Fiscal Sustainability of Mexican Debt Decisions: Is Bad Behavior Rewarded?

By

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Abstract

The Mexican government's municipal debt levels have increased 93.6% in the past 10 years (CEFP, 2018). Many policy makers are questioning if this is sustainable in the long term and look for evidence from more developed economies. International financial institutions have suggested creating fiscal rules to compensate for overzealous politician at the local level—centralizing the control by national treasury authorities. Yet, recently Blanchard (2019), evaluating high debt rates of counties like Japan (290%) the United States (over 100%) and various countries in Europe, has proposed new insightful research that suggests more debt is good for a country's growth. On the other hand, Reinhart, Reinhart and Rogoff, (2019) argue that periods in which government debt rises above 90% of GDP are associated with slowdowns and low economic growth.[3] In particular, when there are less evolved institutions in developing countries, the question becomes when should a country become indebted and what types of debt instruments should be used in its fiscal policy (Ter-Minassian 1990). This research specifically evaluates debt policy decisions on how to create structures to manage fiscal sustainability for developing economies, namely in Mexico. The question analyzed is whether centralizing the control of subnational debt issuances helps promote sustainable finances. Municipal data from the federal government in Mexico for the period of 2000 to 2017 suggest a large fiscal gap that will proceed without the country seeking more autonomy in its financial decision making at the local level.

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[3] https://www.economist.com/free-exchange/2013/04/17/revisiting-reinhart-rogoff

I. Introduction

Blanchard's (2019) research presented at the American Economic Association (AEA)[4] argues that governments can take out more debt, primarily because of social costs of this debt can be extrapolated over a longer time horizon. But he does not evaluate what type of debt and if it should be federal or subnational or what kinds of debt promotes good types of growth. We argue that subnational debt needs to be treated and analyzed in this equation, and that the types of governmental guarantees with fiscal rules can actually worse debt loads and create bad incentives for governments to take out too many loans.

Many policy makers are questioning if this is sustainable in the long term and look for evidence from more developed economies. Yet, recently Reinhart, Reinhart and Rogoff (2019) argue that periods in which government debt rises above 90% of GDP are associated with sluggish economic growth.[5] Blanchard (2019) evaluating high debt rates of counties like Japan (290%) the United States (over 100%) and various countries Europe, has proposed new insightful research that suggests more debt is good for a country's growth.

Blanchard suggests that when the pace of economic growth exceeds the rate of interest on a country's debt, managing indebtedness becomes substantially easier. In such cases, debt incurred in the past shrinks steadily as a share of GDP without any new taxes needing to be levied. Debt and raising interest rates could inflate the total amount of costs raising questions of intergenerational payment for the debt burden today. "Even so America's prevailing interest and growth rates and with deficits continuing to run at 5% of GDP, it would take more than a century for America's ratio of gross debt to GDP to reach the current Japanese level…. Since 1870, the average nominal interest rate on one-year US government debt has been 4.6%, though the average annual growth rate of nominal GDP has been 5.3%. Growth rates have surpassed interest rates in every decade since 1950, except for the 1980s." (Blanchard 2019 p.1).

At present, the levels of subnational debt worry the Mexican government, as the municipal debt levels have increased in 93.6% in the past 10 years (CEFP, 2018). In spite of Mexico´s long history as a consolidated federal republic, subsovereign debt issuances, or the exercise of the state and municipal taking out loans, has only existed for the past 20 years. To counteract the disarray of subnational finances and the growing over-indebtedness that has prevailed in almost all states of the country, the federal government issued the Law for Financial Discipline of the Federal and Municipal Entities (Ley de Disciplina Financiera de las Entidades Federativas y Municipios, LDFEFM,) to maintain the health of the public finances at a federal level, which was enacted on April 27th, 2016 and demanded states to harmonize local laws so they would be congruent with this new law no later than October 25th, 2016[6]. The purpose of this new law is to strengthen fiscal norms and incentivize their compliance, establishing feasible and applicable sanctions, and homogenizing the state laws, to contrast the federal law.

Critics claim that this governmental response not only centralizes the control of debt issuance; it also adds to the perpetual bureaucratic red tape by creating new instructions for

[4] https://www.aeaweb.org/webcasts/2019/aea-presidential-address-public-debt-and-low-interest-rates

[5] https://www.economist.com/free-exchange/2013/04/17/revisiting-reinhart-rogoff

[6] Ley de Disciplina Financiera de las Entidades Federativas y Municipios

centralized authorities to monitor subnational debt policy decisions. This law creates an emergence to study behavioral public administration since principally the 2016 fiscal disciple law is a secondary law to the balanced budget requirements and debt limits already on the books in most state governments. The law establishes common sense guidelines on how to access the market but simultaneously also creates heavy administrative burden and government regulation on subnational governments (Pandey et al 2017; Bozeman 2000; Grimmelikhuijsen et al. 2017).

The explosion of subnational debt in Mexico has increased because of two fundamental reasons. First, additional options are now available for local public authorities to access the markets place (through commercial loans, a national bond bank, a trust fund model and also issuance on the local stock exchange) beginning in 2001 along with the opening of democracy and a change of political power at the national level. Secondly, past administrations have used the bond market to fuel inactive local economies since the global economic crisis in 2008 and plummeted global crude oil prices in 2015, which is a fundamental share of the federal budget.

Ironically, research has shown that municipalities are not accessing effectively the bond market and debt policy decisions are being made irrationally, regardless of political parties (Simon 1947; Benton and Smith 2017; Smith and Benton 2017). The proposed law is supposed to correct for this irrationality by nudging subnational actors to select low interest rate loans with better terms and sources (Thaler and Sunstein 2008).

Yet, the largest problem for implementation of the National Law (LDFEFM) is the issuance of the fiscal rules from the center when weak institutional arrangement exists. Amplified further at the time of budget execution where little or no transparency is provided. Confounding to these compliance factors, Mexico is a country where the central government has historically allowed soft bailouts (Hernandez-Trillo et al 2002) causing problems of moral hazard on the market. Finally, it is speculated that these centralized controls will not help create and strengthen checks and balances at the local ballot box through referendums where people decide their debt issuance, instead political patronage and clientalism will guide who can access the market when "re-negations" take place.

This research first uses municipal data from Mexico for the period of 2000 to 2017 to establish the "*primary gap*" proposed by Blanchard (1990) model of fiscal sustainability. The results from these data will then be tested using a regression model to understand how local governments are paying for their federal government loans and how those that affects fiscal sustainability. In the analysis, we find that debt is mainly guaranteed by federal transfer's (participaciones) over own-source revenues, which makes them dependent on the federal government overall fiscal accounts. Finally, the research seeks to better understand how these results relate to the new regulatory frame of the LDFEFM.

