The Dynamic Response of Fractionalization to Public Policy in U.S. Cities

Job Market Paper

Sreenath Majumder*

Draft: November 2008

Abstract

This paper examines the effect of public policy on population diversity. Using U.S. city level data across decades, I find that public policy has a significant impact on ethno-racial fractionalization growth. Cities in which expenditure on public goods is higher experience a significantly lower growth of ethno-racial fractionalization. I use instrumental variables to identify the direction of causality. The negative impact of public goods spending on fractionalization growth is caused by a significant differential reaction by race to public goods spending. Cities with higher spending on public goods experience a higher growth of the non-Hispanic White population, but a lower growth of the population of other ethno-racial groups. These findings are novel because they indicate that fractionalization is neither a static characteristic of a locality, nor it is an exogenous cause of public policy design. Treating it as endogenous, I find that fractionalization has no significant effect on public goods provision. This casts doubts on claims that fractionalization has significant negative impacts on public policy design and thereby on economic performances.

JEL classification: E6, H41, J18, J11, O21, O10.
Keywords: Fractionalization, Public Goods, U.S. Cities.

*Ph.D. Candidate, Department of Economics, University of Houston, Houston, TX, 77204 (e-mail: smajumd3@mail.uh.edu). Please do not cite without author's prior permission. I thank Prof. Bent Sorensen, Prof. Steve Craig, Prof. Dietrich Vollrath, and the Spring 2007 University of Houston Graduate Workshop for helpful comments and discussion. Any error remains mine.

1 Introduction

Economists have examined the effects of fractionalization on economic growth and found that fractionalization reduces growth. One suggested reason for this finding is that fractionalization leads to poor public policies, in which government expenditure on public goods and infrastructure is either too high, too low, or misdirected (Easterly and Levine 1997; Alesina, Easterly, and Baquir 1999; Alesina et al 2003). The research I present here shows that this framework is deficient, because fractionalization is a function of public expenditure and not an exogenous cause of public expenditure.[1]

If different ethno-racial groups have different preferences for public policies then any particular public policy should have different impacts on the populations of different ethno-racial groups, and thereby affect fractionalization.[2] In this paper, I show that public policy regarding government spending on public goods has a considerable impact on fractionalization. This suggests that fractionalization of a locality is endogenous to local public policy.

My empirical analysis is based on U.S. cities. These cities, with their distinct characteristics, provide an ideal opportunity for analyzing the dynamic nature of fractionalization. In the United States there are few impediments to people's movement across cities, in terms of language, cultural differences, foods habits, social barriers, transportation cost, and political boundaries. The cities are inhabited by people of diverse ethnic and racial groups, who have diverse preference structures. There also exists a substantial variation in public policies among the U.S. cities. As a result, they offer a unique opportunity to examine the dynamic nature of fractionalization and identify the factors that affect its change.

Using a cross section of 820 cities for two census years, I have two main findings: (i) cities with higher spending on local public goods experience a significantly lower growth

[1] Through out the paper I use ethnic origin and racial affiliation of individuals to measure fractionalization of a city. Therefore, my fractionalization index essentially measures ethno-racial fractionalization.

[2] This is true if population is mobile.

rate of fractionalization. (ii) population growth of different ethno-racial groups responds differentially to city governments' public goods provision.

In order to identify the relationship between public goods spending and fractionalization growth between 1990 and 2000, I use two instrumental variables for city governments' public goods spending. The first is the level of federal grant awards that the city governments received in the year 1986. The second is the tenure and political affiliation of the congresspersons who represented the cities. In a federal system funding from a higher level of government as well as the tenure and political affiliation of the representatives should have a significant impact on the level of local governments' services to the population.

The first stage of the 2 Stage Least Squares (2SLS) regression exhibits a significant positive relationship between the instruments and city governments' public goods spending. The subsequent 2SLS regression shows that cities with 1% higher public goods spending in 1990 experienced an almost 0.25% lower growth rate of ethno-racial fractionalization between 1990 and 2000. This result is robust to controlling for a large variety of initial city characteristics.[3]

The effect of public goods spending on fractionalization growth originates from a differential reaction by ethnicity and race to public goods spending. In a similar 2SLS framework, I find that higher public goods expenditure raises the growth of the non-Hispanic White population in an average U.S. city, but lowers the growth rate of other ethno-racial populations. A 1% higher expenditure on public goods by an average city government in 1990 increases the growth rate of the non-Hispanic White population in that city by almost 0.23% between 1990 and 2000. However, this also decreases the population growth rate of the non-Hispanic Black, the Hispanic White, and the Hispanic Other by 0.39%, 0.30%, and 0.60%, respectively. I find no significant impact of public goods spending on aggregate population growth in the US cities.

[3]Alesina, Easterly, Baquir (1999) have shown that the U.S. cities with higher fractionalization levels in 1990 have spent lower budget shares on different public goods. The basic difference between their and my framework is that they analyze the effect of 1990's fractionalization level on 1990's level of city government budget shares on public goods. On the other hand, my results show the effect of 1990's level of total public goods spending on the growth rate of fractionalization between 1990 and 2000.

The Tiebout argument (Tiebout 1956) coupled with the finding that ethno-racial identity is an important determinant of a group's preferences towards public policies suggest my finding, fractionalization is a function of public policy, to be a natural conclusion.

Apart from the impact of public goods expenditure on fractionalization growth, I also find a significant negative relationship between initial level of fractionalization and subsequent fractionalization growth. Conditional upon initial public goods spending, cities where levels of fractionalization in 1990 were higher by 1% have experienced a 0.26% lower growth rate of fractionalization between 1990 and 2000. The result suggests that U.S. cities are converging towards a long run staedy-state level of fractionalization. I find that conditional upon initial fractionalization level, a small difference in initial public goods spending will eventually create a considerable difference of long run staedy-state fractionalization levels between two cities which are otherwise similar.

My main finding exhibits that fractionalization is endogenous to public policy. Taking this endogeneity into consideration in a simultaneous equation framework, I find that endogenous fractionalization has no significant effect on public policy. This result questions some influential findings which claim that fractionalization has a negative impact on public policy, and, thereby, on the economic performance of a society (Easterly and Levine 1997; Alesina, Easterly, and Baquir 1999; Banerjee and Somanathan 2001; Alesina et al 2003).

The rest of the paper is organized along the following lines: In the next section I logically argue that fractionalization is endogenous to public policy. In section 3, I describe my data and its sources. In section 4, I present the Ordinary Least Squares regression(OLS) results. Next, in section 5, I describe my instruments for city governments' public goods spending. In section 6, I present the 2 Stage Least Squares regression (2SLS). Next, in section 7, I analyze the impact of public goods spending on the population growth of different ethno-racial groups. Section 8 describes the long run impact of public goods spending on fractionalization level. In section 9, I present the re-estimation of the effect

of fractionalization on public policy, considering fractionalization as endogenous. The last section presents the conclusions of this study.

2 Fractionalization and Public Goods Provision - Direction of Causality

Studies have analyzed the effect of population diversity on the economic, political, and social performance of a society based on the underlying assumption that diversity of population is an indicator of diversity of preference. If individual preferences towards public policies are correlated with ethnic, racial, religious, and linguistic affiliations then these observed characteristics can help us to identify unobserved individual preference patterns towards public policies. A large body of literature seems to justify this assumption. It emphasizes a strong correlation between ethno-racial affiliation and preference towards public policies. Tajfel et al. (1971), Rubinfeld, Shapiro, and Roberts (1987), Huckfeldt and Kohfeld (1989), Kazol (1991), Bell (1992), Hacker (1995), Wilson (1996), Page (1996), Alesina and La Ferrara (2000), Alesina, Baquir, and Hoxby (2004), and several others argue that conflicts over public policy and, in particular, public goods, are essentially caused by racial and not class divides. In the literature, there is an increasing tendency to attribute political conflicts over public policies to ethnic and racial divisions. Alesina, Baquir, and Hoxby (2004) state that, "diverse preference and avoidance of interaction play at least as important a role as income, perhaps even a more important role. Moreover our results suggest that race and ethnicity are important determinants of these preferences." [pp. 395]

Using these findings, a large part of the current macro growth literature explains public policy design and the economic performance of a society in terms of ethno-racial fractionalization. Works such as Easterly and Levine (1997), Alesina, Baquir, and Easterly (1999), La Porta et al. (1999), Katz (1999), Alesina and La Ferrara (2002), Alesina et al. (2003),

Vigdor (2004), and many more fall in this category.[4]

These studies argue that higher population heterogeneity within a society is reflected in higher fractionalization of preference for public policies among the population. This creates interest conflicts among populations within that society. A particular public policy is preferred by some groups but not preferred by others. The interest conflicts make it harder for the society to have a consensus regarding its present and future goals, and the policy design to achieve those goals. The result is poor and inefficient public policies that ultimately lead to suboptimal economic, social, and political performance of the society.

In order to identify the direction of causality from fractionalization to economic, social, and political performance, these studies use one common assumption. They assume that fractionalization of population is an exogenous cause of public policy. They hardly consider the possibility that government policies can also affect the population heterogeneity of a locality. The assumption of exogenous fractionalization, however, contradicts their basic argument that different racial or ethnic groups have different preference structures concerning public policies. Because in that case a particular public policy regarding public goods provision would differently affect different ethnic or racial group populations. This will induce different ethnic or racial groups to sort themselves among localities whose public policies fit their preference the best. This sorting of population among localities along the line of race and ethnicity would necessarily change the fractionalization of the localities.[5]

The reason why some groups prefer higher expenditure on public goods while some others do not is that government expenditure has a cost/benefit aspect towards population. The cost aspect comes from the tax burden. Higher spending is generally associated with a higher tax burden.[6] If race and ethnicity are important determinants of public policy

[4] For overviews of the literature on effect of fractionalization on public policies, see Alesina and La Ferrara (2003)[pp. 14]

[5] This sorting of population along ethno-racial line of preference for public policy is possible when people can move freely with minimum obstacles. This seems a realistic assumption within the U.S.

