the base case.

1. SG+A = 506 x Inflation + .02 Sales, but not less than .90 x last year.

2. Pension = .02 x Sales, but not less than last year.

3. MR+R = .034 x Sales, but no drop greater than 100.

4. Property tax = .03 x Sales, but not less than last year.

5. R&D = .035 x Sales, sometimes fixed.

6. Cost, OTB/unit = base x inflation, modified for volume by the following:

$$\frac{\text{Base}}{\sqrt{\text{change in units}}}\text{, constrained to inflation}$$

7. Foreign units = increase approx. 5% - 6%

8. Foreign Revenue = base x inflation.

9. Tax Rate = 44%

10. Dividend = .24 x income to common but not less than 350.

11. Accounts Receivable = .052 x Sales

12. Inventory = 38 x $\sqrt{\text{Sales}}$ - 2440

13. Other Investment = Increase 141.

14. Accounts Payable = .1 x Sales

15. Tax Payable = .015 x Sales.

16. Accruals = increase 10%.

FORD BASE ASSUMPTIONS, PLANNED SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
10.0	IND UN SALES US	15.15	14.58	16.15	16.48	13.29	13.31	16.55	17.90
15.0	MARKET SHARE %	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1
20.0	FD UNIT SALE-NA	4.29	4.13	4.57	4.66	3.76	3.77	4.68	5.06
25.0	REV/UNIT - NA	6288	6603	6933	7280	7644	8026	8427	8848
30.0	TOT REVENUE NA	26954	27237	31678	33942	28741	30223	39459	44812
35.0									
40.0	FIXED COSTS								
45.0	SELLING G + A	1070	1076	1165	1210	1210	1210	1320	1428
50.0	PENSIONS	539	545	634	679	679	679	789	896
55.0	MAINT + REPAIR	916	926	1077	1154	1054	1028	1342	1524
60.0	PROP TAX + OTHR	809	817	950	1018	1018	1018	1184	1344
65.0	RES + DEV	943	953	1109	1188	1006	1058	1381	1568
78.0	DEPRECIATION-NA	533	615	659	707	743	774	795	815
81.0	AMORTIZATION-NA	379	501	691	659	650	650	650	650
85.0	FIXED COSTS	5190	5433	6285	6615	6360	6417	7461	8225
87.0									
90.0	OTHER CGS/UNIT	4779	5115	5268	5532	6468	6099	6404	6724
93.0	OTHER CGS	20482	21098	24072	25792	24320	22966	29985	34052
97.0	NAA EARN BEF TAX	1282	706	1322	1534	-1940	840	2013	2534
110.0									
111.0	NNA INCOME								
120.0	NNA UNIT SALES	2.10	2.20	2.30	2.35	2.40	2.50	2.60	2.70
125.0	REV/UNIT -NNA	5085	5339	5606	5887	6181	6490	6815	7155
130.0	TOTAL NNA REV	10679	11747	12895	13834	14834	16225	17718	19319
140.0	FIXED COSTS NNA								
145.0	SELLING G + A-NN	430	446	469	488	508	536	565	597
150.0	PENSIONS-NNA	214	235	258	277	297	325	354	386
155.0	MAINT+REPAIR-NNA	363	399	438	470	504	552	602	657
160.0	PROP TAX + OTHER	320	352	387	415	445	487	532	580
165.0	RES = DEV-NNA	374	411	451	484	519	568	620	676
178.0	DEPRECIATION-NNA	229	276	310	348	383	417	447	479
181.0	AMORTIZATION-NNA	321	424	584	557	550	550	550	550
185.0	FIXED COSTS-NNA	2251	2544	2897	3039	3206	3433	3671	3925
187.0									
190.0	NNA CGS/UNIT	3685	3870	4063	4266	4480	4704	4939	5186
193.0	OTHER CGS -NNA	7740	8514	9346	10026	10751	11759	12841	14002
197.0	NNA INC BEF TAX	688	689	652	769	877	1033	1206	1392
198.0									
199.0	NON AUTO REV	2808	2976	3155	3344	3545	3758	3983	4222
201.0	NON AUTO OP INC	222	235	249	264	280	297	315	334
202.0	NON OPER INC	477	506	536	568	602	638	677	717
203.0	INTEREST EXP	202	210	239	256	236	251	306	342
204.0									
210.0	EARN BEF TAX	2467	1926	2520	2880	-416	2557	3905	4636
215.0	INCOME TAX	1086	848	1109	1267	-183	1125	1718	2040
220.0	NET INCOME	1382	1079	1411	1613	-233	1432	2187	2596
225.0									
230.0	DIVIDENDS	350	350	350	387	350	350	525	623
280.0	CAP INV - PPE	1800	1800	1800	1800	1800	1800	1800	1800
285.0	CAP INV - TOOLS	1200	1200	1200	1200	1200	1200	1200	1200
290.0	SALES $	40441	41960	47728	51120	47120	50206	61160	68353
295.0									

