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### Increasing Decision Making Capacities of Local Governments: Mexico's Quest for Economic Growth

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# Increasing Decision Making Capacities of Local Governments: Mexico's Quest for Economic Growth

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This paper examines the relationship between fiscal autonomy and a municipalities' commitment to and the impact upon economic development activities. This article evaluates quantitatively, using a panel dataset from 1989-2014, the relationship of fiscal capacity to a city's economic development. It tests the hypothesis that if a municipality is more fiscally autonomous in collecting their own revenue and also discretion in making their own decisions, then the city will be more likely to have successful economic development. Fiscal autonomy is measured as total own-source revenue (TOSR) collection and discretion is measured as how local governments decide to enter into the municipal bond market. The empirical model also tests for convergence between municipal growth. Overall municipalities that grow collect more own source revenue, spend a bit more on salaries, often have more debt, but this does not imply they are making efficient debt policy decisions. Finally, through the years, municipal growth shows an absolute (unconditional) beta convergence in decrease in the difference of growth between the poor and rich municipalities.

**Key words:** Fiscal Decentralization, Convergence, Public Finances, Economic Growth, Latin America, and Mexico

## 1. Introduction

While decentralization is believed to generate public policy innovation, greater transparency through citizen participation, and better delivery of public goods and services at the local level, research on how these factors have been used to help increase economic growth has been contested (Davoodi and Zou, 1998). The casual mechanisms to determine the relationship between decentralization and economic growth is complex as it has proven in both theoretical and empirical studies (Brueckner 2006, Filippetti and Sacchi, 2015, Hernández-Trillo, 2016; Smith and Revell, 2016). For example, several large-scale quantitative studies on the relationship between fiscal decentralization and economic development find different outcomes (Davoodi and Zou, 1997; de Mello, 2008; Glaeser, Scheinkman, and Shleifer, 1995; Stein 1999). Scholars explain the mixture of outcomes by the variation that exists in terms of measures of autonomy, fiscal decentralization and own-source revenue generation (Bahl and Bird, 2008; Bahl and Linn 1994; Ebel and Yilmaz, 2002; Martinez-Vazquez and McNab, 2003; Zhang and Zou 1998). The differences can be conceptual, for example how autonomy is defined, to more tangible, such as how budgets are calculated and organized.

Yet, for many decades, scholars, development economists and practitioners assumed that decentralization policies would improve efficiency in government activity and encouraged many emerging countries to shift political power and fiscal resources away from the national government towards sub-national governments. With the mixture of empirical results, recent scholars suggest that countries that are still in the process of designing their institutions, legal systems and human capital will fall behind others in the pursuit of economic development. (Rodriguez-Pose and Krøijer, 2009). Two factors missing by scholarly literature are 1) the economic legacy of a place which impacts of how a community makes fiscal policy decisions, and 2) how the legal structures allow communities to make financial decisions based on economic impacts. These claims need to be studied further to distinguish how they maybe of relevance for previous findings.

Therefore, this research uses a single country, Mexico, to test how communities strengthen their decision making capacity during the decentralization process. Mexico is a unique case because it is a middle-income federalist country with large vertical imbalances, steadily increasing its subnational debt, but also has had consistent efforts by the national government to decentralize state functions to municipalities. At the same time, Mexico has had rapid unsustainable growth of subnational (state and local) debt. According to federal accounts: “debt levels of states from 2008 to 2011 have increased, in real terms, from \$11 to \$22 trillion US dollars respectively. This represents a 92.4 percent increase alone” (ASF, 2012). Hardening soft budget constraints through increased fiscal rules of the debt policy has proven to improve decision making authority over local budgets but there is still a missing link for how this debt helps create growth.

This article reevaluates at the relationship between fiscal decentralization and economic development by studying the causal linkages in the decision making process at the local level. Because empirical research finds a mixture of results, this article evaluates Mexico’s efforts at local tax collection, debt management, public expenditures such as on infrastructure and salaries on economic growth. The hypothesis is that if municipalities report to having higher levels of budget autonomy (discretion to collect local taxes), they

will be more likely to have higher levels of economic development (measured as GDP). The research seeks to test and explain why this happens and how to improve decisions making abilities when a state has weak institutions and relatively low capacity to promote growth measures at the local level.

This article is organized into the following, first it provides an overview of the scholarly literature on fiscal decentralization and economic growth. Then the article describes the intergovernmental system, changes in debt laws and the raise of increased forms of debt issuances in the effort to promote decentralization in Mexico. Next, this research uses a statistical model to evaluate quantitatively the relation of fiscal capacity to a city's investments in economic development programs. This article seeks to fill the current gaps in the literature by providing an analysis of Mexican municipalities by testing their efforts to innovative public finances and economic development.

## **2. Fiscal decentralization and economic growth**

Theories of decentralization derive from the premises of public choice and federalism. Decentralization is suggested to be more efficient for development by federalist scholars because it first, eliminates waste by allowing local governments the appropriate level of service delivery, and two, creates competition between local governments, allowing voters to move with their feet to obtain optimal preferences of service provision (Musgrave, 1959; Tiebout, 1956). This is contrary to centralization, which argues that national governments should control state resources and target development into specific areas, providing high fixed costs for infrastructure, which is expected to create positive spillover effects to neighboring jurisdictions (Manor, 1999; Prud'homme, 1995; Rodden, 2004; Smoke, 2005).

What is further defined in public choice theory, local governments are equipped to design and administer development programs because market forces discipline them (Musgrave 1959). It is the marginal resident and marginal businesses that determine the market value of property in a locality. Therefore, local governments give citizens a choice in the level and type of basic government services. Scholars argued that municipalities are better equipped to facilitate information about how to organize public services and effectively spend less. Although local governments are likely to eschew income tax and rely on property taxes, user fees and other penalties to pay for public goods, political pressure is minimal. Oates (1999) argues that decentralization plays an important role in the efficient production of services leading to more rapid economic growth (Oates, 1999). Because local governments are close to citizens' demands, they are the best to renegotiate the fiscal bargain with taxpayers (Smith and Revell, 2016).

