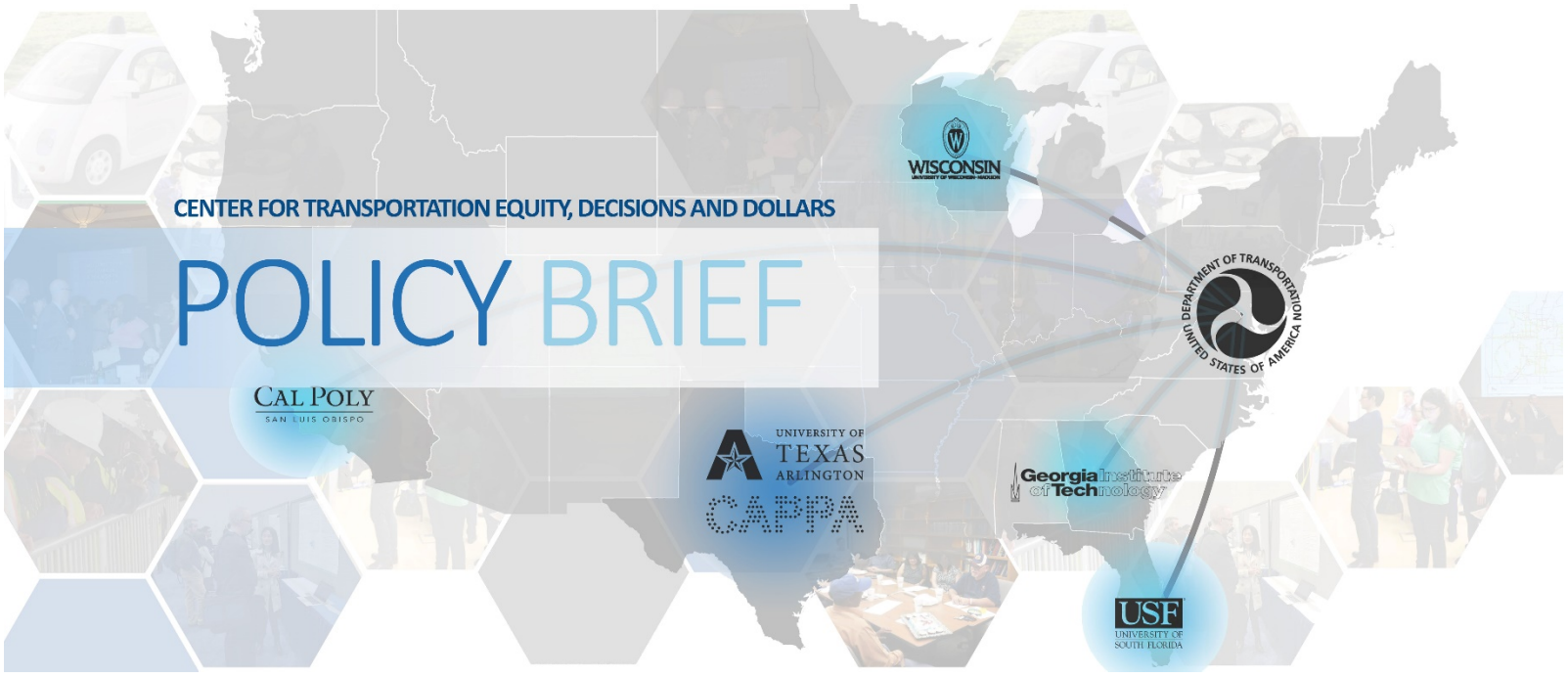

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Overcoming Local Barriers to Regional Transportation: Understanding Transit System Fragmentation from an Institutionalist Framework

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Executive Summary: In this study we trace the development of a transit governance geodatabase for the 200 most populous metropolitan statistical areas in the United States. We use this database to describe thoroughly the metropolitan public transportation systems serving these regions, which include general-purpose local governments, multi-jurisdictional special-purpose governments, public and private transit agencies, and metropolitan planning organizations. From our data, we develop measures of the fragmentation and regionalization of the formal governance of these metropolitan public transportation systems. We discuss national patterns evident in these measures, and we use case studies of four metropolitan statistical areas—two in California, one in Michigan, and one in Texas—to illustrate in more detail the calculation of fragmentation and regionalization.

