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The Social and Fiscal Consequences of Urban Decline: Evidence from Large American Cities, 1980–2010

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Abstract

We examine the fiscal consequences of sustained population loss in American cities. We find the starkest difference between growing and declining cities in their levels of social and economic distress: Declining cities have higher rates of poverty and crime. Our evidence also suggests that shrinking cities have less fiscal capacity than growing cities, although this relationship is complicated by an apparent nonlinearity: Shrinking and rapidly growing cities both have less fiscal capacity than high-demand cities that grow slowly. Lastly, both high distress and low fiscal capacity appear to predict further population loss. Together, our evidence suggests that population loss may both increase social problems and decrease the resources available to solve them, and that declining cities may enter vicious cycles that perpetuate further decline.

Keywords

urban decline, poverty, public finance, shrinking cities, fiscal capacity

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Introduction

In 1950, 1.8 million people lived in Detroit; in 2013, 700,000 did. At different times in their histories, Buffalo, New York; Cleveland, Ohio; and Youngstown, Ohio, were among America's largest and wealthiest cities. Since 1950, Buffalo has lost 55% of its population, Cleveland 56%, and Youngstown 61%. Almost 20 other U.S. cities have had similar fortunes, steadily losing people and jobs while most cities gained both.

What happens to once-large cities that continuously shrink? This question has surprisingly few answers. Scholars have devoted considerable attention to decline's causes (Rappaport 2003), and the question of how cities should respond to decline is one of the oldest in academic urban planning (Bradbury, Downs, and Small 1982; Orfield 2002; Rusk 1999; Storper and Manville 2006). The question of how decades-long population loss affects the social and fiscal fabric of central cities, however, has received less empirical attention. Certainly some research has examined decline's impact on particular places. The fall of Detroit, for example, has been extensively documented (e.g., Galster 2014; McDonald 2014). Detroit's decline led to both more social need and less fiscal capacity; problems accumulated even as the city lost the ability to solve them. This process compounded itself—left unaddressed, the problems worsened, more people left, and revenue shrank—and culminated in a full-blown fiscal crisis, with an insolvent government presiding over a disproportionately impoverished citizenry. Yet while Detroit is often held up as an archetype of decline, it is only one city, and may be an outlier. Relatively little research uses many cities, over long periods of time, to measure the association between population loss and fiscal stress, and to examine the implications of that relationship for the residents of declining cities.[1]

This article attempts to fill that gap, using data on 110 large American cities from 1980 to 2010. Following Ladd and Yinger (1989), we view fiscal stress as having two components: fiscal capacity, which is the potential to raise own-source revenue (essentially the size of the tax base), and social and economic distress (poverty, crime, and so forth), which are factors that increase expenditures. As capacity falls or distress rises, fiscal stress increases. We measure capacity and distress separately, and isolate each one's independent association with population loss. We also control, to the extent we can, for the likely two-way causality between urban decline and fiscal stress. Population loss may create social and fiscal problems, but these problems might in turn encourage people to leave, creating more population loss.

Our examination yields four main findings. First, capacity and distress vary inversely with each other: Less fiscal capacity is accompanied by more

distress. Cities with more social problems have fewer resources to solve them, and cities with fewer resources have more social problems. Second, population loss is associated with less fiscal capacity, but this association is not entirely straightforward. In descriptive data, population loss is clearly accompanied by less capacity, but in our regression analysis the relationship becomes more ambiguous, and sensitive to how fiscal capacity is measured. We believe this ambiguity stems from a nonlinear relationship between capacity and population change; both shrinking cities and fast-growing cities have smaller tax bases than a subset of cities that grow slowly because they are strictly zoned—places where many people want to live but where regulation makes entry difficult.

Third, the largest and clearest difference between growing and declining cities lies in their levels of distress: Population loss consistently predicts higher poverty and more crime, while population gain consistently predicts less. Thus even if declining cities had fiscal capacities equal to those of growing cities, declining cities would still suffer more fiscal stress, because for any given level of capacity they have much more need. Last, both high distress and low fiscal capacity appear to predict further population loss, suggesting that declining cities may enter vicious cycles that perpetuate further decline.

Our findings speak to ongoing discussions about solutions for shrinking cities. A longstanding debate in urban policy revolves around the efficacy of place-based policies designed to "bring back" declining places. Economists in particular tend to oppose such approaches, arguing that economic development should be person-based, targeting people rather than places. A typical recommendation, for instance, is to give people in declining cities direct cash transfers, which might let them move out, rather than give firms outside the cities tax incentives to lure them in (e.g., Glaeser 2007). Governments should not try to make declining places grow, but should help residents who wish to leave depart for places with more opportunity.

Our results do not contradict this argument, but they do complicate it. Person-based policy allows out-migration, and out-migration can help those who leave. But out-migration also inherently implies more decline. This decline, by exacerbating social and fiscal problems, can make it more difficult for cities to provide essential services for the often-vulnerable people who stay. Our results thus suggest a strong need for place-based intergovernmental aid to declining cities, not to restore them to their former size, but to help them provide basic public services as they shrink.

Our results also suggest that many high-demand places may have strong fiscal incentives to discourage in-migration, and to use zoning to keep their population growth low and their property values high. Such actions blunt the

promise of purely person-based economic development efforts. The benefits of leaving a declining place depend in part on the ability to enter a growing one, but if the path to fiscal prosperity involves restricting the arrival of new people, then person-based solutions to decline may not achieve their full promise.

Population Change and Public Finance

Much of the recent literature on urban decline (which we define here as population loss) examines why it occurs. At the risk of oversimplifying a vast body of research, central city population loss often begins with some factor outside the city itself, such as the decline of a larger region, the advent of new technologies, or the loss of core industries. In the decades after World War II, automobiles, highways, and air conditioning all encouraged Americans to leave the cold and dense cities of the Northeast and Midwest, sometimes for the warmer climes of the Sunbelt and sometimes for the spaciousness of the nearby suburbs. These factors were compounded by falling manufacturing employment—itself a consequence of changes in technology, trade policy, and labor law—that deprived many cities of their industrial base (Baum-Snow 2007; Moretti 2012; Rappaport 2003).

A second stream of decline literature is situated in the broader context of economic development: When cities shrink, what should policy makers do? The answers offered range from revitalization—extensive efforts to reverse population loss—to "smart decline" strategies that emphasize adapting to a smaller future (Hollander and Németh 2011; (Pallagst et al. 2009; Pallagst 2007; Schilling and Logan 2008). As mentioned above, critics often attack revitalization for being ineffective, and for wrongly prioritizing places over people (e.g., Glaeser 2005; Glaeser and Gottlieb 2008).[2]

In this article, we follow a related but somewhat different course, and examine the consequences of population loss: why it causes problems to begin with. Our investigation therefore bears less resemblance to the contemporary literature on shrinking cities and more resemblance to an older literature on urban decline, and to a related body of work on the relationship between poverty and urban public finance. This work was prompted by the urban crisis of the late 1960s and 1970s, and the high-profile insolvencies of New York and Cleveland that resulted (Bradbury, Downs, and Small 1982; Clark and Ferguson 1983). While much of this work also dwelled on decline's causes,[3] some of the authors involved also observed that decline might set in motion a self-reinforcing process of weakened finances, increased distress, and further population loss.

Bradbury, Downs, and Small (1982) advanced this idea, but Paul Peterson (1981) discussed it first and most fully, in *City Limits*. *City Limits* was not about population loss specifically, but instead drew connections between poverty, public finance, and population change. Peterson argued that poverty burdens city governments because local officials have the strongest political and moral motivation to redistribute income, but—compared with other levels of government—the least fiscal means to do so. As a city becomes poorer, more of its voters might want or need redistribution, and the plight of the poor will be more visible to its elected officials. Yet local governments are ill-suited to redistribute income. Income redistribution requires higher taxes, and higher local taxes are relatively easy to avoid (a tax-averse city resident can simply move to a nearby suburb). Thus localities that tax their affluent residents to help their poor might encourage out-migration more than they raise revenue, and might encourage more poor people to arrive even as they chase away the rich.

For this reason, most theories of public finance suggest that national, not local, governments should redistribute income. Because it is harder to leave a nation than a city, national taxes are less likely to distort location decisions. National leaders, however, face less political or moral pressure to redistribute income, because from a national capital the poor as a group are distant and small. Only 15% of Americans are poor, compared with 36% of Clevelanders. City leaders are confronted with more poverty, more often, and face larger political consequences for ignoring it. They may also be aware that if they do not redistribute, redistribution overall may be underprovided (Peterson 1981).

In these circumstances, population loss could trigger a series of events that burden urban finances. The city's tax base could shrink: As people and firms leave, property becomes less valuable and other sources of revenue (such as sales and payroll) contract as well. The city's expenses, however, will not fall as rapidly as the population or tax base, because its fixed costs remain. Even with fewer people, the city must maintain the same network of roads, pipes, and other infrastructure, and may still keep a large labor force, if public employment contracts make shedding workers difficult. The shrinking tax base thus forces the city to choose between two bad options: Try to raise the same amount of revenue, which means higher tax rates, or raise less revenue and let the quality of public services decline. Either choice could encourage more people to leave.

