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Essays on Inequality, Credit Constraints, and Growth in Contemporary Mexico

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**ESSAYS ON INEQUALITY, CREDIT CONSTRAINTS,
AND GROWTH IN CONTEMPORARY MEXICO**

A Dissertation Presented

by

LEOPOLDO GÓMEZ-RAMÍREZ

Submitted to Graduate School of the
University of Massachusetts Amherst in partial fulfillment
of the requirements for the degree of
DOCTOR OF PHILOSOPHY

September 2015

Economics

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ABSTRACT

ESSAYS ON INEQUALITY, CREDIT CONSTRAINTS, AND GROWTH IN CONTEMPORARY MEXICO

SEPTEMBER 2015

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This dissertation presents four essays on inequality, credit constraints, and economic growth in the Mexican economy in its recent history, or “contemporary Mexico”. In the first essay, it is argued that the possibility that wealth/income inequality could affect economic growth has been neglected in the contemporary Mexican economy literature. Also, preliminary thoughts on the channels through which inequality could have been affecting growth are offered. In the second essay, a time series, macroeconometric analysis on the possible relationship between inequality and aggregate production (GDP) in Mexico is presented. The analysis suggests that an increase in inequality boosts the economy, but that such effect is very short lived and is followed by a much more prolonged negative effect. In the third essay the question of how, if at all, credit

constraints have been affecting physical capital investment is addressed. The analysis is carried out using establishment-level data that are both recent and reasonably nationally representative. To the best of my knowledge this is a novel contribution. It is a common tenet of the literature on why Mexico -despite its vast liberalization process occurring since the 1980s- has not achieved high and sustained growth, that credit constraints are an important reason explaining the sluggish growth. When digging deeper in the literature, however, very few empirical studies offering evidence in favor of such claim are found; a contribution using microeconomic data with the intention of being nationally representative could not be found. Consistent with the general claims of the literature, the findings of the analysis are that credit constraints negatively affected investment decisions. The fourth essay examines theoretical issues. The links between credit constraints and growth may seem obvious. But one would still like to have a clarification of the mechanisms, through formal modeling. To the best of my knowledge, such a formal model has not been proposed in the recent Mexican literature. The essay, thus, presents a model in which credit constraints can reduce capital accumulation. It is, I believe, applicable to the contemporary Mexico case.

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INTRODUCTION

Since the aftermath of the 1982 crisis the Mexican economy has experienced a vast strategy overhaul in which it has been liberalized, it has been opened to foreign markets and capitals, and it has become very integrated with the U.S.A.'s economy. Although "macroeconomic stability" has to some extent been achieved (setting aside the crises) and there has been an exports boom, the growth effect predicted by the liberal reformers has not materialized. Naturally, many explanations have been offered to explain this worrying fact. One of the explanations virtually all scholars and policy makers offer points out the role of credit constraints; given that especially since the mid-1990s it has been difficult to find financing for productive projects. At the same time the country has shown significant levels of wealth/income inequality (hereafter "inequality", for brevity). There was some evolution in favor of more equality from the 1990s to the 2000s but since then inequality has increased again. Three accepted facts of the Mexican economy in its recent Mexican history, or "contemporary Mexico", are, thus, high levels of inequality, significant credit constraints, and lackluster growth. This dissertation presents four essays on these topics of inequality, credit constraints and growth in contemporary Mexico; although they are interrelated each essay can be read as an independent paper.

That inequality could be a cause and not only a consequence of the economic performance has often been argued in the Economics literature. Indeed, several theoretical channels through which it could be the case have been posited. The first essay of this dissertation, entitled *Inequality and Growth in Mexico, A Neglected Question*, examines the literature on contemporary Mexico and finds that it has neglected the topic of inequality as an

cause of the lackluster economic growth. An examination of the theoretical channels posited in the Economics literature is carried out with two objectives in mind. First, to show that it is reasonable to believe that inequality has been affecting growth through some of those channels. Second, to offer preliminary thoughts on the channels through which it is most likely that that has been the case.

The second essay, entitled *Inequality and Growth in Mexico's Recent History: a Demand-Driven Empirical Approach*, examines the possible relationship between inequality and aggregate output (GDP) through a macroeconometric, time series analysis. The question is addressed through a “structural vector autoregression”. The main finding suggested by the impulse response function is a very interesting relationship between inequality and growth: an exogenous shock on inequality initially boosts growth but this boom is very short lived and it is followed by a much more prolonged negative effect.¹

The third essay, entitled *Investments and Credit Constraints in Mexico, 2005 and 2009-2010*, addresses the question of how, if at all, credit constraints affected physical capital investment in years 2005 and 2009-2010. Rather surprisingly, although credit constraints are mentioned by virtually every scholar and policy maker as one of the reasons of the lackluster growth, when digging deeper in the literature very few detailed empirical studies offering evidence to support these general claims are found. The analysis is carried out using the best, to the best of my knowledge, establishment-level surveys. The surveys are recent and reasonably nationally representative. As far as I know, this is a novel contribution to the literature. Consistent with the general claims of scholars and policy makers, it is found that indeed credit constraints negatively affected investment decisions in both 2005 and 2009-2010.

¹ It is worth mentioning this paper has already been published in a peer-review journal; Gómez-Ramírez (2014).

Finally, the essay entitled *Credit Constraints and Capital Accumulation. A Formal Model Applicable to the Mexican Case*, addresses theoretical issues. The links between credit constraints and lower growth may seem obvious. Yet, one would like a clarification of the mechanisms, through formal modeling. To the best of my knowledge, despite the several general comments on the growth reducing effects of credit constraints, such a formal model has not been proposed in the Mexican economy literature.

It goes without saying that in this dissertation the questions on the relationships between inequality, credit constraints, and growth in contemporary Mexico are not conclusively settled. The limitations of the research I am aware of are openly presented in the concluding comments of each essay; understandably there are other weaknesses that I am not aware of. It should be noted also important related topics have not been directly approached. Among them, it is worth highlighting two of them. First, the topic of policy implications has been left open, that is, straightforward policy implications from the empirical findings have not been derived. For reasons that will be more clearly explicated in the body of the essays, policy implications are more nuanced than they may seem at first glance. Therefore, it was found wise to retreat from telling them, and it was regarded better to leave the topic as open for future research. Second, the seemingly natural topic of the possible relationship on inequality and credit constraints (and therefore growth) is not directly addressed either. It also presents an important area for future research.

With those caveats, I think four (modest) contributions can be found in this work. I would summarize them in four sets of statements. First, there are good reasons to believe that inequality could have been a cause of the economic performance of the Mexican economy in its recent history. The topic has been neglected in the literature, however. If the “Mexican morass” is going

to be understood, which in turn is obviously needed to address it, this shortcoming of the literature should be addressed too. Second, by carrying out a macroeconometric, “structural vector autoregression” analysis evidence is found that inequality has depressed aggregate output in recent Mexican history. Third, a novel empirical analysis using reasonably nationally establishment-level data found evidence to support that credit constraints have deterred investment in contemporary Mexico. This is consistent with the general but only weakly supported claims of the literature. Fourth, a clarification, through formal modeling, of the mechanisms through which credit constraints could have been deterring growth in contemporary Mexico is presented.

Cotler and Woodruff (2008) use a beautiful analogy to express the caveats with which their particular results, in the context of the overall topic of microlending, should be taken. These scholars say:

Our results, like those of many others, represent a snapshot of one particular program at one particular point in time. Collectively, like dots on an impressionistic painting, the individual studies provide a picture of the impact that microlending has on microenterprises and development more generally. We are many dots short of a coherent picture.

This dissertation presents mere dots on the impressionist painting of the contemporary Mexican economy; furthermore, given that this country during this period (and way before) has been full of contradictions it may be thought it does not present a coherent picture. It is the hope of this dissertation, however, that the dots it paints would help to better understand the whole canvas.

CHAPTER 1

INEQUALITY AND GROWTH IN RECENT MEXICAN HISTORY,

A NEGLECTED QUESTION

1.1. Introduction

For expositional purposes, in this paper the Mexican economy period which began after the 1982 crisis is called “recent Mexican history”. Two widely accepted facts of this period are the poor performance in terms of economic growth and the high levels of wealth/income inequality (hereafter “inequality”, for brevity). Although “macroeconomic stability” was achieved (setting aside the several crises) and the country went through a vast overhaul in which it was liberalized, opened to foreign markets and capitals, and became very integrated to the U.S.A. economy, neither the predicted result of sustained growth nor improvements in poverty/inequality reduction has occurred. Notwithstanding the cheerers for the contrary, even though the country became a middle-income per capita nation in the late 20th century it did not become a middle class one; INEGI (2013), Krozer and Moreno-Brid (2014), Samaniego Breach (2014), Esquivel (2015), CONEVAL (2015).² For its part, the idea that inequality could be negatively related with the economic performance is as old as the opposite, traditional idea according to which equality and growth run in opposite directions; the latter is argued on the grounds that the rich save and invest while the poor mainly consume and thus high inequality would (eventually) foster growth.

² At odds with virtually everybody else, Borraz and López-Cordova (2007) and López-Cordova and Zabudovsky (2010, p. 726.) claim that the “commercial openness” has had “a favorable effect in income distribution and in reducing the poverty levels”. The translation is mine. Unless otherwise noted, in what follows all translations are mine.

The challenge to the traditional idea has been particularly strong when speaking about “developing economies”; Todaro (1985).

A seemingly natural important question would be, therefore, if inequality has affected economic growth in recent Mexican history. Indeed, scattered comments about how inequality has depressed growth across Mexican history but without further elaboration can be found; Cárdenas (2010), Castañeda (2010, p. 604), Moreno-Brid and Ros (2010, p. 766), Moreno-Brid et. al. (2009, p. 97), Haber (2008 p. 10), Esquivel (2015, pp. 26-27). It is fair to say, however, that this possible relationship is far from being well understood. Indeed, despite the general claims the topic has rarely been addressed in detail in the literature. Just very recently few contributions have examined this possible relationship for the recent Mexican history case with some more detail; Cingano (2014) and Ros (2015).

This paper intends to contribute to the understanding of the effects of inequality on economic growth in recent Mexican history. Its contributions are twofold. On the one hand, it is shown that, to the best of my knowledge the literature explaining Mexican sluggish growth has barely addressed the topic. On the other hand, preliminary but grounded, I believe, thoughts on the specific channels through which inequality could have been related with growth in recent Mexican history are presented.

It is important to be precise. There is actually a visible body of literature arguing that “inequity”, that is, unequal opportunities, is at the core of the Mexican growth issue; Levy and Walton (2009b) book is an influential compilation of this body of literature. For the scholars adhering to this point of view inequity is one of the most important, if not the main reason explaining the country’s stagnation. Agreeing with them, I think the thesis that the inequity

prevailing in Mexico has been growth-reducing is not controversial.³ In this essay, however, the focus of attention is moved from unequal opportunities to unequal wealth/income.

An obvious reason supporting this shift of attention is that inequality matters for growth because it affects inequity; the former almost invariably will increase the latter. Another, more subtle reason lies in the (old Keynesian) tenet that demand matters for growth. In Gómez-Ramírez (2014) I have explained that an underlying idea of the inequity literature is that the Mexican growth issue is kind of one of unclogging the “bottleneck” created by a “rent-sharing equilibrium”: once monopolies and trade unions are tackled, growth will come. The scholars adhering to this point of view implicitly assume that there will be demand for all what is produced; their approach could be labeled as “supply-driven”. In contrast, from what I label “aggregate-demand driven” growth perspective, the demand for consumption (either for domestic or foreign goods) and investment are not taken as granted but determine how much is produced.^{4,5} In turn, that investment and consumption decisions are affected by inequality is at the heart of the challenge to the traditional idea according to which equality and growth are not compatible. In this paper, thus, the focus of attention lies on how inequality could have been

³ In this literature the impact of inequity on growth is classified into two categories; Bourguignon and Dessus (2009), World Bank (2005). First, it is pointed out that if markets are incomplete or imperfect “resources are allocated by means of other criteria” and it “may be inefficient because they [the noncompetitive allocation criteria] can lead to both underinvestment by groups with lower wealth or influence and overinvestment by relatively advantaged groups with less-efficient investment opportunities”; Levy and Walton (2009, pp. 16-17). Second, it is highlighted that powerful people could design policies and institutions in ways that further favor their interests, with no reason for the outcome to be growth-enhancing. I find hard to disagree with the scholars who claim that both of these mechanisms are actually (strongly) operating in Mexico; indeed, the first mechanism has a strong “aggregate demand-driven” growth flavor, to be explained shortly.

⁴ This type of labeling is always dangerous. Let me stress the distinction is used for expositional purposes and I do not claim it is *the* correct categorization.

⁵ Needless to say, this does not imply to say that the variables stressed by the “supply side-driven” growth perspective, like technological innovation or human capital improvements, do not affect growth. Indeed, I guess both sides agree that variables often affect both the supply-side and the demand-side. Examples of these variable could be the rule of law, which affects both the technological development but also investment demand; the degree of monopoly, which affects both technological change but also investment demand; and the distribution of wealth, which affects both how much is consumed but also how much is invested in education; Galor and Zeira (1993) and García-Peñalosa (1995) are contributions on the relationship between inequality and human capital.

related with growth in recent Mexican history through its possible effects on consumption and investment.

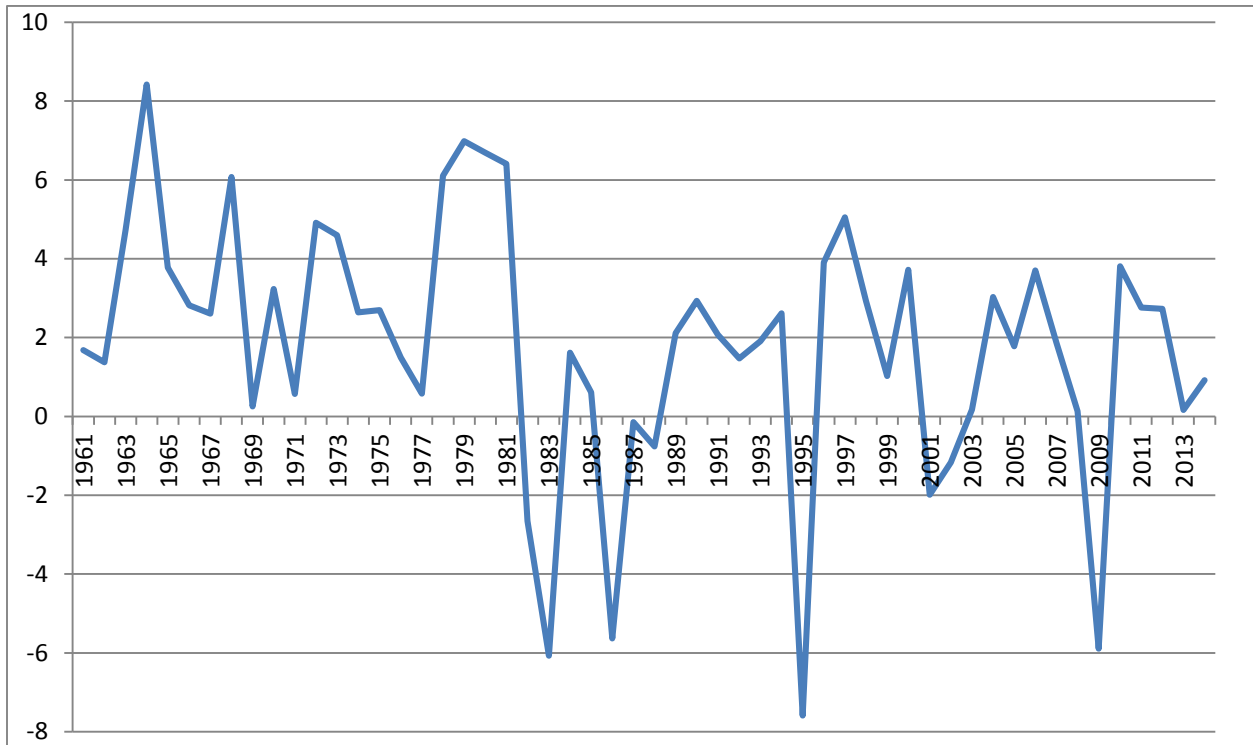
The paper is organized as it follows. Section 2.2 presents a (brief) survey of the literature on Mexican economic growth that could be classified under the aggregate demand-side label. This literature stresses the demand constraints the Mexican economy could have been facing in its recent history. It is found that in this literature the possible relationship between inequality and growth is far from being well understood, to begin with because it has barely been inquired. Section 2.3 presents a (brief) survey of the vast theoretical literature arguing that inequality could negatively affect growth, and it discusses if those mechanisms could have been operating in recent Mexican history. Drawing on the previous sections, in section 2.4 a summary of preliminary thoughts are presented on the mechanisms through which inequality could have been affecting growth in recent Mexican history.

1.2. Demand-side Approaches to Recent Mexican Economic Performance

Figure 1.1 shows Mexico's per capita growth during 1960-2014. It shows that until the beginning of the 1980s per capita growth was always positive and often above 4%, with a 1961-1981 average of 3.75%. Since the 1980s the contrast is clear. Since then, per capita growth has often been negative and almost never above 4%, with a strikingly low 1982-2014 average of 0.6%.

Figure 1.1. Mexico per capita GDP Growth (%).

Source: World Bank national accounts data, and OECD National Accounts data files.



In light of these facts, it is understandable that either to support further liberalizing reforms or to propose an alternative approach virtually all scholars and policy makers have agreed the results have been unsatisfactory. Consequently, there has been no dearth of explanations about the reasons of the three “lost decades” of the Mexican economy; Lustig (2001) is an early assessment, Moreno-Brid and Ros Bosch (2009), Gordon H. Hanson (2010), and Ros Bosch (2013a) are more recent ones. Naturally, different explanations are debated. Levy and Walton (2009) summarizes the debate in terms of two opposing views, one blaming the pro market reforms beginning in the 1980s and another claiming the lack of more liberal reforms

as the problem.⁶ Werner, Barros, and Ursúa (2006) and López-Cordova and Zabludovsky (2010) could be seen as representative of the liberal position. López (2009) could be seen as representative of the critical position. Moreno-Brid and Ros (2009) could be seen as a middle ground critique of the liberal position. Relatedly, the (neo)liberals tend to embrace a supply-side view while their critics tend to embrace a demand-side one. With respect to the more specific question of how, if at all, inequality has been related with growth, it is fair to say that the question has barely been addressed in any detail. And rather surprisingly, this lacuna is found in the demand-side literature too.

Provocatively, it is a supply-side contribution the one which boldly says: “Analysts typically treat them [inequality and growth problems in Mexico] as separate problems, with different roots and different policy solutions”; Guerrero, López-Calva, and Walton (2009). These scholars go on to elaborate on the issue, from the supply-side, “inequity” perspective already explained. We barely read such statements or, most importantly, such elaborations, from the demand-side adherents

López (2009) calls for redistribution of income in Mexico as part of a “progressive” policy program, but it is only in a footnote where we read that redistributing “is not only an end in itself but it also fosters growth.” López and Reyes (2011) does empirically address the relationship between inequality and demand but for the U.S.A. economy. López (2013) also addresses the issue but for four European countries, Japan, and the U.S.A.

⁶ Of course, as Levy and Walton (2009, p. 12) clarify that “Few, if any, analysts of Mexico unequivocally hold either the market reform view or the views of what we have referred to as critics of the market. The point of the previous discussion is not to identify individual positions or specific school of thought, but rather to clarify the broad lines of reasoning behind the main explanations for Mexico’s growth and equity puzzle. Most of analysts would hold as more nuanced and richer view than the ones sketched here.”

Several other contributions have focused in the demand constraints coming from external (foreign) factors. For the 1986-2003 period, Guerrero de Lizardi (2007) inquiries about the role of the U.S.A. economy and of the income and price imports and exports elasticities in Mexico, using “Thirlwall’s law” framework; McCombie and Thirlwall (1994). Guerrero de Lizardi (2006) extends a very similar analysis to the 1929-2003 years. And another example of a very long-run inquiry, namely, 1895-1994, is Gutiérrez-Romero (2007). It is grounded on simulations.

Blecker (2009) goes over the role of external factors as constraining Mexican growth. He argues that most of variation of Mexican economic growth since 1979 can be explained, parsimoniously, by shocks to four external factors: net financial inflows, world oil prices, U.S.A. growth, and the lagged exchange rate. It is worth noting that Blecker is careful enough so as to say that “exposure to external constraints since 1980” could be “one of the” cause of poor growth, but not the only. But in any case the tone of the paper is such that the “external constraints” are considered at least as important (and probably more) than the “internal” obstacles.

Related with the international dimension of the Mexican economy, for reasons that will be clearer later it is important to mention that there is a large literature inquiring about the impact of NAFTA and the vast integration of the Mexican economy with the U.S.A.’s, both for the whole Mexican economy and for its manufacturing sector in particular; Audley, Polaski, and Vaughan (2003), Tornell, Westermann, and Martínez (2004), Ledermann, Maloney, and Serven (2004), Blecker (2003), Moreno-Brid, Rivas, and Santamaría (2005), Moreno-Brid et al. (2009), among many others. For the purposes of this paper the insight of this literature that should be highlighted is that it has shown that the exports boom of the last 30 years has occurred hand in hand with an even larger boom in imports, and that the latter has been the case not only because

of the demand of foreign inputs usual in a developing economy (which does not produce too many capital goods) but also and, “most importantly”, because Mexican people were eager to demand foreign goods after the Industrialization by Import Substitution (ISI) period in which the demand for foreign goods and brands was “repressed”; Moreno-Brid and Ros (2010, pp. 783,786).

Moreno-Brid and Ros’s contributions are of wider scope and grounded on an extensive knowledge of the vast literature on Mexican economic history (not surveyed here), and I consider them very illuminating precisely because of that historical perspective. In fact, Moreno-Brid and Ros (2009) is an ambitious contribution, both in terms of depth and time scope, which presents a general view of Mexican growth/development since the late 18th century. For the recent period, they criticize the neoliberal position according to which the lack of more reforms is the issue. They argue that lack of investment has been at the core of the poor Mexican performance and, in turn, they explain such weak investment performance in terms of four reasons: the low level of public investment, the appreciation of the real exchange rate, the dismantling of industrial policy, and the lack of bank finance. The book in fact argues that high inequality led to low growth, by destroying the ability of reaching consensus on economic policy and thus negatively affecting investment, but in the 19th century. No comment on inequality and growth in the last 30 years is made.

Moreno-Brid and Ros (2010) does suggest that income inequality was prejudicial for the size of the domestic market, which in turn was quite relevant for the positive rates of growth Mexico experienced during the ISI period, prior to 1982. More specifically, these scholars say (p. 766) that “despite the low income per capita levels and of its unequal distribution, the size of the internal market was big enough so as to make possible the establishment of industries with large

fixed costs (...) and therefore strong scale economies.” Other scholars have likewise claimed that in the ISI period the unequal distribution of income did negatively affect the size of the domestic market; Lustig (1979), Cardenas (2010).

The demand-size point of view has also often centered its attention on balance of payments constraints and the role of the real exchange rate. Both theoretical and empirical works about the role of the real exchange rate in developing economies are found; Razmi, Rapetti, and Skott (2012), Rodrik (2008), Hausmann, Pritchett, and Rodrik (2005), Gala (2008), among many others. The issue has also been examined in the specific Mexican case; Blecker (2009), L. M. Galindo and Ros (2008), Ibarra (2011), López, Sanchez, and Spanos (2011). Indeed, it is in some of these contributions in which the role of income distribution has been brought to the discussion, if only as a secondary question.

