Title:

The Impact of Horizontal Fragmentation on Inter-Municipal Fiscal Equality

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Abstract

Municipalities are created and shaped by political processes that may create fiscal capacity inequalities within a region. When creating a city, local leaders may seek to establish boundaries around strong tax bases so that enhanced local services can be offered at a reduced cost. Once created, fiscal disparities between governments may tend to persist if lower income individuals are locked out of property markets in richer areas. Using data on Florida's counties, this study aims to assess the effect of county level horizontal and vertical fragmentation and concentration on regional inequalities in fiscal capacity. Since the creation of new cities can cause fragmentation across cities in a region and may prevent any one city from dominating expenditures at the municipal level, it is predicted that more horizontally fragmented and sparsely concentrated areas have greater inequality in their fiscal capacities. Findings indicate that horizontal concentration does not have an impact on inter-municipal fiscal equality. However, increasing levels of horizontal fragmentation may lead to increased inequality.

Introduction

In 2016, local governments raised over a trillion dollars in own source revenue and spent almost two trillion dollars to provide key educational, social, transportation, environmental, public safety, housing, and infrastructure services for their residents (United States Census Bureau 2016). However, not all governments are created equal. Jacob and Hendrick (2012) define a government's financial condition as its ability to meet short, medium, and long term financial and service obligations within its political and economic environments. Governments with less resources may have less ability to meet their obligations as costs rise. Differences between governments' fiscal conditions can create unequal tax rates and services across the metropolis. Inequality among governments' fiscal capacities is especially important today because local governments are fiscally vulnerable.

Fiscal disparities between local governments cause regional inequalities and can create gaps in local service delivery. A fiscal disparity exists between governments when some are able to offer a similar bundle of public goods with less effort than others. Fiscal disparities can result from differences in the strength of governments' tax bases and or their cost of providing services (Yinger 1986). Less resourced cities may not only have less ability to provide key services, but they may also have citizens with need. For example, cities with concentrated poverty have been shown to increase both direct expenditures on poverty alleviating policies, like affordable housing, and more basic public services, like policing and fire protection (Joassart-Marcelli, Musso, & Wolch 2005). At the same time, those services may be provided least in the areas they are needed most. Governments with less fiscal capacity in fragmented areas often focus on policies which would attract higher income households to their area; ignoring the voices of the less well off (Jimenez 2014).

The impact of fragmentation on metropolitan governance has been long debated (Jimenez and Hendrick 2010; Goodman 2019). While the value of polycentric governance has been praised by localists arguing for small, responsive local governments, fragmentation may contribute to inequality across the metropolis (E. Ostrom 1983; V. Ostrom, Tiebout, and Warren 1961; Hill 1974; Jimenez 2014). Governments in metropolitan areas which are fragmented by adjacent and overlapping governments may have greater inequality in their ability to provide services than those in less fragmented areas (Hill 1974; Jimenez 2014). If cities are at least partially created in an effort to create pockets of wealth with lower taxes and better services causing metropolitan regions fragment into cities with differing fiscal capacities, then inequality between cities could result (Filer and Kenny 1980; Kenny and Reinke 2011; Hill 1974; Jimenez 2014).

This paper asks if municipal fragmentation is associated with inequality in Florida's cities' fiscal capacities. This paper begins by defining and reviewing the debate on governmental fragmentation. Extending the social stratification and inequality thesis, I argue that incorporation movements create inequality because they seek to increase their residents' tax advantage, and that tax base inequalities lock in over time. Results suggest that regions with more fragmented cityscapes feature greater inequality between their cities. While fragmentation can provide people with greater levels of choice, it can promote inequality in governments' fiscal capacities. Given that fragmentation is associated with inter-city inequality, and that cities in fragmented areas provide less in the way of redistributive social services, fragmentation may be associated with service delivery gaps in metropolitan areas (Jimenez 2014).

Literature Review

Metropolitan areas are governed by a fabric of overlapping and adjacent governments. Boyne (1992) describes the structure of governments across a region in terms of vertical and horizontal fragmentation and concentration. Fragmentation refers to the divisions in a metropolitan area caused by having multiple government bodies, and concentration refers to the relative distribution of power and responsibilities between governments. Verticality describes the distribution of overlapping layers of government, and horizontality describes the distribution of adjacent governments (Boyne, 1992). So, a vertically fragmented and sparsely concentrated area might include a diverse division of responsibilities across many county, city, and special purpose governments. An area with horizontally fragmented and sparsely concentrated cities might feature many small cities with no central municipality. The regional fabric of governments matters because it determines how taxes and services are distributed.

Localists and regionalists have debated the positive and negative consequences of horizontal fragmentation for metropolitan regions. The localist view is grounded in Tiebout's (1956) public choice approach. He argues that fragmented regions feature a market for public services that allows residents to "shop" for public services by moving to the city that best fits their needs. Since people with similar desires will move to the city offering their preferred public services, small cities across a region can cater their services to their populations. Therefore, a polycentric assortment of small governments can offer bundles of public goods that are responsive to local voters and that voters are willing to pay more for (E. Ostrom 1983; V. Ostrom, Tiebout, and Warren 1961; Oates 1969). Furthermore, fragmentation may force governments to increase their productive efficiency in order to outcompete one another for mobile taxpayers (Tiebout 1956). For instance, competition between governments has been

shown to cause school districts in fragmented areas to offer their services at lower cost (Hoxby 2000). When they have choice, voters may be able to check leviathan like local governments. Horizontally fragmented areas have been shown to spend less on public services than less fragmented areas (Goodman 2015; Goodman, 2019). However, the benefits of choice may come with consequences.

Metropolitan reformers and regionalists argue that fragmented areas have serious downsides (Jimenez and Hendrick 2010). The complicated system of adjacent governments may result in a lack of accountability and create racial and wealth based segregation (Jimenez and Hendrick 2010; Goodman 2019). One of the most serious negative consequence of fragmentation is that certain regions may not have sufficient resources to provide public services. The social stratification and governmental inequality hypothesis argues that fragmented areas experience inequitable outcomes between cities due to the tendency of cities to attempt to maximize their control over local resources. Hill (1974) argued that the socially advantaged utilize the powers of municipal government to form homogenous communities that are able to exclude less advantaged populations. Fragmented and unequal governments perpetuate social inequities by concentrating municipal fiscal capacity in the hands of the wealthy. This process promotes sorting across the metropolis by race and wealth. Hill's initial use of median income as a stand in for fiscal capacity was rightly criticized for being misrepresentative and his results demonstrated to be a statistical artifact (Neiman 1976; Ostrom 1983). However, more recent evidence has lent some credence to Hill's initial arguments.