[6] For the year 1990 in my 820 sample cities, I find a correlation of 0.5 between city government per capita expenditure on public goods and per capita tax revenue; for the same year and the same sample cities the correlation between total per capita general expenditure and per capita tax revenue is 0.8.

preference, then this cost benefit trade off can have different consequences for different races and ethnicities. People from an ethno-racial group with stronger preference for tax-public goods bundle will choose a location where the local government spends a higher amount on public goods and also imposes higher tax. On the other hand, the same location will not be chosen by a ethno-racial group with a low preference for tax-public goods bundle. It would prefer a locality where the local government spends less on public goods and also levies less tax. This concept of population sorting is a familiar concept in public finance literature. The famous Tiebout argument deals with this line of thought (Tiebout 1956). A vast body of literature (for example, Rubenfield, Shapiro, and Roberts 1987; Epple, Romer, and Sieg 1999; and others) analyzes the Tibout argument and corroborates it. Therefore, with high mobility of population this assumption of one way causality from fractionalization to public policy seems questionable. A more acceptable argument is that causality flows both ways. That is, fractionalization and public policies affect each other and they are jointly determined. This paper uses the argument that causality flows both ways to analyze the impact of public goods expenditure on fractionalization.

3 Data, Source, and Descriptive Statistics

I analyze the growth rate of ethno-racial fractionalization in U.S. cities where the population in 1980, 1990, and 2000 were 25,000 or more. The index I use to calculate ethno-racial fractionalization (*ethnic*) measures the probability that two people drawn randomly from a city will belong to two different ethno-racial groups. The construction of *ethnic* is as follows:

$$ethnic = 1 - \sum_{i=1}^{n} (S_i)^2 \tag{1}$$

$$0 \leq ethnic \leq 1$$

Where S_i is the population share of ith race in a city and n is the total number of ethno-racial groups in a city.

I have all together 12 ethno-racial population categories for each of my two sample years, 1990 and 2000. Therefore i = Non-Hispanic White, Non-Hispanic Black, Non-Hispanic American Indians and Alaskan Native, Non-Hispanic Asian, Non-Hispanic Pacific Islander, Non-Hispanic Other, Hispanic White, Hispanic Black, Hispanic American Indians and Alaskan Native, Hispanic Asian, Hispanic Pacific Islander, Hispanic Other.

The *ethnic* index is bounded between 0 and 1. Theoretically, it can reach a value of 1 when the city is absolutely ethno-racially heterogeneous. On the other extreme, *ethnic* = 0 implies an absolutely ethno-racially homogeneous city, where every individual belongs to the same ethno-racial group.

I have 820 cities from 47 states.[7] My city level ethno-racial data comes from the U.S. Census Bureau. The other city level variables come from three rounds of *County and City Data Book* (*CCDB 1988, 1994 and 2000*) published by the Bureau of Census. These publications provide data on a wide range of subjects for a cross section of U.S. cities with 25,000 or more population. My main variable of interest here is city governments' spending on public goods in 1990. To measure this, I take into account the level of aggregate per capita general expenditure by each city government in 1990 in the following six categories of public services: (1) Health and hospital (2) Public welfare (3) Police protection (4) Fire protection (5) Highways (6) Sewerage and solid waste management[8]. I have not included educational expenditure of the city governments as a component of public goods spending. This is because among the cities there exists a large variation in treatment of education. There are cities where city governments are the primary sources of expenditure on education. However, there are also cities where some other governments (for example, school district) are the main sources of educational expenditure.

Table 1 provides the descriptive statistics of all the variables that I am using in my fractionalization growth regressions. The mean *ethnic* in the 820 sample cities increased from 0.35 in 1990 to 0.44 in 2000, almost a 26% increase in 10 years. The seventh row

[7] I do not include cities from states of Alaska, Hawaii, and Vermont.
[8] For detail construction of the variables see Appendix B.

of Table 1 shows the descriptive statistics of the decadal growth rate of *ethnic*.[9] The remaining rows provide the descriptive statistics of various city level controls.[10]

The U.S. Census Bureau classifies the population into 5 general racial categories. They are: White, Black, American Indian and Alaska Native, Asian and Pacific Islander, and Other. There is, however, a potential difference between a white person of British origin and a white person of Mexican origin. Yet, according to the general classification both may belong to the White race (because an individual of Mexican origin may self identify himself/herself as white like an individual of British origin). The census bureau also reports the ethno-racial profile of each city in greater detail in each census year. It classifies the total population into 12 ethno-racial groups. I use this detailed classification in my paper. Table 2 shows the descriptive statistics of the percentage shares of all the 12 groups for the 820 sample cities in 1990 and 2000. From Table 2, we can see that in both the years 1990 and 2000, on an average, non-Hispanic White, non-Hispanic Blacks, Hispanic White, and Hispanic Other are the four largest ethno-racial groups in my 820 sample U.S. cities. In section 7, I take into consideration these four largest ethno-racial groups in order to examine the effect of public goods spending on population growth of different ethno-racial groups.

Table 3 shows the various ranges of the decadal growth rate of *ethnic* in my 820 sample cities. It shows that in 5.5% of my sample cities the decadal growth rate of *ethnic* is negative. In around 14% cities the growth rate lies between 0% to 10%. In 58% cities the growth rate is in between 10% and 50%. In 22% cities the growth rate is in between 50% and 100%. In around 1% cities the decadal growth rate of *ethnic* is more than 100%. It is clear from Table 2 that fractionalization is not a static characteristic of U.S. cities. Moreover, there is a wide variation across cities in terms of its growth rate. A deeper investigation is required to understand the reason for this wide variation.

[9] Laredo city, TX experienced the lowest *ethnic* growth rate of -0.27, while Marshalltown city, IA experienced the highest growth rate of *ethnic*, 1.47.

[10] For detail construction of these variables see Appendix B.

4 Ordinary Least-Squares Regressions

The first and third columns of panel A in Table 4 reports the OLS regressions of decadal growth rate of *ethnic* on per capita public goods spending. The linear regression that I specify is:

$$\ln(ethnic_{2000})_i - \ln(ethnic_{1990})_i = \alpha + \beta \ln(spending_{1990})_i + \gamma \ln(ethnic_{1990})_i + \delta \ln(X)_i + \varepsilon_i \tag{2}$$

where $\ln(ethnic_t)_i$ is the log of ethno-racial fractionalization index (*ethnic*) in city i in year t (t=2000, 1990). $\ln(spending_{1990})_i$ is the log of aggregate per capita expenditure on the six categories of public goods by the ith city government in the year 1990. X_i is the vector of other city level characteristics in 1990 or prior to that and ε_i is a random error term. The coefficient of interest is β, the effect of public goods spending on fractionalization growth.

Overall, the OLS regression results of Table 4 show that there exists a significant negative relationship between public goods spending and *ethnic* growth. However, following my argument that fractionalization and public policies are interdependent, I cannot interpret this OLS relationship as causal. To interpret the relationship causal, I need an exogenous variation in city governments' public goods expenditure. Instrumental variables for 1990 city governments' public goods spending can give me this exogenous variation. In the following section, I present instruments for city governments' public goods spending and instrumental variable regression results to identify the value of β.

5 Instruments for Public Goods Spending

5.1 Tenure

There is a strong possibility that in a democratic system as the one prevailing in the United States the power of fund allocation for a locality is related to the tenure of its

representative and his/her political affiliation. Therefore, the tenure of the representative of a city and his/her political affiliation can potentially serve as instruments for city governments' public goods expenditure.

I take the total tenure and the political affiliation of the congressperson from a city as an instrument for city governments' expenditure on public goods.[11] Instrumenting a city government's public goods expenditure in 1990 with the tenure of the congressperson who represented that city up to 1990, involves three distinct steps. In step one, I have to find out the number of that corresponding congressional district (CD) to which the city belongs.[12] Then I have to find out the name of the congressperson who served that CD up to 1990. In the third step, I have to calculate his/her total tenure in the U.S. House of Representatives up to 1990, and find out to which political party he/she belonged.[13]

In doing so there are some potential problems. First, many of my cities belong to multiple CDs and, hence, I cannot map a city with a corresponding CD uniquely. Second, the boundaries of the CDs can change in every census. Thus, city A may belong to the 11th CD of Texas in 1990 but could have been in the 1st CD of Texas in 1979. In order to solve the first problem and to uniquely map a city to its corresponding CD in 1990, I select the CD whose representative congressperson had the highest tenure in the House of Representatives.[14] In case of the second problem, I take the 100th congress (with term from 1987 to 1989) as the relevant congress with its districts' boundaries to map my sample cities with their corresponding CDs.[15]

[11]The United States is divided into several congressional districts (CDs); each of these is an electoral constituency that elects a single member to represent in one of the two chambers of the U.S. Congress – the House of Representatives. The length of a term in the U.S. House of Representatives is two years. Therefore a congressperson has a lifespan of two years in the House of Representatives for each term.