Ibarra (2013) argues that real exchange rate depreciation has been positively associated with investment, through its effect on the profitability of the tradables sector. Relatedly, Ibarra (2011) argues that Mexican investment was depressed by a low profitability due to “an uncompetitive real exchange rate” and not due to balance of payments constraints. A similar implied, secondary, discussion of the role of distribution is found in Lopez, Sanchez, and Spanos (2011). Both Ibarra (2008) and Lopez, Sanchez, and Spanos (2011) accept the open economy Kaleckian framework, to be explained in more detail later, in which the functional income distribution is function of the real exchange rate and therefore concluding something about the relationship between the real exchange rate and growth implies concluding something about the relationship between distribution and growth. In these contributions (functional) income distribution is discussed, if only secondary, in the demand-side literature. It is important to describe them in more length.

Ibarra's (2008) core interest is the real exchange rate. He argues that appreciation has decreased the profit share and it in turn has depressed investment. He also argues that the increase in the profit share depressed the saving rate (increased consumption) but it increased imports even more. So, the canonical Kaleckian "functional income distribution impact on growth" analysis is present even if the primary variable of interest is the real exchange rate. Thus, even if only as implied thesis, Ibarra concludes Mexican demand has been "profit-led": the smaller profit-share (coming from appreciation) has been one of the reasons of the poor economic performance.

Lopez, Sanchez, and Spanos (2011) are for their part explicit about their Kaleckian lineage, in which aggregate demand determines growth and the functional income distribution determines demand; for some unexplained reason, however, the wage share appears as an argument of the consumption function but it does not appear as argument of the investment function. Most importantly, distribution drops of their empirical analysis. They examine the role of five variables in Mexican growth: U.S.A. output, government expenditure, trade protection, credit rationing, and the real exchange rate. Different from other papers (Blecker (2009), Galindo and Ros (2008), Ibarra (2009)) they conclude that the real exchange rate has been negatively related with growth (depreciation is not growth enhancing). Thus, they conclude that Mexican demand has been "wage-led".

The very recent contributions of Cingano (2014) and Ros (2015) speak of the possible relationship between inequality and growth in contemporary Mexico with more detail than usual. Studying the topic for OECD countries, Cingano (2014) argues that the rise in inequality reduced growth in Mexico during 1985-2005; this scholar estimates that the negative impact was of 10%. The mechanisms through which this was the case, however, are not explained. In this respect,

accepting that inequality has been cause, and not only consequence of the sluggish growth, Ros (2015, Chapter VII) says that “maybe” the two “more relevant” mechanisms have been the following. First, that inequality together with low growth promotes crime and violence. Second, that inequality reduces the size of the domestic market; indeed, Ros presents (Annex II of Chapter 6) an aggregate demand/aggregate supply model seemingly applicable to contemporary Mexico in which demand is modeled following the “Kaleckian” framework. Intuitively, I find these claims persuasive. However, this contribution does not offer detailed evidence to support them.

Summarizing, the literature stressing demand channels has focused on the (interrelated) roles of foreign factors, particularly of NAFTA and the integration with the U.S.A. economy, and the real exchange rate as constraining growth. It has also focused in the retreat of public investment and in the dismantling of industrial policy. More generally it has brought attention to the perils of foreign investment and the lack of physical investment as a root problem of the Mexican economy. To be fair to these critics of the liberal positions, these are all relevant topics the supply-side has barely discussed. For supply-siders, for example, lack of human capital investment seems to be more important than the lack of physical investment, as if the former would not presuppose the latter to create a virtuous cycle. Nevertheless, the topic of inequality and growth has been very rarely discussed, and when it has been discussed that has been only incidentally; partial exception are the recent contributions of Cingano (2014) and Ros (2015).

1.3. Theoretical Mechanisms

The traditional idea is that there is a trade-off between equality and growth. It is argued on the grounds that the rich save and invest while the poor mainly consume and thus high inequality would (eventually) foster growth. Counter ideas are as old as it. They come in a variety of forms. The challenge to the traditional wisdom has been particularly strong when speaking about “developing economies.” Todaro’s (1995) textbook summarizes it in four general arguments. (i) The rich of developing countries do not necessarily save and invest more than the middle class or even the poor in the local economies. (ii) High inequality reduces productivity because it reduces the human capital of the poor, through less education, nutrition, and health. (iii) The poor consume more of domestic goods than the rich, who spend more on foreign goods. (iv) Some equality would act “as a powerful material and psychological incentive to widespread public participation in the development process” (p. 170). Interestingly, in newer editions of what is essentially the same textbook there are subtle but significant changes; Todaro and Smith (2009). First, mechanism (i) is extended to say that (v) high inequality, in the presence of imperfect credit markets in which borrowing capacity is positively related with wealth makes that fewer loans are granted and thus less physical and human capital investment is undertaken. Second, mechanisms (iii) and (iv) are omitted. Third, a new mechanism is posited: (vi) high inequality facilitates “rent seeking”, which is bad for growth on efficiency grounds and, “Even worse”, in turn tends to create a self-perpetuating situation. It can be seen that (vi) is the same argument the scholars focusing on inequity have rightly argued as actually occurring in the Mexican case. But, as it was argued above, it is essentially a “supply-side” argument which will not be explored further in this essay. The same applies to mechanisms (ii) and (iv). The following survey presents arguments demand-side channels embedded in mechanisms (i), (iii), and (v). In other words, the theoretical models discussed in what follows convey in one way or another two key

ideas: in some contexts neither savings and investment nor its counterpart consumption can be thought as necessarily positively related with inequality.

It helps the exposition to divide this section in four parts. In the first the “sociopolitical channels” affecting investment argument is presented. After that, in a second subsection Murphy, Shleifer, and Vishny (1989) model (which for simplicity I will call “sectorial sizes”) is presented. In a third subsection the Kaleckian open economy model is presented. Finally, an argument focusing on how, in the presence of credit market imperfection, inequality could deter good investment is presented.

1.3.1. Sociopolitical Channels

There is a significant body of contributions, roughly belonging to the endogenous growth literature, arguing that inequality could be negatively related with the demand for investment through “sociopolitical channels”. In this approach, the rate of physical capital accumulation is a negative function of the post-tax rate of return of capital and a risk adjusted international rate. That inequality increases either the tax on capital or the domestic risk has been posited with at least three different arguments.

First, arguing that inequality creates pressures for redistribution which in turn leads to increasing the capital’s tax rate; Alesina and Rodrik (1994), Persson and Tabellini (1994), Bertola (1993). This argument would apply mainly to democratic societies. Second, arguing that inequality is related with a more uncertain distribution of resources, including a higher

expropriation risk; Alesina and Perotti (1994), Alesina, Ozler, Roubini, and Swagel (1996). It can be seen this second argument holds only in a democratic political system as well, because only in that case the rich could face higher risk of expropriation; Sonin (2003) models how on unequal societies a weak rule of law could help the privileged to grab assets of the not privileged. If the decision power of the upper class is much higher than the lower's one (there's no democracy) then inequality may not lead to higher expropriation risk and thus it could not be detrimental to investment, as Ros (2000) and (2013b) rightly points out. Third, arguing that inequality leads to more difficulties in collective-decision making and that leads to reduction of the stability and predictability of government decisions; Knack and Keefer (1995).

In recent Mexican history, has inequality been depressing the rate of capital accumulation through sociopolitical channels? To put the question in more precise terms, has inequality been deterring investment because it has created redistribution pressures and/or increased the risk of expropriation and/or reduced the stability and predictability of government decisions? The short answer is no. On the one hand, Mexico has not had a truly democratic political system through which the lower classes could press for more increased taxes on capital and/or expropriation and/or or have made government decisions less stable. On the other hand, social pressures exerted through other than electoral channels have not been successful either; indeed, as it has already been mentioned, current officers seem undeterred in further advancing the liberal agenda despite recent increases in poverty; CONEVAL (2015). For good or worse, in recent Mexican history the poor have not had enough power to make the rich afraid.⁷

⁷ A comparison with Colombia could be proper. In Colombia the armed guerrillas have posited a moderate but real risk of expropriation in significant parts of the country for a long time, and the "cartels" put the traditional elites in a very precarious situation during the 1980s; Nobel prize Gabriel García Márquez magisterially describes the latter in his journalistic note *Noticia de un Secuestro*. In Mexico, except for few isolated cases, few upper class members have been affected by social movements or by the cartels, despite the sensationalist media reports.

It is important to point out, however, that an arguably “sociopolitical” channel that the endogenous growth literature does not seem to have considered may have been operating in contemporary Mexico. This is the relationship between inequality (and poverty) and crime, violence, and the absence of the rule of law. Indeed, as it has already pointed out, Ros (2015) has recently stated that maybe this has been a relevant mechanism through which inequality has been depressing growth. It could be reasonable to believe that, if the capitalists in the very top of the distribution have had resources to not to be affected, that may not be the case with the middle and lower class layers.

1.3.2. “Sectorial Sizes” Argument

Another argument posited in the literature argues that inequality could depress growth by reducing the demand for manufactured goods produced under increasing returns to scale, advanced technologies (hereafter “IRS-manufactures”) because the size of the market is not enough for such production to be profitable. An influential model presenting the argument is Murphy, Shleifer and Vishny (1989). It captures the idea that some equality is necessary for a low-income country to industrialize, that is, produce a large range of goods under increasing returns to scale, and therefore become a high-income country.⁸ The model has three classes: the poor, who only consume food; the middle class, who consumes both food and IRS-manufactures, and the rich, who consume food, IRS-manufactures, and “backstop” manufactures produced under constant returns to scale, not advanced technology. The model presents two cases. First,

⁸ Murphy and coauthors are cautious enough so as to not to claim that industrialization has “normative significance”. They say that “In practice, however, industrialization seems to lead to the improvement of living standards” (p. 540).

the case of a closed economy in which a boom in the agricultural sector increases the demand for IRS-manufactures because it increases the size of the middle class. Second, the case of an erstwhile⁹ open economy in which the boost to the middle class comes from a boom in some exports sector(s), like minerals, crops or light manufacturing. In either case, the key element that needs to happen, if industrialization/growth is going to happen, is that the benefits of the boom are equally enough distributed. If they were reaped mostly by the rich, the demand for the IRS-manufactures would not be large enough so that the adoption of increasing returns to scale technologies could be profitable.¹⁰ The central message of the model is that a large middle class is necessary for industrialization.

Is this argument relevant to the recent Mexican history case? There are good reasons to support either a positive or a negative answer. In favor of the positive, it could be noted first that the recent Mexican history case seems to fit well the assumptions of the model. Since the 1980s there has indeed been a boom in manufactures exports. In turn, its benefits have not been equally distributed. Few sectors, and most importantly, few companies have been involved; Moreno-Brid et. al. (2009), Mattar et. al. (2003), Dussel (2000). It has already been mentioned that if Mexico has achieved middle income status it has nevertheless not become a middle-class country. In light of these facts, it could be thought that a stronger middle-class would have yielded more IRS-manufactures and thus more growth. In other words, it may be thought that inequality has depressed the domestic market for high technology goods and therefore has reduced investment in their sectors and then growth.

⁹ The model needs to assume that IRS-manufactures trade is costly after the exports-boom, for reasons that will be explained shortly.

¹⁰ Murphy, Shleifer and Vishny also speak of the theoretical possibility in which too much equality could prevent industrialization. This is the case in which the country is so poor that complete equality just means everybody only demands food and no industrialization occurs. But they claim the case of too much inequality “is probably more realistic” (p. 533).

Indeed, it is common to read in the literature scattered comments about how inequality has depressed the size of the domestic market across Mexican history but without further elaboration. Castañeda (2010, p. 604) says that the unequal distribution limited the size of the internal market, “by definition”, during the Import Substitution, prior to 1982 period. Similarly, Moreno-Brid and Ros (2009, p. 97), (2010, p. 766), and Cárdenas, (2010, p. 520) think that happened during the ISI period. Referring to the after 1980 period, Haber et. al. (2008, p. 10, parenthesis in the original) claim inequality/inequity “chokes off long-run economic development (by limiting the size and depth of markets)”. To establish the point is, however, more nuanced, because of the following reason.

Murphy and coauthors explicitly highlight that costly trade is a crucial assumption of their model and that the decision to adopt increasing returns to scale technologies depends to a large extent on the size of the domestic market, which in turn is positively related with the size of the middle class. In recent Mexican history, however, this does not seem to be the case for the Mexican firms in the best position of adopting increasing returns to scale technology, the so-called “economies groups”. It is well-know that those large firms have tried to reach out to foreign markets; Castañeda (2010), Moreno-Brid and Ros (2010). Big firms could find it profitable to establish in Mexico because of lower wage costs or not, but one rarely finds literature references suggesting that they put great weight on how much they would sell in the country. In fact, one criticism against the manufactures-based export-oriented growth strategy is that it has created no domestic linkages; Moreno-Brid, et. al. (2009). Moreno-Brid and Ros (2009) and (2010). Referring to the 1995 crisis case, for example, Moreno-Brid and coauthors (2009, p. 104) say that “the strong increase in the Mexican manufactures exports was certainly

stimulated by NAFTA” but “also by (...) the breakdown of the domestic market in 1995 (...) in which the firms were forced to explore foreign markets to offset the fall in local sales”.

A possibly reasonable rebuttal, however, favoring Murphy and coauthors argument, would point out that the key problem, the lack of a sizable middle-class, is what really matters: if there were a significant middle class the big companies would start producing more for the domestic market. This may be a reasonable point, a good reason to believe Mexican inequality has depressed growth: the big companies would have produced more for the domestic markets had the middle class been larger. Indeed, the Moreno-Brid and coauthors quotation of the last paragraph says that firms “were forced” to explore foreign markets. Furthermore, thinking not about the very large firms the assumption that trade is costly is likely to hold for medium sized and small firms. It could be thought, therefore, that a larger middle class would have incentivized the “development” of these medium size firms.

That the lack of a sizable middle class has prevented growth in Mexican recent history, however, still needs further thought, because of the following. Murphy and coauthors acknowledge that, in addition of a somehow egalitarian income distribution, there are other determinants of the size of the markets which could be favorable for industrialization and growth. These are a large population, which is the case for Mexico, with its 120 million inhabitants; the concentration of the population in few locations (a point already mentioned by Chenery, Robinson, and Syrquin (1987)) which seems to also be the case in Mexico, in which some 75% of the population lives in cities; and homogenous tastes favoring domestic goods. This last assumption, however, could be questionable for the recent Mexican history.

Moreno-Brid and Ros's contributions point out that the exports boom the country has experienced after the openness of the economy has been more than offset by a larger imports boom. These scholars claim that the "most important" reason for that has been "a demand eager of foreign brands and goods erstwhile repressed"; Moreno-Brid and Ros (2010, pp. 783, 786). In other words, in recent Mexican history Mexicans have not shown homogenous preferences for domestic goods. This could lead us to think, thus, that a larger middle class would have indeed increased consumption demand, but for foreign goods.¹¹

Summarizing, there are good reasons to believe a more egalitarian distribution of the gains of the exports boom the Mexican economy has indeed experienced would have triggered development and growth, by making the domestic market attractive enough so as to incentivize more companies to adapt costly but advanced technologies and therefore promote growth. The point, however, is clearly open for future research.

1.3.3. The Open Economy "Kaleckian" Model

The question of a negative relationship in which high inequality could depress growth has been pursued by the "heterodox", "post-Keynesian", "Kaleckian" demand-driven growth literature; Rowthorn (1981), Dutt (1984), Blecker (1989), and Bhaduri and Marglin (1990) are influential contributions; Blecker (1999), (2002), and (2011) are extensions for the open

¹¹ Because of economic thought historical justice it is relevant to mention (as Ros, 2013, does) that earlier debates in the Latin American "structuralist" tradition discussed alternative hypothesis about inequality and the size of the domestic IRS-manufactured goods markets. Furtado (1966), Tavares and Serra (1971), Lustig (1980). As Ros (2000) also points out, it is puzzling to see how often "new" growth theories convey classical development Economics ideas but the former do not mention their lineage.

economy case. This theoretical inquiry has given rise to a sizable empirical literature interested in discerning if economic growth for specific country-periods has been “wage-led” or “profit-led” (to be explained shortly). Note that the distributional dimension this literature focuses on is not wealth distribution across the whole population but the partition of income into wages (accrued by workers) and profits (accrued by capitalists); the “functional distribution”. This empirical literature has focused mainly in developed economies and has obtained different and sometimes contradictory results, that is, some countries turn out to be wage-led, some profit-led, some countries turn out to be the first by some studies and the latter by others. Blecker (2011) presents a survey of this literature. For the Mexican recent history case Ibarra (2008) and López et al. (2011), already discussed, are contributions addressing the Kaleckian question, if only incidentally.

The key arguments of the open economy version of the model are the following. Domestic consumption is positively related with equality, that is, with a larger wage share, as long as workers consume more (save less) than capitalists. For its part, investment is usually positively related with inequality, that is, with a larger profit share, because profitability incentivizes investment.¹² In a closed economy, if redistributing in favor of the owners increases aggregate demand and capital accumulation or not depends on the net balance of these effects; in the first case it is said there is “profit-led” growth while in the second case it is said there is “wage-led” growth. Including the foreign world makes the analysis more complex. In this case, if an economy is boosted by an increase in inequality (profit-led) or not (wage-led) depends on the deeper reason for which the profit share increased. If the profit share increased because of an

¹² Investment is also positively related with demand (the so-called “accelerator effect”). Thus, it is possible that it would increase even if the profit share decreases when the increase in demand more than offsets the decrease in profitability. After Badhuri and Marglin (1990) contribution, this possibility has been questioned.

improvement in cost competitiveness, then the most likely is the economy will be boosted. In contrast, if the profit share increased because of a bigger firms' market power (larger markup over price) the most likely is it will depress the economy.

It is worth mentioning the Kaleckian growth models have been contested as theoretically wrong for the long-run, because of two reasons; Committeri (1986), Duménil and Lévy (1995), Skott (2010), and (2012). First, they assume the effect of a change in the utilization rate on savings is greater than its effect on investment (so-called “Keynesian stability condition”) not only in the short but also in the long-run. This assumption does not seem to hold for the long-run. Second, they assume the utilization rate is an accommodating variable not only in the short but also in the long-run. This assumption does not seem to hold for the long-run case either. I find these criticisms persuasive but it is beyond of the scope of this paper to offer a full assessment of this debate. I also think, however, that regardless of the model drawbacks the questions brought on to the table by the Kaleckian literature are important and relevant. Indeed, some thought about them makes clear they are the same questions on how inequality could affect consumption and investment, domestic and foreign, brought by other theoretical approaches. The difference is the Kaleckian literature focuses on functional distribution while most of the other literature focuses on the distribution across the whole population. I think these are relevant questions for the recent Mexican history case.

The question of whether a more favorable distribution for the workers would have positively affected consumption is similar to the questions about the possible impact a sizable middle-class would have had on industrialization and growth raised by the “sectorial sizes” model. Although there are good reasons to believe more equality would have increased the domestic market, the topic is clearly open for future research.

But the Kaleckian literature raises another relevant question not directly discussed so far: how would have investment been if the profit share had been smaller? More in general, how would investment have been if there had been more equality? This is a very important question, clearly open for future debate and, most importantly, empirical research. Based on reasons to be explained shortly, however, it is my preliminary opinion that, contrary to the traditional wisdom more equality (reflected in a smaller wage share or in a more egalitarian distribution across the whole population) would have not decreased investment; it could have even increased it.¹³

The first thing that can be noted is that in recent Mexican history the functional distribution favorable for the capitalists has not been accompanied with higher capital accumulation. Samaniego (2014) has recently offered estimations of the evolution of the functional income distribution from 1970 to 2012. The high inequality these estimates show are striking: the wage share has never been above 40% (reaching its highest 40% in 1976) and it has been below 30% since the mid-2000s. In turn, Figure 1.2 shows capital formation as percentage of GDP in Mexico.¹⁴ For comparative purposes, the evolution of the same variable in South Korea and China is also presented. It can be seen that investment as percentage of GDP in Mexico increased from 1960 to 1982 (and do not overlook this was in the context of a growing GDP). After that, it has stagnated and it has been always below 25% (and do not overlook this

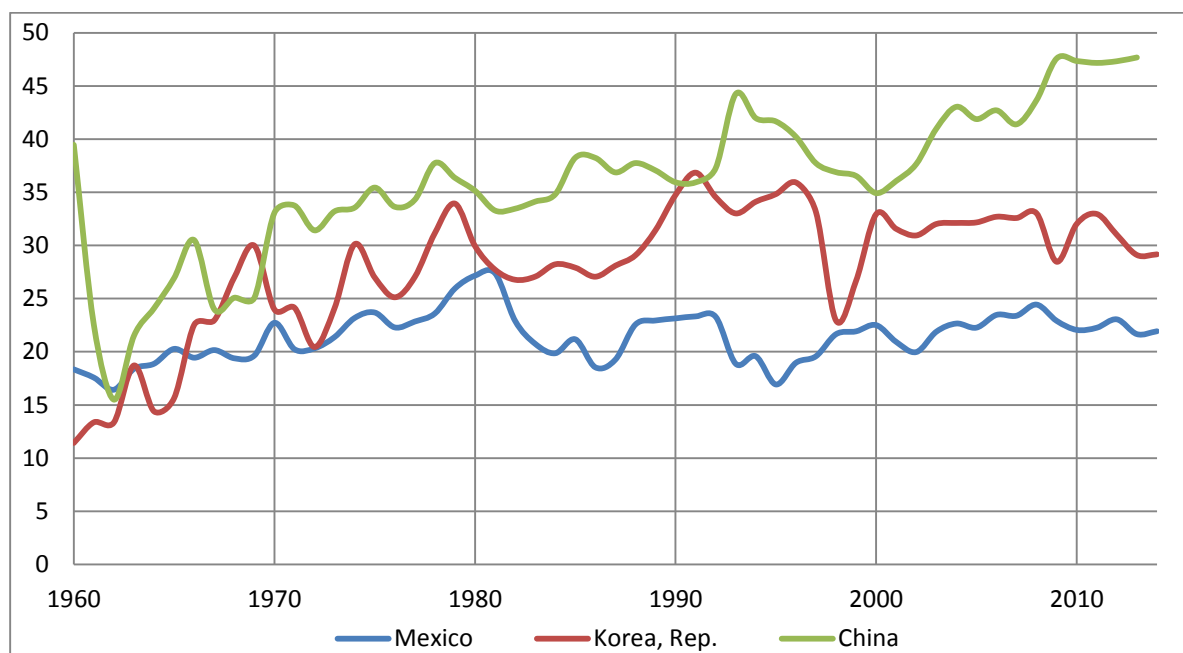
¹³ It is probably worth recalling we are thinking about physical capital investment. That more equality would have increased human capital investment is a different topic. It does seem common sense, though, to believe human capital accumulation has been negatively related with inequality (and poverty) in contemporary Mexico. Indeed, the literature seems to take the human capital reduction effects of inequality/poverty as being the case; Levy (2006), Levy and Walton (2009), Esquivel (2015).

¹⁴ The long definition given by the World Bank is: Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation.

has been in the context of a stagnated GDP). The comparison with South Korea and especially with China is striking.

Figure 1.2. Gross Capital Formation (% of GDP).

Source: World Bank national accounts data, and OECD National Accounts data files.