These problems arising from the shrinking tax base will be compounded if population loss also increases the city's poverty rate. Decline might increase poverty rates for three reasons. Higher-income people might be more likely to leave (to avoid higher taxes or worsening services); lower-income people might be less likely to leave (because they have fewer options, and moving

has high out-of-pocket costs); and lower-income people might be more likely to arrive. This last factor results because housing prices fall with population and property values, and cheaper housing makes the city disproportionately attractive to poorer residents (Downs 1997; Glaeser and Gyourko 2005).

Increased poverty compounds the weakened tax base in two ways. If more poverty encourages the city to redistribute income, it could erode the tax base further, by accelerating the arrival of lower-income people (drawn to the redistribution) and accelerating the departure of higher-income people (fleeing higher taxes whose revenues are spent on people other than themselves).

Poverty can also increase public spending. As poverty rises, many public services—not just those explicitly related to social service and redistribution—become more expensive. Pack (1998) and Gyourko (1997) both showed that poorer cities spent more not just on redistribution but overall, and particularly on police, fire, and correctional services such as courts and jails. Poverty can increase nonredistributive spending because residents both consume and produce many public services: Service quality is determined not just by public effort in the form of tax dollars but private effort in the form of resident spending and behavior. When private residents have less money, public authorities must spend more. A public dollar spent on fire protection, for example, goes further in a city of occupied and well-kept houses with functioning smoke detectors than it does in a city with many vacant homes prone to ignition. Similarly, a dollar of police protection might accomplish more in a densely populated city with "eyes on the street," and a dollar of schooling might be more effective in affluent places where students do not fear for their safety and receive proper nutrition at home. If affluence lets residents enhance the quality of public services (as it probably does), then any desired public service outcome will require more public spending as poverty rises. If cities cannot or will not increase that spending, the quality of services will fall.

In sum, population loss might harm city finances by reducing the city's tax base (reducing fiscal capacity), changing the demographic composition of its residents (increasing distress), or some combination of both. Any of these consequences could encourage more population loss. It is these relationships—between decline, fiscal capacity, and distress—that we examine.

We emphasize that these ideas are not new; our contribution lies in examining them econometrically over a long period of time. The decline studies of an earlier generation, while pathbreaking, occurred when decline was more common. The authors of these studies examined decline over shorter periods, and generally examined its social and fiscal consequences only descriptively. For instance, both Bradbury, Downs, and Small (1982) and Clark and Ferguson (1983) studied cities from the mid-1960s to the mid-1970s. Decline

was the norm during this time: In the 1970s, 97 of the 153 cities with population more than 100,000 were shrinking. Decline today is much less prevalent. Only 21 of the country's largest cities have lost population continuously since 1980, and we know relatively little about the impacts of such long-term loss. This is the gap we hope to fill.

Data and Method

Efforts to compare fiscal capacity and distress across cities, and to measure their association with population change, confront five empirical problems. Although these problems overlap, we discuss each separately. The first problem is one of government structure. Comparing city finances can be difficult, because state governments differ in how they allow cities to collect revenue, and local governments differ in how they apportion taxing and spending authority across jurisdictions. California allows local governments to levy sales taxes, while Massachusetts does not. Only 15 states let local governments tax income, while more than 40 states restrict local fiscal autonomy with Tax and Expenditure Limitations (TEL) that vary in scope and stringency. And so on.

This state-level heterogeneity is compounded by local-level variance. In some cities schooling is a municipal expenditure carried out by the city government, while in others it is financed by independent school districts. In some cities, county governments assume more responsibility for corrections and human services, while in others, the responsibility falls on cities themselves. And in some places these responsibilities migrate from one local government to another over time. Cities might take on bigger or smaller roles in financing courts, schools, or other services.

In sum, to receive the services they demand, city residents pay different types of taxes to their different local governments: city governments, school districts, counties, and so on. In the large cities we study, on average, general purpose city governments only collect about 60% of the local taxes levied on city residents, and account for only about 50% of the local spending that cities residents receive.[4] Comparing cities across place and time thus requires controlling for this variety in both tax instruments and local governments. Failing to do so, and simply examining the revenue and spending patterns of cities themselves, would create a misleading impression of the services available to city residents, the tax revenue available to finance those services, and the burden placed on residents when that revenue is raised. Comparing cities that finance their own schools to cities that have independent school districts, for example, might suggest that taxing and spending is lower in the latter group, because its residents would appear to neither pay for nor receive schooling.

Table 1. Property Tax Bills and Effective Property Tax Rates on a USA$150,000 Residential Property, Select U.S. Cities, 2013.

	Tax Bill	Effective Tax Rate	Per Capita Income
Bridgeport, CT	6,143	4.10	USA$19,754
Detroit	4,988	3.46	14,464
Philadelphia	4,437	3.32	21,902
Milwaukee	4,113	2.74	19,077
Buffalo	3,289	2.19	19,963
Newark	3,279	2.19	16,174
Houston	2,843	1.90	27,328
Chicago	2,311	1.54	27,979
Minneapolis	2,237	1.49	31,616
Phoenix	1,438	0.96	23,637
Boston	175	0.12	33,565

Source. Minnesota Center for Fiscal Excellence, with Lincoln Institute for Land Policy (2014).

Such a conclusion would be incorrect. Residents of both Boston and Los Angeles pay for schools, but Bostonians pay their city government while Angelinos pay their independent school district. Both sets of citizens, however, bear the burden of school taxes and receive the benefit of schooling.

A second and related problem lies in measuring fiscal capacity. Fiscal capacity is the city's *potential* to raise revenue, and potential is hard to observe. While it may be intuitive to think that cities collecting more revenue have more fiscal capacity, simply measuring the revenue cities raise can be deceptive, because it does not control for voter preferences and tax effort. Voters differ in the quality and quantity of public services they demand, and cities in response to these demands might tap more or less of their fiscal capacity. If cities raise large amounts of revenue by heavily taxing a small base (through high rates or high assessment ratios), their large revenue collections might conceal low fiscal capacity. In contrast, fiscally healthy cities might raise relatively low amounts of revenue per capita but have ample flexibility, through their large tax bases, to raise more.

What evidence exists suggests that tax effort varies greatly across cities, and that it varies inversely with income. Table 1, using 2013 data from the Minnesota Center for Fiscal Excellence, illustrates this phenomenon. From a USA$150,000 residential property, Detroit raises 28 times as much revenue as Boston, but not because Detroit is richer or in better fiscal health.[5] To the contrary, Boston's per capita income is more than double Detroit's. Rather, Detroit taxes that property at a rate 29 times higher than Boston. Precisely

because Boston has a bigger tax base, it can tax less heavily (specifically, it offers a homestead exemption of more than USA$125,000—rendering most of the USA$150,000 home's value untaxed). Conceivably we could account for this problem by explicitly controlling for tax rates and homestead exemptions, but systematic data on rates and exemptions, especially going back decades, do not exist.

Furthermore, because we are interested in how population loss impacts fiscal capacity, comparing per capita revenue metrics could be misleading, as declining cities are losing population and therefore have smaller denominators. A shrinking city's per capita revenues might reflect not its many resources but its fewer people. Obtaining an accurate picture of fiscal capacity requires measuring the tax *base*, not simply tax revenue.

The third problem lies in measuring the community's distress—the poverty-related conditions that can require excess spending. Just as revenue collected may not reflect actual capacity, so too might revenue expended not reflect actual need. A city with low per capita poverty expenditures could have few people in poverty, but might also have more needs going unmet, either because it has low fiscal capacity or because its voters will not tolerate higher taxes. High levels of expenditure, similarly, could represent high levels of need, high levels of generosity, inefficiency and waste, or some combination of all three. For this reason, it is more reliable to directly measure levels of social and economic distress, rather than the money spent in response to it.

The fourth problem, to paraphrase Glaeser and Gyourko (2005), is that growth may not be decline's mirror. While population loss might harm city finances, it is not clear that population growth always helps them. Specifically, cities that grow rapidly might not fare as well fiscally as some cities that grow more slowly. If this is the case, then linear regressions measuring the relationship between population change and fiscal stress might yield incorrect results.

Why might such a nonlinear relationship between population change and fiscal capacity exist? Cities with growth pressure can respond in two ways. If they add housing, their populations will increase but their average incomes may not. When housing supply keeps pace with demand, housing prices will appreciate only slowly, the cost of entering the city will not change, and new residents will not have incomes much higher than existing residents.

If cities react to growth pressure with stricter zoning, however, the demand to live in the city will manifest as higher housing prices instead of more people (Glaeser and Gyourko 2003). Would-be residents will compete for the limited existing housing stock and bid up its price, making entry into the city more expensive and making new residents (those who win the bidding war for housing) likely to have higher incomes on average than existing residents. Housing values and per capita incomes will rise, and these higher incomes

and housing prices in turn lead to more fiscal capacity (the tax base is larger) and less distress (a smaller share of the population is likely to be poor). As such, slow-but-positive growth could yield better fiscal health than rapid growth.

Table 2 illustrates this phenomenon. The table's first three rows compare Las Vegas, Detroit, and Boston—archetypical examples of explosive urban growth, urban decline, and urban rebirth. When the 1980s began, Detroit and Boston had both been shrinking for decades, and neither city was affluent. Indeed, Boston's per capita income was not much higher than Detroit's, and both cities had lower per capita incomes than Las Vegas, which had been growing rapidly.