II. Literature Review

1. Financial sustainability

The term "financial sustainability" is regularly applied to businesses. It is evaluated by using financial reasons that reflect how profitable the operation of a company is being, how severe is their indebtedness status, and in its future, how likely it is that the company

continues to grow and generate wealth if their financial behavior continues to be similar. Concretely, these indicators are used by company leaders to make decisions on investments for corporate bonds, but more recently have also been used to invest in governmental bonds. In the past 30 years, the sustained growth of the public debt, especially in Latin American countries has called the attention of international financial organizations. Therefore, research beginning in the decade of the 90s by the Organization of Economically Developed Countries (OECD), the World Bank and the International Monetary Fund[7] coined the term "fiscal sustainability" which has expanded to governments to measure payment capacity of the debt emission that the GDP growth over time permits to a geographical or political area. While a government and a company have very different general objectives, for both institutions it is important to make adequate financial decisions to generate growth.

In the case of governments, in the short term, the debt levels do not seem to be worrisome, but in the long term, the accrual, its inflation and payment terms, may have impacts in the public finances. At the same time, accrual debt can affect the growth of the region and the well-being of the inhabitants. Finally, the local finances may or may not have an impact in the public finances at the national or macroeconomic level. The academic studies on the sustainability indexes of the public debt in its majority integrate factors such as the owe source generation of income, investment levels, economic growth (measured through the GDP), debt interest rates, and payment terms. However, in the case of Mexico, it is also important to add factors such as political cycles, the level of decentralization of local finances and cases such as financial bailouts carried out by the federal government.

There are three types of models to measure financial sustainability of governments. The first type (Horne, 1991; Blanchard, 1990; Paunovic, 2005) were proposed into models, had a long-term focus, their objective was to measure how capable the state would be to face their financial obligations with the projected future economic growth. The second type of models emerged because the long-term models do not consider the intertemporality of variables of weight (Talvi and Végh, 2000) specifically the expense of the government and interest rates that are very important due to the impact that the political and economic cycles have in the expenditure exercise. The third type are stochastic models (Mendoza and Oviedo, 2004) that propose incorporating variables that are hard to predict (external shock, currency volatility, growth volatility), especially for the study of countries in development, whose macroeconomic conditions tend to be more unstable than in developed countries.

Some studies have calculated fiscal sustainability of Mexican debt by using the three different types of models. Mendoza and Oviedo (2004) analyze the fiscal sustainability of four countries of Latin America: Brazil, Mexico, Colombia and Costa Rica. First, they calculate the natural debt lines for each of the countries, after the volatility of their income to incorporate it as a stochastic variable and lastly the ratios of debt/GDP for the determined period. They find that all countries are close to the natural debt line and that, in the historic analysis of sensibility regarding external crashes that affect the currency exchange, generate situations of financial instability happen, especially in the case of Mexico.

Additional research by Paunovic (2005) for the Economic Commission for Latin America and the Caribbean (ECLAC) estimates the financial sustainability of nine countries in Latin America (among them, Mexico), to prove if the indebtedness pattern is sustainable and the probability that these countries to surge into a debt crisis in the upcoming years. Paunovic uses indicators as the "*primary gap*" proposed by Blanchard (1990), the macro-

[7] Horne (1991), Blanchard (1990), Zee (1988), Brixi & Schick (20022)

adjusted primary deficit proposed by Talvi and Végh (2000) which considers interest rate, growth rate and the deficit level that will exist in the future if the macroeconomic conditions were the regular ones (as defined by the author) and finally, the recursive algorithm derived from the law of movement of the debt/GDP reason, proposed by Croce and Juan-Ramón (2003) which is a relation between the balance that must prevail for the desired relation of debt/GDP and the current balance. The results show that the Mexican debt on a national level is not sustainable according to these three indicators, even with a basic sensibility analysis. Yet, the debt level data used by Paunovic (2005) does not consider the subnational debt independently.

2. Fiscal Decentralization

First proposed in the 1980s by the international financial institutions, fiscal decentralization was proposed as a panacea to promote greater transparency and participation and improve the delivery of public goods and public policy at the local level (Davoodi and Zou 1998). Yet empirical and theoretical studies have found that the casual mechanism between economic growth and decentralization is much more complex and dependent on many additional factors (Bruechkner 2006, Filippetti and Sacchi 2015, Hernández-Trillo 2016; Smith and Revell 2016). Namely, political parties, elections and institutional relations such as intergovernmental transfers and administrative quality and devolution of authority to name a few. Some problems may arise because of measurement error in the large empirical quantitative studies. For example, Ebel and Yilmaz (2002) explain the mixture of outcomes by the variation that exists in terms of measures of autonomy, fiscal decentralization and own-source revenue generation. Additional large scale studies have suggested that the differences can be conceptual, for example how autonomy is defined, to more tangible, such as how budgets are calculated and organized (Martinez-Vazquez and McNab 2003; Zhang and Zou 1998). Namely, these measurement errors revert to the consequences of fiscal federalism.

Scholars know now that fiscal decentralization affects subnational governments in several ways (Rodden 2002). On the positive side, issues of fiscal federalism provide fiscal incentives to lower level government. By closing the link between local government revenue and expenditure provides strong incentives for local governments to drive local economic development. But on the negative side, this may induce vertical and horizontal imbalances. In the case of vertical imbalances, the central government may allocate too much or too little transfers to the lower levels, thereby increasing central government control over lower levels of government, reshaping the central and local relationships. Horizontal imbalance is another possible outcome created when transfers are not created appropriately. Especially when cooperation among local governments is rare, decentralization reforms can give rise to fierce competition among local governments. Therefore, how to manage countries fiscal relations between states and federal governments is not so simple and therefore this can often create conflicting policy guidance from international financial organizations or associated research.

3. Fiscal rules

Fiscal rules are essentially regulations established by a national government to apply pressure on local budgets. Sometimes these are created by voters, other times by state legislatures for balanced budget indicators, and other times its created by veto powers by governors or presidents. The United States has a unique history of creating budgeting and fiscal rules beginning with the Tax and Expenditure Legislation (TELS) and expanding to

the rights of state governments to have autonomous control of borrowing, debt, and finances (Chapter 9 bankruptcy) managing to have virtually no federal bailouts (Laubach 2005; Kincaid 2012). The defragmented institutional arrangement of the national government in the United states allows states independently to create rules for that tie them to their different revenue sources. Essentially, all American states have some sort of balanced budget rules, whether they are statutory and constitutional; related to tax and expenditure limits; or some sort of local bankruptcy/fiscal distress provisions. Subnational variations reflect individual policy decisions and fiscal behavior in the absence of federal bailouts. This is what Rodden (2002) suggests imposes fiscal discipline to the subnational credit markets.

