STATE RULES AND POPULATION HETEROGENEITY ON THE FORMATION OF NEW JURISDICTIONS IN MAJOR U.S. METROPOLITAN AREAS

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ABSTRACT

There are relatively few empirical studies examining the determinants of local government structure and how voters sort themselves into various local governments. These studies have concluded that greater fiscal decentralization occurs when demands for government services of residents within a metropolitan area are more heterogeneous. These findings support the fiscal decentralization hypothesis. However, in a more recent panel study utilizing fixed effects model, I find no evidence of Tiebout-sorting process. There is some evidence of greater decentralization of local government structure, similar to the past studies, if the fixed-effects are not controlled. I find that the state rules have significant impact on the formation of new jurisdictions.

INTRODUCTION

Since the early work of Borcherding & Deacon (1972) and Bergstrom & Goodman (1973), empirical studies of the determinants of demand for government spending typically find that demand is a function of socio-economic variables such as income, age, and race. Another strand of the local public finance literature examines the determinants of local government structure and attempts to explain how voters sort themselves into various local governments according to these population characteristics. This paper is motivated by a relatively small number of recent empirical studies that attempt to explain variation in local government structure across

metropolitan areas by examining the relationship between population characteristics and the number and size of local governments within a metropolitan area. Specifically, studies by Nelson (1990), Kenny and Schmidt (1994), Martinez Vazquez et al. (1997), Wassmer and Fisher (1997), and Fisher and Wassmer (1998) have investigated the relationship between measures of population heterogeneity and the number and size of local governments in U.S. metropolitan areas.

A common theoretical framework underlying these studies is the "fiscal decentralization" hypothesis. As suggested by the work of Tiebout (1956) and as explained by Oates (1972, p. 35), a system of decentralized local governments can achieve allocative efficiency in the provision of local public goods by allowing consumers with different preferences for government spending to reside in different communities. Instead of having many heterogeneous consumers who are dissatisfied with the quantity of government services offered by a single centralized government, decentralized provision can increase consumer welfare by improving the match between consumers' demands and the services provided. Proponents of the fiscal decentralization theorem predict that there will be a positive relationship between the variation in demands for government services across consumers within a metropolitan area (or state or country) and the degree of government decentralization or fragmentation.

This paper investigates whether or not a more diverse population will be associated with a greater number of relatively smaller local governments within a metropolitan area. In an extension of the previous studies, this study will make use of the availability of repeated observations on local government structure and metropolitan population characteristics over time to investigate the observed and unobserved determinants of local government structure. Unlike the previous studies, this study pays close attention to certain methodological issues such as the appropriateness of using pooled data from different years in panel data analysis and use of the appropriate econometric methods when the dependent variable is based on counts. Importantly, this paper improves upon past research by attempting to avoid spurious estimated relationships between government structure and population characteristics by restricting the analysis to those metropolitan

areas that have not had their definitions or boundaries changed over time by the U.S. Census Bureau.

CHANGES IN LOCAL GOVERNMENT STRUCTURE

Table 1 summarizes the changes in local government structure[1] between 1952 and 1992. The Census of Governments (1992) reported that there were 81,912 units of local governments (excluding county governments) in 1992 compared to 79,249 units in 1982, an overall increase of 3.4%. Virtually all of the increase is in special district governments, which increased 10.4% over the ten-year period. There is a decrease in the number of independent school districts, which reflects a continued decline over the past forty years, primarily as a result of state-imposed school district consolidation and reorganization. Consolidation mainly occurs in the rural districts (Census of Governments, 1992).

Table 1: Number of units of different types of local governments between 1952 and 1992

Structure of local governments	1992	1982	1952
Total Governments	81,912	79,249	113,704
Municipalities & Townships	35,935	35,810	34,009
Independent School Districts	14,422	14,851	67,355
Special Districts	31,555	28,588	12,340

The rapid increase in the special district governments needs careful examination. From 1952 to 1992, the number of units of special district governments increased dramatically from 12,340 to 31,555, an increase of 156%. Borcherding and Deacon (1972) noted that the increase in the number of single-function units of government was in response to shifting population patterns and demands for specific additional services. The Census of Governments (1992) also reported that the rapid increase in the special

district governments reflects the increased citizen's demand for the provision of services, which are very specific to their tastes and preferences and not offered by the existing governments. Also, the debt and tax limits imposed on cities may be further stimulants for creating special districts.

