The Recent Inequality Reduction in Latin America:

The Role of Tax Policy

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By María Fernanda Valdés Valencia, M.A.

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Referees:

1. Prof. Dr. Barbara Fritz (Freie Universität Berlin)

2. Prof. Dr. Lena Lavinas (Universidad Federal do Rio de Janeiro)

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
CIT	Corporate Income Tax
CODELCO	The National Copper Corporation of Chile
DOLS	Dynamic Ordinary Least Squares
ECM	Error Correction Model
EMPAC	Asset Tax
FONAVI	National Housing Fund
HP	Hodrick-Prescott
IDE	Tax on Cash Bank Deposits
IEAN	Extraordinary Tax on Net Assets
IEPS	Special Tax on Production And Services
IES	The Special Solidarity Tax
IETU	The Single Rate Business Tax
ILO	International Labour Organization
IMF	International Monetary Fund
INDEC	National Statistics and Censuses Institute Of Argentina
ITAN	Temporal Tax on Net Assets
NAFTA	North American Free Trade Agreement
OECD	Organisation for Economic Co-Operation and Development
OLS	Ordinary Least Squares
OTT	Optimal Tax Theory
PAN	National Action Party
PIT	Personal Income Tax
PRI	Institutional Revolutionary Party
PWK	Price Waterhouse Coopers
RS Index	Reynolds and Smolensky Index
SME	Small And Medium Enterprises
TEA	Tax Evasion and Avoidance
VAT	Value Added Tax

1 INTRODUCTION

Although inequality in Latin America remains scandalously high, the region is experiencing an unprecedented equality momentum. Since the beginning of the 2000s, there has been laudable progress in reducing inequality. According to recent studies, income inequality has unambiguously declined – and is still declining – in virtually every Latin American country.[1]

This reduction in inequality has taken many observers by surprise, not only for its unusual timing – inequality has decreased precisely in the years when it increased everywhere else – but also for the fact that the reduction was in Latin America, a region that has for decades held the dubious honor of being the most unequal region in the world (UNDP 2010). Latin American countries have been so flagrantly and persistently unequal that for some, inequality is as Latin American as lively dance music and magical-realist fiction (The Economist 2003). Not many would have predicted that Latin America could eventually escape from the vicious circle of increasing inequality in which the region had seemed trapped mere decades ago. But it has – at least for the time being.

1 See Cornia (2014) and the World Bank (2011) for a summary of the findings.

1.1 THE LATIN AMERICAN EQUALITY MOMENTUM AND ITS DETERMINANTS

Understanding the key factors behind this unprecedented decline in inequality has been a focus of recent research, and central to the discussion has been the question of whether the inequality reduction observed in the region has resulted predominantly from effective policies or, rather, from plain good luck. This question is in fact a very relevant one, because it relates to the sustainability of the reduction: the more the decline in inequality reflects policy changes (rather than transitory and unexpected factors), the more lasting it is likely to be – since good luck rarely lasts forever. Answering this question also allows us see what, if anything, deserves the credit for this change.

Some are inclined to believe that the inequality reduction has indeed been largely a product of plain good luck,[2] for the equality momentum coincided with extraordinarily positive global economic conditions, characterized by increases in remittance inflows, the convenient influx of foreign capital at declining interest rates and, above all, astonishingly high prices of commodities. Under these extraordinary circumstances the region was able to grow more strongly and generate more employment than before, and higher growth and employment have been pointed by some as the roots of the inequality decline.

[2] See for instance the report of Puryea and Jewers (2009).

But the fact that no other region experienced comparable distributive gains despite similar extraordinary global economic conditions has been used as evidence that these inequality outcomes may not stem from simple good fortune. Most studies associate the inequality reduction with important policy shifts and new approaches to public policy in the region. Changes in social policy in the 2000s have been singled out as contributing to the inequality reduction of the region (López-Calva and Lustig 2010; Barrientos 2014). In particular, the 2000s were characterized by the creation and the propagation of social assistance programs focused on the poor, including conditional cash transfer programs such as Bolsa Família in Brazil, Oportunidades in Mexico, and the like.[3] Today, virtually every Latin American country has a conditional cash transfer program, and such programs have been increasing in terms of coverage, generosity and general design over time. A policy shift has also been identified in labor market policies, with a shift in the 2000s towards a much more pro-union and pro-formalization stance, as well as towards an increase in the minimum wage.[4] Another commonly cited policy shift has been in educational policy. The indisputable improvements achieved by Latin American countries in enrolment and completion rates have been the result of efforts in educational policy that began in the 1990s but intensified in the 2000s. Improvements in educational policy have been highlighted as an important factor contributing to the reduction in skill premiums and inequality of

[3] For a critical assessment of changes in social policy in the last few decades see Lavinas (2013).
[4] In the 2000s the minimum wage increased in 14 out of 18 countries in the region (Cornia 2014).

earnings (López-Calva and Lustig 2010; Lustig, López-Calva, and Ortiz-Juarez 2013).

1.2 TAXATION: THE DISREGARDED FACTOR

One policy that is usually disregarded in the analysis is tax policy. So far, only a few[5] have inquired as to whether authorities' use of the tax instrument in the 2000s has significantly differed from the use in the 1990s in a way that can help to explain the inequality reduction in Latin American countries over the past several years. This is precisely the gap that I want to fill with this research. Thus, *the question I will seek to answer throughout this dissertation is whether tax policy in Latin America has been more pro-equity in the period of declining inequality compared to the period of high and increasing inequality in the 1990s, with the ultimate objective of contributing to the growing literature on the causes of the inequality decline in Latin America.*

The lack of interest in the taxation factor can certainly be explained by particular difficulties inherent to the question itself. To ask whether a possible shift in taxation policy can explain the reduction in inequality in Latin America presumes that taxation does indeed have a role to play in determining distributive outcomes: as I will show later in this dissertation, this is an argument that needs to be analyzed before being assumed; it is also an argument that fell out of fashion in economic circles for almost 40

[5] Tanzi (2013), Jiménez and Lopez Azcúnaga (2013) and Cornia et al. (2012; 2014) have inquired along similar lines.

years. Moreover, the concept of "pro-equity taxation" contains certain ideas of fairness, distributive justice and other philosophical normative considerations that economists have tended to circumvent in recent decades; it involves, for instance, talking about the super-rich and questioning the origins of their situation and the desirability of redistributing their income, among other distasteful topics. Thus, the mere concept of pro-equity tax policy pushes many economists to the limits of their comfort zone.

The question is also empirically challenging. In economies so dependent on international factors – particularly on prices of commodities – as is the case in most Latin American economies, it is difficult to differentiate which changes in tax outcomes (such as level of revenue or tax structures) are the result of discretionary tax policy and fiscal efforts of the authorities and which are the result of business cycles, commodity prices and simple good luck. Thus, evidencing policy shifts is much more difficult in the case of tax policy than for other policies such as social expenditures, where a clearer distinction between policy outcomes and policy instruments can be made.

These difficulties explain to a certain degree why the few studies on the subject have, as a matter of simplicity, avoided any significant discussions about inequality and taxation. These studies have also resorted, in the absence of other more accurate empirical alternatives, to presenting changes in tax outcomes such as tax/GDP ratios or/and a few cherry-picked tax reforms as evidence of possible policy shifts.

1.3 APPROACHING THE QUESTION

As I have said, there are conceptual and empirical difficulties embedded in my research that have limited the development of studies on the subject; therefore my general approach will consist of first dealing thoroughly with

these fundamental problems before answering my research question empirically.

Along these lines, I will begin the dissertation with an examination of the conceptual issues. I will show that taxation is an important variable in explaining changes in inequality over time by reviewing a large collection of empirical studies on the subject. I will then go one step further and analyze from a theoretical perspective how and through which channels taxation may affect inequality. I answer this question by reviewing important theories in the areas of public finance, macroeconomics and political economy.

I will then continue confronting the methodological problems. My research question involves comparing tax policy in the period when inequality was increasing to the period of declining inequality, in order to evidence a possible policy shift towards more pro-equity policies. This question required me to decide, on the one hand, which indicator of pro-equity tax policy to use and, on the other hand, to come up with a methodology to measure it, in order to effect the comparison. I will argue in this dissertation, -based on theoretical grounds, that a tax policy is more pro-equity the more it collects, the more progressive it is, and the more counter-cyclical it is. To measure these three factors this research will propose a novel methodology: the structural methodology. This methodology consists in removing the effect of the cycle and the effect of prices of commodities from tax revenues, in order to make the comparison. I will also complement the quantitative information from the structural analysis with other, qualitative, information on tax reforms obtained from legal texts, other qualitative studies, and background discussions with researchers and experts, in order to give the reader a clearer idea of what occurred in the policy arena.

To apply the structural revenue methodology that I have proposed, substantial amounts of information are required; for instance, one needs to have information on tax revenues linked to commodity markets as well as in-depth information about the operation of tax systems. Moreover, the structural methodology that I propose works only in countries highly dependent on commodities. For this reason, I will limit this research to a case study of the five largest Latin American countries dependent on commodities for which data exist: Argentina, Chile, Colombia, Mexico and Peru. Although the country selection was data and methodology driven, the chosen countries do represent the region in one fundamental way: these five countries typify the three types of economic structure found in most countries in the region: countries dependent on oil (Colombia and Mexico), generally called petro-states, countries dependent on minerals (Chile and Peru) and countries dependent on agriculture (Argentina).

Having resolved these issues, I then apply the proposed methodology to my five case studies, using official data of tax statistics and my own constructed data base of tax revenues from commodity sectors.

1.4 MAIN FINDINGS AND CONTRIBUTIONS

My main original contribution to the discussion about the Latin American equality momentum and its determinants is to evidence, after a profound empirical analysis, that in my case studies, the use of the tax instrument by the authorities in the years when inequality was declining was no more pro-equity compared to the 1990s, when inequality was high and rising. Thus, if one is looking for reasons for the decline in inequality, one may want to look elsewhere.

My research also contributes to the field by presenting a consistent and structured compilation of empirical studies and theories about the role

taxation plays in shaping inequality over time. In particular the empirical compilation recognizes that inequality is a relevant variable for explaining inequality but also that the effects of taxation on inequality seem to extend far beyond the direct mechanical and static impact of taxation, with greater indirect effects. The theoretical compilation contributes by identifying three particular indirect ways that taxation can modify inequality, namely: 1) by modifying workers' economic behavior; 2) by creating an equality-friendly macroeconomic atmosphere; and 3) by creating a political environment which favors redistribution.

My research has also made methodological contributions. I proposed the structural methodology, which isolates tax revenues from the effects of the economic cycle and of commodity prices, in order to analyze discretionary tax policy in countries highly dependent on commodities. Using these structural revenues as a proxy for discretionary tax policy is an innovative approach that I am convinced has potential to be of use in further regional studies.

1.5 ORGANIZATION OF THIS DISSERTATION

The remainder of this dissertation is divided into five chapters. Chapter 2 aims to justify the need to include taxation in the discussion of declining inequality by providing a literature review of the most relevant studies which stress the important role of taxation in shaping and reshaping inequality. In Chapter 3 I go one step further and, by reviewing the main theories that link taxation with distributive outcomes, I identify the different channels through which taxation affects inequality. In Chapter 4 I deal with the empirical issues of my research; in this chapter, after defining concepts such as tax policy and pro-equity tax policy, I propose the structural methodology and explain how it is used in my case studies. I also propose complementing my structural analysis with qualitative information

on tax reforms in the countries examined. In Chapter 5 I apply the proposed structural methodology to the five largest countries in the region dependent on commodities: Argentina, Chile, Colombia, Mexico and Peru, for the period 1990-2010. In this chapter I also supplement the results of the structural analysis with qualitative information on tax reforms in the countries examined. Chapter 6 presents the conclusions of this dissertation.

2 EMPIRICAL STUDIES ON THE EFFECTS OF TAXATION IN INEQUALITY

2.1 INTRODUCTION

In the introductory chapter I noted that the Latin-American region is experiencing an unprecedented equality momentum. In seeking to contribute to the discussion of the causes of this decline in inequality, I have decided to evaluate whether tax policy has played a role. This chapter aims to justify the need to include taxation in the discussion by providing a literature review of the most relevant studies which stress the importance of taxation in explaining inequality.

I have found two different approaches in empirical studies to the inequality-taxation question. The first approach consists of using cross-country macro studies. These studies use either regression analysis or simple descriptive statistics to evaluate whether there is a significant relationship between tax variables and inequality among countries and/or over different periods of time. This approach can reveal more long-term and dynamic relationships.

The second empirical approach consists of using incidence analyses: these analyses use country-specific statistics to formulate measures of market inequality (before taxes) and indexes of inequality after taxes. It is the difference between these two measures that is used as evidence of the effect of taxation on inequality. This type of analysis reveals chiefly mechanical and static relationships between taxation and inequality.

The following sections of this chapter will be dedicated to examining the most relevant cross-country studies (Section 2.2) as well as the tax incidence analyses (Section 2.3). The last section will present my conclusions.

2.2 CROSS-COUNTRY MACRO STUDIES

In cross-country studies, researchers approach the inequality-taxation question by associating certain variables of inequality with variables of taxation using different statistical techniques. The variables used vary significantly among studies. Variables of taxation tend to be either the size of the tax system (such as the percentage of tax revenues to GDP) or a measure of the progressivity of the system (such as the ratio of direct/indirect tax revenues or legal statutory taxes to progressive taxes, e.g. the personal income tax (PIT)), or a mixture of both. Variables for inequality come, in general, in two forms: one that measures inequality of market income or any other form of pre-tax inequality, and one that measures inequality after the effect of taxes.

The conclusions derived from these studies depend on the variables chosen for taxation and inequality. For instance, the type of inequality measure used examines very different effects of taxation on inequality. Using a measure of pre-tax inequality is meant to suggest an equalizing effect beyond the direct impact of taxation, that is to say that taxation modifies inequality indirectly since it has the ability to change the economy in a way that the distribution of earnings of individuals is modified. Using a post-tax measure of inequality reflects the direct effect of taxation as well. In other words, measuring post-tax inequality reveals not only the indirect effect of taxation on the distribution of earnings but also the direct effect of taxation: the modified income distribution structure that results from the tax bite taken out of individuals´ incomes.

The first cross-country studies relating inequality to different forms of taxation appeared in the 1990s with a series of studies revealing the stylized fact that countries with fairly egalitarian income tended to have more redistributive tax systems characterized by more progressive taxes

(usually measured by direct taxation ratios) and higher levels of taxation than more unequal countries (Persson 1995; Benabou 1996). These studies not only found a negative association between redistributive taxation and post-tax inequality, but a negative relationship was found for market inequality as well (Persson 1995), indicating that taxation seemed to have an indirect as well as direct effect on inequality.

It is interesting to note that these studies were never presented as evidence of a possible role of taxation in explaining inequality differences among countries, because that was not what these researchers set out to prove. Back then, the interest was in contributing to the theorem of the median voter – en vogue at the time[6] –, applied to theories of endogenous growth; thus what these studies wanted to prove was not that taxation may explain differences in inequality among countries, but that such inequality could explain why some countries chose one tax system over another. In particular, they attempted to prove that high inequality causes pressures for redistributive taxation – but they found the total opposite. Only a few actually considered issues of reverse causality and evaluated the probability that the stylized fact they found was due to the fact that lower degrees of inequality may be the result of a more redistributive tax structure rather than the cause of it.[7]

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[6] The most significant of these works were produced by Meltzer and Richard (1981), Alesina and Rodrik (1994), Perotti (1993), Persson and Tabellini (1994); for a literature review, see Verdier (1994).

[7] See for instance Bjorvatn and Cappelen (2003) and Adam et al. (2013).

The stylized fact found in these earlier studies of the 1990s was recently reconfirmed by Pikkety et al. (2011). They plot the marginal legal tax rates of 18 countries members of the Organization for Economic Co-operation and Development (OECD) countries against the concentration of the top 1% income earners in two different periods, 1960-1964 and 2005-2009. In both plots a positive relationship is evidenced, indicating that indeed countries with more progressive tax systems (proxied by the legal top tax rate) have lower levels of inequality (proxied by the concentration of the top 1%). In this study, the pre-tax concentration of income is used, indicating again that the effect of taxation and inequality is indirect as well.

The work of Pikkety et al. (2011), and later the work of Alvaredo et al. (2013) went one step further. Intrigued by the increase in inequality in the US and other English-speaking countries in the past three decades, and realizing that most of the theories of skill-based technological change and globalization cannot explain why some countries experienced increases in inequality while other high-income globalized countries with similar technological and productivity developments have gone through different patterns of income inequality, they try to see if changes in taxation can explain the differences among countries over time. They use the share of the pre-tax top 1% income share as a measure of inequality, with the justification that the rise in the share of the top 1% has had a noticeable effect on overall income inequality, at least in the US case, based on the study of Atkinson et al. (2009). To examine tax changes, they use the top marginal income tax rate. When they plot the changes in top marginal income tax rates in 18 high-income countries since the early 1960s against the changes over that period in the share of the top 1%, they show that the evolution of top tax rates is strongly negatively correlated with changes in pre-tax income concentration. They show that countries such as Germany, Spain, or Switzerland, which did not experience any significant top rate tax cut, did not show significant increases in the share of income accruing to the

top 1%. They show as well that the countries that decreased their tax rates most dramatically were also the countries that increased their concentration at the top most sharply, as in the case of the US and the UK. Furthermore, there was no country that increased its concentration at the top without decreasing tax rates.

The works cited above show quite clearly that countries with more equal concentrations tend to have higher taxation and higher progressivity. There is also evidence that in some developed countries, changes in the concentration of the top 1% is correlated with changes in top marginal tax rates. This evidence reveals nothing about causation, however, because concentration of income can be caused by many other variables related or unrelated to taxation.

The other set of studies that I am going to present attempts to address the causation issues by using regression analysis. All of these studies seek to explain the effect of changes in taxation on inequality, using as dependent variables a measure of inequality and as independent variables a measure of taxation and certain control variables that account for other factors affecting distribution.

Some of these studies consider only the concentration at the top, such as the work of Atkinson and Leigh (2010). They regress the concentration of income at the top with the legal marginal tax rate and various control variables for a panel of five Anglo-Saxon countries (Australia, Canada, New Zealand, the UK, and the US) with a data span of more than 75 years. They find that the share of the very rich appears to be extremely responsive to changes in marginal tax rates. They estimate that reductions in tax rates can explain between one third and one half of the rise in the income share of the richest 1% that was observed in these countries over the period 1970-2000.

The work of Roine et al. (2007) is interested in examining the effect of the top marginal tax rate not only on the top income earners (P99-100), but also on the wealthy upper middle class (P90-99) and the rest of the population (P0-90). They use a long series for a panel of 16 countries for the entire 20th century. Their findings show that top marginal taxes have a negative effect on the entire top group, both the top percentile and the following nine percentiles, while the effect for the lower nine deciles is strongly positive. They conclude that, taking all the results together, taxation may be important in explaining changes in inequality over time.

Other studies use different measures of taxation and inequality. Chu et al. (2000), for instance, try to describe how the progressivity of the tax system, measured as the direct/indirect taxation ratio, together with the level of collection measured by the ratio of direct taxes to GDP, explain, among other factors, Gini coefficients for developing and transition economies from 1970 to the mid-1990s. Given their data limitation, they present only tentative evidence indicating that the progressivity of the tax system has significant effects on the Gini coefficient; however the magnitude of the effect was small.

Woo et al. (2013) also use the ratio of direct to indirect taxes as a proxy for tax progressivity and a data set of up to 153 countries for as many years as are available from 1960 to 2011. They find that greater progressivity in taxation produces lower inequality as expressed by the Gini coefficient for disposable income. According to their estimates, an increase in the progressivity ratio of 1 is associated with an approximate 2.5% reduction in inequality.

The work of Weller (2007) and Weller and Rao (2008) uses a different measure of inequality: the income concentration of the bottom 20 percent. Using cross-country data from 1981 to 2002 in industrializing economies, they find positive effects for progressive taxation (proxied by the top

marginal tax rate, the average tax rate, and the median tax rate) on income distribution.

Duncan and Peter (2012) formulate income inequality as a function of structural progressivity (defined in a sophisticated manner based on the idea of progressivity of Musgrave and Thin (1948)) and other control variables. They find that progressivity in fact reduces inequality of observed income measured as the Gini of reported income found in household surveys, but has a significantly smaller impact on actual inequality (approximated by the Gini of consumption), due to the presence of tax evasion.

Muinelo-Gallo and Roca-Sagalés (2013) use a general equilibrium model which accounts for the joint determination of growth, inequality and fiscal policy, where pre-tax inequality produces different fiscal policy outcomes, and these outcomes subsequently affect the evolution of post-tax income inequality and growth. They analyze 21 OECD high income countries for the 1972-2006 period. They find that the effect of direct taxation revenues on net inequality is negative and significant in all estimations; thus, increases in direct tax revenue – whether through increases in the tax base, in the overall average tax rate or in the progression of the tax structure – would yield a larger distributive effect and thus lower inequality levels.

Martínez-Vázquez, Vulovic, and Dodson (2012) take a long-term view of how tax and expenditure policies affect income distribution over a continuum of 30 years (1970-2009) using a large panel data set of 150 developed, developing and transition countries. Instead of using one single variable for taxation, they analyze the effect of each tax on inequality. They find that income taxes have a positive impact on income distribution, contributing to decreasing inequality, and this effect is more pronounced the higher the degree of progressivity and the higher the share of GDP that is collected through individual income tax. They also find that corporate

income taxes (CIT) also have a positive effect on income distribution, but that this effect is weakened depending on the degree of globalization or openness of the economies. They find as well that general consumption taxes, excise taxes and customs duties have a negative impact on income distribution, with some caveats depending on the specific type of tax being considered. Furthermore, they analyze the effects of taxes versus public expenditure and determine that their results would not lead us to conclude that expenditure policies have been more effective overall than taxes in affecting income distribution – at least not with the public expenditure measures they considered.

On the whole, the studies on the subject, independently of the methodologies used and the variables analyzed, find that countries' differences and historical trends in income inequality can be partly explained by the level and progressivity of tax policies.

Are there similar studies focused on the case of Latin America? Unfortunately, we do not have many meticulous studies showing a relationship between inequality and taxation. It is difficult to find long-term series of concentration measures as well as of tax variables for the case of Latin America, at least not as lengthy as those of the cross-country studies I have just summarized; this has probably reduced the opportunities for long-period studies. Nonetheless, there are some works on the subject worth mentioning. For instance, Centrágolo and Gómez Sabaini (2007) plot a measure of post-tax Gini for the year 2005 with tax collection as a percentage of income. They find that the most equal countries in Latin America are not those that have higher tax collection. We know as well from the same study that changes in the level of taxation are not related to changes in inequality; in fact, from the year 1990 till 2005, the vast majority of countries increased tax collection, although only half of them managed to reduce inequality, with the other half increasing their Gini coefficients in

that period. There is also some evidence of the way changes in the progressivity of the tax system are related to changes in inequality; in fact, there is an evident consensus in the view that the years of increasing inequality in the 1980s and 1990s coincided with the period when Latin America completed its round of "neoliberal" tax reforms that increased the already high reliance on indirect taxation. The study of Mahon (2011), using a database of 13 Latin-American countries, shows how a clear rise in the ratio of the fifth-quintile to first-quintile incomes coincides with a substantial increase in the proportion of revenue from indirect taxation. What Mahon shows is, however, only an association and says nothing about causation.

There is, to my knowledge, only one attempt to use a regression analysis to show how taxation explains inequality over time in Latin America, namely the work of Cornia (2010). He uses the Gini coefficient of the distribution of household disposable income as a dependent variable, and uses a series of political and non-political variables that may explain inequality, including the ratio of direct to indirect taxation. The panel includes 18 Latin American countries for the years 1990-2007. The study serves to prove that the ratio of direct to indirect taxation is highly significant, and negative, although not very large.

2.3 TAX INCIDENCE ANALYSES

The static and mechanical impact of taxation on inequality can be evaluated by comparing the difference between measures of inequality on the basis of market income and on the basis of after-tax income. These measures are constructed with the use of income micro-data. From micro-data, one can estimate how much each individual (or household) pays in taxes and with this information, one obtains two different types of income, one that includes the effect of taxation, and one without its effect. This information

on income can be aggregated and analyzed to produce different measures of inequality, one based on income without considering paid taxes (which could be considered the market inequality) and one including it (which is the after-tax inequality). When this difference is calculated using the Gini coefficient, we end up with the Reynolds and Smolensky index (RS Index), a widely used index for analyzing distributional effects developed by Reynolds and Smolensky in 1977.

It is worth mentioning that the difference between pre- and post-tax inequality is incorrectly referred to in some academic articles as the redistribution power of taxation. Calculating the difference between market and post-tax income inequality is by no means the same as measuring the effect of taxes on inequality, which is much more complex (Martin and Prasad 2014). This difference can only roughly account for the static and mechanical effects of taxation in inequality. Furthermore, using this measure as the "effect" or "impact" of taxation in inequality is based on the assumption that the pre-tax inequality is the inequality situation that would exist if taxation did not exist. However, no conceivable measure of pre-tax income inequality could indicate what the income distribution would look like if taxation did not exist, because the situation of a society without taxation is as difficult to imagine as it is to measure, this latest interesting point has been made emphatically by Murphy and Nagel (2002).

There have been multiple comprehensive incidence studies applied to developed countries. One common reference is the compilation done by the OECD in 2008 where the incidence of taxation was calculated for 22 OECD countries using OECD income distribution questionnaires. That compilation shows that on average, the tax system of these countries succeeds in reducing mechanically and statically the Gini coefficient by 3.2 Gini points. This reduction is; however, lower than the effect of public transfers. The patterns of redistribution vary among countries: some countries' effects are

higher, as in the case of Germany, whose taxation reduces the level of inequality by 4.6 Gini points; some countries' effects are minimal, as in the case of Japan, which reduces inequality only by 0.3 Gini points; and some countries' tax systems increase inequality, as in the case of Switzerland, which increases inequality by 1.2 Gini points. Furthermore, the analysis shows that during the period of increasing inequality in these countries (they only analyze this from the mid-1990s on), the RS Index actually decreased for the average of countries and for the vast majority of the countries. A similar exercise also undertaken by the OECD in 2011 found that after the period from the mid-1980s to mid-1990s, redistribution achieved by the tax system fell in almost all countries but rose in Canada, Denmark, Finland and the United States.

Another common reference is the study of Wang and Caminada (2011), who apply a budget incidence analysis to a wide range of 36 mainly developed countries using micro-data from the Luxembourg Income Study (LIS) Database. Although they use a different dataset than the study of the OECD, they compare their results and conclude that the general picture of incidence analysis using these different datasets is almost identical.

Studies for the developing world are much scarcer. In the summary developed recently by the IMF (2014), the Fund stresses that studies for developing countries, with the exception of Latin America, tend to be few and focused mainly on specific tax components. A similar argument has been stated by Zolt and Bird (2005), who hold that the available evidence on tax incidence in developing countries is neither conclusive nor persuasive. The conclusions have also been sometimes contradictory; as reviewed by Chu, Davoodi and Gupta (2000), different studies derive different conclusions: an author can conclude in one survey that the tax system in developing countries tends to be progressive, and in a subsequent survey,

the same author concludes that it is difficult not to conclude that tax systems in developing countries must be regressive.

The empirical case of Latin America is different from other developing countries; studies of incidence of taxation are long-standing and rich, starting from the first work undertaken by Musgrave himself, which established the propositions for all further research (Bird and Wulf 1973). The conclusions of incidence analysis in the last 40 years, independently of their techniques, year of measurement and data procedure, propose that taxation in Latin American countries does not affect income distribution, as is shown by the reviews of Bird and Wulf (1973) and more recently by the surveys of Centágolo and Gomez Sabaíni (2007), Goñi et al. (2011), Bird and Zolt (2005) and Cubero and Hollar-Vladkova (2010) for the case of Central America.

Incidence studies for the Latin American region reveal other important facts about taxation; for instance, they demonstrate that the redistribution achieved mechanically and statically through the tax system is markedly lower in comparison with developed countries (Breceda, Rigolini, and Saavedra 2009; Goñi, López, and Servén 2011). There are also important differences among countries in the effects of taxation (Lustig et al. 2011); in some countries, tax systems appear to increase inequality slightly while other tax systems reduce inequality slightly. The effect of each tax on inequality is also different from other countries, most studies agrees that PIT is the *only* progressive tax in most Latin American economies, while the Value Added Tax (VAT) is the regressive tax *par excellence* in most countries (Goñi, López, and Servén 2011). Furthermore, there is some evidence that the mechanical and static effect of taxation on inequality may have improved over time. Comparing incidence studies from 1990 with those of the 2000s, Cornia et al. (2012) show that the incidence of taxation equalizing income improved in all 11 Latin-American countries for which

comparable data is available. They show that in nine countries where the equalizing effect of the tax system was negative in the 1990s, it turned positive by the new century. However, the RS index in absolute terms is still too small in the studies of the 2000s.

Incidence analyses for Latin American countries have also taken the form of simulations. In the oft-cited paper by Engel, Galetovic and Raddatz (1998), the authors, aware of the fact that the impact of taxes on income distribution at the household level in Chile, as evidenced by incidence studies, was very low, assess the sensitivity of the distribution of income to changes in the structure of taxes and tax rates. The result of this "what if" analysis is that even considering radical modifications of the tax structure such as raising the value added tax from 18% to 25% or substituting a 20% flat tax for the present progressive income tax, the after-tax distribution in Chile changes only slightly. They show that major departures from the current tax structure also fail to significantly affect income distribution.

