Fractionalization and The Tragedy of Growth

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Abstract

This paper examines the effect of population diversity or fractionalization on income growth in U.S. cities. Using city level data across decades, I find population diversity has no significant impact on income growth. This directly contradicts the conclusion of established researches that fractionalization causes significant negative impact on income growth of a locality. I consider fractionalization and public policy to be jointly determined, and use instrumental variables to establish the causality between fractionalization and income growth. My results show that when fractionalization is assumed to be an exogenous characteristic, it does have a significant negative impact on growth. However, instrumenting fractionalization in a 2SLS framework shows no significant impact on growth.

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1 Introduction

Macro/growth economists try to understand the determinants of income growth of a society from many angles. Although they have different opinions about the main determinants of growth, most of them agree that population diversity of a society is a very significant determinant for growth. Most of them believe that higher population diversity causes lower economic growth. In this paper, I show that this conclusion does not hold true. The economic logic that higher diversity/ fractionalization causes lower growth is based on the assumption that fractionalization is a static characteristic of a society, and, hence, it is completely exogenous to public policy design. In my previous paper, I have shown that in a set-up where population flow is very persistent this assumption is not tenable. Results show that public policies regarding city governmentsŠ expenditure on a couple of important categories of public goods do have a very significant impact on fractionalization growth in U.S. cities. Hence, fractionalization is not an exogenous cause of public policy design as is assumed by the most part of the literature. Thus the question, what effect does endogenous fractionalization have on the income growth of a locality proves to be very interesting.

In order to answer this question we need a geographic set up where people can move freely across localities. In a cross country setting this is hardly possible. Therefore, our empirical analysis is based on U.S. cities, where 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. There exists a wide variation of ethno-racial diversity across U.S. cities. As a result, they offer a unique opportunity to examine the impact of fractionalization on income growth.

Using the census data of twelve ethno-racial groups of 819 cities for two census years, our results show that fractionalization has no significant impact on income growth when it is treated as endogenous. We have two main empirical results - (1) growth of ethno-racial

fractionalization between 1990 and 2000 has no significant impact on income growth (2) the 1990 level of ethno-racial fractionalization also has no significant impact on income growth between 1989 and 1999.

We use instrumental variable regression to identify the impact of fractionalization on income growth. Two instruments have been used for ethno-racial diversity in U.S. cities. The first is the level of federal grant award received by each city in the year 1986 and the second is the tenure of the democratic congress person representing the city. In my last paper, I have shown that in a federal system funding from a higher level of government and the tenure and political affiliation of the representatives have significant impacts on the level of fractionalization growth of a city.

The first stage of the two stage least squares (2SLS) regression shows a significant positive relationship between the instruments and fractionalization growth from 1990 to 2000 and fractionalization level at 1990. The subsequent 2SLS regression shows that cities with 1% higher ethno-racial fractionalization growth rate between 1990 and 2000 have experienced no significant lower income growth between 1989 and 1999. Moreover, the initial level of 1990 ethno-racial fractionalization has no significant impact on per capita income growth between 1989 and 1999. These results are robust to controlling for a large variety of initial city characteristics.

These findings demonstrate that the earlier powerful finding that population diversity has negative impact on economic performance disappears when population diversity is treated as endogenous to public policy. The rest of the paper is organized along the following lines: In the next section I briefly discuss the literature. Section 3 describes my data and its sources. Section 4 presents the instruments for the 1990 level of ethno-racial fractionalization level and its growth in the cities . In section 5, I present the 2 Stage Least Squares regression (2SLS). Section 6 discusses the conclusions of this study.

2 Literature Review

Fractionalization or population diversity is measured from different angels such as ethnic origin, racial identity, language spoken, religious affiliation etc. An index called the Harfindhal index is been used to represent fractionalization. This index is constructed using total population shares of different population groups in a locality. The index has an intuitive construction and interpretation. It has been included in the famous *World Handbook of Political and Social Indicators* by Taylor and Hudson.

