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Fiscal Decentralization and Its Effect on Poverty Evidence from Panel Data on the lower 48 American States

Nicholas Valaris
Illinois State University

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Abstract: This study examines the effect of local and state fiscal autonomy on the poverty rate in the U.S. from 1980-2000. The findings are that the gap between own revenues and own expenditures, known as Vertical Imbalances, has an optimal level at which the negative influence on poverty is at its maximum. Shifts along the Vertical Imbalances curve towards the optimal value cause reductions in the poverty rate by hundredths of a percent. Convergence towards the optimal Vertical Imbalances value is still recommended as a reduction in poverty could be achieved by incurring little to no economic cost.

Introduction

In recent years financial decentralization has become an increasingly popular method of governance for nations of all types. This process, in which a central government confers greater autonomy on its sub-national governments, is believed to lend itself to a number of desirable outcomes. Political scientists and economists theorize that devolving authority over revenue collection and/or expenditures leads to greater efficiencies on a number of fronts. For example, fiscal decentralization has been recognized for its potential at combating poverty and inciting improvements in public services. Yet financial decentralization's purported benefits are examined very differently depending on whether the context is a developing or developed nation. When the country of concern is of third-world status, the question most often asked is how financial decentralization would facilitate a reduction in poverty. Conversely, when a post-industrial country is the focus, academics are most interested in its effect on economic growth. My objective is to examine whether or not this administrative approach has effectively decreased poverty rates in the United States in the years 1980-2000. Should financial decentralization's potential for poverty reduction in America be confirmed, the policy implications will be considerable. Then, we could confidently prescribe it as a low-cost method by which a given jurisdiction can lessen its number of citizens living in poverty. Such an option would be especially attractive in the current economic climate, where a prolonged recession has depleted many states' financial resources.

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Literature Review

Financial devolution has been conjectured to fight poverty in a number of ways. First, it is thought to create an environment that is conducive for economic growth. Prevailing theory holds that decentralized states have more flexibility in designing region-specific policies concerning infrastructure and human capital investments, as well as the fiscal capacity to realize them (Oates, 1999). More efficient investment strategies will greatly augment the capital base, and facilitate accelerated economic growth. The "productivity enhancement" theory also features improved public service provision and investment as an outcome. With responsibility for such activities squarely on local governments, they are incentivized to minimize production costs and make such activities as efficient as possible (McNab and Vazquez, 2003). As compelling as these theories may be, we cannot draw any firm conclusions about the relationship between fiscal decentralization and economic growth. Conjecture alone is of little use in the face of complex real-world dynamics. Oates conditions all his arguments in favor of financial decentralization by saying "…all the potential…for improving economic performance must be evaluated in terms of the specific characteristics that characterize the current state of the developing nation" (Oates, 1999, P. 24). True to word, empirical analysis conducted on fiscal decentralization's contribution to economic growth has offered no clear answers, but instead produced a great deal of contradictory results.

Some studies on the nature of this relationship have found a negative correlation between sub-national government autonomy and growth rates. Sixteen central and Eastern European countries were examined in the years immediately following the collapse of the Soviet Union in order to determine whether they were benefitting from a decentralized administrative structure. The findings showed that expenditures and transfers to sub-national governments had a soundly negative correlation to national growth rates (Rodrigues-Pose and Kroijer, 2009). However, local level taxes were found to have a statistically significant positive impact on the pace of economic expansion. The authors note that their conclusions are consistent with other studies that have analyzed financial decentralization implemented in developing countries. Specifically, they attribute the negative correlations as the consequences of devolving authority to the local level when municipal governments do not yet have the administrative capacity to efficiently serve their populaces.

While fiscal devolvement may have been counterproductive for the former Eastern bloc countries, China has shown that a middle-income country can successfully enact this approach and reap its benefits. Using a panel data set 30 Chinese provinces from 1994-2002, Ying Ding regressed GPP (Gross Provincial Product) against an array of decentralization measures and control variables. Ding grouped the provinces into three zones, the Eastern, Central, and Western, which exhibit varying levels of industrialization and development. For all three, the expenditure measure of decentralization was positively and significantly correlated (Ding, 2007). The revenue measure was negative and insignificant for two of the three zones, though the author attributed this result more to the faultiness of the indicator than to real-world trends. Regardless, Ding's study is significant for demonstrating that financial decentralization has the potential to accelerate growth for middle-income countries also.