Our database and governance measures are original contributions to scholarship on public transportation. They can contribute to theory by illuminating longstanding debates on optimal metropolitan governance and by promoting more rigorous analysis of how formal institutional variation affects outcomes in public transportation systems and for individual transit users. They also can impact practice by providing insights to public transportation planners and policymakers about the role of institutions and how those institutions can be adjusted to support transit connectivity through strategic policy interventions. We summarize key contributions and implications in the table below:

Contribution	Impact
Project deliverable: A geodatabase matching the more than 12,000 general-purpose local governments in the 200 most populous metropolitan statistical areas to the transit agencies and MPOs serving them, to governance measures of the funding and implementation of transit planning, and to FIPS codes to promote future research.	Extant research on the effects of variation in the formal institutions of governance on transportation outcomes, found mainly in the European policy integration and U.S. post-ISTEA regional planning literatures, predominantly uses small-*n* research designs with inconsistent institutional measures. Our geodatabase and measures of governance will be able to push broad comparative research that studies institutional effects across metropolitan regions and states. They could also be readily mimicked for any international transportation system characterized by multilevel governance.
Project deliverable: Measures of fragmentation and regionalization taken at the level of the metropolitan statistical area.	
Finding: The number and geography of metropolitan planning organizations and transit agencies could not be significantly explained by the geography of local governments, co-location in a census region or division, or metropolitan socioeconomic characteristics.	To the extent regionalization is found to affect transit outcomes, the institutions underlying it—well-known tools of vertical and horizontal governance—are not consistently promoted or hindered by the regional or state context in which they arise.
Finding: A majority of regions exhibiting high fragmentation also had high regionalization. These clustered in Rust Belt regions that tend to have high interlocal heterogeneity and strong state-local devolution.	As political economists have long suggested, metropolitan governance—rather than government—is feasible, even in regions in which theory would suggest it should struggle.

Introduction:

Connecting people to employment, education, healthcare, and other amenities through public transportation often requires that transit services cross boundaries, from the jurisdictional boundaries between general-purpose local governments to the service area boundaries between transit agencies and even the planning area boundaries of metropolitan planning organizations This is especially true in metropolitan regions, in which the markets for public and private goods and services are rarely contained within a single entity's purview, and in which spatial mismatches are known to be common.

Boundary-crossing often requires coordination among multiple organizations. For example, a regional transit funding scheme may involve participation by multiple local jurisdictions. Connection of fixed routes linking a core city to an outlying suburb may be supported by interagency agreements among transit providers. Through these mechanisms and others, the planning and implementation of public transportation in the organizationally balkanized region could be as efficient, equitable, and effective—if not more so—than that delivered in the region with one or only a handful of organizations. However, we lack the empirical evidence that would help us discern to what extent we can explain systematic variation in transportation outcomes by looking at differences in the formal institutional structure of metropolitan public transportation systems. Are some forms of metropolitan governance better than others?

Answering this question requires, first, measures of governance that can be taken of any metropolitan region, and that can serve as the key explanatory variables in analysis of transportation, and specifically, public transportation, outcomes. The goal of this research project is to develop such measures. We divide the policy brief into four sections. First, we briefly summarize our methods. Second, we discuss general findings about the organization of metropolitan public transportation systems. Third, we review our findings about fragmentation and regionalization. Fourth, we conclude with a summary of the contributions of our research.

Methods:

The metropolitan statistical areas (MSAs) in our study were in 47 of the 50 states. In total, they cover about only 23 percent of the land in the continental U.S., but contain far greater shares of the population and economic activity: 258 million of the nation's approximately 320 million residents in 2015 (more than 80 percent), and about three quarters of the nation's jobs.

All data were collected at the level of the general-purpose local government, which included municipalities and the unincorporated areas of counties, and linked via FIPS codes to TIGER/Esri polygon shapefiles. Data sources included mostly secondary sources (the U.S. Census of Governments, National Transit Database (NTD) (2012), General Transit Feed Specification (GTFS), state statutes and regulations, and organizational bylaws), but also primary collection through a survey of transit agencies to discern the presence of interagency agreements.