While scholars have argued that the process of decentralization is sequential—administrative, political and fiscal—it is widely recognized that fiscal decentralization (with hard budget constrains) has been difficult to achieve. While revenue decentralization, the local tax generation at the local level, is easier than expenditure decentralization, or the transfer of federal funds to lower levels of government (Falleti 2005). Within the decentralization debate, Rodden's (2004) research to strengthen soft budget constraints has focused on moral hazard—the likelihood that municipalities borrow more money than they can pay back, forcing the national governments to bail them out and jeopardize the state's

macro-economic stability. Imposing fiscal decentralization too fast could cause economic crisis like what happened in Argentina in 2001 and Brazil in the 1990s. On the other hand, Eaton (2004) has researched the problem of institutional power—the mal-apportionment of representation in the legislative body—creating disincentives for politicians to stay local, be faithful to their constituencies and manage their own resources. This balancing of national priorities and local autonomy is seen by many scholars as a politically challenging task.

For revenue decentralization to be in effect, central governments would need to permit and incentivize the new entities the right to tax its population to pay for its own public programs. Scholars admit that this final element, setting up decentralized financial reforms, promoting fiscal incentives and encouraging revenue systems to emerge from below, has proved to be very difficult to implement (Falleti, 2005; Inman and Rubinfeld, 1997; Rondinelli and Shabbir Cheema, 1981; Taliercio, 2004). Because of this complexity, many scholars emphasize fiscal federalism or balanced “system of transfer payments or grants by which a federal government shares its revenues with lower levels of government” (Montero and Samuels, 2004; OECD, 2007; Wiesner, 2003). Whereas fiscal federalism is the management of budget constraints and allocation of public finance at the local level, fiscal decentralization is local people collecting their own-source revenues and identifying specific policies and plans.

Empirical results of research are mixed. Most large N quantitative studies to test fiscal decentralization on growth use the Government Finance Statistics (GFS) of the International Monetary Fund or the Organization for Economic Co-operation and Development (OECD) data to measure decentralization, for which both maintain cross-country databases over a large time series. For example, the OECD data is from 1971-2005 and includes most of the major economies in the world (Gemmell, Kneller, and Sanz, 2013). Unfortunately, neither the GFS indicators nor the OECD include information at the municipal level of government, rather data represents subnational governments, which may combine both state level and municipal data.

Several single country analyses of fiscal decentralization have focused on expenditures and have not calculated the source of revenue generation, which also represents the discretion of local governments fiscal autonomy (Martinez-Vazquez and McNab 2003, Ebal and Yilma 2002). For example, Davoodi and Zou (1998) evaluate revenue streams in their model, where the dependent variable is the annual per capita GDP growth rate and the proxy for decentralization is the total subnational share of government expenditure, net of grants. However, according to Martinez-Vazquez and McNab (2003) there are serious methodological issues in their analysis because “the subnational share of total government expenditure does not represent the multidimensionality of the fiscal decentralization process. Without controlling for autonomy over expenditure and revenue decisions and whether officials are democratically elected, the expenditure share of subnational governments as a fiscal decentralization variable means very little in representing the level of decentralization.”

To fill this gap, additional measures of decentralization have recently been proposed (Blume and Voigt, 2008; Gemmell, et al., 2013). “Revenue autonomy” for example, is defined as the ratio of subnational governments own source revenue over its

total revenue. Total own source revenue (TOSR) is the sum of tax autonomy, non-tax autonomy minus intergovernmental grants. This measures the tax effort of local collections. According to Schneider, one answer to measure fiscal decentralization that takes into consideration the interaction between the relative size of subnational governments and their fiscal autonomy (Schneider, 2003). Such measure will be computed here as the “own-source revenue ratios”. It is the ratio of subnational governments own-source revenue, over expenditures towards public works, wage bill and public debt.

A second measure of subnational autonomy is the percentage of *total grants and revenues not accounted for by transfers*. This could conceivably include taxes, loans, fees, sales of assets, or informal contributions. There are some drawbacks to excluding all transfers, which do not distinguish for example between transfers over which lower levels of government have total control, such as block grants, and transfers that are tied to central government priorities, such as earmarked transfers, or transfers that require certain behaviors by subnational governments, such as matching or fiscal balance. Still, the treatment of all revenues aside from transfers gives an indication of the degree to which subnational governments raise their own funds through taxes, loans, fees, or sales of assets (Schneider 2003). *For this study, a variable is added as all transfers from the center and add them as a control.*

Vertical fiscal imbalances are also important. This is becoming a problem when the national government raise revenues in excess of its spending responsibilities, while State governments have insufficient revenue from their own sources to finance spending responsibilities. Vertical fiscal imbalances have led to over indebtedness, when subnational governments use loans to fulfill their spending profligacy. Discretion can be measured as the amount of budget disbursed, but it may also be the types of decisions made. This includes types of municipal debt policy. Academic literature has suggested that this is because of a lack of capacity within the subnational governments to manage its financial obligations and understand types and terms of debt.

Finally, for the most complete evaluation of studies related to fiscal decentralization and economic growth is the recent work by Gemmell et al (2013). They trace all papers to date and develop an annexed chart that highlights the various measure of decentralization and independent variable of economic growth that tests the spillover effects of revenue decentralization. Furthermore, these authors use OECD data to evaluate long-term effects on economic growth and further use robust test to see the growth effects on the size of the state, the optimal levels of local taxation and expenditures, and balance for fiscal decentralization. Unfortunately, in their work, Mexico falls out of the model twice because of lack of data collected by the OECD. Furthermore, their analysis only evaluates state governments and not exclusively the municipal level. Therefore, the work is inconclusive for the evaluation of the Mexican experience, so this research tests the following:

Ho1: More revenue autonomy (total tax revenues collected local) will improve the discretion of local governments to promote economic growth

Ho2: More revenue discretion (how local governments effectively manage and decide their debt decisions) will create more economic growth

Ho3: The more inter-governmental relations allow for economic legacy and discretionary capacity of the local municipalities, there will create more (convergence) eliminating the gap between municipalities.