Ter-Minassian (1997) was the first to describe how to extract the US model of fiscal rules and apply them to additional countries. While leading a team at the International Monetary fund, she suggested that the fiscal rules are not automatic for creating subnational fiscal discipline, rather, they also rely on democratic systems with sound policy designs, a robust legal system, which includes enforcement mechanisms. These required elements are often difficult for countries to meet, especially as they are evolving their democratic institution building and any flaws could provide profligate subnational spending. Thus, the most important element of fiscal rules is to constrain politicians, opposition party heads and public managers from over-consuming the common pool, as in this case of debt above Blanchard's line of sustainability. Profligate subnational spending can be done through off budget expenditures, investments not tied to assets, or capital enhancements based on expired future revenue streams from the national government. All of these items therefore must be considered when evaluating fiscal sustainability.

Therefore, this research evaluates the fiscal sustainability of the subnational debt in Mexico by evaluating what type of debt guarantees the federal government provides for local decisions makers to access local capital markets. It is hypothesized that the Blanchard (2019) does not consider the type of debt (such as municipal bonds) nor the type of guarantees the governments under take. By using these variables, the sustainability of the debt issuances will also change not only the amount of debt for productive means but also under what conditions to help or hinder growth.

III. Why the Case of Mexico

The Mexican Federal Republic set its first Constitution in 1824. Since then, the states that integrate the Mexican territory are sovereign in different items of execution. In practice, it has taken the country 200 years to consolidate power and centralized control due to the one party hegemonic power of the Institutional Revolutionary Party (PRI) holding over the presidency for over 80 years.

Academics such as Smith (2014) and Selee (2011) explain that in 1989 the democratic transition began with the triumph of the National Action Party (PAN) wining gubernatorial race in Baja California. With the opening of democracy came reforms for fiscal decentralization, which paradoxically among them, provoked a higher dependency of the states to the federal government. The decentralization of expenditures in 1993 led to the creation of the budget item 28 as a mandatory transfer to States, and the line item 33 as a conditional transfer to states from the federal government and began with the introduction of the VAT for federal collection (Rodríguez, 1997). Finally, and most importantly, the reforms of article 115 granted municipalities the responsibility of loaning public services with own resources and the capacity of generating debt.

The Fiscal Coordination Law (Ley de Coordinación Fiscal, LCF) establishes a regulatory framework for the distribution of federal resources, as well as a formal cooperation dynamic among the subnational governments and the federal government was issued in 1978. This law describes how federal resources need to be distributed among the federative entities. Basically, they are issued through two budget items: the federal participations and the *apportaciones*, or specific contributions to states. The second article in the law establishes that 20% of the collection at a federal level and 89% of the oil income are destined to be distributed among the 32 federal entities (33 now with the City of Mexico a newly created state), as long as they belong to the National Cooperation System. The previous implies that the entities commit to work with the federal bureaucracy to ensure a coordinated approach for public policies to aim for economic growth. The LCF was reformulated in 2007, with the objective of promoting the generation of wealth of the entities by incorporating to the formula aspects such as economic growth, measured through GDP, and the variation in the local tax collection.

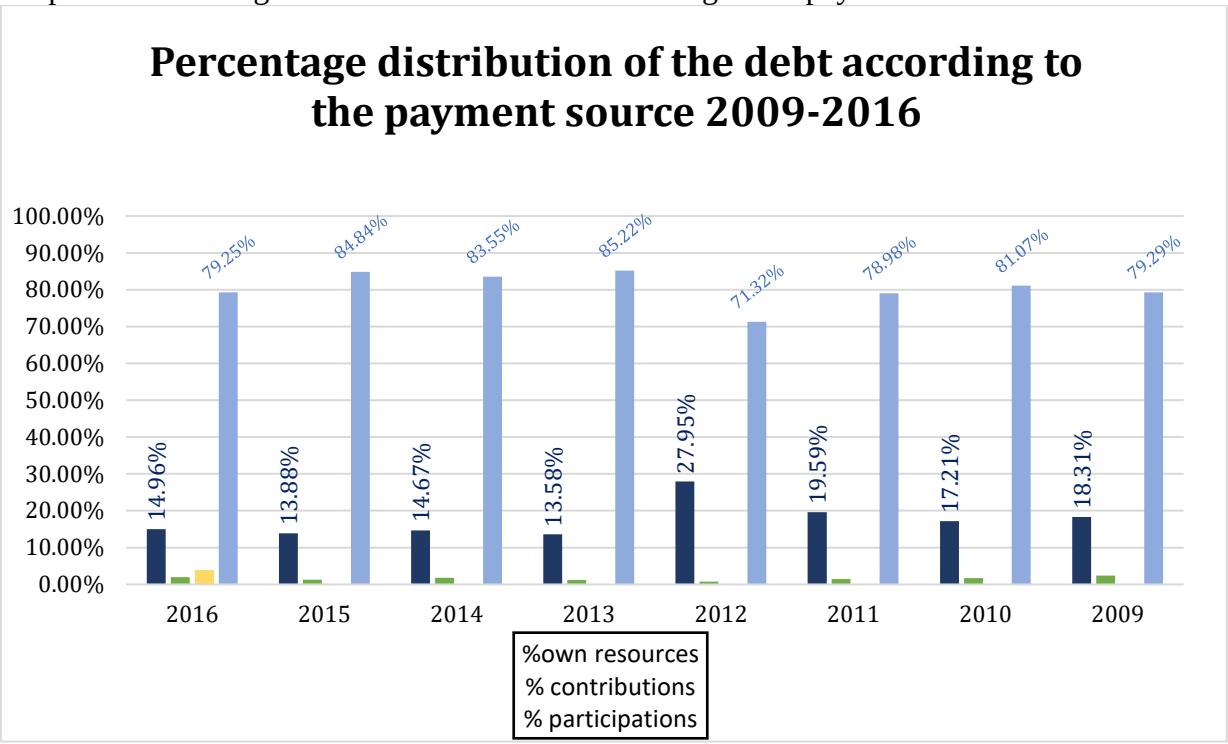
Additionally, subnational governments in Mexico have diverse mechanisms to access the Mexican financial system. Traditionally they may access banking credits in private institutions like commercial banks, take out loans by the government development banks (BANOBRAS), use trust funds like a special propose vehicles (SPVs) for guaranteeing loans from the state governments or go to the credit market where bonds are traded locally. Commercial banks offer retail loans to state and local governments for short term expenditures and are usually paid within the year. Long term loans are often between seven and ten years and must be used for economic development. The state based option, the National Bank of Public Works and Services (Banco Nacional de Obras y Servicios Públicos, BANOBRAS), is a governmental development bank whose sole objective is to provide loans to subnational governments or state-owned companies to finance, mostly, their infrastructure projects, and there are also another eight institutions that are classified as Development Banks in Mexico.[8] Subnational governments can request loans to finance projects that are not for infrastructure, however, this loans must be oriented towards subnational governments who present themselves in vulnerable situations.