An unequivocally positive connection between financial decentralization and economic growth has been more consistently demonstrated when a developed economy is the object of study. Akai and Sakata's research showed that after income distribution, the quality of human capital, economic structure, region-specific characteristics, and a host of other factors had been controlled for, the more fiscally decentralized U.S. states experienced higher levels of economic growth in recent decades (Akai and Sakata, 2002). In a follow-up study, Akai and Sakata set out to find the exact channels through which financial decentralization facilitates economic growth. They introduce the concept of "complementarity", which expresses the ease with which a well-executed public output can compensate for an underperforming project in a nearby jurisdiction. When "local complementarity" (intra-regional) is sufficiently lower than "global complementarity" (inter-regional), risk-sharing between local and central governments becomes more advantageous (Akai, Sakata, and Nishimura, 2007). Then, the relationship between fiscal decentralization and economic growth can be modeled as a parabola, the interior maximum of which denotes an optimal level of decentralization with respect to growth. Using a panel data set of the United States from the 1990s, the authors' empirical test validates their theoretical framework. Going one step further, Akai, Sakata, and Nishimura calculate the location of the fifty states on the parabola and determine that many of them could further decentralize to reach the inflection point, and thus optimize growth.

Later studies validate the "hump shaped" relationship between faster economic growth and financial decentralization on a broader scale. While examining all the OECD nations (except

Luxembourg) over the span of 1970-2000, Ulrich Thiessen noticed that most member countries had converged on a moderate level of fiscal decentralization. Ceteris parabus, states that had achieved a balance of authority between central and local levels had higher overall growth rates, higher figures for investment as a share of GDP, and larger Total Factor Productivity rates. Conversely, countries situated at the extremes (very centralized or decentralized) experienced lower rates of all three measures. The author's conclusion was that the parabola is a fitting description for the interplay between growth and fiscal decentralization in developed countries, though he qualifies the robustness of the findings by highlighting the weakness inherent in his small sample size.

A legitimate question that arises in the discussion of governmental devolution is whether localities with limited fiscal capacity can adequately function with greater autonomy. Critics have speculated that such cities would allocate their expenditures toward fostering commercial activity to the detriment of providing social services, if given free reign over their finances. Lobao and Kraybill study the presence of a trade-off between these two objectives using panel data on 46 U.S states from 1980-2005. They found no evidence that financial decentralization precipitates increased expenditures on business attraction in poverty-stricken municipalities. Even during the severe recession that followed 9/11, poorer cities expanded their social service provision in line with their richer counterparts (Lobao and Kraybill, 2009). The authors concluded that no such reservations should be harbored concerning the fiscal empowerment of economically depressed localities.

In addition to slowing down economic growth, poorly implemented fiscal decentralization can cause other consequences as well. One study demonstrate that if Intergovernmental Transfers from the Federal level become too large a share in state and local expenditures, corruption among public officials increases. In this context, corruption is defined as share of arrests of public officials due to charges of abuse of public office in total population. The authors term the mismatch between own revenues and own expenditures as "vertical imbalances". Their results show that a one standard deviation increase in vertical imbalances causes a 40% standard deviation increase in corruption (Fisman and Gatti, 2002). The authors speculate that this effect is induced by the officials now operating under a "soft budget constraint". Politicians that are accustomed to a soft budget constraint may not be properly incentivized to allocate resources efficiently, maximize the returns on their tax revenues, or

evince any of the desirable characteristics that financial decentralization is thought to bring about. In this scenario, officials may be less responsible with public funds and take more liberties with their position in general. Thus when the fiscal decentralization is extremely asymmetric in nature, there is a higher likelihood that state and local officials will be corrupt.

In a similar vein, revenue decentralization has been shown to increase income inequality in the presence of weak government. Bilin Neyapti explains that local government capture by the interest groups that represent powerful firms can lead to inefficient revenue collection. Influential economic agents use their grip on local authorities to avoid paying their share of taxes. In this scenario, the middle and lower-income classes disproportionately bear the brunt of financially supporting municipals governments (Neyapti 2006). The income inequality in such a society thusly increases. However, this effect is reversed if revenue decentralization is undertaken by a competent government. Presumably, local governments here are more immune to the demands of powerful economic actors, and the latter does not exert as much of a distortionary effect on the rest of society. When economic agents are contributing their fair share to the local administration, revenue decentralization works to decrease income inequality.

Even if a nation or state achieves accelerated economic growth, that in itself is no guarantee that its poverty rate will diminish. In his primer on growth and poverty reduction, Martin Ravallion identifies the fundamental prerequisites of a pro-poor outcome. He notes the essentially of "reducing the antecedent inequalities that limit the prospects for poor people to share in the opportunities unleashed in a growing economy" (Ravallion, 2005, P. 20). This is largely accomplished by changing the income distribution, which in turn hinges upon a host of factors. One commonality Ravallion found across countries was a great disparity in levels of geographic or sectoral growth. The author cautions against provinces, states, or localities being left behind when their economic prospects do not coincide with national trends or goals. A pro-poor growth strategy will not neglect the less dynamic or industrialized regions of a country, but devote sufficient attention to them in order that they can prosper as well. Devolving administrative and fiscal authority to a given jurisdiction thus seems an effective way to ensure that a locality's interests are furthered, and pro-poor growth achieved.