That a high profit share has not been accompanied by high investment seems a rebuttal to the traditional idea that more inequality favors capital formation. However, it is of course possible that the reasons explaining low investment lie somewhere else than in high inequality. As mentioned above, demand-side explanations of Mexican sluggish growth highlighting low investment as the key issue explain the latter in terms of the four following reasons, in which inequality is not included: low public investment, dismantling of industrial policy, real exchange rate appreciation, and lack of bank credit; Moreno-Brid and Ros (2009), Ros (2013b), Ros (2015). However, that inequality could have been related with these other variables, and/or

directly with investment, seems to arise as a natural question; indeed, the same Jaime Ros has elsewhere used (although with a warning) the economics of growth terminology according to which inequality is a “deep”, “fundamental” determinant (as different from “immediate” or “proximate”) of income levels and growth rates; Ros (2013a).

Out of the variables these scholars offer to explain low investment, one could think low public investment and the dismantling of industrial policy could have been related with inequality. In this respect, it seems worth considering Levy and Walton’s (2009) comment according to which one of the possible channels through which the Mexican “rent-sharing” equilibrium could have been deterring growth is through the adoption of policies beneficial for the rich. I find this claim right but incomplete, because it focuses on inequity and dismisses inequality. But adding the wealth/income inequality dimension to the “rent-sharing” equilibrium it would be hard to disagree, I think, with the claim that it has been related with policies which are beneficial for the powerful. And the low public investment and the dismantling of industrial policy may be among the policies beneficial for the status quo. These possible connections represent a topic that deserves further explanation.¹⁵

Another reason for which the idea that investment is positively related with inequality may be questionable is related with the lack of finance for productive projects that since the mid-1990s of many enterprises, especially the medium-size and small. In the theoretical literature on the channels through which inequality could affect growth, it has in fact been argued that in the presence of credit constraints inequality could negatively affect investment. To better understand why I believe this channel could be important in contemporary Mexico, it is convenient to present the theoretical argument first.

¹⁵ This is not to say, of course, that the declared intentions of the policy makers are not related with increasing investment. Naturally, they declare their enacted policies are the good policies to enhance investment.

1.3.4. Imperfect Credit Markets

Going back to the endogenous growth literature, several contributions point out that wealth inequality reduces investment opportunities and/or the effort the agent exerts when he/she engaged in a productive project, in the presence of imperfect credit markets. Aghion, Caroli and García-Peñalosa (1999, p. 1621) says that the “political economy” approach of Alesina and Rodrik (1994) and Person and Tabellini (1994) “is not fully supported by the data” (p. 1621) and offers another theoretical mechanism to sustain the “empirical findings” according to which inequality is negative for growth. The central idea of one of their models, coming in turn from Benabou (1996), is that, in the presence of imperfect credit markets in which borrowing possibilities depend on wealth, wealth inequality reduces demand for investment and/or the effort exerted by borrowers engaged in productive project; Bardhan, Bowles, and Gintis (2000) and Bowles (2012) are similar contributions.¹⁶

This argument is a strong candidate to be considered as being operating in the contemporary Mexico case, because its assumptions of high inequality and credit constraints seem to fit well the facts of recent Mexican history. That the first has been the case has already been shown more than once.

¹⁶ Because of historical justice it is important to mention that the thesis that aggregate investment could be negatively related with the degree of monopoly, which in turn could be positively related with inequality, is not new. Baran (1957) argued that in developing economies there is little incentive to invest because of narrow markets, but these in turn are at least partially related with the monopoly control of the economy (which in turn was caused by imperialism). It is worth Baran’s argument does not follow if the State takes an active role through public investment and stimuli for the private sector; Lustig (1980, p. 36) points this out

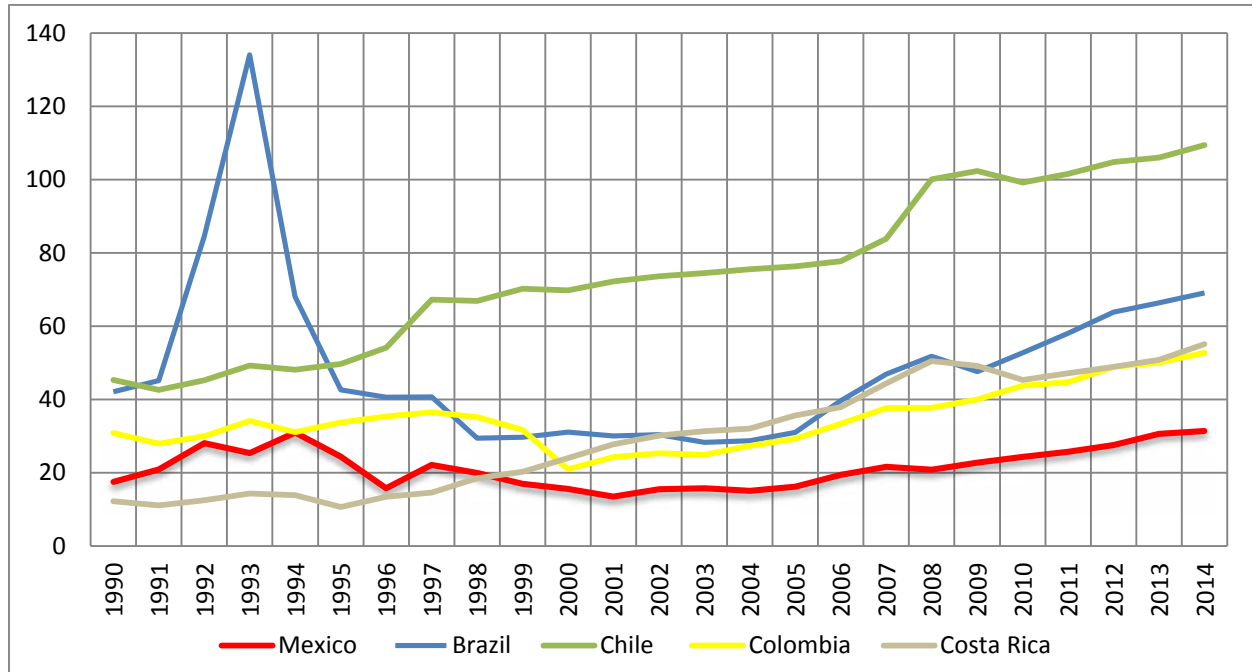
For its part, virtually all the literature points to the lack of finance for productive projects as a central reason explaining sluggish growth; Kehoe and Ruhl (2010) actually say that “The most popular set of theories for Mexico’s stagnation focuses on its inefficient financial system and lack of contract enforcement” (p. 2011). Indeed, in 2013-2014 a legal reform involving changes in more than 30 laws with the declared purpose of improving access to finance was launched; Skelton (2014) presents an optimistic view on it. Figure 1.3 shows the 1990-2014 evolution of a variable usually used in the literature to measure the penetration of the financial system in the economy, the domestic credit to the private sector as percentage of GDP.¹⁷ For comparative purposes the evolution of the same variable in other Latin American countries is also presented.

Figure 1.3 strikingly shows that Mexico has the lowest percentage. To be precise, there has been some progress, especially since the mid-2000s, in which the variable went from less than 20% to 31% in 2014. Nevertheless, this is not that impressive and the average over this period has been a rather low 21%. To put things in context, compare the numbers with the only other Latin American OECD member, Chile. In it, the variable went from 45% in 1990 to 109% in 2014.

¹⁷ The complete definition of “Domestic credit to private sector” used by the World Bank is the following: “financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment.”

Figure 1.3. Domestic Credit to Private Sector (% of GDP).

Source: International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.



It is not surprising that virtually all scholars and policy makers mention the lack of credit for productive projects as an important reason behind the lackluster economic growth. In turn, the usual policy conclusions are that there should be more competition in the financial sector and/or the rule of law has to be strengthened. However, an alternative possibility, the possibility that reducing inequality could in turn ease credit constraints has not been, to the best of my knowledge, put forward for discussion.¹⁸ In other words, the possible relationship between inequality and credit constraints has not been examined in the literature. I find it likely that inequality could have been deterring investment in the presence of credit constraints in

¹⁸ This is not to say, of course, that the standard policy conclusions are not sound.

contemporary Mexico. This is a preliminary thought. But that the topic is important for future research seems clear.

1.4. Concluding comments

Based on this literature review, what are, thus, the (most likely) demand-side mechanisms through which inequality could have been affecting growth in recent Mexican history? This is hard question to answer, of course, and in fact the main objective of this essay is not to answer it but to point out that there are many good reasons for which this question should not be neglected in the literature on the Mexican economy, as it has been. With this caveat, I suggest the following preliminary answers.

Inequality in Mexico could have been negatively related with consumption. Mexico did experience an exports boom since the 1980s but its benefits have been reaped by too few. That the lack of more egalitarian redistribution could have been reducing the incentives for further industrialization, development and growth, because of a small domestic market, seems intuitively plausible. There is a caveat in this reasoning, though. In Mexican recent history the exports boom has been more than offset by an imports boom and that has been the case mainly because the demand for final foreign goods has been extensive, together with the fact that export production need to import foreign inputs to a large extent. Thus, Mexicans' taste may be oriented towards foreign markets. The theme is open for future research.

Inequality and investment could have been negatively related in the recent Mexican history. This is probably the strongest preliminary thesis I have drawn out of the literature review. Virtually all the literature agrees that lack of credit for investment projects has been a major issue behind the poor Mexican economic performance. But the literature has examined neither its links with inequality nor the possible link between inequality and investment in the presence of credit constraints.

At the risk of being repetitive, I would like to stress that the main objective of this paper has been to show that the question of how inequality could have been affecting economic growth in recent Mexican history should not be neglected by the literature, as it has been. Esquivel (2015, p. 27) may not offer many references and/or original evidence but I believe he is right when he claims that “the high inequality reigning in Mexico has in practice already been, and in an strong fashion, limiting the growth possibilities of our economy.” This very important topic should not be a neglected topic in the literature on contemporary Mexican economy.

CHAPTER 2

INEQUALITY AND GROWTH IN MEXICO'S RECENT HISTORY:

A DEMAND-DRIVEN EMPIRICAL APPROACH

2.1. Introduction

Gerardo Esquivel (2011, p. 155) rightly asserts: “That Mexico is a highly unequal country is a fact that has been recognized at least since Alexander Von Humboldt wrote at the beginning of the nineteenth century that the region then known as the New Spain was the ‘country of inequality’. Sadly, this is still true in the twenty-first century.” Indeed, notwithstanding the cheerers for the contrary, despite the fact that Mexico became a middle-income per capita state in the late 20th century, it certainly did not become a middle class country, INEGI (2013). In this paper, I focus on inequality in what I call recent Mexican history: the late 20th and early 21st centuries. Székely’s (2005) estimations of inequality, consisting of 15 points across the 1950-2004 period, yield a Gini coefficient never below 0.42 and as high as 0.57. Furthermore, Székely’s decomposition of three income groups shows that the “best” year, that of 2004, was a year in which 47% of Mexicans were living under poverty, and around 30% were middle class. World Bank data for year 2010 yields a 0.47 Gini coefficient.¹⁹ For econometric analysis, however, the same Székely (p. 927) acknowledges that “only 15 observations (...) diminish the possibilities of making solid statistical inferences.” In turn, Krozer and Moreno-Brid (2014) have recently estimated another series of indicators of Mexican inequality between 1968 and 2012.

¹⁹ In this paper, I do not include the 2009-after global crisis period. It is important to mention, however, that the crisis has brought far-reaching consequences in terms of poverty in Mexico; CONEVAL (2015). It is likely, therefore, that inequality increased as well.

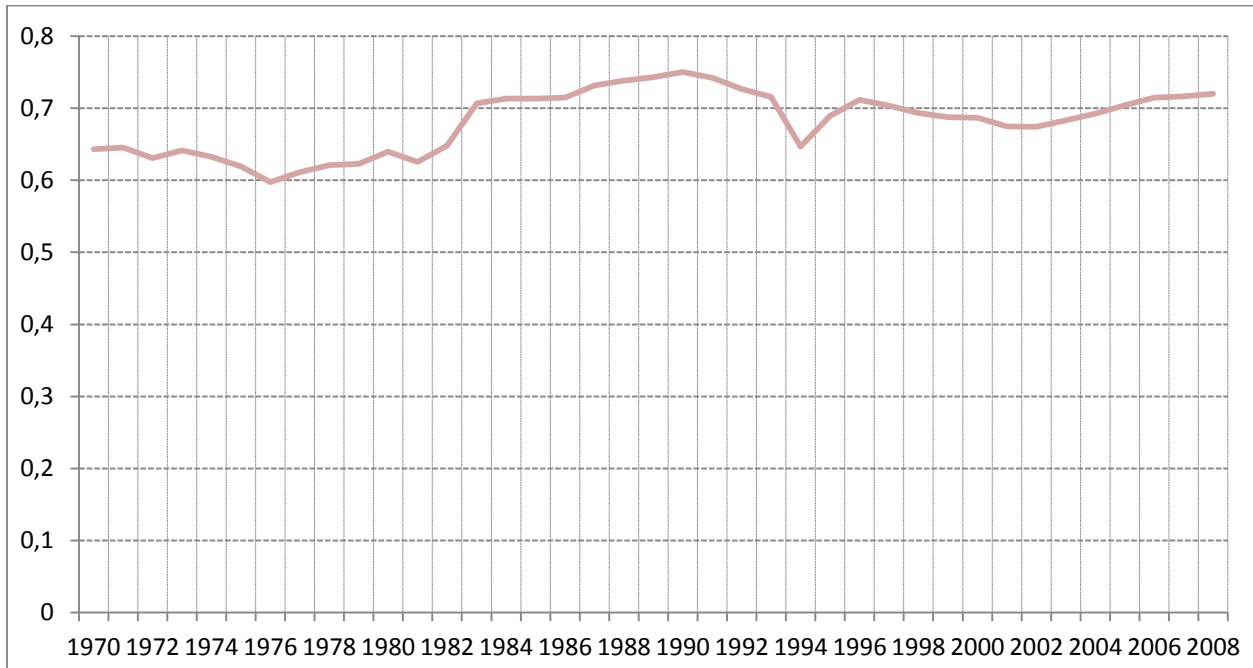
Particularly disturbing are the following three data shown in one of their analytical tables (table 2 on page 5) : (i) these authors' Gini estimates are never below 0.47 (in 2010) and as high as 0.58 (in 1968); (ii) their estimations of the income share of the decile 10 are never below 36% (in 2010) and as high as 48.3% (in 1968); and, most striking than anything else, (iii) their estimations of the share of the income of the deciles 1 to 4 are never above 13.9% (in 2010). Krozer and Moreno-Brid's interesting contribution, however, offers a series as short as 16 observations, with which it is not possible to carry out econometric analysis.

For its part, a large branch of the "heterodox" macroeconomic tradition in which this paper relies has underscored that the functional income distribution is a key determinant of aggregate demand, and therefore of growth. As part of this tradition, the Extended Penn World Tables compiled by Adalmir Marquetti offer a larger data set of the Mexican profit share; <https://sites.google.com/a/newschool.edu/duncan-foley-homepage/home/EPWT>. This is to the best of my knowledge the largest available data set on Mexican inequality. For these reasons, I use such profit share as measure of inequality.²⁰ Figure 2.1 shows the evolution of inequality during 1970-2008. Upon its inspection, we confirm, sadly, that Von Humboldt comments hold still true two hundreds year later: during Mexico's recent history, its profit share has always been above 60%.

²⁰ An anonymous reviewer pointed out the following issue about the profit share as a measure of inequality: if companies are public, for instance, there is no reason to suppose that workers cannot be shareholders. The point is right. But I still think it is appropriate to keep profit share as measure of inequality for two reasons. First, because after the 1980s liberalization process very few public companies persisted in Mexico. Second, and more importantly, because econometric analysis requires the longest series possible to be carried out, and to the best of my knowledge, the series compiled in the Extended Penn World Tables is the longest available dataset of this nature.

Figure 2.1. Mexican Profit Share (annual).

Source: Extended Penn World Tables 4.0.

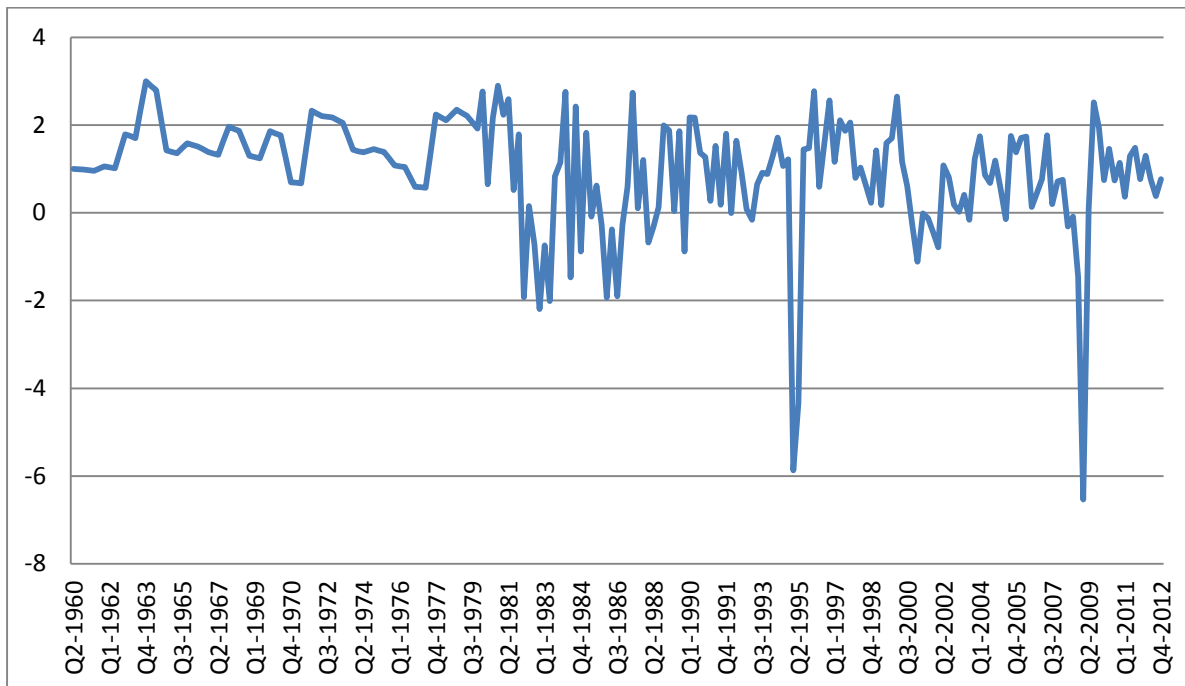


It is also well-known that Mexico's economy has experienced a long period of poor performance in terms of growth, beginning with the debt crisis of 1982.²¹ After the 1940-1980 period of relative growth and industrialization, Mexico has experienced "three lost" decades of recurrent crises and poor performance. Figure 2.2 shows Mexican quarterly growth rates between 1960 and 2012. Descriptive statistics yield 1960-1981 quarterly growth mean of 1.6%, and median of 1.6%, and 1.49%; 1982-2012 quarterly growth mean of 0.55%, and median of 0.75%; and 1960-2012 quarterly growth of 0.98%, and median of 1.24%. This poor performance is disquieting when we are reminded that Mexico's population grew exponentially from 35 million in 1960 to 112 million in 2012 (www.inegi.org.mx).

²¹ Indeed, since the late 1970s economic growth was already not going well. In 1976 there was a severe currency crisis that was only overcome due to the "oil boom" of 1978-1981, in which newly discovered oil resources in southern Mexico were sold in international markets; see Moreno-Brid and Ros (2009, chapter 6).

Figure 2.2. Mexican Economic Growth (quarterly, %).

Source: OECD National Accounts data files.



There is no dearth of explanations for the reasons of this poor economic performance. In fact, there is a hotly dispute about this both in the media and academic circles in Mexico. Levy and Walton (2009a) summarize this debate in terms of two opposing views, one blaming the pro market reforms beginning in the 1980s, and another claiming the lack of more liberal reforms as the root of the problem.²² López-Cordova and Zabludowsky (2010) are good representatives of the liberal position, while Moreno-Brid and Ros (2009) present a measured critique of it. Other

²² Of course, as Levy and Walton (2009, p. 12) clarify, “Few, if any, analysts of Mexico unequivocally hold either the market reform view or the views of what we have referred to as critics of the market. The point of the previous discussion is not to identify individual positions or specific school of thought, but rather to clarify the broad lines of reasoning behind the main explanations for Mexico’s growth and equity puzzle. Most of analysts would hold as more nuanced and richer view than the ones sketched here.”

scholars have also pointed out the role of external constraints and especially of the U.S.A. economy on these recurring crises, Blecker (2009). At the same time, everybody seems to agree that one of the reasons for the high inequality and poverty reigning in the country lies precisely in its poor economic growth.²³ However, virtually no attention has been given to the question of how wealth/income inequality could have affected Mexico's recent economic growth. This omission likely shows, using the words of Paul Krugman's (2014, p. 2) review of Thomas Piketty's *Capital in the 21st Century*, that

Some economists (not to mention politicians) tried to shout down any mention of inequality at all: "Of the tendencies that are harmful to sound economics, the most seductive, and in my opinion the most poisonous, is to focus on questions of distribution," declared Robert Lucas Jr. of the University of Chicago, the most influential macroeconomist of his generation, in 2004.

Even though one has to be cautious to not overgeneralize, it is reasonable to claim there is some truth in this statement for the specific Mexican case. Similarly, referring to out Piketty's already classic abovementioned book, Esquivel (2014, p. 21) reminds us that

In spite of the fact that the problem of inequality was, and is still, present in Mexico—to the extent that our country, together with Chile, is one of the OECD members with the largest disparities between rich and poor people—the topic slowly lost weight within the central debate in the country. In the best-case scenario, it was substituted for the topic of poverty and poverty alleviation policies.

Furthermore, it would be fair to claim that some Mexican economists consider unequal distribution more as consequence than as cause of poor growth. Székely (2005, pp. 926-928) for

²³ It is worth mentioning that even favorable accounts of the impact of poverty reduction programs have recognized that the lack of a sound economy has affected significantly such positive impact; Levy (2006).

example, makes a basic statistical association between growth, inequality and poverty, and says “it implies that the more growth exists the less poverty and inequality.” But he does not mention this relationship could run the other way around too. Likewise, it is reasonable to adhere to Guerrero, López-Calva and Walton’s (2009, p. 111) claim that in Mexico “Analyst typically treat [inequality and growth problems] as separate problems, with different roots and different policy solutions.”

In this paper, I address the question of the possible relationship between inequality and growth in Mexico. I try to answer the question of how, if at all, the high wealth/income inequality prevailing in the country has been related with its poor economic performance during the 1970-2008 period.²⁴

Similar questions have been asked before. As I elaborate on in section 2.2, there is a visible and influential group of scholars considering inequality of opportunities as the main explanation of the poor contemporary Mexican economic performance. Levy and Walton (2009) *No Growth Without Equity?* compiles them. Nevertheless, few scholars have addressed the question of how wealth/income inequality shapes the economic performance, and when the issue has received some attention, it has been only incidentally. This is the case, for example, of Ibarra’s (2008) and López, Sanchez and Spanos’ (2011) works. More importantly, the concern about how wealth/income inequality affects the economy seems unimportant among Mexican economists and policymakers; never mind among the general population.²⁵ My paper contributes

²⁴ My original intention was to focus on the “three lost decades” beginning in the 1980s. But I extended the period back 10 years to be able to use 40 more observations in the econometrics analysis.