2.4 Overview and conclusions

The studies here presented clearly indicate that at the macro level taxation is a relevant variable for explaining inequality. Not only so some tax variables, such as level of collection and progressivity, explain country differences in inequality, but also variables of taxation – particularly measures of the progressivity of the tax system – are significant factors explaining changes over time. For instance, some variables of progressivity of taxation have been shown to be good predictors of the increases in income concentration in developed countries over the last few decades. Macro studies focused on Latin America are scarcer given the limited data, but the few that exist also discern a relevant role for taxation in explaining changes in inequality in the region.

All in all, the macro studies demonstrate that taxation is a relevant and an important factor to be considered when examining the changes in inequality experienced by Latin America in the past few decades.

A key point derived from the macro-analysis studies is the idea that taxation affects not only post-tax inequality but also pre-tax inequality. This indicates that the effect of taxation on inequality goes far beyond the direct mechanical and static impact of taxation and that taxation seems to affect inequality in indirect ways. In fact, it seems that the direct effect is not the most relevant when talking about taxation. For instance, the studies of incidence here presented – which are better able to disclose the mechanical and static effects of taxation on inequality – show that in developed countries taxation modifies inequality less than social transfer, and that in Latin America, this direct effect is almost imperceptible to the point that pre- and post-tax inequality are quasi-identical in most Latin American economies.

The fact that incidence studies of Latin America do not reveal an important effect should not be interpreted as evidence that taxation has not played a role in shaping inequality over time in the region. This is an argument often used,[8] but it is very misleading. The fact that taxation does not seem to affect inequality in direct and static ways does not imply that it does not affect inequality in indirect and more dynamic ways.

[8] See for instance the argument of Bès, in the recompilation of Bernardi et al. (2013), who says that the Argentine tax system cannot be blamed for the outcome of income distribution, given the small impact of taxation on inequality after taxes.

3 CHANNELS THROUGH WHICH TAXATION AFFECTS INEQUALITY: A THEORETICAL INVESTIGATION

3.1 INTRODUCTION

The last chapter compiled a series of empirical studies that evidenced the important role of taxation in shaping and reshaping inequality. These studies did not show, however, the mechanisms through which taxation may change distribution. In this chapter I wish to delve deeper into the different channels through which taxation affects inequality. To do so, I will review the main theories that link taxation with distributive outcomes to see how this relationship is conceptualized from different theoretical angles.

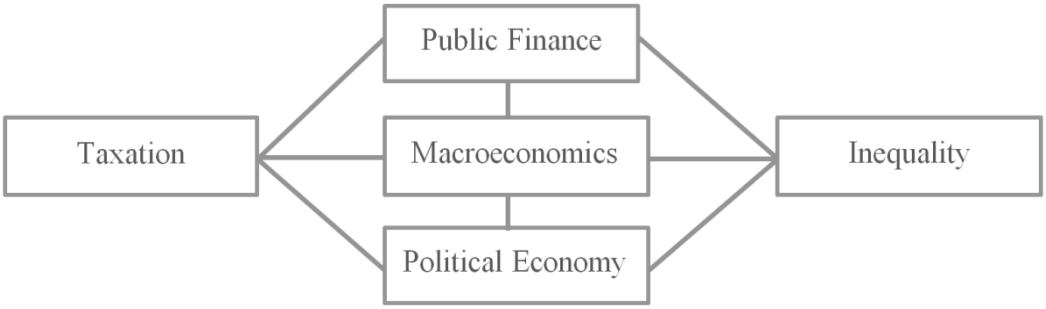
Entering the theoretical field is necessary not only to reconfirm the importance of taxation for understanding changes in inequality – and to verify that such a thing as a pro-equality tax policy exists – but also to provide the information necessary to measure pro-equity tax policy.

The theoretical relationship between taxation and inequality is substantial, complex and not limited to economic factors. Taxation and inequality intertwine with cultural, political and social factors; not without reason have social scientists devoted centuries to studying the interaction from different perspectives. I do not attempt to offer a comprehensive review of all these approaches, nor do I think it is even plausible. Instead, I will focus on the most current assessments in this area; in particular, I have identified three main theoretical discussions within the economic field linking inequality and taxation, which together will construct my theoretical framework.

Figure 3.1 illustrates this framework, composed of the three areas where discussions of inequality and taxation have developed: public finance,

macroeconomics and political economy. Needless to say, these three discussions are, at the same time, intertwined in complex ways, with themes in one area reappearing in another. This differentiated categorization thus serves a purely analytical purpose.

Figure 3.1 Three Discussions Linking Taxation and Inequality



This chapter is divided into four sections. The first three sections examine each of the discussions illustrated in Figure 3.1, namely within the fields of public finance, macroeconomics and political economy. The last section will present my conclusions.

3.2 PUBLIC FINANCE AND TAXATION

The first theoretical discussion of the relationship between taxation and inequality occurs in the field of public finance. Issues of equity and taxation have always been at the heart of public finance studies. However, the way in which the field has perceived the relationship between inequality and taxation has changed dramatically over time. What I want to do now is to present three main visions of this relationship in chronological order. In particular, I wish to highlight the fact that recent developments in the field of public finance indicate that taxation does, in fact, have a role to play in shaping income distribution.

3.2.1 THE POST-WAR PERIOD, KALDOR AND MUSGRAVE

The first view begins with the emergence of modern finance theory, dating back to the postwar period. In his master work, Richard Musgrave (1959), the so-called father of modern public finance, identified the pursuit of a desirable level of income distribution as one of the three fundamental objectives of a modern state, together with the objective of ensuring an efficient allocation of resources and of providing a stable economy with full employment. Modern finance theory thus granted paramount importance to distributive issues from the very beginning.

On the role of taxation, the most remarkable aspect of this period was the unquestioned role of taxation in modifying income distribution. As explained by Bird (2003), the possibility of changing inequality patterns through taxation was a highly shared belief in the post-war period. It was a reflection of a general optimism which maintained that all perceived ills could be fixed through state action.

The initial theories of taxation and inequality are usually attributed to the ideas of Musgrave. Musgrave gave insights into two different roles of taxation with regard to distribution; the first role of taxation is that of modifying the primary distribution. Although he did not use the term "primary distribution" himself, he described this as the "distribution of income and wealth [that]…depends on the distribution of factor endowments…[and]…the prices they fetch in the market" (Musgrave and Musgrave 1979, 11). Taxation, according to Musgrave, accomplishes this function by collecting money, money that will later be spent on strengthening human capital through education, healthcare, sanitation programs, and other social programs. Tax policy thus becomes a factor that contributes to the formation of human capital and in this way it affects the distribution of earning capacities of individuals, thereby helping to shape

the primary distribution over time. The second role is that of modifying secondary distribution (understood as distribution after taxation is taken into account). This role is accomplished when taxation reshapes after-tax income structures. Taxation is capable of producing this reshaping through the progression of tax systems. Progressive tax systems place the higher burden of tax on high-income segments, which is meant to influence post-tax distribution.

As documented by Bird (2003), Bird and Zolt (2005) and Tanzi (2013), the optimism of the post-war era was also reflected in Latin America. This was evidenced by the paramount importance given to the redistributive role of the state and to the instrument of taxation. The ability of taxes to redistribute was unquestioned, and the tax system was seen as the "supreme equalizer" of economic theory (Shah and Whalley 1990). In fact, it was strongly believed that in order to develop, Latin American countries had to "learn to tax" (Kaldor 1963). Learning to tax meant, for Kaldor, collecting greater sums in order to finance a developmental state and collecting more progressively in order to redistribute income and wealth. Note that according to Kaldor, both objectives could be met in the same way: high and progressive tax rates on income could increase revenue and redistribution. As a result of this way of thinking, most early tax missions in developing countries advised policymakers to replace regressive taxes on consumption (tariffs, export taxes, excise taxes, and general sales taxes) with progressive taxes on income.

3.2.2 The supply-side economics period, Mirrlees and the Optimal Taxation Theory

The post-war vision of taxation was soon challenged. At the end of the 1970s, as global economies slowed and Latin American economies entered the "Lost Decade", experts began to doubt taxation's potential as a

redistributive tool in Latin America and elsewhere, and the second view of inequality and taxation started to emerge. The idea of redistributing income through taxation fell very much into disfavor in academic circles, and the new mantra repeated by tax advisers and policy makers was that, if inequality was indeed a concern – something that many economists at that time had begun to doubt, as I argue later in this chapter – it should be combated with different economic tools and strategies.

Part of this perception change is explained by the supportive evidence from the incidence studies already discussed in Chapter 2 which show that, compared to other economic tools such as social expenditure, the difference between income inequality before and after taxes is rather trivial (Zee 2004). But probably the more significant challenge to the distributive role of taxation was the advent of supply side economics. Supply side economics and its obsession with economic efficiency losses – those blamed for the economic stagnation of the 1970s – managed to permeate the field of public finance. Recall that this was the time when Harberger introduced his famous Harberger's triangle, which illustrated the fact that a deadweight loss appears whenever market prices are distorted by taxes. This was also when Arthur Laffer introduced his famous Laffer curve – which stated that tax cuts actually increase revenue – and when Arthur Okun, in his influential book of 1975, argued that using the fiscal system to redistribute wealth from the rich to the poor was like carrying money in a leaky bucket. It was also the time when "many other prominent academic economists argued that such key economic variables as saving, investment, and labor supply were highly sensitive to the bite taken out of their return by taxes" (Slemrod 1994). The obsession with efficiency losses had now arrived in the public finance field to stay.

As Gordon and Li (2009) and Bird (2013) show, the idea that taxation implies huge efficiency losses was also predominant in the

recommendations to developing countries and Latin American countries from the Washington Consensus institutions, such as the World Bank and the International Monetary Fund (IMF), who intensively advocated flattening the tax system to reduce inefficiencies.

This view came with its own normative theory of taxation: the Optimal Tax Theory (OTT). This theory posits that one can find the optimal and most efficient way to design and implement taxation for a given society based purely on economic theory. In principle, these theories came in two forms. The first was developed by the followers of Ramsey (1927) and was entirely unconcerned with the redistributive effects of taxation. The explicit interest was finding the optimal tax rate to obtain a certain amount of public revenue while minimizing deadweight losses. Note that efficiency losses were the focus of interest; it was already a shared belief that redistribution was a secondary concern.

The second form of OTT is that initiated by the work of Mirrlees (1971). The Mirrlees model did not exclude issues of equity; in fact, equity was at the center of its analysis. Mirrlees recognized that both equity and efficiency issues were central to any discussion of optimal taxation; therefore he created an economic methodology that combined the normative criteria of equity and efficiency into one single objective for policy makers: that of maximizing social welfare (Heady 1993). The optimal system is thus the system that maximizes the welfare of society and not one that minimizes inequality or efficiency losses.

The Mirrlees framework became the theoretical foundation of the new vision that declared taxation's potential as a redistributive tool to be negligible. This approach did not exclude equity considerations, as did the followers of Ramsey, but actually included them in the analysis. The Mirrlees framework demonstrates that not only is there a tradeoff between equity and efficiency in taxation – a belief that everyone at the time seemed

to share – but also that the two pillars of Musgrave's justifications for the distributive power of taxation, namely the importance of revenue-raising and progressivity, were actually mutually exclusive. Kaldor's belief, that increases in revenue could be achieved through greater progressivity, lost all validity under Mirrlees's results, because Mirrlees demonstrated that, in order to collect more, one must flatten the tax schedule, and in order to gain progressivity, one must reduce the amount collected; one cannot do both.

3.2.2.1 THE INITIAL MIRRLEES MODEL IN DETAIL

In this subsection I will examine how the initial model of Mirrlees implies a trade-off between revenue-raising and progressivity. Here I refer to the model presented by Mirrlees himself in 1971, with some early modifications undertaken until the 1990s. I will present only a simplified version of the underlying mechanisms of the model, without delving into all the details, which are complex. In spite of its name, the Optimal Tax Theory is concerned not merely with taxes alone, but reveals an optimal net tax function, which includes the design of benefits, and many other elements beyond the interest of this subsection.

To start with, the Mirrlees model is one that maximizes society's welfare function, including labor supply models in its framework. The idea is that a benevolent social planner selects the tax schedule that maximizes the welfare of all individuals with two constraints: the budget constraint and the constraint arising from the fact that each agent is herself optimizing, i.e. maximizing her utility given her preferences for labor and leisure and given the existing tax rate. In this framework, it is in the shape of the welfare curve that equality concerns come into play and the selection of the welfare curve shape is then at the discretion of the researcher. If the researcher considers that a society generally favors equality, the researcher can use a welfare function that conforms to the shape of a classical Rawlsian maxi-min

welfare curve; an example of this approach is the oft-cited work of Atkinson (1983). At the same time, if the society is perceived to be indifferent towards income distribution, the welfare curve could be a straight line, indicating that the welfare loss of a rich person harms the welfare of society in the same way as the welfare loss of a poor person. The social welfare criterion of Mirrlees himself indicated a marginal utility of consumption declining to zero.

The basic idea in these models of OTT is that taxation in modern tax systems affects human behavior.[9] The behavioral effects in Mirrlees models can be divided into two. Firstly, there is a labor supply behavioral effect, which implies that individuals decide how much labor to supply, by analyzing the benefits of working (the financial reward) against the resultant loss of leisure; taxation alters the reward of working, thereby affecting the balance of this trade-off. In the initial model, the only labor supply effect considered was that of individuals deciding how intensively to work at the margin.

The direction of the labor supply behavioral effect depends on two familiar microeconomic concepts: the substitution effect and the income effect. The substitution effect means that, as marginal tax rates change, the price of labor changes in relation to leisure, leaving the individual to choose a different mix of leisure and work. The income effect, on the other hand, implies that as marginal tax rates change, the disposable income of

[9] It is important to note that only taxes that depend either on income or on other measures of ability to pay would produce behavioral changes. A lump-sum tax that demands a fixed amount from all individuals, independent of their socioeconomic characteristics, would not produce any behavioral response.

individuals also changes, and as individuals feel poorer/richer they may decide to work more/less to achieve their initial disposable income. The substitution and income effects work in different directions; when taxes increase, the substitution effect will imply lower labor supply levels: as the individual's reward from work is less, they substitute some leisure for work. The income effect, on the other hand, induces people to work more as tax rates increase, in order to increase their living standards.

In the literature of Mirrlees models, there is a consensus that the income effect appears to be very small in comparison to the substitution effect; therefore many of the models, for simplicity, exclude the income effect of taxation and consider that the only labor supply effect is that resulting from substitution behaviors (Diamond 1998; Saez 2000; Brewer and Saez 2010).

The second type of behavioral effect is the effect of evasion or tax avoidance strategies (TEA effect). As pointed out by Slemrod (1998), individuals respond to taxation by undertaking a variety of tax planning, hiding, renaming and retiming activities whose goal is to directly reduce tax liabilities. Furthermore, according to Slemrod (1994) and Feldstein (1995; 1999), the TEA effect is much stronger in the upper tail of the income distribution, since the rich have more incentives and resources to engage in such activities.

Now, in order to demonstrate the trade-off in the model, I will start by examining how progressivity affects inequality. Progressive taxation, by definition, is designed to collect a larger proportion of income from the rich relative to the poor; accordingly, it has the ability to mechanically reduce inequality, reducing the after-tax inequality relative to the pre-tax inequality. But when facing a more progressive taxation, individuals change their behaviors through the two behavioral effects already explained. The labor supply effect guarantees that those at the top work less, substituting labor with leisure, and those at the bottom work more, substituting leisure

with labor. Thus, the labor supply effect tends to reinforce the redistributive role of progressivity, encouraging those at the top work and earn less, and those at the bottom to work relatively more and earn more. The TEA effect, on the other hand, implies that progressive taxation motivates individuals, particularly those at the top, to hide part of their income. When those at the top conceal part of their income, no taxes are paid on the hidden income, thus seriously limiting the possibility of redistribution through taxation, because the real income of the rich in relation to the poor may even increase in this scenario.

With regard to the revenue-raising role of taxation, progressive taxation without consideration of any behavioral effects is meant to collect higher levels of revenue, since it taxes more heavily those with higher income – those at the top of the distribution spectrum. However, the potential collection from progressive taxation is often severely reduced once the two behavioral effects of the Mirrlees models are taken into account.

The way in which behavioral effects restrict the possibility of obtaining tax revenues is most evident when attention is focused on the top income earners. Since a high proportion of national income is concentrated among the top earners, the limits of extracting from the rich do much to explain the difficulties of raising revenues through taxation.

Here it is interesting to note that when the focus is only on the top income earners, the welfare function of Mirrlees models is also a revenue maximization function (Piketty, Saez, and Stantcheva 2011; Alvaredo et al. 2013; Diamond and Saez 2011; Brewer and Saez 2010). This is because most Mirrlees models consider a curvature of the welfare function, which implies decreasing marginal utility; thus the welfare losses of the top income earners from money lost to taxation have little, if any, effect on the general welfare of society. This is more so if we assume a government with more strict equity considerations, one that gives no weight to welfare losses

at the top. Thus, from the Mirrlees model we can conclude that maximizing the welfare of society as a whole implies maximizing the revenue obtained from those at the top.

Without considering behavioral effects, the potential for obtaining revenues from those at the top is enormous since they concentrate a large proportion of the national income. If the only objective is to raise revenue, a benevolent policy maker should tax those at the top at the highest marginal tax rate possible, that is, a confiscatory tax rate. But with progressive and high tax rates, individuals at the top prefer to work less, leading to a reduction in taxable income. Furthermore, individuals at the top may choose to undertake TEA strategies to a much greater extent, hiding earned income and paying taxes only on reported income. Such behavioral effects limit the amount of taxation that can be obtained from incomes at the top, which limits the option of raising revenue through a progressive tax structure. It appears pointless to tax progressively if those who are taxed more heavily will always circumvent the laws in order to pay less.

As is evident in Table 3.1, where both the revenue-raising and redistributive roles of progressivity are compared, the ability of progressive taxation to reshape after-tax distribution is affected *positively* by the labor supply effect, and negatively by the TEA effect. But the revenue-raising role is affected *negatively* by both the labor supply effect and the TEA effect, thus resulting in a perfect trade-off between the revenue-raising and redistributive roles of progressivity. In other words, the labor supply effect guarantees that any gains in the power of the redistributive role of progressivity imply a loss in the power of the revenue-raising role. Under this scenario, a benevolent government that wants to reduce inequalities must decide whether to tax more progressively to minimize income inequality or to maximize revenue collection at the top; again, it cannot do both. Furthermore, Table 3.1 explains that the TEA effect restricts both the possibility of progressive

taxation reducing inequality and the possibility of its raising revenue. In fact, if the TEA effect is too large, progressive taxation may not guarantee any real effects on income inequality.

Table 3.1 Progressivity and Collection in Initial Mirrlees Models

Effect	Redistributive Role of Progressivity	Revenue-Raising Role
Mechanical	+	+
Labor Supply	+	-
TEA	-	-

3.2.3 THE EMERGING VIEW, THE ECONOMICS OF THE 1% AND THE NEW MIRRLEES MODEL

The idea that taxation was unimportant, or at least not among the most important factors in explaining inequality, dominated thinking for almost 40 years. This idea has recently been challenged and we are now witnessing the emergence of a third view concerning the redistributive role of taxation. This change of paradigm coincides with the preoccupation of economists and other social scientists with the spectacular rise in inequality experienced by developed countries (particularly English-speaking countries) over the last four decades. This focus on inequality in the developed world became more acute after the crisis of 2008, when some notable academics blamed increasing inequality for the global financial crisis (Stiglitz 2012a; Galbraith 2012).

The new paradigm asserts that taxation is – and always has been – a relevant factor in explaining inequality, leading to an increased emphasis on the redistributive role of taxation in new studies on inequality. This new approach is gaining adepts. At the international level, in just one example, the UNCTAD in its Trade and Development Report of 2012 dedicated a whole section to the redistributive effect of tax policy. Moreover, just

recently the IMF (2014) recognized that taxation is relevant to explaining inequality – a concept they had not entirely accepted before.

Probably the most noticeable exponent of this paradigm is Thomas Piketty, who has incorporated these ideas into his recent book *Capital in the Twenty-First Century* (2014). He proposes in his book a progressive global tax on capital and income as a way to halt the inherent tendency of capitalism towards a concentration of wealth and income. This recommendation is based on his argument that taxation can, in actual fact, modify inequality.

Just as the previous view was supported by the empirical evidence obtained from incidence studies, this new perspective is supported by empirical evidence at the international and historical level, as presented and discussed in Chapter 2; evidence which maintains that in historical comparisons, changes in inequality (measured as the concentration of the 1%) over time can be attributed to changes in taxation.

At the same time, just as the previous vision was theoretically underpinned by the OTT initiated by Mirrlees, this new vision is highly rooted in a new version of the Mirrlees model developed during the last few years through substantial academic research. It should be emphasized that there is an intimate connection between the research that supports this new vision empirically and the development of the new Mirrlees model itself, to the extent that most of the authors who provided the empirical analysis – particularly Saez, Diamond, Alverado and Piketty – are the same ones who helped to develop the new Mirrlees model.

What I call the new Mirrlees model is the result of a deliberate attempt to overcome certain unrealistic assumptions of the initial Mirrlees model and to render it suitable for empirical research. What is relevant of the new Mirrlees model is that it does not necessarily imply a trade-off between revenue-raising and progressivity. I will elaborate these ideas in the next

subsection, which explains how the new model actually reconciles these two objectives of taxation.

3.2.3.1 THE NEW MIRRLEES ANALYSIS IN DETAIL

The new Mirrlees model starts by recognizing that the original model had certain limitations in relation to its real-life implementation, as well as certain fundamental flaws hampering the development of policy recommendations. Firstly, the original model treats TEA effects without incorporating new discoveries in the field of economics and evasion. Secondly, the initial model lacks a formulation which could be easily applied to empirical studies; there is no link between the mathematical optimal tax formulas derived from the Mirrlees model and such concepts from behavioral empirical economics as elasticities, which are more familiar to empirical studies (Saez 2000). Finally, in the original Mirrlees model, individual labor market decisions are based on the old economics of the labor markets, whereas a more policy-oriented model should also include all new developments in the field of labor economics.

The initial Mirrlees model has now been adapted and enriched with the objective of overcoming the aforementioned limitations. Since the work of Saez (2000) and Diamond (1998) the original mathematical formulations of Mirrlees have been translated into testable formulas using elasticities to measure the behavioral effects of taxation. There has also been substantial development in the measurement of these elasticities in recent times, as surveyed by Gruber and Saez (2000) and more recently by Saez et al. (2009). The new model provides a new way of looking at TEA effects and their determinants. Recent studies have also included new additions to the labor economics in the original model, in particular, a distinction between labor supply choices at the extensive margin (i.e. the decision to work or not to work) and choices at the intensive margin (i.e. the decision about how

intensively to work, as discussed in Choné and Laroque (2011)). Furthermore, recent works have included new models of job matching, with the possibility of earnings that differ from the marginal productivity of work (as is assumed by Mirrlees).

To demonstrate how the new model reconciles the two roles of taxation, I will start by assessing the way in which this model addresses the redistributive role of progressivity. This new model is similar to the previous one, in that progressive taxation is equalizing both through its mechanical effect and through the labor supply effect, and the only effect that actually limits the equalizing effect of progressive taxation is the TEA effect.

The new model adds two elements to this conclusion. Firstly, the labor supply effect is not only in the short term, as in the initial Mirrlees models. Long-term effects are an important part of the labor behavioral effects of taxation, as in the long run the effects of tax modifications result in long-term responses through education and career choices and also in the type of jobs that people are willing to accept (Feldstein 1995).

Secondly, the new models assume that the TEA effect is small, much smaller than usually presumed. This result comes from considering the TEA effect to be endogenous to the model; the authors consider that the magnitude of the TEA effect is neither immutable nor exogenous, as it depends so greatly upon the tax system and the opportunities for evasion and avoidance inherent within it. This is in contrast to the labor supply effects, which are exogenous for being based on individual preferences for labor and leisure not susceptible to policy manipulation, at least in a free society. The studies reviewed by Slemrod and Kopczuk (2000) have tried to include the optimal administration and enforcement, and their relationship to the optimal rate structure. The same authors formalize a model where the government selects not only the optimal tax rate but also the optimal tax base which is,

according to the authors, a key determinant of TEA opportunities. The studies of Diamond and Saez (2011) have argued that if the Mirrlees model is going to guide policy, it has to minimize TEA strategies; thus one can assume that the TEA effect is not large overall, and this is for the researchers a reasonable benchmark.

In relation to the revenue-raising role, as previously mentioned, the original Mirrlees model stated that the labor supply effect and the TEA effect are the two effects that limit the ability of the authorities to "tax the rich" and obtain sufficient revenue using progressive taxation. Developments in the area of behavioral effects have since arisen that challenge the conclusions of the original model.

The first development was the introduction of a new behavioral effect, what I call the bargaining effect.[10] As argued by Alvaredo et al. (2013), the initial Mirrlees model was rooted in an over-simplified model of pay determination that takes no account of developments in labor economics. In particular, it is rooted in the idea that earnings equal the marginal productivity of labor for all individuals. But according to the now standard models of job matching, the proportion of pay given to agents can be higher than the marginal productivity of work and vice versa; this comes from the fact that creating a vacancy is costly for the employer and job-seeking is costly for the employee, meaning that a match creates a positive surplus that must be distributed among agents in a bargaining setting. The amount of that surplus that goes to each agent depends on the power of agents in

[10] Others call it the rent-seeking effect (Piketty and Saez 2013).

the bargaining process (top income earners generally have more opportunities to set their own pay than low and middle income earners) as well as on the efforts that income earners exert on the bargaining process based on their analysis of the perceived benefits of assuming a more aggressive bargaining stance. The benefits of assuming a more aggressive bargaining strategy depend on the marginal tax rate: when the marginal tax rates are very high, the net reward for bargaining for more compensation is more modest than when the tax rates are lower.

As Piketty et al. (2011) manage to prove quite convincingly, behavioral changes cannot be reduced only to changes in labor supply and TEA strategies; behavioral changes also include the bargaining effect. The idea is better understood with an example: if the government decides to decrease marginal tax rates at the top, a top-earning individual now faces three incentives: to increase her labor supply, either through working more hours or working more intensively through the classical substitution effect of the labor markets; to expend less energy using TEA strategies; or to bargain more intensely for increases in compensation. Since these activities require a certain effort, the individual must decide how to divide her "stock of effort" among these three alternatives.

The recognition of the bargaining effect is very relevant to understanding the limits of taxing the rich through progressive taxation. The bargaining effect is rooted in the idea that overpayment (earnings above marginal productivity) always comes at the expense of underpayment (earnings below marginal productivity); therefore, whenever top income earners, through their bargaining efforts, receive compensation above their marginal productivity, someone in the economy is getting less compensation. Conversely, when marginal tax rates are set progressively and are high at the top, the resulting disincentive for top earners to bargain more intensively means that someone at the bottom is getting that surplus, and

that surplus is going to be taxed. Thus, the bargaining effect creates an externality, a "rent-seeking externality" (Piketty and Saez 2013). This externality enhances the possibility of obtaining revenues from taxing the rich – not exactly from the rich themselves, but indirectly.

It is important to highlight that since the work of Feldstein (1995; 1999) and Lindsey (1987), behavioral effects (both the labor effect and TEA effects) for empirical analysis have been encapsulated into the elasticity of taxable income,[11] usually measured as the elasticity of reported income to the net-of-tax rate.[12] For the Mirrlees models of optimal taxation, until very recently, the distinction among the types of behavioral responses has been considered completely irrelevant (Chetty 2008), because both effects were entered as deadweight costs of taxation. Before Piketty et al. (2011) introduced the concept of the bargaining effect, the elasticity of taxable income, which is the measure used in empirical studies to encompass all behavioral effects, would always push down the optimal tax rate and reduce the possibility of "taxing the rich". Now we know that there is a component of the magnitude of the elasticity of taxable income that pushes the rate up. The optimal top tax rate rises dramatically if a substantial fraction of the effect of top tax rates on pretax top incomes is due to wage-bargaining effects, instead of supply-side effects and TEA effects. To provide an empirical example, the optimum marginal tax rate estimated by the authors

[11] Before the works of Feldstein and Lindsey, the classical measure to assess behavioral effects was the marginal tax elasticity of hours worked or labor participation.

[12] The net of a tax rate or retention rate equals the share of the next unit of reported taxable income that is not taxed, or in other words, it is the difference between 100 percent and the marginal tax rate.

for the US, if one assumes that top earners are paid at their marginal productivity, so that there are no bargaining effects, would be 70%; but if one presumes that most US high-earning executives are overpaid, so that there are bargaining effects, then the optimal tax rate rises to 85%.

The second development occurs through the conceptualization of the TEA effect. The new model states that part of the TEA effect may also create an externality. Chetty (2008) shows that the initial Mirrlees models tend to ignore the fact that some TEA strategies consist of re-timing or shifting income from one tax base to another, so that the revenue leakage in current year tax revenue is partially offset by revenue gains in other years or in other tax bases, and thus cannot be considered deadweight losses; instead, they create positive externalities in the form of tax revenues in the tax system, and these positive externalities boost the revenue-raising role of taxation. Furthermore, not all individuals undertake the same TEA strategies. There is an old saying among tax professionals that the poor evade while the rich avoid (Slemrod 2007). If this premise reflects the reality, as some suggest (Saez, Slemrod, and Giertz 2009), the re-timing or income-shifting strategies are those used most frequently by those at the top; therefore taxing the rich through progressive taxation, even if they try to hide their income, will eventually generate extra revenue.

Table 3.2 shows that once the two new developments in the models are included, the labor supply effect of those at the top (including what I have called the bargaining effect) pushes the revenue-raising role of taxation

down to a lesser extent than the labor supply effect pushes the redistributive role of progressivity up.[13] All this implies that a greater redistributive role for progressivity does not come at the expense of a lesser revenue-raising role. In fact, as noted by Diamond and Saez (2011), "the taxation of high earners is a central aspect of the tax policy debate not only for equity or symbolic reasons but also for revenue raising considerations."