Economic growth aside, fiscal decentralization is believed to achieve a pro-poverty outcome by other means also. Proponents hold that conferring greater autonomy on a state or city leads to social service provision whose nature and structure more closely reflects local needs

(Jutting, Corsi, and Stockmayer, 2005). Eliminating the gap between the administrators responsible for the programs' execution and the intended recipients ensures that social services are more responsive and better targeted (Jutting, Corsi, and Stockmayer, 2005). Additionally, the output of public goods will correspond with the level of need for such resources in a fiscally decentralized locale (Oates, 1995). This precludes the inevitable pitfalls that accompany a centrally-planned approach. There, funds for public goods are distributed uniformly among the recipients without regard for the severity of need of each. Invariably, the result is shortages and surpluses among the lower level governments, which is unquestionably a sub-optimal outcome.

Lastly, fiscal decentralization is theorized to lead to a more economically equitable society due to the increased political participation it engenders. Generally, the more economically disenfranchised an individual, the less willing and able they are to press for their needs and articulate their interests through the proper channels. A more autonomous local state remedies this disconnect by bringing the lower classes into closer contact with the public officials responsible for their welfare. Personal interaction between politician and citizen makes the latter much more difficult to ignore. As the poor are now in a better position to express their desires and affect change, their vulnerability and voicelessness are thought to drastically diminish (Jutting, Corsi, and Stockmayer, 2005). Thusly politically empowered, lower socio-economic classes can now advocate for higher-quality social services, more progressive laws, and other measures that will help them escape from poverty.

Through all of the aforementioned channels, financial decentralization is theorized to lead to a pro-poor outcome. My immediate aim is not to substantiate the existence of these separate channels, but rather to show that their confluence has a net negative effect on poverty. Specifically, I will show the existence of a negative relationship between fiscal decentralization and poverty rates among the lower 48 United States.

Data

The United States of America provides ample material for a comprehensive case study in the influence of decentralization on the level of poverty in a developed nation. Focusing on the U.S. offers several advantages over cross-national data. First, to juxtapose countries with wildly different levels of industrialization and economic maturity is to group together fundamentally different units of observation. Doing so hinders any efforts to distinguish fiscal decentralizations'

unambiguous effect. Secondly, other papers examine time periods during which countries experienced periods of rapid growth and activity. Akai and Sakata argue that fiscal decentralization operates sub-optimally in such scenarios, which leads to distorted results (Akai and Sakata, 2002). The relative political and cultural homogeneity of the United States, as well as the many periods of moderate economic expansion it has experienced, allowed both of these issues to be avoided in this investigation.

The highly varying degree of autonomy among state governments will allow us to examine whether there exists a relationship between a state's governance structure and the standard of living of its citizens. America also has the advantage of allowing political and cultural factors to be safely controlled for. Their relative equality in terms of industrialization and modernity also help ensure the robustness of the results. Simultaneously, the states exhibit a sufficiently high degree of heterogeneity in poverty rates as well as in several measures of fiscal decentralization. In addition, studying the American states also has the distinct advantage over cross-national data sets in that variables are uniform in their definitions. For example, America has utilized a single definition of the Poverty Rate since it began tracking such information. Conversely, different nations may calculate their poverty rate using different measures. Studies which aggregate data measured by various indicators into one measure will produce results that are not as reliable. As the Table of Means indicates, there exists a huge range of both fiscal autonomy and poverty among the United States.

Table 1: **Tables of Means**

Fiscal Decentralization Measure	Minimum	Maximum	Mean	Standard Deviation
State Poverty Rate	2.9% Connecticut - 1993	27.2% Mississippi - 1994	13.2%	.040
Revenue Indicator	18.9% Delaware - 1998	66.2% Nebraska - 1982	39.6%	.080
Expenditure Indicator	21.3% Wyoming - 1984	74.1% Wisconsin - 1991	52.6%	.094
Vertical Imbalances	9.2% Arizona – 1988	29.7% Vermont - 1980	17.4%	.037