### **3. Fiscal decentralization in Mexico**

As a major global federation with a multifaceted history of centralization and recent democratization and decentralization starting in 1983, Mexico provides for an intriguing analysis of fiscal decentralization (Diaz-Cayeros, 2006). Not only because of its recent political upheaval from a one party centralized controlled government, but also with the transformation of multi-layered democracy where elections now take place at the national, state, and local levels. Mexico has also reformed its legal framework in 1997 to provide subnational financing and borrowing at the state and local level. As a developing country, Mexico provides as an example for other countries to follow in its footsteps.

The Mexican Constitution was first amended in 1983 to promote fiscal decentralization. Additionally, the National System of Fiscal Coordination was modified as a mechanism to organize the whole fiscal system to prevent double or even triple taxation on a single source of income. Further political decentralization happened when the opposition party won majority in the Mexican Congress in 1997, which began a windfall of events that radically changed the inter-governmental relations of the country. Also in 1997, revenue decentralization took place, when President Zedillo established the major federal transfers system (Ramo 33 and 28) to distribute additional federal funds to the state governments. In 2000, this process finally resulted in the National Action Party (PAN) winning the presidential elections, after more than 70 years of the Institutional Revolutionary Party's (PRI) rule.

Overall Constitutional reforms to Article 115 (in 1983 and 1999) have increased the duties for subnational governments in Mexico. Municipalities now manage more responsibilities such as: planning urban development, granting of building permits, the provision of public services (water, sanitation, waste and public lightening) and organizing public security. Furthermore, with these additional responsibilities, many local municipalities are looking for new resources to finance sustainable development projects. Subnational governments, states and local governments, must respect the criteria contained in Article 117, Section 8, for states; and Article 115, Section 6, for municipalities (Giugale, Hernández Trillo, and Oliveira, 2000). The Constitution states that subnational governments can borrow only in Mexican pesos and only from Mexicans, and they can borrow only for productive investments. As a result, Banobras—a federal government development bank—and other financial institutions have found a way to lend in pesos with funds obtained in foreign currencies from international financial institutions, taking the exchange risk.

The details for guaranteeing credits are contained in Article 9 of the National Fiscal Coordination Law, created in 1980, which states that sub-national governments can borrow from commercial and development banks to finance investment projects only after receiving authorization of the local congress. This law also states that around 20 percent of federal tax revenue must be transferred to state and local governments (that is, Mexico has a revenue-sharing system).

To induce market discipline in subnational borrowing, Article 9 of the National Fiscal Coordination Law was reformed twice by President Enrique Peña Nieto. First in 2013 to simplify accounting codes and secondly in 2016 with the National Law for Financial Discipline. In the past, national legislation governing subnational debt rights provides few de jure restrictions on municipal debt. Legislation specifies that subnational debt liabilities must be in Mexican pesos, and that long-term debt must be registered with the national finance secretariat and be used for “economically productive” purposes (Auditoria Superior de la Federación 2011, Revilla 2013). Only until 2016 did states determine limits on municipal debt and approval procedures (Auditoria Superior de la Federación 2011, Revilla 2013). Yet, in 2016 the new regulatory procedures ensure that the national treasury could oversee over indebted states with a traffic light system of control. In general, state legislators ask few questions and municipal council support is pro forma because mayors enjoy majority support (Pérez Durán 2008, Merino Huerta 2008). Still national legislation does not require municipalities to ensure savings to offset debt liabilities (Giugale, Hernández Trillo, and Oliveira 2000), and there is a weak link between revenue and estimated repayment capacity (Espinosa and Martell 2015).

The main debt instruments in Mexico’s subnational capital market include public sector development bank loans, commercial bank loans, bond emissions, and “trusts.” Table 1 summarizes Mexico’s instruments by sector and relative cost-efficiency. Municipal governments are able to assess the relative cost-efficiency of different private sector credits, each with different associated financial costs. Less cost-efficient debt instruments tend to be easier and quicker to access; more cost-efficient financing tends to be more difficult and slower to get.

For example, the mission of Mexico’s main public development bank, the National Bank of Public Works and Services (Banobras), is to foment investment in public infrastructure, and its activities are integrated into the national government’s six-yearly economic development plans. These loans could be considered the most costly because of the high transaction costs. Commercial bank loans are one of the oldest forms of subnational financing. Bank capitalization rules require that commercial bank loans be based on creditworthiness, with municipal governments required to contract ratings agencies to appraise their fiscal positions. Commercial bank loans are often guaranteed with un earmarked fiscal transfers for longer term loans or guaranteed with operating expenses for shorter term loans if paid within the same fiscal year (Revilla 2013). Commercial bank credits tend to be less financially cost-efficient to municipalities than other types of private sector credit, in part because commercial banking is highly concentrated among a few banks that reduces competition (Musacchio 2012). Even so, data from the SHCP suggests that cost of commercial bank loans have declined as a result of competition with financial institutions underwriting bonds.

Bond emissions provide more cost-efficient financing. Mexico’s subnational bond market became operational in 2001. Bond issuances occur through a private financial underwriter that agrees, alone or in syndicate with other financial institutions, to purchase the full issuance and remarket it to investors. Bonds are cost-efficient for the creditworthy; otherwise, financial institutions and investors require higher interest rates and stricter terms and conditions. “Trusts” are created to enable the less creditworthy to access private



financing. Trusts are administered by third-party financial institutions and require a portion of the municipality's fiscal resources (usually unearmarked transfers but sometimes own source revenues) to be transferred to them according to a set timetable and maintained above established floors. Additional legal and administrative costs are required to create and manage trusts, on top of the costs of the private sector financing, making them less cost-efficient than commercial bank loans or bonds accessed directly. See Table 1 for a description of the types of loans.

<<*Table 1 Descriptive of Types of Loans*>>

It is impossible to gauge the real cost of financing in Mexico, given that interest rates are just one aspect of all terms and conditions attached to loans. Even so, Freire (2014) notes that municipal bond emissions tend to be more cost-efficient than commercial bank loans. Commercial bank loans are easier to organize than bond emissions because governments can take advantage of pre-existing relationships with banks who handle their retail banking needs. Indeed, such relations can also help governments secure somewhat better terms but as bank loans are often released in tranches, banks can change terms and conditions with little municipal recourse. If municipalities do not have access to a wide range of commercial banks to refinance loans – as is the case in Mexico – they must accept changes that usually raise costs.