[12]CDs are represented with a number along with the name of the state to which they belong. For example 11th district of Alabama means the 11th CD of Alabama

[13]For example, I want to instrument 1990's public goods expenditure of City A in Texas. First, I have to find out the district number to which city A belongs to in 1990. Let us say it belongs to the 3rd district of Texas. Then I have to find out who was the congressperson in 3rd CD of Texas in 1990. Say it was congressperson i. Then I have to find out the total number of years congressperson i served in the House of Representatives, i.e. his/her total tenure in the House of Representatives up to the year 1990, and his/her political affiliation.

[14]In order to calculate tenure of the congressperson, I take into account the total number of years he/she has served in the House of Representatives throughout his/her congressional career up to 1989.

[15]The boundaries of the CDs of the 100th congress were set up in the 1980 census (i.e. in the middle of the 96th congress). Therefore, even if the district number and boundary of a CD changed in the 1980 census a congressperson who got elected in the 96th congress and got subsequent re-elections up to the 100th congress served his/her district at least for 9 years. I think that is a sufficient time to attach a congressman to his/her CDs and city.

Following these rules, I uniquely map each of my 820 sample cities with its corresponding congressional district, and calculate the total tenure of the representative congressperson from the cities in the House of Representatives up to the year 1989. Then I construct a categorical variable indicating whether the congressperson representing a city served in the House of Representatives for 10 years or more, and also if he/she belonged to the Democratic Party. The reason I chose to focus on the tenure of Congress persons from the Democratic Party is that starting from 1955 to 1995 i.e. from the 84th to the 103rd congress, all the congresses were Democrat majority congresses. Hence, I can assume that being members of the Democratic Party in Democrat majority congresses, these congresspersons acquired sufficient power to allocate funds to their districts and, by extension, to their cities.[16]

5.2 Federal Grants

Financial assistance to a lower level of government from a higher level can be an influential factor for the lower level government's expenditure level. In the federal system of the United States the local governments like city, county, or state governments receive financial assistance from the federal government. I use the variation in federal assistance as an instrument for city governments' expenditure on public services. The instrument is the per capita federal grant award received by each city in the year 1986. There are 15 categories of federal assistances available to states and their subdivisions. Of these seven are financial types of assistance and eight are non-financial types of assistance. The grant award includes two types of grants, the formula grants and the project grants.[17] Table 1 shows the descriptive statistics of *grants*, the per capita federal grant awards received by the cities in the year 1986.

[16] Out of my 820 sample cities in 1990, 285 cities had a Democratic congressperson with a total tenure of 10 years or more.

[17] For detail see Catalog of Federal Domestic Assistance. The data on federal grant awards used in my research is taken from the *1988 County and City Data Book*.

6 Fractionalization Growth in U.S. Cities – 2SLS Regressions

6.1 The Determinants of City's Public Goods Spending

The second stage of my 2SLS regression, which I measure to identify the impact of public goods spending on fractionalization growth, is the same as equation(2):

$$\ln(ethnic_{2000})_i - \ln(ethnic_{1990})_i = \alpha + \beta \ln(spending_{1990})_i + \gamma \ln(ethnic_{1990})_i + \delta \ln(X)_i + \varepsilon_i \tag{3}$$

$\ln(ethnic_{2000})_i - \ln(ethnic_{1990})_i$ measures the growth rate of ethno-racial fractionalization in city i between 1990 and 2000. $\ln(spending_{1990})_i$ is, as previously, the log per capita aggregate expenditure on six categories of public goods by the ith city government in 1990. The other regressors have same meaning as in equation (2).

Since I believe that government policy regarding expenditure on public goods and population heterogeneity are not exogenous causes to each other, I consider city governments' public goods expenditure (*spending*) as an endogenous policy variable. Therefore, I instrument it with my two instruments *grant* and *tenure*. Equation (4) describes the relationship between city governments' per capita public goods spending and its determinants, including my two instruments. Therefore, equation (4) represents the first stage regression:

$$\ln(spending_{1990})_i = \alpha_g + \beta_g \ln(grant)_i + \gamma_g(tenure)_i + \delta_g \ln(X)_i + \nu_{gi} \tag{4}$$

where $\ln(grant)_i$ is the log amount of the per capita grant awards received by the ith city in 1986, and $tenure_i$ is the dummy variable for ith city showing whether in 1989 the congressperson representing the city had an experience of 10 years or more in the House of Representatives, and if he/she was from the Democratic Party. According to the logic β_g and γ_g should be positive, i.e. the cities that received higher federal grants and were represented by a long tenured Democratic congressperson should have spent

more on public goods. Panel B of Table 4 shows results of the first stage regression. The coefficient β_g and γ_g are positive and statistically significant in both specifications. The large F statistics in both specifications shows that the my instruments are strong.[18]

6.2 The IV Estimates

Considering the level of public goods spending in equation (3) as endogenous and modeling it with equation (4) gives the IV regression. The second and fourth columns of panel A in Table 4 reports the IV regression results. Column two shows that cities in 1990 with 1% higher public goods spending experienced a 0.24% lower growth rate of *ethnic* between 1990 and 2000. In column four, I include all my seven city based controls, plus state fixed effects. The coefficient of public goods spending almost remains same and is still statistically significant. After controlling for large city level initial characteristics, the result of the fourth column shows that higher expenditure on public goods causes significant lower growth of ethno-racial fractionalization in U.S. cities. For the validity of the two instruments, *grant* and *tenure* must not affect the dependent variable (i.e. the growth of *ethnic*) directly, but only through public goods spending. I test this over identification restriction with the standard Hansen J test. The null hypothesis of this test is that the instruments are uncorrelated with the IV regression residuals. The large p-values of the Hansen J-statistics reported in the second and the fourth column of Table 4 show that we can accept the null and, hence, the instruments pass the test in both specifications.

The IV estimates of Table 4 show that city governments' policy regarding spending levels on public goods has a significant impact on population diversity of cities. Thus fractionalization is not an exogenous cause of public policy design. Rather, it is a function of public policy. This finding has important implications. It indicates that to analyze the impact of population diversity on various social, political, and economic outcomes of a

[18] which jointly test the hypothesis that the coefficients of the two excluded instruments *grant* and *tenure* in the first stage equals zero.

society, we should consider the interdependency of public policy and population diversity of that society.

Apart from my basic finding, one interesting fact is also evident from the results of Table 4. The coefficient of "ln *ethnic* 1990" is large, negative, and statistically significant in all specifications.[19] It suggests that cities with initial higher fractionalization experienced a significantly lower growth rate of fractionalization. This indicates that the cities are moving towards a long run steady state level of fractionalization. In section 8, I show that a city government's public goods expenditure will significantly determine this long run steady state level of fractionalization.

If public goods spending has a significant effect on ethno-racial fractionalization growth, as shown by my IV regression results, then it must have a differential impact on population growth of different ethno-racial groups in the cities. I discuss this issue in detail in the next section.

6.3 Sensitivity Analysis

It is interesting to know whether or not the preceding findings are sensitive to the calculation of my index *ethnic*. I have taken into consideration 12 ethno-racial groups for calculating *ethnic* of each city in both the years 1990 and 2000. By construction, this index is sensitive to the number of population groups. Any increase in the number of groups mechanically increases the index. There, however, exists a possibility that the differences between a couple of these groups are not very significant. Therefore, the population in these cities can be easily classified into much smaller ethno-racial categories. It is worthwhile to check whether public goods spending has any significant impact on fractionalization growth when I divide the population into much smaller categories.

To analyze this possibility, I construct my fractionalization index *ethnic* based on two additional classifications of the city population. For both my sample years 1990

[19] ln *ethnic* 1990 is the level of 1990 log ethno-racial fractionalization in i th city.

and 2000, I classify the population of each of my 820 sample cities into 5 and 2 ethno-racial categories. In case of the 5 categories, I classify the city aggregate population as White, Black, American Indian and Eskimo or Aleut, Asian or Pacific Islander, and Other.[20]In case of the 2 categories, I classify the city aggregate population as non-Hispanic White and All Other. Table 1 reports the descriptive statistics of my index $ethnic_{5races}$ and $ethnic_{2races}$ using these 5 and 2 population categories, respectively. Then I run the same 2SLS regression specification of Table 4, where the first stage and the second stage regressions are the same as equation (4) and (3), respectively. Table 8 reports the results of the 2SLS regression of *ethnic* growth with different ethno-racial classifications. Panel A shows the IV estimates, while Panel B reports the corresponding first stages. The first column, where I construct my fractionalization index (*ethnic*) using 12 ethno-racial categories, reproduces the results of column four of Table 4. The next two columns report the estimates of the growth regression of fractionalization using 5 and 2 ethno-racial groups. Coefficient of per capita public goods expenditure in 1990 (*spending*) is negative and statistically significant in all two different classifications of ethno-racial groups. This clearly exhibits my main result that fractionalization is a function of public goods spending and is not sensitive to ethno-racial classification of population.