Human Capital Attainment	23% Wyoming – 1994	63.5% Delaware - 1993	48.3%	6.47%
Union Member Density	3.3% North Carolina - 1999	38.3% West Virginia - 1981	15.3%	6.55%
Real Per Capita Gross State Product	$7,005 Mississippi - 1980	$41,920 Connecticut – 2000	$18,259	$6,169
State GINI Coefficient	34.8% New Hampshire - 1987	51.8% South Dakota – 1997	41.1%	2.9%
Share of Agricultural Employment	17% Delaware - 2000	1% New Jersey - 1990	4.4%	3%
Share of Manufacturing Employment	3.3% Wyoming - 1984	27.5% North Carolina - 1980	14%	5.3%
Share of Service Employment	15.8% South Carolina - 1980	43.3% Nevada - 1981	26.3%	4.7%
Log of Corruption	-9.85	.755	-2.92	2.38

This study utilizes U.S. Census panel data from the year 1980-2000. For each state it reports own-tax revenues, intergovernmental transfers to the state and national level, own-expenditures, and state and federally mandated expenditures for each year. This will allow the construction of the fiscal decentralization indicators that will serve as my principal explanatory variables. The Census also features tables of annualized poverty rates for all forty-eight states for the aforementioned time span, thus providing the data for our dependent variable.

We follow previous studies for direction in which control variables to include in our specifications. GINI coefficients are used to control for varying levels of income inequality among the states. Ceteris paribus, we believe that income inequality will correlate positively with poverty. The data for the GINI coefficients also originates from the U.S. Census. Real per capita gross state product is included in order to control for varying standards of living. We theorize that real per capita GSP will correlate negatively with poverty, as higher incomes necessarily mean less people subsisting below the poverty line. Figures for nominal per capita were extracted from the Bureau of Economic Analysis, the converted into real terms with a GSP deflator. I control for divergent education levels by including states' average high school graduation rates. The level of human capital attainment is accompanied by a quadratic term in

order to account for formal education's non-linear relationship with poverty. We hypothesize that education will work to diminish poverty only after it has reached a certain point. Accordingly, the level should be positive while the quadratic is negative. Estimates of state graduation rates for some years were taken from the U.S. Census, with figures for all missing years interpolated by Economist Mark W. Frank in one of his studies (Frank, 2009). Union Member Density measures the strength of union presence for each state, the net effect of which is unknown. Figures were taken from unionstats.com. The economic composition of a state is controlled for with a host of sector employment measures. The employment share of manufacturing, agriculture, and services in the total economy inform us as to which industries increase or diminish poverty. Totals for each sector were divided by the employment total to obtain the share, all of which was provided by the Bureau of Economic Analysis.

History of Fiscal Decentralization in America

The fiscal autonomy of a given unit of government has two principal dimensions: revenue and expenditure decisions. The degree to which a government has discretion over those two aspects informs us as to how financially independent it is. With regard to revenues, local and state governments have had command over as much as 66% of their income stream, and as little as 19% over the twenty-one year period. However most states have gravitated towards the average of 40%, as the standard deviation is only 2.3%. Collectively, the states experienced an 8% decline in revenue autonomy from 1980 to 2000, dropped from 40% revenue autonomy to 36%. There were 9 states that were driving this change especially strongly. Wyoming underwent a dramatic 50% shift in revenue autonomy, starting at 41% in 1980 and ending at 20% in 2000. Vermont, Massachusetts, and Wisconsin also saw declines greater than 25%. Conversely, three states decentralized significantly with respect to revenues: Indiana at 8%, Nevada at 10%, and South Carolina at 25%. Examining the states within their respective census regions yields even clearer insights into the trends of the recent past. The Midwest underwent an 11% drop in revenue autonomy, with nearly that entire decline taking place in the 1990s. The revenue autonomy of the West rose in excess of 40% in the mid-1980s, remained constant for ten years, and then dropped to 34% by 2000. The net change was a 9.5% decrease. The North East was fairly static in this regard for most of the sample period, then saw a 9.5% drop in the last five

years of the sample. The Southeast was stable throughout the 21 year time span, and is unique in that it experienced minimal net change during the sample period.

The indicator for expenditure autonomy fluctuated much more wildly for sub-national governments. The mean for the two decades was 53%, and the minimum and maximum were 21% and 74%, respectively. The standard deviation of the expenditure autonomy indicator was fairly large at 9%. The absolute value of the annual percent change in expenditure autonomy was 23%, which also informs as to its erratic nature. Collectively the states underwent an increase of 7% in expenditure autonomy from 1980 to 2000. Four states saw a drop of over 25%, including Iowa, Kansas, Illinois, and Louisiana. Simultaneously, 11 states had their expenditure autonomy increase by over 40%. Virginia was far and away the leader with a jump of 91% in expenditure autonomy. When broken down by census region, each of the four sectors demonstrates a distinct trend in this regard. With respect to expenditure autonomy the Midwest fluctuated wildly, rising as high as 60% in some years and falling as low as 40% in others. By the year 2000 it had settled at 41%, which equates to -12% shift. The evolution of expenditure autonomy was similar in the Northeast, which oscillated in the range of 42%-60%. By the year 2000 it had command over 48% of its expenditures, which represents a 7% rise. The Southeast and West saw similar movements of expenditure autonomy during these 21 years, and had increases of 14.5% and 4.5%, respectively.