Bond issuances tend to be more difficult to organize than commercial bank loans because they require credit ratings whereas bank loans do not (Freire 2014). In Mexico, however, municipalities must secure credit ratings for both bond issuances and commercial bank loans, eliminating this differential. Freire (2014) notes that bond emissions provide three benefits that raise their cost-efficiency over commercial bank loans. Bond emissions allow immediate liquidity, according to standardized terms and conditions that are nearly impossible to change once the issuance occurs; they lower the cost of future borrowing once an issuance has been made; and they allow borrowers to reach a wider range of lenders (investors) – with competition among them improving terms and conditions – than possible with commercial banks (especially in Mexico).

If all municipal governments have full discretionary powers, then each should pursue a cost-efficient strategy to supplement development bank credits with bonds. Furthermore, commercial loans would be used for short term loans and not help economic growth, but more cost-efficient bonds and trust funds would. In addition, the least cost-effective loans commercial banks and development bank bonds would be least likely to generate economic growth. To understand the oft-noted failure of Mexico's subnational capital market (e.g., Hernández Trillo, Díaz-Cayeros, and Gamboa González 2002a, Espinosa and Martell 2015, Giugale, Hernández Trillo, and Oliveira 2000), further tested here are the kinds of debt and their effects on growth.

#### **4. Method and data**

To examine the impact of fiscal decentralization on municipal economic development, we constructed a panel dataset of Mexico's 2,440 municipalities across nearly twenty-five years (1989-2015), giving us of total of 61,000 municipal-year observations. The dependent variables used in this study is total government share of GDP

(consumption plus investment, transfers excluded). Municipal GDP or the economic development as the dependent variable was gathered from various sources, including public finance sectors of private banks and other academic studies. In particular, this variable was difficult to gather because it is not a nationally standardized data point collected by the federal bureaucracy. The years for which the data for Municipal GDP was finally calculated by the World Bank and reported here for 1990, 2000, 2010, which is segmented based on census data in Mexico.

The key independent variable for fiscal autonomy is total own source revenue. The public finance data was collected from Mexico's National Institute of Geography and Statistics (INEGI). This is defined as a percentage of all local tax collection, which is calculated as property taxes, fees, fines, user charges and other local income sources minus state and national transfers (Ramo 28 and 33) and any other philanthropic donations over total revenue. All variables are standardized by population using Mexico's census department (CONAPO). Census data is collected every five years in Mexico and INEGI has performed municipal questionnaires since 1989. The public finance data were validated by the data published by the Mexican Congress' National Deputies (CEPF).

Other independent variables included to measure how the municipalities are making financing decisions. First government consumption is measured alone as a percentage of GDP. Government consumption measures include spending on current operations and is dominated by the government wage bill. This is the usual indicator of the economic "footprint" of government (Rodrik, 1998). To test the Leviathan theory of Brennan and Buchanan 1977, this includes primarily spending on wage bill and public works as local infrastructure investment (to test the spillover effects) and captures other expenditure, but was later cut out of the formal test because it autocorrelated with the wage bill and public works expense. Each of these variables was created as a percentage over the total municipal population to standardize the variables. Table 2 defines these variables: i.e. total own source revenue (TOSR), vertical fiscal imbalance, assets per capita, transfers per capita, salaries per capita, infrastructure per capita.

<<Table 2 Descriptive Statistics>>

The second way to measure the quality of municipal description is measured as total and the types of debt issuance. The finance secretariat (Secretaría de Hacienda y Crédito Público or SHCP) has recorded desegregated use of municipal debt since 2005, so we examine 2005 to 2014, the last year for which we have full data. We expect to see that the more sophisticated the decisions making of the municipality, the more likely they will grow. We use the types of debt--public sector development bank loans (Banobras) and private sector commercial bank loans, bond emissions, and "trusts"—as a way to estimate the sophistication of the debt. It is assumed that relative more cost-efficient debt (bond emissions and trusts) will yield higher amounts of growth over less cost-efficient instruments (Banobras and commercial banks options).

Finally, the economic literature discusses several concepts of convergence seeming from Barro and Sala-i-Martin's (1991) original work. The classic beta (B) type of convergence used here, refers to the negative association between the rate of growth and

the initial level of an attribute such as income. “At the same time, the beta convergence can be the absolute (unconditional) beta convergence which measures whether and by how much poor municipalities may be catching up with rich ones towards a common steady growth rate” (Davalos, Esquivel, Lopez-Calvo, Rodriguez-Castelan 2013). For this research, we are seeking to understand the absolute, where the rate of rich and poor municipalities is converging and growing closer together at the same rate. We measure this variable as the  $y_{t-1}$ .

Beta convergence indicator seeks to have negative correlations because

$$\ln(y_{it}) = \alpha + (1 - \beta) \ln(y_{i,t-1}) + u_{it}$$

Control variables were included which describe the types of municipality in the data set. For example, marginality index, percentage rural data comes from CONAPO was included to ensure other types of municipal growth were considered. Furthermore, dummy variables were included for the years after the 1994 tequila crisis in Mexico and the 2008 global economic crisis. This gives us a sense of whether countercyclical reforms were taken into account by the national government to supplement debt and assist with economic growth. Unfortunately, these variables were not statistically significant in either of the models we ran. Perhaps suggesting these macro-economic effects do not reach the local municipal growth as they could with the large state economies.