In the next three decades, however, the three cities followed very different trajectories. Detroit continued to decline, and both its population and income fell, by 41% and 24%, respectively. Boston, in contrast, reversed its fortunes and joined Las Vegas by beginning to grow. But it grew differently than Las Vegas. Boston is zoned restrictively,[6] so its growth manifested not as population (which rose only 7%) but income (which rose 62%). Las Vegas, meanwhile, continued its rapid population growth (a 255% increase from 1980–2010) but its income did not grow at all.

The same patterns are evident in housing prices. From 1980 to 2010, the real value of a median owner-occupied house in both Detroit *and* Las Vegas grew 27%. (Because this comparison is for owner-occupied housing, it is somewhat deceptive. Detroit's vacancy rate also grew substantially, and many of its vacant homes are almost worthless, e.g., Knowles 2013.) In Boston, meanwhile, median home value grew 265%. Thus where Las Vegas more than tripled its population but saw only modest growth in housing prices and no growth in income, Boston saw only modest growth in population but more than tripled its housing values and substantially increased its income. Boston and Las Vegas, by growing, both fared better than Detroit. But, conceivably, Boston, in growing *less* than Las Vegas, fiscally fared best.

This nonlinear relationship is further complicated by an additional wrinkle: Slow growth is not *uniformly* associated with more fiscal capacity. Slow-growing cities themselves fall into two categories: those that grow slowly because few people want to live in them, and those that (like Boston) have many would-be residents, but also have high housing costs that keep population growth in check. Only in the latter group of cities—those with high demand and high barriers to entry—will slow growth be associated with higher incomes and home values.

Table 2's final rows show this distinction, using population, income and home value statistics for Tulsa and Des Moines. These two cities had 1980–2010 population growth closest to Boston's. Boston grew 7% over this

Table 2. Growth in Population, Median Home Values, and Per Capita Income, Select U.S. Cities, 1980–2010.

City	% Population Change 1970–1980	1980			2010			Percent Change 1980–2010		
		Population	Home Value	Income	Population	Home Value	Income	Population	Home Value	Income
Las Vegas	31	164,674	USA$196,731	USA$24,434	584,641	USA$251,300	USA$24,360	255	28	0
Detroit	−20	1,203,339	USA$63,074	USA$18,667	759,340	USA$80,400	USA$14,118	−37	27	−24
Boston	−12	562,994	USA$108,127	USA$19,688	602,609	USA$395,200	USA$31,856	7	265	62
Des Moines	−5	191,003	USA$125,547	USA$23,542	202,095	USA$117,600	USA$24,096	6	−6	2
Tulsa	9	360,919	USA$137,261	USA$26,544	388,247	USA$117,000	USA$26,069	8	−15	−2

Source. U.S. Census.
Note. All dollars 2010.

period, Des Moines 6%, and Tulsa 8%. Yet where income per capita grew 62% in Boston, it rose only 2% in Des Moines, and fell 2% in Tulsa. Similarly, while Boston's home values grew astronomically, home values in both Tulsa and Des Moines fell. And in absolute terms, incomes and home values are far lower in Des Moines and Tulsa than Boston. Thus slow growth alone cannot predict socioeconomic outcomes or fiscal health. Indeed, while some of the country's highest-income cities grew between 0% and 20% between 1980 and 2010, so too did some cities with low incomes and housing values. Because the middle of the population growth distribution contains cities with very large and very small tax bases, regressions that assume a linear relationship between population change and fiscal capacity might be misleading.

The final empirical problem, which we mentioned earlier, is that population, distress, and fiscal capacity may be endogenous to each other. Population loss might increase distress and reduce fiscal capacity, but if this in turn leads to higher tax rates and/or lower-quality services, then higher distress and lower fiscal capacity might in turn trigger more population loss.

We address these five problems in the following ways:

Controlling for Overlapping Governments and Measuring Fiscal Capacity

We resolve the problem of government structure through two considerations: First, we are specifically interested in how population change influences fiscal capacity—how growth or decline affects the size of the tax base. Second, our interest in declining cities is ultimately rooted in a concern about the well-being of their people. Detroit's finances matter to us primarily because they have implications for Detroit's residents—they suggest the government's ability to deliver services residents need, and the burden residents must bear to pay for those services. Put another way, we want to know how decline affects the underlying resources that Detroit's local governments have to finance schooling, safety, and other local services, and we are less concerned about which local governments (city, county, or school district) actually access those resources.

Given these considerations, the best approach to the problem of heterogeneous government structure is to essentially assume it away. Much like Ladd and Yinger (1989), we impose a condition of "uniform fiscal institutions" on our data, and treat all cities as though they could tax and spend identically. Doing so lets us compare the fiscal capacities of growing and declining cities: to ask, in essence, how much own-source revenue each city *could* raise, if legal and political structures were not an obstacle.

An obvious criticism of this approach is that it in the real world, legal and political structures *are* an obstacle. These structures can help or hamstring cities' efforts to finance services. Undoubtedly public finance looks different in cities that can use more tax instruments, or in cities where the general purpose government does not compete for the tax base with counties or school districts. But these differences are largely irrelevant to our inquiry. Different government structures can influence how local governments raise and spend money, and which governments do so, but they do not change the city's underlying fiscal capacity (the size of its tax base). Furthermore, their presence and influence are largely independent of whether the city is growing or shrinking.

Boston, for example, finances a dependent school system, cannot raise more than 2.5% of its total assessed value in taxes, and cannot levy sales or income taxes. Philadelphia has a city sales tax and a city income tax, but shares its property tax base with an independent school district. These differences are important in many ways, but they are not results of growth or decline. The same laws that prevent a growing Boston from taxing sales today also prevented a shrinking Boston from doing so in 1975, and we have little reason to think city growth or decline causes these state laws to change. More important, these laws do not reflect differences in fiscal capacity as we define it. State constraints create differences in the legal ability to *access* the tax base, not differences in the *size* of the tax base itself. And it is the size of the tax base—fiscal capacity—that we want to compare across growing and declining cities.

We create uniform fiscal institutions in two ways. First, when we descriptively examine city spending and revenue, we use the Lincoln Institute for Land Policy's Fiscally Standardized Cities (FiSC) data set (Lincoln Institute for Land Policy n.d.). FiSC provides public finance data for the largest 112 central cities. We use 110 of these cities and build a data set with observations from 1980, 1990, 2000, and 2010.[7]

Important for our purposes, the FiSC standardizes its public finance variables across cities, and assigns all local taxing and spending that occurs within a city's borders to the city itself. Thus data for Philadelphia include not just the taxing and spending of the city of Philadelphia, but also the taxing and spending of its independent school district, and the portion of county taxing and spending that occurs in Philadelphia's city limits. The FiSC thus allows valid comparisons both across different cities (e.g., those with independent school districts and those without), and within the same cities over time (e.g., if responsibility for some services moves from the city to county, or vice versa). The assumption underlying the FiSC, to use an old public finance adage, is that "money mingles"—citizens want certain services, they

will pay up to a certain amount for those services, and the identity of the government they pay for those services is of secondary importance. Put another way, this logic assumes that if a city's independent school district ceased to exist, the city government would collect the district's revenue and spend it on education. We consider this assumption reasonable—no city resident's total tax payment or services received would change—and also necessary, if we are to make valid comparisons across places and years.

While the FiSC helps account for the variety in local government structure, it does not account for tax effort (the fact that places with weak bases can tax at higher rates) or state-level variance (the fact that some local governments are restricted, legally or politically, in how much revenue they can collect). As such, FiSC data, while useful descriptively, are not reliable guides to fiscal capacity. We therefore do not use FiSC data to measure fiscal capacity, and indeed in measuring fiscal capacity we avoid taxing and spending data altogether. Instead we directly measure each city's primary tax bases. We describe this approach below.

Measuring Fiscal Capacity

Ladd and Yinger (1989) in their seminal study of urban finance, observed that all fiscal capacity ultimately springs from income, because someone's income is the source of all tax revenue. This observation led them to use per capita income as a measure of urban fiscal capacity. Using income, however, could understate the role of tax exporting: Depending on both the choice of tax instruments and the composition of the metropolitan area, some share of a city's taxes will be paid by nonresidents. Sales taxes, which often fall on nonresident shoppers, are an obvious example, but taxes on payroll and commercial property might be paid in part by nonresident employees and customers, and many cities raise revenue through taxes that fall primarily on visitors (e.g., hotel and rental car taxes). The more a locality can export taxes, the less accurate its per capita income will be as a metric of fiscal capacity. Because the extent of tax exporting depends on the share of the city's workers, shoppers and property owners who live outside its borders, Ladd and Yinger adjusted each city's per capita income to account for its share of the metropolitan population, as well as the share of its workers who lived outside the city. The adjustments they make, however, are difficult to replicate with today's data, and some are (by their own admission) fairly arbitrary.

Eggers (2007) developed a second approach to measuring fiscal capacity, which directly estimates the size of a city's primary tax bases. Specifically, this approach estimates the value of owner-occupied and rental housing (the residential property tax base); total commercial payroll (the base for

commercial property taxes and other fees); total individual income (the base for income taxes and most user charges); and total retail sales (the sales tax base). Estimating each base avoids both the tax exporting problem and the problem of heterogeneous government structure. It yields a measure of each city's potential tax revenue regardless of where those who would pay the taxes reside, and regardless of which local government levies the taxes.