Vertical Imbalances averaged 17.4% over the sample period, the maximum observed value being 30% and the minimum 9.25%. The average standard deviation was 1.84%, indicating the values were tightly clustered about the mean. The average annual percent change was .4%, showing that changes in Vertical Imbalances occurred in small shifts. As a nation, Vertical Imbalances was 11.16% lower than its 1980 value. The states most responsible for spurring Virginia, Nevada, Delaware, and Massachusetts all experienced negative percent changes in excess of 30% during the sample period. Nevada and Nebraska were outliers at the other extreme, with positive percent changes in excess of 20%. In regional terms, the four census territories took highly divergent paths with regard to vertical Imbalances. The Midwest had an average value of 19% in 1980 and ended at 18% in 2000, which translates to a 4.8% decline. Vertical imbalances in the Northeast began at 21.5%, sank to as low as 14.5% in the early 1990s but rebounded to 17.5% by 2000. The net change in the Northeast was thus an 18.5% decrease during the sample period. Vertical imbalances in the Southeast and West followed the same

trajectory as in the Northeast, though its net change was smaller at a 10.5% and 13% decrease, respectively.

The trends in fiscal decentralization we observe among the states and four census regions are consistent with the findings of Wallis and Oates in their study "Decentralization of the Public Sector: An Empirical Study of State and Local Government". First, these authors discovered that fiscal decentralization increases with population size. Our anecdotal data substantiate this assertion, with Delaware, North Dakota, and Idaho occupying spots in the bottom ten in rankings of both population and revenue decentralization for 1980. Similarly, four states appear in the top ten with regard to both population size and revenue decentralization in 1980, those being New York, Texas, Illinois, and Florida. In 1990, we see that most of the same states have maintained their position. Delaware, North Dakota, and Idaho are again in the bottom ten states with the smallest population and least fiscally decentralized. Illinois, Florida, and New York are again among the ten states with the highest populations and levels of revenue decentralization, with Texas joining their rankings. The correlation between population size and revenue decentralization appears to have strengthened with the passage of time. In 2000, five states are in the bottom ten for both lists: Wyoming, Vermont, Delaware, Rhode Island, and Idaho. Additionally, five were still in the top ten with respect to population and revenue decentralization: Georgia, Illinois, Florida, New York, and Texas.

Wallis and Oates also find that higher income states are more centralized with respect to their expenditures. Indeed, West Virginia and Kentucky are in the bottom ten states in terms of real per capita income, but in the top ten states for expenditure decentralization in 1980. In 1990, Louisiana, Kentucky, and Idaho are all in the bottom ten states for per capita income, but the top ten states for expenditure decentralization. New Jersey and Virginia have two of the highest standards of living of the 48 sample states, and are also among the least decentralized in expenditures for 1990. In the year 2000, West Virginia, Alabama, and Utah are in the bottom ten states with regard to real per capita income, as well as in the ten most decentralized states with respect to expenditures. Illinois is the only state to appear in both the ten states with the highest real per capita income and the smallest level of expenditure decentralization in 2000.

Lastly, Wallis and Oates discovered that Southern states are inherently more centralized, especially compared to their northeastern counterparts.

Definition of Poverty

A crucial first step in any effort to improve the welfare of the poor in America is to properly define poverty. Only then we can ascertain what proportion of the population is living below an acceptable limit. The definition of poverty most commonly referenced, and the one I use, is the U.S. Census Bureau's. The Census uses a set of money income thresholds that vary by family size and composition to determine who falls below the poverty line. Households that theoretically cannot meet their basic consumption needs, which include food and non-food needs, are defined as living in poverty. Therefore, the poverty line can be thought of as being the minimum expenditure necessary to meet basic food and non-food needs. The Census' poverty thresholds were originally devised in 1963 using U.S. Department of Agriculture food budgets calculated for families under economic duress. They then used other data to determine what share of total expenditures food purchases are on average for American families. Combining this information, the U.S. Census arrived at the definition of the poverty line that is still in effect.

This approach to discerning the extent of poverty in American is subject to a number of criticisms, though. First, it fails to take into account the severity of poverty. Families could be subsisting slightly below the threshold, indicating a moderate degree of poverty. They could also be living in considerable deprivation far below the threshold, but there is no way of knowing under the current guidelines. Secondly, the poverty line uses the household as its unit of observation. Therefore, it implicitly assumes that poverty is uniformly distributed across a given household. In instances in which the elderly, children, and females are treated unequally, they would take on a disproportionate share of the poverty of that household. In this respect the Census' poverty line also fails to capture the severity of poverty bourn by individuals. Third, the poverty threshold does not vary geographically, despite the fact that price levels vary considerably across different regions of the U.S. Consequently, the degree of poverty would be far greater for a family living in a costlier locality, ceteris paribus.