²⁵ It would appear that inequity and inequality are the kind of novice practices—including rampant corruption, violence, or inefficient public health, education and law enforcement institutions—that the vast majority of Mexicans simply either accept, prefer to ignore, or try to escape by emigrating out of the country. These attitudes may be at least partially explained by the fact that the prospect of changing those terrible realities seem daunting and impossible from a household point of view. Levy (2009, pp. 236-239) rightly argues that when the “voice” does not work then the “exit” will ensue.

to address this gap by bringing the issue of how inequality could affect growth to the forefront of economic concerns.

In order to empirically answer the question posited, this paper presents a structural VAR (SVAR) analysis. It uses Mexican GDP and Mexican profit share (as proxy for wealth/income inequality) together with the following relevant macroeconomic variables: United States GDP, Mexican government expenditures, and the Mexican real exchange rate. My objective is limited and very precise: to answer the question of how, if at all, wealth/income inequality has been related with growth through an SVAR analysis using key macroeconomic variables. So it is relevant to make López and co-authors' (2011, p. 357) claim mine: "it is beyond [the] objective [of this paper] to give a full explanation of the factors that have shaped Mexico's recent economic evolution".

Having that said, I want to point out the strengths of SVAR analysis in macroeconometrics research. First, VAR partially addresses endogeneity (feedback) issues, which seem unavoidable when GDP is the "dependent" variable of interest and/or when time series data is used.²⁶ Also, the "structural" part of the analysis incorporates economic theory and institutional knowledge to the simple VAR framework, which has often been criticized as lacking of economic content. Moreover, the VAR framework addresses the "incredible restrictions" of macroeconomic models criticized by Sims (1980).

In the toolkit of VAR-SVAR analysis, the "impulse response functions" are very important; Enders (2010), Sims (1980), Stock and Watson (2001). Thus, relying on impulse response function analysis, the main finding of this paper is that inequality and growth are related in an interesting way: an increase in the former very briefly boosts the economy but then

²⁶ Recall Enders (2010 pp. 294-295) discussion about exogeneity in time series data: it means no correlation between the error term and the "independent" variables "at all leads and lags". This is very unreasonable to assume with time series data but even more unreasonable to assume if the "dependent" variable is some GDP.

it depresses it for a much more prolonged period.²⁷ This result should be taken with caution, however, for reasons I discuss in the concluding comments.

The paper is organized as follows. In section 2.2 I go in more detail over the literature on the effects of inequality on growth. In particular, I explain why I choose to empirically research what I call a “demand-driven growth” instead of a “supply-driven growth” approach to explain the Mexican case. I use this terminology mostly for expositional purposes. In section 2.3 I present the empirical SVAR econometric analysis. The .R file with the code is available by request.²⁸ Lastly, in the concluding comments section I critically elaborate on the caveats with which the paper’s results should be taken, and I outline some avenues for future research. In the appendices A and B I explain the data in greater detail and I present the unit root tests of the variables.

2.2. Literature: “Supply” and “Demand-Driven Growth” Approaches

In thinking about the possible links of inequality and growth for a developing economy, the classic economic development literature tended to see large inequality as a bad but necessary consequence of growth/development. As Ros (2013: 393) expresses it: “The combined message of the Kuznets hypothesis and the Smithian trade-off was: “Grow first, redistribute later”.” Theoretically, the question of a reverse negative relationship in which high inequality could depress growth/development was pursued mainly by the “heterodox” (“post-Keynesian”,

²⁷ This is not to say that in Mexico the large inequality is a “coordination failure” (Prisoners Dilemma) in the sense that “everybody would be better off in a more egalitarian framework”. In my view, in Mexico inequality seems to be Pareto-efficient, in the sense that some (the rich) clearly benefit from it and would be worse off in it changed. Rajan (2009) analyzes with three social classes agrees with this point of view. In any case, analyzing the issue is a topic for future inquiry. Refer to the third topic for future research mentioned in the concluding comments for more on this.

²⁸ The stability of the VAR test was also conducted in STATA to double-check that the VAR was stable. Also, the Granger causality tests were carried out in STATA, because it is much easier to do them in that program than is R. The .do file is also available by request.

“Kaleckian”) demand-driven growth literature; Rowthorn (1981), Dutt (1984), Blecker (1989), and Bhaduri and Marglin (1990) are influential contributions, Blecker (1999), (2002) and (2011) are relevant for an open economy. Such theoretical inquiry gave rise to a sizable empirical literature interested in discerning if economic growth for specific country-periods was “wage-led” or “profit-led”. This empirical literature focused mainly in developed economies (Turkey being the exception). It has used different methodologies (separate equations and aggregative models), and it has yield different and sometimes contradictory results; Blecker (2011) surveys it.²⁹

In the 1990s, scholars of the endogenous growth literature started exploring the idea of inequality affecting growth. Theoretically, this body of work posited many channels through which inequality affects growth, including “sociopolitical mechanisms”³⁰ and “economic mechanisms”. Those theoretical inquiries have been accompanied by empirical efforts. These have consisted mainly in cross-country regressions. They have not reached consensus either; reviews of this literature are Benabou (1996), Perotti (1996), Aghion, Caroli and Garcia-Peñalosa (1999), Ros (2000, chapter 10).

For the specific Mexican case, investigations about the possible effect of inequality on growth have been scattered. From a longer historical perspective, Gutierrez-Romero (2007)

²⁹ The Kaleckian growth theory has been contested (Committeri (1986), Duménil and Lévy (1995), Skott (2010) and (2012)) on the grounds that (1) the short-run “Keynesian stability condition” does not extend to the long run; and (2) the utilization rate cannot remain unconstrained (being endogenous variable) in the long run. It is beyond of the scope of this paper to evaluate this debate, but I deliberately do not use the terms “profit-led” or “wage-led”, which are usually associated with the Kaleckian position, to make it clear that for the purposes of this paper I am not taking a side in that debate.

³⁰ The “sociopolitical mechanisms” can be classified into the following three: inequality creates pressures for redistribution and it creates distortionary taxes; inequality creates incentives for groups to engage in rent-seeking activities and leads to social unrest that makes property rights insecure; and inequality leads to polarization and it in turn undermines consensus for policy reforms or security of property and contractual rights. The “economic mechanisms” can be classified into the following three: inequality affects investment in education and it has negative effect on efficiency; inequality increases fertility and population growth and it reduces the steady state value and transitional value of per capita income; inequality may reduce growth by reducing size of the domestic market for increasing-returns industries (Ros 2000, chapter 10). Of all those mechanisms, the last one is the only one which has the flavor of the heterodox literature on growth and distribution.

approaches the issue for the 1895-1994 period using simulations. Moreno-Brid and Ros (2009) based on historical accounts of the 19th century express that high inequality indeed led to low growth, by destroying the ability of reaching consensus on economic policy and thus negatively affecting investment. In regards to the more recent Mexican economic history period, I found two types of contributions that I succinctly call “supply-driven” and “demand-driven” growth approaches.³¹

The supply-driven growth approach, defended by most of the contributions to Levy and Walton’s (2009b) volume, supports the idea that high “inequity”, that is *unequal opportunities*, has been at the center of Mexico’s poor growth in its recent history. Contrary to the classic development literature, these approach explicitly suggests Mexico is not in the upper part of a Kuznets curve (with high inequality as bad but necessary feature of the process of development), but “Rather, high levels of inequality are sources of a range of inefficiencies that lie at the core of the growth problem. Equity is a growth issue” (Levy and Walton 2009a, p. 27). These scholars claim that a self-sustainable, inefficient, rent-sharing equilibrium is the “main obstacle” to faster growth and more equity in contemporary Mexico. I label this approach “supply-driven growth” because in this view the main obstacle preventing growth is the lack of perfect competition in the goods and labor markets. It assumes that once we get rid of monopolies and trade unions, growth will ensue. Thus, it implicitly assumes that there are no demand constraints, and that once more

³¹ Let me clarify more the distinction I have in mind between “demand-side” and “supply-side” determinants of growth. By “supply-side” determinants of growth I refer to the variables that influence how much can be produced assuming that everything that is produced can be sold; the economy does not face any “bottleneck”, so that everything which is produced is sold. Some examples are technological change, labor market and demographic conditions, degree of monopoly concentration, and human capital accumulation. In contrast, by “demand-side” determinants of growth I refer to the variables that influence how much can be sold assuming that everything that is demanded can be produced. Some examples are *the income of the different social classes*, the size of the markets/sectors with different technologies, the tastes for domestic and foreign products, and the demand for physical capital. It is worth noting that, often, variables affect both the supply-side and demand-side. Now, my interest in this paper rests in the ways in which wealth inequality could affect growth through demand-side channels rather than through supply-side ones. For example, I am interested in how inequality could affect growth through investment and consumption decisions (reflected in the GDP) more than how it could affect family decisions on children’s education (as in Galor and Zeira (1993) and Garcia-Peñalosa (1995)).

production is achieved under perfect competition it will be sold without problems, presumably through price adjustments.³²

In my view, the thesis that the lack of equal opportunities prevailing in Mexico is growth-reducing is not debatable. In the literature, impact of inequity on growth is classified into two categories; Bourguignon and Dessus (2009), World Bank (2005). First, scholars mention interactions coming from market imperfections. In other words, they point out that if markets are incomplete or imperfect, “resources are allocated by means of other criteria”, and it “may be inefficient because they [the noncompetitive allocation criteria] can lead to both underinvestment by groups with lower wealth or influence and overinvestment by relatively advantaged groups with less-efficient investment opportunities”; Levy and Walton (2009a, pp. 16-17). Second, scholars point out the effects of unequal power and influence on the choice of policies and the design of institutions, that is the fact that powerful people could design policies and institutions in ways that further favor their interests, with no reason for the outcome to be growth-enhancing. I affirm that it is hard to disagree with the scholars who claim that both of these mechanisms are actually (strongly) operating in Mexico, as most of contributions in Levy and Walton (2009b) do.

Nevertheless, exploring in greater details the concerns and explanations in this body of literature falls out of the scope of this paper primarily because I believe such approach is incomplete for two reasons. These are that (i) wealth/income inequality matters for growth as well as inequality of opportunities, and (ii) demand matters for growth as well. Let me elaborate on these reasons further.

With respect to (i), I think that even if we accept inequity indeed hinders growth, we could still reasonably argue that income/wealth inequality has also been related with the poor Mexican economic growth/development. This could be the case for two other reasons. On one

³² See footnote 31 for more on this distinction.

hand, because it is plausible to believe wealth/income inequality causes inequality of opportunities (both coevolve); on the other hand, because there could also be direct mechanisms through which wealth inequality hinders growth, such as those stressed in the heterodox literature: inequality affects consumption and investment decisions *according to which class* the household belongs to.

With respect to (ii), there is an underlying idea in Levy and Walton (2009b) and other critics of the “rent-sharing equilibrium” is that perfect competition (which includes equality of opportunities in the sense that people/firms have the same chance of entering the markets) is the best way to “align incentives” to get efficiency and productivity, thereby growth/development. But I think it is reasonable to claim that even if there was equality of opportunities under perfectly competitive markets, demand constraints could still hinder growth. Producing under the most efficiently possible conditions is not enough. In my view, demand for consumption, investment, exports and imports still matters, and this is so not only in the short run as the Keynesian tradition stresses.

In any case, I choose to empirically inquiry the possible link of inequality and growth from a demand-driven perspective because the ideas defended by Levy and Walton (2009) and their supporters are incomplete, not because they are wrong. It could equally be argued that the demand-driven approach is also incomplete. That may be accurate, and an integration of both approaches seems a proper and needed task. However, the goals of this paper are more modest. Pursuing an integrative project would be relevant for future research.

Accordingly, in the demand-driven approach aggregate demand matters for growth, wealth/income distribution matters for demand, and functional income distribution is determined by the mark-up pricing of industrial firms; Blecker (2011). The canonical story is that a

distribution favorable for the capitalists may boost investment, but it may depress aggregate consumption with an ambiguous effect on net exports, such that aggregate demand may shrink. For the recent Mexican history case, specifically for the 1980-2007 period, two papers have to some extent addressed the relationship between inequality and growth: Ibarra (2008) and López, Sanchez and Spanos (2011). But these papers address the issue only incidentally because their main interest is the impact of other variables on Mexican economic growth; their main interest is the real exchange rate. Furthermore, with respect to the role of inequality on growth these scholars reach opposing conclusions. For López et. al. (2011) an increase in the profit share (coming from an exchange rate depreciation³³) is associated with less growth, while for Ibarra (2008) it is associated with enhanced growth. Bringing inequality to the forefront of the analysis, and extending the examination to the 1970-2008 period, I found that inequality has been related with growth in the way I already described. I turn now to present the SVAR empirical analysis on which such result is based on.

2.3. Empirical analysis: Structural Vector Autoregression

The five variables of the empirical analysis that follows are: the difference of the natural logarithm of the Mexican GDP, the Mexican Profit Share, the difference of the natural logarithm of the USA GDP, the difference of the natural logarithm of the Mexican Government

³³ In Lopez et. al, (2011, p 360) aggregate consumption is posited as function of the wage share, which in turn is function of the real exchange rate and protection. But these scholars say that “we don’t have quarterly time series” for the wage share and thus pursue all their analysis in terms of the real exchange rate and protection.

Expenditures, and the real exchange rate. In the appendices A and B I explain these variables more in detail, showing their level graphs, and presenting their unit root tests.³⁴

2.3.1. Granger Causality Tests

Before engaging in the proper structural VAR, I did the so-called Granger “causality”³⁵ tests. Table 2.1 presents the p-values of the tests statistics. For the purposes of this paper, the most important result is that the null that the profit share does not Granger “cause” Mexican GDP can be rejected at the 1% significance level (bold entry in italics). Overall, several nulls stating “x-variable does not Granger-cause y-variable” can be rejected at significant levels.

There is an anomalous result, though. It is that the null that USA GDP does not Granger cause any of the other Mexican economy variables cannot be rejected with any of those four Mexican variables. From a non-statistical point of view, this is, however, extremely hard to believe, given that it is a *consensus* among scholars that the Mexican economy has been dependent on the American one, particularly since the liberalization process which began in the 1980s and still continues until the present. In my view, this is an example in which institutional-historical knowledge should prevail over statistical tests in Economics. Thus, I will keep the United States GDP as one of the variables interacting with the Mexican economy in the following SVAR.

³⁴ By “difference” I mean difference with respect to the last quarter and not difference with respect to the same quarter of the previous year. I used the “quarterly differences” because the original series gotten from the OECD are already seasonally adjusted.

³⁵ The “causality” word could be confusing, because the tests do not include current values of the right-hand side variables but only past values. Therefore, it is possible that some variable x does not Granger “cause” y and yet y is not exogenous with respect to x ; Enders (2010, p. 318). Nevertheless, I use the dominant terminology.

Table 2.1. Granger “causality” tests.

Independent Variable	Dependent Variable in the Regression				
	$\Delta \ln \text{MexicanGDP}$	Profit Share	$\Delta \ln \text{UsaGDP}$	$\Delta \ln \text{Gov}$	RExch
$\Delta \ln \text{MexicanGDP}$	-	0.005	0.504	0.201	0.551
Profit Share	0.000	-	0.255	0.042	0.353
$\Delta \ln \text{UsaGDP}$	0.8504	0.929	-	0.414	0.668
$\Delta \ln \text{Gov}$	0.484	0.044	0.486	-	0.085
RExch	0.001	0.000	0.091	0.808	-

2.3.2. Structural VAR

Moving now to the structural VAR itself, a structural vector autoregression analysis (SVAR) is a blend of the vector autoregression (VAR) framework, with almost none economic theory because it treats every variable as endogenous, and economic theory, because the contemporaneous relationships among the variables are posited using economic theory and/or institutional-historical knowledge.

Given the $x = [\Delta \ln \text{MexGDP} \quad \text{ProfShare} \quad \Delta \ln \text{UsaGDP} \quad \Delta \ln \text{Gov} \quad \text{RExch}]^T$ vector of variables, the structural VAR I estimated is the following:

$$Ax_t = \alpha_0 + \Gamma_1 x_{t-2} + D + B\varepsilon_t$$

in which each entry of the of the error vector, ε , is assumed to be a white noise; α_0 is a vector with the intercepts; D is a matrix with binary variables (“dummies”) controlling for the crisis the

Mexican economy went through the period 1970-2008 that virtually all the literature has recognized (see footnote 21). These are the 1982-1983, 1986, 1995 and 2008-? crises.³⁶

The key identifying restrictions imposed on the B matrix are the following³⁷:

$$B = \begin{bmatrix} 1 & b_{12} & b_{13} & b_{14} & b_{15} \\ b_{21} & 1 & 0 & 0 & b_{25} \\ 0 & 0 & 1 & 0 & 0 \\ b_{41} & 0 & 0 & 1 & 0 \\ b_{51} & 0 & b_{53} & b_{54} & 1 \end{bmatrix}$$

In other words, I am imposing the following five sets of identifying restrictions. (i) Mexican GDP is contemporaneously influenced by all the other variables. In my view, this is fairly realistic. The only plausible debate could be if inequality indeed affects GDP contemporaneously. However, it is a tenet of the “heterodox” literature that inequality matters contemporaneously. This paper supports that view. (ii) Inequality is contemporaneously influenced only by the Mexican GDP and the exchange rate. In other words, I assume the USA economy determines Mexican inequality but not contemporaneously and I assume the same with respect to Mexican government expenditures. The vast literature in the world known “PROGRESA-Oportunidades” poverty reduction program offers evidence to support the second assumption.³⁸ (iii) USA GDP is not contemporaneously affected by any of the Mexican variables. This assumption is, in my view, mere common sense and not controversial. (iv) Government expenditures are contemporaneously determined only by the Mexican GDP. In this respect, someone could argue that inequality affects government expenditures

³⁶ The lag length (2 lags) seems to be uncontroversial because of the following reason. It was unambiguously chosen by the AIC, HQ, SC, and FPE criteria, both allowing a maximum of 12 lags (3 years) and allowing a maximum of 5 lags (following the rule of thumb of allowing a maximum of $T^{1/3}$ lags, which in our case is $156^{1/3} \approx 5$) and also both allowing an intercept and not. Therefore, I conducted 16 tests and with each of them 2 lags was suggested as the proper specification.

³⁷ In the SVAR econometrics terminology, this is called “short-run” SVAR, which means the restrictions are imposed in the contemporaneous relationships among the variables. For its part, a “long-run” SVAR places restrictions on the long-term accumulated effects of the innovations; Amisano and Gianini (1997).

³⁸ Levy (2006) is an influential compilation of the evaluations of this program.

contemporaneously, but I don't think so. On the contrary, government expenditures "follow", so to speak, inequality. Again, the vast literature about "PROGRESA-Oportunidades" program offers some evidence in this respect. (v) The real exchange rate is contemporaneously influenced by all variables except inequality.

With these assumptions we get an identified system from which the crucial impulse response functions (IRF) are obtained; they are not obtained from the avoid of economic content "Cholesky decomposition".

2.3.3. Impulse Response Functions

As it is well-known, differently from regression analysis in the VAR-SVAR framework individual estimated coefficients, their standard errors and their t and F -statistics are not primarily important but the richer interactions of the whole system are analyzed primarily with the "impulse response functions"; Stock and Watson (2001) Enders (2010, pp. 307-312). Taking into account all the reduced-form VAR estimated coefficients (that is, all the interactions of all the lagged variables) and the contemporaneous effects restrictions, an IRF shows the impact of a one-unit exogenous shock in the "error" term of x -variable on y -variable during n periods.³⁹

For the purpose of this paper, the most important question I raise is the following: taking into account interactions of all the lagged variables and the contemporaneous ones restrictions, how does an exogenous shock in the profit share affects the (difference of the natural logarithm)

³⁹ It is beyond the scope of this paper to explain in detail what the IRFs are. But in short, they are functions showing how a variable changes after another variable changes, across time, taking into account the OLS estimated coefficients (of the underlying VAR), and the restrictions imposed in the contemporaneous relationships (the SVAR). Confidence intervals are built using the estimated coefficients as well; see Enders (2010, pp 307-315) for 2-variables 1-lag introduction to impulse response analysis). This paper uses the "bootstrapping" method to build the confidence intervals.

Mexican output? The following figures show the respective IRFs, which could be used to answer such question. Figure 2.3 shows the impact after 3 years, Figure 2.4 after 6 years, and Figure 2.4 after 9 years.

Figure 2.3. Impulse Response Function, 3 years.

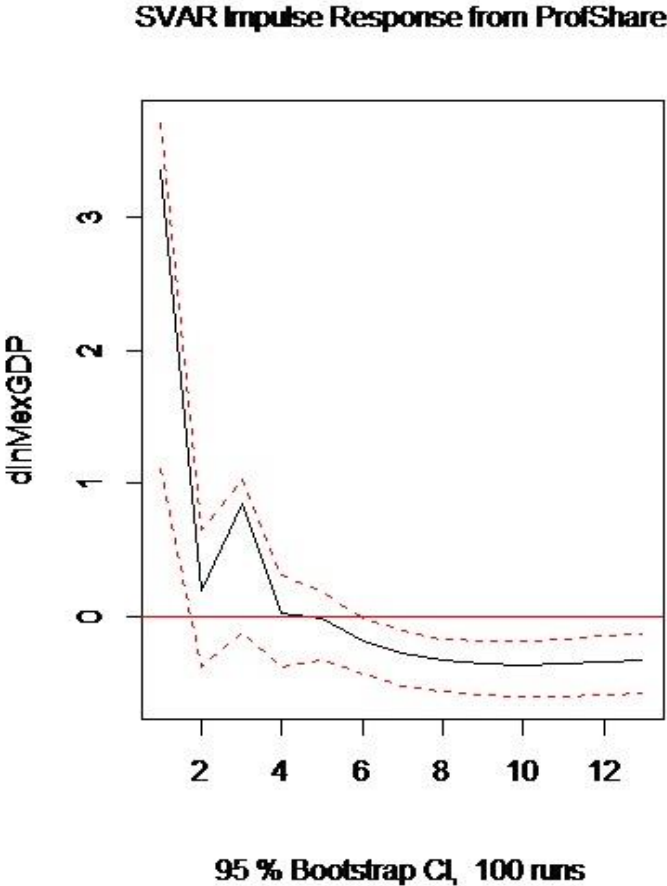


Figure 2.4. Impulse Response Function, 6 years.