Against this background, it is very surprising to find only a few empirical studies investigating the role of population heterogeneity in creating more units of local governments. There are more normative and conceptual viewpoints about how governments are more or less centralized at international, national, and state level (Oates, 1972). These studies also look at efficiency of the various layers of government.

Only five empirical studies (Nelson, 1990; Kenny & Schmidt, 1994; Martinez-Vazquez, Rider, and Walker, 1997; Fisher & Wassmer, 1998; Wassmer & Fisher, 1997) have investigated the change in the number of local government units that focus on the decentralization hypothesis. These studies have found that increases in the variations of tastes and income factors may be associated with greater decentralization of local government structure. Only two of those studies used repeated cross-sections observed over at least two points in time (Martinez-Vazquez et al., 1997; Wassmer and Fisher, 1997). However, these studies do not exploit the usefulness of the panel data by taking full account of the possibilities for controlling for unobserved metropolitan characteristics that are fixed over time. While Wassmer and Fisher are careful to distinguish between metropolitan areas that change their boundaries over time and metropolitan areas that maintain the same boundaries, the metropolitan results in Martinez-Vazquez (1997) appear to be based on a sample that contains a mixture of both stable and changing metropolitan areas.

EMPIRICAL MODEL AND DATA

The fiscal decentralization hypothesis and Tiebout-sorting mechanism imply that the optimal level of utility of an individual from the consumption of a local public bundle increases as the number of jurisdictions increases within a metropolitan area, in the presence of population heterogeneity. It also implied that as the level of population heterogeneity increases due to

increasing population, the optimal level of utility decreases if the number of jurisdictions remains unchanged. Thus, if there is an increase in population heterogeneity, the optimal level of utility of an individual will be unchanged only if the number of jurisdictions increases. Therefore, the underlying hypothesis for my empirical analysis is that the optimal number of governments within a metropolitan area will be directly related to population heterogeneity.

I examine both the total number of governments and the number of governments in each type of government structure within a metropolitan area to see how they are influenced by population heterogeneity during the period between 1980 and 1990. Since the literature review suggests that the optimal structure of a local government depends both on demand and supply factors of a local public bundle, my general empirical model will take into account factors such as income, tastes and preferences, and economies of scale. In addition, past studies have indicated that geographical constraints, and political and institutional factors, may influence the number of local governments in a metropolitan area. Even though population heterogeneity may favor an increase in the number of local governments, a metropolitan area may be geographically and/or institutionally constrained so as to prevent an increase in the number of local governments. Alternatively, a more homogenous population may still have more units of local governments if these constraints do not allow required changes in the composition of the local public bundle. Therefore, to examine empirically the underlying hypothesis that the optimal number of local governments will be directly related to population heterogeneity, ceteris paribus, my empirical model must control for the factors just described.

My empirical model is that in a metropolitan area, the optimal local government structure, as given by the number of local governments, J of type g is given by:

$$J_g = J \left[\text{(population heterogeneity), (environmental factors), (institutional factors)} \right]$$

where g total governments, municipalities and townships, independent school districts, and special districts.

DATA

I have selected metropolitan areas with population of at least 200,000 and with at least one central city being the same in both 1980 and 1990. The Census of Population is done every ten years and therefore the data on population characteristics for 1982 and 1992 come from 1980 and 1990 Census of Population data, respectively. Since the Tiebout process requires that residents have a wide choice of government services with a large number of competing governments trying to attract residents, larger metropolitan areas will allow residents more options of jurisdictional locations given their tastes and preferences for public goods. This resulted in an initial sample of 162 metropolitan areas.