We measured fragmentation through principal component analysis of measures of general-purpose local government concentration by population, employment, and area, and counts of state and local governments. We measured regionalization through principal component analysis of a dozen variables chosen based on literature review and pilot testing because they are capable of capturing the full range of formal, institutional variation in vertical and horizontal governance dimensions. Variables reflected the presence of institutions in five areas: (1) *state funding* (does the state government provide funding for transit operations in all or part of the metropolitan statistical area?), (2) *higher-level governing* (does a multijurisdictional transit agency exist that is nested within the state government or whose key decision-making body is primarily state appointed?), (3) *multijurisdictional funding* (does a multijurisdictional funding scheme exist, and is it one in which participation by local units is mandated?), (4) *interagency agreements* (where more than one transit agency serves a region, to what extent are the transit agencies formally connected through interagency agreements about their operations?), and (5) *formal conjunctions* (to what extent do the primary decision-making bodies of key organizations in the metropolitan public transportation system, such as transit agencies and MPOs, have members from other organizations in the region?).

The organization of metropolitan public transportation systems:

The average metropolitan public transportation system in our study has 63 general-purpose local governments, including four counties and dozens of municipalities (such as cities or villages) and/or county subdivisions (such as townships or, in New England, towns), as shown in Table 1. These communities would, on average, be served by three transit agencies, and together these entities would serve 86 percent of the population, 91 percent of the employment market, and about two thirds of the land area of the metropolitan statistical area. The metropolitan statistical area would have a single metropolitan planning organization (MPO), and the MPO would plan and implement policies for a similar in scale to that served by the transit agencies: about 87 percent of the population, 92 percent of the employment market, and 64 percent of the metropolitan statistical area land area.

Metropolitan statistical areas with single transit agency are quite common in our study: 74 of the 200 have this attribute. Even within this group, there is remarkable heterogeneity. Sometimes these single agencies are nested in a municipal government and serve only that local jurisdiction, such as Amarillo City Transit, which serves about half the Amarillo, Texas population—more than 136,000 people—simply by serving the City of Amarillo. In other regions a single agency can serve dozens of municipalities. The Rochester, New York MSA has 133 local jurisdictions, and 120 are served by one transit agency. The vast majority of the 200 metropolitan statistical areas —154—have a single metropolitan planning organization (MPO), while at the other extreme the Boston-Cambridge-Newton

metropolitan statistical area has nine. The single MPOs serve most of the population (87 percent) and jobs (92 percent) in their metropolitan statistical areas, despite only serving about two thirds of their region's areas on average.

The average transit agency in the 200 most populous metropolitan statistical areas in the United States has a service area of 933 square miles that reaches to 760,000 residents and 376,000 jobs. Despite this seemingly large size, the average transit agency service area still only captures 27 percent of the regional area, containing 39 percent of its residents and 43 percent of its jobs. This means that most transit agencies—88 percent—are in a region in which they are not the only public transportation provider. The fourteen transit agencies that have the most residents and jobs in their service area—which of course do not necessarily have the greatest ridership—are not surprisingly in the three most populous MSAs: New York-Newark-Jersey City, NY-NJ-PA; Los Angeles-Long Beach-Anaheim, CA; and Chicago-Naperville-Elgin, IL-IN-WI. The two largest transit service areas by size are both found in Riverside-San Bernardino-Ontario, California: the portion of the multi-MSA Southern California Regional Rail Authority in that MSA and Victor Valley Transit Authority both have service areas greater than 20,000 square miles, and another 18 transit agencies serve areas of at least 5,000 square miles. Again, this does not mean that the entire area has accessible access to transit, but simply that an organization exists in the governance structure of the region with some level of purview over a very expansive area.

Transit agencies do not reach to every local jurisdiction. Of the 12,569 in our study, 6,132 are not formally part of any transit agency service area, owing to the low-density suburban and sometimes rural character of parts of MSAs. About 37 percent (4,689) are served by just one. The remaining 1,748 are served by multiple transit agencies, most often a combination of an agency nested within the local government and a regional service. Twenty three local units are served by five or more transit agencies, and all but eight of these are in Los Angeles-Long Beach-Anaheim and San Francisco-Oakland-Hayward MSAs.

The geographies of transit agencies, MPOs, and local governments do not strongly correlate. The MSA with the most general-purpose local governments by raw count is New York with well over 600, and it also has numerous transit agencies (fifteen) and MPOs (five). However, the metropolitan statistical area with the most transit agencies—Los Angeles has only 124 and is highly concentrated at the county level with just two counties. Pairwise correlations provide strong evidence that the organizational types are poorly associated with one another (i.e., having more local governments would not be highly predictive of having more transit agencies and MPOs). The correlation between transit agencies and local jurisdictions is only 0.40, and is only 0.41 between MPOs and transit agencies and 0.36 between MPOs and local jurisdictions.