Table 3.2 Progressivity and Collection in New Mirrlees Models

Effect	Redistributive Role of Progressivity	Revenue-Raising Role
Mechanical	+	+
Labor Supply (including Bargaining Effect)	+	+/-
TEA	-	-

There is a study that derives the same conclusion using a Mirrlees framework, namely the work of Zee (2004). This study assumes that taxation is not an effective tool for directly redistributing income, while public expenditures targeted to the poor, according to the author, definitely are. He then constructs a welfare maximization model *à la* Mirrlees where the only objective of the government is to optimally raise revenues to finance public expenditures. He concludes that progressive taxation is more efficient at collecting revenues than a flat system and is even more efficient in poor and highly unequal countries. He proves that progressivity and revenue-raising are not mutually exclusive goals. Along the same line, the

[13] In Table 3.2, this fact is illustrated with a +/- sign.

work of Corneo (2002) shows that more egalitarian economies also benefit from progressive taxation in terms of higher efficiency in collection once we consider the Veblenian idea that people care about their relative consumption in addition to caring about more usual things like consumption and leisure.

3.3 MACROECONOMICS AND TAXATION

The second theoretical discussion takes place in the field of macroeconomics. From a macroeconomic perspective, taxation is seen as a tool for macroeconomic stabilization with an ability to smooth business cycles. There has been considerable interest in recent years in linking this macroeconomic stabilization function of taxation with issues of inequality from different angles. In particular, recent developments in the field of macroeconomics indicate that taxation, through its effects on business cycles, does, in fact, have a role to play in shaping income distribution. To explain this point I will start by assessing the relationship between business cycles and inequality – in particular the way in which business cycles affect inequality – as this will provide the basis for further analysis.

3.3.1 (LACK OF) THEORIES OF ECONOMIC CYCLES AND INEQUALITY

It is difficult to find in the economic field a broad theory of income distribution linked to business cycles. This is not surprising, since these two concepts – income distribution and business cycles – are not only fairly new but are also concepts that fell very much into disuse in theory-building by mainstream economics since at least the last quarter of the 20th century. The idea of the existence of business cycles is an idea that became part of the mainstream only after the advent of Keynesian economics. Before Keynesianism, some heterodox economists, such as the so-called Utopian Socialists of the beginning of the 19th century and Marx himself, had already

envisaged the existence of the periodic crises and instability inherent to the functioning of a capitalist economy. However, the classical vision was that of an economy that tended towards full employment. This equilibrium could be momentarily disrupted by external factors such as wars, but there was nothing intrinsic in the economic system that could lead to cyclical movements around a trend; the economy, according to classical thought, always operated at full capacity.

The Great Depression in the US certainly put the idea of business cycles at the center of economic discussions, and theories of business cycles developed extensively afterwards. Almost each branch of economics had its own theory of business cycles: Schumpeterian economics had its theory, the so-called freshwater economists came up with their Real Business Cycle Theory, the Austrian economists expounded Austrian Business Cycle Theories, and so on.

The relevance of business-cycle discussions lessened as developed countries entered the period known as “the great moderation” in the mid-1980s, when the triumphalist voices of Lucas and Bernanke stated that modern macroeconomic policy had solved the problem of the business cycle, thus making it time, they recommended, to move forward (Krugman 2009). Only after the global financial crunch of 2007 did economists return in a frenzy to the discussion of business cycles.

The interest of economists in the concept of personal inequality began even more recently. As explained by Piketty (2014), the notion of inequality of income in theoretical discussions emerged, for all purposes, after Kuznets (1955). He was the first person to publish historical data on income inequality, computing income share by decile, and, more importantly, he was the first to construct a framework of research tying income distribution centrally into the analysis of how the economy works – in the form of a broad theory of distribution of income. His famous Kuznets curve theory

predicted an inverted U-shaped relationship between economic development and income inequality. The theories of distribution before Kuznets, Piketty explains, were focused on the distribution of the returns of the main factors of production, what is largely known as functional inequality. Piketty highlights the theories of David Ricardo and Karl Marx, who were certainly troubled with the idea that the returns of one single means of production (land for Ricardo and capital for Marx) would generate a small class which reaped the benefits and concentrated income and wealth.

Kuznets's theory was, then, the first and last of its kind. It was the first to construct a theory under the concept of income inequality – in contrast to the concept of functional inequality of his predecessors – but his optimistic results guaranteed, together with many other ideological and political factors, that it was to be the last; if the developmental process is equalizing, as Kuznets believed, then it is pointless to worry too much about inequality, let alone develop economic theories about it.

Indifference to issues of income inequality became standard in the profession. Atkinson (1997)evidences this indifference, noting that from 1940 to 1990 the personal distribution of income was not a central subject for research in the economics profession. He shows that in this period an average of 1.5 articles on income distribution were published by The Economic Journal per year out of 38 articles on other economic subjects.

Not only there was indifference, but outright hostility: Robert Lucas, considered by some the most influential macroeconomist of the last quarter of the 20th century (Mankiw 2009), actively discouraged the study of inequality. He held that the study of distribution in economics should be seen as a tendency that, although seductive, is in fact seriously detrimental to sound economics (Lucas 2004). The profession's indifference towards or even rejection of income inequality issues in the past decades ensures that,

if one is seeking grand theories of distribution, one finds oneself most probably confronting theories of functional inequality from the last century. The comments of Atkinson, written in 1997, still apply today:

> *Much of what can be found today in textbooks under the heading of the "Theory of Distribution" is concerned with the determinants of payments to factors (labour, land and capital). In mainstream economic theory, the competitive theory of factor pricing determines the division of national income between wages, profit and rent. Competitive theory has been criticised, with alternatives proposed, such as the Cambridge theory based on the accumulation relationships, or the Kaleckian theory based on imperfect competition, but it is these ideas which form the main component of the theory of distribution. However, [...] the relationship of the factor distribution with the personal distribution of income is typically not spelled out. Statements about the division of national income between wages and profits do not tell us directly what determines the share of the top 20% or the bottom 20% of income recipients. The factor distribution is certainly part of the story, but it is only part, and the other links in the chain need to receive attention. (Atkinson 1997)*

The short period when interest in income inequality and business cycles coincided (mainly some years around the Great Depression and the WWII) helps to explain the underdevelopment in this area. During this short period of coincidence, perhaps the most remarkable personality was Keynes, who was interested in both cycles and income inequality. His work on cycles is better known, but from the concluding remarks of The General Theory one can see that Keynes was as concerned about inequality of income and wealth as he was about unemployment, when he states that both

unemployment and the arbitrary and inequitable distribution of wealth and income were the outstanding flaws of the economic society in which he lived. His concept of "propensity to consume" was in fact a clear link between inequality and business cycles. He argued that when the money is held by a few hands at the top, much of that money will be transformed into "the savings of the rich out of their superfluity" (Keynes 2006) and not into consumption. Under this scenario what occurs is what he calls the "paradox of thrift":[14] people will spend less in consumption and businesses lose all interest in investing, creating less growth and paradoxically ending with lower savings rates. Therefore, income and wealth concentration at the top, from Keynes's point of view, rather than creating growth is more likely to impede it. In his opinion, equality, high employment and robust growth were complementary rather than competitive goals (Elliott and Clark 1987).

The truth is that his ideas were never constructed into a theory of distribution of income. Instead, his early works and the Keynesian apparatus of thought were used by Kaldor (1955) to construct what we know now as the Keynesian theory of distribution, which is again based on factorial inequality and not on inequality of income. All the subsequent work from Keynesian and post-Keynesian economics, with few exceptions,[15] continued this tradition of using the concept of functional inequality.

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[14] This idea was popularized by Keynes, but its origin is much older, and is found in the poem "The Fable of the Bees" in *Private Vices, Public Benefits* by Bernard Mandeville (1714).

[15] Recent post-Keynesian works have begun linking the concept of functional inequality with personal income inequality; see for instance the work of Dafermos and Papatheodorou (2011). A more recent link has been developed by Piketty (2014)

Thus, we do not have a general theoretical elaboration that explains how cycles affect inequality. This does not mean, however, that economists have not worked on the subject; it simply means that instead of a general theory what we have are fragments of research with a variety of different methods and data that are, fortunately, robust enough to allow the construction of a coherent framework explaining a possible relationship between inequality of income and business cycles – something I will attempt to summarize and present in the next subsection.

3.3.2 CYCLES AND THEIR EFFECTS ON INEQUALITY

In general terms, studies are conclusive on the idea that the contractionary stage of the cycle tends to exacerbate income inequality while the expansionary stage ameliorates it, but not enough to make up for the increase in inequality resulting from downturns. This is the conclusion derived from the work described in Box 3.1.

Box 3.1 Summary of Empirical Studies on Inequality, Business Cycles and Volatility

There have been substantial empirical studies on the relationship between inequality, business cycles and volatility. There is solid evidence that during the "hills" of growth, inequality tends to lessen, while during the "valleys", inequality tends to increase, and this increase is much more intense than the reduction during the hill years, thus implying an asymmetry in the effects of business cycles on inequality.

For instance, Calderón and Levy-Yeyati (2009) used a large data set of 72 countries during the period 1970-2005 and found that output contractions raised the Gini coefficient 5% while an expansion decreased the Gini a meager and statistically insignificant 0.9%. The same exercise has been replicated by De Janvry and Sadoulet (2000) on 12 Latin American countries during the period 1970-1994; they concluded that the effects of downturns on inequality are significant: one percentage point of

decline in per capita income increased inequality by 30% more than one point of growth.

The idea that the recessive part of the cycle, particularly when it comes in the form of an economic crisis, increases inequality is now conventional wisdom supported by ample empirical evidence. For instance, the afore-mentioned work of Calderón and Levy-Yeyati (2009) finds that the effects of macro-economic crises on inequality are not only positive but persistent over time. Baldacci et al. (2002) compare income distribution variables of countries affected by financial crises with a control group. They find that countries that suffered crises reported a higher increase in inequality afterwards compared to the control. Furthermore, the increase was stronger in those countries where crises involved income losses than in countries with fewer income-compromised effects. Barlevy (2004) wondered whether the positive association found in the relationship downturns-inequality has anything to do with the fact that these studies are largely based on data from the last 40 years which were, at the same time, years of increasing secular inequality. He finds that the effects of crises on inequality are indeed stronger for periods when inequality is rising over the long term.

Descriptive analyses derive similar results. The study of Atkinson and Morelli (2011) compares inequality before and after crises in 25 developed and developing countries over a 100-year period. They find that increases in inequality tend to follow financial crises. The analogous work of Lustig (2000) finds that out of 20 crises in Latin America, 15 were followed by a rise in the Gini coefficient. Galbraith and Lu (1999) analyze 34 economic crises and find that in Latin America crises raised inequality in 73% of the cases, in Asia 62% of the cases and in Europe 46% of the cases.

These data implies that volatility is in fact detrimental to equality, something that has also been proven. The pioneers in investigating the inequality-volatility link were Hausmann and Gavin in 1996. They observed that Latin America countries, when compared with industrial countries and East Asian tigers, were much more unequal and had more volatile economic growth. Based on this observation, they tested the correlation of real GDP volatility and the distribution of income and found that indeed real GDP volatility exerts a strong adverse effect on inequality, with the most volatile economies in Latin America being also the least egalitarian. This study was followed by others that reached the same conclusion for other regions and contexts. Laursen and Mahajan (2005), for instance, with a data set of 90 countries with different levels of

development, showed that output volatility positively influences inequality, measured as the income share of the bottom quintile. Breen and García-Peñalosa (2005) using a cross-section of developing and developed countries, found that greater output volatility was associated with higher inequality to the extent that the Gini coefficient of a country such as Chile would fall by 6 Gini points if it were to reduce its volatility to the same level as Sweden or Norway. More recently, Huang et al. (2012) found a volatility-inequality relationship that complements existing cross-country studies. In an attempt to mitigate common problems found in previous cross-country studies (namely the problem of data availability and comparability, and the problems faced when working with cross-country data of countries so different in economic structure, culture and levels of development) their approach consists in using within-country data from the continental US for 48 states from 1945 to 2004. A within-country analysis allows work with higher data observation, more consistently measured data and observations with cultural and structural background similarities; their central finding is that growth volatility is strongly associated with higher income inequality.

I would like to elaborate further on the factors behind the phenomenon that inequality increases during downturns and fails to recover during expansions. I will start with the first aspect: the reasons why downturns, and economic crises in particular, increase inequality. The downward part of the cycle is a moment of inequality creation because it has different impacts on different groups of people. In this process, some end up becoming net winners and some net losers, relatively speaking. Stiglitz (2012b) mentions two main reasons why macroeconomic downturns increase inequality: the adjustments in the labor markets and the policy reaction to recessions.

In relation to the labor market, the slowdown of the economy affects the labor market by reducing the demand for labor and usually culminates in firings, layoffs, or wage cuts. Evidence shows that downturns tend to affect the employment of low-skill workers more than high-skilled ones (Agénor 2001). This seems to be a result of the high cost of training, leading firms to

"hoard" their trained employees (Fay and Medoff 1985), even if this implies assigning them jobs requiring fewer skills (Stiglitz 2012a). Another reason is that the less-skilled are less mobile and thus unable to switch jobs and capitalize on available employment opportunities elsewhere (Agénor 2001). Furthermore, downturns make competition for new jobs acuter and restrict the entrance of low-skilled workers. As the economy contracts and demand for labor decreases, the "added worker effect" (Basu, Genicot, and Stiglitz 1999) predicts that more family members may join the labor force to provide insurance against the possibility of a member of the family losing his or her job. The problem is that with more workers seeking jobs, the severe competition for vacancies makes it incredibly difficult for new entrants, particularly those with limited qualifications, to find a job.

Moreover, Checchi and García-Peñalosa (2004) explain that downturns not only affect actual workers, but affect as well the decisions of those youths who are not already in the labor market but who will later work as skilled or unskilled workers depending on whether or not they invest in human capital. During economic downturns, and particularly during periods of macroeconomic crises, young people from wealthy families (those who receive financial support from their parents to study) are likely to invest in education and training and become future skilled workers. Poor youths, who would require student loans to finance their education, see the investment in education and training as highly risky, and are thus more likely to become unskilled workers. It is in these kinds of ways that

horizontal social mobility is restricted, and inequality is generationally reproduced.

Changes in unemployment accompany a decline in wages. In fact, according to a cross-country study by Fallon and Lucas (2002)[16] the effect of downturns on labor markets is not so much on unemployment as on falling wages. Salary cuts are not, of course, faced by all employees; some, typically the most skilled workers, manage to keep their salary conditions even as others, generally low-skilled workers, do not. Moreover, according to Caroli and García-Peñalosa (2002), while low-skilled workers lose part of their labor income, entrepreneurs tend to benefit and increase their income share.

In most developing countries, incomes are dependent on the informal sector. It is not easy to determine the effect of economic downturns on informal labor markets with the same level of precision as in the formal sector. However, some studies[17] show that the informal sector is affected in a double way: there is a reduced demand for services in the informal sector and the entrance of unemployed formal sector workers into the informal sector further depresses the informal labor market.

Low-income individuals are disproportionately adversely affected by shocks in the labor market, not only because their largest income share is derived from employment, but also because they have fewer resources to protect themselves from income contraction in comparison to higher-income

[16] See also McKenzie (2004) for the same conclusions for the case of Argentina.
[17] See for example Baldacci et al. (2002).

individuals. Poor households are hand-to-mouth, in the sense that they consume no more, no less than their disposable income for each period. Low-income individuals usually have no cushion to isolate the effects of real income variations (Garcia, Restrepo, and Tanner 2011) plus they have strong borrowing constraints in the formal sector (Demirgüç-Kunt, Beck, and Honohan 2008). Previous studies on risk management during crises show that poor households tend to manage risk through informal means, either by borrowing from informal lenders (Fallon and Lucas 2002) or by turning to family or community assistance (Acosta and Ramirez 2004), even when the ability of relatives and the community to engage in income redistribution may be reduced during such episodes (Agénor 2001). By contrast, higher-income individuals will be able to – at least partially – shield themselves from income decline through borrowing and/or building a precautionary cushion of assets.

With regard to the policy reaction to downturns and crises, the literature tends to focus on fiscal policy and on the authorities' use of such policy, which can be crucial in mitigating (or exacerbating) the distributional effects of downturns. In relation to public social expenditure, when it is countercyclical, it increases during economic difficulties and thus establishes a social safety-net to protect some segments from losses, particularly those highly dependent upon public services. Examples of such "equality friendly" responses or "adjustments with a human face"[18] were found in some countries in Asia during the crises of the late 1990s (Stiglitz

[18] To use the words of Jolly in his book "Adjustment with a Human Face" (1991).

2012b). Unfortunately, Asian examples are more the exception than the rule (Stiglitz 2012a). There are studies showing that developing countries tend to react in precisely the opposite fashion, by cutting essential social expenses during downturns (Kaminsky, Reinhart, and Vegh 2004). Such cutbacks are a double whammy to the most vulnerable; they increase the insecurity of low-income individuals already affected by the asymmetric effects on the labor market. This latter approach is typical of the Latin American reaction to crises, where social expenditures appear to be procyclical (Gavin and Perotti 1997; CEPAL 2010), exacerbating poverty and inequality.

To sum up, there is empirical evidence of the existence of a detrimental effect of downturns on inequality, particularly through the asymmetrical and damaging effects of labor markets and policy reactions on the poor. The second step is then to understand why periods of positive cyclical phases are not followed by proportional decreases in inequality. To explain these phenomena, it is vital to grasp the dynamics and long-lasting effects of downturns. In particular, it is essential to understand that these result primarily because those individuals who suffered the most during downturns will find it difficult to return to their previous situation, whereas those individuals who benefited from the situation may not lose everything they gained in relative terms. A return to the pre-downturn situation for those negatively affected by a downturn means, in the first place, a return to their previous income situation, particularly labor conditions. At the macro level, going back to the previous circumstances means regaining the same employment characteristics. At the micro level, for those who lost their jobs, it means finding a new job with the same remuneration as the former one, something that becomes more difficult the longer one is out of work.

At the macro level, empirical studies conclude that after downturns unemployment does not rebound that easily. For instance, the International

Labor Organization (ILO) in 2008 reports that after the Asian crisis formal employment in the five hardest hit Asian economies (Indonesia, Malaysia, the Philippines, the Republic of Korea, Thailand) fell by up to 3.1% and took between 5 to 10 years to return to pre-crisis levels. Onaran (2009) analyzes 9 countries with crisis experiences since the 1980s (Indonesia, Korea, Thailand, Malaysia, Turkey, Brazil, Philippines, Japan and Mexico) and shows that the unemployment recovery was slow, to the extent that in six countries, unemployment in 2009 was still higher than pre-crisis levels.

At the micro level, it is widely acknowledged that finding a job is hard enough; when unemployed it is substantially more difficult; and that finding a job with the same conditions as before becoming unemployed is the most difficult of all. The idea that finding a same-conditions-job after a period of unemployment is difficult, and that it may become a permanent problem over time, seems clear and self-evident to most ordinary people. However, it is worth noting that this idea has only very recently been incorporated into the economic analysis of labor markets.

A short look at the economics of labor markets tells us that until the 1980s, most labor economists adhered to the standard view found in Friedman (1968), who distinguished between two types of separate but interrelated concepts of unemployment. On the one hand, there is a natural unemployment rate, or general equilibrium rate: a rate which is produced by the Walrasian system of general equilibrium equations. On the other hand, there is a market unemployment rate dictated by the demand and supply of labor. Friedman held that the market unemployment rate can change in relation to changes in aggregate demand, but it will ultimately tend to its natural rate of unemployment; thus, after a recessive period unemployment will return to normal.

The history of labor economics tells us that Friedman's predictions ceased to be accurate after the 1970s energy crisis shock. Many countries were

affected by this shock in the form of high levels of unemployment and stagflation – a word in vogue at that time to describe the situation of stagnant growth and high levels of inflation. Western European countries suffered severely, and even years after the crisis, although inflation had eased, unemployment remained persistently high (Blanchard and Summers 1987). The only possible explanation for this phenomenon was that, perhaps, the natural rate of unemployment was "all but natural and all but constant" (Blanchard and Jimeno 1995). Academics realized that the market rate of unemployment could affect the natural rate of unemployment in a process that was termed "hysteresis". Hysteresis, a term typically used by natural scientists, helped economists to explain why the natural rate of unemployment is determined by the history of the market unemployment rate.

The work of Blanchard and Summers in the 1980s was just the beginning of the formulation of the presence of hysteresis in labor markets. At that time, hysteresis was explained by insider-outsider models of the type proposed by Lindbeck and Snower (1989). These models say that, whenever a negative shock translates into redundancies, the released workers find it difficult to be re-hired because the insiders (those who managed to keep their jobs) avoid the decline in real wages necessary to reabsorb them.[19] Nowadays, there is more support for human capital models which state that it is the loss of human capital that makes the unemployed permanently unemployable. Dismissed workers tend to remain so because

[19] At this time in history (1980s), it was difficult for scholars to escape the idea that unemployment was caused either by high wages or by labor unions.

unemployment engenders a loss of human capital. Unemployment attenuates skills or makes some obsolete, as many skills valuable in the labor market are learned by doing. Therefore, those individuals who have lost their jobs will lose human capital and the longer individuals are unemployed, the greater the loss in their human capital and the more difficult it becomes for them to re-enter the labor market under the same conditions as before.

For us, the relevance of the discussion of theories of unemployment is that these engendered the concept of hysteresis in economics. And this is a vital concept used by many (i.e. Stiglitz 2012a; 2012b) to explain why transitory causes such as economic downturns can have permanent effects. The concept of hysteresis taught economists that history matters for understanding unemployment and other socio-economic phenomena, and that socio-economic phenomena are, after all, path dependent. The discussion in the 1980s and 1990s on the presence of hysteresis in labor markets encouraged economists to determine whether the same hysteresis might apply to other socio-economic phenomena. In fact, the idea of structural hysteresis and path dependency was then borrowed by development economists and extensively used in attempts to understand such phenomena as poverty, education, and economic development.

To understand why inequality does not decrease proportionally during upturns, we can uncover multiple examples of the ways in hysteresis-type effects ensure that – even if the income of individuals returns to previous levels – people, in order to cope with reduced total income, make crucial decisions during downturns that have lifelong consequences. One typical example is education. Downturns, particularly economic crises, tend to interrupt education: with declining incomes and declining social public expenditure on education, many students may have to forego education (Fallon and Lucas 2002) to enter the labor force, in order to make up for the

declining income of family members or engage in unpaid family work.[20] Large numbers of these children never return to school (Hausmann and Gavin 1996; Stiglitz 2012a), or if they do, they may not be able to recover from learning gaps and will not progress as far as they might have (World Bank 2009). Such circumstances leave long-lasting effects on human capital, particularly when this happens at critical stages of people lives, such as in early schooling years at primary or secondary education levels. For post-secondary education, the reduced opportunity cost of schooling may lead to the decision to interrupt one's education (World Bank 2009). Some people may feel that without promising prospects for employment, there is little point in investing in more education; this is particularly true for young people, who may lose their optimism and willingness to invest in themselves, let alone their communities (Stiglitz 2012b).

Another example of long-lasting detrimental effects is in the area of health and nutrition. Decreased household income and reduced public services affect access to nutrition and health services. Health and nutrition outcomes have been affected by previous severe economic slowdowns in low-income countries, particularly in the form of under-nutrition in women and children (Unicef 2009). An individual who suffers illnesses or malnutrition may well experience lower productivity throughout all her remaining life. If illness

[20] There are cases where this does not tend to happen because finding employment becomes so difficult. See for example Neri and Thomas (2000), who found that in Brazil children do not drop out of school more during recessions than during economic expansions .

and malnutrition affect the prenatal and childhood stages of development, irreversible physical and intellectual development impairment may occur.

In a similar vein, what holds true for individuals also holds true for businesses during downturns. When aggregate demand contracts and sales collapse, or when increasing interest rates bankrupt companies, these companies are not "un-bankrupted" when circumstances are reversed (Stiglitz 2012b). There is always a net loss as a result of this situation.

To sum up in a few words, volatility creates and recreates inequality in a permanent way. Those affected by the downturn, usually those at the bottom, will find it difficult to regain their previous employment situation. Furthermore, those affected may make critical consumption decisions regarding goods such as food, education and health services, either for themselves or their family members, that will leave scars difficult to erase – leaving them in a disadvantaged position relative to their better-off peers.

3.3.3 CYCLES, VOLATILITY AND TAXATION

The discussion above was central to understanding how taxation is related to inequality. Taxation relates to this literature in two different ways. Firstly, according Keynesian macroeconomics,[21] tax policy is, together with fiscal transfers, a fiscal means of insuring macroeconomic stability.

[21] It is important to keep in mind that the recommendation of counter-cyclical policies is not generally shared by all models. Tax-smoothing models (Barro 1980), for instance, recommend that fiscal policy should remain essentially neutral or acyclical. I follow in this work the Keynesian tradition of assigning a stabilization role to fiscal and tax policy.

Macroeconomic instability is an inequality promoter; consequently, a tax policy that manages to mitigate economic cycles, independently of what happens to transfers, is more of a stability promoter and thus, indirectly, an equalizer.

Taxation has the ability to mitigate economic cycles through either discretionary or non-discretionary tax policy.[22] Non-discretionary tax policy in relation to the stabilization role of taxation is dependent on revenue-automatic fiscal stabilizers; these guarantee that a drop in GDP generates a more than proportional reduction in tax receipts and thus a more than proportional reduction in the tax/GDP ratio, which will stimulate the economy.

In the same vein, more progressive taxation can improve the automatic stabilizer function of a country's fiscal system. In modern tax systems, the most well-known automatic fiscal stabilizer is the progressive personal income tax. During booms, progressive income tax schedules ensure that people are pushed into higher tax brackets, increasing tax receipts in a higher proportion to the increase in output. During recessions, individuals fall into lower tax brackets, which reduces tax receipts more than proportionally to the reduction of output. Progressive taxation has been proved to have a stabilization effect that can be as large as traditional demand mechanisms (Auerbach and Feenberg 2000).

[22] See Chapter 4 for an in-depth explanation of discretionary and non-discretionary tax policy.

Discretionary tax policy, on the other hand, can also contribute to stabilization through its cyclical properties. When discretionary tax policy is countercyclical (i.e. oriented towards more collection in boom periods and towards less collection during downturns) it causes the revenue/GDP ratio to fluctuate in such a way as to mitigate the effects of the business cycle, while a procyclical policy does exactly the opposite. The capacity of discretionary tax policy to influence the cycle is conditioned not only by the movement of the revenue/GDP ratio, but also on the size of this ratio: the higher the revenue/GDP ratio, the more stabilization that discretionary tax policy can create (Fatás and Mihov 2001; Fatás and Mihov 2012; Gali 1994). Furthermore, when discretionary tax policy is oriented towards strengthening the revenue automatic stabilizers, it supports as well the non-discretionary stabilization mechanism.

Some have wondered why policymakers would ever pursue procyclical policies. After all, who would like to pursue policies that tend to create volatility while exacerbating booms and busts? The answer is that certain characteristics of business cycles also put pressure on policy-makers to pursue these policies. In Box 3.2, I show how crises in Latin America have given the authorities perverse incentives to pursue procyclical policies, and how the situation has tended to shift in recent years.

Box 3.2 Economic crises and their effects on tax policy in Latin American countries

Why would countries resolve to increase taxes during an economic crisis? There are factors that make it necessary for countries to do so. Crises in Latin America have shown the way in which economic and political factors encourage procyclical policies.

In Latin America, the first incentive arises from the economic situation itself and the financial limits that Latin American authorities have traditionally had. The fact of the

matter is that in Latin America, economic management has traditionally been very complicated during economic crises, particularly in those countries with open capital markets. As GDP contracts during a crisis, revenue tends to decrease, and new sources of government income become necessary. In the face of economic disruption, most countries in the world would try to run fiscal deficits to stabilize, but during crises, Latin American countries have tended to lose access to credit, either because credit has been limited in quantity or because they can only borrow at very high interest rates. In this situation, countries cannot run a deficit and may end up either cutting spending or increasing taxes, or both (Gavin and Perotti 1997; Kaminsky, Reinhart, and Vegh 2004). Therefore, to restore balance, Latin American countries have placed fiscal reform – usually including tax increases – at the center of macroeconomic stabilization processes (Moore 2004).

But demands for new sources of revenue result not only from the contraction of GDP; crises also tend to increase the amount of debt to be paid. Crises in Latin America have tended to force debt onto unsustainable paths when accompanied, as they usually are, with capital flight and depreciation (Kaminsky, Reinhart, and Vegh 2004). This is due to the fact that Latin American countries, like other developing countries, find it difficult to issue debt in domestic currency; therefore, Latin American countries have tended to have a currency mismatch between assets and liabilities (Ocampo and Vos 2008). Because of this "original sin" (Eichengreen, Hausmann, and Panizza 2003) debt which seemed sustainable at a certain exchange rate may become unsustainable after exchange rate depreciation (Ocampo and Vos 2008).

Another factor that increases the debt to be paid relates to the type of debt acquired. Latin America, like most developing countries, has been too dependent on short-term finance and suffers from maturity mismatches in its accounts (Stiglitz et al. 2006). This is explained by the fact that international creditors, reluctant to lend to developing countries on a long-term basis because of the risk associated with lending to immature markets, which often have high and variable inflation rates, tend to protect themselves from risk by lending mainly on a short-term basis. The problem of depending on short-term finances is that, given the volatility of capital flows, when confidence disappears and debt roll-over becomes difficult, the entire stock of a country's short-term foreign debt may have to be repaid in a hurry (Rodrik and Velasco 1999).