Model 1: Focuses on Total Own Source Revenues

$$\Delta GDP_{t-1} = \beta_1 + \beta_2 \Delta \text{Infrastructure per capita} + \beta_3 \text{Transfers per capita} + \beta_4 \text{Salaries per capita} + \beta_5 \text{TOSR} + \beta_6 \text{Convergence} + \beta_7 \text{Marginality Index} + \beta_8 \text{Rural} + \beta_9 \text{Post crisis} + \beta_{10} \text{Types of debt} + \mu$$

Model 2: Focus on Vertical Fiscal Imbalance

$$\Delta GDP_{t-1} = \beta_1 + \beta_2 \text{Salaries per capita} + \beta_3 \text{TOSR per capita} + \beta_4 \text{Assets per capita} + \beta_5 \text{VFI} + \beta_6 \text{Convergence} + \beta_7 \text{Marginality Index} + \beta_8 \text{Rural} + \beta_9 \text{Post crisis} + \beta_{10} \text{Types of debt} + \mu$$

## 5. Results

We examine the data using cross-sectional time-series analysis with panel- random effects model. Approval of the Hausman test allows us to select random over fixed effects, although the results for the models presented similar results. We include a lagged dependent variable (per capita) in all models to show growth, to account for observed autocorrelation in the residuals (in models without lags) and to control for any substantive effect of prior debt on subsequent debt. We also include the lag of total debt in all models (per capita, square root), in case that this affects access to capital markets. Five models were run, alternating between the TOSR and vertical fiscal imbalances and the total and types of debt.

Table 3 present results using the measure for whether municipalities collect total own source revenues for being fiscally autonomous. and Table 5 presents the result for total own source revenues, assets the municipality has and the virtual fiscal imbalances (VFI). This last variable, VFI, is important to disaggregate from the first model because it describes the consumption of the municipality expenditures over the amounts of transfers received. The questions of whether municipal authorities are making effective discretionary decisions over their public finances will determine and show how much possible moral hazard is created by the debt consumption. That describes how a municipality is using its excessive funding allocation available over the amounts of transfers in debt issuances and what types.

The primary results of this research were as expected that total own source revenues were statistically significant at a .01 standard error in all of our models. This confirms that local authorities which make the decision to collect more taxes, fees and rents at the local level are more likely to grow. Increased also are expenditures in salaries per capita. This is also highly significant in all models at .01 standard errors. In other words, when municipalities collect more local taxes they are likely to employ more local staff, thus confirming the Leviathan theory in public finances (Brennan and Buchanan (1977). This follows others finds that the size of government increases with decentralization (Jin and Zou 2001 and Cerniglia 2003). This finding could be dangerous because when we create more bureaucracy we need to pay for that bureaucracy. This is not the best type of economic growth that will ensure generations of economic development independent from government services. Expenditures in infrastructure per capita were not significant in any of our models (even though all models reported very low coefficients), which possibly indicates nonproductive investments in building hospital and schools over telecommunication, gas and high-level Internet cables are not producing growth directly but indirectly.

*<<Table 3 and 4 Results of Economic Development on TOSR in Mexico>>*

The negative public infrastructure variable is puzzling. Perhaps this is because unconditional transfers are spent to build public works which include infrastructure. The negative correlation with economic growth, suggests that the national transfers are allocated to and for those poor municipalities and that they therefore spend their resources on public works. This hypothesis needs further testing to understand the possibility of endogeneity between the types of infrastructure investment, where the financing comes from, whether it's through the transfers or through local decision making capacity and local debt issuance. Furthermore, which comes first for the economic development to increase in GDP, local tax collection, debt issuances or investments in infrastructure. Lags are suggested to override the endogeneity problem that other researchers have faced. This will be done in the next analysis.

The type of municipality to grow varied a bit with expectations. First in line with expectations, the coefficient for the marginality index was negative and significant for growth in all of our models. In contrast, rural municipalities were not significant, but all had the expected negative coefficient. This suggests that government transfers to encourage municipalities to grow have been successful but diverse between rural and metropolitan regions. Municipalities are also less likely to grow with higher amounts of inequality. But

in line with expectation with the beta convergence, all models showed the gap between poorer and richer municipalities were closing (with the negative coefficient) at.01 standard errors.

The impact of vertical fiscal imbalances was negative and significant, in line with our expectation that this would hamper growth and also the access to capital markets as well (e.g., Freire 2014). However, greater total fiscal assets per capita, a measure of municipal fiscal wealth, did not facilitate access to debt, in line with findings in other research (e.g., Espinosa and Martell 2015). Instead of fiscal solvency, the size of the municipal tax base (measured as TOSR) appears to be more important in Mexico.

Finally, to better understand the types of decision making capacity of the debt market. In line with expectation, and reasons to worry about the unsustainable increase of the subnational debt market, the results show an increase in total amount of subnational debt reported data by INEGI. Furthermore, the types of debt show different results. While commercial debt negatively correlated with growth (with a negative coefficient), Banobras debt, or the debt that is issued to improve growth by the states, is working for that mission (with a possible coefficient). The trust instrument and bond market debt associated with higher amounts of human development and higher capacity (measured as high values on the marginality index) showed no correlations, although their coefficients were negative, which was not in line with expectations. This may be because few municipalities know and understand the types of debt instruments issued in Mexico and may not be published widely or become politicalized as others have written about (Benton and Smith 2016).

Results of these regression tests are preliminary, what the qualitative analysis confirms is that economic development within a municipality will encourage city public officials to collect more local taxes. This in turn will encourage more economic development. The federal governments in developing countries must take the words of fiscal federalism and fiscal decentralization with caution. Since municipalities are still very delicate to promote and increase growth for the country. When they do have higher amounts of economic development, they are more likely to also collect their own taxes to spur economic growth. Further analysis must be done to understand Mexico's efforts at strengthening economic development through public works investments. This indicator needs more research and perhaps could show the miss allocation of public spending within Mexico in relationship to its tax collection rates.

## **6. Discussion**

Even as Mexico has become more decentralized, many academics, policymakers, and researchers have acknowledged that there are several problems in the inter-governmental system (Cabrero and Carrera, 2002; Merino Huerta, 2008; Tamayo-Flores and Hernández-Trillo, 2006). For example, research (Raich, 2002; Sour, 2004, 2008) has suggested that the transfer funds created since 1998 have reduced the incentives of local governments to collect taxes, particularly the property taxes, coincidentally the most important tax revenue at the municipal level, known as the flypaper effect.