Also, since I am looking at changes in local government structure for two time-periods, 1982 and 1992, the metropolitan areas selected must meet some requirements for meaningful comparisons of data from those periods. Therefore, my final sample includes only those metropolitan areas that have retained the same physical boundaries. It consists of 95 metropolitan areas that have the same counties both in 1982 and 1992. Previous studies failed to investigate the importance of changing official definitions of metropolitan areas. Since this sample consists of metropolitan areas that have not changed the physical boundaries, the average population and land area of these metropolitan areas were found to be less than the average population and land area of the metropolitan areas in the initial sample. Therefore, the final sample consists of relatively smaller metropolitan areas compared to those in the initial sample.

LOCAL GOVERNMENT STRUCTURE

The Census of Governments records data on the different types of local governments. These are: municipal governments, township governments, school districts (including independent school districts), and

special districts. The 1982 and 1992 Census of Governments data were used. This paper investigates the effect of population heterogeneity variables on each type of local government structure as well as on the total number of governments (excluding county governments). To look at the change in number of governments of each type of government, the difference between the number of governments of type "g" between 1992 and 1982 was used.

POPULATION HETEROGENEITY VARIABLES

According to the fiscal decentralization hypothesis, I expect that population heterogeneity is directly influencing the number of local governments. Since variation in the economic and demographic characteristics of population give rise to heterogeneous demand for local public goods within a metropolitan area, I collected data on three key variables: income, age, and race. Income heterogeneity is measured using the coefficient of income variation measure that is consistent with the past studies (Fisher and Wassmer, 1998; Martinez-Vazquez, et al., 1997) on this topic. But for age and race heterogeneity, I have used Leik Index (Leik, 1966). Leik Index measures dispersion for ordinal variables or categorical data. It ranges from zero to one, with one representing least homogenous or greatest dispersion. Leik Index is used for age and race because data on all those ordinal variables are either recorded in uneven intervals or they are mainly categorical data. I would like to note that Martinez-Vazquez, et al. (1997) have used Leik Index for measuring both age and race heterogeneity while Fisher and Wassmer (1998) have used Leik to measure only racial heterogeneity.

ENVIRONMENTAL VARIABLES

Several environmental variables may influence local government structure. I have included population, land area, and regional dummies. Population and land area are expected to positively influence the number of local governments within a metropolitan area because with either larger population or larger area, the population is expected to get more diverse.

Therefore, with congestion, the cost of providing government services will go up as discussed in the theoretical model. So, more governments are created to avoid a higher tax price for the same government services. I have also included regional dummies, northeast, south, midwest, and west.

INSTITUTIONAL VARIABLES

State laws and constitutional mandates may also influence residents' choice regarding the structure of local governments. The U.S. Advisory Commission on Intergovernmental Relations (U.S. ACIR) was created by the Congress in 1959 to monitor the operations and practices of federal, state, and local governments and to recommend improvements for achieving equitable allocation of resources, increased efficiency and equity, and better coordination and cooperation. U.S. ACIR reports data on various statewide restrictions. From a whole range of these restrictions (Hill, 1978), I have selected only a few that in the past studies (Nelson, 1990 and Wassmer & Fisher, 1997) were found to be significant in influencing the local government structure. These are debt and property tax limitations, functional home-rule authority, population limit, referendum and majority approval for consolidation.

Debt and property tax limitations will positively influence the number of governments because when a metropolitan area has these limits and there is a need to overcome these limits due to different demands for government services, residents will create more governments to satisfy their needs.

Home-rule authority gives the residents more discretion in carrying out various local functions. Therefore there is less need for creating more governments to meet those demands for government services. Also, if a minimum population is required to incorporate local units then that would negatively influence the number of local governments.

If it were more difficult to consolidate existing units because of law requiring referendum and majority approval then existence of such law would require creation of more governments to meet the needs rather than consolidate those existing units.

