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The Effect of Local Fiscal Policies on Urban Wage Structure

Patricia Beeson
Department of Economics, University of Pittsburgh

Lara Shore-Sheppard[*]
Department of Economics, Williams College
and NBER

Christopher Briem
Department of Economics, University of Pittsburgh

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Abstract

While it has long been recognized that average wages vary strikingly across regions and urban areas, differences in the variance of wages remain relatively unexplored. In this paper we empirically examine differences in the extent and persistence of wage dispersion across urban areas. Using data from the 1980 and 1990 Censuses, we show that metropolitan area wage distributions vary, that the variation is substantial, and that it is not entirely accounted for by differences in the supply of workers with different skills or the size or geographic region of the city. We find that the differences in wage distributions across cities are highly persistent. We investigate whether there is a link between local fiscal policy and the degree of dispersion in the wage structure, and find evidence that such a relationship exists. Cities with higher overall taxes, fewer transfers from state and federal governments, and a greater share of spending on public health and community development appear to have higher levels of overall dispersion. In addition, we find that cities that rely more heavily on property taxes have greater dispersion in the lower half of the wage distribution, and cities with higher expenditures on education have more dispersion in the upper half.

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[*]*Corresponding author. Address for correspondence: Fernald House, Williams College, Williamstown, MA 01267; lshore@williams.edu; beeson+@pitt.edu; cbriem+@pitt.edu.*

I. Introduction

Recently there has been a great deal of empirical work focused on explaining the well-established increase in wage inequality that occurred in the United States during the 1980s. Less commonly studied is the variation in wage distributions across urban areas. While it has long been recognized that average wages vary strikingly across regions and urban areas (see for example, Hanushek (1973), Sahling and Smith (1983), and Farber and Newman (1987)), differences in the *variance* of wages remain relatively unexplored. Little is known about the nature of the variation in wage distributions across cities or why such variation exists.

Previous studies of interurban differences in wage structures have tended to focus on sources of short-run differences in wage distributions, such as that caused by changes in the relative demand or supply of workers with different skills in some regions (see, for example, Borjas and Ramey (1995), Bartik (1996), Cloutier (1997), and Levernier, Rickman and Partridge (1998)). An increase in the demand for high-skill labor in one city, or an influx of low-skill immigrants to another, can temporarily cause increases in wage dispersion in the affected city relative to other cities. Over time, however, migration of workers to the areas where their return is the highest is likely to eliminate these transitory differences in wage distributions. Thus, if changes in demand or supply are to explain the observed geographic differences in wage structure it must be that these differences are transitory. This raises the question, are regional differences in wage structure solely transitory, or is there a persistent component to the observed differences in wage structure? If so, what accounts for the persistent component?

In this paper we empirically examine these questions. Using data from the 1980 and 1990 Censuses, we show that metropolitan area wage distributions vary, that the variation is substantial, and that it is not entirely accounted for by differences in the supply of workers with different skills or the size or geographic region of the city. We examine the sources of differences in wage dispersion, focusing on the dispersion in wage premia–the additional amount workers earn above the wage predicted by a national wage regression–in order to abstract from the effect of differences in the supply of workers with different skills. We show that some, but not all, of the differences in the distributions of wage premia across cities is due to differential returns to education and returns to observable skills. We find that the differences in wage distributions across cities are highly persistent.

We examine two possible sources of the long-run differences in wage structure across labor markets: differences in the provision of local public goods or taxes, and differences in amenities. In considering amenities and local fiscal policies as possible sources for differences in wage distributions across cities, we follow the literature on the sources of long-run differences in average wages across cities (see, for example, Roback (1982), Gyourko and Tracy (1989, 1991), Beeson (1991)). Using a simple theoretical model similar to those used in this literature, we show one possible way by which local fiscal policy can affect relative wages. We then evaluate whether a relationship between local fiscal policy and the wage structure exists using data on 127 metropolitan areas from the 1980 and 1990 Censuses of Population and the 1977 and 1987 Censuses of Governments. Our preliminary results indicate that a relationship does exist, with more overall dispersion in cities with higher overall taxes, fewer transfers from state and federal governments, and a greater share of spending on public health and community development. We also find evidence that a greater reliance on property taxes is correlated with greater dispersion in the lower half of the skill-adjusted wage distribution, and higher expenditures on education are correlated with more dispersion in the upper half. In addition to fiscal policies, we find evidence that differences in demand related to industry structure may be important in explaining cross-city differences in wage structure.

II. Data Construction

The data used in this paper come from several sources. The measures of wage dispersion and demographic characteristics are calculated from data reported in the Census 5% Public Use Micro Samples (PUMS), 1980 and 1990. The PUMS data are attractive for our purposes for a number of reasons. First, they report geographic detail which allows us to examine wage distributions in 127 geographically distinct labor markets. Second, each individual in the PUMS is asked questions related to earnings, industry of employment, and demographic characteristics. This information allows us to determine measures of the variability of wages in a metropolitan area (such as the variance of the log wage distribution and the difference between the 90th and the 10th percentiles). Finally, the samples are very large, and the larger samples improve the precision of our estimates of city wage structures.

We restrict our sample to male wage and salary workers aged 16 to 65, who reported usual hours worked per week of 35 hours or more, and worked at least 49 weeks during the reference year. The hourly wage is calculated as annual wage and salary income, divided by the product of usual hours worked and weeks worked. We limit the sample to men with hourly wages between $1 and $100 in 1979 dollars.[1] The geographic information reported in the PUMS is used to link individuals to geographic areas. Unfortunately, the Census does not report

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[1]These cutoff figures correspond to those used in the U.S. inequality literature; see for example DiNardo, Fortin, and Lemieux (1996).

consistent sub-state geography in the 1980 and 1990 Censuses. We use the template developed by Jaeger, Loeb, Turner, and Bound (1998) to construct 127 geographic areas with consistent boundaries in 1980 and 1990.[2] These areas generally coincide with the 1990 Consolidated Metropolitan Statistical Areas (CMSAs). Our 1980 sample includes over 1.3 million men, while the 1990 sample includes almost 1.5 million men. The number of men per CMSA ranges from 1,082 to 146,428 in 1980, and from 1,362 to 151,036 in 1990.

Using these data we construct several measures of intra-city wage dispersion and wage structure. Our measures of wage dispersion include the variance of the log of wages, and the differences between the 90th and 10th, the 50th and 10th, and the 90th and 50th percentiles of the log wage distribution. In most cases, we use measures of dispersion in skill-adjusted wages to examine differences in wage structure. We adjust for skill differences across labor markets using prices estimated from a standard wage regression using the pooled data for all cities. In this regression, age is entered as a quartic; the race categories are non-Hispanic white, non-Hispanic black, Hispanic, and other; and the six education categories are no high school, some high school, high school diploma, some college, college graduate, and post-graduate study.[3] Using the parameter estimates from this regression, we predict wages for each individual. The predicted wage is subtracted from the actual wage, and the residual is used as a measure of the individual's wage premium.[4]

In section III we compare measures of within-city wage dispersion with two measures of

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[2] Jaeger, Loeb, Turner, and Bound's (1998) template matches 132 metropolitan areas between 1980 and 1990. We omit 5 from our sample because of missing data for other variables.

[3] The parameter estimates from this equation are available upon request.

[4] We use the terms "skill-adjusted wage" and "wage premium" interchangeably in the rest of the paper.

wage structure: returns to education and returns to skill defined more generally. Returns to education in each city are estimated from city-specific wage regressions, which include the same controls for age and race, as well as the six education categories, discussed above. We calculate returns to skill following the approach used by Topel (1994). Workers are classified into one of ten skill classes based on wages predicted from a national wage regression.[5] This regression includes the same controls for age, race, and education as the city-specific regressions discussed above, and also includes city-specific fixed effects to control for differences in the cost of living across areas.[6] Based on predicted wages from this regression ten skill classes are defined, one for each decile of predicted wages. Workers with predicted wages in the lowest decile nationally (decile 1), are classified as the lowest skill workers; those in the highest decile nationally are the highest skill workers (decile 10).[7] Using the average log wage for each skill class in each city, we define four measures of the return to skill intended to capture variation similar to that captured by our measures of wage dispersion. These measures of returns to skill are the differences between the mean log wage of the 1st and 10th skill deciles, between the 2nd and 9th skill deciles, between the 1st and 5th, and between the 6th and 10th skill deciles.

Measures of local taxes and government expenditures are computed using data from the finance files of the U.S. Census Bureau's Census of Governments (COG) for 1977 and 1987. Both sources provide detailed budgetary information for all levels of government in the United

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[5] Topel (1994) identifies 3 skill classes of men and 2 skill classes of women using March Current Population Survey data.

[6] While the city-specific fixed effects are intended to control for differences in the cost of living, they may also pick up differences in unobserved skills across cities.

[7] We use "skill" to denote observable characteristics affecting wages, including education, experience (proxied by age), and race. Unobservable skills are not accounted for in this framework.

States. Since multiple governmental units (including the state, county, and municipality) tax individuals and firms within a given metropolitan area (MSA), our measures of taxation and government spending take into account all levels of government below the federal level. For each level we calculate a weighted (by population of the jurisdiction) average of tax revenues and expenditures per capita and then calculate the taxation and expenditure measures as the sum over all of the levels.

Table 1 gives means and standard deviations for the variables used in our analysis. The top panel shows the measures of dispersion in skill-adjusted wages. As has been noted in the inequality literature, average dispersion increases between 1980 and 1990. The measures of tax structure calculated from the COG include total tax revenues adjusted by the total income in the city and the share of tax revenues derived from personal income taxes, sales taxes, property taxes, and other taxes (which includes corporate income taxes, fees and other taxes not classified elsewhere). Property and sales taxes provide the largest shares of tax revenues on average, although both fall between 1980 and 1990, with income and other taxes filling the gap.