7 Impact of Public Goods Spending on Ethno-racial Groups

My earlier result shows that city governments' expenditure on public goods has a significant effect on fractionalization growth. This clearly indicates the possibility that different ethno-racial groups in the cities reacted differentially to city governments' public goods spending. As I discussed earlier, some ethno-racial group with higher preference for public services may move to a city where expenditure on public services is high. However, some groups with lower preference for public services may move out from that city.[21] To

[20]This is the general classification given by the U.S. Census Bureau and used by Alesina, Easterly, and Baquir (1999).
[21]Higher preference for public goods indicate higher preference for the bundle of higher tax, higher public goods.

measure the impact of city governments' public goods expenditure on population mobility of different ethno-racial groups, I estimate the following regression:

$$\ln(race_{k,2000})_i - \ln(race_{k,1990})_i = \alpha + \beta \ln(spending_{1990})_i + \gamma \ln(X)_i + \pi \ln(R_{1990})_i + \varepsilon_i \quad (5)$$

$\ln(race_{k,2000})_i$ is the log population number of kth ethno-racial group in ith city in the year 2000. $\ln(race_{k,1990})_i$ is the same for the year 1990. Thus $\ln(race_{k,2000})_i - \ln(race_{k,1990})_i$ measures the decadal growth rate of the total population of kth ethno-racial group in city i (k = non-Hispanic Whites, non-Hispanic Blacks, Hispanic Whites, and Hispanic Others).[22] $\ln(spending_{1990})_i$ is the per capita expenditure by the ith city government on six categories of public goods in the year 1990 and X_i is the vector of city level initial characteristics. $(R_{1990})_i$ is the vector of 1990 population numbers of the above four ethno-racial groups.

As before, considering $\ln(spending_{1990})$ as endogenous and instrumenting it with per capita federal grant receipt by the cities in 1986 (*grant*) and the tenure of the Democratic congresspersons from the cities (*tenure*) give the first stage regression:

$$\ln(spending_{1990})_i = \alpha_g + \beta_g \ln(grant)_i + \gamma_g(tenure)_i + \delta_g \ln(X)_i + \pi_g \ln(R_{1990}) + \nu_{gi} \quad (6)$$

The first column of panel B in Table 5 shows the first stage regression results for all four ethno-racial groups. The two instruments, *grant* and *tenure*, are both positive and significant. The large F-statistics reject the null hypothesis that jointly the excluded instruments have coefficient zero.

Panel A of Table 5 reports the IV regression estimates. There are four regressions, one for each of the following ethno-racial groups: Non-Hispanic White, Non-Hispanic Black, Hispanic White, and Hispanic Other. Dependent variable in each of the four columns are the decadal growth rate of the population of the four ethno-racial groups. Results show that cities with 1% higher spending on public goods in 1990, experienced more than 0.23%

[22] Non-Hispanic White, non-Hispanic Black, Hispanic White, and Hispanic Other are the four largest ethno-racial groups in a average U.S. city in both the years 1990 and 2000.

higher growth rate of the non-Hispanic White population between 1990 and 2000. On the other hand, in the same cities the growth rate of the population of other three ethno-racial groups (shown in the second, third, and fourth columns of Table 5) decreases by 0.39%, 0.37%, and 0.60%, respectively. Results suggest that cities with higher public goods spending attracted only the non-Hispanic White population, the average majority racial group. The effect of higher public goods spending is opposite for the other three major ethno-racial groups. Thus, these results of Table 5 exhibit that a particular public policy has a heterogenous impact on individuals of different ethno-racial groups. This differential impact is reflected in my earlier finding that public goods spending significantly affects fractionalization growth. This differential impact of public goods provision on various ethno-racial groups reflects their preference structures for public goods.[23]

In panel A of Table 5, the last column reports the 2SLS regression results of public goods spending on aggregate population growth in the cities, controlling for all seven initial city characteristics, plus state fixed effects. The result does not exhibit any significant impact of public goods spending on the aggregate population growth in the cities. This result indicates that although a particular public policy has significant differential impact on different ethno-racial groups' population mobility and, hence, fractionalization growth, this differential impact may not significantly change the aggregate population. For example, the in-migration of the majority ethno-racial groups and the out-migration of the minority groups essentially lower the population diversity of a locality, but this in and out-migration may have a zero net effect on the aggregate population of that locality.

[23]The results here indicate non Hispanic whites have a relatively higher preference for higher tax, higher public goods bundle, while other three ethno-racial groups have a relatively lower preference for the same.

8 Public Goods Spending and Fractionalization Growth: The Long Run Effect

In my previous results, I find higher initial higher fractionalization causes lower growth rate of fractionalization. Figure 1 shows this relationship between initial fractionalization and growth rate of fractionalization in the 820 sample U.S. cities between 1990 and 2000. The figure depicts a strong negative relationship: cities where the level of fractionalization is higher in 1990, experience a significantly lower growth rate of fractionalization in the next ten year period. This shows that ethno-racial fractionalization in the U.S. cities is a dynamic feature. Therefore, an interesting question is: If the higher fractionalized cities are growing slower in their fractionalization front and if government expenditure on public goods has a negative impact on fractionalization growth, then where will these cities end up in the long run in terms of their population diversity? To answer this question, I can assume a scenario where every U.S. city in 1990 is identical in terms of all characteristics, except the difference in their 1990 fractionalization level; additionally, nothing is changing with time except the level of fractionalization in these cities. Then given the finding that higher fractionalization level induces lower fractionalization growth, I can say that these cities are converging to a long run steady-state level of fractionalization. I can call this an unconditional steady-state. It is unconditional because I assume that fractionalization growth depends exclusively on its initial level and on nothing else. I calculate this unconditional steady state by estimating the basic OLS regression:

$$\ln(ethnic_{2000})_i - \ln(ethnic_{1990})_i = \alpha + \beta \ln(ethnic_{1990})_i + \varepsilon_i \tag{7}$$

Where $\ln(ethnic_t)_i$ is the level of log ethno-racial fractionalization in city i in year t ($t =$ 2000, 1990).

In Panel A of Table 6, the first column gives the point estimates of $\hat{\beta}$ and $\hat{\alpha}$, the

estimated effect of initial fractionalization level on its growth rate and the constant, respectively. Using these two values and the estimated version of equation (7), I calculate the unconditional steady-state value of *ethnic*, which is 0.89[24]. The interpretation is straight forward. If every U.S. city in 1990 is identical, with the only difference being in their fractionalization level, and if nothing changes with time, except their ethno-racial fractionalization, then in the long run they will end up in an ethno-racial fractionalization level of around 0.9.

The cities, however, are not the same in the initial period. There exists a large variation in terms of their initial public goods spending. For example, in 1990 Gaithersburg city, MD spends around $91 per capita on six categories of public goods, while for New York city, NY the amount for the same year is $2069. Will these two cities converge at a same fractionalization level of 0.90? Certainly not. My results in the preceding section show that local governments' public goods spending significantly affects the growth of fractionalization. Hence, cities with their diverse spending levels will certainly reach a diverse fractionalization level in the long run. This is the long run steady-state level of fractionalization, conditional upon initial public goods spending. I calculate this conditional long run steady-state level by estimating the 2SLS regression:

$$\ln(ethnic_{2000})_i - \ln(ethnic_{1990})_i = \alpha_c + \beta_c \ln(ethnic_{1990})_i + \gamma_c \ln(spending_{1990})_i + \varepsilon_{ci} \quad (8)$$

Where $\ln(spending_{1990})_i$ is the level of per capita public goods expenditure by ith city government in 1990.[25] The second column of Panel A in Table 6 gives the estimated values of the point estimates $\hat{\beta}_c$, $\hat{\gamma}_c$ and $\hat{\alpha}_c$. Using estimated version of equation (8) and these point estimates, I can calculate the long run steady state level of *ethnic* for each city, conditional upon its 1990's per capita public goods expenditure.

As I mentioned, there exists a large variation in per capita public goods expenditure

[24] See the appendix A for the detail derivation.

[25] As previous I intrumented $\ln(spending_{1990})_i$ with per capita federal grant awards to cities in 1986 and tenure of the Democratic congressperson from the city. Panel B of Table 6 reports the first stage results.

among cities in 1990. In 1990, out of my 820 sample cities, Fair Lawn Borough, NJ is the lower 10th percentile city that has a per capita spending of 242 dollars on public goods (It has a 1990 ethno-racial fractionalization level of 0.132). Niagara Falls city, NY is the upper 90th percentile city that has a per capita public goods spending of 636 dollars (It has a 1990 ethno-racial fractionalization level of 0.313). Using these two extreme levels of per capita spending values, I calculate the conditional long run steady-state fractionalization level of these two cities. My results show that the city with 1990 per capita public goods spending of 242 dollars (i.e. Fair Lawn Borough, NJ) will reach a long run steady-state fractionalization level of 1, while the city with 1990 per capita public goods spending of 636 dollars (i.e. Niagara Falls city, NY) will reach a long run steady-state fractionalization level of 0.62, ceteris paribus.[26]. In other words, if Fair Lawn Borough and Niagara Falls city are two identical cities in 1990, the only differences between them being their 1990 fractionalization level and per capita public goods spending, and if nothing changes with time, except their fractionalization level, then in the long run Fair Lawn Borough will be more than one and half times ethno-racially fractionalized than Niagara Falls city. In 1990 Fair Lawn Borough has a fractionalization level that is almost one third the fractionalization level of Niagara Falls city. The results here show that a small difference in initial per capita spending level will lead these two otherwise identical cities to a completely different long run situation. [27]

9 Does Endogenous Fractionalization affects Public Policy?

Existing literature claims that fractionalization has a negative impact on public policies such as public goods provision (Alesina, Easterly, and Baquir 1999; Banerjee and Somanathan 2006). However, these findings were based on the assumption that fractionalization is an exogenous cause of public policy. Previous sections of my paper seriously

[26] See the appendix A for the detail derivation

[27] The difference in per capita public goods spending between Fair Lawn Borough and Niagara Falls city in 1990 is \$394 (= \$636 - \$242).