The initial position of an economy when a crisis hits also matters in understanding why

countries may find it imperative to increase taxes during a crisis. When countries do not save during good times, they are more vulnerable and less capable of overcoming economic crises without procyclical policies. But, according to some studies, there are structural factors that restrain the ability of authorities to save in good times. The first and most commonly used explanation is the famous "voracity effect", which describes the inability of governments to resist pressure from interest groups to spend disproportionally during booms(Gavin and Perotti 1997; Velasco 1997; Tornell and Lane 1998; Alesina and Tabellini 2005). This effect is supposedly endemic to developing countries because in these countries, contrary to what happens in their developed counterparts, fiscal resources are a "common pool" from which powerful interest groups try to extract the largest possible share when they perceive economic conditions to be good. No group is willing to moderate its claim on the increased resources, as it knows that these sacrificed resources will be appropriated by another group. The "voracity effect" explains why in developing countries an optimal fiscal policy may be a procyclical fiscal policy (Talvi and Vegh 2005). Nowadays, doubts have arisen as to the accuracy of considering the voracity effect endemic only to developing countries, as many developed countries, particularly in Europe, have been shown to be victims of the inability to save during booms (Vegh and Vuletin 2013).

The second explanation is the existence of a "fiscal illusion" that prevents voters from fully grasping the implications of the governments' constraints over time and thus causes them to support all manner of projects, overestimating the advantages of such expenditure (Buchanan 2000).

The third and final explanation is the idea that in developing countries, where public spending is below optimal, governments are forced to spend whatever windfall they receive almost immediately (Galiani and Levy-Yayati cited in Panizza and Jaimovich 2007, because social demands are so strong and necessary.

Recent studies have shown that Latin America has been able to extricate itself from the trap of procyclicality, at least in terms of expenditure policy. Most Latin American countries have exhibited a shift from procyclicality to counter-cyclicality in the expenditure policy of the past decade (Frankel, Vegh, and Vuletin 2013). And, in reaction to crises, on average Latin American expenditure policy has shifted from being procyclical before 1998 to being countercyclical after 1998 (Vegh and Vuletin 2013).

All this indicates that Latin America has escaped from the procylicality trap of expenditure policy largely as a result of overcoming its historical inability to save during good times. It seems that improvements in institutional factors have improved fiscal management during the good years preceding a crisis. An emblematic case in terms of fiscal management is the structural budget rule that has governed fiscal policy in Chile since 2000, which forces authorities to save during good times (Frankel 2011).

As a result of a better management during the boom years, Latin American economies faced the 2008-2009 crisis in much better macroeconomic shape, with positive budget surpluses and lower debt-to-GDP ratios than during other crises (Daude, Melguizo, and Neut 2010). However, I want to emphasize that there has been little study of changes in tax policy cyclicality in Latin America.

Now, the stabilization role of fiscal policy cannot be reduced in practice merely to tax policy. What really stabilizes at the aggregate level is the conjunction of both expenditure and the revenue side of the fiscal system; this is why the stabilization role of fiscal policy is usually measured using the total budget. However, I would like to emphasize here that a countercyclical tax policy, independently of changes in expenditure policy, may not necessarily guarantee a substantial smoothing of the economic cycle, though it will unquestionably be more stabilizing than a procyclical tax policy.

The second way taxation is related to this discussion has been much less studied; it has to do with the effects of taxation on disposable income. The idea is simple: during downturns, a procyclical tax policy, even when it is in the form of a proportional increase in the share of taxes/income paid by individuals, will imply a proportional reduction of disposable income in all individuals in a society, this reduction will more strongly affect those at the bottom, who have no cushion to protect themselves from income drops, and who are usually already asymmetrically affected by the effect of the downturn. This is why abrupt increases in taxes during bad times, in the

form of austerity measures, have been proven to fall most heavily on the poorest (Woo et al. 2013). Furthermore, if the change in taxation is more regressive, it adds an extra asymmetrical effect on the poor. Fiscal adjustment relying on increasingly regressive taxes (such as consumption taxes) has been proven to increase income inequality (IMF 2014).

To sum up, looking at the relationship between taxation and inequality through the lens of macroeconomic theory, one finds that taxation can influence and shape distributional outcomes through its indirect effect on stabilization. Furthermore, from a macroeconomic perspective, one can also see that the moment when taxes change, that is, the cyclical moment when changes occur, is important when considering the effects of taxation on inequality, because it can reinforce or mitigate the asymmetrical effect of cycles on the disposable income of individuals.

3.4 POLITICAL ECONOMY AND TAXATION

The third theoretical discussion takes place in the field of political economy. The political economy discussion sees the relationship between taxation and inequality as shaped by the political process. In particular, the other perspectives already examined (public finance and macroeconomics) ignore the fact that taxation is not set by a benevolent dictator or produced by divine decree, but rather, in contemporary democracies, is arrived at through a collective decision-making process. This brings an entirely new set of considerations into play.

The political economy perspective sees taxation not only as the outcome of a political process, but also as its determinant. In short, the political economy discussion states that taxation plays a relevant role in explaining inequality because it has the capacity to create a political configuration that favors more redistribution. To explain how taxation can create such a

configuration, I will start by examining two different sets of theories: the theories of the equalizing effects of democracy and the theories of captured democracies, which I will later relate to the topic of taxation.

3.4.1 THEORIES OF THE EQUALIZING EFFECTS OF DEMOCRACY

To see how decisions regarding redistribution are taken in democratic settings, there is a long tradition in economics and political science of studying the relationship between democracy and redistribution. Since ancient times, going back to the ideas of Aristotle, there has been an association between the extension of political rights and the redistribution of material resources (Bermeo 2009). The idea that democracy, by empowering the poor, would push the poor majority to seize for themselves the wealth of the productive elite was a concern of early classical economists such as David Ricardo, who considered that under this scenario capitalism and democracy could never coexist. The idea of this "tyranny of the majority" was in fact a present fear in the discussions that followed the independence of the US, as is reflected in the *Federalist Papers* of the 18th century (Prasad 2006). European political economists of the 19th century such as John Stuart Mill were concerned that the "tyranny of the majority" was just as evil as any other form of political despotism (Mill 2002).

More recently, this old idea of the existence of an equalizing effect of democracy has been formally established by the seminal work of Meltzer and Richard (1981) on the median voter, already mentioned in Chapter 2. According to the median voter theorem applied to redistribution, democracy, by extending political power to poorer segments of society, will tend to select the outcome more preferred by the median voter. And since in an unequal society the median voter tends to be poorer than the average voter, the median voter will favor pro-poor policies, greater redistribution and thus reduced inequality.

Since the introduction of the median voter theorem to studies of redistribution, numerous works in political economy and political science have adopted this framework of analysis.[23] But, as was explained in detail in Chapter 2, there is an evident incongruence between the theory and the data, because while the former predicts a positive association between inequality and redistribution, the latter shows exactly the opposite: most unequal countries tend to redistribute less. The case of Latin America is notable because in the region the process of democratization in the 1980s did not accompany greater redistribution and lower levels of inequality, but quite the opposite – inequality worsened considerably in the 1980s and the 1990s (Kaufman 2009; López-Calva and Lustig 2010). Democracies in the region, even considering the reduction of inequality in recent years, still have a poor record in reducing inequality. This contradictory existence of democratic participation and social exclusion has been labeled "The Latin American Paradox" (Burchardt 2010).

3.4.2 THEORIES OF CAPTURED DEMOCRACIES

There have been several attempts to bridge the disconnect between data and theory. If one looks deeper into the Meltzer and Richard model one can see that it is built upon at least three assumptions: (1) The assumption that there is a relationship between the material situation of individuals and their preferences for redistribution, and in particular that poor people favor

[23] See Chapter 2 for a long list of works explaining redistribution through the median voter approach.

redistribution more than rich people. (2) The assumption that preferences for redistribution are transformed into real demands for redistribution. (3) And the assumption that democracy allows these demands for redistribution of the median voter to be transformed into redistributive policies, or, in other words, the assumption that under majoritarian rule, the median voter is the key voter. Assumptions (1) and (2) have been considered as unproblematic by most studies and easy to accept, thus these have not received much scrutiny (see Box 3.1 for an assessment of these assumptions for the case of Latin America). But it is on assumption number three that the critique has focused.

The idea that in some democratic settings the decisive voter is precisely not the median voter has been the preferred explanation as to why in democratic settings there could be a negative association between inequality and redistribution. In this respect, the economic model of Acemoglu and Robinson (2006) shows that the decisive voter is not the median voter because, while the median voter may represent the median *de jure* political power, what matters the most for policy outcomes and inequality is the *de facto* political power, and that is not represented by the median voter. In fact, the *de facto* political power cannot be allocated by institutions such as elections, but tends to be possessed by economic elites that, given their wealth, weapons and their ability to solve the collective action problem[24], can accumulate *de facto* power.

[24] A small number of actors have a natural advantage in working towards a common goal and overcoming the difficulties of collective action (Olson 1965).

Box 3.3 Assumptions of the Theories of the Equalizing Effects of Democracy, the Case of Latin America

The first assumption of the theories of the equalizing effects of democracy is that one may expect those at the bottom to have more preferences for redistribution than those at the top. From an analytical point of view, there are no reasons a priori to consider uncritically that this assumption holds in reality; in fact, the Marxist idea of false consciousness states quite the opposite: it says that individuals are unable to recognize inequality and tend to naturalize and legitimize their position in society (Blofield and Luna 2011).

From an empirical point of view, however, a couple of studies confirm the fact that in Latin America, those at the bottom seem to have more preferences for redistribution than those at the top. In the study of Blofield and Luna (2011) using the World Values Surveys for the case of Chile, Mexico, Peru and Venezuela, responders were asked to rate their attitude to income inequality, from 1 indicating "income inequality should be made more equal" to 10 denoting "we need larger income differences as incentives". The answers were correlated with the income situation of the responders. In all countries the correlation was positive, indicating that lower income individuals tend to favor redistribution more strongly than wealthy people. The correlation coefficient was not significant in the case of Peru, slightly significant in the case of Chile and strong in the case of Mexico and Venezuela. The authors repeat the analysis for four developed countries: Finland, Spain, UK and the USA. The coefficient was significant only for the UK, demonstrating that preferences for redistribution were not dependent on the income level of the respondents in the developed countries.

Gaviria (2007) does a similar exercise using data from the Latinobarómetro, an opinion survey carried out in 18 Latin American countries every year. Respondents were asked whether they believe that reducing the differences between the rich and the poor is one of the main responsibilities of the state, with the answers correlated to the objective economic situation of the responders as well as to their subjective economic situation (determined by asking them how sufficient their income was for satisfying their needs). The result of the exercise indicates the existence of a negative correlation between socioeconomic status, both objective and subjective, and preferences for redistribution. The author also compares this result with the case of Spain and shows

that in Spain, socioeconomic status does not appear to correlate with preferences for redistribution.

There have been some further explanations regarding the high association between material situation and preference for redistribution in Latin America in contrast to developed countries. It is clear why the poorest segments may prefer more redistribution, but it is not so clear why in societies with such a high proliferation of inequality and poverty, as in Latin America, the richest segments are unable to see and to internalize the negative effects that an unequal society and generalized poverty imposes on society, and more fundamentally on themselves. Blofield (2011) exposed a fundamental explanation from sociological studies: a high degree of social distance among classes, where the elite, in particular, lives in a completely different world, with different social norms and expectations, helps to keep the elite quite indifferent to the realities of the poor. While poor people have some knowledge of what is happening up at the top, through television or their jobs (e.g. the maid who works for wealthy families), people from the elite have little experience with life in lower segments of society. Bjorvatn and Cappelen (2003) have formalized a similar idea using a median voter approach. They have found that since income inequality leads to residential segregation between rich and poor, this segregation weakens the feeling of solidarity of the rich for the poor, thus reducing their willingness to vote for the redistribution of income.

The second step is to consider the assumption that preferences for redistribution are transformed into real demands for redistributive policies. The fact that people think that reducing inequalities is a function of the state or that income inequality should be made more equal, does not necessarily mean that there will be demands for redistribution, nor even that people would blindly accept redistributive policies. This statement was clearly made by Aalberg (2003), who differentiates between perceptions, which describe how the public actually observes reality, and attitudes, which applies to normative beliefs related to concrete situations and policies. The logical line would be to assume perceptions create policy attitudes, but Aalberg, using the emblematic case of Scandinavian countries, shows that this may not be the case. Although Scandinavians have a particularly strong preference for equality, when it comes to policies that should lead to equality, Scandinavians appear to be more skeptical. A similar conclusion for Latin America was derived by Reis (2011).

Interviewing the perceptions of the elite on inequality and poverty in Brazil, she found that there was great concern about social issues among the Brazilian elite; poverty and inequality ranked number 3 of major domestic problems in Brazil according to their perceptions, and many of them were troubled about the existence of racial discrimination. However, when asked for their support of particular policy issues, such as affirmative action or quota systems for the black or increasing taxes to improve education, they unanimously rejected these policy options. The distrust and negative attitudes of economic elites towards taxation, particularly towards direct taxation, is also documented in the summary of Blofield (2011) of various polls of elite policy attitudes. The work of Atria (forthcoming) not only shows the mistrust of Chilean elites to personal taxation, but also how cleverly they justify –and even declare necessary for their businesses – the existence of loopholes that allow them to avoid taxation and reduce their tax burden.

We don't know much about non-elite support for redistributive initiatives in Latin America. But there are reasons for skepticism about a linear and congruent connection between their preferences for redistribution and the policies they support when choosing candidates. If we consider a support for redistributive policies to be reflected in a swing towards the left, the previously mentioned work of Blofield and Luna finds that only in the case of Chile does it seem to be the case that poor people actually favor the left. In Mexico, the wealthy tend to align more to the left, and in Venezuela and Peru, the correlation coefficient is not statistically different from zero, meaning that the socioeconomic position of an individual does not predict his or her political inclination. A similar result is found by Kaufman (2009), who notes that in countries such as Uruguay, Chile, and Brazil, votes for the left do not appear to come from the poorest segments of the society. He also uses data from the Latinobarómetro to conclude that political orientations are not strongly related to the underlying socioeconomic position of respondents. This possible incongruence between preferences for redistribution and actual support for redistributive policies may be explained by the presence of imperfect information in the democratic setting. It may also relate to the idea that a person votes for a candidate not only because of his or her economic policy, but because of all the proposals and ideas that the candidate espouses. An illustration of this latter point is the renowned case of the state of Kansas described by Frank (2005). According to the author, the poor electorate in Kansas was fooled into voting against

redistribution and against their own economic interests in recent years by diverting the interest of the electorate from economic aspects to more cultural issues such as gay marriage and abortion.

On the whole, it seems that the models of Meltzer and Richard are correct in assuming that preferences for redistribution are dependent on the socioeconomic positions of individuals in the case of Latin America, but not in assuming that preferences for redistribution are automatically transformed into real demands for redistribution.

In countries with high levels of inequality and strong economic elites, the difference between *de jure* political power and *de facto* political power tends to be greater, and there is greater incongruence between the median voter and the decisive voter. In such a case, the decisive voter would be much richer than the median voter and would choose those policies that strongly favor the elite, specifically low levels of redistribution. In the words of Rodriguez (2004), who elaborated a model of redistribution under democratic rule where – as in the Acemoglu and Robinson model – the decisive voter is not the median voter:

> *If the question is posed as one of why the poor do not expropriate the rich in democracies, then our explanation is that they do not do so because they cannot do so. The rich have access to political power which allows them to insulate themselves from redistributive pressures. (Rodriquez 2004)*

Acemoglu and Robinson (2006) use the term *Captured Democracy* to refer to the situation when the richer segments of the population can control policies to their own benefit and become the decisive voter. Similar concepts are found in the literature; Gilens and Page (2014), in their viral paper, collect all the theories found in the literature under the title *Economic Elite Domination Theories*. They also manage to probe the validity of these theories in the US, finding that the US government favors the demands of the

affluent while the influence of the average American on policy is practically non-existent.

The model of the *captured democracy* and the *theories of economic elite domination* are definitely a simplification of reality. They imply, for instance, that the decisive voter is the elite voter, and simplifies the concept of elite as defined chiefly by material resources. However, these models, simple and abstract as they may be, capture quite effectively two ideas relevant for this analysis. The first is that inequality has a harmful influence on the quality of democratic institutions – an old idea, with very recent resonance. The relationship between the quality of democracy and material distribution of resources has long been a standard theme in works of political theory .[25] But among economists, this point received substantial attention mainly after the publishing of Professor Stiglitz's book (2012a) on the costs of inequality. Stiglitz's point is that one of the major costs of inequality is precisely the risk of jeopardizing democratic institutions. And when he speaks of jeopardizing, he stresses that inequality endangers democratic institutions in such a way that formal democracy is not at stake. Inequality does not bring a democracy collapse, but it prevents democracy from working as it should; in particular, it prevents redistribution from being achieved, even if the majority considers it a preponderant objective of the state.[26]

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[25] See for instance the work of O'Donnell, Cullel, and Iazzetta (2004).

[26] In fact, the Latin American case shows that dramatic attempts to reverse economic inequality may pose a sharper threat to formal democracy's durability than does economic inequality itself (Bermeo 2009).

The second idea is the necessity of studying elites to understand policy outcomes in Latin America and elsewhere, an idea that has been common in sociological studies, as reviewed by Blofield (2011), but only recently formally introduced to economic analysis. The introduction of concepts of elites and economic elites in economics has received substantial recent interest from the field. Economists have been instituting methods to measure the concentration of income at the top, and connecting this income concentration to the power of the economic elite. Thanks to these methods, we know now how high concentrated income at the top is in some countries in Latin America. We have studies for the cases of Chile (Fairfield and Jorratt 2014), Colombia (Alvaredo and Londoño Velez 2013), Uruguay (Jiménez and Amarante Forthcoming) and Argentina (Atkinson, Piketty, and Saez 2009). New narratives are also rapidly emerging with ways of viewing the relationship between elites, democracy and redistribution – narratives that are only recently being seen in economic dialogues. For instance, just recently Krugman (2014) stated in his Op-Ed column for the New York Times that "inequality creates a class of people who are alarmingly detached from reality and simultaneously gives these people great power" – a narrative that is quite infrequent in the economic profession and more commonly seen in sociological studies.

Understanding the importance of elites for comprehending policy outcomes in Latin America has also led to developments in the categorization of elite power. In the political framework of Fairfield (2013) for the case of Latin America, the author distinguishes two distinct means through which economic elites exert policy influence. Firstly, they can use their *investment power* to signal the government that a reform will act as a disincentive to investment and may lead to capital flight, and that this reduced investment will jeopardize policymakers' goals, leading to punishment at the polls. Secondly, elites can also wield their *political power*, using deliberate actions such as lobbying and various forms of collective action. Close relationships

between policy makers and elites are sources of political power that make such actions more likely to succeed. A clear example of the use of investment power in Latin America is shown by Campello (2011). In her study using the cases of Brazil, Ecuador and Venezuela, she illustrates how in all three countries progressive elected presidents changed their initial redistributive plans in the face of capital flight and switched to conservative economic policies. A further example of how elites may influence policy outcomes against redistribution has been exposed by Ferejohn (2009): elites may attempt to confuse or persuade the median voter into believing that she will be better off if she restrains her demands for redistribution.

3.4.3 THE ROLE OF TAXATION

To return to the issue of taxation, the discussion thus far permits the differentiation of three ways of looking at taxation, each with different implications for this analysis. The first is to look at taxation as one of the principal lenses for observing power and political settlements (Di John 2006), as well as for observing certain overrepresented interests. This view suggests a theoretical association between redistribution through taxation and redistribution through other means. In a *captured democracy*, elites tends to engage strongly in shaping tax structures to their advantage, probably more strongly than in any other policy process, as taxation touches every aspect of the economy and society, and is perhaps the area of public policy where the most interests are at stake (Bergara, Cárdenas, and Echabarría 2006). But, at the same time, elites' interests – or lack thereof – are also decisive in other policies with redistributive effects, such as minimum wages, regulation of trade unions, the direction of public investment, the provision of other public goods, and so on. Seeing taxation as a reflection of the preferences for redistribution of the relevant voter, one can infer, quite plausibly, that the same preferences for redistribution that

support a certain type of taxation are decisive in other policy areas as well. This view can explain how a region such as Latin America performs very poorly not only at redistributing through taxation, but also at utilizing other relevant policies that affect redistribution.

The second way to view taxation is as the outcome of a political process. This implies that the limits of redistribution through taxation can be found at the political level and, more importantly, that the existence of strong economic elites and their interests are relevant to understanding these limits. This latter point is something already recognized by those studying the political economy of taxation. Half a century ago Kaldor (1963) had already come to the conclusion that the main reasons why developing countries do not "tax better" is because even in democratic systems, power remains in the hands of certain dominant groups who have no interest in reforming the system. A recent study by Bernardi et al. (2013) shows that the tax situation in Latin America has not changed in nearly 50 years, mainly because the existence of strong and powerful elites has limited the revenue potential of taxation, as well as the implementation of a broad personal income tax. The historical study of Sokoloff and Zolt (2007) provides an interesting comparison between tax systems in North America and Latin America. They show that there were no major differences during the 19th century in the national tax structures between these two groups of countries, with both of them relying on trade and excise taxes. However, while in the US and Canada local governments developed extensive social programs such as public schools, sanitation and infrastructure, mainly financed through taxes on property and income, Latin America did not experience anything similar, neither at the central nor at the local level. The authors point out that since in North America direct taxation traces back to the 17th and 18th century, it is difficult to argue that the same path was not followed by Latin American countries because of technical, administrative or resource constraints. Instead, they argue that, given the high levels of

inequality, economic elites in Latin America were reluctant to pay higher direct taxes to expand social investment and services – services they could procure privately for themselves and their families.

Finally, taxation can be seen not only as a result of the democratic system, but also as a contribution to it. In the case of the *captured democracy*, it is ultimately this excessive accumulation of wealth and income at the top, empowered and recreated by the tax system, that enables elites to exert influence on policies, using either their investment power, their political power or any other form of influence. This way of looking at taxation is, again, not completely original. The consistent and strong connection between the way revenues are raised and the way people are governed has deep roots in the study of fiscal sociology, as is extensively explained by Schumpeter in his essay "The Crisis of the Tax State", from which I suggest a paragraph that summarizes the idea quite clearly:

> *Taxes not only helped to create the state. They helped to form it. The kind and level of taxes are determined by the social structure, but once taxes exist they become a handle, as it were, which social powers can grip in order to change this structure. (in Swedberg 1991)*

This view of taxation is also a very influential idea in the political economy of taxation. For example, Moore (2007) describes the now-standard narrative in the political economy of taxation that relates the events of the second half of the 18th century – where the prohibition on imposing new taxes in England without the consent of the parliament (in which the Colonies had no representation) caused the colonies in North America to rally behind the slogan "no taxation without representation" – as proof that taxation plays a central role in state formation and re-formation and is a condition for the creation of a professional bureaucracy and representative government.

This idea is also a key piece of the study of public finance initiated by Musgrave. Musgrave (1979) considered a functioning fiscal system the key to making democracy work as intended. In a recent publication in memory of Richard Musgrave, Brook (2009) states that from a Musgravian point of view, progressive taxation is justified, because a grossly unequal distribution of income and wealth undermines the possibility of genuine democracy. He argues that there are gains to be made from taking money from the rich, aside from how the money is spent, and one of these gains is to improve the quality of democracy and all that it entails.

Looking at taxation as a cause of the *captured democracy* is imperative for this study because it explains that a tax system that encourages lower levels of inequality produces redistribution not just through the most obvious and already discussed means, but by altering the political power of the economic elites, thus shifting political power from the top to the median voter and closing the gap between *de jure* and *de facto* political power. This shift of power implies, at least in theory, an approximation of reality to the world of Meltzer and Richard, where the high preferences for redistribution of the median voter would push for more redistribution, not only through tax policies, but through other policies, creating the configuration of a democratic system that is better suited to reducing inequalities on every front.

3.5 CONCLUDING REMARKS

The objective of this chapter was to assess from a theoretical perspective the relationship between taxation and inequality. In particular, the aim was to determine the means by which taxation can affect inequality.

The analysis presented three theoretical discussions within the economic field in which taxation plays a vital role in explaining distribution outcomes.

The first discussion emerges from the public finance field. I showed in chronological order how ideas about the redistributive role of taxation have developed and transformed over time. I also demonstrated that the most recent view, based on up-to-date empirical findings and proposed by economists studying the 1% and the establishment of the new Mirrlees model grants paramount importance to taxation as an explanation of distributional outcomes. According to this approach, taxation affects inequality outcomes not only by affecting individual incomes, but by modifying individual behavior.

The second discussion occurs in the macroeconomic field. From a macroeconomic perspective, taxation has been traditionally seen as a stabilization tool. I showed, using a large set of economic studies, that smooth economic cycles have an equalizing effect on incomes, and that volatility of output, instability and crisis have been proven to create and recreate inequalities. Thus, when studying taxation from this perspective it does seem that taxation affects inequality, not only because a tax policy that manages to mitigate economic cycles promotes stability and thus, indirectly, more equality; but also because taxation affects individual incomes, and can smooth the asymmetrical effect that business cycles have on disposable income distribution.

The last discussion that I considered was within the political economy arena. From this perspective, taxation has an important effect on distributive outcomes because taxation, when used to restrain the accumulation of wealth and income of economic elites, is capable of changing the redistribution of political power from the top to the bottom. The more equally that political power is redistributed, according to the theories here presented, the more the political configuration favors redistribution, not only through a more pro-equity tax system but also through a self-reinforcing more pro-equity public policy in general.

In sum, the three discussions reviewed in this chapter see taxation as capable of changing inequality mainly through three mechanisms: 1) changing individual behaviors, in particular by discouraging or encouraging individuals to work more and earn more, 2) generating a more stable economy by mitigating the inequality created by volatility and crisis, and 3) creating a political configuration that favors redistribution.

4 A METHODOLOGICAL APPROACH TO MEASURING PRO-EQUITY TAX POLICY

4.1 INTRODUCTION

In the last chapters I have examined the concept of pro-equality tax policy. In particular I have maintained, using a good amount of empirical and theoretical evidence, that the ways countries use their tax instruments define, to a certain degree, the level of inequality they will experience, and thus, that there are some tax policies which are pro-equity and others which are not.

The interest of this chapter is on proposing a methodology to measure tax policy, in order to answer the general question of this research: whether tax policy in Latin America has become more pro-equity in recent years.

The rest of this chapter is divided into four sections. Section 4.2 clarifies the concept of tax policy that will be used throughout this dissertation. Section 4.3 explains the methods used in the literature to measure tax policy. Section 4.4 describes in detail the methodology chosen in this work for assessing tax policy, as well as the underlying reasons for this selection. Finally, Section 4.5 explains the concept of pro-equity tax policy, and how to implement the methodology selected to evaluate whether tax policy has become more pro-equity over time. The last section (Section 4.6) concludes.

4.2 THE CONCEPT OF TAX POLICY, REVISED

In economics, the concept of tax policy is divided into two different forms of policy: discretionary and non-discretionary. Discretionary tax policy refers to the authorities' decision to change the "tax policy instrument" in order to alter "tax outcomes" (Tinbergen 1952). The idea is that some actors, usually

governments, directly control the "tax policy instrument" and through this deliberate control can modify the "tax outcome";[27] it is the act of taking a deliberate decision to change the "tax policy instrument" that is a discretionary tax policy, and it is considered an ad hoc reaction. Examples of discretionary tax policy abound; for instance, the introduction of the financial transaction tax by many Latin American countries in the 1990s or a simple reduction of VAT rates.

On the other hand, non-discretionary tax policy is subject neither to the authorities' discretion nor to changes in the "tax policy instrument". Non-discretionary tax policy does not involve any deliberate government legislation or action; it is already embodied in the law, with changes in "tax outcomes" occurring automatically without any changes to the tax instrument. These happen because modern tax systems apply tax rates to certain tax bases, usually personal income, consumption, property, etc. and whenever these tax bases change, as the result of an economic crisis or a new restructuring of the markets, for example, the tax outcome changes without any intervention from authorities. A classic example of a non-discretionary policy in action is the case of a person who used to pay a tax rate of 30% on her income at a given income level, but after a salary rise is now in the 40% personal income tax bracket. Note that there was no decision by the authorities or change in any tax law, but the effect on this individual is the same as if the authorities had increased the tax rate from 30% to 40%.

[27] Tax outcomes can take several forms; they may be tax revenues, as well as the structure of the tax revenue.

Whenever the concept of non-discretionary tax policy is used in relation to the stabilizing role of tax policy (see Chapter 3 page 26 for an explanation of the three commonly attributed roles of tax and fiscal policy), the concept turns to what we know as "revenue automatic stabilizers", a pillar of Keynesian macroeconomic theory stating that automatic or non-discretionary tax policy tends to dampen fluctuations in real income in modern and progressive tax systems. While these two concepts can be considered analogous under certain circumstances, non-discretionary tax policy is more general, whereas revenue automatic stabilizers are more related to one of the three roles of taxation, namely stabilization.

Although I use the terms discretionary and non-discretionary tax policy in this document, I would like to point out that this taxonomy is decidedly contested. For instance, Dos Reis et al. (2007) argue that it is more appropriate to refer to automatic and non-discretionary tax policy as "passive tax policy", given that not modifying tax instruments in the wake of large and observable swings in the tax base is as discretionary as the decision to modify them. The same terminology is used by Gómez Sabaini and Rossignolo (2014), who show that in Argentina authorities have discretionarily decided not to change the structure of income taxation in a process they call "passive adaptation". Some others prefer to refer to discretionary tax policy as legislated tax policy, highlighting the fact that discretionary changes must be legislated while non-discretionary factors are already present in the system in a series of rules. Whilst being aware of these discussions – particularly of the fact that a discretional nature is present in both what authorities do and what they choose not to do – as a matter of practicality I will continue to use the discretionary/non-discretionary categorization for tax policy.