Overall research into metropolitan fiscal inequality generally demonstrates that fiscal disparities between cities exist but that there are relatively few rich and poor cities and relatively more middle class cities with a mix of income groups (Logan and Schneider 1982; Jimenez

2014). Most recent evidence indicates that about four percent of municipalities could be classified as very poor and eleven percent as very rich (Jimenez 2014). Often, inequality has been pitched as the difference in capacity between rich suburbs and a poor central city. For instance, Sacher's (1993) economic simulation of D.C. area municipalities found that consolidating across municipal boundaries would do little to improve the overall equality between individuals in the central city and suburbs. Morgan and Mareschal (1999) did not find that fragmentation caused greater inequality between the income of a core city and its surrounding suburbs, and found that smaller central cities, as compared to the surrounding region, actually had better fiscal health. However, it could be argued that their conceptualization of inequalities between the central city and suburbs ignored inequities among suburban governments. More modern research has demonstrated that fragmentation leads to a certain amount of spatial sorting across racial, but not wealth based, lines. Controversy still exists over the extent of wealth segregation across governments (Lowery 1999; Jimenez and Hendrick 2010). When metropolitan regions are considered as a whole, fragmentation does not appear to impede the overall level of wealth segregation (Jimenez 2016). However, as Jimenez (2016) notes, there is not enough research or evidence on wealth based sorting across governmental boundaries.

Governmental boundaries are the foundation of fragmentation. Legally, local governments extend voting rights only to those living within their borders and may only tax and spend within their borders to the extent that they are not providing business like services (Briffault 1996). Differences in governments' fiscal capacities across governmental boundaries can result in fiscal inequalities in metropolitan regions (Briffault 1996; Yinger 1986). Municipal incorporation is a particularly notable form of boundary change that has a high degree of

potential as a setting for political conflict and the redistribution of local resources. Cities tend to engender a broader range of public involvement than special districts and have the notable regulatory power of zoning. They may provide an avenue for exclusion but may also represent alternative havens for low taxation and increased services (Burns 1994). The creation of governments leads to fragmentation across metropolitan areas. A significant number of studies have shown that city creation may be motivated by the potential to create fiscally advantaged areas and that wealthier areas are more likely to incorporate (Filer and Kenny 1980; Kenny and Reinke 2011; Miller 1981; Burns 1994; Leon-Moreta 2015a; Leon-Moreta 2015b; Musso 2001; Smith, and Debbage 2011). Therefore, it is entirely reasonable that increased fragmentation among cities may lead to increased inequality between cities.

This project deepens the theoretical foundation of the social stratification and inequality hypothesis by considering how city creation and political barriers lead to differences in governments' ability to raise taxes. Instead of focusing on wealth segregation across a metropolitan region or between suburbs and central cities, this paper assesses fiscal capacity inequality between all governments in a metropolitan area. Metropolitan areas continue to become fragmented. While incorporations are not common nationwide, the south experienced a spate of 193 new municipal incorporations from 1990 to 2005 (Smith and Dabbage 2006). The debate over the benefits and consequences of fragmentation will continue to be relevant as metropolitan areas continue to change.

Theory

Inequality in cities' fiscal capacities across metropolitan areas may result from city creation and long term sorting processes that prevent cities from gaining equal fiscal capacity. There is evidence that incorporation is driven by the desire to create fiscal disparities among

governments. Burns (1994) finds a history of entrepreneurship in city formation from early nineteenth century land speculators pushing for new towns to the Walt Disney company's creation of a special district around its park. Burns focused on the influence of business and industrial groups on the prospect of incorporation, but public officials and residential organizations have also been identified as potential political entrepreneurs (Feiock and Carr 2001). In his case study of Los Angeles County incorporation movements, Miller (1981) found that those pushing for the incorporation of cities often strategically drew boundaries around wealthier areas so that their governments could provide a certain level of services at a lower tax price. Miller (1981) identifies several cases in which local business owners pushed for incorporation as a way to avoid taxation. For example, the aptly named town of Industry initially incorporated to achieve low tax rates for the businesses in its borders. Of course, no incorporation movement could succeed without attracting a broad base of support.

Newly incorporated communities as a whole may benefit from increasing their relative control of their tax base. Filer and Kenny (1980) show that groups of well off individuals being served by a county government that also contained poorer populations could attain governmental services at a lower tax rate by incorporating because their wealth would be pooled at a higher per capita rate to provide services to a smaller area. Lending credence to the theory, Kenny and Reinke (2011) show that relatively wealthier and more educated block groups in counties are more likely to incorporate. Studies of incorporation movements have found that income heterogeneity within regions may increase the probability of incorporation, and that relatively well-off areas are more likely to incorporate than their less well of peers (Leon-Moreta 2015a; Leon-Moreta 2015b; Musso 2001). Census designated places that are older, better educated, richer, and whiter have been shown to have a higher likelihood of incorporation, and newly

incorporated municipalities have been shown to be whiter and richer than comparison cities (Musso 2001; Smith, and Debbage 2011).

Since evidence suggests that wealthier regions may incorporate to gain tax advantages, and incorporations increase fragmentation and decrease concentration, then areas with less concentration and more fragmentation of municipal governments should have greater fiscal inequalities. Once established, initial inequalities between governments are likely to persist. Economic and political barriers may slow or stop individuals in lower income classes from moving to municipalities dominated by higher income levels. Economically, it may be difficult for less well-off households to relocate into a more well-resourced city because they may find it hard to pay into inflated housing markets (Yinger 1986). Politically, cities may promote wealth based sorting. In the original social stratification and inequality hypothesis, Hill (1974) argued that municipalities seek to control economic resources and promote a certain lifestyle/standard of living within their communities. To achieve this goal, Hill argues that municipalities utilize their powers, such as zoning, taxation, and permitting, to promote homogenous local growth and development. While Hill's (1974) view was criticized by Ostrom (1983) as being overwrought, the proposition here is much simplified. Since evidence suggests that wealthier regions may incorporate to gain tax advantages and that incorporations increase fragmentation and reduce concentration, then areas with greater horizontal de-concentration and fragmentation of municipal governments should experience greater fiscal inequalities. Initial inequalities may persist because there are economic and political barriers to sorting that reduces tax base inequality between cities (Yinger 1986; Hill 1974).