question this assumption. My results suggest that fractionalization and public policy are not exogenous to each other. Rather, they are jointly determined. This simultaneity of causation makes it interesting to re-examine the impact of fractionalization on public policy. Examining a cross section of U.S. cities in 1990, Alesina, Baquir, and Easterly (1999) show that those U.S. cities in which fractionalization is high devote a significantly less share of their budget to public goods like roads, sewerage and sanitation, and fire. I re-estimate their specification in Table 7 using a cross section of U.S. cities in 1990. The basic OLS regression specification is:

$$spendingshare_{1990,i} = \alpha + \beta ethnic_{1990,i} + \gamma X_i' + \varepsilon_i \tag{9}$$

Where $spendingshare_{1990,i}$ is the aggregate share of spending by ith city government on highways, fire and seawarge in 1990. $ethnic_{1990,i}$ is the fractionalization level in ith city in 1990.[28] The results of the OLS regression are shown in the first column of Table 7. The OLS results reproduce the influential finding that higher fractionalization causes lower provision of public goods, and cities where fractionalization is higher spend a significantly lesser share of their budget on public goods. However, when fractionalization and public goods spending are treated as endogenous in a simultaneous equation framework, then this negative impact of fractionalization on public goods spending disappears. Instrumenting 1990 fractionalization level with 1980 fractionalization level, and the share of spending on public goods in 1990 with per capita federal grant awards of 1986, the 3 Stage Least Squares (3SLS) regression results in the second column of Table 7 shows that the impact of fractionalization on public goods spending is not significantly different from zero. This result together with my other findings indicate that treating fractionalization as exogenous to public policy has some serious drawbacks.

[28] This specification considerably resembles the specification of Alesina, Easterly, and Baquir (1999), except that they looked at the separate effects of fractionalization on each of the categories road, fire, and sewage, while I am looking at the same effect on the aggregate share of those same categories.

10 Conclusion

Fractionalization is not an exogenous cause of government's policies. Using U.S. city level data, I have established in this paper that local governments' expenditure in important categories of public goods significantly affect the ethno-racial fractionalization growth. The impact of public goods spending on fractionalization growth originates from the logical framework that different ethno-racial groups have different preferences for public services and their costs. Therefore, individuals from different ethno-racial groups react differentially to a public policy. Results show that while higher public goods spending increases one ethno-racial group's population in an average U.S. city, it decreases the population growth of some other ethno-racial groups. Again, the results of this paper exhibit the dynamic nature of fractionalization. They show that the current level of fractionalization affects the future growth of fractionalization. Cities with initial higher level of fractionalization experience a significantly lower fractionalization growth. Therefore, these results seriously question the established links between higher fractionalization and poor economic performance, where fractionalization is considered to be static and exogenous to governments' activities. Regarding fractionalization as endogenous to local governments' expenditure on public goods shows no significant impact of fractionalization on public goods spending. Therefore, considering fractionalization as a function of public policy can reshape our understanding of the impact of fractionalization on social, economic, and political performances of a society.

References

Acemoglu, D., S. Johnson, and J. A. Robinson, "The Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review*, XCI (2001), 1369-1401.

Alesina, A., A. Devleeschauwer, W. Easterly, S. Kurlat, and R. Wacziarg, "Fractionalization," *Journal of Economic Growth*, VIII (2003), 155-194.

Alesina, A., E. Glaeser, and B. Sacerdote, "Why Doesn't the US Have a European-Style Welfare State?" *Brookings Papers on Economic Activity*, MMI (2001), 187-254.

Alesina, A., and E. Zhuravskaya, "Segregation and the Quality of Government in A Cross-Section of Countries," NBER Working Paper No. 14316, 2008.

Alesina, A., and E. L. Ferrara, "Ethnic Diversity and Economic Performance," *Journal of Economic Literature*, XLIII (2005), 721-761.

Alesina, A., and E. Spolaore, "On the Number and Size of Nations," *Quarterly Journal of Economics*, CXII (1997), 1027-1056.

Alesina, A., E. Spolaore, and R. Wacziarg, "Economic Integration and Political Disintegration," *American Economic Review*, XC (2000), 1276-1296.

Alesina, A., R. Baqir, and C. Hoxby, "Political Jurisdictions in Heterogeneous Communities," *Journal of Political Economy*, CXII (2004), 348-396.

Alesina, A., R. Baqir, and W. Easterly, "Public Goods and Ethnic Divisions," *Quarterly Journal of Economics*, CXIV (1999), 1243-1284.

Alesina, A., R. Baqir, and W. Easterly, "Redistributive Public Employment," *Journal of Urban Economics*, XLVIII (2000), 219-241.

Banerjee, A., and R. Somanathan, "Caste, Community and Collective Action: The Political Economy of Public Good Provision in India," unpublished, 2001.

Barrow, R. J., and X. Sala-i-Martin, "Convergence," *Journal of Political Economy*, C (1992), 223-251.

Barrow, R. J., and X. Sala-i-Martin, *Economic Growth* (Cambridge, MA: MIT Press, 2003).

Bell, Derrick, *Faces at the Bottom of the Well: The Permanence of Racism* (New York: Basic Books, 1992).

Borjas, G. J., *Economics of Migration* (St. Louis, MO: Elsevier, 2000).

Borjas, G. J., "Immigration and Welfare Magnets," *Journal of Labor Economics*, XVII (1999), 607-637.

Campos, N. F., and V. S. Kuzeyev, "On the Dynamics of Ethnic Fractionalization," *American Journal of Political Science*, LI (2007), 620-639.

Caselli, F., and W. J. Coleman II, "On the Theory of Ethnic Conflict," NBER Working Paper No. 12125, 2006.

Easterly, W., and R. Levine, "Africa's Growth Tragedy: Policies and Ethnic Divisions," *Quarterly Journal of Economics*, CXII (1997), 1203-1250.

Epple, D., and T. Romer, "Mobility and Redistribution," *Journal of Political Economy*, XCIX (1991), 828-858.

Goldin, C., and L. Katz, "Human Capital and Social Capital: The Rise of Secondary School in America, 1910 to 1940," *Journal of Interdisciplinary History*, XXIX (1999), 683-723.

Hacker, Andrew, *Two Nations: Black and White, Separate, Hostile and Unequal* (New York: Scribner's, 1995).

Huckfeldt, R., and C. W. Kohfeld, *Race and the Decline of Class in American Politics* (Urbana: University of Illinois Press, 1989).

Kaestner, R., N. Kaushal, and G. V. Ryzin, "Migration Consequences of Welfare Reform," NBER Working Paper No. 8560, 2001.

Kozol, J., *Savage Inequalities: Children in America's Schools* (New York: Crown Publishers Inc., 1991).

La Porta, R., et al., "The Quality of Government," *Journal of Law, Economics, and Organization*, XV (1999), 222-279.

Michalopoulas, S., "The Origins of Ethnolinguistic Diversity: Theory and Evidence," unpublished, 2008.

Munshi, K., and N. Wilson, "Identity, Parochial Institutions, and Occupational Choice: Linking the Past to the Present in the American Midwest," NBER Working Paper No. 13717, 2008.

Page, C., *Showing My Color: Impolite Essays on Race and Identity* (HarperCollins, 1996).

Posner, D., "The Implications of Constructivism for Studying the Relationship Between Ethnic Diversity and Economic Growth," in K. Chandra, ed., *Ethnicity, Politics, and Economics*, Working Paper No. 13717, 2004.

Rappaport, J., "Moving to Nice Weather," *Regional Science and Urban Economics*, XXXVII (2007), 375-398.

Rappaport, J., "Why are Population Flows so Persistent?" *Journal of Urban Economics*, LVI (2004), 554-580.

Rhode, P. W., and K. S. Strumpf, "Assessing the Importance of Tiebout Sorting: Local Hetrogeneity from 1850 to 1990," *American Economic Review,* XCIII (2003), 1648-1677.

Rubinfeld, D., P. Shapiro, and J. Roberts, "Tiebout Bias and the Demand for Local Public Schooling," *Review of Economics and Statistics*, LXIX (1987), 426-437.

Sokoloff, K. L., and S. L. Engerman, "History Lessons: Institutions, Factors Endowments, and Path of Development in the New World," *Journal of Economic Perspectives*, XIV (2000), 217-232.

Tajfel, H., M. Billig, R.P. Bundy, and C. Flament, "Social Categorization and Intergroup Behavior," *European Journal of Social Psychology*, I (1971), 149-178.

Tiebout, C., "A Pure Theory of Local Expenditures," *Journal of Political Economy*, LXIV (1956), 416-24.

Vigdor J., "Community Composition and Collective Action: Analyzing Initial mail responses to 2000 Census," *Review of Economics and Statistics*, LXXXVI (2004), 303-312.

Wilson, W., *When Work Disappears: The World of the New Urban Poor* (New York: Knopf-distributed by Random House, Inc., 1996).