ESTIMATION STRATEGY

Past empirical studies on local government structure have used either linear or non-linear specification of the ordinary least square estimation. In general terms, the ordinary least squares model (OLS) is of the form:

$$J_i = \beta_0 + \beta_1 H_Y + \beta_2 H_E + \beta_3 H_A + \beta_4 H_R + u_i$$

where J_i is the number of local governments in metropolitan area *i* and H_k represents variations of population heterogeneity variables, k ϵ Y, E, A, and R

The OLS model assumes that the data is normally distributed and that the dependent variable, J_i, is continuous. In my data, the dependent variable J_i is a count of the number of local governments in metropolitan area *i*. Therefore, the use of OLS model for count variables may result in inefficient, inconsistent, and biased estimates (Hausman et al., 1984; Cameron and Trivedi, 1986).

Count data models are more appropriate than the OLS model when the dependent variable is a non-negative integer valued random variable. For example, if the dependent variable is the number of patents applied for and received by firms in a given year (Hausman et al., 1984) or how frequently a person visited the doctor (Cameron and Trivedi, 1986) or number of derogatory reports in an individual's credit history, count data models have been used.

The simplest form of a count data model is the Poisson regression model. It is the oldest parametric count model with a tight distributional and parametric structure. The discrete non-negative nature of the dependent count variable generates non-linearities that make the usual linear regression models inappropriate. Using the OLS model, therefore, may result in biased estimates, and OLS might predict a negative number of governments.

In practice, count variables often have the presence of overdispersion, i.e., the conditional variance is greater than the conditional mean. If overdispersion is present the Poisson estimates will be inefficient and biased

(Cameron & Trivedi, 1986). Overdispersion can arise for reasons such as unobserved heterogeneity.

In order to account for overdispersion, one possible extension of the Poisson regression model is to include an unobserved metropolitan specific effect, which allows the conditional variance to exceed the conditional mean, and is called the negative binomial regression model. A log-likelihood ratio test will determine the overdispersion and therefore the appropriateness of the Poisson versus negative binomial (Cameron & Trivedi, 1986, 1990). If ln LPRM is the log-likelihood from the Poisson regression model and ln LNBRM is the likelihood from the negative binomial regression model, the likelihood ratio test statistic is given by:

$$\textit{Likelihood ratio test statistic (LR)} = 2\,(ln_{NBRM} - ln_{PRM})$$

In the next section, I discuss the appropriateness of using the negative binomial regression model in this study based on the likelihood ratio test.

EMPIRICAL RESULTS

In this section, the empirical results of how variations in population characteristics among residents influence the local government structure are discussed using the final sample of 95 metropolitan areas that have the same counties both in 1982 and 1992. Previous studies failed to investigate the importance of comparing metropolitan areas over time by retaining the same physical boundaries. First, I will discuss the pooled cross-sectional results between 1982 and 1992. Then, results from panel fixed effects that control for unobserved metropolitan area fixed effects will be analyzed.

POOLED CROSS-SECTIONAL RESULTS

In this study, I examine whether a positive relationship between population heterogeneity variables and the number of local governments exists across the metropolitan areas over two time periods, 1982 and 1992. Table 2 reports the pooled results for total governments, municipalities,

school districts, and special districts respectively. Before I could pool the two years of cross-section data I conducted likelihood ratio test for structural change to see if the two sets of coefficients of the explanatory variables were statistically the same in 1982 and 1992. The joint test[2] for structural change at a 99% level of confidence could not reject the null hypothesis that the coefficients were same. Therefore, pooling the cross-sectional data was appropriate.

The findings of the influence of population heterogeneity variables on local government structure from pooled regression results provide some interesting implications. Even though the individual population heterogeneity variables do not strongly support the decentralization hypothesis, my results clearly demonstrate that the interactive population heterogeneity variables are more significant. Each of the population heterogeneity variables may not be significantly affecting the number of local governments directly, but through their interaction the local government structures across metropolitan areas are affected.

Income heterogeneity was positive and significant for special districts and total governments. Age heterogeneity directly affected the special districts too. Also, population diversity in both income and age led to a statistically significant increase in the number of municipalities.