Since fiscal reforms of 1997 and 2000, the federal government allows the subnational governments to place securities for the debt in the stock market, also that subnational governments generate trust funds backed by federal participations to access financing. Therefore, subnational (state and municipal) governments operate in the Mexican financial markets as if they were a private company, as they can request banking credits, access sophisticated financial instruments (trust funds, and investment funds) and issue stocks. The difference is that the financial evaluations that intermediary companies would do in regards to the health of the credit requester finances, is not done to the governments requesting for the financing, but to the capacity of the federal government to face the risk of non-payment from subnational governments. It is worth mentioning that between 65% and 87% of the

[8] Agricultural Development National Financer (Financiera Nacional de Desarrollo Agropecuario, FND), National Savings and Financial Services Bank (Banco de Ahorro Nacional y Servicios Financieros, BANSEFI),Foreign Trade National Bank (Banco Nacional de Comercio Exterior, BANCOMEXT), National Bank of the Army, Air Forces and Armed Forces (Banco Nacional del Ejército, Fuerza Aérea y Armada, BANJERCITO), National Financer (Nacional Financiera, NAFIN), Federal Mortgage Society (Sociedad Hipotecaria Federal, SHF), Capitalization and Investment in the Rural Sector Fund (Fondo de Capitalización e Inversión del Sector Rural, FOCIR) and Trusts Instituted in Relation to Agriculture (Fideicomisos Instituidos en Relación a la Agricultura, FIRA)

subnational debt is backed up by federal resources through the participations system. (See Graphic 1)

Graphic 1: Percentage distribution of the debt according to the payment source

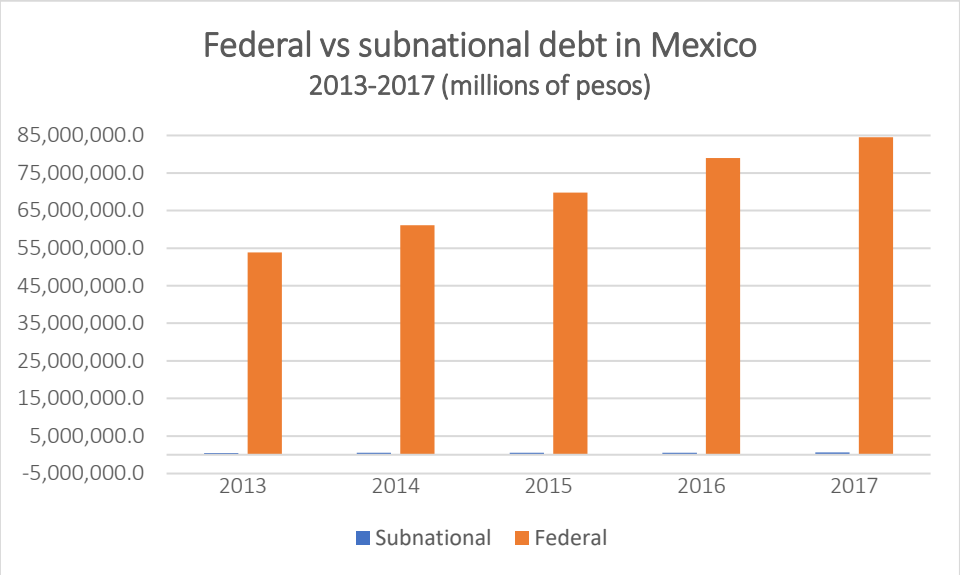


Source: Own elaboration with data from SHCP

Graphic 1 shows data of the subnational debt from 2009 to 2016. The light blue bar indicates, from the total debt, what is the percentage that will be paid with participations, the green one represents contributions, the navy blue represents what will be paid with own source revenues. The data shows that the indebtedness pattern has remained in the same path during the latter years. Most of the obligations are secured with federal resources. Considering that the contributions are a way of federal transfer to subnational governments and so, the percentage that is sustained with self-generating income is minimum. From the presented data one can conclude that the sustained increase of the public debt is based on federal resources. It is not an indication that the subnational governments are increasing their resource generation pace, but they are increasing, both the amount of assigned participations as well as the total debt issued.

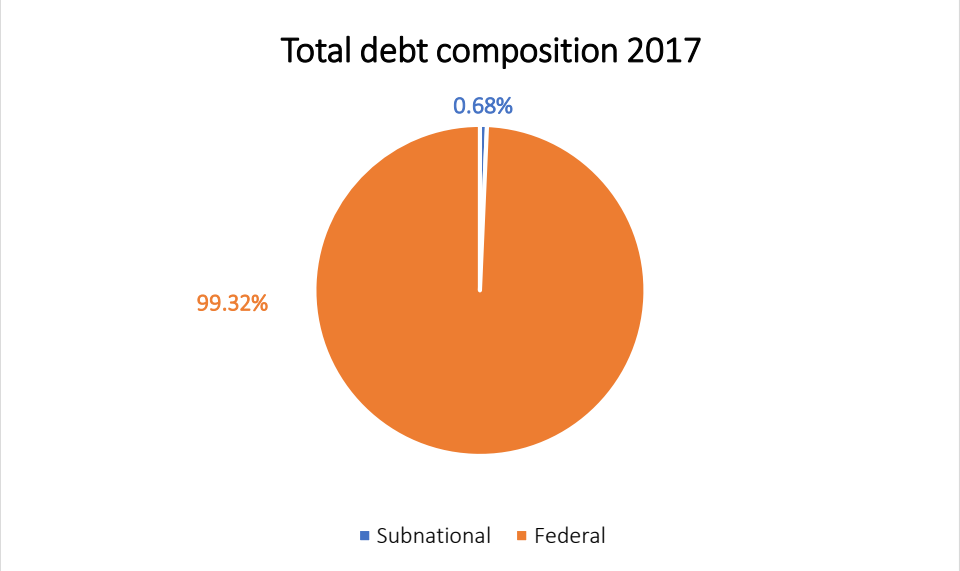
While the Mexican debt system is a hybrid of market-based and government-financed and government-backed loans, the amount of subnational debt for municipal finances is minimum compared to other types of federalized debt, which can be seen in Graphic 2 and Graphic 3. In 2017, less than 1 percent (0.68%) of the federal debt is located in subnational governments. The rest is based of governmental, state own enterprises and corporate debt.