The Census' poverty definition is thus severely flawed and subject to a great many limitations. Its virtue is that there exists an abundance of data on it at the state level, which serves my purposes well. The Census' definition is therefore my poverty measure of choice in this study.

Recent History of Poverty in America

From 1980 to 2000, the American states had an average poverty rate of 13.22%. The figure in 1980 was 12.5% and in 2000 was 15.13%, which comes out to a 26% increase. The average annual percent change was 2.3%, and the standard deviation was 2%. There were several notable outlier states that we observed; for instance, Nevada, Wisconsin, and Connecticut experience drops in their poverty rate of 20% or more. The states driving the general trend were Minnesota, West Virginia, and New Hampshire, all of which had percent increases of 70% or higher. With regard to Census regions, all four underwent net increase in the poverty rate. The Northeast's rate began at about 10% and held fairly constant until the last few years of the sample, during which it climbed to 13%. Its net change was thus a 28% increase. The Midwest began at 11.5% of its populace living under poverty, and spent the duration of the sample fluctuating between 11-14.5%. It finally settled at 13.5%, which equates to a 14.5% increase. The West had a starting poverty rate of 12.3%, which grew steadily until finishing at 15%. The fraction of citizens living in poverty thus increased by 23%. The Southeast experienced the most dramatic shift of all: a 32.7% increase in the poverty rate. Its figure as of 1980 was already high at 15%, and ended at about 20%.

Empirical Approach

In my most parsimonious model, I regress state poverty rates onto each of the six proxies for financial decentralization. I then expand the model to include that proxy's quadratic term, as well as control for a number of pertinent variables. Single variable or groups of like variables are added in one at a time. For example, percentage of state population under the age of 19 and percentage 65 or above enter into the model at once. I employ a two-way fixed-effects model for every specification in order to control for state-specific characteristics that persist through time. Year binary variables are utilized to control for time-specific shocks that would otherwise bias my findings. The model is thus specified as

$$PR_{it} = b_o + b_1 FD_i + b_2 FD_i^2 + b_3 X_{it} + \alpha_i Si + \alpha_i Y_t + e_{it}.$$

Financial Decentralization Indicators

In order to properly gauge the effects of financial decentralization, the first step is necessarily to create a proxy or group of proxies that accurately indicate the degree of autonomy a local government exercises. At first, it would seem intuitive to consider a municipality's share of expenditures as a percent of total expenditure decisions as a measure of autonomy. Yet the presence of intergovernmental grants (IGRs) precludes this approach (Akai and Sakata, 2002). This is due to the fact that many IGRs are distributed to local governments with explicit conditions on how they can be utilized. Expenditures made possible by federal money due not reflect any decision-making on the part of a state government, and thus tell us nothing of its level of autonomy. Alternatively, it may be tempting to regard a state's level of tax revenues as an indicator of its financial independence. However unconditional lump-sum grants from the federal or administration add considerably to a state government's budget, greatly augmenting its fiscal independence (Akai and Sakata, 2002). Lump-sum grants therefore prevent tax revenues from serving as an accurate measure of a state's autonomy.

One way to account for these distortions is to utilize several indices that inform us as to the level of a state's financial autonomy. Indicator 1: The Revenue Indicator is the ratio of local revenues to state and local government revenues combined (Akai and Sakata, 2002). The underlying assumption of this indicator is that all IGRs are conditional and thus do not contribute to a given state's fiscal independence (Akai and Sakata, 2002) Indicator 2: The Production Indicator is the ratio of local government expenditure to combined state and local government expenditure. The implicit assumption here is that the local government has complete autonomy with respect to its expenditure decisions, i.e., that all IGRs are unconditional.

The last indicator I include is "Vertical Imbalances", the purpose of which is to gauge the overall autonomy achieved by a locality. It captures the gap between a locality's expenditures and own revenues, with the difference being made up by federal intergovernmental grants. Accordingly, vertical imbalances are calculated as federal IGRs / combined state and local expenditures. Fishman and Gatti hypothesize that the larger the rift between own revenues and expenditures, the higher the likelihood of corruption and the less effective financial decentralization will be (Fishman and Gatti, 2001). This indicator will allow us to determine whether states and towns that decentralized symmetrically do indeed enjoy financial decentralization's theoretical benefits.