Controls for differences in the structure of government services include expenditures per dollar of tax revenue on infrastructure (including spending on air, highway and water transportation), education (the largest category), public health and community development, and police protection. CMSA population size, population density, doctors per 1,000 residents, serious crimes per 1,000 residents, and heating and cooling degree days are included to control for differences in amenities. Population, density, and crime are all higher in 1990, while the number of physicians is slightly lower, on average. We control for business cycle and price effects using state-level unemployment rates and the median wage in the CMSA. Finally, in order to test potential demand-oriented hypotheses for the variation in wages, we calculate the fraction of workers in each of ten industrial groups: construction; non-durable manufacturing; durable manufacturing; transportation; wholesale and retail trade; finance, insurance, and real estate; nonprofessional services, professional services; public administration; and other (which is primarily composed of agriculture and mining).

III. The Extent and Persistence of Intra-city Wage Dispersion

To set the stage for our empirical analysis, we begin by documenting that the wage distribution varies across cities, that the variation is in the wage premia received by workers in the city and is not only due to different supplies of workers with various skills, and that it persists over time. Figure 1, which displays kernel estimates of the density of log hourly wages for 8 cities using data from the 1990 Census, provides simple illustrative evidence that wage distributions differ.[8] Some cities, such as Minneapolis and Seattle, have relatively "tight" distributions, while others, such as Los Angeles and Houston, have distributions which are relatively more spread. The distributions also differ in their shape, with some having relatively more mass at the lower end (Atlanta and Pittsburgh) and others having relatively more mass at the upper end (New York).

To enable us to employ a regression framework in our analysis of the sources of the variation in wage distributions across cities, we use the variance of the log wage distribution and the difference between various percentiles of the distribution as summary measures of the

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[8]The kernel densities are estimated using an Epanechnikov kernel with the bandwidth selected to minimize the mean integrated squared error. Note that to the extent that high wages are topcoded in the data, wage dispersion in the upper tail of the distribution will be understated.

spread. Descriptive statistics for these measures in our sample of 127 MSAs are presented in Table 2. While the variance is only a single summary measure and thus cannot express all of the variation in distributions, the range in column 1 shows that the variance differs substantially across cities, from 0.244 (in York, PA) to 0.499 (in Colorado Springs, CO). The mean variance across cities in 1990 is 0.349, however 22 of the cities (including Los Angeles, New York, and Austin) are more than one standard deviation above the mean and twenty, (including Providence, Hartford, and Erie), are more than one standard deviation below the mean. On average, the variance of the log of wages is considerably higher in the South and West than in the North and Northeast, and increases slightly with city size.

As context for our estimates of the extent of wage variation across cities, it is useful to consider the variation in the U.S. wage distribution over time. Over the 1980s, a period widely recognized as being one of increasing wage variability, the variance in log wages in our sample increased from 0.326 in 1980 to 0.388 in 1990. The range of wage variability across cities shown in Table 2 is thus larger than this increase that occurred nationally.

Since worker characteristics such as education and demographics affect wages, one explanation for the differing wage distributions across metropolitan areas is that cities differ in the distribution of skills of their workers. Descriptive statistics for measures of dispersion based on age-, race- and education-adjusted wages are presented in columns 4-8 of Table 2. While the demographics appear to play some role in explaining dispersion (wage dispersion is lower, on average), there is still considerable variation in residual wages across cities. In addition, the ordering of the cities by degree of variation is largely preserved: the rankings of cities with and without controlling for demographics are highly correlated, with a rank correlation of 0.84.

Differences in worker characteristics appear to explain some of the regional differences in the degree of wage dispersion, but regional differences still exist. City-size differences, however, are much less pronounced.

Using the 90-10 differential in the skill-adjusted log wage as the measure of dispersion yields similar results to those for the variance of the log of skill-adjusted wages, and the rankings of cities by both measures are highly correlated, with a correlation of 0.94. The last two columns decompose the differential between the 90th and 10th percentiles into the 90-50 and 50-10 differentials. On average the upper half of the distribution is more spread than the lower half, although there is a great deal of variation in the split between the two.

Persistence of wage and tax structures

We next examine the persistence of cross-city differences in wage structure between the 1980 and 1990 Censuses. For each measure of wage dispersion we construct three measures of persistence. One way to see the relative sizes of persistent versus transitory differences in the distribution of wage premia is by examining the relative sizes of the cross-sectional and time-series variation. Thus as one measure of persistence we decompose the Theil measure of inequality to show the relative sizes of the cross-sectional and time-series variation in skill-adjusted wage dispersion. The second measure is the rank correlation between skill-adjusted wage dispersion in 1980 and in 1990. This measures the extent to which cities maintained their relative positions between 1980 and 1990. The third is the coefficient from a regression of the 1980 dispersion measure on the 1990 dispersion measure, where a coefficient of one would indicate complete persistence. This coefficient measures the persistence of the relative size of skill-adjusted wage dispersion across cities over the time period.

The first panel of Table 3 reports these measures of persistence for our four scalar measures of dispersion. By all three measures, differences in wage premia across cities are very persistent over the 10-year period. Using the Theil decomposition, between 85 and 95 percent of the variation in city-level skill-adjusted wage dispersion reflects the persistent component over this 10 year period, and 5 to 15 percent is transitory. The rank correlations are over 0.80 for all but the 50-10 split, and the regression coefficient estimates the permanent component at above 0.80 for these three measures. The estimates of persistence for the 50-10 split are somewhat lower, between 0.65 and 0.70.

For comparison, the second and third panels of Table 3 report on the persistence of cross-city differences in returns to education and returns to skills. By all three measures, there is much less persistence in cross-city differences in returns to education. Cross-city deviations in returns to skill are somewhat more persistent, but are not as persistent as differences in wage premia within a city. One interpretation of these results is that much of the variation in returns to specific worker characteristics (experience and education), are transitory, caused by shocks to local labor demand and supply, and as such we expect that migration of labor in response to differences in returns to these characteristics will eliminate these differences in returns across cities. For example, suppose there was an influx of low-skill immigrants into Houston in 1979. This increase in the supply of low-skill workers would lower the wages paid to low-skill workers relative to high-skill workers, thereby increasing the measured returns to skill in Houston. Over time, we expect low-skill workers to leave Houston (or firms employing low-skill workers to move to Houston), increasing the relative wage of low-skill workers, bringing the returns to skill back in line with that in other cities.

On the other hand, we find substantial persistence in the variance of skill-adjusted wages: if a city has a relatively large degree of residual wage variation in 1980, it is likely to also have a large degree in 1990. This finding suggests that independent of the specific characteristics of the workers at the top and the bottom of the residual wage distribution, some cities tend to have a bigger gap in wages than others. Thus it appears that there may be fundamental differences underlying the wage distribution in these cities. As local amenities and fiscal structures have been identified as playing a role in differences in average wages between cities (see, for example, Gyourko and Tracy 1989), it may be the case that they also affect the structure of wages in the city. For example, if Houston had a tax structure that was nominally more progressive than other cities, workers at the high end of the distribution would require relatively more pre-tax compensation to live in Houston than would those at the low end of the distribution. As a result, wage differentials would be higher in Houston, and we would not expect this difference to be reduced through migration of households and firms.

This explanation requires that there be a high degree of persistence in local fiscal structure. We examine this in Table 4, which reports the same three measures of persistence for various measures of amenities and fiscal structure. By all measures, cross-city differences in fiscal structure and amenities are as persistent as cross-city differences in skill-adjusted wages, suggesting that local fiscal structures may play a role in persistent differences in wage structure. We explore this role in the next two sections of the paper, beginning first with a theoretical motivation for why amenities and fiscal structure may impact within-city dispersion.

IV. Theoretical Framework

In this section we present a simple model which shows how local fiscal conditions can affect the wage distribution when both workers and firms are mobile across regions. We extend Beeson's (1989) model of the effect of non-produced amenities on wage structure to include fiscal characteristics of the local government, and Gyourko and Tracy's (1989, 1991) examination of the relationship between local fiscal policies and average wages to look at the effect of local fiscal policies on the distribution of wages. The model demonstrates that different tax structures and different mixes of goods provided by local governments can result in different distributions of gross wages because the values of taxes and local public goods to different types of households can be capitalized into wages or land prices. It is important to recognize that this is not a model of economic incidence of taxes–the model we present here is concerned with pre-tax wages. Net of tax wages are assumed to be unaffected by tax policy.[9]

Cities are assumed to differ in two respects: the natural amenities with which they are endowed and the locally provided package of taxes and public services. Both are assumed to be taken as given by all potential residents and to be available uniformly throughout the urban area. Individuals are completely mobile across locations, but work in the city where they live, and supply one unit of labor. Similarly, physical capital is completely mobile and employed along with labor, land, and intermediate goods to produce a composite traded good, *X*, that is available everywhere at a constant price and serves as the numeraire.