Throughout this dissertation, the focus will be on discretionary rather than non-discretionary tax policy. In the introductory chapter of this work, I

indicated that part of my interest in researching tax policy was to observe whether the reduced inequality detected in the Latin American region was backed by policy fundamentals, namely whether authorities were actively attempting to achieve a more equal distribution of income. Given this interest, an examination of discretionary tax policy is the most appropriate means of achieving the objectives of this research since it implies deliberate action by the authorities. Non-discretionary tax policy, by contrast, does not imply any decision on the part of the authorities and thus would provide no insight into the aims of this study.

4.3 MEASURING DISCRETIONARY TAX POLICY OVER TIME

Measuring discretionary tax policy over a series of years is a rather byzantine task. Analytically, the best system for assessing the evolution of discretionary tax policy over time is to focus on "tax policy instruments" and observe how these change over time. The greatest difficulty in this approach is in defining exactly what a "tax policy instrument" is. Economic textbooks tend to simplify the "tax policy instrument" as a constant letter T, which has a value between 0 and 1 and is applied to a single tax base, namely personal income, which is usually denoted by the letter Y. In reality, this letter T does not exist; instead, we face the problem of having multiple taxes, some of which are not a constant but rather consist of brackets that apply to multiple tax bases other than personal income. Moreover, as if this was not problematic enough, there are many other exceptions to the applicability of taxes and bases, which are difficult to conceptualize, such as special treatments for certain individuals or certain businesses. Furthermore, policy instruments are not restricted to regulations of taxes and changes to the tax code alone; indeed, it has already been extensively recognized that a change in tax administration is another means of effectuating discretionary

tax policy (Bird and Jantscher 1992), since it suggests a deliberate decision by the authorities to alter "tax outcomes".

Given the difficulty of registering all these decisions and evaluating their effect upon tax outcomes, researchers have found methods to *summarize* this information in a systematic way. In the literature, there are at least two ways of dealing with the problem of multiple and sometimes unobservable policy instruments. The first involves a quantitative approach using "proxy variables". The second comprises in-depth case studies through narrative approaches.

4.3.1 USING PROXY VARIABLES TO ASSESS DISCRETIONARY TAX POLICY

Several proxies have been used in the literature to obtain insights into changes in the "tax policy instrument". Early literature concerning tax policy used tax revenue or the effective tax rate (tax revenues as a percentage of GDP) as proxies for changes in policy instruments.[28] These proxies are seldom used by conscientious studies nowadays, as it is well-known now that discretionary tax policy is one thing and tax revenues another. Tax revenues (which are a type of tax outcome) can change for reasons other than discretionary tax policy. In general, there are two factors that can affect tax revenues other than discretionary tax policy: the economic cycle and exogenous factors. Tax outcomes change in relation to the economic cycle since economic cycles affect tax bases. Tax revenues are also affected by exogenous factors, described by Romer and Romer (2007) essentially as

[28] See for instance Gavin and Perotti (1997).

economic forces such as changes in stock prices and inflation, but their definition can encompass other structural changes, such as demographic or income distribution or even non-economic forces such as tax compliance attitudes. Since tax revenues are overwhelmingly dominated by the effects of these two forces, most experts nowadays advise against using them as a proxy of discretionary tax policy.[29]

Kaminski et al. (2004) used the "inflation tax"[30] as a proxy of discretionary tax policy in their work, suggesting that governments in need of money either use taxation or create inflation. A similar approach was used by Mahon (1997). The problem behind this proxy is that there is no theoretical consensus on whether inflation could be considered another tax. In particular, some consider that inflation can be considered a tax only when the independence of the central bank is low, as only under this scenario is inflation set taking fiscal accounts into consideration (Nolivos and Vuletin 2014).

Other proxies which include statutory tax rates have been used by Morley, Machado, and Pettinato (1999) and Vegh and Vuletin (2012). The former authors use as a proxy for discretionary tax policy a self-constructed "index" which contains four equally weighted components: maximum marginal tax rates on CIT and PIT, the VAT rate and the efficiency of the VAT.[31] They meticulously constructed this index for Latin America and the Caribbean for

[29] See the criticism of Kaminski et al. (2004) and of Vegh and Vuletin (2012).
[30] The inflation tax is the inflation rate.
[31] Defined as the ratio of the VAT rate to VAT receipts, the latter expressed as a proportion of GDP.

the period 1970-1995.[32] The latter authors use as proxies the most representative statutory marginal legal tax rates, namely the CIT, PIT and the VAT rate. For their work they construct a novel data set of these tax rates for 65 countries.

Using statutory tax rates as proxies for discretionary tax policy seems like a good alternative; however, I want to emphasize that this approach is not suitable for the Latin American case. The reason is that although Latin America is a keen tax reformer (Lora and Cárdenas 2006), the latest reforms rarely include changes in the most representative tax rates. This point is sustained by the data displayed in Annex 2**,** where the most important tax rates for a selection of Latin-American countries are displayed for the period from 1990 to 2010. The evidence reveals that changes in rates are quite rare in the region. This point is also confirmed by studies which characterize tax policy in Latin America as relying on and pursuing policy output objectives through the use of "heterodox taxes" (Darío González 2009) such as the tax on financial transactions, simplified regimens for small taxpayers and even export taxes, without changing orthodox tax rates as the PIT rate or the VAT rate. Latin America has followed this path in its persistent search for politically easy revenue, a phenomenon that Tanzi[33] has called the search for the "El Dorado[34] of the tax world". All this indicates that using the tax rates of the most representative taxes could hide an essential part of the story of discretionary tax policy in Latin America.

[32] Later, Escaith and Paunovic (2004) completed the series until 2000.
[33] Found in Bernardi et al. (2013).
[34] In reference to the "El Dorado", a legendary city made of gold sought by the Spaniards in Latin America.

Another proxy traditionally used to assess discretionary tax policy is the cyclical adjusted tax revenue.[35] This is a mathematical construction that generates the hypothetical level of revenue that an economy would have if GDP was at its potential.[36] Put differently, this technique renders it possible to see which changes in policy outcomes are caused by the cycle and, once the effect of the cycle is removed, the result of this subtraction is a proxy for discretionary tax policy. This method offers an advantage in relation to other proxies in terms of its ability to differentiate the effect on revenues from the cycle, as well as its suitability for research involving many countries and long periods of time. However, this approach has a particular shortcoming, namely the underlying assumption that every change in revenues that is not explained by the cycle must be "discretionary tax policy", thus ignoring the aforementioned exogenous effects.

4.3.2 USING NARRATIVE APPROACHES TO ASSESS DISCRETIONARY TAX POLICY

One obvious possibility for observing changes in "discretionary tax policy" is to look into the changes in tax legislation themselves. However, while this is an understandable approximation, it is not an entirely pragmatic one. An inconvenience with this approach is that even when tax laws are available material, real-life tax reforms are not easy to interpret. Simply reading the text of a tax reform cannot provide a clear idea of its effects in terms of volume collected, progressivity or cyclicality outcomes. For instance, a

[35] Also called high employment, full employment or standardized employment revenue.
[36] For a historical assessment of this method, see Marcel (2001; 2013), Fernandez et al. (1993) and Alesina and Perotti (1995).

single piece of tax legislation can increase some tax rates while decreasing others; another can reform some taxes towards more progressivity while changing others towards more regressivity. Even if tax reforms could be interpreted based upon theoretical assumptions, their applicability for long periods of time and cross-country analysis is very restricted; such analyses require simple and comparable methods.

One alternative is the use of narrative method as employed by Romer and Romer (2007). In their seminar paper, they searched for a convenient methodology to calculate the value of the tax multiplier for the US – a demanding task that implied, among other complexities, differentiating between discretionary and automatic tax changes. Rather than using proxies, the authors brilliantly developed a mixed method, including what they called a "narrative analysis".[37] Their point is that to observe changes in "tax instruments", it is not necessary to read and interpret the law itself; rather, there exists a vast narrative record describing the history and motivation of discretionary tax policy changes. They use records such as Presidential speeches and Congressional reports to identify the size, timing and principal motivation for all major post-war legislated tax policy actions, before subsequently transforming such information into quantitative data and using it for quantitative analysis.

A similar approach was undertaken by Focanti et al. (2013) for the Latin American case. They constructed a data base for Latin American tax reforms

[37] The same approach was used by Ramey and Shapiro (1999) and Ramey (2009) for identifying public expenditure shocks. The approach has been duplicated for the UK by Cloyne (2012).

based on the *International Tax Summaries* annually released by Price Waterhouse Coopers (Pwc). This dataset presents the principal tax reforms per year and their possible effects on tax outcomes as interpreted by Pwc tax specialists. Unfortunately, there was an interruption of this publication in year 2005.

Some problems with the narrative approach are evident; for instance, Romer and Romer's approach takes explicit intentions at face value, which is problematic, yet a risk that the authors explicitly assume. But the most important limitation is that it is definitely a methodology suited to a single country case study, since it implies the collection of speeches and reports usually only found in a country's public archives, if available at all.

4.4 MY APPROACH: A STRUCTURAL TAX REVENUE ANALYSIS

For the purpose of this research, the method chosen should allow discretionary tax policy to be identified, and should also be suitable for application in many Latin American countries and over a long period of time (1990-2010). Given the discussion above, there is no single proxy that allows me to fulfill the requirements of this research without certain modification. For this reason,

The aforementioned shortcoming of this proxy lies in attributing to discretionary policy all changes in tax outcomes that are not associated with

the cycle;[38] such an assumption is difficult to swallow, however. For instance, it is unable to distinguish whether an increase in the cyclically adjusted tax revenue was due to changes in policy instruments or the result of a boom in the stock market increasing capital gain realizations, thus ignoring the exogenous variables already discussed. In some cases, the effect of these exogenous variables is so strong that cyclically adjusted revenues appear to be poor descriptors of discretionary policy changes.[39]

This shortcoming is very relevant in Latin American economies because there is an important exogenous factor affecting the tax outcomes of many countries: commodity prices. Some regional tax systems are very heavily dependent on revenues from commodity sectors and are thus highly dependent on volatile commodity prices (Jiménez and Tromben 2006). An increase in commodity prices affects tax outcomes, even if there are no tax reforms and even if the effect of the cycle is isolated. This is because, for instance, an increase in commodities influences the balance sheets of companies and their taxable income. Furthermore, there are taxes related to the extraction of certain natural resources, such as the taxes on mining in

[38] A deep analysis of the limitations of this approach (mainly based upon interpreting cyclically adjusted balances as discretionary fiscal policies) can be found in Auerbach (2000), Suescun (2007), Larch and Salto (2003), Bouthevillain et al. (2001) and Murchison and Robbins (2002). In the same working paper series of 1990 see Blanchard (1990) and Chouraqui et al. (1990).

[39] Chalks (2002) uses the case study of Japan and Germany in the 1990s to see if legislative changes coincide with changes in cyclically adjusted balance indicators. He concludes that structural variables do not reflect changes in the policy arena; however, cyclically adjusted expenditure variables better predict changes of policy related to expenditure than cyclically adjusted tax revenue variables predict changes in tax legislation. See also Dos Reis et al. (2007).

Chile and Peru or export taxes in Argentina, which depend strongly on prices of commodities. Without a correction for the effect of commodities, the picture of the structural tax revenues will erroneously imply efforts by the authorities to change the tax instruments. In the case of periods of increasing prices of commodities, as seen in the last 10 years in Latin America, tax revenues tend to increase even if authorities do not change tax instruments, creating what Girouard and Price (2004) have called "unwarranted revenues". A failure to isolate the effect of these commodity prices on tax outcomes will most likely overestimate the authorities' efforts to increase taxes using their instruments. In contrast, when prices of commodities are falling, the structural tax revenue (without controlling for commodity prices) would underestimate all attempts of authorities to increase tax revenues.

Therefore, we need a method that allows us to subtract from the cyclical adjusted tax revenue the effects of these exogenous factors in order to use it as a proxy for discretionary tax policy. For Latin America, this undoubtedly means removing the effect of commodity prices from the cyclically adjusted tax revenue. Fortunately, this method exists and involves adjusting tax revenues so as to create a hypothetical level of tax revenues that would exist if the economy was operating at its trend *and* if the price of commodities were at its long-term value. While this method will be explained below in detail, for the sake of clarification, the revenues resulting from using this method (and my selected proxy of discretionary tax policy) will be called "structural tax revenues" throughout this work, while those that only subtract the effect of the cycle will be termed the "cyclically adjusted tax revenues".

I would like to highlight the fact that the methodology I propose for calculating structural tax revenues was not created by me; on the contrary, it is a well-established procedure that is commonly used and there are even

standard guidelines for its implementation.[40] There are however three aspects that are innovative of my approach that I would like to mention. Firstly, although the method for constructing structural tax revenues is well-developed, using these structural tax revenues as a proxy for discretionary tax policy is not common. In fact, this is the first work to my knowledge that uses that proxy. As mentioned in Section 4.3.1, cyclically adjusted tax revenues are often used as proxies for discretionary tax policy, although the same is not true for structural tax revenues, which are generally only used as an input to elaborate "structural fiscal budgets".[41] I consider that structural tax revenues have enormous potential as proxies for discretionary tax policy in public finance research.

The second novelty of my approach is that I obtain and analyze structural tax revenues for different kinds of taxes and in this way I can obtain proxies for discretionary tax policy of different taxes, e.g. PIT discretionary tax policy. How I manage to obtain these proxies will be explained below in Section 4.5.

Finally, my contribution comes not only from the method itself, but more significantly from the data collection that that this method entails. I manage to construct an original dataset of tax revenues linked to commodity sectors

[40] For a description of the methodology, see Girouard and Price (2004), Price and Dang (2011) and Morris and Schuknecht (2007). For a guideline, see IMF (2012)

[41] The structural fiscal budget is the difference between structural revenues and structural expenditures. This indicator provides a good indication of a government's fiscal sustainability, which should be more accurate than the simple cyclically adjusted fiscal budget.

in Latin America for the period 1990-2010. The way this dataset was constructed will be explained later in Section 4.4.2.

One important limitation of using structural tax revenues as proxies for discretionary tax policy is that, even in countries with tax systems highly dependent on commodity markets, exogenous variables other than the cycle and commodity prices may affect tax receipts. Some effects of these exogenous variables can be easily dealt with, the typical example being the level of prices. Inflation has a significant impact on revenues, but by using real variables a good part of the problem is resolved. Nonetheless, some other variables cannot be addressed and, although these might have a less important effect on revenues (Marcel 2013), they still exist; thus, the use of changes in structural revenues as an indicator of discretionary tax changes is always better interpreted as it is: a *summary* and an *abstraction* of what is happening in the discretionary policy arena over time. Thus it is always better to interpret it in conjunction with other information. For this reason, while the structural revenue analysis will be the basis of my methodology, I will illustrate the results with the information on tax reforms that I will collect from legal texts and other qualitative studies, including background discussions with researchers (see in Annex 5 Panel B a list of experts) and the revision of legal texts. This information will assist me in constructing a complete picture of discretionary tax policy for the years under analysis.

4.4.1 MULTIPLE CASE STUDY METHODOLOGY AND CASE SELECTION

The methodology of using structural revenues as a proxy for discretionary tax policy requires a profound understanding of different countries' tax system peculiarities and other relevant context variables. In the first instance, it involves choosing one commodity sector that affects tax results and requires an understanding of how tax regulation affects these commodity sectors. Furthermore, it requires relevant information about the

cyclical behavior of the economy and periods of booms and busts. This is a method in which one size does not fill all countries; rather, it requires previous in-depth analysis and therefore is better addressed through the use of case studies.

The unit of analysis is "countries with tax systems dependent on one recognizable product". However, there is no way of knowing *a priori* the level of tax systems' dependence on commodity markets; indeed, this requires an exhaustive analysis beforehand. Therefore, I assume, in line with similar literature,[42] that the dependence of exports on one single product reflects a dependency of tax systems on the same product.

Having made the unit of analysis clear, I selected for this study the five largest one-single-product dependent countries in the region, for which the complete time series of tax revenues is available.[43] The definition of dependency is those countries with at least 25% of exports dependent on one single product.[44] The size of the economy is measured by population and GDP. Table 4.1 shows the selected countries, their most relevant commodity and the size of the economy measured by population and GDP.

[42] See for instance Jiménez and Tromben (2006).
[43] Venezuela featured in the list of the largest commodity countries, but was discarded for its lack of important information on tax revenues.
[44] The one-product-dependent countries are Argentina, Bolivia, Chile, Colombia, Ecuador, Honduras, Mexico, Paraguay, Peru and Venezuela.

Table 4.1 (2010) Selected countries: export participation of a single product, population and GDP

Country	Product	Export participation (%) of total exports	Population	GDP at constant prices (millions of USD)
Mexico	Crude petroleum and petroleum products	38,3 (a)	117,886,404	952,036.8
Argentina	Soybeans and derivatives	25,6	40,374,224	253,746
Colombia	Crude petroleum and petroleum products	40,7	46,444,798	182,951.4
Chile	Copper (refined, ores and concentrates of copper)	53,0	17,150,760	147,668.3
Peru	Copper	25,0	29,262,830	112,221.2

Source: Author's calculations based on data from Cepalstat for GDP and export participation and World Development Indicators for the information of population.
(a)Mexico information was taken from Jiménez and Trambon (2006).

The five countries selected comprise 16% of the region's population, and 29% of those people living in countries dependent on one single product. These countries together produce 12% of Latin America's GDP and 21% of the GDP of Latin American countries dependent on one single product. The five countries selected represent Latin America by representing three different dependencies that we find in the economic structure of most Latin American economies, namely those dependent on oil (Mexico and Colombia), those dependent on minerals (Chile and Peru) and those dependent on agricultural products such as soybeans (Argentina).

4.4.2 THE CONSTRUCTION OF STRUCTURAL TAX REVENUES

Obtaining structural revenue can be summarized as a 3-step procedure. **The first step** is the estimation of the potential output and the associated output gap, which is the difference between the observed output and the potential

level. There are two classical ways of obtaining the potential output.[45]The first method involves decomposing a production function through a classical Solow function, a methodology used by the OECD, the EU commission and other regional studies of structural balances.[46] The principal advantage of this production function approach is that it provides a clearer link of output to trends in factors of production and total factor productivity. However, the limitation is that it is demanding in terms of data requirements (Hagemann 1999). When data is a limitation and the number of cases is more ambitious, studies use the second option, namely using statistical filters. The Hodrick-Prescott (HP) filter[47] is the most ubiquitous in this case, in terms of being simple, transparent (Bouthevillain et al. 2001) and requiring little judgmental intervention insofar as it involves the mechanistic de-trending of historical data (Hagemann 1999). Actually, the only judgmental intervention of the researcher in this de-trending consists in choosing the value of a coefficient λ, which is a smoothing parameter that penalizes variations in the growth rate of the potential output.

Given that this study is a multiple case-study type and there is limited data,[48] the HP filter methodology will be used. However, this method involves two relevant limitations. The first is that this method is frequently unable to detect sudden breaks in a trend. While this problem is difficult to

[45] For a deep analysis of the methods, see Cotis, Elmeskov and Mourougne (2004).
[46] See for example Daude et al. (2010) for Latin America or Le Fort (2013) for Uruguay.
[47] For a full explanation of the filter, see Hodrick-Prescott (1981).
[48] For the case of Mexico, there are problems in obtaining information regarding capital stock and the indicators of capacity utilization. For literature focused on the problems associated with estimating the output gap in Mexico see Antón (2010) and more recently Esquivel and Peralta (2013).

address, it is generally less severe the smaller the value of the chosen factor λ (Bouthevillain et al. 2001). For this work, the value of this factor will be 100, in line with other studies for the region (Martner 1999) and according to the standard practice for yearly data (Baxter and King 1999). The results of the output gap can be found in Annex 1.

The second problem is referred to in the literature as the "end-point problem" (Bouthevillain et al. 2001), namely the method's tendency to skew the distribution gradually at the end of the sample period. Using the filter, the values of the output trend will be primarily determined by the actual value of the output at the end of the sample. The pragmatic solution to deal with this problem is to extend the time series using projections. For this reason, each country series is filtered using the data of real GDP at national currency and constant prices from the IMF World Economic Outlook. The period was extended to 1987-2014 and, in line with other studies[49], the last two years were estimations.

The second step involves distinguishing the commodity sector to be used for the adjustment. In the case selection procedure, the primary product was already chosen: for Argentina, the primary product was soybeans and derivatives; for Chile and Peru, the product was copper; for Colombia and Mexico, it was oil. Figure 4.1 shows that there is indeed a positive and significant correlation between the prices of these commodities and total tax revenues for all countries analyzed.

[49] See for example the works of Zettelmeyer and Vladjova-Hollar (2008), Zack (2013) and Girouard and Price (2004).

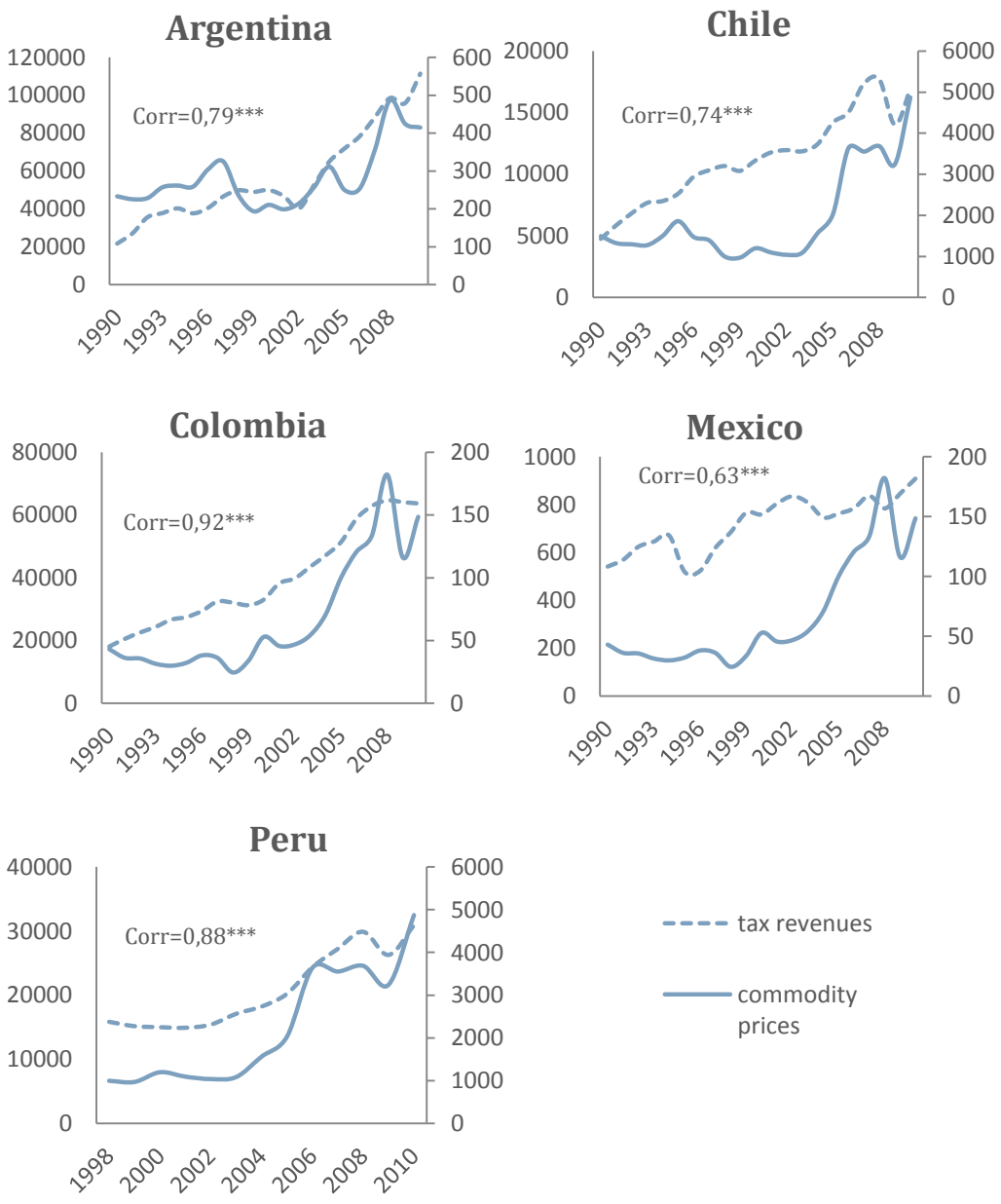
For the price of oil, the crude oil index was used, which is a simple average of three spot prices, Dated Brent, West Texas Intermediate and the Dubai Fateh, with the base year 2005, published by Cepalstat. For the price of copper, the price set at the London Metal Exchange found in the UNCTAD database was used, while in the case of soybean and derivatives I calculated a weighted-by-quantity average of the prices of the most representative soy products sold abroad by Argentina, namely oil seed cake and meal (primarily soy flour), soybeans and soybean oil. The quantities exported and the prices of these commodities were taken from the Dirección Nacional de Estadísticas del Sector Externo of the National Statistics and Censuses Institute of Argentina (INDEC).

The final step involves determining the total structural revenue for each country, which is, as explained above, the level of tax revenues adjusted by the cycle and prices of commodities. Following Marcel (2001) and Zettelmayer and Vladjova (2008), a distinction between non-commodity and commodity tax revenues is made and the "structural" level for each component is estimated separately. The final structural revenue is the sum of non-commodity and commodity structural revenues.

The customary method for computing the non-commodity structural tax revenue (Hagemann 1999) assumes a constant elasticity relationship between the tax revenue T and its tax base, which is usually the output denoted by letter Y. Accordingly, in one year, tax revenues for the non-commodity sector are given by:

$$Tn_t = AY_t^{\varepsilon} \qquad (1)$$

Figure 4.1 (1990-2010) Selected countries, correlation between total tax revenues in local currency (left) and prices of primary commodity (right)



Source: Author's calculations based on Cepalstat, UNCTAD and INDEC. * = statistically significant at the 10% level, ** = statistically significant at the 5% level, *** = statistically significant at the 1% level.

By definition, the structural revenue is the level of revenue that would exist if Y was at its potential level. Therefore, if we use a star to denote potential output, the structural tax revenue of the non-commodity sector is represented by:

$$Tn_{s,t} = AY_t^{*\varepsilon} \qquad (2)$$

If we assume the structural parameter A to be constant (as most studies do), we can replace from equation (1) the parameter A ($A = \frac{Tn_t}{Y_t^{\varepsilon}}$) into equation (2) to obtain:

$$\mathrm{Tn}_{\mathrm{s,t}} = \mathrm{Tn}_{\mathrm{t}} \left(\frac{\mathrm{Y}^*}{\mathrm{Y}_{\mathrm{t}}}\right)^{\varepsilon} \qquad (3)$$

where $Tn_{\mathrm{s,t}}$ is the structural tax revenue from non-commodity sources in year *t*, Tn_t is the observable tax revenue for non-commodity sources in year *t*, *Y* is the output in year *t*, $Y^*$is the potential output and ε is the elasticity of tax revenues of non-commodity taxes on output.

To calculate Equation (3), the variables *Y* and *Y** were those calculated in **Step 1**. The total tax revenues from non-commodity sectors were calculated as the total tax revenues for each country (found in the Cepalstat database), minus the commodity-related revenues. In relation to the value for ε, according to certain guidelines on the subject (IMF 2012), this value can be measured, assumed or sourced from the literature. In this research, the value of this elasticity was measured; Box 4.1 explains the model used for its estimation and Annex 4 presents the elasticities calculated.

Box 4.1 Estimating tax elasticities

The estimation of tax elasticities has traditionally been obtained by regressing the following function:

$$\ln(T_t) = \beta_0 + \beta_1 ln(Y)_t + \varepsilon_t \qquad (1)$$

Where T_t is the tax revenue in year t; Y_t is a measure of the tax base, which in this case is the real GDP in year t; β_1 is the tax elasticity and ln is the natural logarithm.

There are two problems related to regressing equation (1). The first relates to the fact that T_t is affected by discretionary tax policy and a genuine estimation of tax elasticity should be corrected for this effect. Without this correction, β_1 cannot be economically interpreted as the tax elasticity, but rather as a concept termed the buoyancy of the tax system (Shome 1988; Jenkins, Kuo and Shukla 2000). While there have been many attempts in the literature to correct tax revenues for discretionary tax policy in order to obtain factual elasticities,[50] this chapter has extensively explained the difficulties in assessing discretionary tax policy. In fact, the whole point of calculating tax elasticities is to use them as an input for constructing a proxy of discretionary tax policy (the structural tax revenues); therefore, if a measure of discretionary tax policy was required in the process of constructing this proxy, we would face a chicken-and-egg type problem. Confronted by this problem, many studies have tended to simply ignore or circumvent the issue (Wolswijk 2007). My approach to deal with this problem consists in simply recognizing this limitation, especially regarding the economic interpretation of the estimated parameters.

The second problem with equation (1) is the possibility that income and/or tax

[50] See for example two studies on Latin America: Machado and Zuloeta (2012) and Zettelmeyer and Vladjova-Hollar (2008).

revenues (in natural logarithms) have a tendency to drift systematically upward over time, rather than returning to some mean value. If this is the case, we can say that the series of tax revenues and GDP are non-stationary, and it is well known that regressing non-stationary series using Ordinary Least Squares (OLS) might produce spurious results (Granger and Newbold 1974). Thus, it is necessary to start by testing the variables, to ascertain whether or not they are stationary. I check for this in the usual way, using the Augmented Dickey-Fuller (ADF) test[51] in Stata®. For the implantation of this test, an important practical issue left to the researcher's decision is the specification of the lag length. I undertake the selection of lags manually, as recommended by Ng and Perron (1994), following a testing down strategy: I start with the number of lags resulting from applying the criterion of maximum number of lags of Schwert (1989) and subsequently test down until I get significant lags.[52]

The results of the ADF test for all tax variables and income are detailed in Annex 3 Panel A. Indeed, the test reveals that most series are non-stationary, as the null hypothesis of non-stationarity cannot be rejected. I also tested whether the variables are stationary after adjusting for a constant trend, with the results suggesting that the variables are still non-stationary, thus implying that the trend does not remove the non-stationarity.