FORD BASE ASSUMPTIONS, TREND SPENDING CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
10.0	IND UN SALES US	15.15	14.58	16.15	16.48	13.29	13.31	16.55	17.90
15.0	MARKET SHARE %	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1
20.0	FD UNIT SALE-NA	4.29	4.13	4.57	4.66	3.76	3.77	4.68	5.06
25.0	REV/UNIT - NA	6288	6603	6933	7280	7644	8026	8427	8848
30.0	TOT REVENUE NA	26954	27237	31678	33942	28741	30223	39459	44812
35.0									
40.0	FIXED COSTS								
45.0	SELLING G + A	1070	1076	1165	1210	1210	1210	1320	1428
50.0	PENSIONS	539	545	634	679	679	679	789	896
55.0	MAINT + REPAIR	916	926	1077	1154	1054	1028	1342	1524
60.0	PROP TAX + OTHR	809	817	950	1018	1018	1018	1184	1344
65.0	RES + DEV	943	953	1109	1188	1006	1058	1381	1568
78.0	DEPRECIATION-NA	537	510	514	529	539	545	544	543
81.0	AMORTIZATION-NA	271	288	378	359	364	376	389	402
85.0	FIXED COSTS	5086	5115	5827	6137	5870	5914	6949	7705
87.0									
90.0	OTHER CGS/UNIT	4779	5115	5268	5532	6468	6099	6404	6724
93.0	OTHER CGS	20482	21098	24072	25792	24320	22966	29985	34052
97.0	NAA EARN BEF TAX	1386	1024	1780	2012	-1450	1343	2525	3054
110.0									
111.0	NNA INCOME								
120.0	NNA UNIT SALES	2.10	2.20	2.30	2.35	2.40	2.50	2.60	2.70
125.0	REV/UNIT -NNA	5085	5339	5606	5887	6181	6490	6815	7155
130.0	TOTAL NNA REV	10679	11747	12895	13834	14834	16225	17718	19319
140.0	FIXED COSTS NNA								
145.0	SELLING G + A-NN	430	446	469	488	508	536	565	597
150.0	PENSIONS-NNA	214	235	258	277	297	325	354	386
155.0	MAINT+REPAIR-NNA	363	399	438	470	504	552	602	657
160.0	PROP TAX + OTHER	320	352	387	415	445	487	532	580
165.0	RES = DEV-NNA	374	411	451	484	519	568	620	676
178.0	DEPRECIATION-NNA	143	229	241	260	277	293	306	319
181.0	AMORTIZATION-NNA	229	244	320	304	307	318	329	340
185.0	FIXED COSTS-NNA	2073	2317	2564	2698	2857	3077	3309	3555
187.0									
190.0	NNA CGS/UNIT	3685	3870	4063	4266	4480	4704	4939	5186
193.0	OTHER CGS -NNA	7740	8514	9346	10026	10751	11759	12841	14002
197.0	NNA INC BEF TAX	866	916	985	1110	1226	1389	1568	1762
198.0									
199.0	NON AUTO REV	2808	2976	3155	3344	3545	3758	3983	4222
201.0	NON AUTO OP INC	222	235	249	264	280	297	315	334
202.0	NON OPER INC	477	506	536	568	602	638	677	717
203.0	INTEREST EXP	202	210	239	256	236	251	306	342
204.0									
210.0	EARN BEF TAX	2749	2471	3311	3699	423	3416	4779	5526
215.0	INCOME TAX	1210	1087	1457	1628	186	1503	2103	2431
220.0	NET INCOME	1539	1384	1854	2071	237	1913	2676	3094
225.0									
230.0	DIVIDENDS	369	350	445	497	350	459	642	743
280.0	CAP INV - PPE	901	937	972	1008	1043	1079	1114	1150
285.0	CAP INV - TOOLS	601	624	648	672	695	719	743	767
290.0	SALES $	40441	41960	47728	51120	47120	50206	61160	68353
295.0									