There are two types of individuals, low-skill (low-wage) and high-skill (high-wage). Individual utility depends on consumption of the composite good *X*, land *h,* as well as the

[9] Feldstein and Wrobel (1998) find evidence that net wages are unaffected by nominal progressivity in state tax rates.

amenities A, and services G offered in their community,

$$(1) \qquad U^i = U_i\{X_i, h_i; A, G\}$$

where i indexes worker type (i = 1, 2; 1 indicating low-skill workers). The gross-of-tax price of the composite good is 1+s, where s is the sales tax rate and the pre-tax price of the composite good is normalized to equal one. The gross-of-tax rental price of land r^* is the same for all residents and firms in the city and is given by (1+t) r where t is the local property tax rate and r is the pre-tax land rental rate. Individuals maximize their utility subject to the following budget constraint:

$$(2) \qquad (1 - s)X_i + (1 + t)r \cdot h_i = (1 - z_i)w_i$$

where w_i is the gross wage income and z_i is the personal income tax rate for type i.

In equilibrium, utility of all workers of the same type must be the same at all locations. If this were not the case, workers could move and increase utility. Written in the form of an indirect utility function, equilibrium for worker type i requires

$$(3) \qquad \bar{V}^i = V\{w_i^*, r^*, (1 + s); A, G\},$$

where $\bar{V}^i$ is the nationally given utility level for type i workers and w_i^* (=(1-z_i) w_i) is the net wage.

In each city firms produce the composite commodity X, using N_i workers of type i, land (L^P), and intermediate goods according to a constant returns to scale production process. These inputs are imperfect substitutes in production. Local amenities and public goods can have a Hicks' neutral effect on the productivity of firms, and firms can vary the amount of amenities and public goods in production only by varying their location. Because firms sell their product in a national market at a common price, equilibrium for firms requires that unit costs *C(·)*, are the same in all locations and equal to the price of *X*, assumed to be 1. For firms in a given location this implies

$$(4) \qquad C\left\{w_1, w_2, r^*, (1+s); A, G\right\} = 1$$

where *s* is the sales tax on intermediate goods, which is assumed to be the same rate as that applied to consumer goods.

Given the national level of utility for each type of worker, $\bar{V}^i$, and the price of the composite commodity (=1), the equilibrium conditions for the two types of households (3) and the equilibrium condition for firms (4) jointly determine the wage and rent differentials across cities. Taking the total derivatives of (3) and (4) and solving for $d \log r$ and $d \log w_i$ using Roy's identity and Shepard's lemma yields the following expressions for the total differentials of wages and land rents across cities:

$$(5) \qquad d\log w_i = \frac{1}{1-z_i}\left[dz_i + k_i\,dt + k_i(1+t)\,d\log r + \frac{x_i}{w_i}ds - \frac{p_{A_i}}{w_i}dA - \frac{p_{G_i}}{w_i}dG\right], \text{ and}$$

$$(6) \qquad d\log r =$$

$$\frac{1}{r(1+t)B}\left[\sum_{i=1,2}\left(\frac{-1}{1-z_i}dTax_i + \frac{1}{1-z_i}\left(N_i p_{A_i} dA + N_i p_{G_i} dG\right)\right) - dTax_F + \left(-C_A X dA - C_G X dG\right)\right]$$

where

$$B = L^p + \frac{N_1 h_1}{1-z_1} + \frac{N_2 h_2}{1-z_2},\; dTax_i = N_i w_i dz_i + N_i h_i r\,dt + N_i x_i ds, \text{ and } dTax_F = C_s X ds + L^P r\,dt.$$

The first term on the right hand side of the rent equation (6) $((\&1)/(1\&z_i)dTax_i)$ is the change in total taxes collected from type i individuals; the second term $(1/(1\&z_i)(N_i p_{A_i} dA \% N_i p_{G_i} dG))$ is the change in the value of public services and amenities to individuals; the third term $(dTAX_F)$, is the change in total taxes collected from firms; and the fourth term $(-C_A XdA - C_G XdG)$, is the change in the value of amenities and public services to firms. Both the first and third terms are negative, indicating that increases in total taxes collected from either households or firms result in proportionately lower rents per unit of land. The second and last terms are positive if public goods and amenities are productive ($C_G<0$ and $C_A<0$). Thus, increases in the value of public goods or amenities to either households or firms increase rents per unit of land by an amount equal to the value of the public service or amenity per unit of land. Thus the positive value of amenities and of public goods is fully capitalized into land values. Differences between workers and firms in their valuation of local amenities, public goods, and taxes will be reflected in average wages (see Gyourko and Tracy, 1989). Here we show that differences between different types of workers in their valuation of amenities, public goods, and taxes will be reflected in relative wages.

We use this model to examine the effects of changes in the tax structure on wage dispersion by considering the effect of tax changes on the difference between $d \log w_2$ and $d \log w_1$. The effect will have two parts: a direct effect of the change, and a change resulting from capitalization of the tax into land values. This second part is due to the fact that $d \log r$ enters equation (5). As long as the shares of income spent on housing (k_1 and k_2) are not the same, the effect of a change in tax structure on pre-tax wages will partially depend on what happens to land prices. If the shares differ, then the wages of the group spending less of its income on land would increase. Intuitively, as taxes are capitalized into land values, if land expenditures are not the same proportion of income for both groups, then the group spending a lower share of its income on land is not receiving the same amount of compensation for the higher taxes. Consequently, wages would have to adjust to compensate, or the less compensated group would find it beneficial to migrate. Pre-tax wage differentials would thus increase as a result of a change in tax structure if the low-wage workers spend a larger fraction of their income on land.

For simplicity in analyzing the effects of tax changes in this model, however, we abstract from the capitalization effect and assume $k_1=k_2=k$—the two groups spend the same proportion of their income on land. In this case, the term in (5) containing $d \log r$ will drop out. Using this assumption, we consider the impacts on wage differentials of four changes: implementation of a nominally progressive income tax, a change in property taxes, a change in the sales tax, and a change in public services.

Consider first the case of an income tax where the tax rate on the high-wage workers is raised above the tax rate on the low-wage workers. From equation (5), the effect is to increase pre-tax wage differences:

$$(7) \qquad \frac{d\log w_2 - d\log w_1}{dz_2} = \frac{1}{1 - z_2} > 0.$$

In equilibrium, wages of high-skill workers must rise to compensate them for the increased tax burden, which increases the spread between the wages of the two types of workers.[10]

[10] This is the same effect found by Feldstein and Wrobel (1998). Their model is similar to the one presented here, with a primary exception being that they consider only one form of taxation.

The effect of an increase in the property tax depends on whether the income tax is nominally progressive ($z_2>z_1$), regressive ($z_2<z_1$), or proportional ($z_2=z_1$):

$$\text{(8)} \qquad \frac{d\log w_2 - d\log w_1}{dt} = \left[\frac{1}{1-z_2} - \frac{1}{1-z_1}\right]k.$$

If the income tax is proportional, then changes in the property tax have no effect on wage differentials. In the case of a progressive income tax, however, an increase in the property tax will again increase pre-tax wage inequality. This is because we have assumed that the two groups spend the same fraction of their income on housing, so compensation for higher taxes on the high-wage workers must come through the labor market.

The third change we consider is an increase in sales taxes. The effect of this change depends on the fraction of after-tax income that each group spends on consumption:

$$\text{(9)} \qquad \frac{d\log w_2 - d\log w_1}{ds} = \frac{1}{1-z_2}\left(\frac{x_2}{w_2}\right) - \frac{1}{1-z_1}\left(\frac{x_1}{w_1}\right).$$

Inequality will increase if the high-wage individuals consume a larger portion of their after-tax income, and will fall if the low-wage individuals consume the larger fraction. The intuition for this result is straightforward: the group consuming a larger share of its income pays a relatively larger share of the sales tax; consequently that group must be compensated through the labor market.

Finally, we consider an increase in public spending (note that since amenities and public spending enter the model in the same way, these results will hold for a change in amenities as well.) In this case, the effect on inequality depends on the monetized values of the marginal utility of the public service for the two groups (p_G/w):

$$(10) \qquad \frac{d\log w_2 - d\log w_1}{dG} = -\frac{1}{1-z_2}\left(\frac{p_{G_2}}{w_2}\right) + \frac{1}{1-z_1}\left(\frac{p_{G_1}}{w_1}\right).$$

If the high-wage group values the public service more relative to their after-tax wages, pre-tax wage inequality will decrease. This is because the group valuing the service more will accept lower wages to live in this city.

This model makes several strong assumptions, including the assumptions that land prices are uniform throughout the local market and that taxes and public goods are the same at all locations in the local market. To the extent that metropolitan areas are made up of many local communities with fixed geographic boundaries, each offering distinct fiscal packages, and to the extent that households sort themselves across these communities based on their preferences for these fiscal packages, the value of these fiscal packages can be capitalized into land prices. However, if households do not sort completely to form homogeneous communities, relative wages can be affected as described by this model.

V. Regression Analysis

Overall Wage Dispersion, 1990

The model presented in section IV suggests that differences in wage dispersion can reflect regional differences in amenities and local fiscal policies that affect the utility of households and hence the supply of different types of workers. Another explanation is that regional differences in wage structure reflect differences in the demand for various types of workers in the presence of barriers to migration. This section of this paper compares wage dispersion across metropolitan areas and examines the extent to which differences in wage dispersion are consistent with each theory. We begin by examining the relationship between the distribution of skill-adjusted wages within cities and local fiscal policies. We then examine how fiscal policies affect the wages of workers at different points in the wage distribution.

The distribution of skill-adjusted wages, 1990.

We examine the relationship between the distribution of skill-adjusted wages and local fiscal policies using the following model:

$$(11) \quad Y_j = a + \beta_T T_j + \beta_G G_j + \beta_D D_j + \beta_A Aj + \beta_R R_j + u_j$$

in which Y_j is a measure of the dispersion of skill-adjusted wages in MSA j, such as the variance of the logarithm of wages, and T_j, G_j, D_j, A_j, and R_j, are vectors reflecting local taxes, public expenditures, local labor demand, amenities, and region, respectively. We first estimate this model with the 1990 data only, to focus on the sources of cross-sectional variation. We then estimate the model pooling the 1980 and 1990 data, and including CMSA-specific fixed effects. The parameters from this regression are thus estimated from the within-city variation in wage dispersion and fiscal/amenity/demand variables.