H1: Horizontally fragmented counties have greater inequality in their cities' fiscal capacities.

H2: Horizontally de-concentrated counties have greater inequality in their cities' fiscal capacities.

Hypotheses one and two are tested by regressing the level of countywide inequality in Floridian cities' tax capacity on measures of county-level fragmentation and concentration. Florida provides a useful motivating example because it publishes detailed datasets on its counties, school districts, cities, and special districts.

Data

Sample

This study collected data on Florida's counties due to Florida's extensive and accessible fiscal databases which makes the creation of county level inequality, fragmentation, and concentration measures possible. As a state, Florida features well-populated urban areas across its coast and in its interior and set of more sparsely populated counties, especially along the panhandle (United States Census, 2010a). Therefore, the state features a diverse mix of metropolitan areas that may feature different distributions of governments. Florida has a mostly "southern style" system of local governments that features county-coterminous independent school districts, counties that provide municipal services, and special districts (Delegal 2014; Stephens and Wikstrom 2000). Results may be less comparable to states with different local government systems. In particular, states that feature New England Town style systems may not be as comparable to Florida (Stephens and Wikstrom, 2000).

While metropolitan areas are more commonly used in the literature to study fragmentation, past studies have also employed county level measures (Hendrick, Jimenez, and Lal 2011). In Florida, counties should form the basic unit of analysis because they are

meaningful governmental layers that provides services and contain cities. The final analysis uses fifty two of Florida's counties. Thirteen counties only have one city making the construction of inequality measures impossible. Jacksonville-Duval is dropped because it is consolidated. Orange County is also dropped as an influential outlier. The presence of Disneyworld, which was incorporated as a tiny and very rich city, makes the county an outlier due to the high level of inequality between cities in Orange County (Overdeep 2019). Therefore, Orange County itself is dropped.

Measuring Inequality Between Cities' Fiscal Capacities

Research into the inequality between municipalities requires a robust definition of the fiscal disparities between municipalities. Neiman (1976) demonstrates that purely income-based measures of local tax capacity are flawed because they are based in the false assumption that local revenues are derived only from local incomes. In reality, local revenues are supplemented by external revenue inflows, taxes imposed on non-residents, and taxes on bases that ultimately do not flow from personal income, such as taxes on industrial property. Fiscal capacity can be defined as a government's ability to raise tax revenue from its base (Zhao, 2018). In his analysis of fiscal disparities in Massachusetts and Connecticut, Zhao (2018) utilizes both the representative tax system, which measures the amount of tax that could be raised at a uniform rate across municipal tax bases, and an income with tax exporting measure, which measures the amount of revenue which could be raised from a standard tax rate applied to local incomes multiplied by one plus the proportion of total taxes that are exported. Both measures were also employed in Cherknick's 1998 assessment of New York's tax capacity. Tax capacity measures a local government's ability to produce revenue from its potential tax revenue streams.

Following Chernick (1998), the representative tax system measure will be based on the property tax because it is the only non-external revenue source available across Floridian municipalities with a well-defined base. For municipalities in Florida, local option sales tax and tourism sales tax revenue are not distributed within counties on the basis of base. While sales tax revenue is raised and utilized at the local level, the sales tax is generally distributed within counties to municipalities on the basis of population, pending an inter local agreement (Florida Department of Financial Services 2009). The remaining own source revenues available to local governments include ad-valorem taxation, sale of local government assets, extracted rents/royalties, permits/fees/licenses, interest/other earnings, and judgements/fines/forfeitures (Florida Department of Financial Services Bureau of Local Government 2011). Therefore, county level inequality in cities' fiscal capacities is given by the Gini coefficient calculated on the per-capita amount each city would generate from a 10-mill property tax rate (Zhao 2018; Chernick 1998; Allison 1978). Property tax base data is available from the Florida Department of Economic Opportunity, and Gini coefficients were calculated using Zeileis's (2014) R package. This measure has error because, as of 2010, 25 of Florida's 410 cities do not provide property tax base data.

Measuring Horizontal and Vertical Fragmentation

This paper assesses the impact of both horizontal and vertical concentration and fragmentation on regional inequality (Boyne 1992). Horizontal and vertical fragmentation can be thought of as dimensions to a region's overall level of fragmentation (Goodman 2015). There is debate as to the correct manner to operationalize fragmentation, and a tremendous number of specifications are used across the literature (Goodman 2019). Following Goodman (2015) and Jimenez (2014), total fragmentation is operationalized as the logged number of governments per

capita. This common operationalization measures political fragmentation because it represents the extent to which citizens are divided into different governments (Goodman 2019; Hendrick, Jimenez, and Lal 2011; Jimenez 2014; Goodman 2015; Hendrick and Shi 2015).

In this context, political fragmentation measures the extent to which population centers across a county were able to establish independent communities with their own taxes and services. Therefore, the total political fragmentation is given by the logged number of governments per capita. Total horizontal fragmentation can be decomposed into measures of horizontal fragmentation that include the logged number of schools, cities, and special districts per capita (Goodman 2015; Hendrick and Shi 2015). Decomposing total fragmentation into its relevant components requires vertical fragmentation to be measured. Following Goodman (2015) and Hendrick and Shi (2015), the proportion of independent special purpose governments to all governments is used to measure vertical fragmentation. Here, independent special districts are used because counties and municipalities create have strong control over dependent special districts[1]. Including dependent special districts in the calculation of vertical fragmentation may reduce the measure's validity because dependent special districts may act an arm of a municipality or county, and areas with more cities may have more dependent special districts because cities create them (Florida Department of Economic Opportunity n.d.). Fragmentation indices are created using the Florida Department of Economic Activity's list of special districts, the ad valorem tax profiles, each county government and each county's school district. Population estimates are available from the Florida Office of Economic and Demographic Research.