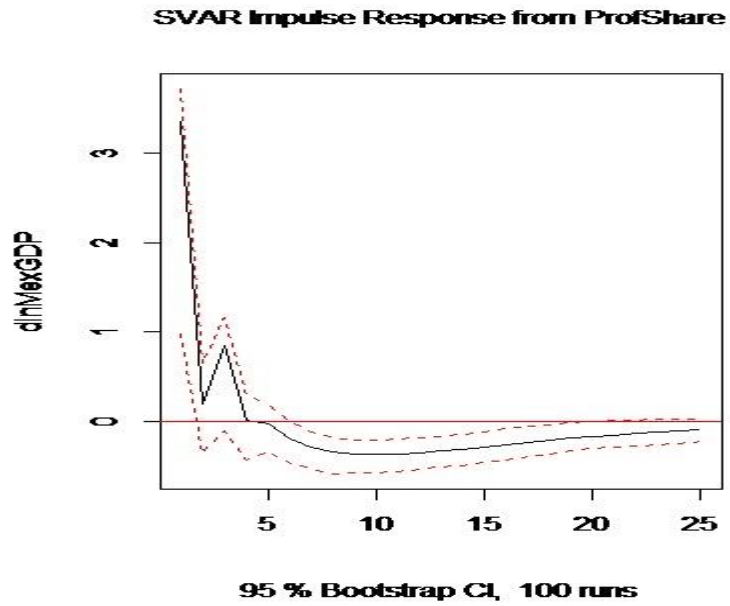
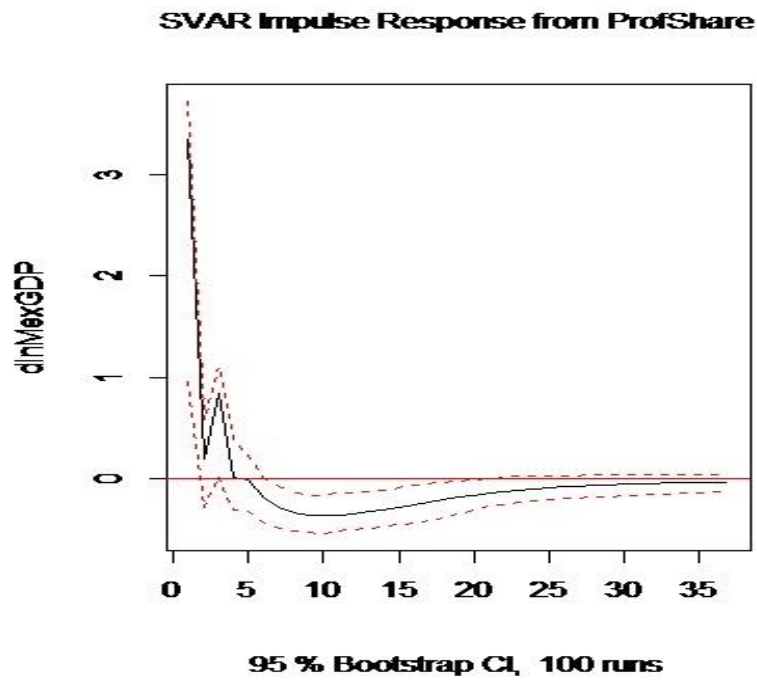


Figure 2.5. Impulse Response Function, 9 years.



From figures 2.3 and 2.4 we can observe a very interesting dynamic that for explanatory purposes could be divided in five stages:

1. The increase in inequality initially boosts the economy. This is, nevertheless, statistically significantly different from 0 *only in the very first quarter*.
2. The following three quarters the effect is still positive but at an increasing rate first (quarter 2 to 3) and at a decreasing rate later (quarter 3 to 4). During these three quarters, however, such positive effect is not statistically significant different from 0.
3. Beginning the second year the effect is negative. This negative effect is not statistically different from 0, however, until one and half years have passed (period 6).
4. After one and half years, *inequality depresses the economy for a significant period of time: approximately until 5 years have passed* (period 20). This negative effect is *statistically significant different from 0*.
5. After 5 years the effect disappears. Indeed, figure 2.5 is only shown to confirm that there is no affect after sometime (20 quarters). This was expected given that the stability tests gave evidence to support the VAR is stable.

In short, the main finding of this paper is that *Mexican inequality initially boosts the economy but this effect is very short-lived and, most importantly, deceitful because after some time it depresses the economy for a more considerable period of time*.

2.4. Concluding Comments

In a place where many extremely poor people co-exist with very few extremely rich people, as is the case in Mexico's recent history (and even before), one can intuitively believe that this

disparity could have a negative impact on output as a whole. This intuition stems from reasoning it is likely that inequality is related with reduced aggregate consumption even if with increased investment, and that it is also likely related with vastly unequal access to health services, education opportunities, law enforcement services, productive projects, and so on and so forth. The SVAR analysis I used for this paper between Mexican GDP, inequality (measured with the profit share), U.S.A GDP, Mexican government expenditures and Mexican real exchange rate during the 1970-2008 period offers a partial vindication of such intuition.

This partial vindication, however, should be taken with caution, at least for the following two reasons. First, because as it is often the case in heterodox macroeconometrics –to be fair, in macroeconometrics in general- I did not work with the best data for the simple reason it does not exist. The proxy I used to measure inequality is the quarterly profit share, but in fact the original source was yearly data and I built the quarterly data assuming the annual changes were “smooth” (see appendix A). Furthermore, the profit share is not the only measure of inequality: there are several others. However, the longest series of a measure of inequality used in the literature I could find was the 1970-2008 annual profit share given by the Extended Penn World Tables (version 4.0). That is why I built my series based on such source. Nevertheless, it is *one out of many* measures of inequality and it would be misleading to claim it is a perfect one.

Second, and this is to some extent related with the first concern, I do not claim my results are conclusive for the simple reason this paper is certainly “isolated” in the literature. In other words, it is one of few papers addressing directly the question of how wealth/income inequality has, if at all, affected output in Mexico in its recent history. Such novelty certainly calls for measure, while at the same time one has to trust the results, for the simple reason that conclusive

theses have to be consolidated within the context of a solid body of literature. Until such body emerges, the results of this paper have to be taken with caution.

Identifying this exiting gap in the literature opens up avenues for future research. Three stand out as most pressing: First, a logical consequence of what I stated above, is contributing to the examination of the relationship between wealth/income inequality and growth. Future studies would have to use different measurements of inequality, different time periods, different specifications, and probably different methodologies. This is clearly an area for future fruitful inquiry.

Second, as mentioned in section 2.2, there is another “supply-side growth” branch of literature (more solidly consolidated than the “demand-driven” one in the Mexican case) arguing that unequal opportunities are at the very center of the reasons for the poor contemporary Mexican economic performance. This idea is hardly controversial. But, to reinstate, it is incomplete. One could argue the “demand-driven growth” approach is also incomplete. In my opinion, that is right. The literature pointing out that a “rent-sharing” equilibrium is constraining the Mexican economy should not be ignored. Accordingly, an integration of both approaches is an ambitious project out of the scope of this paper, but it clearly arises as topic for future research.

Third, if my conclusion (together the ideas defended by Levy and Walton (2009) and their supporters) is (are) right, the policy conclusions are straightforward: the large inequality in Mexico should be dealt with, not only on moral grounds, but also because the analysis of economic performance provides the evidence for it. “Fixing inequality” is, however, easier said than done. Careful inquiry about the forces keeping Mexico in the “inequality trap”⁴⁰ is a

⁴⁰ In this paper, the term inequality trap is understood along Ros’ (2000, chapter 10) lines, for whom a growth slowdown keeps the economy longer in the middle-income level range in which inequality is higher, but that in turns

preliminary but necessary step to offer more insightful and sound policy recommendations. To put it in terms of game theory, analyzing the Nash equilibrium sustaining the inequality trap in Mexico is a necessary step to offer insightful policy advice. It arises as a fascinating avenue for future investigation.

Mexico is a very unequal country. It is a tough and unfair situation for the vast majority of the population, and its effects in terms of the quality of life of such majority are hard to overemphasize.⁴¹ Talking about unequal opportunities, Levy and Walton (2009a, p. 39; italics are mine) say that “undertaking serious change is urgent if the vast majority of Mexico’s citizens are not going to remain *long-term victims* of a slow-growth, inequitable society.” Even the people who benefit from the status quo have to recognize occasionally that wealth/income and opportunities inequalities are morally unacceptable. The results of this paper show that wealth/income inequality might also have effects in terms of economic performance. In my opinion (and this view is not singular, recall Esquivel (2014) comments quoted in the Introduction) Mexican economists and policy makers have not brought such concern to the center of the issues to be discussed. I want to conclude mentioning again that while the results of this paper should be taken with caution, bringing this concern to the forefront of economists and policy makers’ discussions, and consequently starting to fill an existing lacuna in the literature, is a worthwhile endeavor.

does not help income growth and it could even produce a setback. By contrast, Rao (2006) or Guerrero, López-Calva and Walton (2009), understand the term as inequality being perpetuated across generations.

⁴¹ The first version of this paper was submitted for peer-review in January 2014. At the time of the revisions (November 2014) the tragic disappearance of 43 students of the Ayotzinapa school, in the state of Guerrero, has finally achieved what the worldwide media refused to recognize before—that in Mexico massive violence, massive corruption, and massive impunity are rampant and prevailing. It is not a big leap to think that they coevolve with the also prevailing massive inequality.

CHAPTER 3

INVESTMENT AND CREDIT CONSTRAINTS IN MEXICO, 2005 AND 2009-2010

3.1. Introduction

Virtually all scholars on recent Mexican economic performance agree one of main reasons explaining its lackluster growth, after the vast liberalization process it has gone through since the 1980s, is that it is very difficult to obtain financing for productive projects. Kehoe and Ruhl (2010) say that “The most popular set of theories for Mexico’s stagnation focuses on its inefficient financial system and lack of contract enforcement” (p. 2011).⁴² Indeed, in 2013-2014 a legal reform involving changes in more than 30 laws with the spoken purpose of improving access to finance was launched; Skelton (2014) presents an optimistic point of view on it.⁴³ But the dominant (that is, held by policy makers and scholars with influence on policies) point of view on “the hearth of Mexico’s growth challenge” is it lies in the low productivity of the vast majority of Mexican enterprises. From this point of view, thus, inefficient financial systems do not help productivity; quote in Bolio and McKinsey Global Institute (2012, p. 6), other contributions adhering to this view are Tinoco-Zermeño and Venegas-Martínez (2014), Gordon H. Hanson (2010), and Kohel and Ruhl (2010). Other scholars, however, have sustained what I

⁴² In this paper, the very relevant rule of law issue (including enforcing contracts) and violence issues are not studied at all. However, it is worth mentioning that the magnitude of the problems is now acknowledged even in very influential outlets which not long ago seemed to endorse the official point of view according to which there was a “Mexican moment.”

<http://www.economist.com/news/21566314-enrique-pe%C3%B1a-nieto-mexicos-newly-elected-president-sets-out-his-priorities-mexicos-moment>

<http://www.economist.com/news/americas/21640397-president-who-doesnt-get-he-doesnt-get-it-mexican-morass>

Even Bolio and McKinsey Global Institute. (2012) who, on one hand, only speaks of (p.3) “continuing to improve security”, on the other hand also mentions the country was ranked 139 out of 144 on organized crime by the World Economic Forum rankings in 2012-2013; World Economic Forum (2013).

⁴³ At the time of this writing, July 2015, the results of this so-called “structural reform” results are still not seen.

consider a more reasonable point of view, rooted in deeper analysis of Mexican economic history and not in *a priori* constructed (if mathematically/statically sophisticated) growth models. These scholars argue the productivity slowdown is more a consequence than a cause of the growth slowdown the country has experienced. They highlight poor investment demand as the key issue explaining the sluggish Mexican performance and in turn explaining it in terms of the lack of bank finance for productive activities, the low public investment, the elimination of all types of industrial policies, and the real exchange rate appreciation; Moreno-Brid et al. (2005), Moreno-Brid and Ros (2009) and (2010), and Ros Bosch (2013a).⁴⁴

When digging deeper in the literature of either point of view, however, many general comments stating credit constraints have negatively affected growth but very few detailed empirical analyses of how, if at all, that has been the case are found. On the particular effect of the lack of financing on investment, to the best of my knowledge only Cotler and Woodruff (2008) and Love and Sánchez (2009) have recently examined the topic. The first contribution is much localized, hardly nationally representative, however, and the other is actually not that recent; it is worth highlighting those contributions are empirical, econometric studies which do not take standing in the macroeconomic debate on the reasons of the Mexican sluggish growth.

The idea that credit constraints have negatively affected investment in Mexico may sound as common sense. Nevertheless one would still like to find more empirical evidence. This paper tries to help to start filling out this literature lacunae. Using econometric methods, in this paper the question of how, if at all, financial constraints have affected investment decisions on physical capital in contemporary Mexico is addressed. Given the best, to the best of my knowledge,

⁴⁴ This is not to say, of course, that the dominant point of view does not mention low investment as part of the explanation of the lackluster economic growth. Hanson (2012, p. 8-9) for example, actually says credit constraints have negatively affected productivity through the investment channel. Likewise, and needless to say, the alternative approach does not dismiss productivity issues either.

available establishment-level surveys both somehow recent and with the intention of being nationally representative, the World Bank Enterprise Surveys (hereafter WBES), the analysis is carried out for the years 2005 and 2009-2010 (hereafter 2010 as shorthand). Each year is analyzed separately because the establishments covered in each survey are not the same.⁴⁵

The WBES offer a good data set to tackle the research question even though they have an important missing part of information. It is they virtually include only formally registered establishments with more than 5 workers when it is nonetheless known a very significant portion of the Mexican economy, and in fact the one hiring most of workers, consists of “informal”, operating out of the law, establishments, very likely with less than 5 workers; Instituto Nacional de Estadística y Geografía (INEGI) (2004) and (2011), and Bolio and McKinsey Global Institute (2012); see the appendix C for details.⁴⁶ However, for the reasons explained shortly, missing this information could strengthen the results of this paper.

Consistent with the general comments of the literature, the findings of this paper are that financial constraints negatively affected investment decisions in 2005 and 2009 -2010. Thus, this paper offers empirical support to the claims of Moreno-Brid et. al. (2005), Moreno-Brid and Ros (2009) and (2010), and the secondary comments of the dominant point of view (see footnote 44)

⁴⁵ Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank.

The WBES were carried out in 2006 and 2010-2011 with (most of) questions referring to the last fiscal year, which in Mexico is the same as the calendar year. This is the reason for which I say the analysis was carried out for 2005 and 2009-2010. The majority of the establishments in the 2010-2011 WBES were interviewed in 2011: 1127 out of 1480. Thus, the 2010 WBES is mainly about 2010. This is the reason for which I often use “2010” as shorthand for “2009-2010.”

Access to a much larger, panel data set (1998-present) of firm-level data information on the sources and uses of financing was denied by the Mexican Central Bank (“Banco de México”, Spanish acronym BANXICO) because of confidentiality issues. In any case, this larger in terms of time span data set does not include the several control variables of the empirical analysis. Thus, proxies for these other variables would have to be used.

⁴⁶ Another ongoing salient debate on contemporary Mexican is if informality is more a cause (for some, the main cause) than a consequence of the poor performance of the economy. OCDE (2012) presents the former and Ros (2013a) the second point of view. In my opinion, Ros’s argument is stronger to begin with because, as Hanson (2012) points out, the alleged incentives favoring informality (dual social security system) didn’t exist until the late 1990s.

according to which the little lending by financial actors for productive projects has had a negative effect on capital accumulation.

From a methodological point of view, two aspects of the paper are worth highlighting. First, it uses good quality microeconomic, establishment-level data, clearly more reliable than aggregated macroeconomic one. Second, the analysis addresses the difficult issue of the possibility of endogeneity between financial constraints and investment. This possibility is usually assumed in the literature on the effect of credit constraints on innovation investment and its logic holds for physical capital investment as well; Savignac (2007), Gorodnichenko and Schnitzer (2013), Lorenz (2014).

As I just said, the WBES surveyed mostly legally operating, “formal” enterprises with more than 5 workers but it is well-known the “informal” are establishments very important in the Mexican economy. Missing this part of information, however, could actually strengthen the results of this paper. If credit constraints negatively affected investment of the large, formal firms they will almost certainly affect the small, informal firms in a more acute way: an informal firm typically will not have access to formal credit through the banking system. The selection bias in the data set – the overweighting of large formal sector firms – reinforces the conclusion.⁴⁷

The paper is organized as it follows. Section 3.2 presents a more detailed literature review. Section 3.3 presents preliminary aspects of the econometric analysis, among them the key issue of the possibility of endogeneity. Section 3.4 presents the econometric results. The last section presents concluding comments.

⁴⁷ Another missing part of the WBES is they don't cover the south of Mexico, which is known to be poorer and more backwards than the rest of the country. But, again, and for analogous reasons, missing this part could actually strengthen the results.

3.2. Literature

Significant attention has been/ and is devoted to the topic of financial constraints and growth in developing economies; proof of this is the recent volume 5 of the Handbook of Development Economics contains a chapter entitled “Access to Finance” Karlan and Murdoch (2010). Several contributions have examined the effect of credit constraints on industrial growth, mostly addressing the questions at the firm level. In most developing countries, the size distribution of firms is characterized by a “missing middle”. Most firms are very small and a very small number of firms are very large. The vast majority of smaller firms face acute credit constraints, due to lack of collateral, etc., and also infrastructural constraints. This has emerged, according to many analysts, as one of the most important constraints on industrial growth; Banerjee and Duflo (2014), Bigsten et al. (2003), A. Galindo and Schiantarelli (2003), Harrison and McMillan (2003), Hericourt and Poncet (2007).

Since the 1980s Mexico engaged in a liberalization and openness process whose last round of reforms occurred in 2012-2014 with the end of the state ownership on oil and energy resources, among other so-called “structural reforms”; Lustig (2001) presents an early assessment; Moreno-Brid and Ros (2009), Hanson (2010) and (2012) are more recent ones. Either to support further liberalizing reforms or to propose an alternative approach virtually all scholars and policy makers have agreed growth has not been the expected growth. As I already said, the dominant point of view blames low productivity while an alternative one highlights the role of the low physical capital investment. All agree credit constraints have played an important

role. But few detailed empirical studies have been done on how financial constraints have negatively affected productivity and/or investment and therefore growth; and/or directly growth for that matter.

When digging in the literature, several contributions on the reasons for which lenders, especially the banks, lend so little for productive purposes in Mexico, even if credit for consumption and housing has increased, are found. Bergoeing, Kehoe, Kehoe, and Soto (2002) compares Chile and Mexico bankruptcy laws; Haber (2005), and Haber et al. (2008) focus on the banks privatization process. Mántey de Anguiano (2007) points out banks make good enough profits by buying government bonds and engaging in the derivatives market. Haber (2009) offers evidence to support the problem lies in the oligopolistic banking system and in the difficulties for lenders in seizing assets from borrowers if the later default. Haber and Mussachio (2012) offer a detailed study of the impact of foreign banks entry in Mexico. Tinoco-Zermeño, Venegas-Martínez, and Torres-Preciado (2014) examine the effect of inflation on low rates of bank credit. Chavarín Rodríguez (2015) rejects the idea that low lending comes from borrowers who don't pay back on time.

Contributions focusing on the distributional dimension of credit constraints, that is, offering evidence and/or explanations of why small and medium size firms are more credit constrained than large ones, are also found; Garrido and Prior (2007), Lecuona (2009), Clavellina (2013). Relatedly, there are contributions focusing on the impact of credit constraints on poverty and on informality; Niño-Zarazua (2013), Carreón, Di Giannatale, and López (2007). Bruhn and Love (2014) examine the gender dimension of the issue. Using quasi-experimental data they examine how relaxing credits constrains affects entrepreneurship, employment and income of men and women.

An interesting experimental study is McKenzie and Woodruff (2008). It examines if easing capital constraints (revenues) affects firms' profits. The likely endogeneity of the independent variable is addressed through a randomized experiment. These scholars designed and launched an experiment in which grants were randomly given to enterprises similar in many respects. The effect on profits was found to be positive and significant. Also, these scholars say (p. 477) that "In Mexico, returns are much higher than interest rates offered by banks and microfinance firms. The leading explanation for such high returns is that many of the firms are credit constrained, causing them to operate below their efficient size." Such "leading explanation" is tested by interacting measures of credit constraints with the randomly assigned grant. It is found that indeed the return was higher among firms which reported being credit constrained.

As for policy advice on how to improve access to credit, especially for smaller firms, the mainstream point of view always remains in the free markets framework: improve the rule of law and make financial system more competitive. Some scholars have nevertheless called for more state intervention, especially through national development banks (Calva (2007), Levy Orlik (2007)), or implied it (Moreno-Brid (2013)).

It may be difficult to find or collect data on the issue. But given that it would evidence to support the dominant point of view one would expect several empirical studies on how credit constraints have negatively affected productivity. Such body of literature couldn't be found, though. One contribution offering empirical evidence to support the mainstream point of view are Villalpando (2014).

Contributions on how credit constraints have, if at all, affected investment are also difficult to find; again, probably the difficulties in finding or gathering data may explain this

literature lacunae. Scattered papers are found. Gelos and Werner (1999) examine how credit (cash flows) affected investment in manufacturing firms from 1984 to 1994. Sánchez (2001) finds cash flows had a significant effect on investment on manufacturing establishments for 1984-1999. Castañeda (2003) goes over the relationship of cash flows and investment before and after the 1995 acute crisis. More recently, Cotler and Woodruff (2008) and Love and Sánchez (2009) have examined the issue.

Cotler and Woodruff (2008) examine the impact of micro-lending on physical capital investment, among several “measures of the firm’s performance”. Overall, a positive and significant relationship between obtaining a loan and investment in fixed assets is found. The data of this contribution is quasi-experimental, that is, it consists of both a “treated” and a “control” group of enterprises similar in many respects, coming from a real world event. But the access to this type of data, if on the one hand clearly strengthens the results, on the other hand implies a shortcoming. It is that the study is circumscribed to small retailers, very likely with no paid workers, located in two neighborhoods of the suburban area of Mexico City. Mexico is a very large, highly uneven, and complex country. Results obtained from small retailers of two neighborhoods of Mexico City are hardly representative of the whole country. To be fair, indeed Cotler and Woodruff seem to be aware of the scope of their findings (p. 848).

Love and Sánchez (2009) tries to show some rural agents in Mexico are credit constrained, addresses the question of how credit constraints affect investment in Mexico, and attempts to estimate the effect of removing credit constraints on investment. The paper is circumscribed to rural Mexico but it uses surveys which are nevertheless representative at the national and regional level. These scholars find evidence to support that the easing of credit constraints would increase the number of agents investing and their quantities of investment. The

findings, however, are not that recent, because they are obtained with surveys from 1999 (representative at the regional level) and 2001 (representative at the national level). Furthermore, even if this contribution could be more nationally representative than the above describes it is still only circumscribed to the rural sector. Some 75% of Mexicans live in urban areas, though.

3.3. Econometrics Preliminaries

3.3.1. World Bank Enterprise Surveys for Mexico

The World Bank Enterprise Surveys offer a rich source of information of Mexican establishments; some of them part of larger “firms” and some not.⁴⁸ Each survey interviewed 1480 establishments covering almost the whole country. Each survey also offers information about several different industries (food, textiles, construction, services, and eight others). Most of the surveys (see footnote 48) offer information about the general characteristics of the establishments: ownership, legal status, size, and so on and so forth; their infrastructure and services: electricity, water, internet, phone, and related; their sales: national or international, main/secondary products/services, and so on and so forth; their supplies: domestic or foreign; their costs: labor, raw materials, etcetera; their degree of competition and innovation; their

⁴⁸ Both the 2006 and the 2010-2011 WBES are divided in three surveys: one for manufactures, one for services, and one for “others.” Each survey is slightly different. Some have extremely detailed questions; for example, the 2006 survey on manufactures asks what percentage of the establishment’s main product/service was sold in its same “municipality” (the smallest governance unit in Mexico). Here I just present a very brief general description.

The calculated percentages of section 2.1 are rough estimates because they take 1480 as 100%, that is, they are calculated without erasing the missed observations (in turn the case if either the establishment was not asked about something, if it was but it did not answer, or if it was but it didn’t know).

capacity utilization; their land and interest or pressure to be environmentally responsible; their relationship with courts; their relationships with crime; their relationship with the government; their finance; their labor force: number, permanent or temporary, their education, and so on and so forth; and the self-perceived main constraints to their operation.