Table 1: Descriptive Statistics

	Obs	Mean	S.D.	Min	Max	Unit
*ethnic*90	820	0.35	0.20	0.03	0.79	Fraction
*ethnic*00	820	0.44	0.19	0.06	0.81	Fraction
$ethnic_{5races}$90	820	0.29	0.17	0.01	0.70	Fraction
$ethnic_{5races}$00	820	0.38	0.17	0.04	0.73	Fraction
$ethnic_{2races}$90	820	0.30	0.15	0.03	0.50	Fraction
$ethnic_{2races}$00	820	0.35	0.13	0.02	0.50	Fraction
growth rate *ethnic*	820	0.32	0.26	-0.27	1.47	Fraction
median rent 1990	820	475	145	239	1001	Dollar
unemployment rate 1991	820	6.8	2.6	0.8	17.9	Fraction
per capita income 1989	820	14.5	4.8	5.8	55	Thousand dollar per capita
firm establishments 1987	820	12	5.4	141	11.7	Thousand per capita
total population 1990	820	11.4	32.7	25	7322.5	Thousand
percentage of old population 1990	820	13.12	4.79	2.7	48.5	Fraction
spending 1990	820	429.0	223.6	91.2	2068.7	Dollar per capita
grant	820	283.9	972.8	2.3	137.6	Hundred dollar per capita
city Area 1990	820	39.6	69.4	1	758.7	Square Miles

Notes: *ethnic*90: city ethno-racial fractionalization in 1990, *ethnic*00: city ethno-racial fractionalization in 2000. $ethnic_t = 1 - \sum_{i=1}^{n}(S_{i,t})^2$, Where S_i is the population share of ith ethno-racial group in a city in year t and n is the total number of ethno-racial groups in a city in year t, i = Non-Hisp. White, Non-Hisp. Black, Non-Hisp. American Indians and Alaskan Native, Non-Hisp. Asian, Non-Hisp. Pacific Islander, Non-Hisp. Other, Hisp. White, Hisp. Black, Hisp. American Indians and Alaskan Native, Hisp. Asian, Hisp. Pacific Islander, Hisp. Other. t = 1990, 2000. $ethnic_{5races,t}$: city ethno-racial fractionalization in year t using 5 categories of races (White, Black, American Indian and Eskimo, or Aleut, Asian or Pacific Islander, and Other). $ethnic_{2race,t}$: city ethno-racial fractionalization in year t using 2 categories of races (non-Hispanic White and All Other). growth rate *ethnic*: Growth rate of *ethnic* between 1990 and 2000 measured as $\ln(ethnic2000) - \ln(ethnic1990)$. median rent 1990: median gross rent (for renter-occupied housing units) in a city in 1990. unemployment rate 1991: civilian unemployed as a % of total civilian labor force in the city in 1991. per capita income 1989: city level per capita income in 1989. firm establishments 1987: 1987 city per capita total number of (manufacturing firms establishments with 20 or more employees + wholesale trade establishments + retail trade establishments with payroll + taxable service establishments with payroll). total population 1990: city aggregate population in 1990. percentage of old population: % of total city population with age more than 65 years in 1990. spending 1990: city governments' 1990 aggregate per capita general expenditure on welfare, health, police, highways, fire, and sewerage and solid waste management. *grant*: amount of per capita federal grant awards received by cities in 1986. city area 1990: total city land area in 1990.

Table 2: Ethno-racial Group's Population Shares in U.S. Cities − Descriptive Statistics

	2000					1990					
	Obs	Mean	S.D.	Min	Max	Obs	Mean	S.D.	Min	Max	Unit
non Hisp. white	820	65.30	22.62	1.02	97.09	820	73.89	20.63	1.46	98.68	%
non Hisp. black	820	14.14	16.85	0.13	88.23	820	12.71	15.75	0.05	88.51	%
non Hisp. aian	820	0.52	1.11	0.02	16.45	820	0.51	1.00	0.02	13.10	%
non Hisp. asian	820	4.27	6.74	0.11	61.47	820	3.13	5.00	0.03	56.01	%
non Hisp. pi	820	0.11	4.22	0.00	2.78	820	0.03	0.12	0	1.94	%
non Hisp. other	820	2.09	1.20	0.16	14.41	820	0.13	0.25	0	4.73	%
Hisp. white	820	6.38	8.93	0.07	79.94	820	4.99	8.29	0.12	79.00	%
Hisp. black	820	0.28	0.39	0	3.60	820	0.30	0.55	0	5.87	%
Hisp. aian	820	0.15	0.19	0	1.25	820	0.07	0.09	0	0.71	%
Hisp. asian	820	0.05	0.06	0	0.58	820	0.05	0.11	0	1.35	%
Hisp. pi	820	0.02	0.02	0	0.16	820	0.07	0.15	0	1.33	%
Hisp. other	820	6.68	8.80	0.06	55.62	820	4.10	6.94	0.03	64.98	%

Notes: City level observations for the year 1990 and 2000.
non Hisp. white: non-Hispanic White, non Hisp. black: non-Hispanic Black
non Hisp. aian: non-Hispanic American Indian; Eskimo; or Aleut.
non Hisp. asian: non-Hispanic Asian, non Hisp. pi: non-Hispanic Pacific Islander.
non Hisp. other: non-Hispanic Other, Hisp. white: Hispanic White, Hisp. Black: Hispanic black
Hisp. aian: Hispanic American Indian; Eskimo; or Aleut.
Hisp. asian: Hispanic Asian, Hisp. pi: Hispanic Pacific Islander, Hisp. other: Hispanic Other.

Table 3: Ranges of *ethnic* Change in U.S. Cities

Growth Rate of *ethnic*	Number of Cities	% of Total Cities
Negative	45	5.49
More than 0% but less than 10%	112	13.66
More than 10% but less than 50%	475	57.93
More than 50% but less than 100%	179	21.83
More than 100%	9	1.10

Notes: ***ethnic***: ethno-racial fractionalization level in a city, calculated using 12 ethno-racial population categories.
Growth rate of *ethnic* measure the decadal growth rate of ethnic from 1990 to 2000 and calculated as $\ln(ethnic_{2000}) - \ln(ethnic_{1990})$.

Table 4: Public Goods Spending and Growth of *ethnic* in U.S. Cities

2SLS Regression

Panel A: IV Estimates				
Dep. Var: ln(*ethnic* 2000) - ln(*ethnic* 1990)	(OLS)	(IV)	(OLS)	(IV)
ln *spending* 1990	-0.016	**-0.244*** **	-0.030**	**-0.246*** **
	(0.013)	**(0.051)**	(0.014)	**(0.061)**
ln Per Capita Income 1989			0.006	0.080*
			(0.042)	(0.048)
ln Total Population 1990			0.026**	0.045***
			(0.011)	(0.012)
ln Median Rent 1990			0.146**	0.093
			(0.057)	(0.058)
ln PC Firm Establishments 1987			-0.003	0.063**
			(0.018)	(0.027)
ln Unemployment Rate 1990			-0.008	0.018
			(0.020)	(0.023)
ln Percentage of old population 1990			0.042*	0.049**
			(0.022)	(0.023)
ln City Area 1990			-0.017*	-0.009
			(0.010)	(0.011)
ln *ethnic* 1990	-0.279***	-0.260***	-0.273***	-0.247***
	(0.009)	(0.011)	(0.014)	(0.017)
State Dummies	No	No	Yes	Yes
R^2	0.63	0.50	0.72	0.64
Hansen J Statistic (p value)		0.20		0.33

Panel B: First Stage for Public Goods Spending in 1990 (*spending* 1990)

Dep. Var: ln *spending* 1990				
ln ***grant***		0.085***		0.067***
		(0.010)		(0.012)
tenure		0.066**		0.060**
		(0.029)		(0.028)
F-test of excluded instruments		39.5		18.7
Number of observations	820	820	820	820

Notes: Robust standard errors are in parentheses. ***significant at 1%, **significant at 5%, *significant at 10%.

ln *spending* 1990: Log city governments' 1990 aggregate per capita general expenditure on welfare, health, police, highways, fire, and sewerage and solid waste management.

grant: per capita federal grant awards received by cities in 1986.

tenure: whether in 1989 the representative congressperson of the city is from the Democratic party with 10 years or more tenure in the House of Representatives.

Excluded Instruments: *grant* and *tenure*. Instrumenting **ln *spending* 1990** with *grant* and *tenure*.

ln(*ethnic* t): Log ethno-racial fractionalization level in a city in year t (t = 2000, 1990), calculated using 12 ethno-racial population categories. First Stage regressions of Panel B include all the control variables of second stage regressions in Panel A.