We follow Eggers's approach, and use data from the 1982–2007 Economic Censuses (taken every five years), as well as the 1980–2000 Decennial Censuses and the five-year American Community Survey, to estimate each city's fiscal capacity. At the time of writing, city-level data from the 2012 Economic Census had yet to be released, so for our 2010 estimates, we match 2010 Census data with aggregate commercial payroll and retail sales data from 2007. This approach is not ideal, as it matches employment and sales data from the prerecession peak with property values from near the trough of the postrecession crash. This mismatch may influence our results, particularly since some evidence suggests that the recession's largest impacts on local finances came from lost sales tax revenue rather than lost property value (Lutz, Molloy, and Shan 2011). (We address this potential problem later in the analysis by estimating panel regressions.)

Table 3 shows how we construct the fiscal capacity variable. Essentially, for each city we measure each tax base and then apply a constant tax rate to it. We generate this constant tax rate by estimating average national tax rates for each of the four years we examine (1980, 1990, 2000, and 2010), and then taking the mean of those tax rates. For example, we estimate a constant local income tax rate by calculating, for each year, the ratio of total local income tax revenue (from the Census of Governments) to total national household income (from the Decennial Census). We take the average of these four ratios, 0.003, and apply it to the aggregate income of each city in the sample. This calculation yields, for each city, an estimate of its income tax revenue if all cities could tax income and did so at the same rate.[8]

Similarly, to estimate the potential revenue from residential property, we first calculate a constant residential property tax rate. We compute, for each year, the national ratio of total real estate taxes paid to the aggregate value of housing stock, which we then average over the four years in our study, yielding a rate of 0.01. We apply this both to a measure of the owner-occupied housing tax base (aggregate home values in each city) and to a measure of the rental property tax base. We build this latter measure by taking Census estimates of total gross rent and applying an average national capitalization rate (the ratio of income to asset value) for multifamily structures of 11.76, as reported by Freddie Mac (Guggenmos et al. 2015). For retail sales, we calculate a constant local sales tax rate of 0.02 by averaging the ratios of national

Table 3. Construction of Fiscal Capacity Measure.

Operation	Variable	Rate	Description and Source	Tax Base
	Aggregate property value	0.01	Aggregate value of owner-occupied housing. Census/ ACS	Owner-occupied property tax
+	Aggregate income	0.003	Aggregate annual income. Census/ ACS	Local income tax
+	Aggregate rent	11.76 × .01	Aggregate asking rent. Census/ACS	Rental property tax
+	Aggregate payroll	0.05	Total payroll, all industries. Economic Census	Commercial property tax
+	Aggregate retail sales	0.02	Total rental sales. Economic Census	Sales tax
=	**Total potential revenue**	—	Sum of value, rent, payroll, and sales	
/	Population	—	Total population. Census/ACS	
=	**Per capita revenue**	—	Total potential revenue divided by population	
/	Average government wage	—	Average annual government wage. BLS	
=	**Fiscal capacity**	—	Spending power (in government labor) of average person's tax contribution	

Source. Method drawn from Eggers (2007).
Note. ACS = American Community Survey; BLS = Bureau of Labor Statistics.

local sales tax revenue from the Census of Governments to total national retail sales from the Economic Census. Finally, for the commercial property tax base, we follow Eggers (2007) and apply a rate of 0.05 to total payroll. Payroll is an imperfect proxy for the commercial tax base, but it does suggest the value of commercial property in a jurisdiction.

Having adjusted and summed the estimated tax revenues from each tax base for each city, we divide the result first by each city's population, and then by the average local government wage (from the Bureau of Labor Statistics). Using wages as the ultimate denominator lets us control for local variation in the cost of providing services. The final number—our fiscal capacity variable—can be interpreted as the share of a city worker's annual salary that could be covered by the average resident's tax contribution, if all cities taxed their entire base at

a uniform rate. Put another way, the variable shows, controlling for effort, how much government service (as measured by government labor) each city could provide per person. In our sample, Salt Lake City, Utah, has the largest fiscal capacity, at 0.06. This number suggests that Salt Lake City could provide the equivalent of 6% of a full-time government employee per person, if all cities taxed their full base at uniform rates. The lowest fiscal capacity (0.007) was in Columbus, Georgia. Consistent with Ladd and Yinger's contention that capacity is mostly a function of income, the simple correlation between our capacity measure and city per capita income is 0.7.

One broad argument against this measure is that, again, it ignores the different legal constraints cities face in actually tapping their tax bases. As we describe above, however, for our purposes this omission is a feature, not a bug. Our concern is the size of the base, not the ability to access it. We want to isolate the relationship between population change and the tax base, and holding government structure constant lets us do so. A narrower and more valid concern is that this measure could overestimate fiscal capacity in declining cities, as it shows how much government labor cities can provide per person, and declining cities have fewer people. To address this possibility, we build a second estimate of fiscal capacity, which measures how much government labor cities could require per square mile of *land*. This metric is identical to the one above, except the penultimate denominator is the city's land area rather than its population. Arguably this measure of capacity is better. Measuring land-based capacity avoids the denominator problem created by per capita measures, and accounts for the reality that land is the city's most permanent attribute. Land defines the city as a political entity, defines the area over which it must deliver service, and defines its tax base. All potential tax revenue in a jurisdiction springs from the value of activities occurring on its land.

The city with the largest land-based fiscal capacity is densely developed and property-rich New York, whose fiscal capacity of 891 suggests it can finance the equivalent of almost 900 city employees per square mile.[9] Anchorage, Alaska, has the lowest land-based fiscal capacity: By our estimate, it can finance seven employees per square mile. Flint and Detroit, Michigan, can pay for 51 and 81 employees per square mile, respectively, while Boston can finance 586. The correlation between income and this measure of fiscal capacity (0.4) is smaller but nevertheless strong. In our analysis, we use both the person-based and land-based metrics of fiscal capacity.

Measuring Distress

Just as fiscal capacity might ultimately spring from income, so too might distress, and its resulting demand for redistributive spending, ultimately

spring from poverty. A larger share of low-income people could both increase demands for municipal services and make those services more expensive to provide. The precise mechanism by which poverty might increase expenditures is difficult to parse, because poverty is often associated with other factors, such as crime, vacancy, and abandonment, that can also require more spending. In our sample, the simple correlation in 2010 between the poverty rate and the violent crime rate is 0.6, while the correlation between violent crime and housing vacancy is 0.5. Again following Eggers (2007), we use factor analysis to create a single measure of social and economic distress. Factor analysis is appropriate for this task because it reduces collinear variables to their common correlation, and creates a single measure explaining this common variation (Kline 1994).

The index is built primarily on the overall poverty rate, the childhood poverty rate, and the elderly poverty rate—all from the U.S. Census. We also include the housing vacancy rate: Vacancy is often correlated with poverty, and vacant housing may require more attention from cities if it is more prone to vandalism, fire, crime, or collapse (Accordino and Johnson 2000; Ahrens 2009). Last, we add property and violent crime rates, from the Federal Bureau of Investigation's (FBI) Uniform Crime Reporting Series.[10]

The factor analysis creates a standardized measure of distress whose mean is 0, and assigns cities positive or negative values that represent their distance from that sample average. Cities with positive scores have more distress than cities with negative scores. In 2010, our index shows that Fremont, California, has the lowest level of distress (−2.42), while Flint, Michigan, has the highest (2.75). We attempted a number of alternative specifications for the factor analysis, but found little variation across models. Poverty is consistently the factor with the highest weighting; in 2010, the simple correlation between the overall poverty rate and the distress index was almost 1.

Addressing Nonlinearity and Endogeneity

We control for nonlinearity by replacing, in some of our regressions, a linear population change variable with binary variables that indicate population loss and rapid growth (we discuss these more below). Endogeneity is a more difficult problem to resolve. Because we use panel regressions and linear time-series regressions that compare jurisdictions to themselves over time, we should be able to control for any endogeneity arising from omitted variables. We are less able to isolate, however, the extent to which distress, fiscal capacity, and population loss simultaneously determine each other. It is possible, for instance, that a regression analyzing fiscal capacity might attribute some variance to population loss when in reality this variance begins with levels of

Table 4. Social and Economic Characteristics of Declining and Growing Cities, 1980 and 2010.

	Sustained Population Loss (*N* = 21)			Net Population Gain (*N* = 80)		
	1980	2010	% Change	1980	2010	% Change
Population	447,349	344,508	−23	431,611	592,436	37
Land area (sq. mi.)	79.1	80.5	2	151.7	184.1	21
Density	5,698	4,427	−22	3,711	4,256	15
Housing units	181,753	166,544	−8	176,765	249,711	41
Median house value	96,613	101,933	6	161,515	245,170	52
Vacancy	5.2%	22.4%	330	4.5%	11.3%	151
Per capita income	19,504	19,515	0	22,707	26,723	18
Poverty rate	0.19	0.27	46	0.14	0.18	29
Share Black	0.36	0.48	31	0.14	0.17	18
Share w/BA or higher	0.12	0.21	71	0.20	0.58	196
Structure fires	[a]	8.3	[a]	[a]	5.3	[a]
Property crime	8,337	5,176	−38	8,246	4,407	−47
Violent crime	1,282	1,174	−8	932	707	−24
Murder	25	25	1	15	7	−52

Source. U.S. Census and ACS, FBI Uniform Crime Reports, Department of Homeland Security/U.S. Fire Administration.
Note. Crimes are reported per 100,000 population. Fires are reported per square mile. Total *N* for fire data is 89 (13 declining cities and 66 growing). All dollars 2010. BA = Bachelor's degree; FBI = Federal Bureau of Investigation.
a. No data available.

distress that lead to population loss. The total effect may roughly be the same, but some particular associations may be in error. There is little to be done about this issue beyond being transparent about it. Absent persuasive instruments, which we could not identify, our coefficient sizes should be interpreted with some caution.