To capture variation in tax policy we use total taxes per capita normalized by per capita income and the shares of tax revenues from sales taxes, property taxes, and other taxes. The share of tax revenue from income taxes is the omitted category in our regressions. We also include the amount of state and federal transfers relative to tax revenues as a measure of non-local revenue. To capture variation in the types of goods and services provided by local governments we include government expenditures per tax dollar on infrastructure, education, health, and police. Demand is proxied by the share of employment in each of ten broadly defined industries. The amenity variables included are the numbers of heating and cooling degree days, doctors per 1,000 residents, the serious crime rate, population and population density.

The results from the estimates of equation (11) using the 1990 data only are presented in Table 5. The first three columns report the parameter estimates with the age-, race-, and education-adjusted variance of the log wage distribution as the dependent variable. The first column reports the parameter estimates without controls for region or industry mix. We add region controls in the second column, and region and industry mix variables in the third column. The final three columns report the estimates for the difference between the 90th and the 10th, the 50th and 10th, and the 90th and 50th percentiles of the age-, race-, and education-adjusted log wage distribution.

The results for the variance of the skill-adjusted log wage presented in the first column indicate that the tax structure, government spending, and population characteristics of the city all affect the within city dispersion of wage premia. The coefficients on the tax structure variables are positive, indicating that cities with high overall tax burdens relative to income tend to have more dispersion, and that cities that rely more on income taxes (the omitted category) tend to have less dispersion. Cities that receive more transfers from the state and federal government relative to taxes raised locally also tend to have less dispersion. Adding regional dummies (column 2) does not change these results. However, when demand measures are included (column 3) none of the coefficients on the tax share variables are significant, although the coefficients on the overall taxes and state and federal transfers remain significant.

Two of the government expenditure variables have positive and statistically significant coefficients even with the inclusion of region dummies in column 2: spending on health and spending on police services. The positive coefficients indicate that greater spending on health and on police services is associated with greater dispersion in skill-adjusted wages in a metropolitan area. These results are relatively unaffected by the inclusion of controls for industry structure (column 3), except that spending on police services goes from being marginally significant to being marginally insignificant.

With or without controls for demand, skill-adjusted wages tend to be more dispersed in large cities than in smaller cities, and less dispersed in the Northeast than in other regions of the county. The coefficients on the controls for business cycles are not significantly different from zero, however industry structure matters. Cities with higher concentrations of employment in manufacturing and public administration (relative to the omitted category of construction) have significantly less dispersion in wage premia, while cities with higher concentrations in professional services have significantly more dispersion.

Thus far we have concentrated on examining how tax structure and other factors affect the overall dispersion of skill-adjusted wages within a city, without examining whether these factors affect primarily the upper or lower tails of the distribution. We now ask whether these variables increase the spread of wage premia by decreasing the 10th percentile relative to the median, by increasing the 90th percentile relative to the median, or both. Our estimates of the effects on the difference between the 10^{th} and 50^{th} percentiles and the 90^{th} and 50^{th} percentiles of the log wage distribution are presented in the last two columns of Table 5. The coefficient estimates from the regression on the difference between the 90^{th} and 10^{th} percentiles are also presented, in column 4. The results for the 90-10 split are similar to the results for the variance of the log wage reported in column 3.

The parameter estimates reported in the last two columns of Table 5 indicate that local fiscal policies differentially affect the lower and upper ends of the skill-adjusted wage distribution. Cities with larger shares of tax revenues from sales taxes or from property taxes have significantly more dispersion at the lower end of the distribution, but these tax shares have no significant effect on dispersion at the upper end of the distribution. Moreover, increases in total taxes as a fraction of income increase dispersion at both ends of the distribution, but the estimated effect is fifty percent larger at the lower end of the distribution. The composition of government expenditures also differentially affects the upper and lower ends of the distribution. Specifically, cities that devote a larger share of their budgets to education have significantly more dispersion at the upper end of the distribution and less dispersion at the lower end, although this effect on the lower end is not statistically significant.

Change in the distribution of skill-adjusted wages, 1980-1990

If cross-city differences in wage structure are related to differences in the underlying fiscal structure, then changes in that fiscal structure should affect wages . We explore this question by examining the effects of changes in fiscal structure, amenities, and demand on the distribution of skill-adjusted wages between 1980 and 1990. We pool our data from 1980 and 1990 and use the pooled data to estimate equation (11) with city-specific fixed effects.

Given the lack of time-series variation in both the measures of wage dispersion and fiscal structure and amenities documented in Tables 3 and 4, it is not surprising that most of the explanatory power of the model comes from the city-specific effects. Few of the other coefficient estimates are significantly different from zero. However, some of the dimensions of fiscal structure do have statistically significant effects on wage dispersion as measured by the 90-10, 50-10, and 90-50 percentile splits (columns 2-4). By these estimates, increased reliance on sales taxes is associated with greater overall wage dispersion, primarily with higher dispersion in the lower tail. Increases in federal and state subsidies also are associated with increased dispersion, but primarily in the upper tail of the distribution.

To summarize, we find some evidence that the dispersion of skill-adjusted wages within a city is related to fiscal structure. The overall spread is found to be higher in cities with higher overall taxes, fewer transfers from state and federal governments, and a greater share of spending on public health and community development. Cities that rely more heavily on property and sales taxes have more spread in the lower tail, while those with more expenditures on education have more spread in the upper tail. We also find changes in the dispersion of wage premia to be related to changes in fiscal structure. Demand factors (as proxied here by industry shares) also appear to play a role in within-city dispersion of wage premia.

Fiscal structure and the wages of low- and high-wage workers

In the previous sections we concentrated on examining how tax structure and other factors affect the dispersion of skill-adjusted wages within a city, without regard to whether it is the wages of low- or high-wage workers that are most affected. In this section we look at how fiscal structure and other factors affect the wages of workers at various points in the wage distribution, controlling for observed differences in individual human capital. Specifically, we estimate the effects of local fiscal policies on the wages of individuals at every percentile of the local wage distribution. We do this by first grouping individuals based on their percentile ranking in their city-specific non-skill-adjusted wage distribution.[11] We then use data for individuals from each city to estimate a wage equation for each percentile. Thus, we estimate 100 equations of the following form, using data for one percent of the sample for each city:

$$(12) \quad ln\ wage_{ij} = \alpha + \beta_{hc}HC_i + \beta_T T_j + \beta_G G_j + \beta_A A_j + \beta_D D_j + \beta_R R_j + u_{ij}$$

where HC_i is a vector of characteristics of individual *i* measuring age (as a quartic), race (four categories), and education (six categories); and the other vectors of characteristics of CMSA *j* are as defined above.[12] These are the same individual characteristics used to construct the age-, race-, and education-adjusted measures of wage dispersion used as dependent variables in the regressions reported in Table 5. We weight the regressions to give equal weight to each city.

Figures 2-10 plot the estimated effects of each of the fiscal variables on each percentile in the wage distribution. To facilitate comparisons of the effects of different variables, we standardize by multiplying each coefficient by one standard deviation of the mean of the variable.[13] Thus, each point represents the estimated effect of a one standard deviation increase in the variable in question on individuals at that percentile in the wage distribution. Surprisingly, the plots of these estimated effects are quite smooth, except for the stray points in both tails, which may reflect noise in the wage data.

Figure 2 plots the estimated effects of a one standard deviation increase in total taxes relative to income. Ignoring the very lowest percentiles, the estimated effect of total taxes is

[11] Note that in this analysis individuals are assigned to percentiles based on their non-skill-adjusted wages. In the analysis reported in Table 5, percentiles are based on skill-adjusted wages.

[12] Note that the skill adjustment here is different from that used earlier in that the coefficients on the human capital variables are now allowed to vary by percentile.

[13] This standardization changes the scale on the y-axis but does not affect the shapes of the distributions.

increasing as income increases from the lower percentiles to the median. Thus, higher levels of taxes are associated with increased wage dispersion at the lower end of the distribution. Between the median and the 90th percentile, the estimated effect is also increasing steadily, though at a slower rate, so the increase in wage dispersion associated with higher taxes is smaller at the upper end of the distribution. In the context of the theory presented in section 4, this suggests that cities with high average taxes (and expenditures) tend to also have fiscal structures that are nominally progressive throughout, though more strongly progressive at the lower end of the wage distribution.

Figures 3-6 plot the effects of one standard deviation increases in the tax shares in each of the reported categories relative to the omitted category–the income tax. The estimated effects of the sales taxes, other taxes, and federal and state subsidies appear to decline slightly as wages increase through most of the range of wages, thus reducing pre-tax wage dispersion as wages of low-wage workers increase relative to high-wage workers.

Increases in the share of tax revenues derived from the property tax appear to increase wage dispersion, particularly at the lower end. The estimated effects of the property tax increase rapidly from low- to median-wage groups. However, beyond the median wage the effect is relatively flat, and it declines slightly at the higher wage percentiles. Again in the context of the model presented in section 4, this is consistent with property taxes being nominally progressive at the lower end of the distribution, and flat or slightly regressive at the higher income levels, relative to the income tax.