Race heterogeneity was found to be negative for all types of local governments but only significant for special districts and total number of local governments. However, the coefficient of age-race heterogeneity has a positive significant effect on all types of governments. Income-race heterogeneity has a significant negative effect on school districts, special districts and total governments when age heterogeneity is controlled. The positive age-race heterogeneity coefficient lends some support to the heterogeneous demand argument rather than the "taste for association" argument provided by Martinez-Vazquez, et al (1997). Taste factors such as age and race do affect demand for public education and special services. Therefore, it is not surprising to find that metropolitan areas with greater diversity with respect to both age and race will have more school districts and special districts.

Table 2: Pooled Cross-sectional Negative Binomial Regression Estimates for the Number of Local Governments in 95 Major U.S. Metropolitan Areas during 1982-1992

Explanatory variable	Total Governments	Municipalities	School Districts	Special Districts
State Rules				
Home rule	-11.46 (-1.82)*	-4.84 (-1.57)	6.86 (3.79)***	-15.79 (-4.66)***
Min pop limit	-23.16 (-3.12)***	-3.98 (-1.00)	-3.82 (-1.84)*	-16.60 (-3.76)***
Consolidation limit	-0.32 (-0.04)	0.84 (0.19)	5.77 (2.41)**	-5.75 (-1.32)
Debt limits on cities	27.30 (2.88)***	8.73 (1.65)*	7.65 (2.73)***	12.02 (2.16)**
Tax limits on cities	-11.66 (-1.36)	-4.16 (-1.04)	3.48 (1.45)	-8.45 (-1.76)*
Metro Characteristics				
Northeast	73.39 (5.42)***	27.87 (4.16)***	24.03 (7.00)***	18.70 (1.96)**
Midwest	76.58 (5.98)***	36.18 (5.76)***	28.02 (8.75)***	2.78 (0.40)
West	23.28 (2.07)**	-34.40 (-5.33)***	22.05 (8.27)***	16.68 (2.55)**
Land area	0.53E-02 (3.25)***	0.27E-02 (4.57)***	0.49E-03 (1.08)	0.25E-02 (2.72)***
Population	0.56E-03 (4.51)***	0.16E-03 (3.36)***	0.86E-04 (3.13)***	0.30E-03 (3.64)***
Heterogeneity measures				
Income	14.32 (1.97)**	3.38 (0.98)	0.32 (0.16)	9.12 (1.95)*
Income-squared	-0.15 (-2.94)***	-0.86E-01 (-3.26)***	-0.12E-01 (-0.81)	-0.47E-01 (-1.41)
Income * Population	-0.41E-07 (-0.08)	-0.16E-06 (-0.65)	-0.14E-06 (-1.07)	-0.61E-07 (-0.20)
Age	3253.58 (1.56)	679.17 (0.62)	812.39 (1.25)	1920.65 (2.00)**
Age-squared	-5133.90 (-2.00)**	-2494.54 (-1.98)**	-1448.93 (-1.71)*	-1606.00 (-1.20)
Age * Population	-0.13E-02 (-4.00)***	-0.39E-03 (-2.97)***	-0.15E-03 (-1.97)**	-0.70E-03 (-3.31)***

Table 2: Pooled Cross-sectional Negative Binomial Regression Estimates for the Number of Local Governments in 95 Major U.S. Metropolitan Areas during 1982-1992

Explanatory variable	Total Governments	Municipalities	School Districts	Special Districts
Race	-865.91 (-2.75)***	-72.81 (-0.48)	-117.49 (-1.13)	-481.12 (-2.67)***
Race-squared	111.44 (0.85)	78.53 (1.23)	3.45 (0.10)	-23.05 (-0.33)
Race * Population	-0.11E-03 (-4.34)***	-0.31E-04 (-2.59)***	-0.24E-04 (-3.57)***	-0.48E-04 (-2.93)***
Income * Age	18.09 (1.32)	21.81 (3.11)***	4.96 (1.04)	-5.64 (0.57)
Income * Race	-5.50 (-2.21)**	-0.18 (-0.12)	-1.52 (-1.88)*	-3.14 (-1.88)*
Age * Race	3170.22 (3.90)***	8.82 (0.02)**	630.08 (2.28)**	1945.88 (4.69)***
Constant	-804.25 (-1.66)*	-157.29 (-0.64)	-171.81 (-1.21)	-585.86 (-2.28)**
Log -L	-1012.08	-760.50	-727.74	-891.50

N=190. All coefficients are expressed as marginal effects; t-statistics in parentheses with *** (99%), ** (95%), and *(90%) confidence, respectively.