[1] Cities and counites may create independent, community development districts (that are less than 2500 acres). These independent districts are included in the calculation of the percent special district measure (Florida Department of Economic Opportunity, n.d.).

Concentration describes the division of financial responsibilities between governments in a region. Horizontal and vertical concentration can be thought of as characteristics of the overall degree of concentration in a municipal area. Following Hendrick and Shi (2015) and Goodman (2015) overall concentration is measured by a Herfindahl-Hirschman Index (HHI) of government expenditures. The HHI measures the extent to which expenditures are spread out amongst governments. A larger HHI indicates that a single government dominates regional expenditures. The overall HHI between all governments can be broken down into horizontal and vertical components. Horizontal concentration is operationalized as the HHI between municipalities as shown in equation 1.

$$\left(\frac{1-\sum M_i^2}{1-\frac{10\,0}{n}}\right) \quad 1$$

Here, M represents the proportion of total expenditures spent by a municipality and n is the number of municipalities (Hendrick and Shi 2015). Vertical concentration is given as the HHI of expenditures at different government layers that given by equation 2.

$$\left(\frac{1-\sum L_i^2}{1-\frac{100}{n}}\right) \quad 2$$

Here, L represents the proportion of all expenditures spent by governments that are counties, school districts, cities, and special districts, and n is given as the number of governmental layers in the county (Hendrick and Shi 2015). In all HHI measures, capital expenditures are excluded to prevent large, one time expenditures from making it appear that a certain government has more fiscal responsibility within the region than they really do[2]. Since cities are fiscally responsible for their component units and component unit special districts' expenditures are not separately

[2] Schools debt service is excluded because it is not reported in the state's annual report.

reported, component unit special districts' expenditures are assigned to their city (Florida Department of Economic Opportunity 2018). Expenditure data was made available from the Florida Department of Financial Services and HHI values were calculated using Zeileis's (2014) R package. There is a small amount of missingness in the underlying expenditures used to calculate the HHI indices due to certain governments' failure to report their expenditures to the state[3].

Controls

Multiple controls are used to help explain the degree of inequality within a county. Counties' coastal status is controlled for. Coastal cities may have greater fiscal capacity than interior cities since seaside property is valuable. Therefore, coastal counties may have greater inequality between their cities. Counties' coastal status was gathered from the Florida Department of Environmental Protection's map of coastal counties. Each county's population density is controlled for. Municipalities per capita measures the degree of political fragmentation in a county, but rural counties may have a high number of municipalities per capita because their cities correspond to spread out population groups. Therefore, inequality in fragmented rural counties may not be due to city incorporations seeking to isolate wealth. Population density is calculated by dividing the population data from the Florida Office of Economic Research by the land area in miles as given by the 2010 United States Census (b). This measure is logged to prevent skew since some counties are dramatically denser than others.

Inequality between cities fiscal capacities may be driven by sorting processes. The average age of cities within each county is controlled for. As argued by Hill (1974), cities may

[3] The Florida Department of Financial Services publishes an annual list of non-compliant governments.

become increasingly unequal over time due to wealth based sorting. Alternatively, inequalities created by initial city creation may lessen over time. Cities ages were gathered from news reports on recent incorporations, the Florida League of Cities, and The Legislative Committee on Intergovernmental Relations (n.d.; 2001; The Village of Estero 2016; Erblat 2018).

Additional controls for economic segregation follow from Jimenez (2016). Higher median incomes may increase the potential for sorting across different neighborhoods because higher median incomes permit mobility (Jimenez 2016; Jargowsky 1996). Jimenez (2016) finds that places with higher percentages of Hispanics, Blacks, and with higher poverty levels tend to be more economically segregated. This may be due to the tendency of racial segregation to concentrate poverty (Massey 1990). Areas where fewer people are employed in industrial jobs may cause greater economic segregation as professional firms and individuals employed in managerial and professional sort to relatively well-off suburban areas (Jargowsky 1996). Jimenez (2016) finds that high percentages of regional jobs in manufacturing concentrates affluence, and percentages of professional and managerial jobs reduces the economic segregation of the poor but increases the tendency of the affluent to sperate themselves. Demographic data is available from the National Historic Geographic Information System and is drawn from the 2006-2010 American Community Survey 5 Year Dataset and represents averages for the 2006-2010 period (Manson, Schroeder, Van Riper, Kugler, and Ruggles 2020).

Results

Empirical Model

While data were collected over 2009-2017, there is extraordinary little over time variance in either inequality, fragmentation, or concentration as shown in Table 1: Descriptive Statistics.

Since inequality changes so little over time, fixed effects are inappropriate because they remove all time invariant variation. Given that a panel method is inappropriate for this model, an ordinary least squares approach is taken using data from 2010.

[Insert Table 1: Descriptive Statistics here]

The linear model may be inappropriate because it models an unbounded dependent variable whereas the Gini coefficient can only take on values between zero and one. However, results indicate that the linear model likely provides a good enough fit.

Results

The best estimate of horizontal fragmentation's impact on county level inter-municipal tax capacity inequality comes from the more conservative regression with robust standard errors and Orange County removed. Since Orange County features Disneyworld as an incorporated city, it has large inequality between its cities that tends to mildly inflate the effect of horizontal fragmentation on inter-city inequality. The model with Orange County removed exhibits good fit. A White (1980) test for homoscedasticity fails to reject the null hypothesis that the errors are homoscedastic with a p-value of .43. A Ramsey RESET test for model specification and omitted variable bias does not reject the null hypothesis that there is no omitted variable bias with a p-value of .79 (Ramsey 1969; Baum 2006). The model has an R^2 of .67 indicates that 67% of the overall variance in inter-municipal inequality is explained by the model.

Horizontal fragmentation significantly increases the countywide inequality in cities' fiscal capacities. Therefore, hypothesis one cannot be rejected.