Results: Social and Fiscal Differences in Growing and Declining Cities

We now examine 110 of the largest central cities in the United States. From 1980 to 2010, these cities on average grew 33%, although some cities shrank by more than 40% (Gary, Indiana; New Orleans), while others grew more than 200% (Bakersfield, California; Las Vegas). Tables 4 and 5 present summary statistics drawn from these cities along a number of measures of social

Table 5. Revenues and Expenditures in Declining and Growing City Governments, 1980–2010.

	Sustained Population Loss (N = 21)			Net Population Gain (N = 80)		
	1980	2010	% Change	1980	2010	% Change
Property tax revenue per capita	802	1,033	29	741	1,288	74
Property tax share of general revenue	23%	19%	−17	25%	27%	6
Charges & misc. rev. per capita	620	1,169	89	638	1,231	93
Sales tax revenue per capita	153	367	140	225	396	76
Individual income tax revenue per capita	223	310	39	23	34	47
Own-source revenue per capita	1,855	3,024	63	1,686	3,059	81
Own-source revenue burden	0.12	0.23	92	0.12	0.17	42
City share of MSA employment	42%	28%	−32	49%	45%	−8
Intergovernmental revenue per capita	1,657	2,681	62	1,300	1,775	37
Intergovernmental share of total revenue	47%	47%	0	44%	39%	−11
General expenditure per capita	3,455	5,756	67	2,887	4,866	69
Debt per capita	2,936	7,758	164	3,272	7,380	126
Poverty expenditures per capita	435	661	52	319	587	84
Poverty expenditures per poor person	2,557	2,424	−5	2,672	3,911	46
Annual freeze-thaw cycles	61	62	2	43	39	−9
Annual snowfall (inches)	38	44	16	13	15	15
Fiscal capacity (population)	0.024	0.026	8	0.028	0.036	29
Fiscal capacity (land area)	129	111	−14	125	139	11
Distress index	0.56	1.22	66	−0.25	−0.34	−9

Source. Lincoln Institute for Land Policy FiSC, U.S. Census, NOAA, Authors' calculations.
Note. All dollars 2010. FiSC = Fiscally Standardized City; MSA = Metropolitan Statistical Area; NOAA = National Oceanic and Atmosphere Administration.

and fiscal health. Each table shows sample means in 1980 and 2010, as well as the percent change between those years. The table includes 101 cities, and

divides them into two categories: cities that have lost population in every decade from 1980 to 2010 ($N = 21$) and cities that have grown over the same time ($N = 80$). We omit, for the moment, six cities that lost population overall, but grew in at least one decade between 1980 and 2010. We do so only for simplicity: Including these cities in the shrinking category does not substantively change the larger story.

Table 4's first rows show how population loss might erode a local tax base. In declining cities, population fell 23% on average from 1980 to 2010, while in growing cities it rose 37%. Crucially, however, the physical form of declining cities changed less than their population. Growing cities gained land area (by 21% on average) but declining cities did not *lose* land area (land area grew a statistically insignificant 2%, staying essentially unchanged). Because land area did not fall with population, density did: Where density rose an average of 15% in growing cities, it fell 22% in declining cities. Similarly, because housing is durable—housing units do not disappear when people leave—declining cities lost people faster than housing. While on average growing cities added housing faster than population (41% to 37%), in declining cities housing units fell 8%, while population fell almost three times that much.

This disappearance of people and persistence of structures has two consequences. First, growth in occupied housing value slows. Where the median value of owner-occupied housing rose 52% in growing cities, it grew only 6% in declining cities. Second and perhaps more important, excess housing in declining cities creates more vacancy. Vacancy is correlated with lower property values, and thus with a smaller property tax base. Vacancy grew in both growing and declining cities from 1980 to 2010 (likely due to the foreclosure crisis of the late 2000s) but grew much faster in cities that shrank. In 1980 vacancy was only modestly higher in declining than growing cities, but by 2010 the average vacancy rate in declining cities had quadrupled, to become twice that of growing cities.

Decline is also, as Table 4's remaining rows show, associated with increased distress. From 1980 to 2010 per capita income increased 18% in growing cities but remained flat in declining cities. Poverty, meanwhile, grew much faster in declining cities, despite starting at a higher base. By 2010 the mean poverty rate in declining cities was 27%, compared with 18% in growing cities. African-Americans tend to be poorer than Americans at large, and the share Black in declining cities, already sizable in 1980, grew 31%. In 2010, declining cities were on average 48% African-American, while growing cities were only 17%. Disparities in educational attainment were also large. In growing cities 58% of adults held bachelor's degrees in 2010, compared with just 21% in declining cities, and growing cities added educated adults much faster than declining cities.

The table's final rows show that declining cities are on average more dangerous than growing cities. Data from the U.S. Fire Administration, which were available for 89 of our 110 cities, show that in 2010 declining cities averaged 8.3 structure fires per square mile, compared with only 5.3 such fires in growing cities. Crime rate differences between declining and growing cities are larger still. Property crime declined nationwide between 1980 and 2010, but fell less in declining cities than growing cities (38% compared with 47%) despite starting at a higher level. Violent crime also fell nationwide from 1980 to 2010, but fell three times as fast in growing cities as declining cities, despite starting at a higher level in declining cities. Murder, which is considered the most accurate proxy for violent crime because it is most likely to be reported, remained essentially unchanged in declining cities, even as it fell 52% in growing cities. In 2010 the average murder rate in declining cities was more than triple that in growing cities.

Do these socioeconomic differences translate into fiscal differences? The upper rows of Table 5 show revenue and spending trends across growing and declining cities. Recall that these are FiSC data, and thus show all local revenue and spending that occurs within city limits, not just revenue and spending carried out by the general purpose city government. For purposes of comparison, we show similar data restricted to general purpose city governments in the appendix. An additional caveat is that because these are revenue and expenditure data, they may reflect differences in tax effort and not be reliable guides to fiscal capacity.

Consistent with the idea that a shrinking population might harm the property tax base, per capita property tax revenue grew over four times as fast in growing places as in declining places, and in 2010, governments in growing cities collected more than USA$250 more per capita from property taxes than governments in declining cities. Property tax revenue did grow in absolute terms in shrinking cities, which may be a result of increased tax effort. Local governments can set both the rate and the base of property tax—raising rates, delaying reassessments, and adjusting assessment ratios—and this flexibility lets them increase revenue even when property values are low (Lutz et al. 2010). Governments in declining cities may have followed this path. At the same time, declining city governments also decreased their overall reliance on the property tax. The tax's share of general revenue in declining city governments fell 17% between 1980 and 2010, while it grew 6% in growing cities.

Property tax revenue accounts for much of the gap in overall revenue collections between governments in growing and declining cities. When we look at other revenue instruments, the differences between growing and declining cities are noticeably smaller. A caution here is that while every government in

our sample taxes property, not all governments are legally allowed to use all other revenue tools. Nevertheless, governments in both growing and declining cities dramatically increased their reliance on user charges between 1980 and 2010, although use of these charges grew faster, and revenue from them was slightly higher, in growing cities. Sales tax revenues per capita, in contrast, grew almost twice as fast in declining cities as growing cites, although in absolute terms sales tax revenue was still larger for governments in growing cities.

Perhaps the biggest difference in revenue between growing and declining city governments lies in their relative use of income taxes. Only 15% of all U.S. local governments tax income, but governments in declining cities are overrepresented in their ranks. Twelve of the 21 declining cities had income tax revenue in 2010, compared with only 6 of 80 growing cities. We draw no causal inference here. Decline might lead to more income taxation (if cities tax income to compensate for falling property values), income taxes might lead to decline (if they encourage firms and people to leave the city), or some combination of both—or the correlation might be spurious. Whatever the reason, governments in declining cities raised on average USA$310 per resident in income tax, while growing cities raised only USA$35. In part this difference reflects many cities not taxing income at all, but even if we only compare places with income taxation, governments in declining places still raise more income tax revenue than governments in growing places (USA$571 per capita, compared with USA$498).[11] The income tax is thus the only revenue instrument for which declining city governments raise more in absolute terms than governments in growing cities.