Graphic 2: Federal vs. Subnational Debt in Mexico



Own elaboration with SHCP data

Graphic 3: Total debt Composition 2017



Own elaboration with SHCP data

Therefore, considering the extant literature and the history of debt in Mexico, the question for this research becomes even more reverent. Does fiscal decentralization and the creation of fiscal autonomy create the market principles needed to promote fiscal sustainability? Do the fiscal rules enforce sustainable financial practices or create bad behavior of the debt itself? Next we present Blanchard's primary fiscal gap of subnational debt in Mexico, then we test the autonomy of municipalities to pay for their own debt. A discussion and conclusions follow this debate.

IV. Model and Data

Due to the unpredictable situation of the subnational debt and the sustained growth maintained in the latter years, this work aims to: 1) Measure the financial sustainability of municipalities of the Mexican Republic, to be able to find patterns that have caused this behavior to be sustainable or not 2) Identify how the financial sustainability is increased or reduced in relation to fiscal autonomy levels

For the Mexican case, an economy in development, with high volatility in exchange type and the marked existence of political cycles in the expenditure exercise, the most adequate model to calculate fiscal sustainability would be the stochastic type. However, as the study is at a municipal level, the availability of data is reduced in that level of disaggregation, therefore, a simpler model will be chosen, in the long term, following the methodology of the *"primary gap"* proposed by Blanchard (1990). The most basic variation of this model is the following:

$$Debt_{t+1} = Debt_t(1 + r) - (I_t - G_t)$$

Where $Debt_{t+1}$ is the amount of acquired debt for the end of the period, $Debt_t$ is the accrued debt until the studied period, r is the real interest rate and $(I_t - G_t)$ is the budget balance (Income-Expenditure) of the state. From this equation the basic relation emerges for the measurement of financial sustainability:

$$\frac{Debt}{GDP} = \frac{(I_t - G_t)}{r - g}$$

Where g is the expected average economic growth in the long term. What measures this identity is the desirable level of the Debt/GDP, with regards to the conditions of income, expenditure, interest rates and economic growth. In Mexico there is no central data point which includes all of the interest rates at the local level, therefore it is not feasible to use the previous equation. The following equation is proposed to estimate the desired level of the Debt/GDP relation for Mexican municipalities. After comparing the existing ratio and the desirable ratio to approximate whether the indebtedness patter is sustainable or not:

$$\left\{[Debt_{P/c_t}/GDP_{p/c_t}]\right\} = (Transfer_t + Tax_t - Expenses_t)/\pi_t \qquad (1)$$

Where $Debt_{P/c_{t+1}}$ and $GDP_{p/c_{t+1}}$ are real values per capita for the studied period $Transfer_t$ is the amount of federal transfers that the municipality receives, since, in Mexico the percentage of income that the federal transfers represent (through the participations and contributions system) is too high, and Tax_t is the tax collection, rights and fees, finally π_t is used as an interest rate value alternative, considering that these two variables are related. If the debt is sustainable, this equality must be complied. To know how sustainable is the indebtedness behavior of each municipality, the gap between both values is calculated. The value on the right is the desired one and the value on the left is the real debt/GDP value, therefore we rewrite the equation (1) as follows:

$$\left\{\left[Debt_{P/c_t}/GDP_{p/c_t}\right]\right\} - (Transfer_t + Tax_t - Expenses_t)/\pi_t = Bb \qquad (2)$$

Where the Blachard gap is, as it grows closer to zero, the closer the municipality is to being financially sustainable. Negative values indicate that the municipality is acquiring too much debt contrasting with the growth they are generating, which implies: 1) that the national government is not adequately channeling the debt resources and 2) that in the long term the local government will have difficulties to comply with their financial obligations, as they surpass their own source tax generation capacity. On the other hand, positive values indicate that the municipal level of indebtedness is under their maximum capacity, for which the growth is being sub-optimum given their economic capacities.

The obtained results show that the Mexican municipalities have a very low level of sophistication and financial transparency. The database is incomplete, and this may be due to the municipalities not reporting their information correctly, or do not even have the information available. The fiscal gap analysis shows that the indebtedness is not being accompanied by a sustained economic growth that is partly due to the acquired debt is of a poor quality and partly because the financial autonomy of municipalities is non-existent. These two causes appeal at the same time to a root problem that is the lack of financial culture in the municipal dependencies, that has generated that the State and Federal governments look for control mechanisms to avoid over indebtedness. Given this result, the following hypothesis are stated:

Ho: The fiscal rules (LDFEM) strengthens the centralization of fiscal policy
Ho1: The centralization of fiscal policy reduces fiscal sustainability

Using the estimated values of the primary gap, the following models are stated to evaluate the impact of fiscal decentralization in the sustainable value of the debt acquisition:

$$Bb_s = \beta_0 + \beta_1 TOSRpc + \beta_2 Partpc + \beta_3 Aportpc + \gamma_n(Control\ Variables) + \varepsilon$$

Where, Bb_s is the gap between the sustainable debt and the municipality debt level "s", γ_n are the control variables, β_1 is the weight of the effect at the decentralization level (measured as a percentage of the income level that comes from resource auto-generation sources as the collection of local taxes and collection of rights and fees) and ε is the estimation error. Specifically,

- *TOSRPC* refers to the percentage of the total income of the municipality each year that corresponds to the municipal taxes collection (equity tax including property taxes), general trade tax and the lending of services, housing tax, tax on staff work payroll), collection of payment of rights (civil procedures, permits to use land, property paperwork), donations and uses (which are any other type of income not considered previously). Because of the heavily dependency of the federal transfers, we expect there to be a significant positive correlation between the own source revenues and municipal sustainability.
- *Partpc* refers to percentage of transfers to the municipality from the federal and state government received every year by law. Budget item 28 of the National Federal Budget stipulates that states will receive each year a specific amount calculated through a formula (that considers, among other thing, local collection of taxes, number of

inhabitants and levels of poorness) and that a percentage of that amount will be given to the municipalities using a similar formula. Because of the heavily dependency of using trust funds for ensuring debt, we expect there to be a significant negative correlation between the participation transfers and municipal sustainability

- *Aportpc* refers to the percentage of municipal transfers corresponding to exceptional contributions made by the federal government with a specific purpose (infrastructure, social programs, health care, education). Contributions are not mandatory, the procedure to request them is stipulated in budget item 33 of the National Federal Budget. Because of the heavily dependency of federal transfers to low income states, we expect there to be a significant negative correlation between the aportaciones transfers and municipal sustainability

The data used for the econometric model are municipal data at a national level for the period of 2000 to 2017. To calculate the Blanchard gap yearly data of income and expenditure is used, obtained by the State and Municipal Database System (Sistema Estatal y Municipal de Bases de Datos, SIMBAD) from the National Statistics and Geography Institute (Instituto Nacional de Estadística y Geografía, INEGI). Control variables considered include the municipal GDP (*Inperc*) presented by the World Bank in periods of 5 years (2000, 2005, 2010 y 2015) and finally, the data of accrued yearly *inflation* is used, for which the yearly inflation is the same in all municipalities. Inflation rates are calculated by the Mexican Central Bank (Banxico) and are standardized for the country and only changes overtime. As follows, the obtained results are presented as the measurements of financial sustainability from the Blanchard gap (Bb). It is important to highlight that, due to the precariousness of the data, in each year, there is an average of only 150 municipalities that have the information available to calculate this gap. Table 1 presents the descriptive statistics of the variables.