Figures 7-10 plot the estimated effects of one standard deviation increases in expenditures per tax dollar on infrastructure, education, police, and health. The most interesting are Figure 7, expenditures on education, and Figure 8, expenditures on police and fire services. On net, increases in either the share of taxes spent on education or the share spent on police increase wage dispersion. However, in the case of education spending, wage dispersion increases because of wage increases in the top half of the wage distribution, relative to the median. With expenditures on police, the increased wage dispersion comes about because of declining wages for the lower percentiles relative to the median. In the context of the model in section IV, both are consistent with low-wage earners benefitting relatively more than high-wage workers from expenditures on education and police.

VI. Summary and Conclusions

This paper contributes to the literature on urban wage structures by exploring differences in the degree of wage dispersion that exists within urban areas. We begin by documenting that wage distributions vary considerably across cities, and that this variation cannot be explained entirely by differences in the supply of workers with different skills, or the size or region of the city. Differences in wage distributions also reflect variation in the wage premia earned by workers in the city, and we show that some, but not all, of these differences in wage premia are related to differences between cities in the returns to education and observed skills. We then demonstrate that these cross-city differences in the distribution of wage premia are persistent. We find that the current dispersion of wage premia is a very good predictor of future dispersion.

As previous work has indicated that fiscal policy can impact wage levels, we hypothesize that local fiscal policy may also contribute to the observed differences in wage distributions. We present a theoretical model which illustrates one possible mechanism by which local fiscal policy can affect the structure of wages. We then evaluate whether such a relationship between local fiscal policy and wage structure exists using data on 127 metropolitan areas from the 1990 and 1980 Censuses of Population, and the Census of Governments.

Overall, we find that the structure of wages in an urban area is related to the structure of taxes and composition of local expenditures. Looking first at the distribution of the skill-adjusted wages, we find more dispersion in wage premia in cities with higher overall taxes, fewer transfers from state and federal governments, and a greater share of spending on public health and community development. We then look at how the fiscal structure relates to wages of individuals at different points in the wage distribution. Here we find that a greater reliance on property taxes and other taxes is positively correlated with dispersion in the lower half of the skill-adjusted wage distribution, while greater expenditures on education are found to be positively related to dispersion in the upper half of the skill-adjusted wage distribution. In addition to fiscal structure, we also find evidence that differences in demand related to industry structure may be important in explaining cross-city differences in wage structure.

Thus, we have identified a number of factors that contribute to cross-city differences in wage structure. In future drafts of the paper we plan to assess the relative importance of these factors as well as others, considering the possibility of differences in the returns to unobservable skills. We will also examine the direction of causality between fiscal structure and wage structure. Our model implies that differences in the wage structure across cities result from capitalization of differences in fiscal structure. However, it is possible that the direction of causality might be the reverse: differences in wage structure lead to different fiscal structures. For example, our model suggests that higher police expenditures result in greater inequality at the lower end of the wage distribution through a compensating differential. However, it might be the case instead that more wage inequality at the lower end of the wage distribution leads to higher crime and therefore a greater demand for higher expenditures on police. To separate out the question of causality, we need instruments for tax structure: one possible instrument is tax limitation measures that were passed in several states during the 1980s. We also plan to investigate whether the results hold for longer time spans using data from the 1970 Census. In addition, we would like to examine the implications of using tax rates instead of tax revenues. Using tax rates we would be able to explore directly whether and how progressivity in taxation matters for pre-tax wage inequality.

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Table 1: Variable Means and Standard Deviations

	1980		1990	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**
	(1)	**(2)**	**(3)**	**(4)**
Scalar Measures of Dispersion				
Variance of Log Wages	0.2329	0.0249	0.2445	0.0275
(90^{th} percentile /10th percentile)	1.0884	0.0784	1.1507	0.0777
(90^{th} percentile /50th percentile)	0.4883	0.0458	0.5190	0.0462
(50^{th} percentile/10th percentile)	0.6001	0.0450	0.6317	0.0458
State and Local Taxes				
Total Taxes per capita as fraction of income per capita	0.1220	0.0255	0.1456	0.0285
Share Property Taxes	0.3205	0.0813	0.2466	0.0582
Share Sales Taxes	0.3749	0.1021	0.3183	0.1014
Share Income Taxes	0.1394	0.0928	0.1613	0.1026
Share Other Taxes	0.1652	0.0534	0.2738	0.0580
State and Fed Transfers, normalized by total taxes	0.2455	0.0635	0.3798	0.1298
State and Local Expenditures, per dollar tax revenues				
Share Infrastructure	0.1794	0.0550	0.1514	0.0413
Share Education	0.6256	0.1077	0.7282	0.1536
Share Police	0.0596	0.0152	0.0542	0.0145
Share Health	0.1463	0.0555	0.1408	0.0672
Amenities				
Population (millions)	1.1262	1.7287	1.2599	1.9423
Population Density (1000s)	0.3534	0.2891	0.3905	0.2996
Doctors (per 1,000 residents)	0.2034	0.0688	0.2185	0.0737
Serious Crime Rate (per 1000)	5.6202	1.7257	6.3513	1.7964
Heating Degree Days (1000s)	4.1411	2.1350	4.1411	2.1350
Cooling Degree Days (1000s)	1.4878	1.0177	1.4878	1.0177

Notes: Inequality measures calculated from wages adjusted for skill.
Sources: 1980 and 1990 Censuses of Population, 1977 and 1987 Censuses of Governments.

Table 2: Means and Range of Scalar Measures of Wage Dispersion, by Region and by City Size

				Controlling for Individual Characteristics				
	# obs.	Var log wage 1990	Var log wage 1980	Var log wage 1990	Var log wage 1980	log($90^{th}/10^{th}$) 1990	log($50^{th}/10^{th}$) 1990	log ($90^{th}/50^{th}$) 1990
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Full Sample								
Mean	127	0.349	.303	.244	.233	1.151	.519	.632
Std. Dev.	127	0.048	.044	.028	.025	.776	.046	.046
Range	127	.244 -.499	.212 -.443	.180 -.326	.174 - .292	.982 - 1.318	.411 - .638	.514 - .742
Mean by Region								
Northeast	23	0.302	.269	.218	.209	1.064	.477	.587
North Central	27	0.319	.263	.230	.213	1.105	.482	.622
South	54	0.373	.327	.257	.246	1.191	.548	.643
West	23	0.376	.328	.258	.247	1.194	.534	.660
Mean by 1990 City Size								
< 500,000	53	0.339	.298	.241	.232	1.151	.518	.632
500,000-1,000,000	36	0.348	.304	.244	.233	1.149	.521	.627
> 1,000,000	38	0.364	.310	.249	.234	1.152	.517	.635

Sources: 1980 and 1990 Censuses of Population.

Table 3: Persistence of Wage Dispersion

	Theil Decomposition, % within year variation	Rank Correlation, 1990, 1980	Regression of 1980 value on 1990 value	
			Beta (Std. Err.)	R^2
	(1)	(2)	(3)	(4)
Scalar Measures of Dispersion				
Variance of Log Wages	95.3%	.814	.899 (.057)	.663
(90^{th} percentile /10^{th} percentile)	86.2	.814	.807 (.051)	.663
(50^{th} percentile /10^{th} percentile)	89.2	.678	.690 (.067)	.460
(90^{th} percentile /50^{th} percentile)	89.9	.804	.858 (.047)	.724
Returns to Education (relative to college grad)				
HS Dropout	23.2	.328	.469 (.121)	.108
HS Graduate	19.5	.295	.357 (.103)	.087
College Dropout	24.6	.297	.285 (.082)	.088
Returns to Skill				
Decile 10 - Decile 1	56.2	.408	.364 (.072)	.166
Decile 9 - Decile 2	54.6	.453	.396 (.070)	.205
Decile 10 - Decile 6	65.7	.521	.528 (.078)	.271
Decile 5 - Decile 1	78.8	.449	.540 (.096)	.202

Notes: Inequality measures calculated from wages adjusted for skill. Returns to education estimated from CMSA-specific regressions. See text for definitions of skill deciles.

Sources: 1980 and 1990 Censuses of Population.

Table 4: Persistence of Fiscal Structures and Amenities

	Theil Decomposition, % within year variation	Rank Correlation, 1990, 1980	Regression of 1980 value on 1990 value	
			Beta (Std. Err.)	R^2
	(1)	(2)	(3)	(4)
State and Local Taxes				
Taxes per Capita	76.2%	.876	1.107 (.054)	.768
Total Taxes per capita as fraction of income per capita	83.2	.723	.807 (.069)	.523
Share Property Taxes	78.6	.759	.543 (.042)	.575
Share Sales Taxes	92.9	.950	.943 (.028)	.902
Share Income Taxes	99.1	.921	1.019 (.038)	.849
Share other	52.1	.530	.698 (.100)	.281
State and Federal Subsidies/Taxes	66.3	.611	1.248 (.145)	.373
State and Local Expenditures				
Share Infrastructure	92.2	.721	.541 (.047)	.520
Share Education	86.0	.666	.949 (.095)	.443
Share Health	99.8	.726	.878 (.074)	.527
Share Police	96.8	.832	.792 (.047)	.693
Amenities				
Population	99.7	.992	1.114 (.013)	.984
Population Density	95.5	.989	1.025 (.014)	.977
Doctors	98.8	.986	1.056 (.016)	.972
Serious Crime Rate	95.9	.844	.878 (.050)	.712

Notes: Inequality measures calculated from wages adjusted for skill.
Sources: 1980 and 1990 Censuses of Population, 1977 and 1987 Censuses of Governments.

Table 5: Parameter estimates from wage dispersion regressions, 1990.