Once we account for nonproperty tax revenue sources, the difference in total own-source revenue between growing and declining cities is only about USA$35 per capita, much less than the USA$250 per capita difference in property tax revenue. Differences in revenue burdens, however, are much larger, because the declining cities are much poorer. The own-source revenue burden—total own-source revenue per household as a share of median household income—almost doubled in declining cities, and is substantially higher (0.23 to 0.17) in declining than growing cities. And while some own-source revenues are raised from nonresidents (e.g., some sales taxes and user charges), declining cities have less ability to export their tax burdens. Growing cities on average hold 45% of their Metropolitan Statistical Area (MSA) employment, while declining cities have only 28%.[12]

Unsurprisingly, governments in declining cities rely more on intergovernmental aid. Intergovernmental aid is often endogenous to population change. Criteria for aid vary across states and programs, but in general cities receive aid based on their populations, their levels of poverty and distress, and the

size of their local tax base (National Conference of State Legislatures n.d.). Per capita intergovernmental revenue increased more in declining than growing cities, and by 2010 growing cities relied less on such aid than they had in 1980.[13]

Despite raising less money, governments in declining cities on average spent almost USA$900 per capita more than governments in growing cities, and carried slightly more debt. Climate may explain some of this extra spending. Population loss is more common in colder areas of the country, and each year declining cities average 60% more freeze-thaw days—days where the high and low temperatures straddle the freezing point—than growing cities. Such days often heavily damage roads and other infrastructure, and thus require more spending. Declining cities also have, on average, three times the snowfall of growing cities, and snowfall can burden municipal budgets through road damage and overtime for plowing and repairs (e.g., Luhby 2010). These statistics actually understate snowfall differences between declining and growing cities, because Anchorage, Alaska, is a growing city and gets more than 70 inches of snowfall per year. More than 30 of the 80 growing cities average no annual snowfall at all.[14]

But weather cannot account for all the spending differences. Consistent with Pack (1998), governments in declining cities (which have higher poverty rates) spend more per capita on both direct poverty expenditures (public welfare, health, and hospitals) and overall. Notably, however, declining city governments spend less on poverty per *poor person*. Where poverty expenditures per poor person increased 46% from 1980 to 2010 in growing cities, they fell 5% in shrinking cities, and in 2010 declining cities spent on average almost USA$1,500 less per poor person than growing cities, suggesting that their greater share of poor people might make their redistribution larger but also less generous.

These data, in sum, suggest real disparities between growing and declining cities. Because these are revenue and expenditure data, however, for reasons we have described above they reflect tax effort and may be inaccurate to actual levels of capacity and distress. To address this possibility, the bottom rows of Table 5 show our fiscal capacity and distress measures, which are not drawn from revenue and expenditure data.

Examining these metrics suggests that the differences between growing and declining cities are more substantial than revenue and spending data alone suggest. While per capita own-source revenue in declining cities is only 1% smaller than in growing cities, per capita fiscal capacity is 40% smaller. Between 1980 and 2010, population-standardized fiscal capacity grew 8% in declining cities, but more than three times as fast in growing cities, despite growing cities starting at a higher level. Differences in land-based fiscal

capacity are even larger: By this measure, declining cities on average *lost* 14% of their fiscal capacity, while growing cities gained 11%. In other words, if all cities taxed identically and at the same rate (meaning no cities were constrained by state laws, and declining cities could not compensate for less capacity with more tax effort), declining cities would raise far less revenue than growing cities.

As large as this gap in capacity is, the largest difference between growing and declining cities lies in their levels of distress. The distress index started higher in declining cities and got substantially worse—it more than doubled—while in growing cities distress started low and on average fell. By 2010 distress levels in declining cities were more than three times those in growing cities.

Distress, Capacity, and Decline: Econometric Evidence

We now present simple regressions testing the idea that population loss is associated with less fiscal capacity and more distress. We first present linear regressions examining changes across the entire 1980–2010 period, then present panel regressions examining decade-by-decade changes. Our sample is 110 large U.S. cities.

Table 6 shows the results of five linear regressions that examine three dependent variables: fiscal capacity in 2010, distress in 2010, and population change between 1980 and 2010. The independent variables in each regression are the initial (1980) conditions of the dependent variable, and the dependent variables of the other regressions. Thus when we analyze fiscal capacity in 2010, our independent variables are fiscal capacity in 1980, the percent change in population from 1980 to 2010, and the distress index in 2010. Similarly, when we analyze the distress index in 2010, the independent variables are the distress index in 1980, fiscal capacity in 2010, and the percent change in population from 1980 to 2010. When population change is the dependent variable, we use the level of population change rather than its percent change, and control for initial population. Furthermore, because we expect fiscal conditions to influence population change over the long run, in this regression we also use fiscal capacity and the distress from 1980, not 2010, as predictors. All the regressions are parsimonious, as two of our main variables are composites of multiple measures.

Three results stand out immediately. First, the regressions consistently suggest that fiscal capacity and distress vary inversely with each other: More poverty, crime, and vacancy are associated with a smaller tax base and less potential revenue. Second, initial conditions matter: Distress in 1980 predicts

Table 6. Associations Between Population Change, Fiscal Capacity, and Distress, 110 Large U.S. Cities (OLS Regressions).

	Distress Index	Fiscal Capacity	Fiscal Capacity	Distress Index	Population Change
	2010	2010	2010	2010	1980–2010
% Change population, 1980–2010	−0.6017***	−0.0077***			
	(0.1176)	(0.0019)			
Distress index, 2010		−0.0069***	−0.0059***		
		(0.0010)	(0.0011)		
Fiscal capacity, 1980		0.5700***	0.5021***		7,254,000**
		(0.1283)	(0.1282)		(24,620)
Distress index, 1980	0.4544***			0.4362***	−5.961e+04***
	(0.0642)			(0.0588)	(16,312.9860)
Fiscal capacity, 2010	−37.5251***			−29.6218***	
	(5.1157)			(5.1708)	
Continuous population loss, 1980–2010			−0.0032	0.6835***	
			(0.0027)	(0.1548)	
Population growth >40%, 1980–2010			−0.0083***	−0.4650***	
			(0.0020)	(0.1235)	
Population, 1980					0.1425***
					(0.0020)
Constant	1.5024***	0.0217***	0.0246***	1.0653***	1.683e+05*
	(0.1890)	(0.0035)	(0.0037)	(0.2126)	(71,889.7960)
N	110	110	110	110	110
R^2	.66	.38	.41	.71	.36
F	69.1	23.3	18	65.2	20
Dependent variable (*M*)	0.00	0.035	0.035	0.00	93,448
Dependent variable (*SD*)	0.98	0.011	0.011	0.98	195,612

Note. Standard errors in parentheses. Mean percent population change from 1980 to 2010 is 34%. Standard deviation is 53%. OLS = ordinary least squares.
*$p < .05$. **$p < .01$. ***$p < .001$.

distress in 2010, and capacity in 1980 predicts capacity in 2010. Third, population loss is associated with more distress. In the first equation, the coefficient on population change is large and statistically significant, and suggests that a 1 percentage point increase in population is associated with a 0.6 percentage point reduction in distress. Put another way, the model predicts that, holding other factors constant, a city losing 30% of its population between 1980 and 2010 would have a distress index of 0.38, while a city growing by 40% would have a distress index of −0.4. To give this some context, in our

sample the average poverty rate is 22% in cities with 2010 distress indices between 0.35 and 0.45, and the violent crime rate is 818 per 100,000 residents. In contrast, the average poverty rate is 16% for cities where the distress index is between −0.5 and −0.4, and the average violent crime rate is 699 per 100,000 residents. Thus substantial population loss is associated with a marked downturn along a number of important social indicators.

The second equation, however, yields a counterintuitive result: Population growth is associated with *less* fiscal capacity, meaning—by extension—that population loss is associated with more. This result contradicts our initial hypothesis that decline would erode fiscal capacity. But the finding may be an artifact of two issues. First is the use of a person-based rather than land-based fiscal capacity; we address this potential problem in the next set of models. Second is the potential nonlinearity we discussed earlier: Slower-growing places might have more capacity than both shrinking places and fast-growing places.

To examine this latter possibility, the third equation replaces the linear population change variable with two binary variables: a variable set to 1 if the city lost population in every decade between 1980 and 2010 and 0 otherwise, and a variable set to 1 if population grew more than 40%, and 0 otherwise. The results suggest that nonlinearity is, in fact, an issue. Compared with moderate levels of population gain, both consistent population loss *and* large population increases are associated with less fiscal capacity. Only the latter coefficient is statistically significant: The population loss coefficient is statistically insignificant and economically small. This lack of significance might result from the high variance in the middle of the population change distribution, which includes both rich and poor cities. Whatever the reason, the most counterintuitive finding from the previous regression—a positive and statistically significant association between decline and capacity—disappears.

Does a similar nonlinearity exist between population change and distress? The fourth equation tests this idea, and yields an important distinction between distress and fiscal capacity. Where both fast growth and continuous decline seem associated with less fiscal capacity, only fast growth is unambiguously associated with less distress. Continuous decline, in contrast, is strongly associated with more distress.