The negative income-race heterogeneity coefficient for school districts shows that demand for public education is expected to be similar within a metropolitan area with either a greater number of young children or more old people. So there is less desire to change school districts. If the coefficient of income-race heterogeneity was positive then "taste by association" might perhaps explain why a racially diverse population would like to create more school districts, as different races may not want to share the same public schools.

The state rule requiring a minimum population limit to create new governments plays a significant role in explaining why there are fewer school districts and special districts in the presence of increasing racial heterogeneity. Both for school districts and special districts, the coefficient of minimum population limit is negative and statistically significant. Therefore, the desire to create more governments because of heterogeneous

demands for government services is limited due to the existence of state rule requiring that there should be at least a minimum population to create a new government.

It is worth mentioning that the significant effects of the state rules in affecting the number of local governments can not be ignored, because most of the metropolitan areas experienced change in at least one or more state rules between 1982 and 1992. Home rule, minimum population limit, and debt limits significantly affected the total number of governments and special districts with the expected signs of their coefficient estimates. In addition, minimum population limit significantly reduced the number of school districts, whereas the consolidation limits and debt limits significantly increased the number of school districts.

From a regional perspective, the total number of local governments significantly increased in all the regions. Municipalities significantly increased in the Northeast and Midwest regions while they were reduced in the West. School districts significantly increased in the Northeast, Midwest, and Western regions but special districts mainly increased in the Northeast region. Population has a direct significant impact on all the governments while the land area has a positive significant effect on the municipalities, special districts, and the total number of governments.

So far, this pooled cross-sectional study seems to improve upon the past cross-sectional and pooled studies. I say this because of several reasons. First, it justifies the meaningful comparison of results across metropolitan areas that retained the same number of counties. Second, past pooled studies did not fully pay attention to all the population heterogeneity variables and their impact on all the different types of local governments at the metropolitan level. Kenny & Schmidt (1994) mainly focused on the state level data and examined how income impacted the number of school districts. Martinez-Vazquez et al. (1997) focused mainly on the impact of racial heterogeneity on school districts at the metropolitan level and both school and special districts at the state level. The third reason why my pooled study improves upon the past cross-sectional studies is that I have extended the time horizon and used the most recent data.

Examining the Tiebout-sorting process or the decentralization hypothesis through cross-section studies may not be appropriate, because it is expected that if the Tiebout process actually exists it might take time for residents to sort themselves in respective communities. Also, creating new governments because of changing residents' demand for government services is not an instantaneous process. It occurs gradually through time. Even in this case where I have a ten-year period, a decade is too short to observe sufficient change in the local government structure.

PANEL FIXED EFFECTS RESULTS

To control for unobserved metropolitan characteristics that are fixed over time, I employ a fixed-effects model. This fixed effects model is similar to Holtz-Eakin (1986). Previous studies that did not control for fixed effects may have led to biased estimates of the population heterogeneity variables. Therefore, the support of the Tiebout sorting process and the decentralization hypothesis may have been overemphasized through the past empirical studies. The significant coefficients of the population heterogeneity variables may have been overestimated.

It is important to mention that the panel fixed effects regression was conducted using the ordinary least squares estimation instead of the negative binomial estimation method. My panel data come from two years, 1982 and 1992, and to control for fixed effects I take the first difference of each variable like Holtz-Eakin (1986). The values of the first difference in the dependent variable range from negative to positive. Therefore, negative binomial estimation is not appropriate. Also, Levinson (1999) argues that non-linear fixed effects models yield biased estimates of the fixed effects, and this bias increases as the number of time period falls.