	Variance of log Wages						90^{th} - 10^{th} pctile		50^{th} - 10^{th} pctile		90^{th}- 50^{th} pctile	
	Coef.	Std Err.	Coef.	Std Err.	Coef.	Std Err.	Coef.	Std Err.	Coef.	Std Err.	Coef.	Std Err.
	(1)		(2)		(3)		(4)		(5)		(6)	
State and Local Taxes (personal income tax omitted)												
Total Taxes as fraction of income	0.3734 [a]	0.0818	0.3620 [a]	0.0788	0.2541[a]	0.0964	0.6670 [b]	0.2738	0.4110 [b]	0.1745	0.2491[c]	0.1390
Share Sales Taxes	0.0432 [c]	0.0262	0.0515 [b]	0.0246	0.0078	0.0243	0.0216	0.0690	0.0063	0.0493	0.0147	0.0393
Share Property Taxes	0.0448	0.0356	0.0308	0.0333	0.0219	0.0328	0.0969	0.0933	0.1272 [c]	0.0649	-0.0290	0.0517
Share Other Taxes	0.0612 [c]	0.0355	0.0830 [b]	0.0335	0.0415	0.0346	0.1560	0.0983	0.1400 [b]	0.0703	0.0154	0.0560
State and Fed Transfers, relative to taxes	-0.0616 [a]	0.0226	-0.0570 [a]	0.0212	-0.0439 [b]	0.0209	-0.0730	0.0594	-0.0340	0.0417	-0.0383	0.0332
Government Spending per tax dollar on												
Infrastructure	0.1491 [a]	0.0576	0.0563	0.0574	0.0705	0.0565	0.2006	0.1605	0.1489	0.1087	0.0487	0.0866
Education	0.0282	0.0197	0.0105	0.0188	0.0141	0.0218	0.0534	0.0618	-0.0399	0.0388	0.0916 [a]	0.0309
Police	0.5130 [a]	0.1845	0.2964 [c]	0.1810	0.2543	0.1764	0.7051	0.5012	0.5178	0.3600	0.1893	0.2867
Health	0.0613 [b]	0.0282	0.0481 [c]	0.0271	0.0632 [b]	0.0248	0.1514 [b]	0.0703	0.0866 [c]	0.0507	0.0648	0.0404
Other City Characteristics												
Population	0.0037 [a]	0.0011	0.0031 [a]	0.0010	0.0025 [b]	0.0010	0.0072	0.0029	0.0037 [c]	0.0020	0.0035 [b]	0.0016
Population Density	-0.0080	0.0078	0.0041	0.0077	-0.0025	0.0074	-0.0168	0.0210	-0.0190	0.0148	0.0025	0.0118
Heating Degree Days	-0.0063 [a]	0.0018	-0.0013	0.0023	-0.0019	0.0021	-0.0054	0.0060	-0.0016	0.0043	-0.0039	0.0034
Cooling Degree Days	-0.0037	0.0038	0.0039	0.0043	0.0000	0.0041	-0.0011	0.0118	0.0015	0.0085	-0.0026	0.0067
Doctors per 1,000	0.0539 [b]	0.0268	0.0579 [b]	0.0251	0.0113	0.0290	0.0990	0.0823	0.0221	0.0591	0.0766	0.0471
Crime Rate	0.0010	0.0013	0.0001	0.0012	-0.0005	0.0011	-0.0013	0.0032	-0.0005	0.0023	-0.0008	0.0018

Region (Northeast omitted region)												
North			0.0861 [b]	0.0273	0.0151 [a]	0.0058	0.0413 [b]	0.0164	0.0288 [b]	0.0117	0.0124	0.0093
South			0.0139 [a]	0.0055	0.0277 [a]	0.0084	0.0772 [a]	0.0239	0.0475 [a]	0.0163	0.0293 [b]	0.0130
West			0.0297 [a]	0.0077	0.0247 [a]	0.0083	0.0727 [a]	0.0236	0.0608 [a]	0.0170	0.0119	0.0136
Business Cycle												
Unemployment Rate					0.0017	0.0021	0.0093	0.0059	0.0104 [a]	0.0038	-0.0010	0.0030
Median Wage					0.0054	0.0312	0.0048	0.0886				
Industry Structure: Share of Employment in (Construction omitted)												
Non-Durables					-0.1015 [b]	0.0460	-0.2471 [c]	0.1308	-0.0256	0.0817	-0.2179 [a]	0.0651
Durables					-0.0783 [b]	0.0391	-0.3068 [a]	0.1110	0.0168	0.0650	-0.3201 [a]	0.0518
Transportation					0.0110	0.0926	0.0849	0.2631	0.4922 [a]	0.1769	-0.4022 [a]	0.1409
Trade					-0.0187	0.0750	-0.2394	0.2129	-0.3232 [b]	0.1493	0.0811	0.1190
Finance					0.1770	0.1499	-0.1061	0.4258	-0.3575	0.3008	0.2559	0.2397
Services					0.0774	0.0630	0.0584	0.1789	0.0984	0.1187	-0.0362	0.0945
Professional Services					0.1440 [c]	0.0776	0.2775	0.2203	0.4318 [a]	0.1555	-0.1519	0.1238
Public Administration					-0.2912 [a]	0.0747	-0.8704 [a]	0.2121	-0.3036 [a]	0.1409	-0.5623 [a]	0.1123
Other					0.0632	0.0668	0.1133	0.1897	0.0348	0.1264	0.0824	0.1007
adjusted R^2	.5988		.6555		.7287		.7251		.5894		.7442	

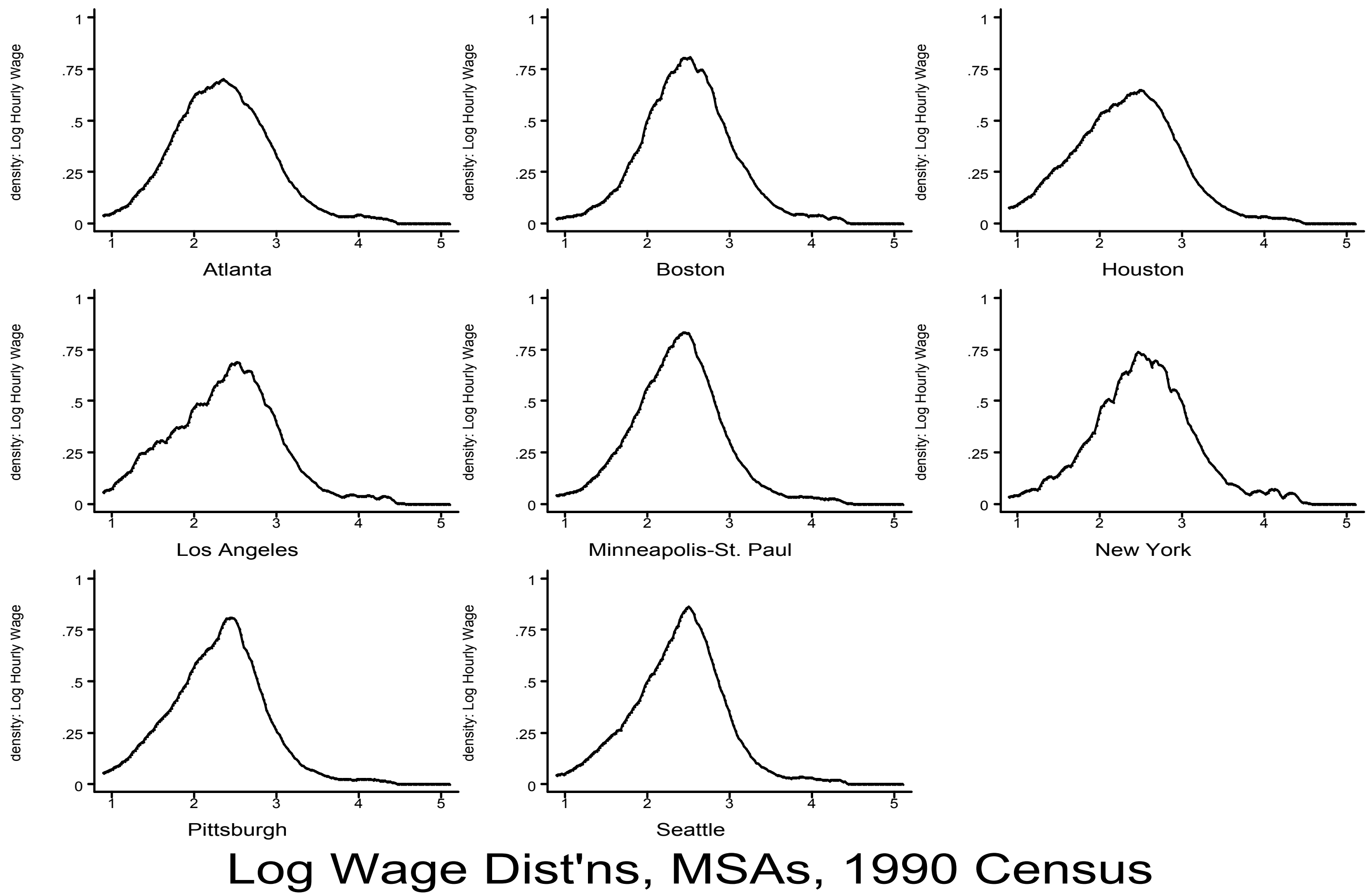
Notes: Dependent variables calculated from skill-adjusted wages distributions. Number of observations is 127.
[a, b, c] indicate significant at 1%, 5%, and 10% levels of confidence, respectively

Table 6: Parameter estimates from wage dispersion regressions, pooled 1980 and 1990 data.