The final equation shows that high levels of distress and low levels of capacity are both associated with slower population growth. The unstandardized coefficient in this equation is difficult to interpret, since it predicts the population change associated with a shift in fiscal capacity from 0 to 1—a massive jump that is both outside the range of our data and likely outside the realm of possibility (a fiscal capacity of 1 implies a city that could fund the equivalent of one government employee for every resident). Interpreted

within our sample, however, the model implies that places with less capacity and more distress will grow more slowly, and will sometimes shrink. The regressions suggest that a city with fiscal capacity of 0.012 in 1982 would lose 17,000 people by 2010 (although the confidence interval around this prediction includes 0, so the city might simply not grow), while a city with a fiscal capacity of 0.04 would gain more than 18,000 people, all else equal. Similarly, a city of 100,000 people and fiscal capacity of 0.03 is predicted to add only 4,000 people over the next 30 years if its initial distress index is 1 (**a**nd the confidence interval on that prediction suggests the city could lose population as well) while a similar city with an initial distress index of 0 would gain 60,000 people, and a third with an index of −0.4 would gain 87,000. Such predictions should, of course, be interpreted with caution, but they suggest the extent to which low capacity and high distress are associated with less growth.[15]

Table 7 repeats the analysis of Table 6, but uses the land-based fiscal capacity measure rather than the per capita measure. The results tell essentially the same story, and in some ways provide stronger evidence for our hypotheses. Population loss, and particularly continuous decline, still has a large and statistically significant association with distress, and distress and fiscal capacity remain negatively associated with each other. In these models, however, the counterintuitive relationship between population loss and fiscal capacity disappears. Population loss becomes associated with less fiscal capacity, not more, and when we control for nonlinearity this association is statistically and economically significant. The regressions suggest that declining cities can pay for the equivalent of 92 government employees per square mile of land, controlling for other factors, while growing cities can pay for 165 employees. The fastest-growing cities, however, can pay for only 126 employees per square mile, reinforcing the idea that slow growth can be more fiscally beneficial than both decline and fast growth. Last, the model predicts that declining cities will have a distress index of 0.8, controlling for other factors, while fast-growing cities have one of −0.3. Once again we see that distress, not capacity, is the biggest difference between growing and declining cities. And once again we see that where lower fiscal capacity is associated with both fast growth and continuous decline, only continuous decline is associated with more distress.

Thus far we have only analyzed the 30-year change between 1980 and 2010. In one sense this approach is appropriate, as long-term decline is our primary interest and changes in city finances would be more evident over longer durations. However, ending in 2010 also introduces potential bias, because in 2010, many cities were still suffering from the Great Recession, and because our fiscal capacity variable in 2010 contains some prerecession

Table 7. Associations Between Population Change, Fiscal Capacity (Land), and Distress, 110 Large U.S. Cities (OLS Regressions).

	Fiscal Capacity	Distress Index	Fiscal Capacity	Distress Index	Population Change
	(Land) 2010	2010	(Land) 2010	2010	1980–2010
% change population, 1980–2010	−14.6076	−0.6816***			
	(15.5132)	(0.1410)			
Distress index, 2010	−42.7320***		−30.4800***		
	(8.0881)		(8.5625)		
Fiscal capacity (land), 1980	1.8993***		1.8898***		−731.2348**
	(0.1079)		(0.1003)		(256.6760)
Distress index, 1980		0.4796***		0.4448***	−69,400***
		(0.0759)		(0.0661)	(15,922.3628)
Fiscal capacity (land), 1980		−0.0013**		−0.0009	
		(0.0005)		(0.0004)	
Continuous pop. loss, 1980–2010			−39.2182*	−0.4338**	
			(15.3436)	(0.1426)	
Pop. growth >40%, 1980–2010			−72.6481***	0.9657***	
			(19.7260)	(0.1638)	
N	110	110	110	110	110
R^2	.765	.525	.800	.637	.358
F	115.27	39.02	104.73	46.06	19.74
Dependent variable (*M*)	151	0.00	151	0.00	93,448
Dependent variable (*SD*)	141	0.98	141	0.98	195,612

Note. Standard errors in parentheses. Mean percent population change from 1980 to 2010 is 34%. Standard deviation is 53%. OLS = ordinary least squares.
*$p < .05$. **$p < .01$. ***$p < .001$.

data from 2007. To address these potential problems, in Table 8 we estimate panel regressions that measure the impact of population change decade-by-decade across the sample. These regressions measure the absolute change in population, and control for the initial population in 1980, which leaves us with 330 observations.

In general, these regressions confirm the results above: Population loss is both predicted by and predicts distress, and distress and capacity vary inversely with each other. These regressions are linear, so the counterintuitive relationship between population change and fiscal capacity again materializes, although the relationship is only statistically significant when controlling for land area. The coefficients are somewhat smaller than those in the previous regressions, which makes sense given that these models estimate

Table 8. Associations Between Population Change, Fiscal Capacity, and Distress, 110 Large U.S. Cities (Panel Regressions).

	Fiscal Capacity	Fiscal Capacity	Distress	Population Change	Population Change
	(Population)	(Land)	Index	(Thousands)	(Thousands)
Population change (absolute)	−0.0000	−0.1979***	−0.0011**		
	(0.0000)	(0.0517)	(0.0004)		
Distress index	−0.0045***	−17.5590**		−26.4830***	−25.1352***
	(0.0007)	(6.6012)		(4.8450)	(4.3977)
Population 1980 (000s)	0.0000	0.0837***	0.0001	0.0451***	0.0561***
	(0.0000)	(0.0104)	(0.0001)	(0.0054)	(0.0059)
Fiscal capacity (population)			−19.4442***	−613.3342	
			(3.3962)	(434.4618)	
Fiscal capacity (land)					−0.1672***
					(0.0420)
Constant	0.0308***	91.9494***	0.5597***	26.7845	23.8943***
	(0.0009)	(10.2870)	(0.1361)	(14.5008)	(6.6200)
N	330	330	330	330	330
R^2					
Within	.08	.16	.07	.02	.05
Between	.19	.27	.25	.46	.50
Overall	.16	.25	.22	.32	.35
Dependent variable (*M*)	0.030	123	0.00	31.1	31.1
Dependent variable (*SD*)	0.006	43	0.381	45.7	45.7

Note. Standard errors in parentheses. Estimated as random effects regressions—Hausman tests validate use of random rather than fixed effects.
*$p < .05$. **$p < .01$. ***$p < .001$.

average associations across and between cities for changes of only 10 years, rather than 30. Nevertheless, the regressions suggest that a 10,000 person increase in population within and between cities is associated with a 1 percentage point reduction in the distress index, while a 1 unit increase in the distress index is associated with a 24,000 person decrease in population over the decade.

Conclusion

In 1926, Lewis Mumford declared that America's greatest urban problem was its cities' ceaseless growth (Mumford 1926). Many cities today continue to grow, and their growth does present challenges. But contemporary urban

policy also confronts a problem that Mumford may have found unimaginable: once-large cities that continuously shrink.

We have shown that shrinking cities suffer more fiscal stress than growing cities. We see fiscal stress as having two parts: a lower potential to raise revenue (reduced fiscal capacity) and more social and economic problems (increased distress). Cities that lose population over long periods have much more distress than growing cities. Indeed, the great difference between growing and declining cities lies in their rates of poverty, and in the prevalence of social problems, like crime and vacancy, that often travel in poverty's shadow. Shrinking cities spend more on poverty than growing cities, but are able to spend less per poor person.

We find evidence that declining cities also have less fiscal capacity—fewer resources available to help solve their social problems—but this evidence is more ambiguous than the evidence linking decline with distress. The ambiguity appears to result not from population loss increasing fiscal capacity, but from a nonlinear relationship: Slow-growing, affluent cities have larger capacities than both shrinking and fast-growing cities. When we control for this nonlinearity, decline's association with reduced fiscal capacity becomes stronger.

Last, our evidence suggests that low levels of capacity and high levels of distress predict lower levels of population growth. Population loss may create social problems and erode city finances, and these problems may in turn exacerbate population loss.

Further research can shed more light on the precise relationships between decline, distress, and fiscal capacity. To the extent our findings are broadly correct, however, they suggest that as cities lose population, their social problems rise while the resources available to solve those problems fall. Moreover, because our findings control for government structure, they suggest that this problem runs deeper than state laws that constrain some cities' ability to spend and tax. Our analysis shows that even if all cities taxed their entire tax base at identical rates, declining cities would still lag behind growing cities, because their tax bases are smaller and their needs greater.

This situation reinforces arguments for place-based intergovernmental aid to declining cities. This assistance should not involve star-crossed efforts at revitalization, nor other attempts to restore cities to their former size and glory. Rather it should help declining cities provide basic services while they shrink. Person-based assistance that lets people leave declining cities has many advantages, but the same out-migration that can offer some residents better lives elsewhere may compound problems for those who remain. Moreover, the nonlinear relationship between population change and fiscal capacity suggests that fiscally strong cities may not welcome lower-income

migrants from other places. If affluent cities protect their tax bases by regulating the entry of the less affluent, the efficacy of purely person-based approaches to economic development will be blunted. State and national governments, in their urban policy, do not owe growth to any city, and attempts to conjure growth out of decline may be futile in any case. But it is in the interest of higher levels of government to ensure that every city can provide schooling, health, and safety to its citizens. If decline saps cities of that power, higher levels of government should intervene.

Appendix

Revenues and Expenditures of Unstandardized (General Purpose) Cities

Table 5 in the body of this article presents descriptive statistics on revenue and expenditures. The table uses standardized metrics that account for the variety of local governments that tax and spend to provide local services. What would these spending and revenue patterns look like if we did not control for this heterogeneity, and instead just examined general purpose city governments? We show such tabulations in Table A1. Note that these comparisons only matter for our revenue and spending statistics, for which we used Fiscally Standardized City (FiSC) data. Our fiscal capacity measure, which is drawn from other sources, is unaffected by our decision (or not) to use the FiSC.