Table 1: Descriptive Statistics

Variables	*Observations*	*Mean*	*Std. Dev*	*Min*	*Max*
TOSRpc	29,010	769.9572	9053.026	0.014697	761981.1
Partpc	36,193	2905.156	19426.5	0.0137792	1233848
Aportpc	35,287	2840.201	14624.24	0.0003997	1313838
Inperc	42,696	1116.146	693.0553	116.5064	9067.073
Inflation	44,244	0.0453167	0.0154632	0.0213	0.0896
BB	5,905	-26562.65	427833.7	-3.05E+07	0.9984264

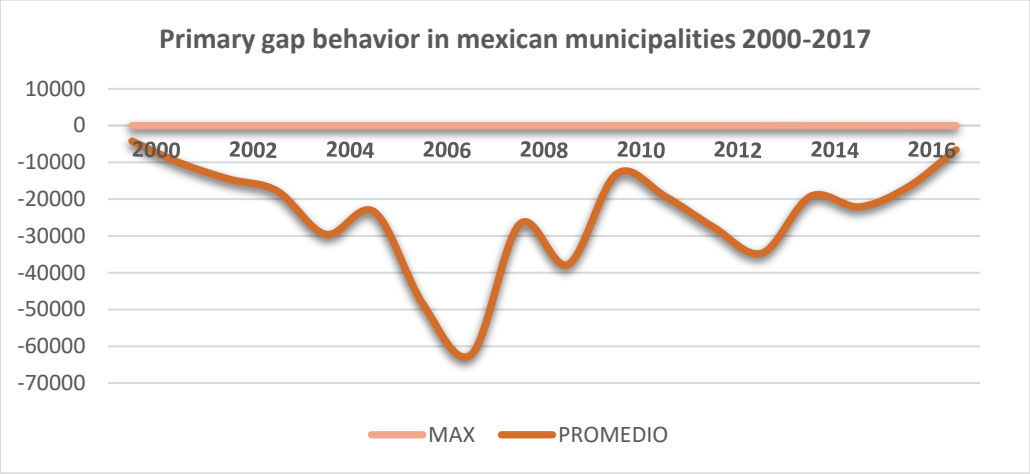
Data sources: SIMBAD, World Bank (inperc), Banxico (Inflation)

V. Results and Discussion

The first analysis is the Blanchard gap indicator. Out of 2458 Mexican municipalities, information to calculate this index is available for only 150 per year. In 2017, for example, there are only 53 observations. The poor databases indicate a lack of transparency and/or sophistication traducing into subnational financial problem. Graphics 4 and 5 show the behavior of the Blanchard gap throughout time. In Graphic 4 shows the higher level the BB reached every year and the historical mean, we can see that the Blanchard gap showed a

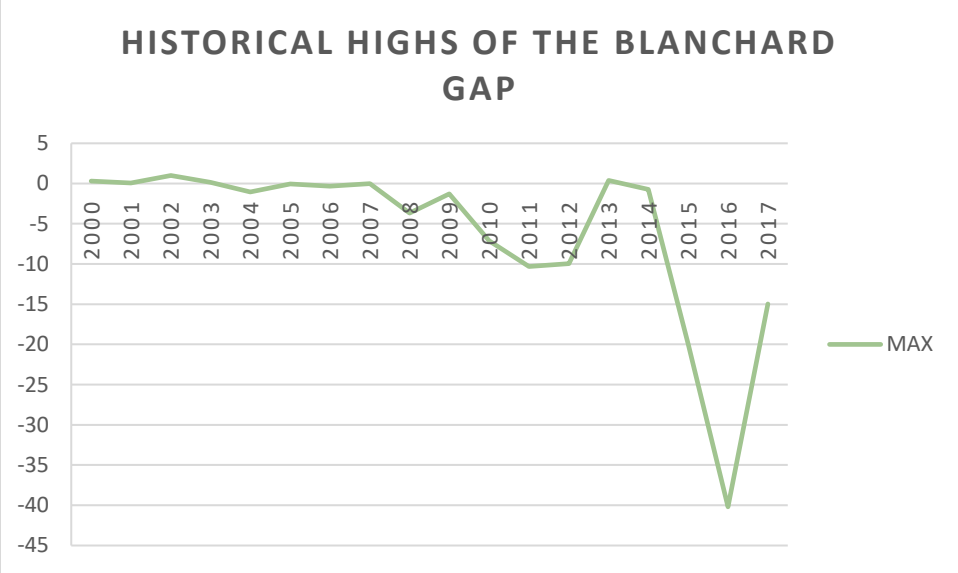
valley during the economic crisis of 2008, in the years of the crisis, the municipalities issued more debt, a peak is observed in 2013 that is recovering and then slightly drops again in 2015. Graphic 5 shows the behavior of the highest values of the Blanchard gap throughout the years, this one has a negative trend with certain peaks, as from 2013 the Blanchard gap has been negative for all municipalities.

Graphic 4. Behavior of the Blanchard Gap in Mexican Municipalities, 2000-2017



Source: Own elaboration with data from SIMBAD

Graphic 5. Historical Highs of the Blanchard Gap



Source: Own elaboration with data from SIMBAD

The econometric model used for the analysis was a panel regression using a fixed effects model. Because the Hausman specification test reject the null hypothesis and show that the OLS has a correlation between a predictor variable and the error term, we use the

fixed effects model over the random effects. The results obtained are in Table 2. As predicted, the significant variables with 95% of confidences are income per capita, own resources revenues, and the transfers both the Block Grants (Partpc) and Categorical Grants (Aportpc). The own resources revenue variable has a positive sign (coefficient of 15.7), which means that as the own resources generation closes the gap. Considering that the gap always has negative values for Mexican municipalities, this implies that the more autonomy a municipality has, the greater will the sustainability of their debt/GPD ratio be.