Results

Preliminary Results

Many of the states in our sample exhibit trends in the financial decentralization indicators that correspond to increases or drops in the poverty rate that conform to our hypotheses. For example, Florida began in 1980 with a Vertical Imbalances value of 18.8%, which steadily decreases to 10.5% by 1991. During the same period, the poverty rate jumps from 11.6% to 15.5%. This increase makes sense in light of the fact that the state and local governments have less access to federal funds. Michigan had a revenue decentralization value of 43.6% in 1991 which shrank to 36.5% by 2000. A movement towards the poverty-maximizing revenue decentralization value of 37% should increase a given state's poverty rate. Indeed, Florida's poverty rate grew from 13.3% to 16.2%. Mississippi began the sample period with a Vertical Imbalances value of 23%, which is very close to the optimal value (20.7). By 1990, Mississippi's Vertical Imbalances had diminished to 15%. Simultaneously, revenue decentralization decreased from 48% to 43.4%. Both of these shifts should theoretically lead to an increase in poverty, and we do see the poverty rate go from 12.2% to 15.7%.

Nebraska was an outlier in that it had the highest average for revenue decentralization from 1980-2000. In 1982 it had a value of 66.25%, which diminished to 53.75% by 1997. Its Vertical Imbalances value in 1989 was 11.75% and grew to 15.8% by 2000. These movements in fiscal decentralization counteract one another, and the net effect on the poverty rate is indeterminate a priori. Indeed, Nebraska's poverty rate fluctuated about its mean of 11.25% during the twenty-one year sample period. Lastly, New Jersey went from being 43.25% revenue decentralized to 37.7% (the poverty-maximizing value) by 1989. Vertical balances decreased from 16.3% to 11.9% during that time. Accordingly, the poverty rate rose from 8% in 1980 to 10.3% in 1990.

Table 2: Estimate of the Effect of Fiscal Decentralization on Poverty
Dependent Variable: State Poverty Rate, 1980-2000

	(1)	(2)	(3)
Intercept	-7.06* (3.62)	-2.68 (3.31)	-.990 (3.60)
Revenue Indicator	21.4*** (8.25)		
Revenue Indicator^2	-28.1*** (10.4)		
Expenditure Indicator		-1.09** (.541)	
Vertical Imbalances			-26.7* (15.1)
Vertical Imbalances^2			74.2* (39.7)
Log of Real Per Capita GSP	-.0003*** (.00006)	-.0003*** (.00006)	-.0003*** (.00006)
Share of Agricultural Employment	-9.16*** (2.47)	-8.96*** (2.46)	-9.80*** (2.45)
Share of Manufacturing Employment	-3.14 (1.95)	-3.55* (1.93)	-2.98 (1.95)
Share of Service Employment	-6.05* (3.65)		
Union Member Density	-.063*** (.024)	-.075*** (.024)	-.070*** (.024)
GINI Coefficient	6.70** (3.05)	6.65** (3.06)	7.34** (3.09)
Log of Corruption	.046* (.027)	.054** (.027)	.047* (.027)
Lag 1 of Poverty	.469*** (.026)	.475*** (.026)	.460*** (.026)
Lag 2 of Poverty	.192*** (.026)	.194*** (.026)	.184*** (.026)
Human Capital Attainment	48.1*** 11.8	48.3*** (11.7)	50.3*** (11.7)
Human Capital Attainment^2	-54.3*** (12.7)	-55.04*** (12.6)	-58.2*** (12.6)
Number of Instruments	1.0e+03	1.0+03	1.0e+03
Number of Observations	912	912	912

Wald Chi^2	2805.76	2749.28	2815.68

Notes to Table 2: Standard errors in parenthesis. Data from the U.S. Census Bureau, the Bureau of Labor and Statistics, the Bureau of Economic Analysis, and the Current Population Survey, and include all the lower 48 states between the years 1980-2000. Each regression includes binary variables for each sample state, as well as for each year

The negative coefficient on vertical imbalances (-.519) along with the positive coefficient on vertical imbalances squared (1.22) inform us that this variable exhibits a parabolic shape when graphed against the poverty rate. I calculate the inflection point to be .213, or 21.3%. At this minimum, symmetric financial decentralization exerts its strongest negative effective on the Poverty Rate. To give a quantitative example, a given state that moves from 0% Vertical Imbalances to the optimal value would experience an approximately -.05% decrease on its poverty rate.