In some ways using data from general purpose cities alone does not change the overall story very much. Revenue still grows more in growing cities, declining cities rely more on intergovernmental aid, and also spend more per capita.

In other ways, however, the differences are notable. Perhaps most obvious is that absolute values are lower across the board. Table 5 showed that in declining cities, own-source revenue per capita in 2010 was USA$3,024, and in growing cities, it was USA$3,059. In Table A1, these numbers are about 60% smaller: USA$1,834 and USA$1,746, respectively. Still larger disparities exist in general expenditures per capita: General purpose expenditures are only 56% of fiscally standardized general expenditures in declining cities, and only 44% in growing cities. These differences arise because many counties and school districts collect property taxes; because counties often are responsible for human service expenditures; and because many user charges are levied by independent school districts. A total of 86 of the 110 cities in our sample have independent school districts. Focusing only on general purpose

Table A1. Revenues and Expenditures of Declining and Growing Cities, 1980–2010 (General Purpose Governments Only).

	Sustained Population Loss (*N* = 21)			Net Population Gain (*N* = 80)		
	1980	2010	% Change	1980	2010	% Change
Property tax revenue per capita	350	470	34	340	580	74
Property tax share of general revenue	19%	18%	−3	21%	25%	21
Sales tax revenue per capita	75	196	161	192	296	54
Individual income tax revenue per capita	230	311	35	21	33	57
Charges per capita	248	564	127	230	541	135
Own-source revenue per capita	1,089	1,834	68	991	1,746	81
Own-source revenue burden	0.06	0.10	71	0.04	0.07	48
Intergovernmental revenue per capita	864	1,183	37	536	512	37
Intergovernmental share of total revenue	39%	28%	−28	27%	15%	−44
General expenditure per capita	1,964	3,222	64	1,458	2,296	69
Debt per capita	1,676	4,390	162	2,111	4,433	126
Poverty expenditures per capita	11	21	91	33	36	9
Poverty expenditures per poor person	53	81	53	215	260	21

Source. Lincoln Institute for Land Policy FiSC, U.S. Census, NOAA, Authors' calculations.
Note. FiSC = Fiscally Standardized City; NOAA = National Oceanic and Atmosphere Administration.

governments, and excluding other local governments, ignores at least 40% of the taxes collected from, and spending directed at, city residents.

Table A1 also suggests that the relative role of counties and school districts is not the same in declining and growing cities. As a result, some of the findings in Table 5 are overturned in Table A1. For example, where in Table 5 growing cities had more per capita own-source revenue than declining cities, in Table A1 the reverse is true, and declining cities collect 5% *more* own-source revenue than growing cities. Similarly, when we only look at general purpose city governments, we find that declining cities collect more user

Table A2. Fiscally Standardized and Unstandardized Data for Three Cities, 2010.

	Boston		Detroit		Arlington, TX	
Per capita	Consolidated	City Only	Consolidated	City Only	Consolidated	City Only
Property tax revenues	2,619	2,619	889	381	1,549	349
Education expenditures	1,809	1,809	1,845	91	1,654	0
Social service expenditures	349	349	443	153	537	8

Source. Lincoln Institute for Land Policy FiSC database.
Note. All dollars 2012. FiSC = Fiscally Standardized City.

charges per capita than growing cities, and spend less per capita on poverty than do growing cities. Standardized metrics showed the opposite. Essentially, in declining places general purpose governments are more likely to share their tax bases (or to share them more evenly) with county governments, school districts, and other special-purpose authorities.

Table A2 examines three cities in more detail—slow-growing Boston, shrinking Detroit, and fast-growing Arlington, Texas. For each city, the table shows both FiSC data and data for the general purpose city government alone. The table shows property tax revenues per capita, education expenditures per capita, and social service (poverty) expenditures per capita. For Boston, there is no difference between the two columns. Boston has a dependent school district and a county government that does little to no redistribution (counties in Massachusetts are weak and mostly used for courts). Taxing and spending by the city thus accounts for almost all of the local taxing and spending that affects city residents.

For Detroit and Arlington, the situation is different. Examining city data alone would suggest that Detroit residents benefit from far less per capita education spending than do Boston residents, and that Arlington residents receive no education spending at all. Bostonians also appear to pay seven times as much in property taxes as people in Detroit, and eight times as much as people in Arlington. Last, people in both Detroit and Arlington appear to receive very little social service spending—Arlington spends only USA$8 per capita on social services, compared with USA$349 in Boston.

These differences, however, are greatly and sometimes entirely influenced by local government structure. When we account for social spending by county governments, Arlington residents receive more social service expenditures than Boston residents, USA$537 per capita compared with USA$349. Detroit residents also receive more social service spending than Boston

residents (USA$443 compared with USA$349). Similarly, when we account for independent school districts, the gaps in educational expenditures also shrink or disappear, as do gaps in property tax collections. Some differences remain, to be sure, but once we account for all the local governments that access the local tax base and deliver services to local residents, they are nowhere near as large, and sometimes they are flipped—for instance, Boston's per capita education expenditures become lower than Detroit's.

So which measure is better? The answer depends on the hypothesis being tested. Certainly if one is interested specifically in the fiscal conditions of general purpose city governments, the city-specific numbers are more appropriate. In this article, however, our concern is with the fiscal consequences, more broadly construed, of urban decline: When cities shrink, can local governments still deliver services to their residents? For our purposes, then, the consolidated data are more appropriate. It would be a mistake to look at Table A1, or at Detroit, and conclude that declining cities spend less on poverty than growing cities because they have smaller tax bases. Declining cities *do* have smaller tax bases, but the gap in poverty spending in Table A1 (and the gap between Detroit city and Boston city) does not result from differences in the tax base. It results from the decision to exclude county governments, which draw on the same tax base and which in many states for statutory reason play a large role in local redistribution.

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Notes

1. To be clear, many scholars examine fiscal stress, but relatively few specifically examine its relationship with long-term population loss. Much recent work on fiscal stress, for example, examines it in the context of state-level austerity policies or the Great Recession. Skidmore and Scorsone (2011) examine changes in expenditures in Michigan cities between 2005 and 2009, but do not expressly

focus on the role of population loss. Similarly, Peck (2014) examines fiscal stress in the context of recent pushes for public austerity, and Warner (2012) examines its relationship to local government structure.

2. The decline literature also includes some interesting research into newer questions, such as how residents of shrinking cities view their own quality of life (e.g., Hollander 2011).
3. For example, in Bradbury, Downs, and Small's (1982) exhaustive examination of decline, virtually all of the econometric analysis (chap. 6) uses population or employment change as the dependent variable. The consequences of population change on fiscal conditions are discussed theoretically and descriptively, but are not econometrically examined.
4. We show this in more detail in the appendix.
5. This calculation also assumes that both cities collect what they charge, which may be inaccurate, as tax delinquency is more common in poorer cities (Pew Charitable Trusts 2013).
6. See Glaeser and Ward (2009).
7. We exclude Columbus, Ohio, and Kansas City, Missouri, due to missing data.
8. Averaging the four national ratios makes our rates consistent both geographically (between jurisdictions) and temporally (across the 30 years included in our study). Arguably we could approach the income base differently, and apply a national average user charge rate (user charges as a share of total income) instead of national average income tax rate to the income base, as user charges are also drawn from income and are more common than income taxes. In principle, however, what matters is that some representative constant rate is applied to all the bases, so we use the income tax rate.
9. The measure thus predicts that New York could hire 450,000 employees. The city's actual employment is about 300,000 (NYC Independent Budget Office, http://ibo.nyc.ny.us/cgi-park2/?p=590). Given that cities do not actually tax their entire bases at uniform rates, and that much government spending is not labor, the measure seems reasonably accurate.
10. In our estimation, we retain five factors with a total of 35 parameters. We compute factor loadings via the principal-factors method, using the "factor" command in Stata (statistical software). Changing the number of factors or the estimation method has little impact on the loadings or the predicted index it creates.
11. Moving to sales or income taxes from property taxes could also increase burdens on low-income people. The extent of this burden will vary, depending on whether lower-income people rent (and are thus somewhat shielded from property taxes in the short term), have taxable income (some of the lowest-income residents may not), and also on what goods, if any, are exempt from sales taxes.
12. Declining cities may also be less able to export taxes because they have fewer visitors, which depresses taxes raised from hotels, rental cars, and meals. Data from 50 large hotel markets show that in nine cities that declined continuously from 1980 to 2010, hotel revenue per available room was USA$57 in 2010, compared with USA$67 in growing cities (PKF Hospitality 2015).

13. Because intergovernmental aid is not own-source revenue, and because states often distribute it based on a judgment of a city's capacity, we do not consider it part of local fiscal capacity. If anything, a state's ability to give intergovernmental aid is a reflection of the state's fiscal capacity (and the state's effort).
14. Weather data come from the National Oceanic and Atmosphere Administration. To control for annual variation in climate, we create the freeze-thaw variable from the average of the surrounding five years (e.g., the 1980 estimate is the average for 1978–1982). The snowfall variable is a three-year average.
15. Estimating these regressions with a different but related dependent variable—the percent change in population from 1980 to 2010—yields similar results. A city with a fiscal capacity of 0.012 in 1980 would grow a statistically insignificant 14% (and might decline up to 9%), while a city with a fiscal capacity of 0.04 in 1980 would grow almost 30%.

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