Fractionalization or population diversity has become a "standard" explanatory variable in cross country growth regressions after the influential articale published by Easterly and Levine (1997). [1] In this paper they have shown, in a cross country settings, higher ethnolinguistic fractionalization has a strong negative impact on per capita GDP growth of a country. They argued it is the higher ethnolinguistic diversity among the population of African countries that are responsible for their miserable growth tragedy. A large part of the macro growth literature broadly confirms their results. Works such as La Porta et al. (1999), Alesina, Baquir, and Easterly (1999), Katz (1999), Annett (2001), Alesina and La Ferrara (2002), Caselli and Coleman (2002), and many more fall in this category. Alesina et al. (2003) substantially updated the original ethno-linguistic fractioanlization index called as ELF using mainly data sourse from the *Encyclopedia Britannica* for 190 counties in the year 1990. Their comprehensive measure of fractionalization confirmed the earlier findings that there exists a robust negative causal relationship between ELF and growth. They found higher ethnic diversity is associated with low government quality.[4]

The literature on fractionalization, that find diversity has a negative outcome on economic performance of a locality, based upon the assumption 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

[1] The general Growth empirics exercises of Doppelhofer et al. (2000), Brock and Durlauf (2001).

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

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 performance of the society. 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 any public policy 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. Therefore considering this interdependency between fractionalization and public policy is more logical way to measure the impact of fractionalization on economic growth.

3 Data, Source, and Descriptive Statistics

I analyze the per capita income growth rate 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 Pa-

cific 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 819 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.

Table 1 provides the descriptive statistics of all the variables that I am using in my income growth regressions. The mean *ethnic* in the 819 sample cities increased from 0.35 in 1990 to 0.44 in 2000, almost a 26% increase in 10 years. The seventh row 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

[7] I do not include cities from states of Alaska, Hawaii, and Vermont.

[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.

12 groups for the 820 sample cities in 1990 and 2000.

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.

4 Instruments for Public Goods Spending

4.1 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 congress person 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 congress person who served that CD

[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 congress person 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

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 congress person 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]

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 congress person from the cities in the House of Representatives up to the year 1989. Then I construct a variable indicating the total tenure of the congress person from 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 congress persons acquired sufficient power to allocate funds to their districts and, by extension, to their cities.[16]

[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 congress person in 3rd CD of Texas in 1990. Say it was congress person i. Then I have to find out the total number of years congress person 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 congress person, 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 congress person 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.

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

4.2 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.

5 Income Growth in U.S. Cities – 2SLS Regressions

5.1 The Determinants of City's fractionalization level

The second stage of my 2SLS regression, which I measure to identify the impact of fractionalization on per capita income growth is :

$$\ln(PCI_{1999})_i - \ln(PCI_{1989})_i = \alpha + \beta \ln(ethnic_{1990})_i + \gamma \ln(X)_i + \varepsilon_i \qquad (2)$$

$ln(PCI_{1999})_i - \ln(PCI_{1989})_i$ measures the growth rate of per capita income in city i between 1999 and 1989. $\ln(ethnic_{1990})_i$ is the ethno-racial fractionalization level in city $i$in 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 ethno-racial fractionalization on income growth.

[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*.

Since I believe that income and population heterogeneity are not exogenous causes to each other, I consider cities' ethno-racial diversity (*ethnic*) as an endogenous variable. Therefore, I instrument it with my two instruments *grant* and *tenure*. Equation (3) describes the relationship between cities' ethno-racial fravtionalization level and its determinants, including my two instruments. Therefore, equation (3) represents the first stage regression:

$$\ln(ethnic_{1990})_i = \alpha_g + \beta_g \ln(grant)_i + \gamma_g(tenure)_i + \delta_g \ln(X)_i + \nu_{gi} \tag{3}$$

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 congress person 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. 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]

5.2 Income Growth and Level of Fractionalization

The first and third columns of panel A in Table 4 reports the ordinary least squares (OLS) regression results of per capita income growth on level of fractionalization. Column one shows that cities in 1990 with 1% higher ethno-racial population diversity experienced a 0.2% lower growth of per capita income between 1989 and 1999. After controlling for all city level characteristics plus 50 state dummies, the impact of fractionalization level on income growth is still robust and significant as exhibited in column two. Cities in 1990 with higher ethno-racial population diversity experienced a significant lower income growth. This result is consistent with the established literature that assumes fractionalization as

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

an exogenous characteristics of a locality.