Four things about the WBES on Mexico are worth mentioning. First, the establishments surveyed are mostly domestically owned. 1342 (90.67%) establishments of the 2005 survey are such that the percentage owned by domestic individuals, companies or organizations is 100%, and that's the case in 1311 (88.5%) establishments of the 2010 survey. Second, the 2005 WBES offer information of establishments whose inputs come mostly from Mexican markets; although if the suppliers were national or foreign is not said. In it 756 establishments (51%) reported they had bought 0% of inputs/supplies from foreign markets, and only 120 reported they had bought 50% or more inputs/supplies from abroad. In turn, in the 2010 WBES the source of inputs is slightly more mixed but still clearly more national than foreign. In it, 436 establishments (29.46%) reported they had bought 0% of inputs from abroad, 241 reported they had bought 50% or more, and 88 reported they had bought 80% or more. Third, most of the establishments' sales are domestic or sold to domestic establishments which in turn export them (which the WBES calls "indirect exports"). For 2005 1332 establishments reported 0% of their sales were direct exports. For 2010 the survey has few more establishments exporting directly but it still mainly consists of establishments selling domestically or selling to other establishments which in turn export. In it, 1054 establishments reported 0% of their sales were direct exports, and only 57 reported 50% or more of their sales were direct exports.⁴⁹ Fourth, many of the establishments

⁴⁹ The following important point was brought up to me in earlier presentations of this paper. It was pointed out that the survey does not represent the large exporting firms doing fairly well in Mexico; as the "two Mexico's" term mentioned in Bolio et. al. (2014) highlights. In this respect, it is very likely (we can't be sure because of

surveyed made handsome profits, at least for Mexican standards.⁵⁰ In 2005 only 2.7% were not profitable, 75% made more than 1 million pesos, 52% made more than 10 million, 41% made more than 100 million, and 38% made more than 1000 million. In 2009 4.8% were not profitable, 75% made more than 1 million pesos, 50% made more than 10 million, 34% made more than 100 million, and 28.5% made more than 1000 million.

3.3.2. Credit Constraints and Investment in Mexico, 2005 and 2009-2010

The measure of investment used in this paper is if in the last year the establishment bought fixed assets such as machinery, vehicles, equipment, land or buildings (*Investment*).⁵¹ With respect to the independent variable of primary interest, a binary variable based on a purposely more objective measure built precisely on the basis of the information offered by the WBES, proposed by Kuntchev, Ramalho, Rodríguez-Meza, and Yang (2013) is used; hereafter *credit constraints* (*CredConst*). Based on the information offered by the World Bank Enterprise

confidentiality issues) this paper does not include such large, usually transnational. I think, however, that the result that financial constraints negatively affected investment decisions of Mexican-based establishments would still hold if we included such large exporting firms. In turn, I think so because, as the BANXICO data set mentioned in footnote 45 suggests, these firms are not credit constrained (they get finance from abroad) and very likely invest. In any case, I fully acknowledge the point is completely valid and the concern can't be addressed with the WBES.

⁵⁰ To get an idea of how profitable these establishments compared with what I call "Mexican standards," consider the following facts about the very lower tail of the distribution, the people earning the minimum wage. Moreno-Brid, Garry, and Monroy-Gómez-Franco (2014) rightly point out the current real minimum wage does not fulfill its Constitutional obligation (Article 123, section 6) of providing "sufficient compensation to meet the normal material, social and cultural needs of a head of household, and to provide for the compulsory education of one's children". They prove this using data from the Social Development Policy Evaluation Council (Spanish acronym CONEVAL). CONEVAL calculations show that in order to merely be able to purchase the very minimum amount of food (without taking into account social, cultural, or education needs) \$83 pesos are needed. Nevertheless as of January 2015 the nominal minimum wage was set to be \$70.10 pesos in region A and \$66.45 pesos in region B.

⁵¹ The WBES collected information on the amount of investment, a continuous variable. However, while virtually all establishments knew if they had bought fixed assets or not, many of them did not know how much they spent on such purchases. The continuous variable would have significantly reduced the sample size.

Surveys, Kuntchev and coauthors propose a categorical variable of financial constraints which, in their own words (p. 3) “provides an innovative way of measuring credit constraints firms based both on their usage of and ability to obtain new credit. This is an important contribution of the literature since most papers ... either look only at usage of credit, as opposed to access, or focus on self-reported obstacles based on perceptions instead of objective on the experience of the firm.” It classifies establishments in four groups: establishments not credit constrained, maybe credit constrained, partially credit constrained and fully credit constrained; further explanation presented in the appendix D. *CredConst* is a binary variable equal to one if the establishment was partially or fully credit constrained, and zero otherwise. Table 3.1 presents descriptive statistics of *Investment* and *CredConst*.

Table 3.1. Investment and Credit Constraints in Mexico, 2005 and 2009-2010

Author’s calculations based on Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank.

	2005	2009- 2010
○ Invested	422 (28.5%)	792 (53.5%)
○ Did not invest	1054 (71.2%)	686 (46.3%)
○ Credit Constrained	438 (29.5%)	399 (26.9%)
○ Not Credit Constrained	1019 (68.8%)	1021.9%
<p>% calculated without erasing the missing values. With respect to <i>Investment</i>, 4 observations were missed in 2005 and 2 in 2009-2010. With respect to <i>CredConst</i>, 23 observations were missed in 2005 and 60 in 2009-2010.</p>		

3.3.3. Endogeneity Issues

It is likely investment decisions affect the credit situation of the establishment. If this is the case then there is endogeneity between the endogenous and the exogenous variable of primary interest in this paper. The argument for the endogeneity of financial constraints appears in papers in which the dependent variable is innovation but its logic holds for physical investment too; Savignac (2007), Gorodnichenko and Schnitzer (2013),⁵² Lorenz (2014). An establishment decides to invest. For financing such endeavor, it could use internal or external funds. It is reasonable to believe the second is more expensive due to asymmetric information “that cannot be easily collateralized.” So, it is more likely it will rely on internal funds. But in turn the likelihood of being financially constrained increases if the establishment uses internal funds for the investment endeavor.

Given this theoretical argument, and the fact many papers on the relationship between credit constraints and innovation investments accept it, the consequent endogeneity issue needs to be addressed in the econometrics analysis. This is not an easy issue to deal with; indeed, it is fair to say that a lot of modern econometrics is an attempt to address endogeneity issues. In this paper a bivariate probit model is estimated; for an introduction to the topic, see Greene (2012).

⁵² Gorodnichenko and Schnitzer analyze the impact of financial constraints on innovation. Given that the dominant point of view on Mexican slow growth focuses on low productivity, and it is usually regarded as related with innovation, an earlier version of this paper also analyzed the effect of credit constraints on innovation. Preliminary results showed a negative relationship, as expected. Further thought on the theme, however, prevented the continuation of this analysis. The main reason for not doing so was the following timing issue.

From the WBES different direct measures of innovation could be obtained; *newprodserv* and *newprocess* explained in the appendix E. Nevertheless, both *CredConst* and most of the control explanatory variables refer to situations/decisions which happened/were taken at some point of the last year, not of the last 3 years. Thus, the relationship of credit constraints with innovation would very likely have implied analyzing past decisions/circumstances on the basis of current decisions/circumstances.

One paper in the credit constraints and innovation literature does not use a simultaneous equation approach, presumably because it has good instrumental variables; Gorodnichenko and Schnitzer (2013). Lewbel, Dong, and Yang (2012), however, argue that the issue of endogeneity in the context of an exogenous binary variable and an also binary endogenous variable should not be addressed through instrumental variables methods. Indeed, the Stata reference manual is very clear that “ivprobit” is inappropriate if the endogenous variable of interest is discrete. Fortunately, as Greene (2012, pp 738-739) points out, a bivariate probit model “provides a specification for analyzing a case in which a probit model contains an endogenous binary variable in one of the equations”. A variety of other contributions in which both the exogenous and the endogenous variables of interest are binary have approached the issue by estimating a bivariate probit; Evans and Schwab (1995), Greene (1998), Ploetscher and Rottmann (2002); the last actually addresses the topic of investment and financial constraints for German construction and manufacturing firms.

3.4. Econometrics Results

The (recursive) bivariate probit model estimated consists of the following equations

- (1) $Investment^* = \mathbf{X}_1\boldsymbol{\beta}_1 + CredConst * \boldsymbol{\gamma} + \varepsilon_1$; $Investment = 1$ if $Invest^* > 0$, 0 otherwise,
- (2) $CredConst^* = \mathbf{X}_2\boldsymbol{\beta}_2 + \varepsilon_2$; $CredConst = 1$ if $CredConst^* > 0$, 0 otherwise,

in which ε_1 and ε_2 are bivariate normal with mean zero, unit variance and $\rho = \text{Corr}(\varepsilon_1, \varepsilon_2)$.⁵³ It can be seen our main interest is in γ . If $\rho = 0$ the model consists of independent probit equations, which can be estimated separately; Greene (2012, pp 741-742). Alternatively said, if $\rho \neq 0$ probit estimation of (1) is inconsistent for β_l and γ ; Wooldridge (2002) p. 477). In the appendix E the control variables are described.

Table 3.2 presents the results of the simple probit and the bivariate probit estimations for 2005. As it is known, in a probit model in order to estimate the marginal effect of the independent variable of primary interest it is necessary to offer values of all the other explanatory variables. The bivariate probit literature usually uses their means; Greene (1996), (1998), (2012), Christofides, Stengos, and Swidinsky (1997), Savignac (2007), Lorenz)2014. The marginal effects of credit constraints on investment shown in Table 3.2 (and Table 3.3 below) are calculated following such custom.

Table 3.2 shows that, if the endogeneity issued is not taken into account credit constraints are negatively related with investment at highly significant levels (the p-value is 1.2%) The effect is relatively small though. The “partial effect” shows the likelihood of investing is reduced 8% when there are credit constraints. If the endogeneity issue is addressed the negative relationship is still highly significant level (the p-value is 1%) level and the effect turns out to be larger. Now, the partial effect shows that the likelihood of investing decreases 49% when there are credit constraints and this result is statistically significant at the 1% level.

⁵³ An introduction to multivariate probit estimation is Greene (2012) chapter 17, section 5.

Table 3.2. Investment and Financial Constraints, Econometric Analysis, 2005.

Dependent variable: Investment		
Independent variable	Probit	Bivariate Probit
<i>Credit Constraints</i>	-.2747441** (.1099877)	-1.644546*** (.074653)
largerfirm	.2955172** (.1581204)	.0869318 (.1378894)
lnage	.1082047* (.066627)	-.0363047 (.054431)
sales	4.83e ⁻¹⁰ (4.55e ⁻¹⁰)	1.57e ⁻¹⁰ (3.77e ⁻¹⁰)
natsales	-.0138092*** (.0046875)	-.0096323 (.0033708)
compmain		
○ 1	-.163458 (.2570881)	-.0923188 (.1101678)
○ 2 to 5	.0122078 (.1905804)	.0483773 (.087893)
○ 6 or more	-.0533929 (.1923899)	-.036434 (.0923592)
newprodserv	.3591842** (.1484727)	.1806479 (.126616)
newprocess	.0922846 (.1496805)	.0807413 (.1272217)
obstinf	.0535099 (.1163308)	.2877024*** (.093542)
caputi	-.002324 (.0024442)	-.0011537 (.0014167)
secu	.0677182	.2381457***

	(.1117056)	(.0918478)
obstmacroins	-.1825688* (.1107331)	-.0301207 (.0900824)
size	-.0000633 (.0002797)	.0000306 (.000239)
intercept	.4399479 (.5611277)	.8858088** (.3956925)
<i>Marginal Effect of Credit Constraints on Investment</i>	-.0786975** (.0312794)	-.4876054*** (.0164168)
Observations	840	835
Likelihood-ratio test of $\rho = 0$ ("chi squared" statistic)		9.92248***
Standard errors under parenthesis *, **, and *** denote statistical significance at the 10, 5, and 1% level, respectively		

It is worth highlighting the likelihood-ratio test rejects the null of $\rho = 0$ at the 1% level. This offer evidence to support the estimation of the bivariate probit is more adequate than the single probit would be.

The bivariate model was also estimated using profits of the establishment instead of its sales; which implied losing almost 100 more observations. The results, shown in the appendix F, strengthen the results presented in Table 3.2.

Table 3.3 presents the results of the simple probit and the bivariate probit estimations for 2009-2010.

Table 3.3. Investment and Financial Constraints, Econometric Analysis, 2009-2010.

Dependent variable: Investment		
Independent variable	Probit	Bivariate Probit
<i>Credit Constraints</i>	-.2637807*** (.095205)	-1.240042*** (.3052612)
largerfirm	-.0835377 (.1227566)	-.1646272 (.1223988)
lnage	-.088345 (.0602883)	-.1437218** (.060502)
sales	-1.10e ⁻¹⁰ (1.93e ⁻¹⁰)	-4.79e ⁻¹² (9.02e ⁻¹¹)
natsales	-.0046971 (.0039184)	-.0041469 (.0036226)
compmain		
○ 1	.3743045 (.3813367)	.3109166 (.3366897)
○ 2 to 5	.2518713 (.2485411)	.192787 (.2189739)
○ 6 or more	.2913722 (.2451291)	.2446878 (.2162423)
newprodserv	.2769207*** (.0968176)	.1918701* (.1022392)
newprocess	.3709644*** (.0984626)	.3249946*** (.1013939)
obstinf	-.1821969* (.0957497)	-.0594875 (.1053609)
caputi	.0050321** (.0022567)	.0044615** (.0021355)
secu	.5269346***	.3672377

	(.0902696)	(.1045968)
obsttax	-.0433116 (.0924821)	.0129347 (.0931083)
size	.0013633*** (.0004154)	.0010347*** (.0003214)
intercept	-.356408 (.5065615)	.2514527 (.4987409)
<i>Marginal Effect of Credit Constraints on Investment</i>	-.0902337*** (.0321764)	-.386024*** (.0746854)
Observations	957	873
Likelihood-ratio test, chi statistic under the null of $\rho = 0$		3.43416**
Standard errors under parenthesis *, **, and *** denote statistical significance at the 10, 5, and 1% level, respectively		

From Table 3.3 it can be seen that, if the endogeneity issue is not taken into account credit constraints are negatively related with investment at highly significant levels (the p-value is 0.6%). The effect is relatively small though. The “partial effect” shows the likelihood of investing is 9% higher when there are credit constraints. In turn, if the endogeneity issue is addressed the negative relationship is still highly significant (the p-value is 1%) and the effect turns out to be larger. Now the partial effect shows the likelihood of investing decreases 38% in the presence of credit constraints and this is significant at the 1% level.

It is worth highlighting the likelihood-ratio test rejects the null of $\rho = 0$ at the 5% level. This offer evidence to support the estimation of the bivariate probit is more adequate than the single probit one.

The bivariate model was also estimated using profits of the establishment instead of its sales, even though it implied losing some 50 observations. The results, presented in the Appendix B, are similar to the ones of Table 3.3.

3.5. Concluding comments

Since the 1980s Mexico did pretty much all what the Washington “Consensus” recommended. It liberalized the economy, it opened to foreign capital and foreign ownership of now virtually all sectors, withdrew almost completely from state intervention, and so on and so forth; Lustig (2001) and Moreno-Brid and Ros (2009) present good descriptions of the processes before the last round of liberalizing reforms, which happened in 2012-2014; for the latter, see Skelton (2014). However, the expected growth has not been the expected growth. The dominant point of view is that low productivity of the vast majority of the enterprises explains the sluggish growth; Bolio et al. (2014) speak of “two Mexico’s” running in two directions, hindering growth in the process. More reasonably, in my view, other scholars have pointed out that productivity is more a consequence than a cause of the poor performance. They highlight low investment as the key issue. In any case, all agree one of the reasons for the less than stellar performance is that enterprises, except the large ones, find difficult to find financing for productive projects. Nevertheless, very few detailed empirical analysis on how, if at all, credit constraints have affected growth, through any of the posited channels, can be found in the literature (section 1). Using econometric methods this paper addressed the question of how credit constraints affected investment in Mexico in 2005 and 2009-2010. In order to address the likely endogeneity of credit

constraints, a bivariate probit model was estimated. Consistent with the general claims of the literature, the findings of the paper are that indeed credit constraints negatively affected investment in both 2005 and 2009-2010.

But it is important to be modest (and honest) about the results. Two caveats should be mentioned. First, the quantitative estimates should be taken with caution, for the very reason that *Investment* variable is binary and not continuous. Second, the analysis of this paper is the first, to the best of my knowledge, in which the relationship between credit constraints and investment in contemporary Mexico is inquired with data in principle nationally representative. It is a novel contribution. But precisely because of this novelty restraint should be taken. Cotler and Woodruff (2008, p. 848) say “Our results, like those of many others, represent a snapshot of one particular program at one particular point in time. Collectively, like dots on an impressionistic painting, the individual studies provide a picture of the impact that microlending has on microenterprises and development more generally. We are many dots short of a coherent picture.” This beautiful analogy is particularly applicable to this contribution. With respect to the impact of credit constraints on investment in Mexico, we are much more dots short of a coherent picture.

Policy implications clearly arise as an important theme for future research. In this respect, an important insight suggested by Moreno-Brid (2013) should be mentioned since now; for very different reasons, Hanson (2010) also speaks of the nuances of policy implications. It is that merely implying that “more should be lend” could be misleading. As the defense of industrial policy offered by Moreno-Brid mentions, more sound advice is not only lending more but it implies being careful on to what sectors, and how, it should be lend. Relatedly, the role of the

State clearly arises as something to be thought on; Hermann (2014) goes over how this is particularly the case for a developing economy.

I would like to finish this paper by pointing out that another theme that could be brought into the topic of Mexican growth and credit constraints is the role of its high levels of wealth/income inequality; Esquivel (2015) documents how inequality could be currently sharper now than in the 1980s and also shows how the gap between the very top and the very low is so shocking that, assuming their wealth would increase 5%, the 4 richest Mexicans could hire 3 millions of minimum wage earners without losing one single peso of their wealth! As I have said more than once, virtually all the literature mentions credit constraints have been growth reducing. Virtually no one, however, has thought about a possible relationship between the high levels of wealth/income inequality and credit constraints; and/or between inequality and investment; and/or between inequality and growth for that matter (Gómez-Ramírez (2014)). Let me be clearer. As mentioned in the literature review, some contributions have shown that small and medium size enterprises are more credit constrained than large ones. Now, even though a theme which naturally follows from those findings is the possibility that reducing inequality could in turn reduce credit constraints, to the best of my knowledge such possibility has not been thoroughly examined in the literature.⁵⁴ Esquivel does mention that, in the presence of imperfect credit markets, inequality in Mexico could have been depressing physical and human capital investments. However, to the best of my knowledge this general (probably common sense) comment has not been supported by theoretical and/or empirical detailed analyses. This is clearly an important area for future research.

⁵⁴ The speech of the Mexican Central Bank Governor, Agustín Carstens, on the occasion of the enactment of the recent financial sector laws (January 9th 2014) is an interesting example of how, on the one hand, it is recognized that small firms are more credit constrained than large ones but, on the other hand, the seemingly natural thought that reducing inequality could in turn reduce credit constraints is not brought to the debate; <https://www.youtube.com/watch?v=TuURjd6PxmA> (original in Spanish, minutes 15-27).

CHAPTER 4
CREDIT CONSTRAINTS AND GROWTH,
A FORMAL MODEL APPLICABLE TO THE MEXICAN CASE

4.1. Introduction

Since the 1980s the Mexican economy has gone over a vast liberalization and openness process. The State significantly retreated from direct economic activity, privatizations of thousands of erstwhile public companies have taken place, industrial policy has lost importance, foreign capital has been welcomed more than before, labor markets have been liberalized, the Imports Substitution growth/development strategy has been substituted for an exports-led one, and the economy has become very integrated to the USA's. The latest of the reforms occurred with the end of the state ownership of oil and energy resources, among other so-called "structural reforms". It is a virtual consensus, however, that the economic growth has not been the announced by the neoliberal reformers; Lustig (2001) presents an early assessment, Moreno-Brid and Ros (2009), Hanson (2010) and (2011) are more recent ones. Among policy makers (and scholars with influence on policies) the dominant point of view is that the main reason explaining the sluggish growth lies in the stagnant total factors' productivity. An alternative point of view considers the low rate of capital accumulation is the most important proximate cause of the sluggishness, and regards low productivity more as an endogenous consequence of the low rate of capital accumulation. In my view, the alternative approach is more adequate than the dominant one. In any case, that the lack of finance for productive projects has been part of

the low growth explanation is mentioned by both approaches. For the dominant point of view, thus, inefficient financial systems do not help productivity; Bolio et al. (2014), Tinoco-Zermeño and Venegas-Martínez (2014), Hanson (2010), and . For its part, for the alternative point of view, credit constraints, among other reasons, have reduced capital formation; Moreno-Brid et al. (2005), Moreno-Brid and Ros (2009) and (2010), and Ros Bosch (2013a).⁵⁵ In this essay, a formal model capturing how credit constraints can affect capital accumulation and productivity is presented.

The empirical evidence presented in essay “Investment and Credit Constraints in Mexico, 2005 and 2009-2010” of this dissertation shows a negative relationship between credit constraints and physical capital investment decisions. This essay addresses theoretical issues. The existence of links between credit constraints and growth may seem obvious but a clarification of the mechanisms, through formal modeling, seems proper. To the best of my knowledge, the literature on contemporary Mexico has not proposed a formal model capturing the growth reducing effects of credit constraints. In this essay, such a formal model is presented. Through the interplay of capital accumulation and productivity, it captures how inefficient financial systems reduce growth.

The paper is organized as it follows. Section 4.2 shows stylized facts on growth and credit constraints and presents a literature review on the topic of credit constraints and growth in contemporary Mexico. Section 4.3 presents the formal model. Section 4.4 analyzes some of its implications. The last section concludes.

⁵⁵ This is not to say, of course, that the mainstream point of view does not mention low investment as part of the explanation of the lackluster economic growth. Hanson (2011, p. 8-9) for example, actually says credit constraints have negatively affected productivity through the investment channel. Likewise, the alternative approach does not dismiss productivity issues either.