Fragmentation and regionalization:

As seen in Figure 1 (below), higher than average fragmentation scores occur in those metropolitan statistical areas in the Northeast, Midwest, and Southeast. This is consistent with the literature on variation in state systems of local government, and gives us some confidence in our fragmentation index. States in these parts of the country tend to have (or had) liberal incorporation laws, strong local autonomy through home rule and enabling statutes that make incorporation attraction, and limitations on annexation and consolidation that might allow for the erasure of boundaries over time. The paradigmatic small suburban jurisdiction is a creature of these laws, as is—by extension—the polycentric, sprawling conurbation with a landlocked core city. Because the fragmentation index is driven in large part by HHI concentration measures using population, employment, and area shares, we would expect older Rust Belt metropolitan regions—the metropolitan statistical areas for Chicago, New York, Pittsburgh, Cincinnati, St. Louis, Minneapolis, and their ilk—to rank especially high, and they indeed do. In the Southeast, the driver of fragmentation is the abundance of counties and the existence of large areas of unincorporated land for which the county is the only general-purpose local government. Atlanta's 29 counties—plus a core city that had become bound in by growing suburbs over whom annexation could not be readily exercised—allow it to stand out in this part of the country.

Fragmentation in Metropolitan Public Transportation Systems in the United States (2018)

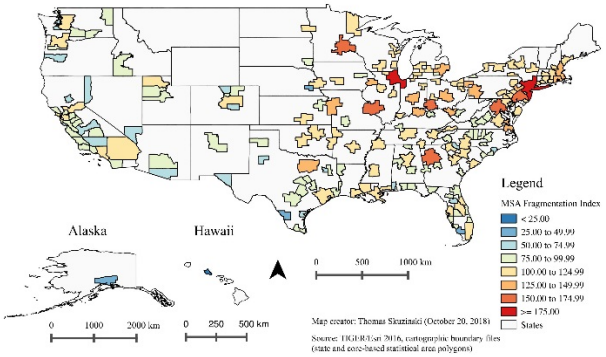

Figure 1

Many of those metropolitan statistical areas that are the most fragmented are also among those that perform above average on the regionalization index, which reflects mechanisms of both vertical and horizontal regionalization of governance (see Figure 2). But this is not universally true, and it is not the case that a strong correlation exists between fragmentation and regionalization. Many of the west coast regions, for example, are at best mildly fragmented, but have institutions of governance in place that would suggest even this weak fragmentation has been overcome to a larger degree than in other regions. Several regions in the heartland are relatively highly fragmented, and lack boundary-spanning or boundary-mitigating institutional arrangements that would indicate they have a regionalized system.

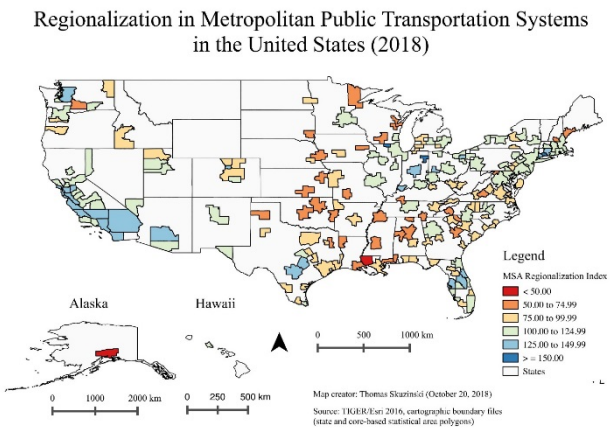

Figure 2

By isolating those metropolitan statistical areas that score above average on fragmentation, we can show more clearly those that are also above average on regionalization—a result that speaks to the capacity of some metropolitan public transportation systems for regional governance—and those that score below average on regionalization in which the institutional contexts largely reifi**es** their fragmented structure. In Figure 3 (below), the Rust Belt regions are highlighted for their ability to mostly overcome, at least in theory, their potential boundary problems. Of the 103 regions with higher than average fragmentation, 58 (56 percent) also exhibit higher than average regionalization, supporting the proposition that boundary-spanning governance can occur within metropolitan areas in policy domains that are regional in scale. Of these, 37 were located in the Rust Belt, a region roughly including the East North Central and Middle Atlantic census divisions (see Figure 3).