In general, discussions of the flypaper effect refer to public money that “sticks” where it “hits” or to the sector in which it is initially assigned. Rosen (2002) suggests that

“a dollar derived as a grant generates 40 percent of public spending, while an additional dollar of private income increases public spending only by 10 cents” (Rosen 2002; p502). He, as do others (Oats 1999) add that communities seek to generate more funding from grants and not collect their own revenues. This creates an opportunity for self-maximizing bureaucrats to trick the citizenry and not be as transparent of their fiscal transfers through grants from the national government. This becomes complicated since grants may create more public spending, yet that spending is not transparent. Thus public choice scholars who seek ballot measures to increase or degrees debt issuances, for example, are not included in the fly paper effect. Rather, these maximizing bureaucrats have incentive to abscond information, create more bureaucratic programs and spend more public funds without the checks and balances of the ballot box. This is increasingly problematic when debt decisions are nascent in Mexico and many public officials are unclear of the costs associated with debt issuances of the various instruments (public loans from Banobras, commercial banks, the bond market and trust funds.)

Several Mexican academics have studied the flypaper effect on the incentive to collect local fiscal revenues with the increased use of federal transfers (Cabrero and Carrera 2002; Raich 2002; Sour 2004; Sour 2008). The majority of them have found a correlation between increases in transfers with the displacement of local tax collection. For example, Gamboa shows how the Mexican revenue-sharing may discourage revenue mobilization at the local level by increasing local government’s dependency on central government transfers (Ramo 33 and 28). This is because these transfers decrease incentives of local jurisdictions to increase local taxes. He claims that as in other federations, closing the gap between local revenues and service delivery costs tends to improve governance in countries. This is because the central government loosens control over subnational finances and significant financial autonomy enjoyed by lower tiers of government (Fukasaku and de Mello 1999). This becomes a problem for local revenue collection as it becomes easier to request political favors from higher levels of government than for mayors and local authorities to raise taxes at the local level, which are often politically unpopular.

In her research on Mexico’s federal transfer systems, Sour (2004) found that both non-conditional and conditional transfers (Ramo 29 and 33) have negative impact on all local governments tax collection effort. She uses the variable tax effort, although measures municipal tax capacity. In her study, she determines that there is no difference in fiscal performance by size of municipality, but rather the larger and smaller municipalities are equally affected by the increase in federal aid received each year by the Mexican transfer system.

Cabrera Castellanos and Cruz Mora re-evaluate Sour’s work by looking at the tax base and other revenues that a municipality can collect (Cabrera Castellanos and Cruz Mora 2009). These authors measure fiscal capacity by dividing the municipal income in two components: the tax base by property tax, and a base that includes “other” revenues to make their analysis. For which, they find that their work is consistent with that of Sours. These authors suggest municipalities have greater fiscal capacity, which is not exercised. Also, they find that municipalities, which have additional economic activity such as those with tourist destinations, are more likely to collect more local tax revenues. Cabrera

Castellanos and Cruz Mora (2009) thereby conclude that industrial activities of municipalities do have a bias for increasing the tax base.

In general, even as problems within the inter-governmental system continue, there are some positive signs that harder budget constraints are working to improve how debt issuances are being performed. Furthermore, local administrative capacity is improving with the additional debt issuance options and data suggests that a true conversion is happening among municipalities in Mexico. Yet, more research is needed to understand the correlations between the debt issuance and types and the types of funding that its replacing through the inter-governmental grants and transfer systems.

<b>Table 1 Types of Debt</b>	
<b>Development Bank Debt</b>	<b>Bonds on the Mexican Stock Market</b>
<p>Oldest form of credit (1933)</p> <p>Largest form (\$10 billion in 2010)</p> <p>Banobras</p> <p>Federal Reserves guarantee state financing</p> <p>Own criteria for determining loans</p> <p><i>Least cost efficient debt due to administrative costs</i></p>	<p>Created in 1997 (reforms to CETES, creation of CONSAR, CNBV and CNSF in 2000)</p> <p>Structural considerations encourage use (credit ratings, structured finance, AFORES)</p> <p><i>Most cost efficient form of debt</i></p>
<b>Trust Fund Debt</b>	<b>Commercial Bank Debt</b>
<p>Payments managed through separate “trust” accounts (<i>participaciones</i> / own-source revenues)</p> <p>Since 2000, subnational governments make own <i>fideicomiso</i> arrangements with creditors for debt collateralization, states assume any legal risks</p> <p>Legal “Trusts” reduce risk of manipulation</p> <p><i>More cost efficient than dev. and com. bank loans</i></p>	<p>Short term loans (&gt;180 days)</p> <p>Used to cover fiscal shortfalls (operating expenses)</p> <p>Bank capitalization requirements (two credit ratings) have made these loans more competitive</p> <p>But, interests still fairly high</p> <p><i>Less cost efficient than trusts or bonds, but probably more cost efficient than development bank debt</i></p>



<b>Table 2 Key Descriptive Statistics</b>					
<b>Variable</b>	<b># obser</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>MIN</b>	<b>MAX</b>
DV: Change of PIB per capita	83,816	1300.517	924.6057	44.8233	9067.073
Total Own Source Revenue (TOSR)	7,116	97.7466	300.6162	0	5208.515
VFImbalance	19,272	.8713987	.1282099	0	1
Assets per capita	19,270	3012.326	1991.51	1.508392	37446.27
Transfers per capita	7,116	673.1222	1426.44	0	17575.44
Salaries per capita	7,116	203.36	509.2354	0	9044.241
Infrastructure per capita	3,366	1529.821	2402.779	.2201916	25493
Convergente Variable	83,815	.0350449	291.7799	-8168.534	5151.362
Data collected from Mexico's National Institute of Geography and Statistics (INEGI) measured in thousand pesos					