Table 5: Public Goods Spending and Population Growth of Ethno-racial Groups in U.S. Cities
2SLS Regression

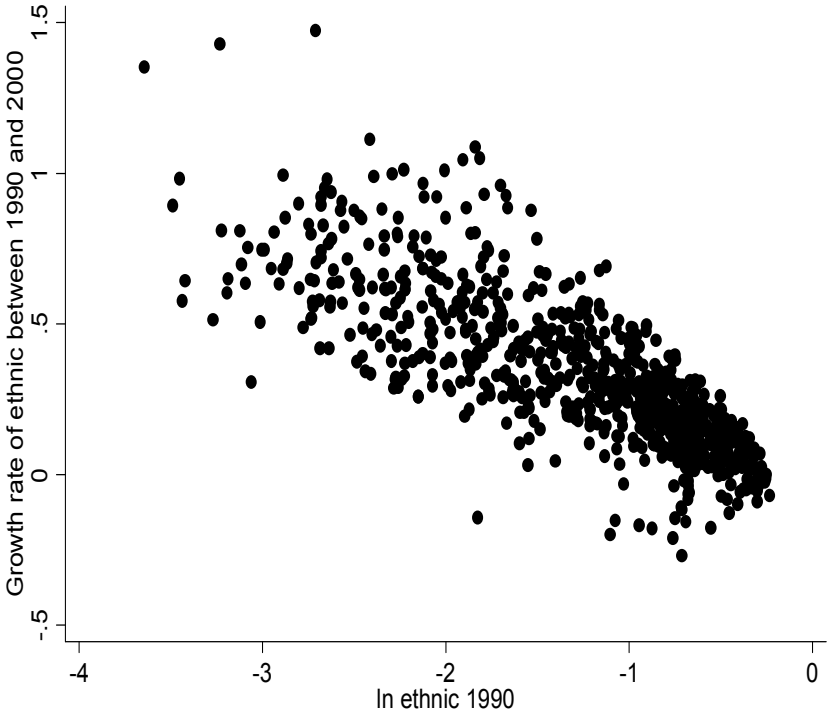
	Dep. Var: ln(Pop of *ith* Race in 2000) - ln(Pop of *ith* Race in 1990)				
Panel A: IV Estimates	i = Non Hisp. White	Non Hisp. Black	Hisp. White	Hisp. Other	Total city Pop
ln *spending* 1990	**0.235*** **	**-0.393** **	**-0.374** **	**-0.602*** **	**-0.055**
	(0.086)	(0.154)	(0.159)	(0.206)	(0.048)
ln Rent 1990	-0.085	0.445***	0.380***	0.489***	0.154***
	(0.055)	(0.145)	(0.113)	(0.152)	(0.037)
ln Unemp. Rate 1990	0.018	0.199***	0.191***	0.196***	0.046***
	(0.023)	(0.063)	(0.055)	(0.070)	(0.018)
ln PCI 1989	0.050	-0.153	0.074	-0.283**	-0.006
	(0.056)	(0.114)	(0.103)	(0.139)	(0.032)
ln Tot. Firm Est. 1987	-0.028	-0.038	0.121*	0.267***	0.036**
	(0.032)	(0.065)	(0.065)	(0.086)	(0.018)
ln % of old pop 1990	-0.129***	0.022	0.031	0.060	-0.093***
	(0.022)	(0.051)	(0.044)	(0.055)	(0.016)
ln City Area 1990	0.049***	-0.021	0.023	-0.015	0.033***
	(0.014)	(0.026)	(0.024)	(0.030)	(0.008)
ln Tot. non Hisp white 1990	0.170***	0.183***	0.110**	0.288***	
	(0.035)	(0.057)	(0.049)	(0.057)	
ln Tot. non Hisp black 1990	-0.043***	-0.157***	-0.029*	0.075***	
	(0.009)	(0.022)	(0.017)	(0.022)	
ln Tot. Hisp white 1990	0.043**	-0.028	-0.412***	0.131***	
	(0.020)	(0.035)	(0.036)	(0.046)	
ln Tot. Hisp. other 1990	-0.035**	-0.012	0.304***	-0.271***	
	(0.014)	(0.025)	(0.027)	(0.034)	
ln City Population 1990	-0.200***	0.115	0.056	-0.108	-0.028***
	(0.042)	(0.080)	(0.064)	(0.079)	(0.010)
R^2	0.44	0.45	0.41	0.42	0.40
State Dummies	Yes	Yes	Yes	Yes	Yes
Hansen J Statistic (p value)	0.64	0.01	0.79	0.75	0.10

Panel B: First Stage for Public Goods Spending in 1990 (*spending* 1990)

Dep. Var: ln *spending* 1990	(I)				(II)
ln ***grant***	0.062***				0.074***
	(0.012)				(0.012)
tenure	0.056**				0.062**
	(0.028)				(0.029)
F-test of excluded instruments	16.35				23.13
Number of observations	820	820	820	820	820

Notes: Dependent Variable in the first four columns of Panel A is the decadal population growth rate of the four above mentioned ethno-racial groups. Dependent Variable in the fifth column is the decadal growth of aggregate population. Column (I) of Panel B shows the first stage of population growth regressions for all four ethno-racial groups. The first stage is identical for non-Hispanic White, non-Hispanic Black, Hispanic White, and Hispanic Other. Column (II) of Panel B shows the first stage for aggregate city population growth regression. Robust standard errors are in parentheses.***significant at 1%, **significant at 5%, *significant at 10%. **ln *spending* 1990:** log city governments' 1990 aggregate per capita general spending on welfare, health, police, highways, fire, and sewerage and solid waste management. ***grant*:** Per Capita Federal Grant received by cities in 1986. ***tenure*:** whether in 1989 the representative congressperson of the city is from the Democratic party with 10 years or more tenure in the House of Representatives. **Excluded Instruments:** *grant* and *tenure*. Instrumenting ln *spending* 1990 with *grant* and *tenure*. First Stage regressions of Panel B include all the control variables of second stage regressions in Panel A.

Figure 1: Convergence of Ethno-racial Fractionalization (*ethnic*) in U.S. Cities.



Note: ln *ethnic* 1990 is the level of log ethno-racial fractionalization in 1990, calculated using 12 ethno-racial population categories.
Growth rate of *ethnic* between 1990 and 2000: ln(*ethnic* 2000) – ln(*ethnic* 1990).
Number of observations: 820 U.S. cities.

Table 6: Convergence of *ethnic* in U.S. Cities
2SLS Regression

Panel A: OLS and IV Estimates

Dep. Var: ln(*ethnic* 2000) - ln(*ethnic* 1990)	(I)	(II)
ln *ethnic*1990	-0.281***	-0.260***
	(0.009)	(0.011)
ln *spending* 1990		-0.244***
		(0.051)
Constant	-0.032***	1.450***
	(0.009)	(0.310)
R^2	0.63	0.50
Hansen J Statistic (p value)		0.20

Panel B: First Stage for City Govt. Public Goods Spending in 1990

Dep. Var: ln *spending* 1990	(I)	(II)
ln *ethnic*1990		0.037*
		(0.019)
ln ***grant***		0.085***
		(0.010)
tenure		0.067**
		(0.029)
F-test of excluded instruments		39.5
Number of observations	820	820

Notes: Robust standard errors are in parentheses. ***significant at 1%, **significant at 5%, *significant at 10%.
Column (I) presents results for the OLS regression: $\ln(ethnic_{2000})_i - \ln(ethnic_{1990})_i = \alpha + \beta \ln(ethnic_{1990})_i + \varepsilon_i$
Column (II) presents results for the 2SLS regression:
$\ln(ethnic_{2000})_i - \ln(ethnic_{1990})_i = \alpha_c + \beta_c \ln(ethnic_{1990})_i + \gamma_c \ln(spending_{1990})_i + \varepsilon_{ci}$
where $\ln spending_{1990}$ is instrumented by *grant* and *tenure*. **ln(*ethnic* t):** Log ethno-racial fractionalization level in a city in year t (t = 2000, 1990) calculated using 12 ethno-racial population categories. **ln *spending* 1990:** Log city governments' 1990 aggregate per capita general expenditure on welfare, health, police, highways, fire, and sewerage and solid waste management. ***grant*:** Per Capita Federal Grant received by cities in 1986. ***tenure*:** whether in 1989 the representative congressperson of the city is from the Democratic party with 10 years or more tenure in the House of Representatives. **Excluded Instruments:** *grant* and *tenure*.

Table 7: Fractionalization and Public Goods Provision in U.S. Cities
3SLS Regression

Dep. Var: Share of spending on public goods in 1990	(OLS)	(3SLS)
ethnic 1990	-4.83**	-1.92
	(2.44)	(2.82)
ln Median Rent 1990	-14.39***	-16.02***
	(2.64)	(2.69)
ln Unemployment Rate 1990	-3.55***	-4.34***
	(1.29)	(1.26)
ln Per Capita Income 1989	1.96	-0.75
	(2.67)	(2.90)
ln PC Firm Establishments 1987	3.32***	5.49***
	(1.21)	(1.25)
ln Total Population 1990	-1.78**	-0.73
	(0.85)	(0.81)
ln Percentage of old population 1990	-1.65	-1.72
	(1.24)	(1.28)
ln City Area 1990	-0.20	-0.35
	(0.74)	(0.63)
ln PC Federal Grant Received 1986		-1.86***
		(0.30)
R^2	0.16	0.20
Number of observations	820	820

Notes: Robust standard errors are in parentheses.
***significant at 1%, **significant at 5%, *significant at 10%.
Share of spending on public goods in 1990: 1990 city governments' % share of total general expenditure on (fire + highways + sewerage and solid waste management).
***ethnic* 1990:** Ethno-racial fractionalization level in a city at 1990, calculated using 12 ethno-racial population categories.
Instrumenting Share of spending on public goods in 1990 with Per Capita Federal Grant received by cities in 1986 and *ethnic* 1990 with *ethnic* 1980.
ethnic 1980: Ethno-racial fractionalization level in a city in 1980, calculated using 5 categories of races: White, Black, American Indian and Eskimo, or Aleut, Asian or Pacific Islander and Other.