	Var of log wages		90^{th}-10^{th} pctile		50^{th}-10^{th} pctile		90^{th}- 50^{th} pctile	
	Coef.	**Std Err.**	**Coef.**	**Std Err.**	**Coef.**	**Std Err.**	**Coef.**	**Std Err.**
	(1)		**(2)**		**(3)**		**(4)**	
State and Local Taxes (personal income tax omitted)								
Total Taxes as fraction of income per capita	-0.0764	0.1349	0.3054	0.3647	0.6106[b]	0.2566	-0.1172	0.1989
Share Sales Taxes	0.0945	0.0739	0.3763[c]	0.1998	0.3051[b]	0.1478	0.1297	0.1146
Share Property Taxes	-0.0160	0.0482	-0.0044	0.1302	0.0145	0.0976	0.0052	0.0757
Share Other Taxes	0.0848	0.0582	0.3139[b]	0.1574	0.1810	0.1175	0.1678[c]	0.0911
State and Fed Transfers, relative to taxes	-0.0178	0.0238	0.0087	0.0644	0.0101	0.0473	0.0202	0.0366
Government Spending per tax dollar on								
Infrastructure	-0.0327	0.0489	-0.0782	0.1322	-0.0168	0.0930	-0.1296[c]	0.0721
Education	-0.0003	0.0211	0.0157	0.0570	0.0009	0.0430	0.0079	0.0333
Police	-0.2436	0.2157	-0.2434	0.5830	0.2332	0.4385	-0.3904	0.3400
Health	-0.0257	0.0367	0.0222	0.0991	-0.0579	0.0749	0.0818	0.0581
Other City Characteristics								
Population	0.0013	0.0055	0.0123	0.0149	0.0062	0.0112	0.0083	0.0087
Population Density	0.0646	0.0474	0.0052	0.1281	0.0145	0.0887	-0.0815	0.0688
Doctors per 1,000	0.0203	0.1287	0.0426	0.3479	0.1239	0.2632	-0.0800	0.2040
Crime Rate	0.0002	0.0017	-0.0007	0.0046	0.0006	0.0034	-0.0027	0.0026
Business Cycle								
Unemployment Rate	0.0014	0.0018	0.0052	0.0047	0.0045	0.0034	0.0026	0.0027
Median wage	0.0054	0.0373	-0.1418	0.1009				
Industry Structure: Share of Employment in (Construction omitted):								
Non-Durables	0.0759	0.1232	-0.3675	0.3329	0.0109	0.2417	-0.2472	0.1379
Durables	0.0007	0.0885	-0.2139	0.2392	-0.1187	0.1778	-0.0334	0.2399
Transportation	0.0676	0.1515	0.0598	0.4094	0.1701	0.3094	-0.1319	0.1967
Trade	-0.0602	0.1247	-0.2592	0.3370	0.1273	0.2537	-0.3424[c]	0.4387
Finance	0.0351	0.2777	-0.3135	0.7505	-0.9482[c]	0.5658	0.7189	0.1681
Services	0.1952[c]	0.1060	0.0817	0.2866	0.0771	0.2168	0.0028	0.2352
Professional Services	0.4720[a]	0.1519	0.9004[b]	0.4105	0.6873[b]	0.3034	0.3356	0.2477
Public Administration	0.0720	0.1564	-0.0666	0.4227	-0.1645	0.3195	0.1200	0.0397
Other	0.0150	0.0255	0.0223	0.0690	0.0279	0.0512	0.0137	0.1874
Year (=1980)	0.0030	0.0081	-0.0064	0.0220	0.0038	0.0166	-0.0128	0.0128
R^2	0.9366		0.9527		0.9164		0.9507	

Notes: Dependent variables calculated from skill-adjusted wage distributions. Number of obs. is 127.
[a, b, c] indicate significant at 1%, 5%, and 10% levels of confidence, respectively. All models include city-specific fixed effects.

Figure 1.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.75
.5
.25
0
1
2
3
4
5
Atlanta
Boston
Houston
Los Angeles
Minneapolis-St. Paul
New York
Pittsburgh
Seattle
Log Wage Dist'ns, MSAs, 1990 Census

Figures 2-10: Coefficients from regressions run by percentile in city wage distribution (x one standard deviation change in variable).