**Table 3: Results of Economic Development on TOSR in Mexico**

	(1)	(2)	(3)	(4)	(5)
Infrastructure per capita	-0.0252	-0.00323	-0.00358	-0.00484	-0.00338
	(0.0236)	(0.0242)	(0.0244)	(0.0245)	(0.0245)
Transfers per capita	0.00892	-0.0230	-0.0228	-0.0183	-0.0215
	(0.0534)	(0.0543)	(0.0546)	(0.0548)	(0.0549)
Salaries per capita	0.550***	0.581***	0.586***	0.572***	0.577***
	(0.0993)	(0.101)	(0.101)	(0.101)	(0.102)
TOSR	0.638***	0.604***	0.592***	0.601***	0.606***
	(0.0616)	(0.0629)	(0.0633)	(0.0634)	(0.0635)
Convergence	-1.100***	-1.141***	-1.141***	-1.145***	-1.153***
	(0.0255)	(0.0260)	(0.0262)	(0.0263)	(0.0262)
Marginality Index		-64.78***	-70.23***	-70.72***	-68.90***
		(23.31)	(23.57)	(23.66)	(23.75)
Rural		-91.60	-106.6	-104.8	-101.7
		(65.07)	(65.87)	(66.14)	(66.43)
Post crisis		-3.265	6.930	1.795	-8.390
		(35.58)	(36.60)	(36.68)	(36.69)
Commercial Debt			36.21	-16.13**	
			(22.99)	(6.334)	
Banobras			57.89**	0.655	
			(24.44)	(2.841)	
Bond Market			-14.02	-37.40	
			(26.08)	(24.13)	
Trusts			-43191.8	-44170.9	
			(29994.8)	(30114.3)	
Other Debt			33.85	12.50	
			(32.83)	(31.69)	
Total Debt			-58.85**		-3.092
			(24.98)		(2.684)
Constant	681.0***	788.6***	805.3***	808.1***	818.3***
	(36.80)	(60.13)	(61.08)	(61.31)	(61.43)
N	1166	1165	1165	1165	1165
r2					
chi2	3027.7	3191.3	3272.3	3265.6	3255.2

Standard errors in parentheses = " \* p<0.10 \*\* p<0.05 \*\*\* p<0.01"

**Table 4: Results of Economic Development on TOSR in Mexico (VFImbalance)**

	(1)	(2)	(3)	(4)	(5)
Infrastructure per capita	0.0130	0.0169	0.0146	0.0127	0.0144
	(0.0133)	(0.0137)	(0.0138)	(0.0139)	(0.0138)
Salaries per capita	0.674***	0.654***	0.648***	0.642***	0.647***
	(0.0380)	(0.0383)	(0.0380)	(0.0381)	(0.0382)
TOSR per capita	-0.0956**	-0.0579	-0.0350	-0.0485	-0.0611
	(0.0450)	(0.0464)	(0.0459)	(0.0458)	(0.0460)
Assets per capita	-0.531	-1.391	-1.898	-1.882	-1.450
	(1.737)	(1.996)	(2.033)	(2.054)	(2.023)
VFImbalance	-1144.3***	-782.0**	-668.3**	-791.6**	-871.0***
	(269.6)	(313.5)	(321.9)	(322.0)	(318.1)
Convergence	-1.133***	-1.155***	-1.178***	-1.195***	-1.173***
	(0.0302)	(0.0305)	(0.0310)	(0.0311)	(0.0307)
Marginality		-99.98***	-115.6***	-115.2***	-105.5***
		(32.85)	(33.63)	(33.99)	(33.38)
Rural		83.65	54.33	70.72	68.91
		(98.35)	(101.1)	(102.2)	(100.4)
Post crisis		-26.84	-22.43	-31.76	-18.78
		(48.94)	(51.31)	(51.76)	(51.14)
Commercial Debt			67.58**	-22.73***	
			(27.22)	(7.192)	
Banobras			96.17***	-0.964	
			(28.59)	(3.688)	
Bond Market			16.42	-20.08	
			(31.36)	(29.60)	
Trusts			-38760.2	-39876.0	
			(75659.2)	(76531.4)	
Other Debt			34.66	-4.176	
			(40.11)	(38.93)	
Total Debt			-100.3***		-6.320*
			(29.28)		(3.414)
cons	1827.8***	1525.4***	1511.2***	1632.9***	1658.9***
	(240.1)	(269.6)	(279.3)	(279.5)	(275.7)
N	953	953	953	953	953
r2					
chi2	2325.0	2406.6	2628.2	2619.2	2504.0

Standard errors in parentheses ="\* p<0.10 \*\* p<0.05 \*\*\* p<0.01"

## References

- Auditoria Superior de la Federación. (2011). *Análisis de la Deuda Pública de las Entidades Federativas y Municipios, 2000-Marzo 2011* edited by Cámara de Diputados. Mexico City, Mexico.
- Barro, Robert and Xavier Sala-i-Martin. (1991). Convergence across state and regions. 108 Brookings Papers on Economic Activity, 1, 107-182.
- Blume, L., and Voigt, S. (2008). Federalism and Decentralization – A Critical Survey of Frequently Used Indicators. Philipps-Universität Marburg, Germany.
- Brennan, Geoffrey and James Buchanan (1977). “Towards a Tax Constitution for Leviathan”, *Journal of Public Economics*, 8, 255–274.
- Brueckner, Jan K. (2006). Fiscal federalism and economic growth. *Journal of Public Economics* 90:2107-2120.
- Cabrero, E., and Carrera, A. (2002). Fiscal Decentralisation and Institutional Constraints. Paradoxes of the Mexican Case. DAP-CIDE.
- Cerniglia, Floriana. (2003). Decentralization in the public sector: quantitative aspects in federal and unitary countries. *Journal of Policy Modeling* 25: 749-776.
- Consejo Nacional de Población (CONAPO). Accessed at <<http://www.conapo.org.mx>>.
- Davalos, Esquivel, Lopez-Calvo, Rodriguez-Castelan. (2013). “Convergence with Stagnation: Mexico’s Growth at the Municipal level 1990-2010.” Washington DC: World Bank Working Paper
- Davoodi, Hamid and Heng-Fu Zou (1998). Fiscal Decentralization and Economic Growth: A Cross-Country Study. *Journal of Urban Economics*, 43 (2) 244-257.
- de Mello, L. (2008). Public Finance, Government Spending and Economic Growth: The case of Local Governments. OECD Development Center.
- Diaz-Cayeros, A. (2006). *Federalism, Fiscal Authority, and Centralization in Latin America*. Cambridge, New York: Cambridge University Press.
- Eaton, Kent. (2004). *Politics Beyond the Capital: The Design of Subnational Institutions in South America*. Stanford: Stanford University Press.
- Ebel, Robert D. and Serdar Yilmaz. (2002). On Measurement and Impact of Fiscal Decentralization. World Bank Policy Research Working Paper 2809.
- Fukasaku, K. and M. de Mello Jr. (1999). Fiscal Decentralization in Emerging Economies. Paris, France: OECD: Governance Issues.
- Espinosa, S and C Martell. (2015). Building Bond Repayment Capacity in Developing Countries: A Study on Property Tax Collections and Debt Affordability in Mexico. *International Journal of Public Administration* 38 (3), 227-236.
- Falleti, T. (2005). Decentralization and democracy in Latin America (A review). *The Americas, The Academy of American Franciscan History*, 62(1), 144-145.
- Freire, Mila Emilia. (2014). "Managing External Resources." In *Municipal Finances: A Handbook for Local Governments*, edited by Catherine Farvacque-Vitkovic and Mihaly Kopanyi. Washington, DC: The World Bank.
- Filippetti, A. and Sacchi, A., (2016). Decentralization and economic growth reconsidered: The role of regional authority. *Environment and Planning C: Government and Policy*, 34(8), pp.1793-1824.
- Gemmell, N., Kneller, R. and Sanz, I., (2013). Fiscal decentralization and economic growth: spending versus revenue decentralization. *Economic Inquiry*, 51(4), pp.1915-1931.