[Insert Table 2: Regression Results]

According to the model with Orange County removed, a 25 percent increase in the number of municipalities per ten thousand people leads to a .02 increase in the Gini coefficient measuring inter-city tax capacity. The Gini coefficient can be challenging to interpret. One way of interpreting it is as twice the relative mean absolute difference in a population (Xu 2003). In Florida, a 25 percent increase in the number of municipalities per capita is associated with an .04 increase in the ratio between the average difference between all of a county's cities per capita tax capacity and the average per capita tax capacity of all cities in the county. This effect is visualized in Figure 1.

[Insert Figure 1: Impact of Horizontal Fragmentation on Inequality]

With other variables held at their medians, high levels of municipal fragmentation are associated with high Gini coefficient values of up to .58. To put this in context, the Gini coefficient of income in the United States as a whole in 2019 is .47 (United States Census Bureau 2019). This result indicates that some counties feature more inequality between their cities' tax capacity than the total level of income inequality in the United States as a whole. Therefore, horizontal political fragmentation has both a statistically significant and substantial impact on the observed level of inequality between cities' fiscal capacities in Florida counties. However, horizontal concentration does not appear to have any effect on intermunicipal inequality. There was no effect of horizontal concentration on inequality between cities. Therefore, hypothesis two is soundly rejected.

Several controls were also significant. Unsurprisingly, coastal and dense counties featured greater inequality between their cities. There may also be a relationship between the average city age and inequality. However, no demographic controls are significant. This differs from past research on economic segregation (Jimenez 2016). It is possible that inter-municipal

wealth based sorting exists based on demographic factors, but that these differences do not translate into tax base inequality.

Discussion

Jimenez and Hendrick (2010) provide a nuanced view on the overall debate over metropolitan fragmentation. They argue that fragmentation should be viewed as a feature of metropolitan regions that has contrasting positive and negative aspects rather than a net negative or positive. Inequality between cities' ability to provide services may be one such negative effect caused by fragmentation that trades off with benefits, such as inter-governmental competition and local choice. While previous studies have not found significant evidence that fragmentation increases wealth based sorting over the entire metropolitan region, this study shows that fragmentation increases the fiscal capacity disparities between governments across a region (Lowery 1999; Jimenez and Hendrick 2010; Jimenez 2016). Given that substantial evidence exists that incorporation movements may be initiated to maximize future city residents financial advantages and that wealthier areas are more likely to participate in incorporation movements, it stands to reason that a long term impact of fragmentation would be inequality between cities (Filer and Kenny 1980; Kenny and Reinke 2011; Miller 1981; Burns 1994; Leon-Moreta 2015a; Leon-Moreta 2015b; Musso 2001; Smith, and Debbage 2011). Initial fiscal disparities may persist if economic barriers, and the political barriers envisioned in the original social stratification and inequality hypothesis, are prevent the less well off from moving into wealthier cities (Hill 1974; Yinger 1986).

Governments' fiscal capacity is a key part of their overall fiscal health because it represents their ability to raise the revenue that they need to be able to meet service demands (Jacob and Hendrick 2012). Given that poorer cities' have less ability to provide services, may

have need of greater redistributive and standard public services, and may attempt to attract wealthy residents by providing fewer redistributive services, fragmentation may lead to substantial inequities in the services that people within metropolitan areas receive and the tax price they pay for them (Joassart-Marcelli, Musso, & Wolch, 2005; Jimenez 2014). Under the cost capacity framework, both community characteristics that increase desired expenditures, like having more extensive road networks, and variables that make government services more expensive, like high regional wages, can help measure the expected cost of government (Bradbury and Zhao 2009; Zhao 2018). Future research may be able to extend this argument by demonstrating that fragmentation increases regional gaps in the cost of government services and the capacity of governments to meet them.

This study has several limitations which may be resolved in future research. First, while the use of Florida allowed for detailed data to be collected on cities' fiscal capacities, expenditures, and the number and type of governments within counties, the use of a single state may bias the result. Fragmentation's impact on inter-municipal inequality may not apply in other states. Second, this study takes a relatively narrow view of cities' overall fiscal health. This paper does not consider intergovernmental aide or the cost of providing services within municipalities. The cost capacity gap framework introduced above may be able to illuminate a broader conception of fragmentations' impact on cities' overall ability to provide services. Finally, the panel used in this analysis is fairly short and does not describe over-time variation. It does not show that incorporation movements that increase horizontal fragmentation directly lead to inequality or allow for unobserved heterogeneity to be controlled for. However, substantial evidence exists indicating that richer areas are more likely to incorporate already. This paper can

be viewed as complementary to those studies by going a step further and demonstrating that fragmentation is associated with inequality.

Conclusion

Regions rich with cities are able to provide residents with the choice of where best to live (Tiebout 1956). However, they also tend to feature inequality between cities. Movements seeking to establish wealthy cities and the barriers that residents face when attempting to move to richer areas may create and perpetuate differences in cities' fiscal capacities. These inequalities in fiscal capacities may create differences in cities ability to provide services and propensity to experience fiscal stress. Future research should continue to explore how fragmentation affects the distribution of services across metropolitan areas, for better and worse.

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Tables and Figures

Table 1: Descriptive Statistics

Variable	Mean	SD	Between Standard Deviation	Within Standard Deviation	Skew
RTS Gini coefficient	0.29	0.19	0.19	0.03	0.97
Cities per 10K	0.72	0.80	0.81	0.02	1.32
Logged Cities Per 10k	-0.95	1.16	1.16	0.03	0.07
School Districts per 10K	2.55	2.83	2.84	0.21	3.02
Logged School Districts per 10K	-2.58	1.46	1.47	0.03	.058
Special Districts per 10K	2.55	2.83	2.84	0.21	3.02
Logged Special Districts per 10K	0.56	0.83	0.83	0.04	0.47
Independent Special Districts PoT	48.52%	15.11%	15.16%	1.52%	.25
HHI City Expenditures	0.54	0.24	0.24	0.04	0.00
HHI Government Layers	0.35	0.11	0.10	0.03	1.69
Logged Population per Square Mile	5.20	1.30	1.31	0.03	0.04
Average City Age	94.96	23.66	23.86	0.44	0.35
Percent of Population Hispanic (2006-2010 Average)	12.66%	12.43%	-	-	2.29
Percent of Population Black (Not Hispanic; 2006-2010 Average)	13.07%	9.69%	-	-	2.22
Percent of Population Below Poverty Line (2006-2010 Average)	15.49%	5.03%	-	-	.79
Median Income (2006-2010 Average)	$44,844.91	$7,793.23	-	-	.42
Percent Employed in Manufacturing Industry (2006-2010 Average)	6.14%	2.60%	-	-	1.26
Percent Employed in Managerial/Professional Industry (2006-2010 Average)	9.80%	2.84%	-	-	-.08