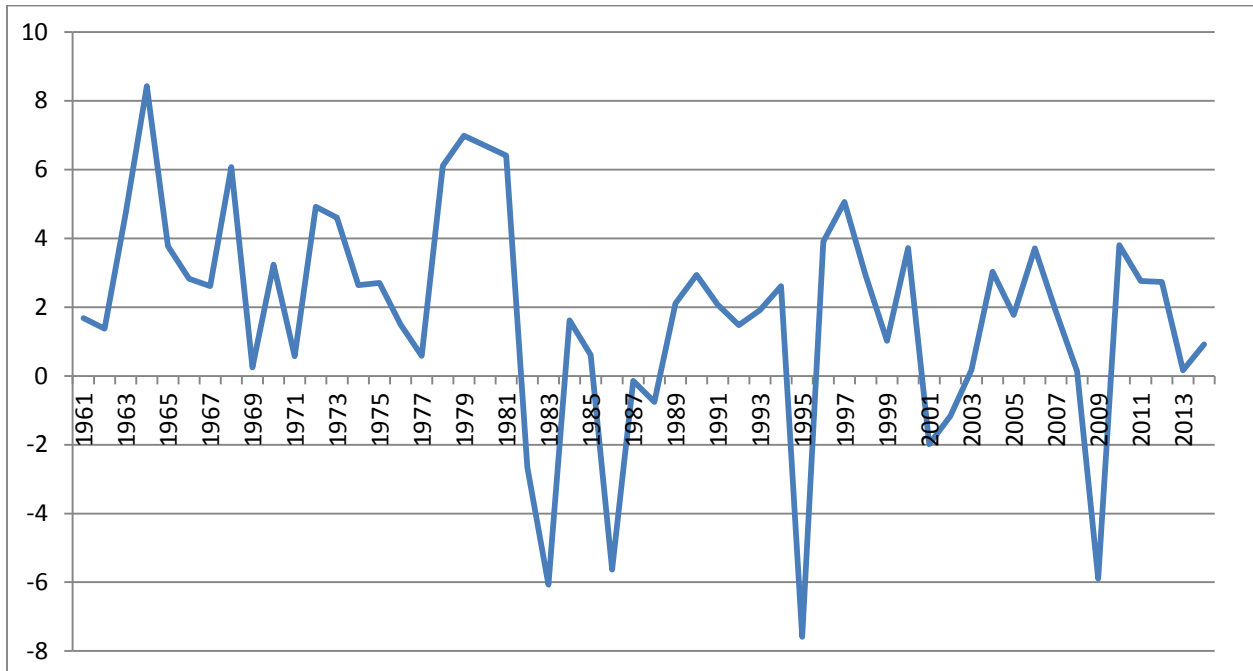
4.2. Stylized Facts and Literature Review

Since the 1980s the Mexican economy has experienced a vast overhaul, in which it went from an import-substitution growth/development strategy to an export-led one, the State's involvement in the economy significantly diminished, vast privatizations happened, and the economy was significantly opened to foreign goods and capitals (including in the banking sector). Naturally, the shift was announced as the best strategy to pursue after the 1982 debt crisis by its promoters. Were they right?

Figure 4.1 shows per capita growth from 1960 to 2014. It shows that until the beginning of the 1980s per capita growth was always positive and often above 4%, with a 1961-1981 average of 3.75%. Since the 1980s the contrast is clear. Since then, per capita growth has often been negative and almost never above 4%, with a strikingly low 1982-2014 average of 0.6%.

Figure 4.1. Mexico per capita GDP Growth (%).

Source: World Bank national accounts data, and OECD National Accounts data files.



In light of these facts, it is understandable that either to support further liberalizing reforms or to propose an alternative approach virtually all scholars and policy makers have agreed the results have not been satisfactory. As said in the introduction, the dominant point of view blames low total factor's productivity while an alternative one highlights low physical capital investment and regards the latter more as a consequence of the former than as a cause. In turn all agree that, even if credit for consumption and housing has increased, finance for productive projects has not and that credit crunch has been an important part of the growth problem. Kehoe and Ruhl (2010, p. 1011) actually say that "The most popular set of theories for Mexico's stagnation focuses on its inefficient financial system and lack of contract enforcement". Indeed, in 2013-2014 a legal reform involving changes in more than 30 laws with

the spoken purpose of improving access to finance was launched; Skelton (2014) presents an optimistic point of view on it.

How bad has the credit constraints problem been? Figure 4.2 presents the 1990-2014 evolution of a variable usually used in the literature to measure it, the domestic credit to the private sector as percentage of GDP.⁵⁶ For comparative purposes the evolution of the same variable in other Latin American countries is also presented. The figure strikingly shows that Mexico is actually the lowest. To be fair, there has been some progress, especially since the mid-2000s, in which the variable went from less than 20% to 31% in 2014. Nevertheless, this is not particularly impressive and the whole period average has been a rather strikingly low 21%. To put things in context, compare the numbers with the only other Latin American OECD member, Chile. In it, the variable went from 45% in 1990 to 109% in 2014.⁵⁷

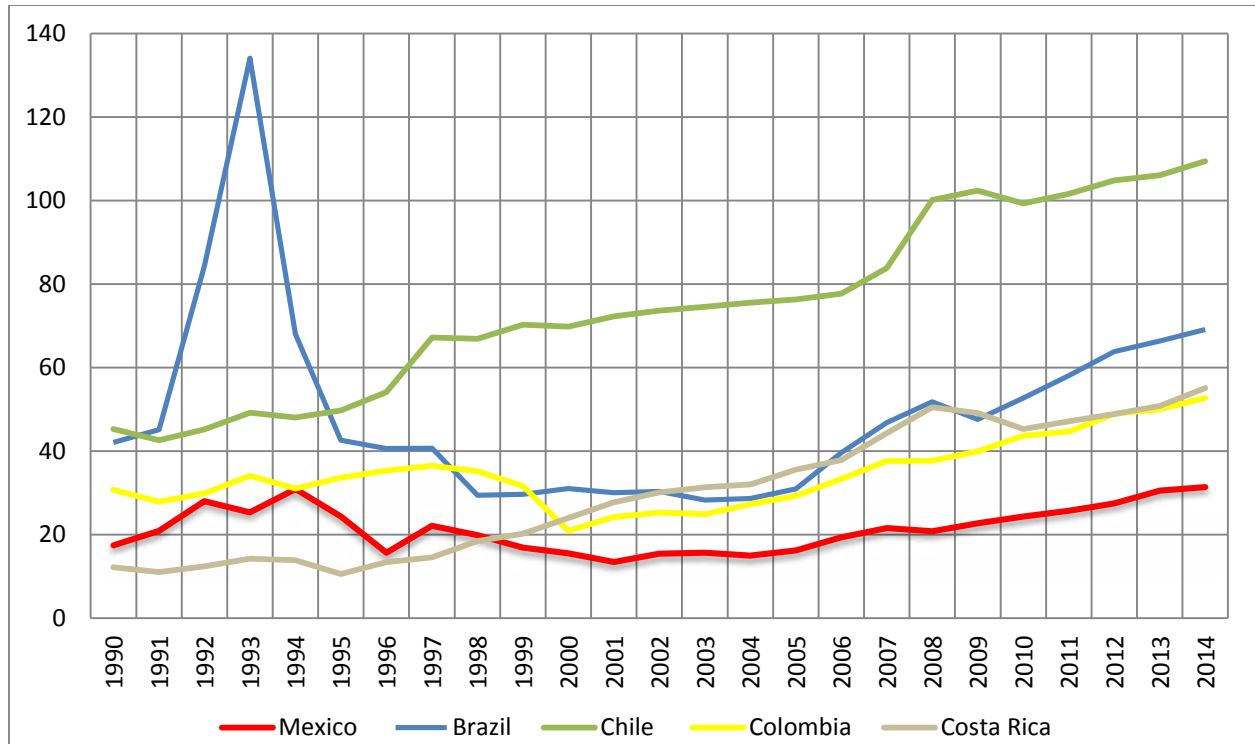
It is thus not surprising that virtually all scholars and policy makers speak of the lack of credit for productive projects as an important reason explaining the sluggish Mexican growth.

⁵⁶ The complete definition of “Domestic credit to private sector” given by the World Bank is: financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment.

⁵⁷ The Mexican Central Bank has been collecting quarterly data on the sources of financing of Mexican enterprises since 1998. These surveys also and unequivocally show Mexican enterprises (except the very large ones) face credit constraints; see “Encuesta del mercado crediticio” at www.bancomexico.gob.mx

Figure 4.2. Domestic Credit to Private Sector (% of GDP).

Source: International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.



Contributions focusing in the distributional dimension of credit constraints, that is, trying to offer evidence and/or explanations of why small and medium size firms are more credit constrained than large ones, are also found; Garrido and Prior (2007), Lecuona (2009), Clavelina (2013), Padilla-Pérez and Fenton (2013). Relatedly, other contributions have focused on the impact of credit constraints on poverty and informality; Niño-Zarazua (2007), Carreón, di Giannatele, and López (2007), Bruhn and Love (2009). Contributions on the gender dimension of the issue are also found. Using quasi-experimental data Bruhn and Love (2009) and (2012) examine how easing credits constrains affects entrepreneurship, employment and income of men and women.

An interesting experimental study is Mackenzie and Woodruff (2008). It examines if easing capital constraints (revenues) affects firms' profits. The likely endogeneity of the independent variable is addressed through a randomized experiment. These scholars designed and launched an experiment in which grants were randomly given to enterprises similar in many respects. The effect on profits was found to be positive and significant. Also, these scholars say (p. 477) that "In Mexico, returns are much higher than interest rates offered by banks and microfinance firms. The leading explanation for such high returns is that many of the firms are credit constrained, causing them to operate below their efficient size." Such "leading explanation" is tested by interacting measures of credit constraints with the randomly assigned grant. It is found that indeed the return was higher among firms which reported being credit constrained.

As for policy advice on how to improve access to credit, especially by smaller firms, the mainstream point of view virtually always remains in the free markets framework: improve the rule of law and make financial system more competitive. Some scholars have nevertheless called for more state intervention, especially through national development banks (Calva 2007, Levy 2007), or implied it (Moreno-Brid (2013)).

It may be difficult to find or collect data on the issue. But given that it would evidence to support the dominant point of view one would expect several empirical studies offering evidence of the productivity reducing credit constraints effects. Such body of literature couldn't be found, though. One contribution offering empirical evidence to support the mainstream point of view is Villalpando (2014). This contribution empirically tests the hypothesis that bank credit increases firms' productivity. It addresses the possible endogeneity issues with instrumental variables;

collateral and utilities expenditures are the “instruments”. The estimate is that firms with access to banking credit are 50% more productive.

Related with the alternative point of view, contributions on how credit constraints have, if at all, affected investment are also difficult to find. Scattered studies are found. Gelos and Warner (1999) examine how credit (cash flows) affected investment in manufacturing firms from 1984 to 1994. Sánchez (2001) finds cash flows had a significant effect on investment on manufacturing establishments during 1984-1999. Castañeda (2003) goes over the relationship of cash flows and investment before and after the 1995 crisis. More recently, Cotler and Woodruff (2008) and Love and Sánchez (2009) have examined the issue.

Cotler and Woodruff (2008) examine the impact of micro-lending on physical capital investment, among several “measures of the firm’s performance.” Overall, a positive and significant relationship between obtaining a loan and investment in fixed assets is found. The data of this contribution is quasi-experimental, that is, it consists of both a “treated” and a “control” group of enterprises similar in many respects, coming from a real world event. But the access to this type of data, if on the one hand clearly strengthens the results, on the other hand has a drawback. It is that the study is circumscribed to small retailers, very likely with no paid workers, located in two neighborhoods of the suburban area of Mexico City. Mexico is a very large, highly uneven, and complex country. Results obtained from small retailers of two neighborhoods of Mexico City are hardly representative of the whole country; to be fair, the same Cotler and Woodruff (p. 848) acknowledge the limited scope of their findings.

Mackenzie and Woodruff (2008) don’t directly examine if credit constraints affect investment but examine how easing capital constraints (revenues) affects firms’ profits. The

study addresses the likely endogeneity of revenues through a randomized experiment. These scholars designed and launched an experiment in which grants were randomly given to enterprises similar in many respects. The effect on profits was found to be positive and significant, as expected. Also, these scholars say (p. 477) that “In Mexico, returns [to capital investment] are much higher than interest rates offered by banks and microfinance firms. The leading explanation for such high returns is that many of the firms are credit constrained, causing them to operate below their efficient size.” Mackenzie and Woodruff (2008) test such “leading explanation” by interacting measures of credit constraints with the randomly assigned grant. They found that indeed the return was higher among firms which reported being credit constrained. That this paper used completely experimental data on the one hand strengthens its results but on the other hand implied a limited scope, again. The experiment was launched in the city of León, Guanajuato. Given that the country is very large, uneven and complex it is difficult to draw nationally representative conclusions from its findings.

Love and Sánchez (2009) tries to show some rural agents in Mexico are credit constrained, addresses the question of how credit constraints affect investment in Mexico, and attempts to estimate the effect of removing credit constraints on investment. The paper is circumscribed to rural Mexico but it uses surveys which are nevertheless representative at the national and regional level. These scholars find evidence to support that increasing loans to credit constrained agents would increase the number of agents making investment and their quantities of investment. The findings, however, are not that recent, because they are obtained with surveys from 1999 (representative at the regional level) and 2001 (representative at the national level). Furthermore, even if this contribution could be more nationally representative

than the above describes it is still only circumscribed to the rural sector. Some 75% of Mexicans live in urban areas, though.

Using microeconomic, establishment level data with the intention of being nationally representative⁵⁸ I found empirical evidence supporting that credit constraints are negatively related with capital accumulation decisions; paper “Investment and Credit Constraints in Mexico, 2005 and 2009-2010” of this dissertation. Given that both the independent variable (bought fixed assets such as machinery, vehicles, equipment, land or buildings, or didn’t buy them) and the dependent variable of most interest (being credit constrained or not) used in the analysis were binary and given the likely possibility, usually assumed as being the case in papers in which the dependent variable is innovation investment (Savignac 2007, Gorodnichenko and Schnitzer 2013, Lorenz 2014), of endogeneity of credit constraints, the econometric strategy was the estimation of a bivariate probit model; as Greene (2012, pp 738-739) points out, a bivariate probit model “provides a specification for analyzing a case in which a probit model contains an endogenous binary variable in one of the equations.” Given the coverage of the surveys, the analysis was carried out for years 2005 and 2009-2010.

In both years investment was negatively affected by credit constraints. Now, if the analysis does not take into account the likely endogeneity, the negative relationship holds at highly statistically significant levels but it is not that big. In 2005 the likelihood of investing is 7% less when the establishment is credit constrained and in 2010 it is 9% less. In clear contrast, if the endogeneity issues are addressed then investment is negatively related with credit constraints at highly statistically significant levels and the impact is greater. Now, for 2005 the

⁵⁸ Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank.

likelihood of investing is reduced 48% if there are credit constraints while for 2009-2010 it is reduced by 38%.⁵⁹

With respect to theoretical models on the macroeconomic effects of credit constraints, David Romer advanced macroeconomics textbook (3rd edition, section 8.9) offers a formal model in which financial market imperfections can reduce investment. This investment reduction can have effects on short-run fluctuations and on long-run growth. Relatedly, McKinnon (1973) argues in favor of the long-run growth effects of sluggish investment and offers a theoretical model on the relationship between savings and growth. The links between credit constraints and reduced capital accumulation may seem obvious. But one would still like to have a model applicable to the recent Mexican history case, in which the mechanisms are clarified. To the best of my knowledge, such a model has not been offered in the Mexican economy literature. It is now proposed.

4.3. A Formal Model

In the following model credit constraints can reduce the rate of capital accumulation, productivity and output. There are two sectors. An “informal”, “backwards” sector supplying labor for the “modern” one while keeping its real wage fixed, in a Lewis-type model. The backwards sector does not produce a good which could be invested. In the modern sector we

⁵⁹ It should be said, however, that these quantitative estimates of the paper. This is the case for the very reason that the independent variable of analysis is discrete (if the establishment bought fixed assets or not) and not continuous (how much it spent on such purchases). Using a continuous variable would have significantly reduced the sample size.

assume that there are n firms producing a good which can be either invested or consumed. Each one produces with a Leontief production function with capital and labor as inputs. Capital productivity, σ , is constant across firms but labor productivity, A_i , is firm specific:

$$y_{it} = \min\{A_{it}l_{it}, \sigma k_{it}\} = \sigma k_{it} = A_{it}l_{it} \quad (1).$$

With respect to labor productivity it is assumed that, at any given period and without correlation with the productivity it exhibited last period, a firm can implement a standard technology or innovate. It affects its productivity (not in linear but in exponential fashion⁶⁰).

$$A_{it} = \begin{cases} e^{a_t} \\ e^{a_t+b} \end{cases}$$

$$\ln A_{it} = \begin{cases} a_t \\ a_t + b \end{cases} \quad (2).$$

There are therefore two levels of productivity, “low” (“standard” or “base”) and “high”. The distribution of technological improvements (innovations) is random across the population of firms, with $p \in [0,1]$ being the probability of implementing an innovation in any given firm every period.

Denoting $K_t = \sum_i k_{it}$ as overall capital, $L_t = \sum_i l_{it}$ as overall labor, and $\overline{A}_t = \frac{\sum_i A_{it}l_{it}}{L_t}$ as average labor productivity, the economy-wide production is

$$Y_t = \sigma K_t = \overline{A}_t L_t \quad (3).$$

Let ω be the exogenously given real wage, which we assume is the same for all firms.

This assumption is reasonable in the context of a dual economy with a large informal sector, like

⁶⁰ If technology linearly affects productivity, the growth rate of average productivity, $\widehat{\overline{A}_t}$, to be derived later, asymptotically converges to 0 in the long-run.

Mexico; INEGI (2004) and (2011). Each firm's total profits are positively related with its labor productivity:

$$\Pi_{it} = y_{it} - \omega l_{it} = A_{it} l_{it} - \omega l_{it} = l_{it}(A_{it} - \omega) \quad (4).$$

Alternatively:

$$\Pi_{it} = y_{it} \pi_{it} \quad (5).$$

where $\pi_{it} = 1 - \frac{\omega}{A_{it}}$ is the profit share. From equations (4) and (5) it can be seen that, for any given real wage, each firm's total profits and its profit share are positively related with productivity. Given an exogenously fixed ω , profits and the profit share are different only if productivity is different. Let us denote the profit share of a firm with low productivity π_t^{low} and the profit share of a firm with high productivity π_t^{high} . Let us denote Π_t^{low} as the summation of the profits of low technology firms, $\Pi_t^{low} = \pi_t^{low} \sum_i y_{it}^{low} = \pi_t^{low} Y_t^{low}$, and Π_t^{high} as the summation of profits of high technology firms, $\Pi_t^{high} = \pi_t^{high} \sum_i y_{it}^{high} = \pi_t^{high} Y_t^{high}$.

The effects of credit constraints on capital accumulation can be highlighted considering only two polar cases, one with complete credit constraints and one with perfect capital markets. An extension of the model could go over the more realistic case of a mixed credit situation.

Assume first that there are complete credit constraints in the sense that no firm can borrow or lend. In this situation, every firm invests in capital regardless of its productivity. Each firm invests a fraction of its profits:

$$I_{it} = s \Pi_{it}.$$

Overall investment is

$$I_t = I_t^{low} + I_t^{high}$$

$$I_t = s\Pi_t^{low} + s\Pi_t^{high}$$

$$I_t = s(\pi_t^{low}Y_t^{low}) + s(\pi_t^{high}Y_t^{high}).$$

Recall that each period t , and independent of the innovation's distribution at $t - 1$, the distribution of innovations is random across the population of firms. By assumption the fraction with standard technology is $(1 - p)$ while the fraction with high one is p . Therefore the output produced by firms with standard productivity is $(1 - p)Y_t$ and the output produced in firms with high productivity is pY_t . Thus:

$$I_t = s(\pi_t^{low}(1 - p)Y_t) + s(\pi_t^{high}pY_t)$$

and rearranging

$$I_t = sY_t((1 - p)\pi_t^{low} + p\pi_t^{high}) \quad (6).$$

For simplicity, assume complete depreciation so that $K_{t+1} = I_t$; an extension of the model could go over the more realistic case of partial depreciation. Thus next period capital stock is

$$K_{t+1} = sY_t((1 - p)\pi_t^{low} + p\pi_t^{high}) \quad (7).$$

In the other polar case, assume there are perfect credit markets in the sense that at t investment in capital is carried out only in firms which showed high technology at $t - 1$. In other words, this period some firms innovate and others don't (independent from if the innovated last period or not) but investment in capital is carried out only in firms which showed high productivity last period. The rationale is that those firms signaled that they would be more

profitable and that's why they currently attract all disposable loans. Mathematically, we capture this situation with $p = 1$.⁶¹ Overall investment is then

$$I_t = s\pi_t^{high}Y_t \quad (8).$$

And next period capital stock is

$$K_{t+1} = s\pi_t^{high}Y_t \quad (9).$$

Given that $\pi_t^{low} < \pi_t^{high}$ then

$$sY_t((1-p)\pi_t^{low} + p\pi_t^{high}) < s\pi_t^{high}Y_t \quad (10):$$

credit constraints reduce capital accumulation.

Given that capital accumulation determines output growth (from equation 3 it follows that $\hat{Y} = \hat{K}$) credit constraints reduce output growth as well.

The model explicitly shows that investment is negatively affected by credit constraints through the impact of them on productivity and profitability. We also want to capture that productivity growth can in turn be affected by credit constraints. In this paper it is important to explicitly model this because, as we said since the introduction, we consider the alternative point of view on the “Mexican morass”, according to which low productivity is more an endogenous consequence of the low rate of capital accumulation than a cause of the sluggish economic growth, more reasonable than the dominant one.

⁶¹ It should not be interpreted as saying that this period all firms innovate, but as saying that this period only firms which innovated last period are able to invest in capital.

Assume there is technology diffusion. In other words, that the base technology is positively related with the previous implementation of good ideas, in turn affected by investment decisions taken under credit constraints or not. The rationale to support this assumption is that the implementation of innovations positively affects the overall base technology because if in the past good ideas were implemented then in the future the base technology would be higher for all firms, even those who didn't contribute to the technology improvement; recall we are speaking about the modern sector of an economy. Think, for example, about the advent of the computer: with the pace of time virtually every firm has adopted its use. Mathematically we capture this assumption positing that baseline productivity in the future is a positive function of average productivity:

$$\frac{A_{t+1}}{A_t} = \lambda \left(\frac{\bar{A}_t}{A_t} \right),$$

which, recalling equation (2), is the same as:

$$a_{t+1} = a_t + \lambda(\ln \bar{A}_t - a_t) \quad (11).$$

Again, to capture the central message it suffices to consider only the two polar cases we have considered. First, let us examine the case of complete credit constraints. Given that in this case at any time t the distribution of innovations is random across firms, then the proportion of them producing with standard technology is $(1 - p)$ while the proportion producing with better technology is p :

$$\ln \bar{A}_t = (1 - p)a_t + p(a_t + b) = a_t + pb \quad (12).$$

Combining equations (11) and (12) it follows that technical change with the (lower) investment carried out under credit constraints is

$$a_{t+1} - a_t = \lambda bp \quad (13).$$

Note that, under the assumption of slow change in \bar{A} , $\hat{A} = \ln\bar{A}_{t+1} - \ln\bar{A}_t = \lambda bp$ as well.

Passing to the other polar case of perfect credit markets, in it only firms with high technology last period are able to invest this period (see footnote 61). Mathematically we capture it with $p = 1$. Therefore

$$\ln\bar{A}_t = a_t + b \quad (14).$$

And combining equations (11) and (14) it follows that technological change with the (higher) investment carried out under perfect credit markets is

$$a_{t+1} - a_t = \lambda b \quad (15).$$

Note that, under the assumption of slow change in \bar{A} , $\hat{A} = \ln\bar{A}_{t+1} - \ln\bar{A}_t = \lambda b$ as well.

And then it can be seen that

$$\lambda bp < \lambda b \quad (16):$$

There is lower technical change and therefore less productivity growth because of credit constraints.

Summarizing, in the model presented low investment and low productivity coevolve in the presence of credit constraints, in a vicious cycle. Reducing credit constraints increases investment and productivity in a virtuous cycle. However, it is only from the point of view of the employers that it can be unequivocally said it is a virtuous cycle. It is important to discuss the implications of the model for the workers. Mexican policymakers often argue productivity

improvement will benefit them. The implications of this model show this is not necessarily the case.