CHRYSLER BASIC PROFORMA ASSUMPTIONS

Note: These may have been modified for particular runs. They represent the base case.

1. SG+A = 3.93 x $\sqrt{\text{Sales}}$
2. Pension = .018 x Sales, but not less than last year.
3. MR+R = .031 x Sales
4. Property tax = .018 x Sales, but not less than last year.
5. R&D = .03 x Sales
6. Cost, OTB/unit = .83 x Sales - .05 x change in sales, constrained to ranges of .80 x Sales to .86 x Sales.
7. Foreign units = increase approx. 5%.
8. Common dividend = 0
9. Accounts Receivable = .055 x Sales - 5.
10. Inventory = .132 x Sales + 423.
11. Prepaids = .005 x Sales + 39.
12. Investments = increase 45.
13. Accounts Payable = .085 x Sales.
14. Accruals = .045 x Sales.
15. Emp. Comp. = .015 x Sales.

CHRYSLER BASE ASSUMPTIONS, PLANNED SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
10.0	IND UN SALES-US	15.15	14.58	16.15	16.48	13.29	13.31	16.55	17.90
15.0	MARKET SHARE	11.7	12.0	12.4	12.4	12.4	12.4	12.4	12.4
20.0	CHRYS UN SALES-N	2.02	1.99	2.28	2.32	1.87	1.88	2.33	2.52
25.0	AVG REV/UNIT NA	5767	6055	6358	6676	7009	7360	7728	8114
30.0	TOT REV -NA	11622	12045	14476	15511	13134	13811	18032	20478
40.0	FIXED COSTS								
45.0	SELLING G + A	424	431	473	489	450	462	528	562
50.0	PENSIONS	209	217	261	279	279	249	325	369
55.0	MAINT + REPAIRS	360	373	449	481	407	428	559	635
60.0	PROP TAX + OTHER	209	217	261	279	279	279	325	369
65.0	RES + DEV	349	361	434	465	394	414	541	614
78.0	DEPRECIATION -NA	109	127	147	164	185	198	206	210
81.0	AMORTIZATION	245	330	421	387	404	355	307	258
85.0	FIXED COSTS	1905	2057	2445	2545	2399	2385	2790	3017
87.0									
90.0	OTHER CGS/UNIT	4811	5033	5185	5525	5975	6108	6238	6658
93.0	OTHER COST GDS S	9695	10013	11807	12838	11196	11461	14554	16802
97.0	NAA INC	22	-25	224	128	-462	-35	687	659
100.0									
120.0	NNA UNIT SALES	1.00	1.05	1.10	1.15	1.20	1.23	1.26	1.30
125.0	AVG REV/UN -NNA	5245	5507	5782	6071	6375	6694	7028	7380
130.0	NNA REV	5245	5782	6361	6982	7650	8233	8856	9594
178.0	DEPRECIATION	45	50	54	58	61	63	61	59
181.0	AMORTIZATION-NNA	66	82	105	97	101	89	77	65
197.0	NNA INCOME	26	29	32	35	38	41	44	48
198.0									
199.0	NON AUTO SALES	643	682	723	766	812	861	913	967
205.0	NON AUTO INC	49	52	54	57	60	63	66	69
207.0	NON OPER INC	32	34	36	38	40	43	45	48
208.0	INTEREST EXP	88	93	108	116	108	115	139	155
210.0	EARN BEF TAX	41	-3	238	142	-431	-3	704	669
215.0	INCOME TAX	17	-1	95	57	-172	-1	282	268
217.0	COST FIT ADJUST.	-150	0	0	0	0	0	0	0
220.0	NET INCOME	-125	-2	143	85	-259	-2	422	402
225.0									
229.0	PREF DIVIDEND	27	27	27	27	27	27	27	27
230.0	COMMON DIV	0	0	0	0	0	0	0	0
280.0	CAP INV - PPE	408	459	525	525	525	337	337	337
285.0	CAP INV -TOOLS	392	441	505	505	505	323	323	323
290.0	TOT SALES	17510	18509	21560	23259	21596	22905	27800	31039
295.0									