Table 2: Regression Results

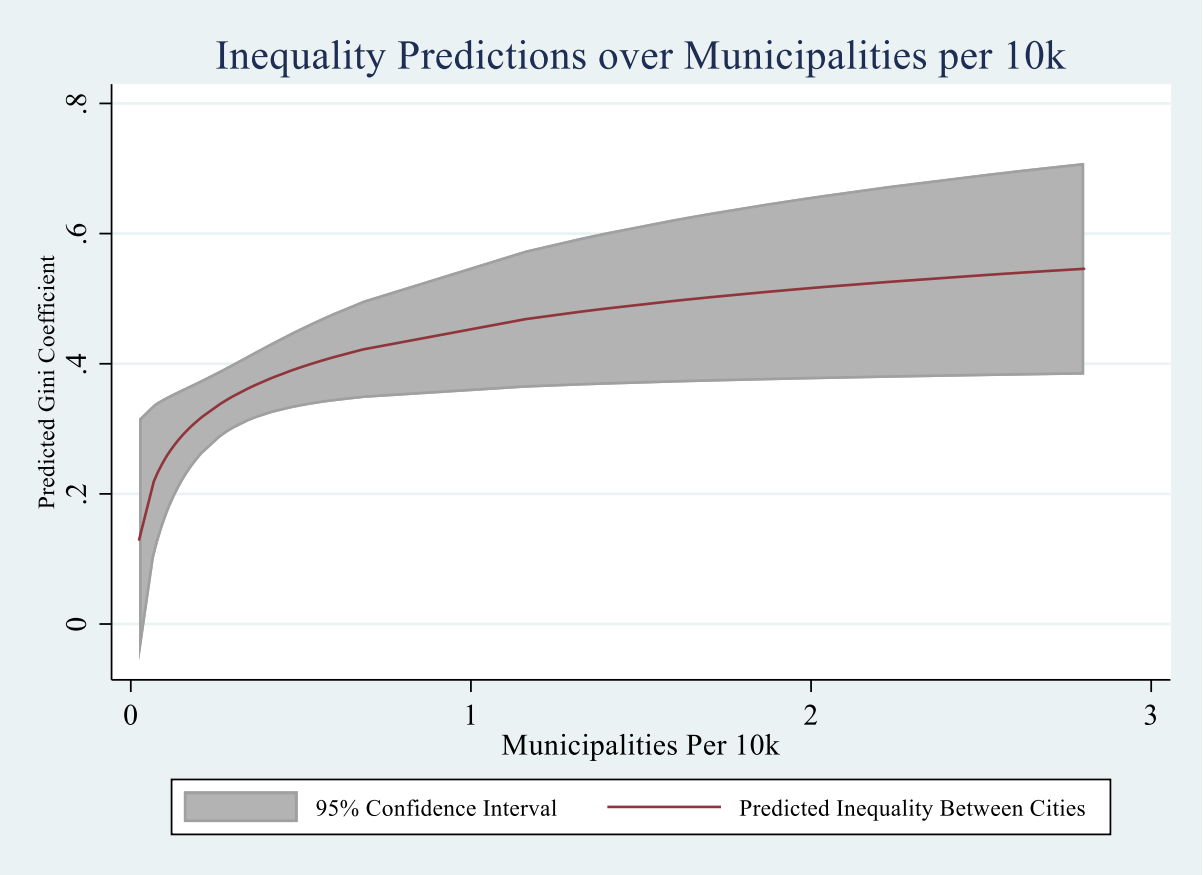
2010 OLS Results

	OLS, Orange Retained		OLS, Orange Retained, Robust SE		OLS		OLS, Robust SE	
Logged Cities Per 10k	0.1*	(0.05)	0.1*	(0.04)	0.09*	(0.04)	0.09*	(0.03)
Independent Special Districts PoT	0.0002	(0.002)	0.0002	(0.002)	-0.0005	(0.001)	-0.0005	(0.001)
HHI City Expenditures	0.1	(0.1)	0.1	(0.09)	0.1	(0.09)	0.1	(0.09)
HHI Government Layers	0.09	(0.3)	0.09	(0.2)	0.2	(0.2)	0.2	(0.2)
Logged Population per Square Mile	0.1*	(0.04)	0.1**	(0.04)	0.09**	(0.03)	0.09**	(0.03)
Average City Age (10s)	-0.01	(0.01)	-0.01	(0.01)	-0.02	(0.010)	-0.02	(0.010)
Coastal	0.2**	(0.06)	0.2**	(0.06)	0.2***	(0.04)	0.2***	(0.04)
Percent of Population Hispanic	0.003	(0.003)	0.003	(0.002)	0.002	(0.002)	0.002	(0.002)
Percent of Population Black (Not Hispanic)	0.003	(0.003)	0.003	(0.002)	0.002	(0.002)	0.002	(0.002)
Percent of Population Below Poverty Line	-0.008	(0.01)	-0.008	(0.007)	-0.005	(0.008)	-0.005	(0.006)
Median Income (10,000s)	-0.003	(0.06)	-0.003	(0.04)	0.01	(0.04)	0.01	(0.03)
Percent Employed in Manufacturing Industry	0.003	(0.010)	0.003	(0.008)	0.006	(0.007)	0.006	(0.008)
Percent Employed in Managerial/Professional Industry	-0.004	(0.01)	-0.004	(0.01)	-0.009	(0.01)	-0.009	(0.01)
Constant	-0.2	(0.5)	-0.2	(0.3)	-0.1	(0.3)	-0.1	(0.3)
Observations	53		53		52		52	