4.4. Implications of the Model for Employment

By assumption, the informal sector is large enough so as to keep the real wage of the modern sector fixed, $w_t = \bar{w}$; this is a reasonable assumption for the contemporary Mexican economy case. From the Leontief production function of equation (3), it follows that overall employment in the modern sector is given by

$$L = \frac{\sigma K}{A} \quad (16).$$

From (16) it can be seen that capital accumulation exerts a positive influence on employment and productivity exerts a negative one. Indeed, given that the output/capital ratio is fixed,

$$\hat{L} = \hat{K} - \hat{A} \quad (17).$$

But in our model, capital accumulation exerts a positive impact on productivity and productivity also exerts a positive effect on capital accumulation. Therefore, capital accumulation exerts both a direct positive influence on employment and an indirect negative influence, through its positive impact on productivity. Likewise, productivity exerts both a direct negative impact on employment and an indirect one, through its positive impact on capital accumulation. The outcome on employment depends on the relative weights of these effects.

Again, we examine the two polar cases we have been considering. In the case of complete credit constraints, it follows from (7) that

$$\hat{K} = s \frac{Y_t}{K_t} \left((1-p)\pi_t^{low} + p\pi_t^{high} \right) = s\sigma \left((1-p)\pi_t^{low} + p\pi_t^{high} \right).$$

In turn, it follows from (12) and (13) that

$$\hat{A} = \lambda bp.$$

An expression for employment growth is obtained:

$$\hat{L} = s\sigma \left((1-p)\pi_t^{low} + p\pi_t^{high} \right) - \lambda bp \quad (18)$$

in which π_t^{low} and π_t^{high} increase in \bar{A} .

It cannot be determined unequivocally if employment will increase or decrease. But some circumstances in which each case is more likely can be pointed out.

First, the larger the profit share's difference $\pi_t^{high} - \pi_t^{low}$ is the more likely employment growth will increase. The intuition is that, even though capital accumulation is deterred by the fact all firms invest regardless of their productivity and therefore profitability status, the larger the gap in profitability (coming from the gap in productivity) the stronger the effect capital accumulation on high productivity firms will have on employment. Second, the larger the saving and investing rate s is the more likely employment will increase. The intuition is that, if more is saved and invested the larger the positive effect of capital accumulation on employment will be. Third, the larger the extent of the better technology implemented by the high productivity firms compared with the standard technology, captured in the parameter b , the less likely employment will increase. The intuition is straightforward: given that an increase in productivity implies

fewer workers are needed for producing the same amount of output, then the better the labor-saving technology is the less likely employment will increase. Similar comments can be said about the parameter λ , which captures the strength of technology diffusion in the economy. Finally, the effect on the probability of adopting an advanced technology (p) on employment growth cannot be determined unambiguously. From (18) it can be seen that

$$\frac{\partial \hat{L}}{\partial p} = s\sigma(\pi_t^{high} - \pi_t^{low}) - \lambda b$$

which can be either positive or negative (or zero). But we can say, consistent with the circumstances just discussed, that it is more likely to be positive the larger $\pi_t^{high} - \pi_t^{low}$, s or σ are, and it is more likely to be negative the larger b or λ are.

In the case of perfect credit markets, from (9), (14), (15) an expression for employment growth is obtained:

$$\hat{L} = s\sigma\pi_t^{high} - \lambda b \tag{19}$$

in which π_t^{high} increases in \bar{A} .

The circumstances in which employment growth is more likely to increase are if the saving and investing rate and/or the output/capital ratio and/or the profit share is high. Employment is more likely to decrease if the extent of technology diffusion and/or the technology improvements are significant.

It is important to highlight that in this model the benefits of reducing credit constraints and therefore improving productivity may never benefit the modern sector workers. If capital accumulation responds strong enough then employment in the formal sector will increase; do not

overlook, however, that even in this case the real wage each worker gets is the exogenously fixed ω which will not change until the “reserve army” of labor is depleted (or there is a change in the traditional sector that makes it more attractive). But if capital accumulation does not respond strong enough then employment in the modern sector will not increase and may even decrease; which in turn may reduce ω . The benefits of a “booming” economy will not benefit the average man/woman. This possibility casts doubts on the usual statements of Mexican policymakers according to which productivity growth will be good for everybody.

It should be noted that the model assumes away aggregate demand issues: we have implicitly assumed that there is enough demand to match any production. An extension should address this important missing part.

4.5. Concluding Comments

The literature on the Mexican economy usually speaks of credit constraints as part of the explanation of its sluggish economic growth. There is empirical evidence supporting the claim that credit constraints have been growth reducing in this country. The existence of links between credit constraints and growth may seem obvious but a clarification of the mechanisms, through formal modeling, seems proper. To the best of my knowledge, however, no theoretical model has been proposed in this respect in the Mexican economy literature. This paper presents such a theoretical model. The model shows how, through its impact on productivity and profitability, credit constraints can reduce investment and therefore output. It also shows how in turn lower

investment can go hand in hand with lower productivity. The implications for the average men/woman cannot be unambiguously determined.

It should be said, however, that the model has the important limitation of assuming away demand constraints. It assumes there is enough demand to match any production. An extension of the model to address this limitation arises as important for future research.

Moving beyond from theoretical issues two topics arise as important for future research. These are the same as mentioned at the end of Chapter 3. First, the need of thinking further on policy implications. Second, the possibility that inequality could have been coevolving with credit constraints.

APPENDIX A

DATA USED ON ANALYSIS OF CHAPTER 2

The data used consist of the following five variables, quarterly observations from 1970Q1 to 2008Q4:

- Quarterly Mexican GDP, in millions of dollars, real (volume estimate) seasonally adjusted.

Source: OECD.



- Quarterly Profit Share: constructed from the profit share annual data, assuming a “smooth” quarterly change. In more detail it was constructed as it follows:

$$1971^{62} \text{ Quarter 1 PS} = 1970 \text{ Annual PS} + ((1971 \text{ Annual PS} - 1970 \text{ Annual PS}) * 0.25)$$

$$1971 \text{ Quarter 2 PS} = 1970 \text{ Annual PS} + ((1971 \text{ Annual PS} - 1970 \text{ Annual PS}) * 0.50)$$

$$1971 \text{ Quarter 3 PS} = 1970 \text{ Annual PS} + ((1971 \text{ Annual PS} - 1970 \text{ Annual PS}) * 0.75)$$

⁶² For year 1970 I used the original annual data in each quarter.

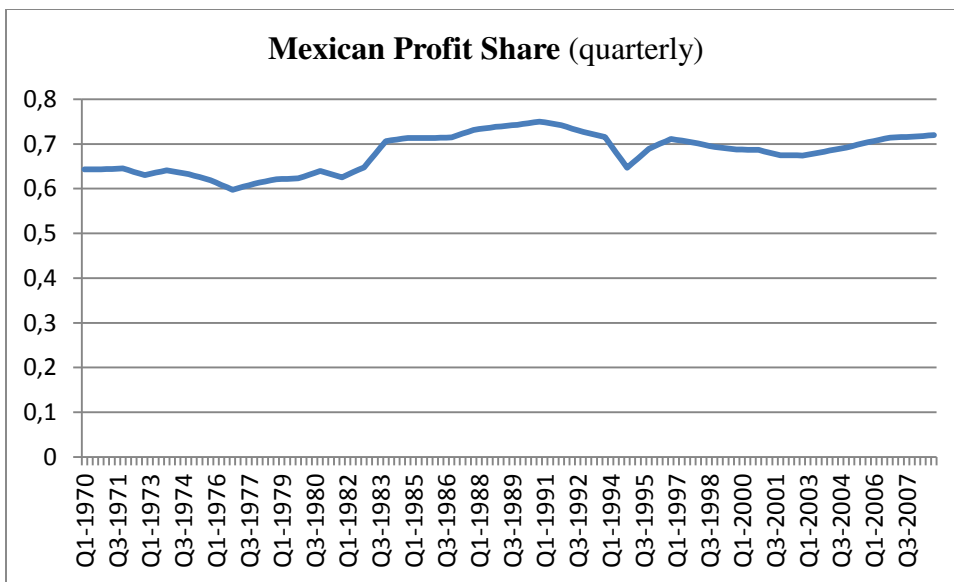
$$1971 \text{ Quarter 4 PS} = 1970 \text{ Annual PS} + ((1971 \text{ Annual PS} - 1970 \text{ Annual PS}) * 1) =$$

$$1971 \text{ Annual PS}$$

$$1972 \text{ Quarter 1 PS} = 1971 \text{ Annual PS} + ((1972 \text{ Annual PS} - 1971 \text{ Annual PS}) * 0.25)$$

so on and so forth

Annual profit share source: Extended Penn World Tables version 4.0, by Adalmir Marquetti.⁶³

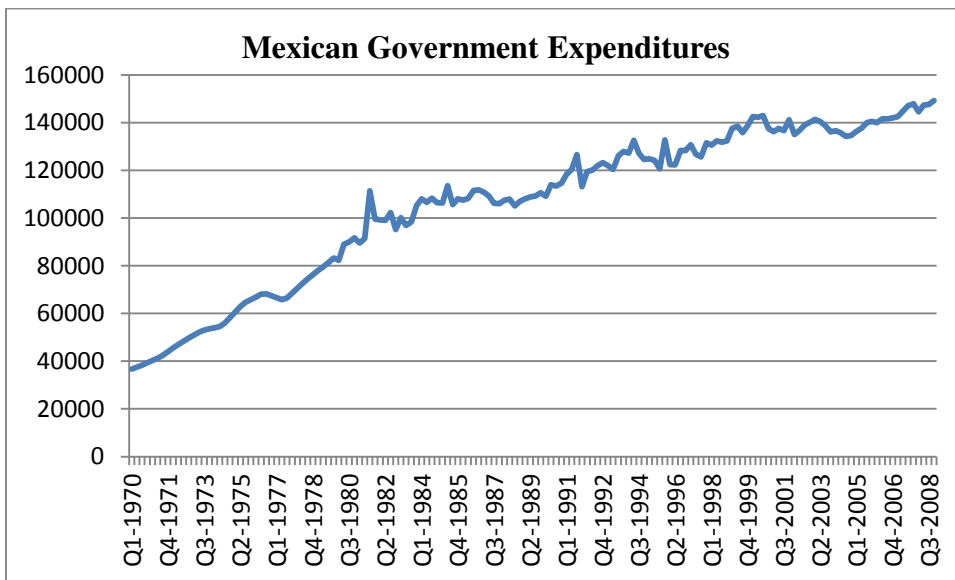


- Quarterly United States GDP, in millions of dollars, real (volume estimate) seasonally adjusted. Source: OECD.

⁶³ Agreeing with the apt suggestion of a reviewer it is important to mention that I am not using the “Gross Profit Rate” variable, which also available in the Extended Penn World Tables 4.0.



- Quarterly Mexican government expenditures, in millions of dollars, real (volume estimate) seasonally adjusted. Source: OECD.



- Quarterly Mexican Peso Real Exchange Rate. Constructed from the Monthly Mexican Peso Real Exchange Rate, multilateral, weighted average with 111 countries, index (base=1990). Source: Bank of Mexico. The quarterly data was built as the three-month average:

Real exchange rate Q1 1970 = (Real exchange rate January 1970 + Real exchange rate February 1970 + Real exchange rate March 1970) * (1/3)

Real exchange rate Q2 1970 = (Real exchange rate April 1970 + Real exchange rate May 1970 + Real exchange rate June 1970) * (1/3)

so on and so forth ...



Note: an increase means depreciation.

APPENDIX B

UNIT ROOT TESTS OF VARIABLES USED ON ANALYSIS OF CHAPTER 2

It could be seen in the graphs of the levels of (i) the Mexican GDP, (ii) the USA GDP, and (iii) the Mexican Government expenditures that the three series seem follow a similar trend. Thus, it could be that either series is unit root with a drift or it is not unit root but it has a linear trend (or both). Monte Carlo studies have shown, however, that the power of classic Augmented Dickey-Fuller (ADF) tests can be very low in this type of situation (Enders, pp 234-244). Likewise, the power of the ADF tests could be very low in situations in which it is difficult to distinguish between a true random walk and a near-unit root process (a striking example is shown in Enders 2010, pp. 235-236). However, visual examinations of the graphs of (i) the Mexican Profit Share, (ii) the real exchange rate, (iii) the first difference of the natural logarithm of the Mexican GDP, (iv) the first difference of the natural logarithm of the USA GDP, and (v) the first difference of the natural logarithm of the Mexican Government Expenditures (the last three graphs are not shown) seem to be examples of this situation. Therefore, I did not carry out ADF but Elliot, Rothenberg, and Stock (1996; ERS) tests. Enders (pp. 240-244) shows how the latter has more power. Table A.2.1 presents the statistics of the tests and indicates if the nulls of unit root can be rejected. In order to do the analysis as careful as possible, I conducted the tests with both possible specifications: constant in the model and trend in the model. In both case the regressions have 5 lagged differences; following the rule of thumb of including $T^{1/3}$ lags, which in our case is $156^{1/3} \approx 5$. It could be seen that the variables I use for the structural VAR analysis are stationary, except in the case of the profit share. In this case, however, I still maintain the assumption of stationarity because of the following reasons. On one hand, the statistics are not

that far, so to speak, from the critical values which would allow the rejection of the null. On the other hand, and most importantly, it is a consensus that unit root tests are never entirely trustful, and seeing the level graph is hard to believe the profit share is a random walk. Third, and most importantly, I did tests of the stability of the VAR, both in STATA and R software (files available by request) and indeed they both yield *the VAR is stable*. Thus, the question of the stationarity or not of the profit share is not worrisome.

Table B.1. ERS unit root tests

	“Constant”	“Trend”
Mexican GDP	1.6454	-2.5164
Δ In Mexican GDP	-3.0857***	-4.2614***
Profit Share	-1.0762	-2.0821
USA GDP	0.1543	-1.5741
Δ In USA GDP	-2.9485***	-3.3175**
Government Expenditures	1.6228	-0.7873
Δ In Gov Expenditures	-2.7032***	-4.6147***
Real Exchange Rate	-2.1997**	-2.7745**
<p>*, **, and *** denote we can reject the null of unit root at the 10%, 5%, and 1% significance level, respectively. For models with constant, R reports Mackinnon (1991) critical values while for models with trend it reports ERS (1996, Table 1) critical values.</p>		

APPENDIX C

WBES AND FORMAL ESTABLISHMENTS

Table C.1. WBES cover virtually only formally registered, more than 5 workers establishments

	2005		2009-2010	
	Formally registered	Don't know if registered / Never registered	Formally registered	Don't know if registered / Never registered
Mini: <5 workers	9	1	32	1
Small: 5-19 workers	681	55	463	15
Medium: 20-99 workers	430	9	460	9
Large: >100 workers	288	5	496	3
Total	1408	70	1451	28

APPENDIX D

KUNTCEV ET. AL. (2012) MEASURE OF CREDIT CONSTRAINTS

- Establishments “Not Credit Constrained”: establishments which, regardless of having some external finance at the time or the survey, did not apply for a loan in the previous fiscal year and the reason for which they did not applying was they had enough capital to fulfill their needs.
- Establishments “Maybe Credit Constrained”: establishments which satisfy the following three conditions. (i) They used external finance for working capital and/or investment during the previous fiscal year, (ii) they applied for a loan(s) during the previous fiscal year, and (iii) they have a loan outstanding granted by a financial institution at the time of the survey.⁶⁴ By definition these establishments have (some) external finance yet “they are classified under the possibility of maybe being credit constraint as it is impossible to ascertain whether they were partially rationed on the terms and conditions of their external finance.” (*Op. Cit.*, p. 11)
- Establishments “Partially Credit Constrained”: establishments which satisfy conditions (i) and either (ii) or (iii). (i) They used external finance for working capital and/or investment during the previous fiscal year and/or have a loan outstanding granted by a financial institution at the time of the survey. (ii) They applied for a loan during the previous fiscal year but it was rejected.⁶⁵ (iii) During last fiscal year they didn’t apply for a loan because of

⁶⁴ The wording of the definition of establishments maybe credit constrained (Kuntchev et. al. p. 11) is ambiguous, because it says these establishments used external finance for working capital and/or investment “and/or have a loan outstanding at the time of the survey”, which suggests condition (iii) is not a necessary condition. Nevertheless, looking at Figure 1 (p. 20), in which the *OFC* definitions are associated with the WBES questions, it is clear the definition should say “and” and not “and/or” have a loan outstanding at the time of the survey.

⁶⁵ Different from the 2006 WBES, the 2010 one does not have a direct question about if an application for a loan or line or credit was rejected or not. In email exchange with the WBES team I double checked this direct question does not exist for the Mexican 2010 WBES. Nevertheless, Kuntchev et. al. (2012, pp. 9-10) figured it out if an establishment’s application for a loan was rejected by, first, seeing if the establishment applied for a loan during the previous fiscal year and, second, checking the establishment did not have an outstanding loan or line of credit at the

other reason than having enough capital to fulfill their needs.⁶⁶ It can be seen that condition (ii) or (iii) indicate the establishment faces some degree of credit rationing. However, condition (i) indicates “firms in this group manage to find some other forms of external financially and, consequentially, they are only partially credit constrained.” (*Op. Cit.*, p. 11)

- Establishments “Fully Credit Constrained”: establishments which satisfy conditions (i) and either (ii) or (iii). (i) They did not get external finance for either investment or working capital during the previous fiscal year, and they do not have an outstanding loan at the time of the survey. (ii) They applied for a loan/credit the previous fiscal year but it was rejected (see footnote 65). (iii) They did not apply for a loan during the previous fiscal year because of other reason than having enough capital for the establishment’s needs (see footnote 66). Quoting Kuntchev and coauthors (2012, p. 10) “In summary, fully credit constrained firms have no external loans because loan application were rejected or the firm didn’t even bother to apply even though they needed additional capital.”

time of the survey. I followed this procedure for both 2010 and 2006 even though the direct question does appear in the 2006 survey.

⁶⁶ Condition (iii) here is equivalent to not applying for a loan or line of credit because of any of the following six reasons: the application procedures were complex, interest rates were not favorable, collateral requirements were too high, size of the loan and maturity were insufficient, it did not think the application would be approved, or others.

APPENDIX E

CONTROL VARIABLES USED ON ANALYSIS OF CHAPTER 3

Variables in X_1

- *Profits*, which are by definition total sales minus total costs. The latter, in turn, are labor, raw materials and intermediate goods, fuel, electricity, communication, transport of goods (not including fuel), water, and rental of lands, buildings, equipment, and furniture costs. Intuitively, a positive sign in the coefficient of *profits* is expected.
- *Sales*; total value of sales of the establishment
- *Size of the establishment*; measured with the number of full-time, permanent employees. Intuitively, a positive relationship between size and investment is expected.
- *% of sales sold domestically (natsales)*. A negative coefficient in *natsales* is expected. In other words, a positive relationship between investment and exports is expected, due to the exposure to foreign markets of exporters.
- *Capacity utilization (caputi)*, measured as the establishment's current output in comparison with the maximum output possible using all the resources available, that is to say capacity utilization, at the last fiscal year (%). This variable could be thought as a proxy for aggregate demand (Ploetcher and Rottman 2002). The sign of this coefficient is not a priori determinate. On the one hand, establishments facing higher demand may be willing to meet it using more of their already existing resources, hiring more workers or improving their human capital, which reduces the likelihood they would accumulate more physical capital. On the other hand, they might try to accumulate more physical capital if they are already at full capacity.

- *Competition in market of main product (compmain)*. This is a categorical variable with four categories: no competitors faced in main market of main product, 1 competitor, between 2 and 5, and more than 5. It is difficult to anticipate a sign of this variable. On the one hand, more competition should force establishments to invest more. But on the other hand establishments facing more competition may be forced to not invest because they are lagging behind.
- *Number of years the establishment has been operating, natural logarithm (lnage)*. For a long time economists have argued about the sign of this coefficient.
- A binary variable capturing if the establishment was part of a larger firm (that is, a firm with at least two establishments); *largerfirm*. This is another proxy for size, not based on the number of workers.
- The two following innovation measures. On one hand, if the establishment introduced a new product or service into the market in the last three years; *newprodserv*. On the other hand, if the establishment introduced a new method or process of production in the last three years; *newprocess*. The signs of these variables are not a priori determined, because innovation and physical investment can be complements or substitutes.
- A binary variable capturing if the firm spent money in private security; *secu*. Given the high rates of criminality (and impunity) in contemporary Mexico, it is important to somehow control for it.
- Given that most of the surveyed establishments reported the main obstacle for their operation was the competition of other not formal establishments, a binary variable trying to capture this issue was included; *obsinf*. It equals 1 if the establishment declared that the competition

of other informal establishments was a “major” or “very severe” obstacle for such operation, and 0 if it declared it was “none,” “minor” or “moderate” obstacle.

- Given that in 2005 the firms stated macroeconomic instability was the second most important obstacle for the firms operation a binary variable equal to 1 if the establishment declared it was a “major” or “very severe” obstacle was included; *obstmacroins*.
- Given that in 2009-2010 the firms stated tax rates were the second most important obstacle for the firms operation, a binary variable equal to 1 if the establishment declared it was a “major” or “very severe” obstacle was included; *obsttaxr*.

Variables in X₂

- The variables in X₁ except *natsales*, *compmain*, and *caputi*.
- *Lostsales*: loss in sales due to robbery, breakage or spoilage, either in the place of operations or while shipping products (as % of total sales)
- *Obstcrime*: binary variable equal to 1 if the crime was a major or sever obstacle for its operation (self-declared)
- *Infpayments*; amount of informal payments given to officials to “get things done with regards to customs, taxes, licenses, regulations, services, etcetera. This variable was not included in the 2005 analysis, because it would have implied losing 80% of the observations.

APPENDIX F

ANALYSIS OF CHAPTER 3 USING PROFITS VARIABLE

INSTEAD OF SALES VARIABLE

Table F.1. Bivariate Probit Estimation Using Profits

Dependent variable: Investment		
Independent variable	2005	2009-2010
<i>Credit Constraints</i>	-1.687629*** (.0801153)	-.9550049** (.4828676)
largerfirm	-.0156236 (.1485024)	-.1624051 (.1285071)
lnage	-.0656146 (.0580017)	-.1310627** (.0643023)
profits	1.32e ⁻¹¹ (7.07e ⁻¹¹)	-5.43e ⁻¹⁰ ** (2.63e ⁻¹⁰)
natsales	-.009169** (.0036202)	-.0045878 (.0039531)
compmain		
○ 1	-.0292018 (.1473152)	.3840256 (.364526)
○ 2 to 5	.0869593 (.1188948)	.237436 (.2395426)
○ 6 or more	.0081463 (.1201944)	.2819461 (.2366582)
newprodserv	.2666385** (.1354169)	.2392719** (.1105594)
newprocess	.0583937	.3327618***

	(.1363042)	(.1041688)
obstinf	.2787955*** (.0995954)	-.1038198 (.1137283)
caputi	-.0018858 (.0015521)	.0052126** (.0022983)
secu	.3072459*** (.0978571)	.377455*** (.1093078)
obstmacroins	-.049359 (.0970182)	
obsttaxr		-.0077977 (.0988246)
size	.0000513 (.0001686)	.0016974*** (.0004963)
intercept	.9369155** (.4341153)	.0279837 (.5643608)
<i>Marginal Effect of Credit Constraints on Investment</i>	-.4935444*** (.016883)	-.3083908** (.1363212)
Observations	743	862
Likelihood-ratio test of $\rho = 0$ (“chi squared” statistic)	8.94342***	1.26822
Standard errors under parenthesis *, **, and *** denote statistical significance at the 10, 5, and 1% level, respectively		

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