The panel fixed effects results are reported in Table 3. Almost all of the population heterogeneity variables are not significant. Except in a few cases where they are significant, they have signs contrary to what one would expect if the decentralization hypothesis is true.

Interestingly, the results also show that there is lack of significance of several of the state rules. Compared to the pooled results for 1982-92,

several characteristics of state rules become either much less significant (in the case of state-imposed debt limits and tax limits on cities) or completely insignificant (in the case of the limitation on minimum population size of local governments or the existence of broad home rule powers for local governments).

The changes in the estimated importance of state rules as I move from cross-sectional or the pooled estimates to the fixed effects results indicate either one of two things. First, the lack of statistically significant findings may be due to lack of variation over time in these state rules. Therefore, they may be considered as a part of the fixed effects influencing the local government structure. Surprisingly, however, there exists substantial variation over time in many of these state rules during the time 1982-92. During that time period, 18 metros had changes in home rule provision, 22 metros had changes in the minimum population limitation, and 13 metros experienced changes in the debt limits (U.S. ACIR, 1993). This amount of variation should have been enough for the fixed effects estimator to identify the effects of change in these state rules. It is more likely that changes in the importance of the state rules found in the fixed effects regressions may result from the fact that unlike the other estimation methods, the fixed effects results take into account unobserved metro-specific characteristics that may be correlated with both the state rules and the number of local governments.

By comparing the findings from the fixed effects estimation to the findings based on pooled data, the significance of the state rules appears to come primarily from the cross-sectional variation in the state rules across the different metropolitan areas and the fixed effects results suggest that the state rules do not affect local government structure, while the pooled results suggest otherwise. Because the latter results do not control for unobserved metropolitan specific characteristics, they likely suffer from omitted variable bias. A similar story can be told for the estimated relationship between special districts and the various state rules, although in this case one of the state rules (tax limits on cities) becomes more significant in the fixed effects analysis.

CONCLUSION

The fiscal decentralization hypothesis has been empirically tested by few researchers for both cross-sectional and panel data. These researchers have concluded that greater fiscal decentralization occurs when demands for government services of residents within a metropolitan area are more heterogeneous. In this study, my empirical findings suggest that if metropolitan area-specific fixed effects are controlled for, then there are no positive statistical significant effects of population heterogeneity variables on any type of local governments. Therefore, there is no evidence of Tiebout sorting due to heterogeneous demands for local government services in the panel fixed-effects model.

Examining the Tiebout-sorting process or the decentralization hypothesis through cross-sectional studies may not be appropriate because it is expected that if the Tiebout process actually exists it may take time for residents to sort themselves in respective communities. Also, creating new governments because of changing residents' demand for government services is not an instantaneous process. It occurs gradually through time. Even in this case where I have a ten-year period, a decade may be too short to observe sufficient change in the local government structure.

Table 3: Panel Fixed Effects Ordinary Least Squares Estimates for the Change in Number of Local Governments in 95 Major U.S. Metropolitan Areas during 1982-1992

Change in Explanatory variable	Change in Total Governments	Change in Municipalities	Change in School Districts	Change in Special Districts
State Rules				
Home rule	1.19 (0.40)	-0.29 (-0.50)	0.81 (2.19)**	0.67 (0.26)
Min pop limit	7.12 (1.80)*	0.63 (0.95)	0.44 (0.56)	6.05 (1.69)*
Consolidation limit	0.41 (0.13)	0.16 (0.37)	0.21E-02 (0.00)	0.25 (0.08)
Debt limits on cities	9.77 (2.43)**	1.57 (2.41)**	0.96 (1.53)	7.23 (2.13)**

Table 3: Panel Fixed Effects Ordinary Least Squares Estimates for the Change in Number of Local Governments in 95 Major U.S. Metropolitan Areas during 1982-1992