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

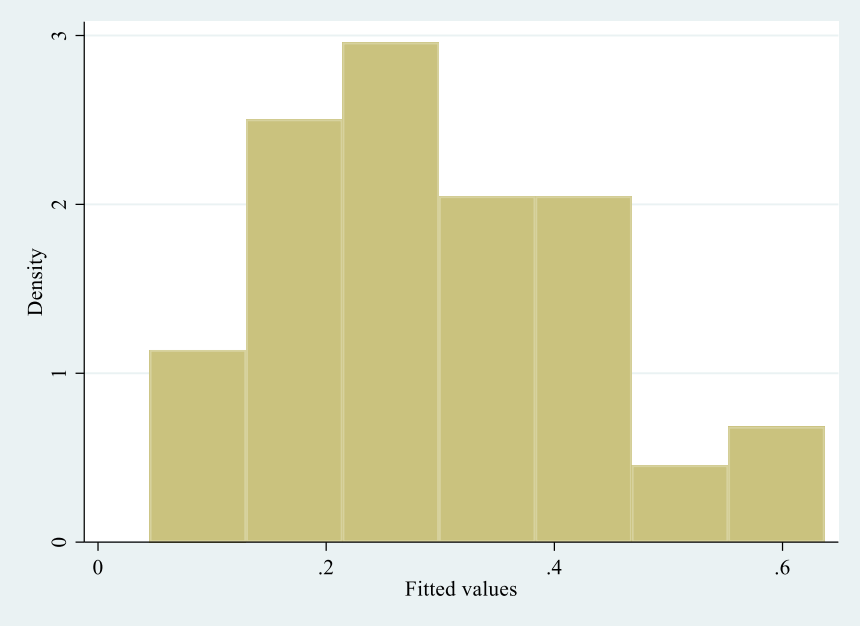
Figure 1: Predicted Inequality Values



Supplementary Analyses

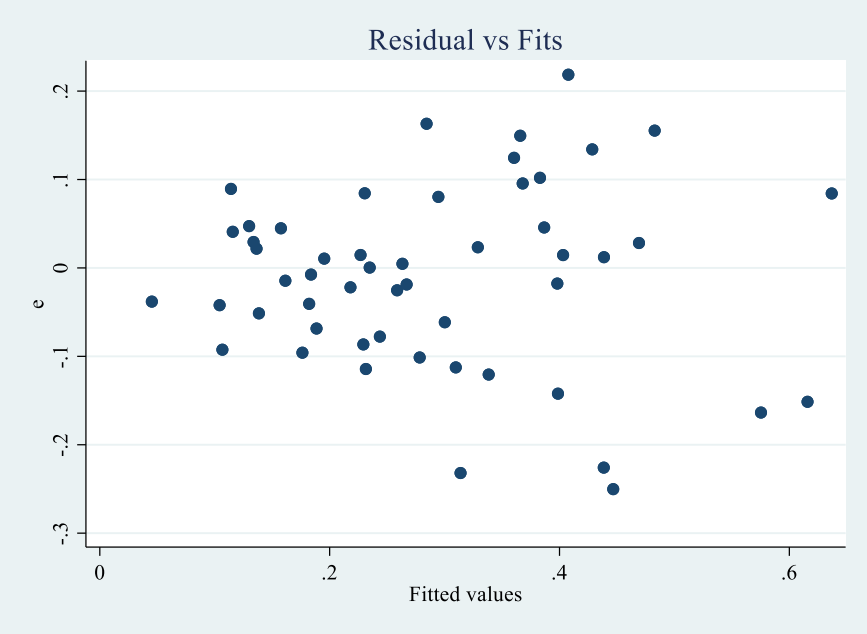
Supplement A: OLS Model Fit (Orange County Removed)

Functional Form: The Gini Coefficient is bound between zero and one whereas the linear model is unbounded. First, the histogram of fitted values demonstrates below that impossible predictions of the Gini Coefficient are not generated.

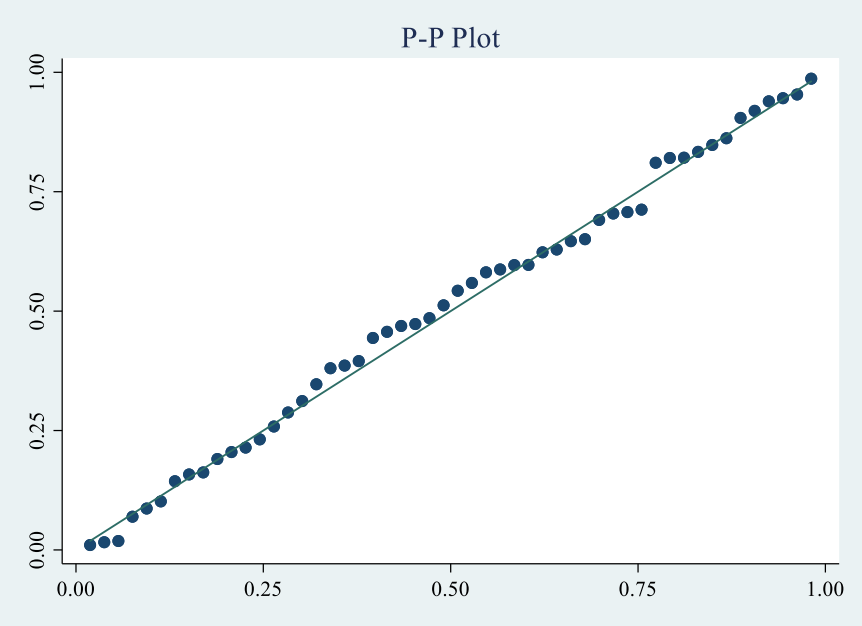


Second, a Ramsey RESET test using powers of the fitted values is performed to test the appropriateness of the linear specification and for omitted variables (Ramsey, 1969; Baum, 2006). The null hypothesis that there are no omitted variables cannot be rejected. The test produces an F statistic of .35 on 3 and 35 degrees of freedom with an associated p-value of .79. This result implies that the linear model chosen is appropriate.

Error Heteroskedasticity: A White (1980) test for homoskedasticity fails to reject the null that errors are homoscedastic with a χ^2 value of 52 on 51 degrees of freedom with an associated p-value of .43. Visually however, a slight amount of heteroskedasticity can be seen when plotting the errors against the fits. The variance appears to inflate as the fitted values increase.