It is still possible to avoid the problems of spurious results of equation (1) if tax revenues and income are co-integrated. Co-integration is an idea introduced by Nobel prize winner Clive William John Granger (1981) to describe the phenomenon that non-stationary processes can have linear combinations that are stationary (Johansen 2009). The economic meaning of co-integration is that there is a stable long-run relationship among the variables, as well as a long-run elasticity. Indeed, it is the long-run elasticity that explains how much revenue will grow as output increases.

[51] For more details, see Dickey and Fuller (1981)
[52] For all the variables tested without intercept, I selected 0 lags; however, I conducted a sensitivity analysis with all possible lags.

To check for co-integration, I run equation (1) and conduct the Dickey-Fuller test again to ascertain whether the residuals of equation (1) are stationary. Panel B of Annex 3 shows the test results for all residuals. As is evident, with a few exceptions, the null hypothesis of non-stationarity is rejected for all the residuals, thus indicating that these are stationary and therefore co-integrated. Accordingly, this means that by running equation (1) via OLS, we get the long-run elasticity without the problem of spurious results. However, we know that even though co-integration removes in some cases the problem of spurious regressions, several other problems can arise when estimating equation (1) via OLS, such as the generation of biased estimates and inconsistent standards errors. To deal with these problems, I follow Stock and Watson's (1993) procedure of running Dynamic Ordinary Least Squares (DOLS) estimates to correct for the coefficient bias[53] and use the Newey-West correction (Newey and West 1987) to reduce the inconsistency of the estimates of the standards errors. Annex 4 shows the results of the long-run elasticities derived from DOLS. I also computed the OLS estimates to compare them; as can be seen, there is not much difference between the long-term elasticities derived from those two procedures in the majority of the cases.

Once the long-run elasticity has been estimated for these co-integrated variables, I proceed to estimate the short-term elasticity, which indicates how much tax revenues fluctuate over the business cycle. Obtaining short terms elasticities requires all variables to be transformed into stationary form.[54] We know that an easy way of achieving this is through differences, with Panel A Annex 3 of reconfirming that stationary was achieved for all tax categories after first differencing; therefore, to obtain short-run equations, equation (1) can be transformed into the following equation:

[53] Following similar works (Wolswijk 2007), I added one lead and one lag to the change of the independent variable.
[54] For a graphical and clear explanation of this, see Sobel and Holocombe (1996).

$$\Delta \ln(T_t) = \partial_0 + \partial_1 \Delta lnGDP_t + \gamma_t \qquad (2)$$

where Δ is the first difference operator; ∂_1 is the elasticity ;and the rest of the variables are the same as in equation (1).

Before proceeding, it is important to highlight a problem that arises when estimating equation (2) in the presence of co-integration. Given that co-integration means that there is a long-run equilibrium between the variables, the two variables will tend to move back together whenever they become too distanced from one another, in a process technically called an error correction mechanism. If we run equation (2) and ignore the error-correction mechanism, we get a spurious estimation. Engle and Granger (1987) showed that this problem can be removed through the construction of an Error Correction Model (ECM). This model adds a new variable to equation (1) which shows how far apart the variables are from their long-run equilibrium in the previous period, thus reflecting the idea that a proportion of the disequilibrium from one period is corrected in the next period through the error correction mechanism already explained. The following equation shows the ECM:

$$\Delta \ln(T_t) = \alpha_0 + \alpha_1 \Delta lnGDP_t + \alpha_2 \gamma_{t-1} + \mu_t \qquad (3)$$

where γ_{t-1} is the lagged residual from the estimation of equation (1); and α_2 is the adjustment parameter or the error correction term, which indicates the percentage point of year *t*-1 deviation corrected in year *t*. The estimations for the short term elasticities are presented in Annex 4.

Thus far, I have explained the procedure to obtain the short- and long-run elasticities of the variables with co-integrated relations. The remaining step is to estimate the short-run elasticity of the non-cointegrated equations. In this case, there is no problem in estimating the elasticities using equation (2). The results of running this equation are presented in Annex 4. Note that the long-run elasticities of the non-cointegrated equations were not computed as, by definition, non-cointegration relationships mean that there is no long-run relationship.

To compute commodity tax revenues, I presume that commodity tax revenues depend on the quantity of commodity production, the prices of the products and the tax structure regarding commodity markets. It is assumed

that both the commodity production and the tax structure are part of the structural tax revenue that is in principle under the control of economic authorities, whereas the price depends on external factors. Therefore, the level of commodity-related tax revenues is given by the following equation:

$$Tc_t = Bp_t^{\partial} \qquad (4)$$

By definition, structural commodity tax revenues are the hypothetical level of commodity tax revenues that would exist if prices of commodities were at their long-term value. Accordingly, if we use a star to denote the long-term price of commodities, the structural revenue is represented by:

$$Tc_{s,t} = Bp_t^{*\partial} \qquad (5)$$

Again, we have to assume that B is a constant, although we know that B could change due to changes in the regulation of tax applicable to commodities, as well as because of changes in commodity production; however, given that estimating the value of B over time is an exercise in itself, we follow other studies and assume that the value of B is constant. Accordingly, inserting B from equation (4) ($B = \frac{Tc_t}{p_t^{\partial}}$) into equation (5), the structural commodity-related tax revenue is defined by:

$$Tc_{s,t} = Tc_t \left(\frac{P^*}{P_t}\right)^{\partial} \qquad (6)$$

where Tc_s is the structural tax revenue from commodity sources in year t, Tc_t is the observable tax receipts for commodity sources in year t, P is the price of commodity at time t, $P^*$is the long term price of commodities and ∂ is the elasticity of commodity tax revenues to commodity prices. Note that commodity revenues are not separately adjusted by the cycle, to reflect the fact that the business cycle is already affected by commodity prices.

To calculate Equation (6), the same prices for Figure 4.1 were used. The long-term price was calculated as a rolling average of the past ten years, as

has been done previously (Daude, Melguizo, and Neut 2010). The value of the elasticity ∂ was assumed to be 1, following standard practice (Marcel 2001; Zettelmeyer and Vladkova-Hollar 2008; Daude, Melguizo, and Neut 2010).

The commodity-related tax revenue was country-specific, depending on the peculiarities of each country's tax system. We know for instance that in Argentina the soy sector contributes to the state – apart from the regular taxes that all sectors pay – through the export tax, which subjects soy products to the highest export rate (currently around 35%). Therefore, the commodity-related tax revenue of Argentina is all the taxes paid by the soy sector, including the export tax. In Chile the mining sector is composed of the operation of private mining companies and the National Copper Corporation of Chile (CODELCO), the public mining company. All companies pay the CIT, but CODELCO pays a higher corporate tax of 40% and an extra 10% tax designated for the army (Restricted Law on Copper). Since 2006, all mining operators in Chile pay the Specific Tax on Operational Mining Income (Impuesto Específico a la Actividad Minería). Accordingly, Chilean commodity-related tax revenue consists of taxes paid by private mining companies and CODELCO. In Colombia the oil sector pays to the state, in addition to the regular corporate taxes paid by oil companies, an Oil Pipeline Transport Tax and the National Gasoline and ACPM Tax (formerly called the Global Gasoline and ACPM Tax); thus the commodity-related taxes are those taxes paid by oil companies plus the special taxes on oil. In Mexico, Pemex (the Mexican state-owned petroleum monopoly) has a special fiscal regime where the company must pay a series of duties; regarding taxation, Pemex pays the Special Tax on Production and Services (IEPS) applicable to gasoline and diesel and the Oil Revenue Tax (Impuesto a los Rendimientos Petroleros), which is comparable to a corporate income tax. Thus the commodity-related tax revenue for the case of Mexico consists of those taxes paid by Pemex. In the case of Peru, there was no special regime for the

mining sector during the period 1990-2010,[55] therefore the commodity-related tax revenues consist of the regular taxes paid by mining companies in Peru.

The commodity-related revenues have been identified for all case countries, but measuring these revenues is a real challenge. Most works on the region highlight the importance of commodity sectors in total *fiscal* revenues;[56] accordingly, the interest has been in measuring the participation of commodity-related *fiscal* revenues in total *fiscal* revenues, and not the importance of commodity sectors on *tax* revenues. There is virtually no official comparable data on tax revenues related to commodity sectors. For this reason, to measure the total commodity-related tax revenues for each country I had to create my own data set using official data, secondary data, corporations' reports and some imputation techniques. The imputation techniques and the sources of information for the construction of this dataset are described in detail in Annex 5 Panel B and the constructed dataset for each country can be found in Annex 6.

From the constructed dataset of commodity related tax revenues one can see that indeed the dependence of these countries' tax systems on commodity-related revenues is high and has been increasing in the latest decade. Table 4.2 shows the share of tax revenues coming from commodity

[55] Peru approved in 2011 the Special Mining Tax (Impuesto Especial a la Minería), and the Special Mining Contribution (Gravamen Especial a la Minería) was created for those mining companies which had signed Tax Stability Agreements. President García created in 2006 a voluntary tax for mining companies (see section 5.3.5)

[56] The works of Acquatella et al. (2013) and the OECD (2014), for instance, summarize the special fiscal regimes for commodity sectors.

sectors in total tax revenues. In all countries except Mexico,[57] the average share of tax revenue coming from the commodity sector has increased importantly. The country with the highest increase was Argentina, where the percentage of total tax revenues coming from commodity sectors was 10 times higher in the 2000s than in the 1990s. The second largest increase happened in Chile, where total average tax revenues in the 1990s tripled compared to the average in the 2000s. In Colombia and Peru this value doubled. The comparison among countries is more problematic due to different methods and imputations.

Table 4.2 Selected countries, share of taxes from commodity sectors in total tax revenues (1990-2000)

Years	Argentina	Chile	Colombia	Mexico	Peru
1990-2000	1.33%	6.85%	4.35%	12.23%	13.08%
2000-2010	11.90%	14.45%	8.71%	9.92%	16.21%

Source: Author's calculations.

Therefore, the structural tax revenue is the sum of the non-commodity tax revenue and commodity tax revenue according to the following equation:

$$T_{s,t} = Tn_t \left(\frac{Y^*}{Y_t}\right)^{\varepsilon} + Tc_t \left(\frac{P^*}{P_t}\right)^{\partial} \qquad (7)$$

[57] The reason for this result lies in the design of the IEPS paid by Pemex to the state, which becomes a subsidy whenever the difference between the price of production and the market price is too high. Therefore in years of high prices of commodities, taxes paid by Pemex appear to be lower.

4.5 THE CONCEPT OF PRO-EQUITY TAX POLICY AND WAYS TO MEASURE IT OVER TIME

In the previous sections, I explained the concept of tax policy and the methodology selected to measure tax policy in five case studies. In this section, I now intend to examine the concept of pro-equity tax policy, providing a definition of this concept and a method to measure it over time.

In the previous chapters of this work I elaborated the notion that taxation has a capacity to affect inequality, and I supported sustained this idea using several theoretical discussions and empirical research. From this idea one can assume that some discretionary tax policies are pro-equity, in the sense that they reinforce the capacity of the tax system to diminish inequalities, while some discretionary tax policies are not, either because they decrease the capacity of the tax system to affect inequality or because they leave this capacity unaffected.

The next step is to identify the most salient aspects of discretionary tax policies as they are expected to impact inequality. From both the theoretical and the empirical discussions of previous chapters one can identify three particular aspects that may be most expected to impact inequality: the level of collection, the level of progressivity and the cyclical element of taxation.

The level of collection and the level of progressivity of the tax systems were the two concepts most frequently used in the empirical studies presented in Chapter 2. In the theoretical discussions, the level of collection and the level of progressivity were key aspects as well, but the theoretical discussion included the importance of the cyclicality element, which showed that a countercyclical tax policy tends to be equality friendly while a procyclical tax policy is at odds with equality.

What is then a pro-equity discretionary tax policy? In line with the argument and with the definition of discretionary tax policy above, a pro-equity discretionary tax policy is the use of policy instruments to encourage more revenue collection, more progressivity and more countercyclicality. Clearly, during a particular period of time, each of these factors can move in different directions, i.e. tax policy could be revenue-increasing while at the same time reducing its progressivity. Unfortunately, neither the theory nor the empirical studies analyzed before allow us to construct a hierarchy of effects in order to distinguish which factors matter the most or the least.

However, it is easy to see that these three factors are so intimately related that they are most likely to affect distributional outcomes when improvements in all areas coincide. As an example, let's consider the three bottom-line cases: 1) all factors improve except the level of collection 2) all factors improve except the level of progressivity, and 3) all factors improve instead the cyclicality of tax policy. It is easy to see that without an increase in collection, improvements in the other factors lose much of their redistributive power, since in a way it is collection that provides the magnitude of the effect. In fact, Musgrave (1959) always considered preferable a system that collects more and slightly progressively than a system that collects very progressively but with low levels of collection. In the second and third cases, if collection improves but not progressiveness or countercyclically, it is feasible that its effects on inequality could be insignificant. In fact, one could argue that if progressivity and cyclicality worsen, it might be preferable to have no improvements in collection at all, since it can be quite reasonably assumed that in terms of the effect on inequality, it is better to have a regressive (or procyclical) system that collects less than a regressive (or procyclical) system that collects a lot.

It thus follows that an accurate criterion for answering the dichotomy of whether or not a certain tax policy is pro-equity is to answer in the

affirmative only when all three factors improve; if even one factor worsens, then the answer must be negative. This criterion is congruent with the analysis above, and it is also congruent with a solution that is common in statistical testing, which consists of trying to minimize type I errors even at the expense of type II errors. In other words, as in statistical testing, if there must be a risk of error, it is preferable to risk a false negative (finding no policy shift when there really was one) than a false positive (falsely asserting a policy shift which does not exist).

Having stated what pro-equity discretionary tax policy means and its three components, it remains to assess how each component may be measured.

4.5.1 Measuring the collection component of discretionary tax policy

The best way to measure the collection component of tax policy is to use the total structural tax revenues as a percentage of potential GDP using the methodology of adjustment explained in Section 4.4.2. An increase in total structural tax revenues would indicate the authorities' efforts to increase tax revenues, while a decrease would indicate the exact opposite. To determine whether there was a change in the way the five countries have used tax policy in recent years – which is the objective of this work – I must compare periods before and after a year with a possible policy shift. I compare the average growth of the structural tax revenue during those years when inequality was increasing to the years of decreasing inequality. we know that in the 1990s, all countries increased inequality, as measured by Gini coefficient, and after the year 2000, a period of decreasing inequality began in most Latin American countries, although the precise year when this period of decreasing inequality began is country-specific. I decided to select a country-dependent turning-point year based on data on inequality from the Cepalstat database, which shows that 2003 was the year when inequality started to decrease in Argentina and Peru, 2000 was the turning-

point year for Mexico and Chile, while inequality in Colombia started to decrease in the year 2002 (see Annex 8 Panel A).

4.5.2 MEASURING THE CYCLICALITY COMPONENT OF DISCRETIONARY TAX POLICY

The cyclicality component of discretionary tax policy will be determined in the standard way, namely using correlation analysis. A correlation analysis has been the standard procedure to assess cyclicality in line with the prominent work of Gavin and Peroti (1997) and Kaminski et al. (2004), which demonstrated the procyclicality of fiscal policy in developing countries for the first time.

I start by correlating the output gap with the structural tax revenues for each country, which provides general information about the level of cyclicality during the 20 years analyzed. However, I do not wish to assess how procyclical or countercyclical tax policy has been in the past 20 years, but rather whether policy response towards the cycle has evolved over time; in other words, whether there has been a policy shift. To evaluate a possible policy shift, I follow a twofold strategy. Firstly, following the work of Vegh and Vuletin (2013), I choose a turning point and compare the before and after correlations. Contrary to the aforementioned authors, who conducted a similar exercise for the case of cyclicality of expenditure and monetary policies in Latin America and assumed 1998 to be the turning point year for all countries, I opt for a turning point more in line with the business cycles of each country. Accordingly, I select the turning point year as the year when a new business cycle starts, thus enabling me to compare the correlations over entire businesses cycles. As can be seen in Annex 8 Panel B, the turning point for Chile is 2003; for Colombia and Argentina it is 2002; Mexico has two turning points, 1995 and 2003; and the turning point year for Peru is 2001.

Secondly, I compare the correlation of the cyclical component of GDP with the structural revenues and my proxy of progressivity only at times of crisis, to ascertain whether there has been a change in the way in which discretionary tax policy has reacted to economic crises in terms of both magnitude and progressivity. This comparison is relevant, given that how tax policy reacts in times of crisis is vital for understanding the effects of taxation on inequality, as was explained in depth in the analytical chapter above. I start with a general correlation for all moments of crisis, which will tell me whether tax policy is procyclical, acyclical or countercyclical at such times. Afterwards I will compare the correlation of different crises, to see if there have been improvements over time. To select crisis periods, I use those recognized by Vegh and Vuletin (2013; 2014), who consider a macro-economic crisis to begin in the quarter in which real GDP falls below the preceding 4-quarter moving average and to end in the quarter in which real GDP reaches the pre-crisis level.[58] I consider their selection to be accurate, given that it is country-specific and congruent with the idea of crisis that was theoretically analyzed in previous chapters. Furthermore, it is a definition of macroeconomic crisis that coincides with periods of financial crisis widely discussed in the literature, as can be seen in Annex 7**,** which shows the years of crises defined by Vegh and Vuletin (2013; 2014) and

[58] For statistical reasons, those crisis periods lasting less than three years had to be extended for the correlation estimation; this was conducted based on other macroeconomic information. This is the case for the Chilean crisis of 1999-2000, which was extended until 2000, as well as the crisis in Peru in 2000-2001, which was indicated to start in 1999. For the same reasons, the period of the global financial crisis of 2008-2010 was considered a crisis for all countries.

compares them with the years of financial crises defined by Reinhart and Rogoff (2009).

4.5.3 MEASURING THE PROGRESSIVITY COMPONENT OF DISCRETIONARY TAX POLICY

The measuring of progressivity is less straightforward. It depends very much on the definition of progressivity one uses and which proxy or measurement one decides to implement. In empirical studies described in Chapter 2, the measures implemented to measure progressivity fall into one of two groups. The first one is more interested in what could be termed a *de jure* progressivity, which uses statutory tax rates; this is for instance the approach followed by Piketty (2014) which consists in using statutory top PIT rates as a measure of progressivity.

The second group uses measures of *de facto* progressivity, which – independently of what the official tax laws say – examines what people really pay and who pays what. This is the case for those using indexes of distribution of the tax burden by income bracket, such as the Kakwani index, which is the classical measure of the distribution of the tax burden, defined as the difference between the concentration coefficient of taxes and the Gini of pre-tax income (Kakwani and Lambert 1998). This is the approach followed by scholars such as Cornia et al. (2012). The other type of studies based on a *de facto* progressivity notion are those cross-country studies presented in Chapter 2 that use a ratio of total tax revenues from progressive revenues to total regressive tax revenues, usually measured as the ratio of direct/indirect taxation with the underlying assumption that direct taxation is progressive while indirect taxation is not.

For this study I will use a measure of *de facto* progressivity. The reason for discarding *de jure* measurements is that, as was shown in Section 4.3.1, the classical measurement of de jure progressivity – the statutory marginal top

PIT rate – does not change substantially in the years analyzed in the five countries, despite some literature indicating that progressivity did change during the 20-year time span (See Chapter 2).

From the two types of *de facto* progressivity used in the literature, the option of using Kakwani indexes (or similar) was also discarded, given that computing these measures generally requires information on pre- and post-tax income and on the distribution of the tax burden, information that is either not available for uninterrupted periods of time or not comparable across countries.

Since what is required is ideally a single, comprehensive measure of progressivity which not only could be easily replicated in many countries but which is available for long periods of time, I have decided to use a ratio of progressive total tax revenues to regressive total tax revenues, given that tax revenues for different taxes are readily available for my case studies. However, in order to include the peculiarities of the Latin American case, my ex ante expectations of the impact of each tax on income inequality will be based on the tax incidence literature of the region already reviewed in Chapter 2. To recall, the conclusion of the literature was that, contrary to the tradition in other countries, direct taxation is not always progressive in the region; instead, all studies state that the only unambiguously progressive tax for Latin American countries is the PIT. Thus, my progressivity index will be the ratio of PIT revenues to tax revenues from all other tax categories.

This progressivity index implies that tax policy that increases collection from progressive taxes in relation to regressive taxes is more pro-equity. I will compare the average growth of the progressivity ratio in the same way as the revenue collection component, namely the years before and after inequality started to drop.

It is important to indicate that the ratio of PIT revenues to tax revenues from other taxes has to be adjusted by cycle and commodity prices in order to be used as a measure of progressivity of discretionary tax policy. In Section 4.4.2, it was explained how to construct structural tax revenues using aggregated tax revenue data, which are used as proxies for discretionary tax policy. Following the same logic, one can disaggregate tax revenues into their tax components (e.g. value added tax revenues, income tax revenues, etc.) and construct structural variables for each tax component, using them as proxies. For instance, if the structural revenue of personal income tax (PIT) changes, it can be used as a proxy for discretionary tax policy changes regarding PIT taxes. In a formal way, one can transform equation (7) into:

$$T_{s,t}^{j} = Tn_{t}^{j}\left(\frac{Y^{*}}{Y_{t}}\right)^{\varepsilon^{j}} + Tc_{t}^{j}\left(\frac{P^{*}}{P_{t}}\right)^{\partial^{j}} \qquad (8)$$

where $T_{s,t}^{j}$ represents the structural tax revenues of year t from tax j, Tn_{t}^{j} is the total tax revenues of tax j from non-commodity sources in year t, ε^{j} is the elasticity of tax revenues of tax j of non-commodity taxes on output and Y_t and Y^{*} represent the output in year t and the potential output, respectively. Tc_{t}^{j} is the total tax revenues of tax j from commodity sources in year t, ∂^{j} is the elasticity of commodity tax revenues of tax j to commodity prices, P_t is the price of commodity at time t and P^{*} is the long term price of commodities.

My proxy of progressivity can then be given by the ratio:

$$Progressivity\ proxy = \frac{T_{s,t}^{pit}}{T_{s,t}^{reg}}$$

where T_t^{pit} are the total structural revenues from PIT, while $T_{s,t}^{reg}$ are the total structural tax revenues of regressive taxation, which in this case accounts for all other tax revenues not coming from PIT.

For data limitations, the exercise of obtaining the structural PIT tax revenue will assume that there are no personal income tax revenues related to commodity extraction, an assumption that is easy to hold given that personal income tax in the region usually does not tax dividends and capital income (Jiménez, Gómez Sabaini, and Podestá 2010). When we assume that commodity related tax revenues are zero, equation (8) is converted into:

$$T_{s,t}^{pit} = T_t^{pit} \left(\frac{Y^*}{Y_t}\right)^{\varepsilon^{pit}} \qquad (9)$$

Conversely, the structural regressive taxation is adjusted for commodity prices in the following way:

$$T_{s,t}^{reg} = T_t^{reg} \left(\frac{Y^*}{Y_t}\right)^{\varepsilon^{reg}} + Tc_t^{reg} \left(\frac{P^*}{P_t}\right)^{\partial^r} \qquad (10)$$

The data of disaggregated tax revenues for each country was taken from the Cepalstat database[59] while the elasticities ε^{reg} and ε^{pit} were calculated according to the instructions stated in Box 4.1 and can be found in Annex 4.

[59] In the case of Argentina, I used only the data on personal income tax from 1991 to 2010. For the case of Mexico, there is no information on personal income tax for the years prior to 2002. In this case, I assumed that the proportion of PIT to the total income tax revenue was held constant and equal to the average of the years for which the information is available. In the case of Chile, there is no information on personal income tax for the years prior to 1995; in this case, I used the information found in Bernardi et al. (2013).

4.6 CONCLUSIONS

The objective of this chapter was to propose a methodology that allowed me to determine whether tax policy in Latin America has become more pro-equity over time. I began this chapter by defining key concepts such as tax policy and pro-equity tax policy and reviewing other methodologies used in the literature with the same purposes.

In this chapter I proposed measuring tax policy using structural tax revenues as a proxy. Structural tax revenues are those revenues adjusted for the business cycle and prices of commodities. The whole idea behind this proxy is that once the cycle and other exogenous factors such as prices of commodities have been controlled, changes in tax revenues must arise from any form of intervention by the authorities, thus reflecting discretionary tax policy.

In order to measure the pro-equity characteristics of tax policy, I identified three particular aspects that may be most expected to impact inequality: the level of collection, the level of progressivity and the cyclical element of taxation. The more a tax policy manages to collect, the more progressively it collects and the more countercyclical it is, the more pro-equity it will be. To measure the collection component I will look at my proxy of discretionary tax policy: the structural tax revenues. To measure the progressivity component, I proposed a proxy of progressivity, and for measuring the cyclical component, I will correlate the structural tax revenues against the output gap.

I also proposed using the case studies of Argentina, Chile, Colombia, Mexico and Peru during the 1990-2010 period. In order to determine whether tax policy has become more pro-equity in the region, I shall observe the development of the three components of pro-equity tax policy (collection, progressivity and cyclicality) in the periods when inequality was increasing,

mainly in the 1990s, compared to the those years when inequality was decreasing. If taxation became pro-equity over time and was in fact related with the reduction in inequality observed in the region in recent decades, one should observe a significant difference in the way these three factors developed.

5 IS TAX POLICY BECOMING MORE PRO-EQUITY IN THE REGION? AN EMPIRICAL INVESTIGATION

5.1 INTRODUCTION

I have dedicated the former chapters to the task of analyzing and validating the concept of pro-equity tax policy, as well as to developing a methodology to evaluate whether or not a particular discretionary tax policy is pro-equity. After all the discussions and analysis I have come to the conclusion that to assess whether a certain discretionary tax policy is pro-equity one should look at three factors: revenue collection, progressivity and cyclicality. My *ex ante* expectations of the impact of each factor is that the more revenue-increasing, progressive and countercyclical a tax policy is, the more pro-equity it will be. At the same time, I have elaborated what is, according to my analysis, the best methodology for evaluating these three factors over time: structural analysis. Structural analysis is the methodology that allows me to obtain the proxies of discretionary tax policy that I will use throughout this chapter.

In this chapter I apply the proposed methodology to evaluate the three factors in five Latin American countries (Argentina, Chile, Colombia, Mexico and Peru) and compare how each of these factors performed during the periods when inequality was increasing in comparison to the period when overall inequality was decreasing. I complement and contrast this empirical study with other narrative data from country case studies and other qualitative studies to obtain a complete picture of how discretionary tax policy has been pursued in these countries.

The remainder of this chapter will be divided into three sections. The first section is devoted to assessing each factor (revenue collection, progressivity

and cyclicality) for each case study using the structural methodology. The second section complements the structural analysis with other qualitative material. The last section presents my conclusions.

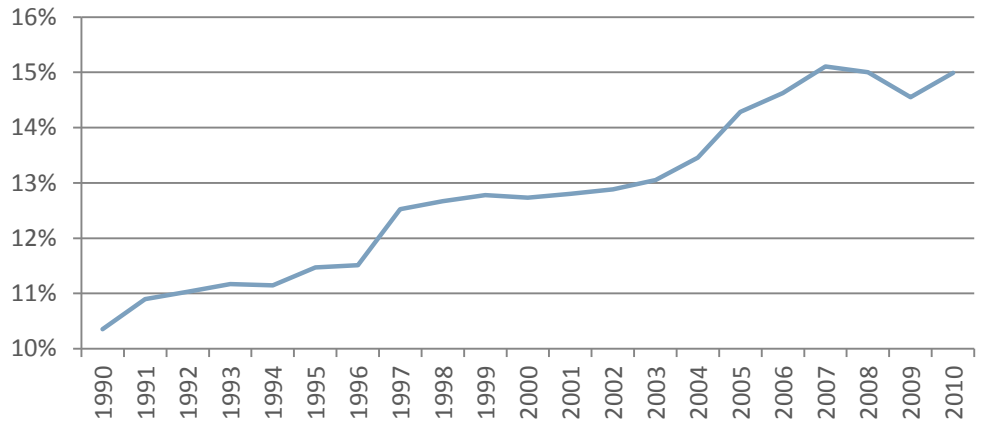
5.2 ANALYSIS OF THE THREE FACTORS DETERMINING PRO-EQUITY TAX POLICY

5.2.1 REVENUE COLLECTION FACTOR

As was discussed previously, the first determinant of a pro-equity discretionary tax policy is whether it increases tax collection. I have assumed that the more a tax policy increases collection, *ceteris paribus*, the more pro-equity that tax policy will be.

Something that is remarkable about the Latin American experience in the years analyzed is that, although the level of taxation has historically been very low, it has increased dramatically since the 1990s. Figure 5.1 illustrates this increase in tax collection in the last two decades in the region. In the period examined, the level of tax collection increased by 4.6 percentage points. The region began the 1990s collecting only around 10.4% of GDP; by the year 2010 it had reached a collection level of 15.0%. It is important to state that this increase in tax collection was higher than the increase seen in any other region in the same period (Corbacho, Fretes Cibils and Lora 2013). Also, the region has now achieved tax burdens comparable to or higher than those that once prevailed in the so-called industrial countries until around the time of the Great Depression in the 1930s and the Second World War (Tanzi 2013).