- Giugale, Marcelo, Fausto Hernández Trillo, and Joao de Carmo Oliveira. (2000). "Subnational Borrowing and Debt Management." In *Fiscal Decentralization in Mexico: Achievements and Challenges*, edited by Steven Webb and Marcelo Giugale. Washington, DC: The World Bank.
- Glaeser, E., Scheinkman, J., and Shleifer, A. (1995). Economic Growth in Cross Section of Cities. National Bureau of Economic Research
- Hernández-Trillo, Fausto. (2016). Poverty Alleviation in Federal Systems: The Case of México. *World Development* (87), 204-214.
- Manor, J. (1999). *The Political Economy of Democratic Decentralization (Directions in Development)* Washington, D.C.: World Bank Publications.
- Martinez-Vazquez, J. and McNab, R.M., (2003). Fiscal decentralization and economic growth. *World Development*, 31(9), pp. 1597-1616.
- Merino Huerta, M. (2008). Federalismo vs. Municipalismo: Una hipótesis alternativa al programa de investigación sobre la materia. Programa de Naciones Unidas para el Desarrollo (PNUD).
- Montero, A., and Samuels, D. (Eds.). (2004). *Decentralization and Democracy in Latin America*. Notre Dame, IN: Notre Dame Press.
- Musacchio, Aldo. (2012). *Mexico's Financial Crisis of 1994-1995*. Harvard University Business School. Working Paper No. 12-101.
- Musgrave, R. (1959). *Public Finance in Theory and Practice*. New York, NY: McGraw-Hill.
- Oates, W. (1999). An essay on fiscal federalism. *Journal of Economic Literature* 37(3), 1120-1149.
- OECD. (2007). Web site on fiscal federalism. Retrieved December 1, 2007
- Prud'homme, R. (1995). *The Dangers of Decentralization*. World Bank Publication.
- Raich, U. (2002). Impacts of Expenditure Decentralization on Mexican Local Governments. Budget and Public Expenditure Program at the Centre of Research and Teaching of Economics (CIDE).
- Revilla, Ernesto. (2013). "Debt Management in Mexico: A Tale of Two Crises" in *Until Debt Do Us Part: Subnational Debt, Insolvency, and Markets* edited by Otaviano Canuto and Lili Liu. Washington, DC: World Bank.
- Rodden, J. (2004). Comparative Federalism and Decentralization: On meaning and Measurement. *Comparative Politics*, 36(4), 481-500.
- Rodriguez-Pose, A. and A. Krøijer, (2009). Fiscal Decentralization and Economic Growth in Central and Eastern Europe. *Growth and Change* 40(3)387-417.
- Rodrik, D. (1998). Why do more Open Economies Have Bigger Governments? *Journal of Political Economy*, 106(5), 997-1032.
- Rondinelli, D., and Shabbir Cheema, G. (1981). Government decentralization in a comparative perspective: Theory and practice in developing countries. *International Review of Administrative Sciences*, 47, 133-145.
- Rosen, H. (2002). *Public Finance* Sixth Edition. McGraw-Hill Irwin.
- Schneider, A. (2003). *Who Gets What from Whom? The Impact of Decentralization on Tax capacity and Pro-Poor Policy*. Paris, France: Institute of Development Studies.
- Secretaría de Hacienda y Crédito Público. (2005). *Equilibrio y responsabilidad en las finanzas públicas*. Mexico City, DF: Editorial Fondo de Cultura Económica.

- Smith, H. and K. Revell. (2016). Micro-incentives and municipal behavior: Political decentralization and Fiscal federalism in Argentina and Mexico. *World Development*, 77 (1), 231–248.
- Smoke, P. (2005). *Fiscal Decentralization and Good Governance*. United Nations Department for Economic and Social Affairs Publication.
- Sour, L. (2004). El sistema de transferencias federales en México ¿Premio o castigo para el esfuerzo fiscal de los gobiernos locales urbanos? *Gestión y Políticas Públicas*, XIII(3).
- Sour, L. (2008). Un Prepaso de los Conceptos sobre Capacidad y Esfuerzo fiscal, y su Aplicación en los Gobiernos Locales Mexicanos. *Estudios Demográficos y Urbanos*, 23(002).
- Stein, E. (1999). Fiscal Decentralization and Government Size in Latin America. *Journal of Applied Economics* 2(2), 357-391.
- Taliercio, J., Robert (2004). Administrative Reform as Credible Commitment: The Impact of Autonomy on Revenue Authority Performance in Latin America. *World Development Journal*, 32(2), 213–232.
- Tamayo-Flores, R., and Hernández-Trillo, F. (2006). *Financiamiento de la Infraestructura Local en México: Temas Actuales y Perspectivas*. CIDE y Tecnológico de Monterrey.
- Tiebout, C. (1956). A pure theory of local expenditures. *Journal of Political Economy*, 64(5), 416-424.
- Zhang, T. and Zou, H.F., (1998). Fiscal decentralization, public spending, and economic growth in China. *Journal of public economics*, 67(2), pp.221-240.