Error Normality: A P-P plot of the error terms indicates that they appear to be normally distributed.

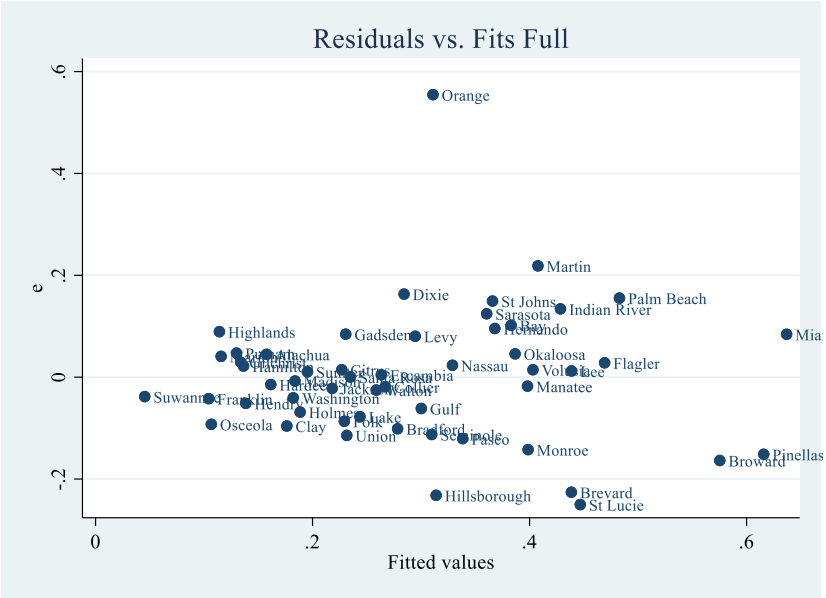


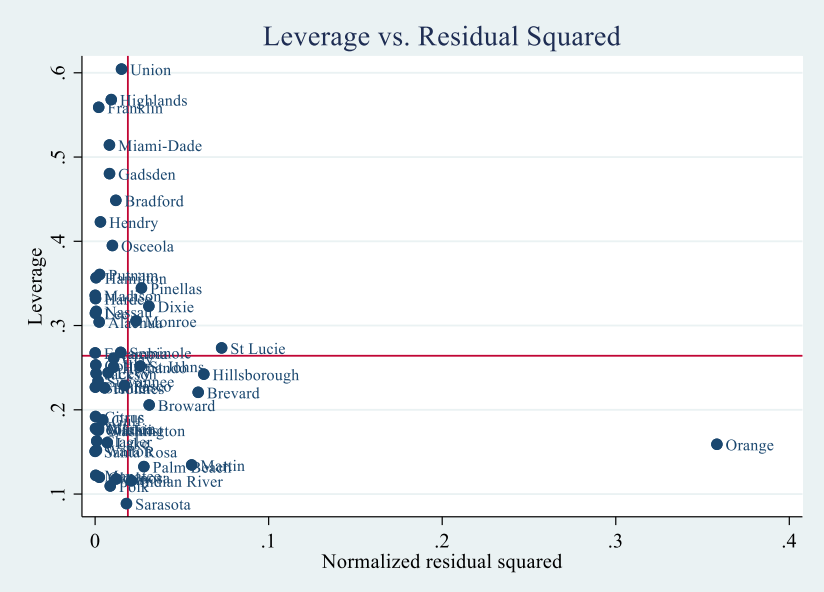
Multicollinearity: Going by the rule of thumb that a variable with a variance inflation factor greater than 10 is indicative of collinearity, collinearity does not appear to be a problem for (Baum, 2006).

Variable	VIF
Logged Cities Per 10k	6.99
Independent Special Districts PoT	1.80
HHI City Expenditures	1.93
HHI Government Layers	1.79
Logged Population per Square Mile	7.08
Average City Age (10s)	2.10
Coastal	1.84
Percent of Population Hispanic	2.40
Percent of Population Black (Not Hispanic)	2.05
Percent of Population Below Poverty Line	6.77
Median Income (10,000s)	4.32
Percent Employed in Manufacturing Industry	0.1.45
Percent Employed in Managerial/Professional Industry	3.66

Supplement B: Orange County Outlier Status

When included, Orange County is a large residual as shown in the Residuals vs. Fits and Leverage vs. Residual Squared Charts below. However, it has a limited leverage, and including it in the regression hardly affects the estimated coefficients as shown in Table 2.





Supplement D: Additional Regression Specifications By Year
Annual OLS Models – Robust Standard Errors

	2009	2010	2011	2012	2013	2014	2015	2016	2017
Logged Cities Per 10k	0.1**	0.07**	0.05*	0.05	0.07*	0.07*	0.07*	0.07*	0.06*
	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Independent Special Districts PoT	0.0003	-0.0003	-0.001	-0.001	-0.0008	-0.0006	-0.0007	-0.0003	-0.0010
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
HHI City Expenditures	0.06	0.06	0.02	-0.004	0.1	0.04	0.03	0.002	-0.02
	(0.10)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.09)	(0.08)
HHI Government Layers	0.2	0.2	0.2*	0.2	0.3	0.2	0.3	0.2	0.4
	(0.2)	(0.1)	(0.09)	(0.1)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)
Logged Population per Square Mile	0.1**	0.08**	0.07**	0.07**	0.09**	0.09**	0.09**	0.09**	0.08**
	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Average City Age (10s)	-0.01	-0.02	-0.02*	-0.01	-0.02*	-0.01	-0.01	-0.009	-0.01
	(0.009)	(0.009)	(0.008)	(0.007)	(0.008)	(0.007)	(0.007)	(0.008)	(0.007)
Coastal	0.2***	0.2***	0.2***	0.2***	0.2***	0.2***	0.2***	0.2***	0.2***
	(0.04)	(0.04)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.04)	(0.03)
Constant	-0.3	-0.1	-0.04	-0.02	-0.2	-0.1	-0.2	-0.2	-0.2
	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)
Observations	52	52	52	52	52	52	52	52	52

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$