Figure 5.1 (1990-2010) Latin America, tax revenues as % of GDP



Source: Cepalstat

Figure 5.1 clearly evidences the impressive increase in tax revenue experienced by the region in recent years. However, it does not allow us to see many aspects that are relevant to this study. In the first place, the region is known for having very heterogeneous tax experiences (Corbacho, Fretes Cibils and Lora 2013), and the aggregate regional tax revenues mask a great deal of that heterogeneity. Secondly, changes in tax revenues as a percentage of GDP do not provide even a glimpse of the possible causes of such changes. In effect, looking at Figure 5.1 one cannot know whether the increase in tax collection in the region was caused by discretionary tax policy or was just the result of favorable economic conditions and/or changes in external factors such as prices of commodities.

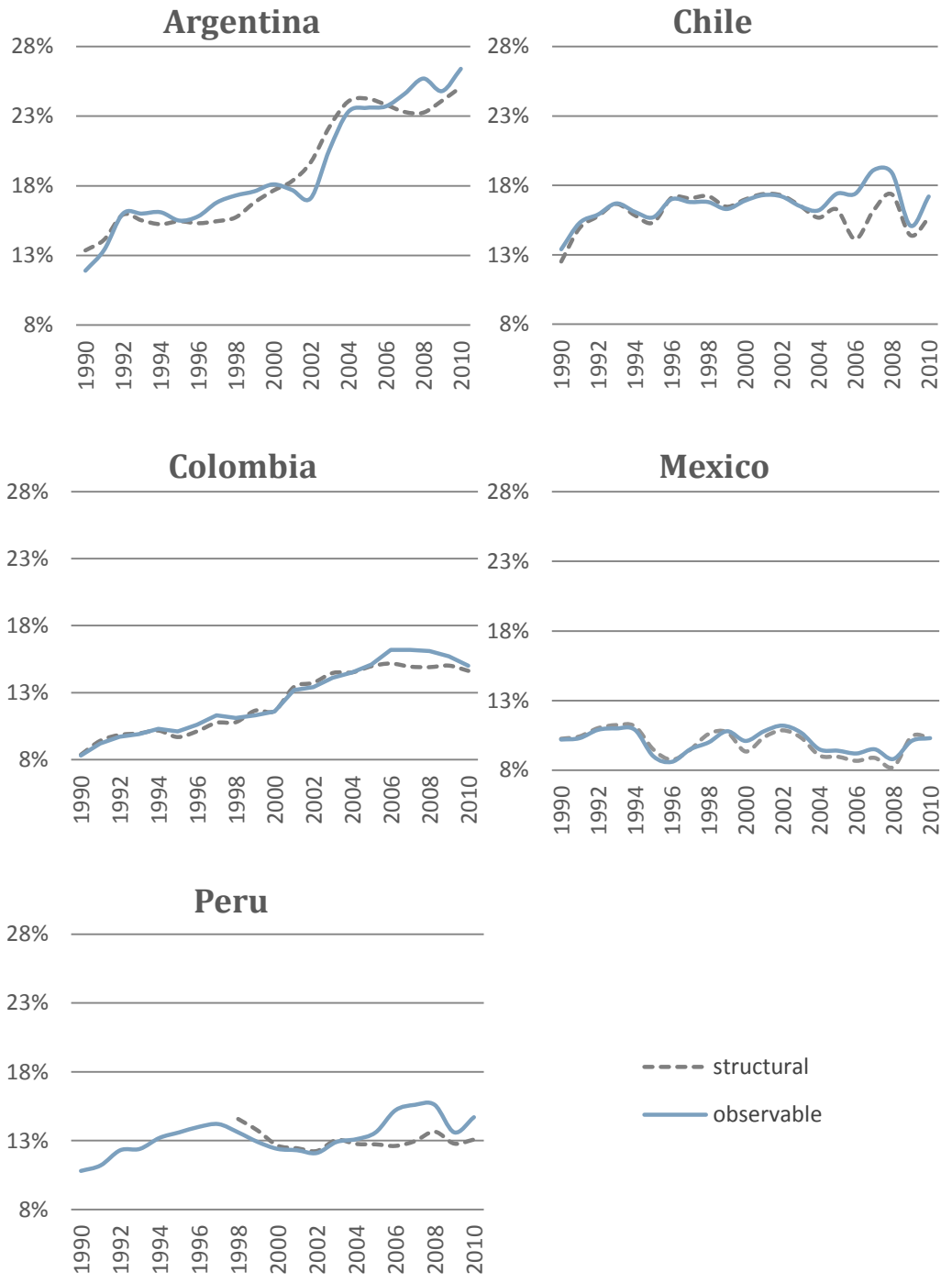
The heterogeneity of the countries' experiences and some possible explanations for the results in terms of collection can be perceived once one assesses countries individually and examines the proxy of discretionary tax policy. To illustrate this point, Figure 5.2 shows total tax revenues individually for my five case studies and, in addition to displaying the observable tax share for each country, which is total revenues divided by GDP, it shows the structural share – which is my proxy for discretionary tax

policy, calculated as structural tax revenues as a percentage of potential GDP.

Figure 5.2 shows that, looking only at the observable shares, it is evident that all countries increased tax collection in the 20 years analyzed in accordance with the regional experience. However, Figure 5.2 does reveal the substantial diversity that exists among country experiences. Argentina and Colombia are the stars of revenue collection increases in the sample. Argentina, remarkably, increased its tax revenues continuously. In 1990 Argentina was collecting 11.9% of its GDP in taxes; 20 years later this value had more than doubled to 26.4%. In the case of Colombia, there is a dramatic and constant increase in tax collection. At the beginning of the 1990s, observable tax collection represented 8.3% of GDP, making Colombia the lowest collector of the sample. From then on, Colombia steadily increased tax receipts to 16.2% in 2007. From 2008 onwards, there was a reduction of the tax share, falling back to around 15% by 2010. In total, during the two decades analyzed, Colombia not only increased its collection by approximately 7 percentage points, but in the year 2010, it was also no longer the lowest collector, having outstripped Peru and Mexico.

The two countries that follow in terms of collection increase were Chile and Peru. Those countries increased their tax revenues in the period by around 4 percentage points each. At the beginning of the 1990s, Chilean authorities were collecting 13.4% of GDP in taxes, while at the end of the 2010s this value had reached 17.2%. Chilean tax revenues did not increase continuously. Tax revenues as a percentage of GDP increased in two particular periods, in the first three years of the sample (1990-1993) and in the four years before the crisis of 2009 (2004-2008); in the latter period, collection peaked in 2008, when collection was as high as 18.9% of GDP. After this period a decrease in collection was experienced. Over the other years analyzed, tax revenues remained rather

Figure 5.2 (1990-2010) Selected countries, structural and observable tax revenues as a (%) of GDP and potential GDP.



Source: Author's estimations

constant. In Peru, the share of taxes in GDP increased from 10.8% to 14.7%. There was a particular period of revenue expansion in Peru, from 2003 to 2008.

The last country in terms of revenue increases was Mexico. In 1990 Mexico was collecting 10.2% of its GDP in taxes, and 20 years later this value had very slightly increased to 10.3%. In 2010 Mexico was the lowest revenue collector of my sample.

Figure 5.2 also allows us to evaluate a possible explanation for these tax revenue changes in each country. When we compare the observable line with the structural line we can see that, once the effect of the cycle and commodity prices is taken into account, the increase in tax revenues is more modest in all cases, indicating that the increases in tax revenues seen in the last 20 years in these countries were not completely based on discretionary tax policy, but were also the result of the effect of the commodity boom and the positive economic conditions.

The structural line of Figure 5.2 further reveals the extent to which discretionary tax policy in these countries was revenue-increasing. In the case of Argentina and Colombia, the impressive increase in tax revenues was accompanied by a discretionary tax policy that was substantially revenue-increasing. Comparing the structural line at the beginning of the 1990s with that in the year 2010, it is evident that Argentina and Colombia are the countries with the most intense revenue-increasing discretionary tax policy; adjusting for the cycle and commodities, they increased tax

revenues by 11 and 5 percentage points respectively. The third country with considerable revenue-increasing discretionary tax policy was Chile, with an increase in 3 percentage points, followed by Mexico with no increase and then Peru, which saw the value of its structural line fall by one percentage point during the period since 1998.[60]

Figure 5.2 thus clearly reveals discretionary trends during the entire period of analysis. But, apart from these 20-year trends, I would like to focus the analysis now on a possible shift in taxation policy. Particularly, I wish to examine whether discretionary tax policy has been more revenue-increasing in years when inequality was increasing as compared to years when inequality was decreasing. This is, in fact, the most relevant question of this section.

In Chapter 4 I explained that, based on data from Cepalstat, the year when inequality started to decrease was 2003 in the case of Argentina and Peru, 2000 for Mexico and Chile, and 2002 for Colombia. Accordingly, I have calculated for each country the average growth rate of my proxy of discretionary tax policy before and after the year of the inequality shift. The average growth rate in a certain period gives me a measurable idea of how revenue-increasing – or decreasing – discretionary tax policy was in the period concerned.

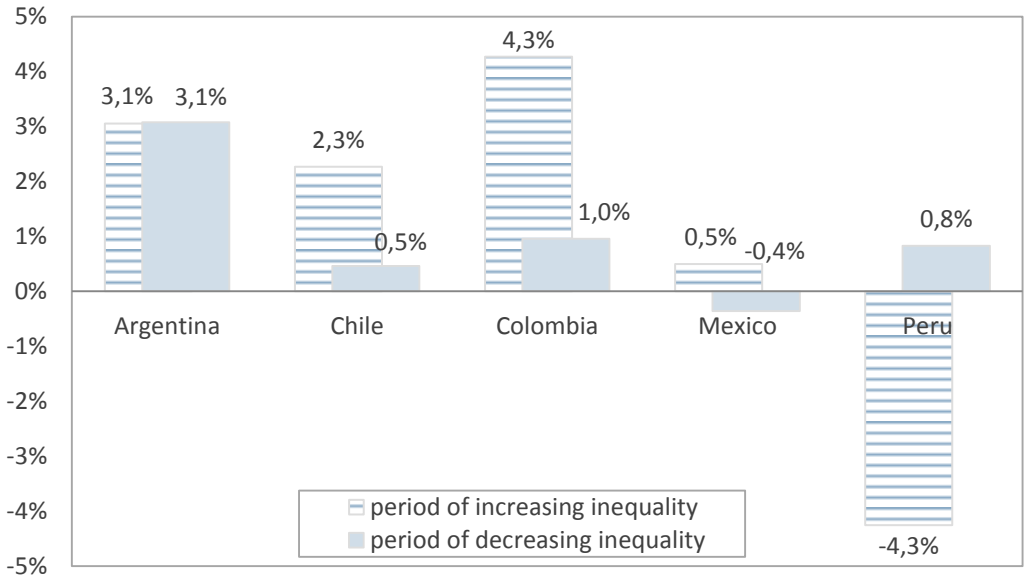
Figure 5.3 Panel A shows the calculated averages for each country. This panel illustrates that there is an evident difference in averages, illustrating

[60] For Peru the structural tax revenues series begins in 1998.

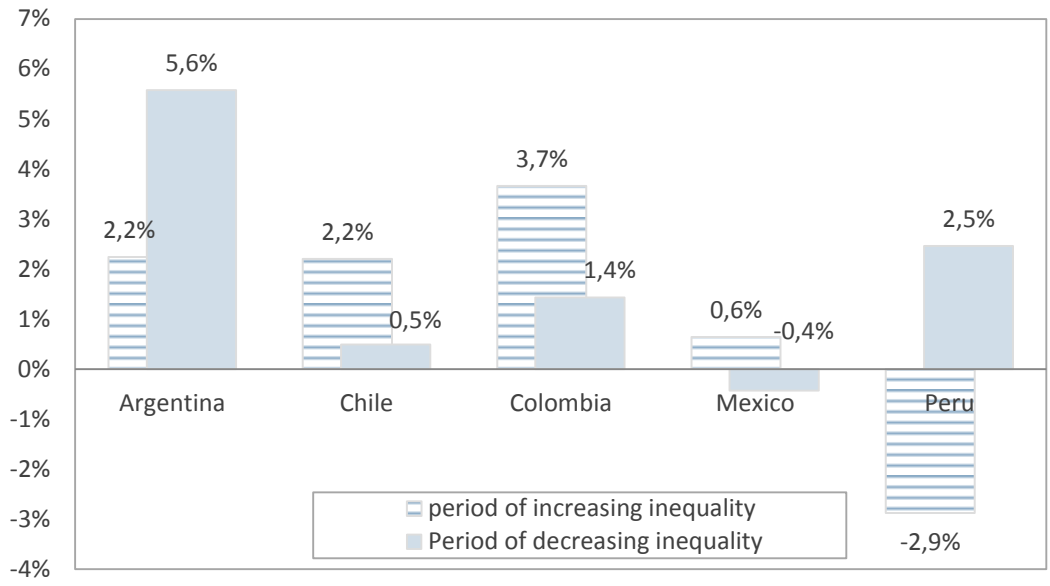
the existence of a policy shift regarding taxation in 4 out of the 5 countries studied. The only exception is the case of Argentina, where discretionary tax policy was revenue-increasing in both periods and of exactly the same magnitude. In the other four countries that indeed witnessed a policy shift, we find three different experiences. The first is that of Colombia and Chile, where discretionary tax policy increased revenue in both periods, but more significantly in the period of increasing inequality than in the period of decreasing inequality. The second experience was that of Mexico, a country that pursued a revenue-increasing discretionary tax policy in the first period and a revenue-decreasing discretionary tax policy in the second. The third experience is that of Peru, where discretionary tax policy in the first period was produced markedly lower revenues, while in the second period tax policy was oriented to increasing revenues.

Figure 5.3 Selected countries, average tax revenue growth

Panel A. Structural tax revenue growth as a % of potential GDP



Panel B. Observable tax revenue growth as a % of GDP



Source: Author's estimations

I decided to replicate in Figure 5.3 Panel B the exercise of Figure 5.3 Panel A, but this time using observable total tax revenues. I did this calculation only to prove that the increase in the observable revenue collection in the period when inequality was decreasing was, in the majority of cases, inflated by the effect of increasing prices of commodity and a the positive economic conditions. Discretionary tax policy explains only partially the increase of collection in the years of decreasing inequality. In the case of Argentina this effect is quite noticeable: comparing Figure 5.3 Panels A and B, one can see that prices of commodities and the conditions of the business cycle greatly inflated tax revenues in the period when inequality was decreasing.

5.2.2 PROGRESSIVITY FACTOR

In this section, the focus is on examining how changes in tax policy have affected the progressivity of the tax system over time.

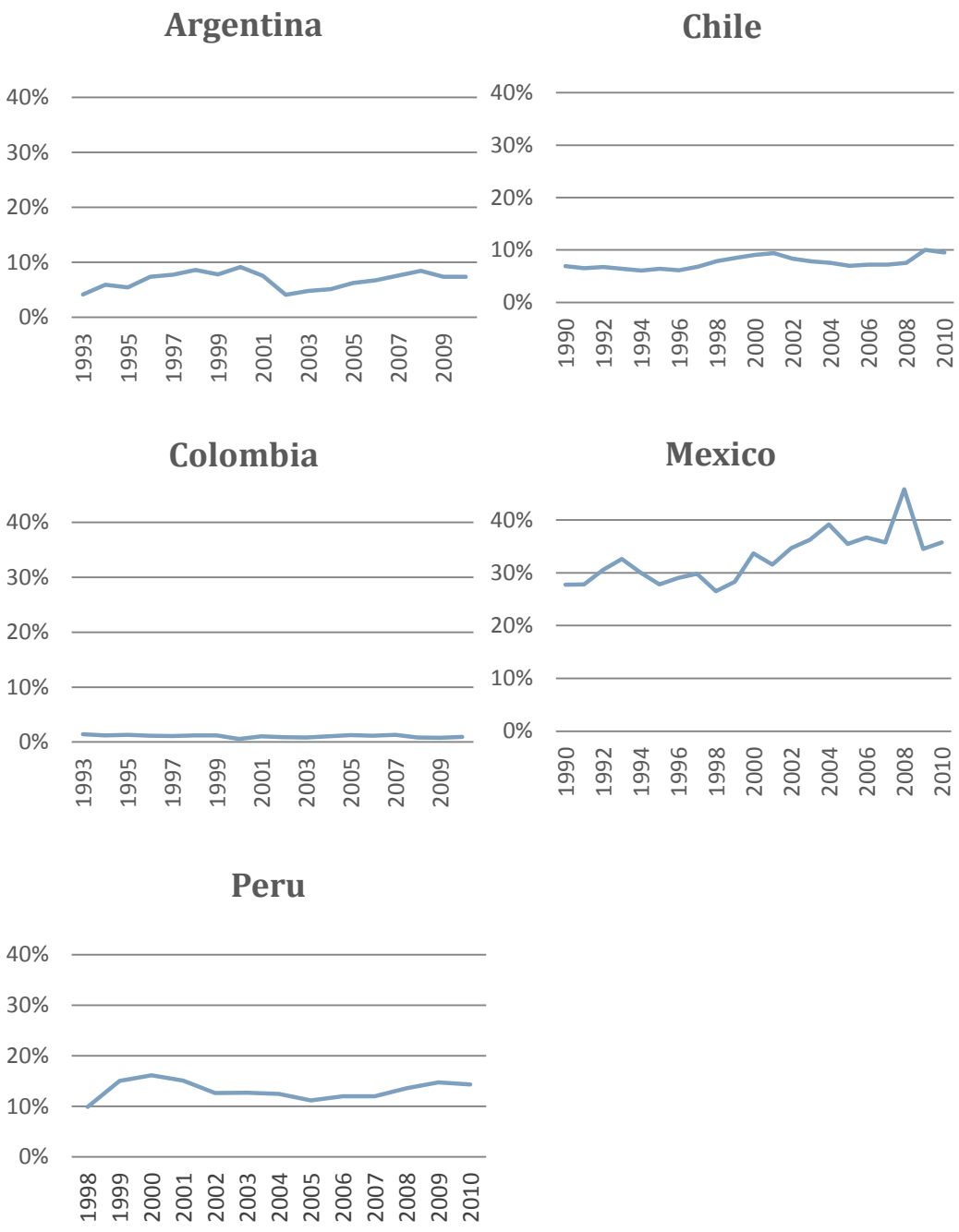
I propose a proxy for progressivity. In the strictest sense, this proxy equals the ratio of structural PIT tax revenues to the structural tax revenues of the remaining tax categories. The economic interpretation of this index is the participation of progressive taxes over regressive taxes, once adjusted for the cycle and prices of commodities. The change of this proxy value will be interpreted as a change in discretionary tax policy, such that an increase in this variable indicates a shift in tax policy towards more progressivity of the tax system, while a decrease can be interpreted as the opposite.

Figure 5.4 shows the calculated progressivity index. In general terms, according to this index, the country with the highest average proxy value in the period was Mexico, with a variable average value of 0.33 – indicating that, considering an economy running at its trend and prices of commodities at their long-term value, there are, on average, 0.33 Mexican pesos of tax revenues coming from progressive taxes for every peso coming from regressive taxes. The next country is Peru, with an average ratio of 0.13, followed by Chile and Argentina with ratios of 0.08 and 0.06 respectively; finally, the country with the lowest value is Colombia, where the ratio of progressive taxation was, on average, just 0.01.

Some caution should be exercised with any attempt to derive conclusions from the above data, as the degree of progressivity/regressivity of said progressive/regressive taxes varies significantly among countries. To say that, for instance, the Mexican tax system is more progressive than the Colombian, would be a misleading interpretation of the data. It is true that the Mexican tax system collects more from progressive taxes, but Mexican progressive taxes could be less progressive than Colombian progressive taxes. In other words, a tax such as the PIT could be progressive in all countries, but there are different levels of progressivity; in some countries PIT could be highly progressive, while just slightly progressive in others. I do not account for these differences in degree in this work. Accordingly, I

focus on changes in the proxy in each country over time, and not on comparing countries.

Figure 5.4 (1990-2010) Selected countries, progressivity index



Source: Author's estimations

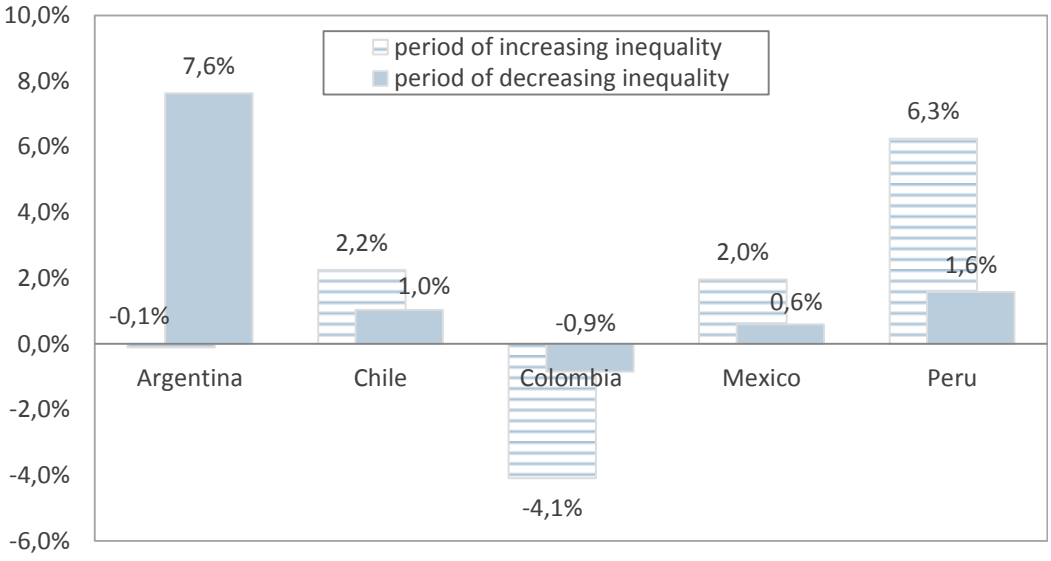
Another factor to be considered is that the degree of progressivity of the PIT in each country's tax system may have changed over time. In fact, Chapter 2 documented evidence of changes in progressivity of certain taxes in the region. Again, given the difficulty of taking this factor into account, I assume that there were no strong changes in the degree of PIT progressivity over time.

Figure 5.4 also illustrates the direction of tax policy in terms of progressivity during the period analyzed. With the sole exception of Colombia, all countries pursued discretionary tax policy that shifted the tax system towards greater progressivity. Comparing the proxy in the beginning of the series with the last year of the series, the country that increased its progressivity index most radically was Argentina, which doubled the value. The second place goes to Peru, which increased its progressivity by 44%, then Chile, with a 37% bump, followed by the case of Mexico, with a 29% increase. Lastly we find the case of Colombia, which actually reduced its progressivity index by 34%.

What I want to assess now is whether there has been a policy shift regarding progressivity in recent years. To fulfill this objective, I will duplicate the exercise done in the previous section and compare the average growth of the progressivity index in the two periods: the years when inequality was increasing and the years of declining inequality. Figure 5.5 shows the results of the average growth of the proxy. In all countries there seems to be a policy shift regarding progressivity. We find, however, different experiences. Two of the countries did indeed pursue a tax policy towards more progressivity – or less regressivity – during the years when inequality started to decrease; this was the case for Argentina and Colombia. In Argentina tax policies made the system slightly more regressive during the first period and substantially more progressive in the second. The case of Colombia is different in the sense that during the period of 1993-2002,

when inequality was increasing, tax policy changed the tax system towards more regressivity, and in the subsequent period, tax policy continued to make the system more regressive, but less so than in the first period. Chile, Mexico and Peru, on the other hand, had a policy shift towards less progressivity. Discretionary tax policy in these countries tended to make the systems more progressive in both periods, but in the second period less so.

Figure 5.5 Selected countries, progressivity index growth



Source: Author's estimations

5.2.3 CYCLICALITY FACTOR

It is clear that the cyclical properties of discretionary tax policy are an important factor in assessing the extent to which a tax policy can be considered pro-equity. Accordingly, in this section the interest is in examining how the cyclicality of tax policy has evolved over time. Has discretionary tax policy become more countercyclical over time? This is the main question this section will answer.

It is interesting to note the lack of studies of cyclicality of taxation that exist in the literature. It seems that the interest of researchers has been on the cyclicality of expenditure policy rather than that of tax policy, as the abundant literature on the former can attest.[61] However, the few studies on the subject evidence that tax policy tends to be procyclical in developing countries(Vegh and Vuletin 2012; Kaminsky, Reinhart, and Vegh 2004). I would like to determine whether this is the case for the Latin American cases studies analyzed. Can we observe a procyclical tax policy in the five countries?

To address the cyclical stance of tax policy I have calculated the correlation coefficient of the cyclical component of GDP with the structural tax revenues as a percentage of potential GDP for each country for the 20-year time span. A tax policy is defined as procyclical (countercyclical) if this correlation is negative (positive), suggesting that tax policy is in fact amplifying (reducing) the business cycle. A tax policy is acyclical when this correlation is close to zero.[62]

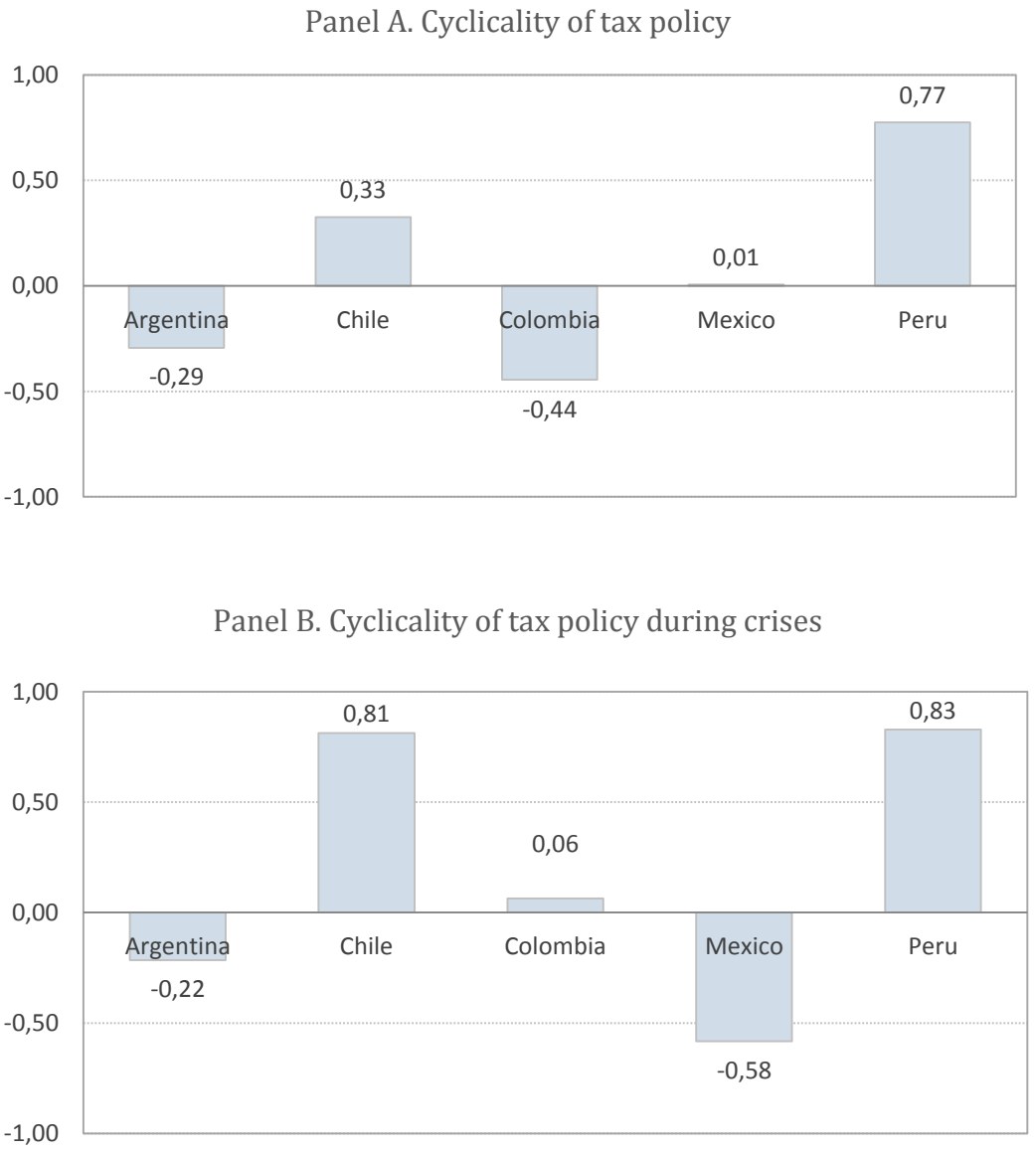
Figure 5.6 Panel A illustrates the results from that correlation and shows that during the 20-year span countries had very different cyclical properties. For instance, Argentina and Colombia pursued a procyclical tax policy during the years analyzed. Chile and Peru pursued a countercyclical

[61] See for instance Ilzetzki and Vegh (2008) for the cyclicality of developing countries' expenditure policy and the works of Jiménez and Fenelly (2009) and CEPAL (2009) for Latin America.

[62] In my correlation analysis I am more interested in the correlation coefficient's magnitude and less so in statistical significance, as the small size of the time series makes it difficult to find significance.

tax policy, while the tax policy of Mexico was more acyclical, as the correlation of the output gap with the structural tax revenues was positive but very close to zero.