Many of the control variables I included also became increasingly significant as I further specified my model. Share of Agriculture in total employment was negative and significant at the 1% level (, showing that states with agricultural sectors had slightly lower poverty rates. Conversely, employment share of manufacturing and service were negative and significant at the 1% and 5% level, respectively. Unemployment rate was negative and significant at the 1% level, which contradicts economic theory on the topic. However, the small coefficient (-.0002) is economically insignificant. The variable percentage of population 65 or above was negative and significant at the 5% level with a sizeable coefficient (-.552), showing that states with larger shares of senior citizens have lower poverty rates. Human Capital Attainment was positive and significant at the 1% level, though its quadratic is negatively signed and equally significant. Together, these variables inform us that poverty increases with a state's share of high school graduates until the inflection point of 52.6%. To give this figure a point of reference, the average of human capital attainment for the 21 year period is 48.3%. After passing the minimum, poverty and human capital attainment become inversely related.

Economic Significance

With the statistical significance of vertical imbalances thus proven, our attention now shifts onto the extent of its economic importance. The example given earlier of a state moving from 0% to 21.3% VI was admittedly unrealistic, as American states are typically situated in the 10-30% range. It is rare for states to be on the beginning portion of the VI curve, where the elasticity of poverty with respect to VI is greatest. Consequently, potential real-world reductions in the poverty rate due to a movement towards the optimal VI level are decidedly modest. I use the data points on VI for each sample state in 2000 in order to ascertain their most recent position

on the curve. In this year, 36 states were operating below the optimal point, 9 states above, and 3 states on it. I then calculated what the difference in poverty rates would be if all 48 states were instead operating at the minimum VI value. Multiplying these hypothetical poverty rates against state populations gives us the reduced number of citizens living under the poverty line in this scenario. The difference between observed values and fitted values shows reductions in poverty that can be realized by converging upon the optimal VI value. For the year 2000, a total of 14,620 less people would be living under the poverty line if the government reallocated revenue and expenditure shares optimally

Elevating only a few thousand people out of poverty in a national population of three hundred million admittedly seems like a trivial achievement at first. However, it must be kept in mind that these gains in social welfare can be attained by incurring little to no cost. All that is required is the U.S. government brought all states into the ideal balance between own revenues and own expenditures. Additionally, any gains in economic growth, human capital, and physical capital accumulate and persist through time. Increases in these three macroeconomic variables compound and serve to raise the standard of living for all generations indefinitely. Though the levels of individuals exiting poverty may be small, the effect of increased economic growth and capital could become more pronounced over time. Granted, this outcome is contingent upon the theoretical channels through which fiscal decentralization reduces poverty being true.

Conclusion

Despite having proven the existence of a relationship between fiscal decentralization and poverty in America, there is still a great deal left to find out on this topic. Our results tell us nothing of the extent of social mobility achieved by individuals due to movements by their government towards the optimal VI value. That is, we do not know how far above the poverty line they ascended, nor how far below it they were to begin with. Similarly, our measures do not inform us of movements by citizens upwards within the 'poverty zone'. It could very well be that the severity of poverty was lessened for numerous individuals due to the effect of VI, even if they were not able to escape poverty ultimately. Third, we are ignorant as to which demographic groups benefit most from efficiently implemented fiscal decentralization. It remains to be seen whether some populations are more sensitive to a movement towards the VI optimal value, such as urban vs. rural, female vs. male, Hispanic vs. non-Hispanic, etc.

All of these shortcomings can be fully addressed in further studies. More comprehensive measures of poverty can be utilized in order to gain further insight into the effects caused by fiscal decentralization / centralization. For example, the Squared Poverty Gap measure could be employed to see what changes in standard of living those under the poverty line undergo. This way it could be determined whether the poverty gap is increased or lessened on average. The Watts Index is distinct in that it can be decomposed for different sub-populations, and would allow us to gain insight into these trends. Secondly, more recent data can be gathered on states' fiscal autonomy, in order that their positions on the VI curve could be best calculated. Then meaningful policy recommendations could be given to public officials in order that they could either centralize or decentralize their administrations in order to approximate the optimal VI value. Third, the channels through which financial decentralization is thought to reduce poverty could be empirically tested to determine whether theory holds up in the real world.

With respect to Channel 1: improved and expanded public goods and service, one could look at project outcomes for social welfare programs to see if they do achieve more quantitative success under an efficiently structured government. Changes in the size of the clientele base for the same public programs would clearly indicate whether such initiatives are growing or contracting in scope. For Channel 2: increased focus on human and physical capital, I plan on gathering data on education share of government expenditures and standardized test scores to examine changes in scholastic investment and quality, respectively. Studying the changes in government spending on infrastructure and communications would inform us as to whether optimally decentralized government indeed direct greater funds towards high-productivity sectors.

Appendix

Table 3 Pairwise Correlations

	Revenue Indicator	Expenditure Indicator	Vertical Imbalances
Revenue Indicator	1.000		
Expenditure Indicator	.0048	1.000	
Vertical Imbalances	-.0074	-.0302	1.000

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