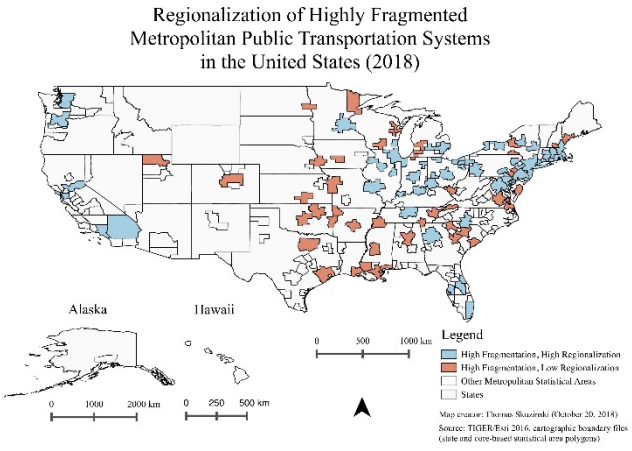

Figure 3

Lastly, we present a scatterplot in Figure 3 that is mean-centered and sorts MSAs based on their degree of fragmentation (higher than average versus lower than average) and degree of regionalization (higher than average versus lower than average). In the upper right quadrant are MSAs with high fragmentation and high regionalization. This includes many of those in California and Florida which are sprawling regions with many municipalities but also have large county-level transit agencies, and many of the Rust Belt regions which have extreme fragmentation but also frequently have state-level transit governance.

Figure 4

The upper left quadrant has those MSAs with high fragmentation but low regionalization. For many of these regions, high percentages of the populations or areas of these regions are not served by any transit agency at all, due to the fact that they allow jurisdictions to opt out of participation in transit agencies. For example, much of the St Louis (36.6% of the population), Detroit (27.6%) and Dallas (41.9%) live in jurisdictions lie outside the service area of a transit system, a reality traceable to municipalities' ability to opt out of transit services and/or funding in these states. State governments have been largely absent in many of these cases, too, including in efforts to cross state boundaries through interagency agreements or other institutions.

Summary of contributions:

Our research fills three gaps. The first is functional. We became aware through initial exploration of secondary sources that no comprehensive, contemporary database exists about metropolitan public transportation systems. A key product of our work, therefore, is a geographic information system with polygon shapefiles containing the general purpose local governments, transit agencies, and metropolitan planning organizations for the 200 most populous metropolitan statistical areas in the United States, with the general purpose local governments as the base unit. Because each unit has a federal information processing standards (FIPS) code, it can be linked to all the data available through the census at this geographic level. We hope this will be of use to those studying public transportation from an institutional perspective, as well as many other researchers working outside this perspective.

The second is theoretical. Scholars of the urban and metropolitan condition—found in public administration, political science, planning, public policy analysis, and other disciplines—have for decades debated the optimal approach to governing the many public services and goods provided in America's large conurbations. Some view fragmentation as an inherently problematic condition that inevitably supports inefficiency, segregation, polarization, and civic apathy. The policy recommendation flowing from this viewpoint is to have a regional government whose boundaries are consistent with the territorial scale at which these problems arise. Others, working from a political economy perspective, regard the fragmented metropolis as a promising geography, in which ad hoc cooperation and collaboration can be used to scale governance as appropriate to the need. Regional government is not necessary, in this view, because regional governance can function just as well when it is needed. Neither of these views is specific to any particular policy area, but rather to decision making in general. Our measures of governance will allow us and other researchers, in subsequent work, to gather evidence about which of these forms is significantly better at delivering truly metropolitan public transportation. Is regional governance enough to deliver regional transportation? If not, which policy interventions can help improve the form and function of regional governance?

This latter question is at the heart of the third gap our measures can help fill in future work: to understand, if possible, the formal institutional mechanisms at work in those metropolitan regions with high-performing public transportation systems (regardless of the dimension chose to measure performance), and those that are lacking in low-performing ones. Formal institutions—which range from regulations and bylaws to contracts and memoranda of understanding—are a useful target of study because they are socially constructed and can be targeted by policy interventions. We are not interested in the governance of metropolitan public transportation systems as a structure to be described but as something from which we can gain insights and advance positive change.