CHRYSLER BASE ASSUMPTIONS, TREND SPENDING, CYCLE SALES

LINE NO		1978	1979	1980	1981	1982	1983	1984	1985
10.0	IND UN SALES-US	15.15	14.58	16.15	16.48	13.29	13.31	16.55	17.90
15.0	MARKET SHARE	11.7	12.0	12.4	12.4	12.4	12.4	12.4	12.4
20.0	CHRYS UN SALES-N	2.02	1.99	2.28	2.32	1.87	1.88	2.33	2.52
25.0	AVG REV/UNIT NA	5767	6055	6358	6676	7009	7360	7728	8114
30.0	TOT REV -NA	11622	12045	14476	15511	13134	13811	18032	20478
40.0	FIXED COSTS								
45.0	SELLING G + A	424	431	473	489	450	462	528	562
50.0	PENSIONS	209	217	261	279	279	249	325	369
55.0	MAINT + REPAIRS	360	373	449	481	407	428	559	635
60.0	PROP TAX + OTHER	209	217	261	279	279	279	325	369
65.0	RES + DEV	349	361	434	465	394	414	541	614
78.0	DEPRECIATION -NA	112	123	132	139	149	157	165	170
81.0	AMORTIZATION	213	248	277	217	222	227	232	236
85.0	FIXED COSTS	1876	1971	2286	2350	2181	2216	2674	2955
87.0									
90.0	OTHER CGS/UNIT	4811	5033	5185	5525	5975	6108	6238	6658
93.0	OTHER COST GDS S	9695	10013	11807	12838	11196	11461	14554	16802
97.0	NAA INC	51	61	383	323	-244	134	803	721
100.0									
120.0	NNA UNIT SALES	1.00	1.05	1.10	1.15	1.20	1.23	1.26	1.30
125.0	AVG REV/UN -NNA	5245	5507	5782	6071	6375	6694	7028	7380
130.0	NNA REV	5245	5782	6361	6982	7650	8233	8856	9594
178.0	DEPRECIATION	46	48	49	49	49	49	49	48
181.0	AMORTIZATION-NNA	53	62	69	54	56	57	58	59
197.0	NNA INCOME	26	29	32	35	38	41	44	48
198.0									
199.0	NON AUTO SALES	643	682	723	766	812	861	913	967
205.0	NON AUTO INC	49	52	54	57	60	63	66	69
207.0	NON OPER INC	32	34	36	38	40	43	45	48
208.0	INTEREST EXP	88	93	108	116	108	115	139	155
210.0	EARN BEF TAX	70	83	397	337	-213	166	820	731
215.0	INCOME TAX	28	33	159	135	-85	66	328	293
217.0	REALITY PLUG	-150	0	0	0	0	0	0	0
220.0	NET INCOME	-108	50	238	202	-128	100	492	439
225.0									
229.0	PREF DIVIDEND	27	27	27	27	27	27	27	27
230.0	COMMON DIV	0	0	0	0	0	0	0	0
280.0	CAP INV - PPE	271	277	284	290	295	301	308	314
285.0	CAP INV -TOOLS	261	267	272	278	284	290	295	301
290.0	TOT SALES	17510	18509	21560	23259	21596	22905	27800	31039
295.0									

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