Not surprisingly, the coefficient of the Block Grants (Partpc) variable is negative (coefficient of -27.4), therefore the relation to the gap is inversed. The higher the transfers from the central government, the greater the gap and the less sustainable the finances will be. These two results are congruent with the argument that, the higher the fiscal centralization, the less sustainable the subnational finances.

The estimator of the Categorical Grants (Aportpc) variable is also significant and positive (coefficient of 18.7); however, the result is counterintuitive with the prior argument; this result could be explained because the contributions are additional income to subnational governments who are generally less developed and for specific project financing. Therefore, these funds are not committed from the beginning of the fiscal year as Block Grants (Partpc) are, and this allows their use for additional productive public investment that may crowd out individual municipal authorities' decision making and at the same time generate economic growth.

Income Per capita (Inperc) was statistically significant at the 90% of confidence, which is also congruent with theory regarding more wealth states will have higher indebted rates overall. While you could expect the gap to close, this result is consistent with previous research that municipal authorities which have access to more resources are not necessary making the most efficient decisions to make their debt sustainable (Benton and Smith 2017; Smith and Benton 2017).

Table 2. Econometric Results

Variables	*Coef.*	*Std. Err*
Own Source Revenues (TOSRpc)	15.66587**	(-1.04656)
Block Grants (Partpc)	-27.39125**	(-0.82193)
Categorical Grants (Aportpc)	18.75297**	(0.648137)
Income Per capita (Inperc)	19645.61*	(11714.3)
Inflation	628604.1	(530789.7)
_cons	-9596.444	(25190.09)

*p<0.1, **p<0.05

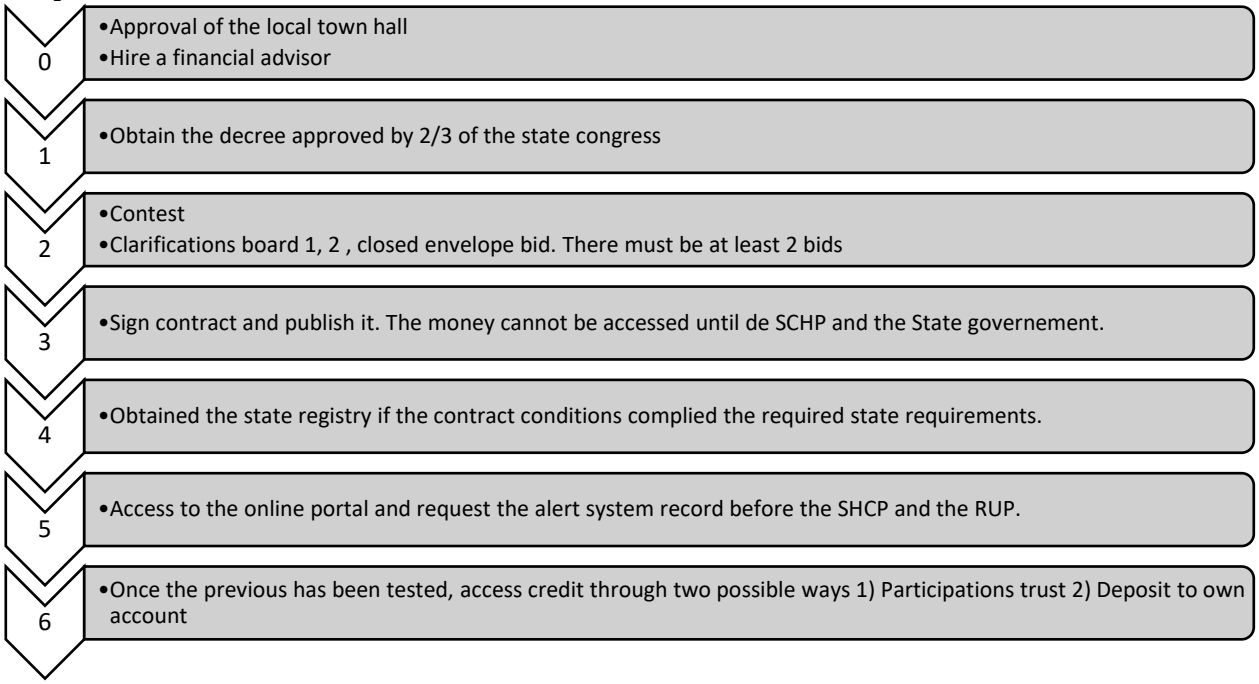
The model is a regression with data from the panel with fixed effects, this is due to the Haussmann test showed that there is correlation between the errors.

The unitary root test that was performed is the Fisher test as the data is too weakly balanced. The results of the test show that there is presence of unitary root in all the panels, meaning the data behavior through time is stationary. To prove that there is no heteroscedasticity the modified Wald test was run for models with fixed effects. A heteroscedasticity problem was found that was corrected with the "robust" option. To prove

there is no correlation between variables the Wooldridge test is used and it is proven that there is no autocorrelation of first order between the variables.

The gap analysis shows that the indebtedness is not being accompanied by a sustained economic growth that is partly due to the acquired debt being obtain is of very bad quality and partly because the financial autonomy of municipalities is non-existent. These two causes appeal at the same time to the original problem of fiscal decentralization, the lack of financial culture and municipal dependencies on the federal government. All of these items were part of the fiscal rules created in the LDFEM. The idea was to generate control mechanisms and to avoid over indebtedness by state and local governments. For example, Chart 2 presents the process that the municipalities must follow to acquire the debt stipulated in the LDFEM that is complicated, long and centralized.

Graphic 6: Process to obtain a loan in the LDFEM.



Source: Own elaboration with information gathered from interviews with the Finances Secretary of the State of Mexico.

Among the good practices that the LDFEM demands subnational governments to adopt, outstanding obligation made by states and municipalities to order their financial processes so they can present debt requests to the federal government. The law seeks to increase transparency on the use and source of subnational budget. It demands that debt processes be homogenize across the country. The LDFEM promotes competitive practices on debt acquisition decisions and generates databases for further studies. Nevertheless, the law reinforces perverse practices that harm financial sustainability at the subnational level by strengthening fiscal centralization, that is retreat of federalism, and by complicating and lengthening the acquisition process causing that less local governments decide to acquire debt, and so, contracting the debt market. Finally, by being a national law, it does not consider the particular characteristics of certain localities, damaging certain places with the general parameters for indebtedness caps.