Figure 2: Coefficients on Total Taxes/Income

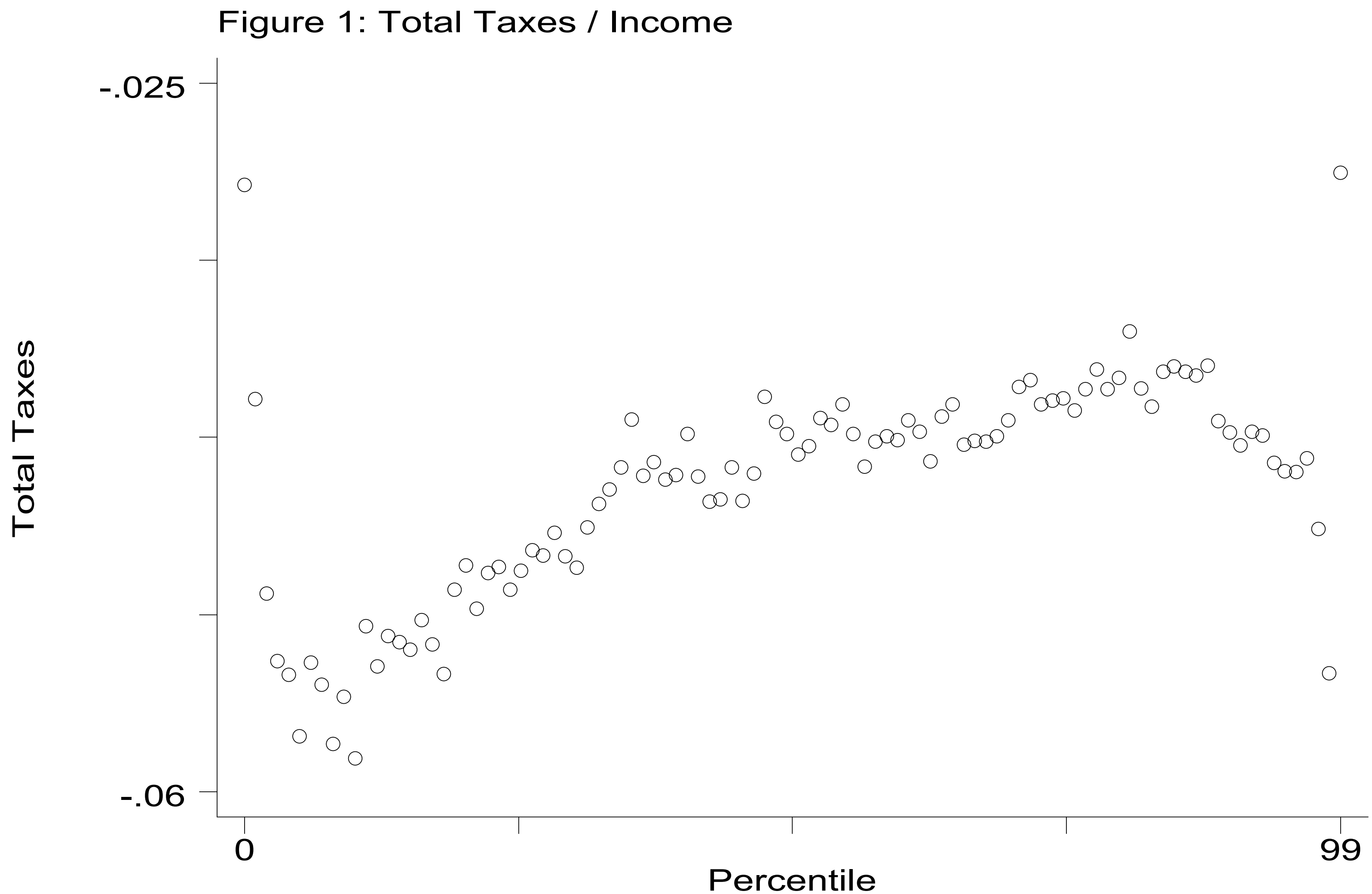

Figure 3: Coefficients on Share of Sales Taxes

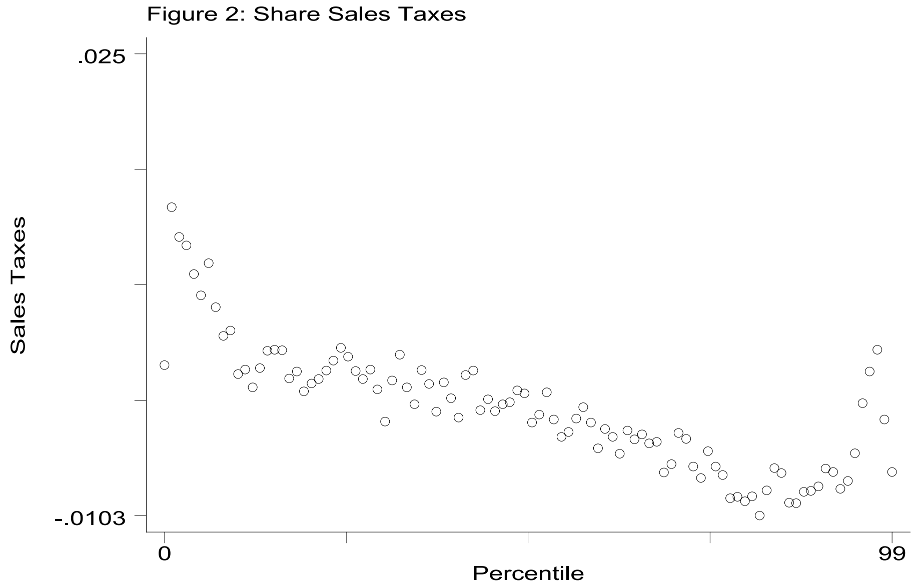

Figure 4: Coefficients on Share Property Taxes

Figure 5: Coefficients on Share Other Taxes

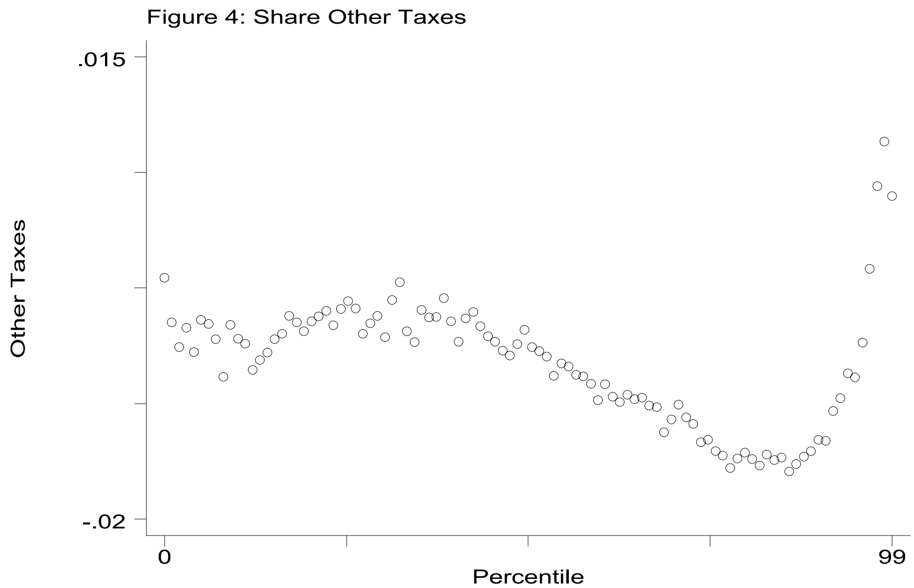

Figure 6: Coefficients on Federal and State Subsidies, per tax dollar

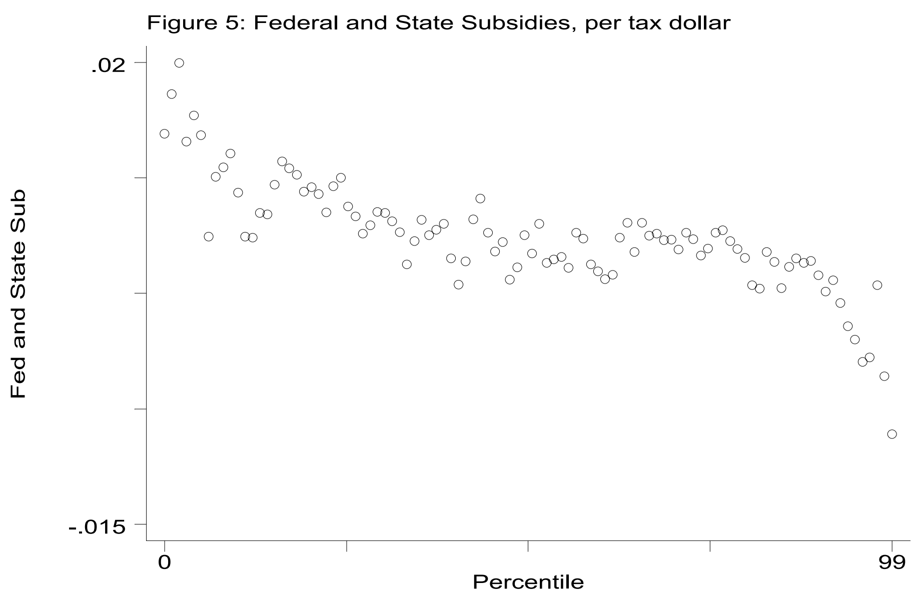

Figure 7: Coefficients on Share of Spending on Infrastructure

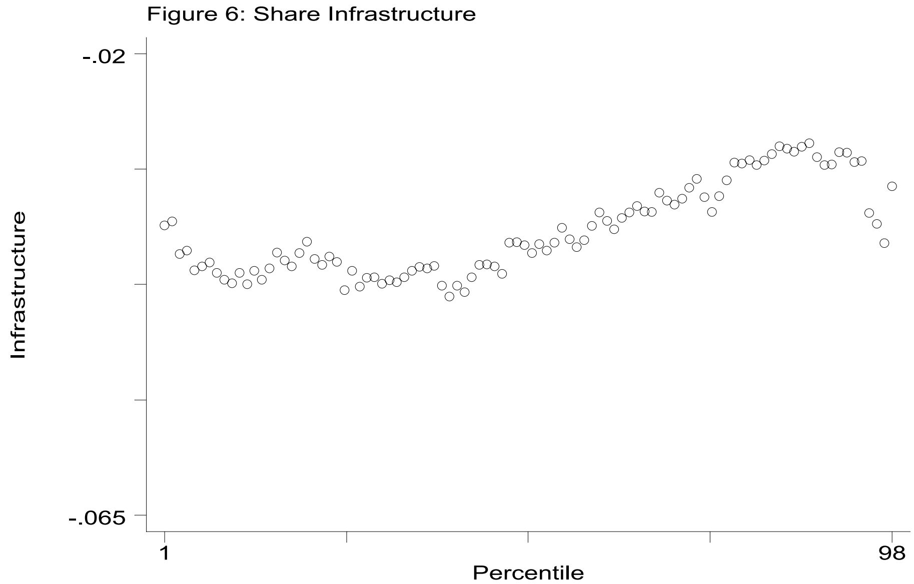

Figure 8: Coefficients on Share of Spending on Education

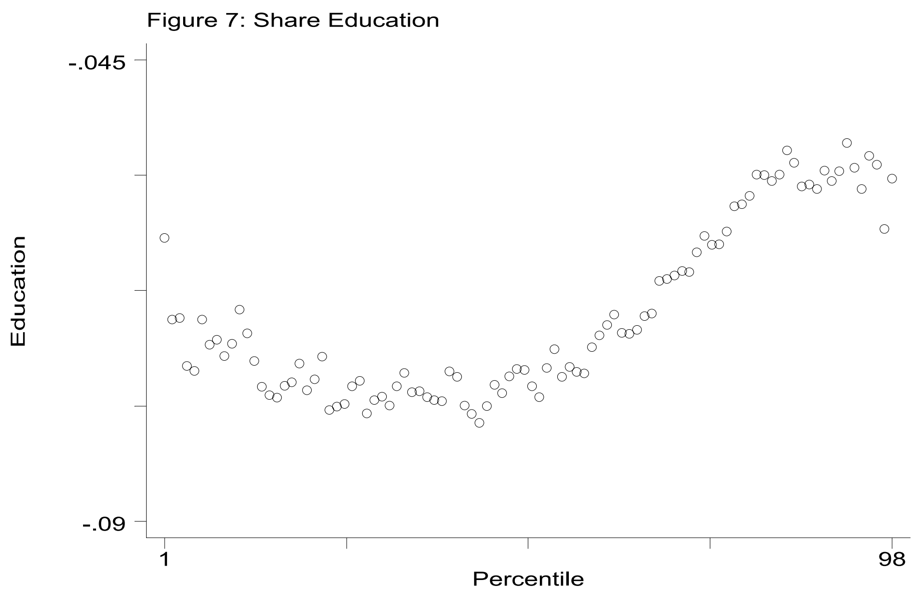

Figure 9: Coefficients on Share of Spending on Police Services

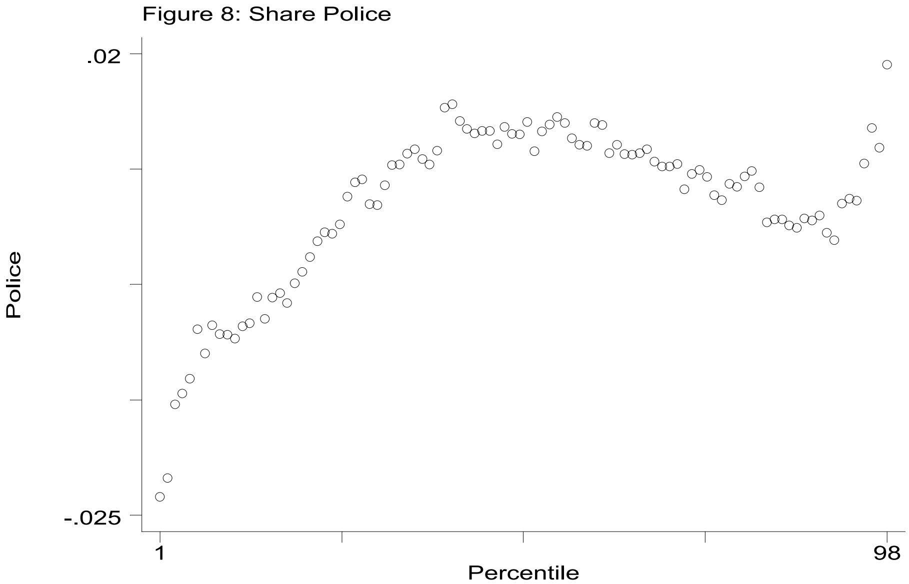

Figure 10: Coefficients on Share of Spending on Health Care