Change in Explanatory variable	Change in Total Governments	Change in Municipalities	Change in School Districts	Change in Special Districts
Tax limits on cities	-5.67 (-1.49)	-0.14 (-0.40)	0.75 (1.76)*	-6.28 (-1.71)*
Metro Characteristics Land area	0.11 (3.53)***	0.36E-01 (3.67)***	0.37E-01 (4.81)***	0.31E-01 (1.78)*
Population	0.31E-04 (0.68)	0.14E-04 (1.61)	-0.64E-05 (-1.02)	0.23E-04 (0.64)
Heterogeneity measures				
Income	-0.76 (-1.82)*	0.19E-01 (0.33)	0.36E-01 (0.43)	-0.82 (-2.19)**
Income-squared	-0.43E-01 (-1.68)*	-0.43E-03 (-0.13)	0.17E-02 (0.33)	-0.44E-01 (-1.88)*
Income * Population	0.25E-05 (0.87)	0.51E-06 (0.98)	-0.28E-06 (-0.58)	0.22E-05 (0.94)
Age	-116.73 (-2.12)**	-7.39 (-0.93)	-4.08 (-0.45)	-105.26 (-2.25)**
Age-squared	235.08 (0.92)	20.26 (0.47)	9.95 (0.39)	204.87 (0.96)
Age * Population	0.19E-03 (1.06)	-0.30E-04 (-0.85)	0.12E-04 (0.88)	0.20E-03 (1.43)
Race	14.76 (0.35)	-4.91 (-0.71)	-1.85 (-0.17)	21.52 (0.58)
Race-squared	-110.44 (-1.63)	-12.53 (-1.37)	-21.79 (-1.19)	-76.12 (-1.49)
Race * Population	0.17E-03 (1.36)	0.18E-04 (0.71)	0.89E-05 (0.80)	0.15E-03 (1.31)
Income * Age	-9.05 (-2.36)**	-0.94 (-1.78)*	-0.57 (-0.65)	-7.55 (-2.43)**
Income * Race	3.11 (1.06)	-0.11 (-0.26)	0.42E-01 (0.06)	3.17 (1.30)
Age * Race	-420.72 (-0.98)	-16.90 (-0.28)	-107.53 (-0.92)**	-296.29 (-0.84)
R-squared	0.48	0.66	0.56	0.42

N=95. t-statistics in parentheses with *** (99%), ** (95%), and *(90%) confidence, respectively.

The state rules and regional factors have a significant influence on the local government structure. The minimum population requirement limit mainly affected the formation of school districts and special districts while the consolidation limits, debt limits, and tax limits affected all types of local governments. There were significant regional influences on school districts and special districts. Most of the statistically significant increase in municipalities and school districts occurred in the Northeast and Midwest regions, as more decentralization took place in those regions. These regions have a relatively large number of communities compared to the national average.

Based on my empirical findings, there are two implications of the influences of population heterogeneity variables on the local government structure.

a) Changes in the local government structure are very complex and one has to be very careful in disentangling the individual effects of the explanatory variables. The significant or lack of significant population heterogeneity variables need careful examination before coming to any conclusion about their impacts on the local government structure.

b) Population heterogeneity variables may have differential impacts across the metropolitan areas. It is more likely that in some metropolitan areas local government structure may be significantly influenced by population heterogeneity variables, while other metropolitan areas may have less significant or no significant influence on population heterogeneity variables but changes in the local government structure may be mainly due to institutional and/or political factors. It is also quite likely that some metropolitan areas may go through changes in their local government structure due to a combination of several factors without being able to isolate the relative significance of each one of them. In this research, the estimation allowed for the possibility that the effect of each type of population heterogeneity might depend on the levels of other forms of population heterogeneity as well as on the size of the population.

ENDNOTES

[1] Changes in local government structure refer to the changes in the number of different types of local governments in U.S.. The Census of Governments recognizes five basic types of local governments. Of these five types, three are general-purpose governments. These are county and subcounty general-purpose governments (municipalities and townships). The other two are special purpose governments - independent school districts and special districts governments. Special district governments are mainly single-function units created to provide special services that are not supplied by existing general purpose governments due to state regulations

[2] A joint test for structural change was conducted. It was found that the likelihood ratio test statistic was greater than the (2) value at 19 degree of freedom and p-value=0.01.

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