Historically, as explained above, the way to constrain politicians, local public administrators and financial operatives was to create rules in the budgeting process (von Hagen 1991). For example, in the United States rules were created by voters to close loop holes by politicians and made them more accountable to their will. Simply by voting them out of office when election time came. The way to manage the intergovernmental system by was through decentralization control and creating more political constraints by voters to elected and non-elected positions. Rules were created like balanced budget requirements, tax and expenditure restrictions (TELS) and debt ceilings and other limitations (von Hagen 1991).

International comparative research has suggested that these types of rules may be more effective in federal over unitary governmental systems, but each country has its own specificities (Ter-Minassian, 1997). Yet, scholars have argued that subnational capital markets and their evolution, especially in developing economies, need to be overseen and managed by national governments (Canuto 2010, Leigland 1997). How to manage this control by the national government with the fiscal rules is difficult to evaluate. What we can see from our analysis here is that too much control and oversight can lead to more unsustainable debt practices by municipal governments.

Although, the centralized and efficient control of balance sheet and deficits may increase centralized budgeting authorities, seems easier (Alesina, Hausmann, Hommes, and Stein, 1999; Poterba and Rueben, 1999; Tabellini and Alesina, 1988), in the long run, states feel less responsible for their state government debt level. Duplication of responsibilities may result, but debt oversight should be managed at the local level. This again could allow fiscal space for lower-level financial managers—creating capital budgets without proper asset guarantees—to achieve their budget priorities while meeting voter-politician requirements.

VI. Conclusions

The debt problem goes back to the indebtedness in Mexico in a subnational level that has continued to grow in the last few years. This research states the possibility that Mexican subnational governments (state and municipalities) are not capable of paying for their expenses or debt issuances, at least autonomously with own source revenues. To identify a public policy response to the problem, it is necessary to find its origins. Is the problem a lack of autonomy or is it due to the debt instruments chosen by the national sub governments to finance themselves that are not profitable? To answer this question, this research performed an econometric to study the impact of the fiscal centralization level (measured through local tax collection) over a financial sustainability indicator.

This research shows that municipalities have a low index of subnational autonomy to make decisions and also low levels of tax collection to generate their own revenues to make their debt decisions more sustainable. Yet, we speculate how these decisions are being made on a more political bases over a market based logic. Therefore, one of the limitation of this research is to understand these public financial decisions by subnational actors. An analysis of the impact of the type of debt issued over fiscal sustainability (BB) could be conducted in the future to complete the analysis.

Therefore, if the legal framework does not consider the payment structures of subnational debt for promoting growth and fiscal sustainability, subnational governments won´t be able to acquire debt adequately. The results of this research present an absence of

understanding on how the debt market could also promote and sustain governmental institutions, reflected in the (LDFEM). Centralizing budget institutions will not be sustainable in the long run when creating rule of law. So, when government regulation like the (LDFEM) is implemented in developing countries where weak institutions are present, it is even more important to evaluate the source of payments that are being calculated.

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Annexes

Horne (1991) defines financial sustainability in terms of sustainable budgetary balance in the long term, making a distinction between the political and fiscal sustainability (in terms of debt and tax rates) and the government solvency (budgetary balance), as, even when a government has budgetary solvency and this allows the reduction of the debt growth and generating expenditure for economic growth, this does not imply that the combination between collection and debt issuance is de adequate in the longer term so the state does not incur in liquidity problems. For Horne, the only way to generate real economic growth and financial sustainability is through the collection of taxes. The debt must only be a temporary means and not fundamental to the expenditure.

Talvi and Végh (2000) studied the pro-cyclical behavior of the fiscal policy, with a sample of 52 countries. The finding shows that in developing countries, specifically 14 countries in Latin America, the governments tend to decrease taxes and increase expenditure when the economy is expanding, while the countries in G7 (Group 7, which comprehends the 7 greatest economies in the world: Germany, Canada, United Sates, Japan, United Kingdom and Italy) that there is no correlation between the business cycles and fiscal policies. This implies that, in developing countries the tax base is pretty volatile. Considering this, the authors propose a soft taxing model to maintain financial sustainability in an intertemporal way. However, Paunovic (2005) highlighted that due to the difficulty of calculating government future flows, especially if the macroeconomic conditions are volatile and the political decisions weigh on the economic decisions, as is the case of Mexico with its high dependency of petroleum income, simpler indicators have been taken, which are based on the debt/GDP reason in the long term.

Blanchard (1990) suggests a series of indicators different to the Cyclically Adjusted Budget Balance (CAB). The CAB estimates, according to the natural fluctuations of the economic cycle, in a period of at least ten years of balanced budgets, if it is in negative numbers to determine the financial risk of the government. This indicator was used in the International Monetary Fund (IMF) and the World Bank (WB) to reference fiscal sustainability. However, Blanchard explains that financial sustainability needs to be evaluated with a different approach and that the previous indicator needs to be created.

Therefore, to measure fiscal sustainability, Blanchard defines two key indicators. The first one is the "*primary gap"* which estimates the optimum level of debt/GDP relation which countries should keep to avoid running financial risks:

$$PS - (\frac{debt}{GDP}) * (i - g)$$

Where:
PS= Primary Superavit which is (total income – total expenses)
Debt= Debt level
GDP = Amount for the Gross Domestic Product in real terms
i= real interest rate
g= real GDP growth rate

The second proposed indicator *"medium-term tax gap"* which measures the adequate reason for Debt/GDP to avoid incurring in financial risk, taking into account the estimations for future expenditure and the tax rate:

$$(Average\ Expenditure/g_t + g_{t+1} + g_{t+2})/GDP + [(Debt/GDP) * (i - c + \tau)$$

Where:
Average expenditure= Average spent in the previous years
s= expenditure in the measured year
es+1= estimated expenditure for the next period
es+2= estimated expenditure within two periods
GDP= Gross Domestic Product in real terms
Debt= Debt level in measured period
i= real GDP growth rate
T= tax rate
c= real growth rate

Mendoza and Oviedo (2004) propose a model oriented to the emerging economies, due to the volatility of the GDP which is generally present, as well as the sensibility of these economies to external shocks. These authors propose the existence of a "natural debt line" which is given by the difference between the worst-case scenario of the public income minus the minimum necessary expense that the government must do before irrupting into a fiscal crisis (being this a status of sustained fiscal status in the long term). If the government is indebted below this line, it is exposed to carry the public expenditure to sub-optimal levels. If the government is indebted above this line, they cannot commit to paying off the debt. Based on this line, the authors develop a stochastic type model to incorporate fiscal frictions. This outcome implies a dollarization of debt, due to the volatility of the currency in developing countries, which can be a factor that radically changes the projections of financial sustainability in national currency. For Mendoza and Oviedo, the financial sustainability must measure if the debt/GDP ratio is sustainable given the local and international macroeconomic conditions.