But as we argued previously fractionalization is not an exogenous cause of public policy and hence to income. Considering the level of ethno-racial fractionalization in equation (2) as endogenous and modeling it with equation (3) gives the IV regression results in column three and four. The result of column three shows no negative impact of fractionalization on income growth. Cities with higher fractionalization in 1990 actually experienced a higher income growth. After including all of my city level controls plus state fixed effects the result of column four shows no significant relationship between population diversity and income growth. 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 considering population diversity as endogenous characteristics of locality, determined by public policy, shows diversity does not cause lower income growth. Thus the earlier findings that population diversity causes poor economic performance of a society seems to be originates from the strong assumption that diversity is a static factor and hence completely exogenous to any public policy design.

5.3 Income Growth and Growth of Fractionalization

Another interesting angel to analyze the impact of population diversity on economic performance of a locality is to measure the causal impact of fractionalization growth on income growth. In my earlier paper I have shown ethno-racial diversity in U.S. cities are not a static factor. As a result regressing the growth of per capita income on the growth of ethno-racial diversity can give us more logical impact. To measure this impact the base

line regression that I measure is

$$\ln(PCI_{1999})_i - \ln(PCI_{1989})_i = \alpha + \beta[\Delta(ethnic)_i] + \gamma \ln(X)_i + \varepsilon_i \quad (4)$$

Where $[\Delta(ethnic)_i]$ is $\ln(ethnic_{2000})_i - \ln(ethnic_{1990})_i$, the growth rate of ethno-racial fractionalization in city i between 1990 and 2000.

Again as previous fractionalization growth is treated as endogenous and instrumented with per capita federal grant received by the cities in 1986, $\ln(grant)_i$ and tenure of the democratic congress person from the city, $\ln(tenure)_i$.

$$\ln(ethnic_{2000})_i - \ln(ethnic_{1990})_i = \alpha_g + \beta_g \ln(grant)_i + \gamma_g(tenure)_i + \delta_g \ln(X)_i + \nu_{gi} \quad (5)$$

Panel A of table 5 reports the IV regression results. Column I shows the impact of fractionalization growth on income growth in 819 U.S. cities with out any controls. Result shows cities with 1% higher growth rate of ethno-racial fractionalization between 1990 to 2000, experienced a 9% significant lower per capita income growth between 1989 to 1999. However after controlling for other city level characteristics, this effect tend to disappear. Cities with 1% higher fractionalization growth does not have any significant impact on income growth.

6 Conclusion

Population diversity as measured by ethnic origin as well as racial identity has no significant impact on income growth in U.S. cities. This result critically depends upon the finding that fractionalization is not a static exogenous characteristics. The result here clearly indicate that economic growth is hardly depends upon population diversity when population is mobile. It is the public policy design that has the ultimate say to shape the economic performance of a society. It is now interesting to examine this question in

a cross-country setting where established literature has an unambiguous finding, higher fractionalization causes lower growth.

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Table 1: Descriptive Statistics

	Obs	Mean	S.D.	Min	Max	Unit
per capita income 1989	819	21.21	4.8	9.3	66	Thousand dollar per capita
per capita income 1999	819	14.53	7.1	5.8	55	Thousand dollar per capita
growth rate of PCI	819	0.38	0.09	0.08	0.77	Fraction
*ethnic*90	819	0.35	0.20	0.03	0.79	Fraction
*ethnic*00	819	0.44	0.19	0.06	0.81	Fraction
% of Graduates 1990	819	22.38	11.38	3.7	71.2	Fraction
median rent 1990	819	475	145	239	1001	Dollar
unemployment rate 1991	819	6.8	2.6	0.8	17.9	Fraction
firm establishments 1987	819	12	5.4	141	11.7	Thousand per capita
total population 1990	819	11.4	32.7	25	7322.5	Thousand
percentage of old population 1990	819	13.12	4.79	2.7	48.5	Fraction
spending 1990	819	429.0	223.6	91.2	2068.7	Dollar per capita
grant	819	283.9	972.8	2.3	137.6	Hundred dollar per capita
city Area 1990	819	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	819	65.30	22.62	1.02	97.09	820	73.89	20.63	1.46	98.68	%
non Hisp. black	819	14.14	16.85	0.13	88.23	820	12.71	15.75	0.05	88.51	%
non Hisp. aian	819	0.52	1.11	0.02	16.45	820	0.51	1.00	0.02	13.10	%
non Hisp. asian	819	4.27	6.74	0.11	61.47	820	3.13	5.00	0.03	56.01	%
non Hisp. pi	819	0.11	4.22	0.00	2.78	820	0.03	0.12	0	1.94	%
non Hisp. other	819	2.09	1.20	0.16	14.41	820	0.13	0.25	0	4.73	%
Hisp. white	819	6.38	8.93	0.07	79.94	820	4.99	8.29	0.12	79.00	%
Hisp. black	819	0.28	0.39	0	3.60	820	0.30	0.55	0	5.87	%
Hisp. aian	819	0.15	0.19	0	1.25	820	0.07	0.09	0	0.71	%
Hisp. asian	819	0.05	0.06	0	0.58	820	0.05	0.11	0	1.35	%
Hisp. pi	819	0.02	0.02	0	0.16	820	0.07	0.15	0	1.33	%
Hisp. other	819	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: Growth of Income in U.S. Cities