Table 8: **Sensitivity Test:** Growth of *ethnic*
2SLS Regression

Dep. Var: ln(*ethnic* 2000) - ln(*ethnic* 1990)			
Panel A: IV Estimates	Twelve Groups	Five Groups	Two Groups
ln *spending* 1990	**-0.246*** **	**-0.236*** **	**-0.274*** **
	(0.061)	**(0.066)**	**(0.077)**
ln Per Capita Income 1989	0.0.080*	0.024	0.411***
	(0.048)	(0.053)	(0.067)
ln Total Population 1990	0.045***	0.057***	-0.032*
	(0.012)	(0.013)	(0.017)
ln Median Rent 1990	0.093	0.165***	-0.180**
	(0.058)	(0.063)	(0.077)
ln PC Firm Establishments 1987	0.063**	0.054*	0.088**
	(0.027)	(0.028)	(0.036)
ln Unemployment Rate 1990	0.018	0.012	-0.028
	(0.023)	(0.024)	(0.027)
ln Percentage of old population 1990	0.049**	0.055**	0.073**
	(0.023)	(0.025)	(0.028)
ln City Area 1990	-0.009	-0.016	0.053*
	(0.011)	(0.012)	(0.015)
ln *ethnic* 1990	-0.247***	-0.291***	-0.218***
	(0.017)	(0.017)	(0.023)
State Dummies	Yes	Yes	Yes
R^2	0.64	0.70	0.62
Hansen J Statistic (p value)	0.33	0.12	0.56

Panel B: First Stage for Public Goods Spending in 1990

Dep. Var: ln *spending* 1990			
ln ***grant***	0.067***	0.066***	0.068***
	(0.012)	(0.012)	0.012)
tenure	0.060**	0.060**	0.060
	(0.028)	(0.028)	(0.028)
F-test of excluded instruments	18.7	18.3	19.4
Number of observations	820	820	820

*Notes:*Robust standard errors are in parentheses. ***significant at 1%, **significant at 5%, *significant at 10%.
ln(*ethnic* t): Log ethno-racial fractionalization level in a city in year t (t = 2000, 1990) and calculated as $ethnic_t = 1 - \sum_{i=1}^{n}(S_{i,t})^2$, Where S_i is the population share of ith race in a city and n is the total number of ethno-racial groups in a city. In case of 5 groups n =5 and i= White, Black, American Indian and Eskimo, or Aleut, Asian or Pacific Islander and Other. In case of 2 groups n =2 and i= non-Hispanic White, all other.
ln *spending* 1990: Log city government's 1990 aggregate per capita general expenditure on welfare, health,police, highways, fire, and sewerage and solid waste management. ***grant***: per capita federal grant awards received by cities in 1986. ***tenure***: whether in 1989 the representative congress person of the city is from the Democratic party with 10 years or more tenure in the House of Representative. **Excluded Instruments:** *grant* and *tenure*.
Instrumenting **ln *spending* 1990** with *grant* and *tenure*. First Stage regression of Panel B includes all the control variables of second stage regressions in Panel A.

Appendix A

To estimate the absolute convergence, the basic regression that I am measuring is

$$\ln(ethnic_{2000})_i - \ln(ethnic_{1990})_i = \alpha + \beta \ln(ethnic_{1990})_i + \varepsilon_i \tag{10}$$

The first column of Panel A in Table 6 gives the estimated version of equation (10):

$$\ln(ethnic_{2000})_i - \ln(ethnic_{1990})_i = \hat{\alpha} + \hat{\beta} \ln(ethnic_{1990})_i \tag{11}$$

For ith city, in the long run at steady-state, $ethnic_{2000} = ethnic_{1990} = ethnic_{ss}$. Putting the steady-state value in equation (11), I get:

$$\ln(ethnic_{ss})_i - \ln(ethnic_{ss})_i = \hat{\alpha} + \hat{\beta} \ln(ethnic_{ss})_i \tag{12}$$

$$or, \ln(ethnic_{ss})_i = -\hat{\alpha}/\hat{\beta} \tag{13}$$

From the first column of Panel A in Table 6, I get $\hat{\alpha} = -0.032, \hat{\beta} = -0.281$
Hence, $\ln(ethnic_{ss})_i = -0.114$
or, $ethnic_{ss,i} = 0.892$

This is the long run unconditional steady-state level of ethno-racial fractionalization for my sample cities, if every city is identical in 1990 except in their 1990 ethno-racial fractionalization level.

To calculate the long run steady-state fractionalization level conditional on initial public goods spending, the regression that I measure is:

$$\ln(ethnic_{2000})_i - \ln(ethnic_{1990})_i = \alpha + \beta \ln(ethnic_{1990})_i + \gamma \ln(spending_{1990})_i + \varepsilon_i \tag{14}$$

The second column of Panel A in Table 6 gives the estimated version of equation (14):

$$\ln(ethnic_{2000})_i - \ln(ethnic_{1990})_i = \hat{\alpha} + \hat{\beta} \ln(ethnic_{1990})_i + \hat{\gamma} \ln(spending_{1990})_i \tag{15}$$

Putting the steady-state value of *ethnic* in equation (15), we get

$$or, \ln(ethnic_{ss}) = \{-\hat{\alpha} - \hat{\gamma} \ln(spending_{1990})\}/\hat{\beta} \tag{16}$$

where $\hat{\alpha} = 1.450, \hat{\beta} = -0.260$ and $\hat{\gamma} = -0.244$

The lower 10th percentile value of $\ln(spending_{1990})$ is 5.49 (i.e. \$242), while the upper 90th percentile value is 6.46 (i.e. \$636).

Putting the lower 10th percentile value of $\ln(spending_{1990})$ in equation (16), I get

$\ln(ethnic_{ss}) = 0.425$

or, $ethnic_{ss} \approx 1$ (because $0 \leq ethnic \leq 1$).

Similarly putting the 90th percentile value of $\ln(spending_{1990})$ in equation (16), I get

$\ln(ethnic_{ss}) = -0.485$

or, $ethnic_{ss} = 0.616$.

Appendix B

Data and Variable Construction

Ethno-racial Fractionalization Index:

$$ethnic = 1 - \sum_{i=1}^{n} (S_i)^2 \tag{17}$$

Where S_i is the population share of ith race in a city and n is the total number of ethno-racial groups in a city (n=12).

Total population in city j in year t = Total population of (non-Hispanic White + non-Hispanic Black + non-Hispanic American Indians and Alaskan Native + non-Hispanic Asian + non-Hispanic Pacific Islander + non-Hispanic Other + Hispanic White + Hispanic Black + Hispanic American Indians and Alaskan Native + Hispanic Asian + Hispanic Pacific Islander + Hispanic Other) in city j in year t, t = 1990, 2000. (Source: U.S. Census Bureau.)

ethnic index for 5 ethno-racial groups is calculated using the same formula (equation (17))where the names of the ethno-racial groups are White, Black, American Indian and Eskimo or Aleut, Asian or Pacific Islander, and Other. In this case total population in city j in year t = Total population number of (White + Black + American Indian and Eskimo or Aleut + Asian or Pacific Islander + Other) in city j in year t, t = 1990, 2000. (Source: *County and City Data Book 1990*)

ethnic index for 2 ethno-racial groups is calculated using the same formula (equation (17)) where the names of the ethno-racial groups are non-Hispanic White, and All Other. In this case total population in city j in year t = Total population number of (non-Hispanic White + All Other) in city j in year t, t = 1990, 2000. (Source: U.S. Census Bureau.)

ethnic index for 1980 is calculated using the same formula and using the population shares of 5 ethno-racial groups - white, black, American Indian and Eskimo and Aleut, Asian and Pacific islander, and other. (Source: *County and City Data Book 1988*)

Growth rate of ethnic is calculated as $\ln(ethnic_{2000})$ - $\ln(ethnic_{1990})$.

Public Goods Expenditure

Per capita public goods expenditure by ith city government in year 1990 is calculated as follows:

Total 1990 share of spending on public goods by ith city government = (% of 1990 general expenditure on Public welfare + % of general 1990 expenditure on Health and hospitals + % of general 1990 expenditure on Police protection + % of general 1990 expenditure

on Highways + % of general 1990 expenditure on Fire protection + % of general 1990 expenditure on Sewerage and solid waste management) by ith city government.

Per capita public goods expenditure by ith city government in year 1990 = (Per capita 1990 general expenditure by ith city government)$\times$(Total 1990 share of spending on public goods by ith city government). (Source: *County and City Data Book 1990*)

Median Rent

Median rent for the year 1990 gives the dollar value of median gross rent for specified renter occupied housing paying cash rent in 1990. (Source: *County and City Data Book 1990*)

Unemployment Rate

1991 civilian unemployment in a city as a percent of total civilian labor force in that city. (Source: *County and City Data Book 1990*)

Per Capita Income

1989 dollar amount of per capita money income of the resident of a city based on resident population enumerated as of April 1, 1990. (Source: *County and City Data Book 1990*)

Firm Establishments

This is calculated as follows:

Total number of firm establishments in 1987 = Total number of Manufacturing establishments with employees in 1987 + Total number of Wholesale establishments in 1987 + Total number of Retail trade establishments with payroll in 1987 + Total number of taxable Service industries with payroll in 1987.

Total number of Manufacturing establishments with employees in 1987 = Total Manufacturing establishments in 1987 $\times$ % of Manufacturing establishments with 20 or more employees in 1987.

Then per capita firm establishments in a city in 1987 = Total number of firm establishments in 1987 / Total city population in 1986. (Source: *County and City Data Book 1990*)

Total City Population

1990 aggregate city population. (Source: *County and City Data Book 1990*)

10.0.1 Old Population

% of 1990 total city population with age between 65 to 74 years + % of 1990 total city population with age between 75 years and over. (Source: *County and City Data Book 1990*)

Federal Grant

This represents the dollar amount of Federal Grant awards to the cities in 1986.

1986 per capita grant to a city = The dollar amount of Federal Grant awards to the city in 1986/ Total city population in 1986. (Source: *County and City Data Book 1988*)

City Area

Total 1990 square miles of dry land (and partially covered by water) area of city. (Source: *County and City Data Book 1990*)