Panel A: IV Estimates

Dep. Var: ln(PCI 1999) - ln(PCI 1989)	(OLS)	(OLS)	(IV)	(IV)
ln ELF 1990	-0.02***	**-0.03*** **	0.04***	**0.01**
	(0.00)	**(0.00)**	(0.01)	**(0.02)**
ln % of Graduate pop 1990		0.06***		0.04***
		(0.01)		(0.01)
ln Median Rent 1990		-0.07**		-0.10***
		(0.03)		(0.03)
ln PC Firm Establishments 1987		-0.01		-0.02
		(0.01)		(0.01)
ln Unemployment Rate 1990		0.02		0.00
		(0.01)		(0.02)
ln Percentage of old population 1990		-0.01		0.02
		(0.01)		(0.01)
ln City Area 1990		0.00		-0.00
		(0.00)		(0.00)
ln PCI 1989		-0.02		0.03
		(0.03)		(0.04)
State Dummies	Yes	Yes	Yes	Yes
R^2	0.30	0.35	0.18	0.30
Hansen J Statistic (p value)			0.64	0.16

Panel B: First Stage for ln ELF 1990

Dep. Var: ln ELF 1990				
ln ***grant***			0.15***	0.13***
			(0.01)	(0.02)
ln ***tenure***			0.04**	0.03**
			(0.02)	(0.01)
F-test of excluded instruments			70.96	39.09
Number of observations	819	819	819	819

Notes: Robust standard errors are in parentheses. ***significant at 1%, **significant at 5%, *significant at 10%. Instrumenting ELF 1990 with *grant* 1986 and *tenure*

Table 5: Growth of Income in U.S. Cities

Panel A: IV Estimates

Dep. Var: ln(PCI 1999) - ln(PCI 1989)	(I)	(II)
ln (ELF 2000) - ln (ELF 1990)	-0.09***	**-0.04**
	(0.00)	**(0.06)**
ln % of Graduate pop 1990		0.04**
		(0.02)
ln Median Rent 1990		-0.09***
		(0.03)
ln PC Firm Establishments 1987		-0.02
		(0.01)
ln Unemployment Rate 1990		0.00
		(0.02)
ln Percentage of old population 1990		-0.02
		(0.01)
ln City Area 1990		0.00
		(0.00)
ln PCI 1989		0.03
		(0.04)
State Dummies	Yes	Yes
R^2	0.26	0.32
Hansen J Statistic (p value)	0.64	0.17

Panel B: First Stage for Growth rate of ELF 1990

Dep. Var: ln (ELF 2000) - ln (ELF 1990)		
ln ***grant***	-0.06***	-0.04***
	(0.01)	(0.01)
ln ***tenure***	-0.02***	-0.01**
	(0.01)	(0.01)
F-test of excluded instruments	71.53	28.23
Number of observations	819	819

Notes: Robust standard errors are in parentheses. ***significant at 1%, **significant at 5%, *significant at 10%. Instrumenting ln (ELF 2000) - ln (ELF 1990) with *grant* 1986 and *tenure*

Appendix

Data and Variable Construction

Ethno-racial Fractionalization Index:

$$ethnic = 1 - \sum_{i=1}^{n} (S_i)^2 \tag{6}$$

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 $\ln(ethnic_{2000})$ - $\ln(ethnic_{1990})$.

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 and 1999 dollar amount of per capita money income of the resident of a city based on resident population enumerated as of April 1, 1990 and April 1, 2000. (Source: U.S. Census Bureau.)

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 × % 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*)

6.0.1 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*)