Figure 5.6 Selected countries, correlation analysis



Source: Author's estimations

I have indicated before how relevant it is to look at times of crises in the Latin American case to understand the relationship between taxation and inequality; for this reason, I have replicated the exercise of computing the correlation coefficient of cyclical GDP with the structural revenues but this time only for times of crisis. I used the definition of crisis of Vegh and Vuletin (2013; 2014) found in Annex 7. Figure 5.6 Panel B demonstrates that Argentina and Mexico followed a procyclical tax policy pursuing revenue-increasing discretionary tax policy in times of crisis. Chile, Colombia and Peru, on the other hand, followed a countercyclical tax policy at such times.

Now I would like to evaluate whether there has been a policy shift in the cyclicality of tax policy in the case study countries. Ascertaining the existence of a possible policy shift towards countercyclicality is the most important question to answer in this section. Moreover, answering this question has a value in itself as a complement to the closely related and newly emerging literature on the cyclicality of macroeconomic policies in developing countries, particularly in Latin America. This recent literature shows that over the last decade, about a third of the developing world has been able to escape the procyclicality trap and actually become countercyclical in terms of government expenditure (Frankel, Vegh, and Vuletin 2013). This literature also evidences that Latin American countries have graduated in terms of their expenditure and monetary policy responses to moments of crises – in the sense that they have been able to switch from procyclical to countercyclical policies (Vegh and Vuletin 2013). Determining whether there has been a policy shift towards countercyclicality in taxation can thus not only resolve the main question of this section, but also determine whether the Latin American experience of taxation follows the tendencies previously noted in terms of expenditure policy and other economic policies.

To evaluate whether tax policies have evolved over time and in particular whether their cyclical properties (countercyclical, acyclical or procyclical) may have changed, if at all, over time, I had to choose before-and-after dates to do the comparison. As I explained in Chapter 4 I decided to select the turning point year of each country individually, depending on the year when a new economic cycle began. Accordingly, the turning point for Chile is 2003; for Colombia and Argentina, it is 2002; Mexico has two turning points, 1995 and 2003; and that for Peru was 2001 (see Annex 8).

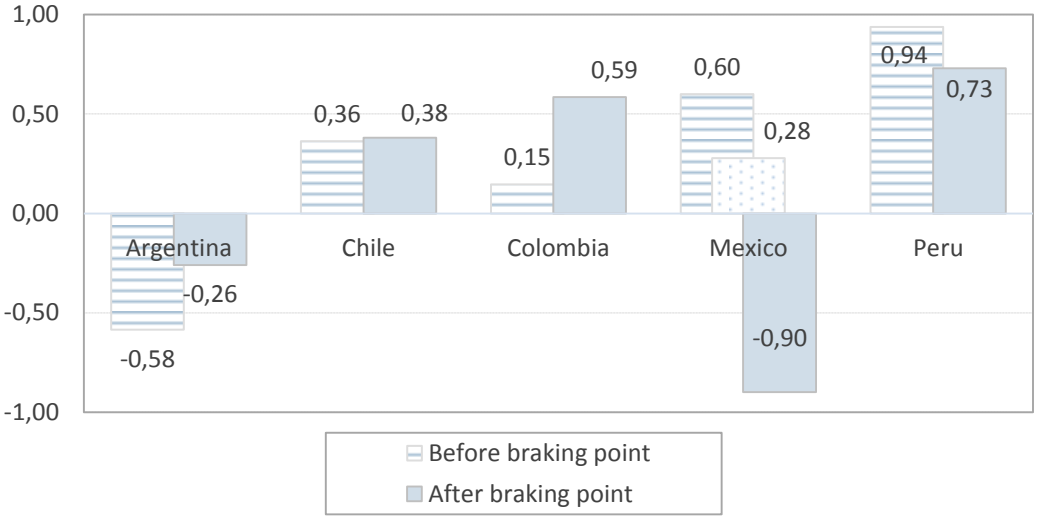
Regarding a policy shift in cyclicality, Figure 5.7 Panel A shows that it is possible to distinguish a policy shift in all countries analyzed. The direction of the policy shift depends, however, on the case. A shift towards more countercyclicality or, at least, less procyclicality, was found in the majority of the cases. Argentina, Chile and Colombia improved in that sense. Argentina's tax policy was procyclical in the first period, and changed towards less procyclicality in the last period. In the cases of Chile and Colombia, tax policy was countercyclical in the first period, and became more countercyclical over time (although the change was very modest in the case of Chile). The remaining two countries (Peru and Mexico) had a policy shift towards more procyclicality or less countercyclicality. Peru pursued a countercyclical tax policy until 2001 and a less countercyclical policy afterwards. Mexico was the only case where tax policy was countercyclical in the 1990s and became procyclical in the later period.

Thus, according to Figure 5.7 Panel A, there is evidence that just as expenditure policy became more countercyclical in most developing countries, as evidenced by the studies here presented, the same trend is seen in some countries in Latin America regarding tax policy. I would like to evaluate now whether tax policy responses to moments of crisis have graduated, in the sense that they have been able to switch to more countercyclical policies in recent years. To evaluate this point, I will

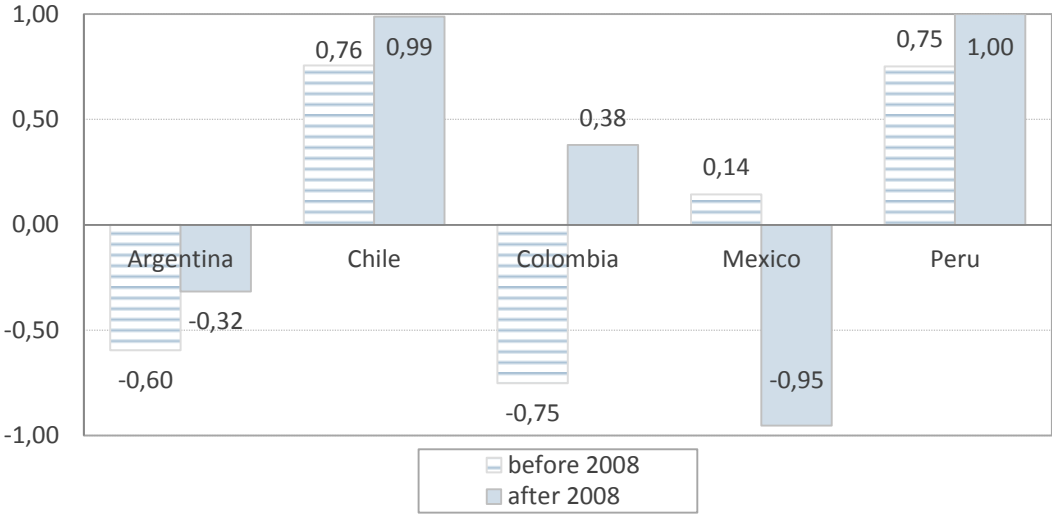
examine the policy reaction to the crisis prior to 2008, and compare it with the reaction to the 2008-2009 crisis.

Figure 5.7 Selected countries, correlation analysis (policy shift assessment)

Panel A. Cyclicality of tax policy



Panel B. Cyclicality of tax policy during crises



Source: Author's estimations

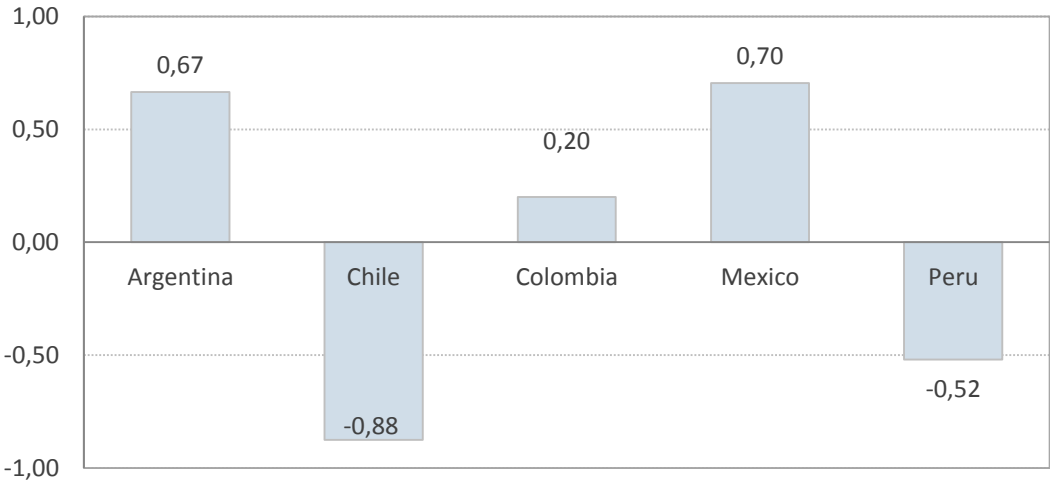
Figure 5.7 Panel B is very telling, as it establishes that all countries have clearly graduated in their policy response to crisis, switching to more countercyclical (or less procyclical) reactions to the crisis of 2008 as compared to the previous crises. The only exception was Mexico, which responded countercyclically to the Tequila Crisis while procyclically to the 2008 crisis.

Now, it seems to be true that tax policy responses to crises have responded more countercyclically over time, but another very relevant question to answer is whether we can also observe the progressivity of the policy reaction evolving over time. In other words, are countries responding to crises by changing the system towards more progressivity? Or, instead, do countries in crisis increase regressive taxes, making the system more regressive overall? To answer this question I will correlate the economic cycle against my proxy of progressivity only during times of crisis. A positive (negative) correlation indicates that during crises the progressivity of the system is reduced (increased).

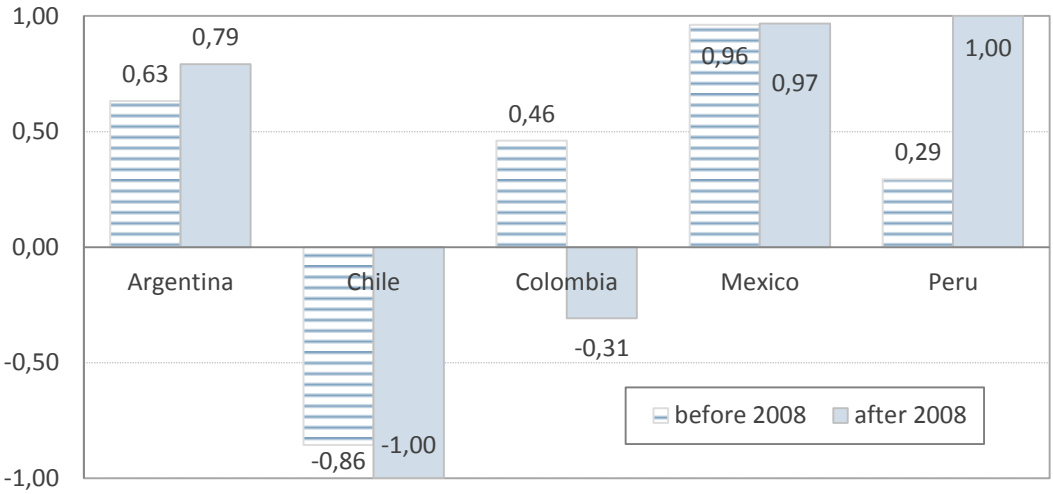
I will start with a general assignment of the progressivity of the tax reaction to crises in my five case studies. Figure 5.8 Panel A shows that Mexico, Argentina and Colombia, in that order, reacted to the earlier crises by reducing the progressivity of the tax system, while Chile and Peru, when facing crisis, increased the general progressivity of the tax system. In order to see whether this reaction improved in the recent crisis, Panel B reveals that only Chile and Colombia actually improved their reaction to crisis. Chile reacted to both crises in a very progressive way, but more so to the crisis of 2008. Colombia decreased the progressivity of its tax system during the crisis of 1999, but reacted progressively to the crisis of 2008. In the other countries one sees that the reaction to the 2008 crisis was more regressive than to the previous crises.

Figure 5.8 Selected countries, correlation analysis, progressivity reactions to crisis

Panel A. Progressivity reaction to crises



Panel B. Progressivity reaction to crises (policy shift assignment)



Source: Author's estimations

5.3 COMPLEMENTING THE ANALYSIS WITH AN ANALYSIS OF IMPORTANT REFORMS

Now I want to complement these results with the information on tax reforms that I have collected from legal texts and other qualitative studies, including background discussions with researchers and experts. A

structural variables analysis is good at explaining long term trends and showing general, measurable comparable results, but it does not indicate the actual changes in legislation that may explain the general results. Complementing the data from the structural analysis with evidence of tax reforms is a really valuable exercise since it provides a much more complete vision of discretionary tax policy in the five countries and thus contextualizes the results. Any contrast can also be used as a check of the results, since in general one should expect a certain coincidence between the structural analysis and the results from other qualitative material.

5.3.1 Argentina

According to the structural analysis presented above, Argentina stands out for being the country with the most revenue-increasing tax policy of all the case studies in the 1990-2010 period. The structural analysis shows as well that efforts to increase revenues were present both in the period when inequality was increasing (1990-2002) and in the period when inequality was decreasing (2003-2010). In this section I want to look into both the motivation and the reforms behind these results.

I will start by examining the period when inequality was increasing (1990-2002). As we will shortly see, this period was characterized by profound economic transformations, but above all, by the imperative to increase revenues in order to reduce the chronic fiscal deficits in Argentina. Given that necessity, virtually all important reforms during these years had as an objective the increase of revenues to achieve some balance in fiscal accounts.

The first tax reforms of the 1990s were undertaken by the Peronist president at the time, Carlos Menem, and his finance minister Domingo Cavallo. President Menem came to office in 1989 amid a difficult situation that included generalized riots, recession, annual inflation rates of 5000%

and a complete loss of confidence in the government, both on the international stage and among the general Argentinian population. The situation was so severe that president Menem had to take office five months early due to the resignation of the then president before the end of his term.

But from an economic perspective, Menem was by no means an icon of economic prudence, coming from a populist party and having won the elections with promises of salary increases and transformative policies, raised concerns about his commitment to market stability. His strategy for restoring confidence was to embark on an aggressive program of free-trade market reforms (Sanchez 2011), which included waves of privatization, deregulation, a restructuring of public finances and several initiatives to open up to international markets, such as the signature of the Mercosur in 1991. Perhaps the most important component of Menem's reforms was the implementation of the Convertibility Plan designed by Cavallo, which, among other measures, fixed the Argentine peso at parity with the US dollar as a way to stabilize the economy.

In terms of taxation, market reforms implied increasing the extractive capacity of the tax system to reduce the fiscal deficit. Tax measures during the first years of the 1990s consisted of increasing revenues by increasing the VAT tax rate from 13% to 18%,[63] and by widening the tax base. There was also a clear attempt to simplify the tax system, through the abolition of some minor taxes and taxes on exports and the modernization of the federal tax bureau. These impressive tax measures passed without major difficulties

[63] See Annex 2 for legal tax rates in the 1990-2010 period.

since the mega-inflationary context had made stability the priority for social and economic groups, and whatever means were necessary to restore stability were easily accepted (Sanchez 2011).

The economic reforms at the beginning of the 1990s seemed to work. In 1994, it was tempting to think that Argentinian authorities had won the battle against economic instability. Inflation ended shortly after the convertibility system was implemented, growth was restored, and the favorable international environment, with rekindled international eagerness to invest in emerging markets, poured capital in from abroad. Menem's apparently successful economic policy ensured his reelection in 1995.

But stability and growth proved to be short-lived in Argentina. Two economic shocks soon destabilized the country and an endless process of tax reforms began (Cetrángolo and Gómez Sabaini 2010). The first shock came from Mexico; in 1995, the Mexican crisis erupted and foreign investors, afraid that other emerging markets would follow Mexican paths, became reluctant to invest or renew their loans to those countries. No other country in the region was affected more by the contagious effect of the Mexican crisis, dubbed the "tequila effect", than Argentina (Ganapolsky and Schmukler 1998). Within a short time, the Argentinian economy suffered large capital outflows, a deceleration of the economy and a resultant collapse in tax revenues. Facing this situation, Cavallo increased the VAT to 21%. The increase was meant to be transitory but remains the VAT tax rate in Argentina to this day.

The second shock came from a very unfortunate international economic environment. At the end of the 1990s, most South-East Asian countries, Russia and Brazil, among other developing countries, had fallen into severe economic crisis. This gust of instability pushed international prices of commodities down, prompted capital flight from emerging markets, and

pressured developing countries to devalue their currencies. Argentina was again severely affected by this international situation, which merited further revenue-enhancing tax reforms. In 1998 the first tax measures were implemented at the initiative of the new finance minister Roque Fernandez, who was appointed after Cavallo had been asked to resign due to personal problems with president Menem. The tax measures consisted of an increase in the maximum rate of PIT and the single CIT from 30% to 33%, a reduction of the non-taxable minimum income, an expansion of VAT to include services provided from foreign countries, and the creation of some tax privileges for certain sectors such as construction, agriculture, financial institutions, etc. Other important taxes were created such as the interest tax, the presumptive income minimum tax and the Monotributo, a simplified tax system for small businesses.

In 1999, it was already evident to the authorities and the public alike that the Argentinian economy was more affected by the external shocks than initially forecast. Argentina had already entered into the deepest and most prolonged recession of its postwar period (Fanelli 2002), but this time it was in the hands of a new government to implement the necessary reforms. In 1999, De la Rua won elections under the patronage of the Alliance, a recently created center-left coalition that was meant to be an alternative to the neoliberal approach that Menem had pursued for a decade.

In terms of taxation, the initial idea of De la Rua and the newly assigned finance minister José Luís Machinea was to obtain more tax revenues, but in a more progressive way. The Machinea “impuestazo” of year 2000 consisted of broadening the VAT base by abolishing some tax exemptions, reducing the non-taxable minimum income, increasing the number of tax brackets, creating an extraordinary tax to be applicable only one year at the rate of 20% on high incomes and modifying the system of tax deductions in a progressive way through a scheme colloquially called the “tablita

Machinea". The reform did not, however, manage to increase revenues, which remained stagnant in 2000 and even decreased in 2001. Machinea sent his letter of resignation in 2001.

After two finance ministers had already been dismissed, De la Rua appointed Cavallo, the father of the convertibility system, as Minister of Finance. Cavallo came with the idea of passing heterodox and countercyclical measures to boost investment (Gaggero and Gómez Sabaini 2002), but given the severity of the situation and his commitment to the "zero deficit now" strategy, he ended up implementing a hybrid policy of tax incentives and tax hikes. The tax incentives consisted of the creation through Decree 730/01 of "plans of competitiveness", a program of beneficial tax treatment for certain strategic businesses. The tax hike consisted of a generalization of the VAT and, following the model of Brazil, the creation of a financial transaction tax whose tax base and tax rate were increased during the course of the crisis. This reform was unable to stimulate investment or increase revenues, which continued to fall until 2002.

The story that follows is more well-known, as it made the front pages of the world's newspapers: at the end of 2001, Cavallo, in order to prevent further bank runs, introduced a set of draconian restrictions against money withdrawal, dubbed the "corralito". The social discontent unleashed by this measure was of unprecedented dimensions and manifested itself in street riots (colloquially known as the "cacerolazo") and violent looting. The situation became so unbearable that in December of 2001 President De la Rua took a helicopter and left the Argentinian official residence forever.

For this study, the end of the De la Rua administration coincides with the period when inequality starts to decline. In this period the authorities also attempted to increase revenue, but in a very different manner: while previous reforms were oriented towards increasing revenues to stabilize

fiscal accounts during difficult economic times, the post-crisis reforms came at a time of economic recovery or boom. The instruments used were very different as well. Whereas the reforms during the period of increasing inequality used tax rate increases, particularly of the VAT, PIT and CIT, Argentina did not modify these rates after the crisis; instead, the policy consisted either of creating more heterodox taxes or of broadening the application of certain taxes.

After De la Rua left, a period of political instability followed. In just over a week Argentina had five different presidents, and it was during this short period that Argentina declared the default of its sovereign debt – the biggest default in history. The last of these five presidents, Eduardo Alberto Duhalde, managed to implement two important economic measures in his short presidency period of a little bit more than a year: he repealed the convertibility system and implemented, through Decree 310/02 and Resolution 11/02, an export tax. The export tax has become an important source of revenue for the state and it is still today a distinctive feature of the Argentinian tax system, accounting for an average of 13% of total tax revenues since its implementation.

In 2003 a process of continuous recovery began, interrupted only by the international shock of 2008-2009. In the 2003-2008 period Argentina grew at "Asian" rates of 8.5%, propelled by the export sector, which was benefiting from the commodity boom and from the currency depreciation that came after the abandonment of the peg. Fiscal policy was also very expansive, especially in terms of public expenditure, and wage incomes also increased substantially.

In the political field, the period of recovery and the economic downturn at the end of the decade coincided with the administration of Nestor Kirchner (2003-2007) and his wife Cristina Fernandez (from 2007 on). During both administrations, reforms were more subtle than the reforms in the past; the

explanation is that although Argentina completely lost access to external credit, the positive cyclical conditions and prices for commodities boosted public finances. During the years 2003-2008 Argentina enjoyed fiscal surpluses, for the first time since 1992, giving the authorities necessary space to maneuver.

During the recovery period under the administration of Nestor Kirchner, important but subtle tax initiatives oriented towards increasing revenues were implemented. For instance, at the beginning of his presidency, Kirchner decided that before thinking seriously about a new major reform it was mandatory to fight the high tax evasion level characteristic of Argentinian society; therefore he launched the Anti-Evasion Plans I and II. These two programs entailed an aggressive plan to achieve tax compliance, which included higher penalties for evaders and a technification of the federal tax bureau. His administration also continued the already ongoing process of VAT generalization and did not renew the Competitiveness Agreements – in part due to strong pressure from the IMF. Some other preferential treatments for businesses were created instead, particularly for the oil sector (Bonvecchi 2010).

Another subtle policy by the government consisted in not adjusting income taxation for inflation and for nominal increases in salaries. During the convertibility, indexation in the economy was banned, including any indexation of income tax brackets or the non-taxable minimum income. At that time, inflation was virtually non-existent, so it was not necessary to

adapt the brackets to inflation; however, after the end of the convertibility, double-digit inflation returned to Argentina together with salary hikes.[64] The discretionary decision not to modify the tax brackets was taken in Argentina as a revenue-enhancing strategy.

Kirchner's administration also decided to take advantage of the commodity boom by increasing the export tax rate. In the case of soy, the tax rate was increased from 24% to 28% in January 2007 and to 35% in November 2007 (Gómez Sabaini and Rossignolo 2008).

At the end of 2007, Nestor Kirchner officially passed power to his wife Cristina Fernandez. On tax issues, Cristina Fernandez tried to replicate some of her husband's measures, but this time with less success. In 2008, she introduced a sliding agricultural export tax pegged to commodity prices, which meant an effective increase in tax rates.[65] Argentina's farmers went on strike for several weeks until the measure had to be reversed. Cristina continued with the policy of not adjusting income taxation brackets; this was in fact a profitable measure, as inflation and salaries increased during her administration. However, due to union demands, the administration had to increase the non-taxable minimum income more than once, as well as eliminating the famous "tablita Machinea" in 2008.

The Kirchnerismo policy of not adjusting the PIT to inflation and wages explains another aspect evidenced by the structural analysis: the increase in

[64] According to data from Cepalstat, during the period of recovery the average inflation rate was 11.7%.
[65] The tax rate on soybeans increased from 35% to 44% and on sunflower products from 32% to 39%.

the progressivity index during the period of decreasing inequality. The refusal to adjust the PIT was, in the end, a PIT revenue-enhancing policy, which may explain the increase in my progressivity index during this period. By contrast, the review of the policies during the period of increasing inequality evidences that, apart from a few initiatives during the first years of De la Rua administration, all attempts to increase revenues increased regressive taxes, particularly the VAT rate and base, which explains why my progressivity index only increased very slightly during this period.

Furthermore, the fact that all the reforms in times of crisis examined in this qualitative analysis were oriented towards increasing revenues, particularly from regressive taxes such as VAT and other heterodox taxes such as export taxes, explains why the structural analysis showed such clear sings of procyclicality and regressive reactions at times of crisis in Argentinian taxation in both periods.

5.3.2 CHILE

According to my structural analysis, Chilean discretionary tax policy appeared to be revenue-increasing both in the period when inequality was increasing (1990-1999) and in the period when inequality was decreasing (2000-2010). However, when inequality was decreasing, discretionary tax policy was less revenue-enhancing. In the next paragraphs I would like to explain this trend from a policy point of view.

I will start by assessing changes in the policy arena during the period of increasing inequality in Chile, which coincides with the decade of the 1990s. This is in fact a very relevant period, full of ambitious changes in Chile. It should be recalled that in 1989 a plebiscite removed dictator Pinochet from office, marking the end of almost two decades of harsh military rule and the beginning of Chile's transition to democracy, which implied a new

configuration of the institutional apparatus. Tax reforms were at the center of the transition to democracy in Chile, and, as will be shown, most tax reforms in the 1990s were related to the democratization process in one way or another.

Studies on tax reforms in Chile show that indeed most tax reforms in the 1990s were revenue-increasing. The reason for this is that, after the fall of the Pinochet dictatorship, the so-called Concertación – the triumphant political center-left coalition that won every single election in Chile from 1990 to 2010 – fearful of succumbing to the populist experiences of other new democracies, such as Brazil or Argentina, which culminated in economic crises and political unrest, opted for a prudent course (Weyland 1997). Under the motto of "growth with equity", the Concertación coalition supported the idea that neoliberalism could work for the people through the implementation of a project of "change in continuity" (Ffrench-Davis 2004) which implied, on the one hand, a continuation and even an intensification of the neoliberal agenda, retaining the market system and emphasizing openness to the world economy. At the same time, on the other hand, there were massive increases in public expenditure, in order to finance an ambitious program of welfare expansion aimed at reducing the social deficits inherited from the Pinochet era.

Even as the massive increases in social expenditure planned by the Concertación required more revenue, the opening of the economy and the reduction of import tariffs eroded the tax system. This explains the strong pressure to raise revenues via tax reforms, which began in the 1990s. It should also be noted that by constitutional mandate, the Chilean congress cannot approve any additional expenditures without clearly indicating the sources of the funds needed to meet such expenditures; this, and the fact that serious budget constraints were left by the military (Sanchez 2011), exerted further pressure to pursue revenue-increasing reforms.

The objective of increasing revenue while opening the economy to international markets was present in all reforms of the 1990s. The most successful revenue-increasing reform was Chilean reform Law 18985 of 1990, launched by the newly elected first president of the Concertación, Patricio Aylwin. This was also an emblematic reform, which has attracted much interest not only for being the first reform under democracy but also for constituting a successful strategic negotiation between the government and the reluctant Chilean elites (Gómez Sabaini 2007), as well as representing one of the most successful experiences in public policy implementation in Chile (Marcel 1997). This reform has been classified as revenue-increasing for being designed to collect an extra 3% of GDP in tax revenues by increasing the VAT tax rate from 16 to 18%, the CIT rate from 10% to 15% and by changing the brackets of the PIT, reducing the income level at which the maximum rate was applicable, a move that was meant to create more progressivity.[66]

But the big reform of 1990 was of a transitory nature[67] and had to be renegotiated in 1993; in general terms, the reform of the renegociation in 1993 kept most of the changes made in 1990, but has been considered to have a slight revenue-decreasing character (Marfan 1998; Rivera Urrutia 2012), as it returned the PIT back to its pre-1990 structure with lower maximal tax rates (45% in comparison to 50%) and created a series of tax

[66] See Annex 2 for legal tax rates in the 1990-2010 period.
[67] According to Fairfield (2014) the strategy of legislating tax increases as transitory helped the Concertación extract more revenue from economic elites, businesses and the right. But these became quite aware of this strategy over time and started resisting even the most marginal tax increases.

exemptions for corporations that donate to educational institutions. The reform also gave the president the ability to choose discretionarily a VAT rate between 16%-18% in 1997; in a small reform in 1997, he decided to leave it at 18%. The reform of 1993 also included a clause of tax stability that committed the Concertación to maintaining the main tax rates in the next government (Gómez Sabaini 2007).[68]

Two particular reforms in this period were launched to accelerate the process of trade liberalization. Firstly, in 1991, the government unilaterally reduced import tariffs from 15% to 11%, also as a means of stopping the currency devaluation that was affecting the Chilean export sector (Sanchez 2011). Secondly, in 1998, Chile, like most Latin America countries and all the countries here analyzed, faced a downturn. The Chilean domestic economy underwent a recession triggered by the negative impact of the Asian crisis on its terms of trade and export volumes. The government decided at this time to reduce the tariffs even further, from 11% to 6%. Both reforms tried to compensate for the revenue losses from trade liberalization by broadening tax bases and rates of other specific taxes such as tobacco and petrol. At the same time as its unilateral reduction in tariffs, Chile began negotiating trade agreements; in particular, Chile signed in 1996 its inclusion in Mercosur, and in 1997 a trade agreement with Canada, which represented further reductions in tariffs for imports from these countries.

[68] The second president of the Concertación, President Eduardo Frei (1994-2000), fulfilled this commitment, as can be seen in Annex 2: the statutory tax rates of the most representative taxes in Chile did not change until year 2001.

As the economy began to contract at the end of the 1990s, new voices demanded tax reform, but the authorities decided to prioritize predictability and stability by announcing a moratorium on discussions of new reforms until 2000 (Sanchez 2011). Thus the last years of the 1990s passed without any important reforms being implemented.

Now I would like to assess changes in the policy arena in the period when inequality was decreasing in Chile, which coincides with the decade of the 2000s. In economic terms, the 2000s were divided into two periods, the first years until around 2005 – years of economic recovery from the crisis of 1999 – and the years afterwards. This first period coincided politically with the presidency of the third Concertación president in power, Ricardo Lagos (2000-2006). The second period was characterized by strong economic growth interrupted only by the crisis of 2009. This latter period coincides politically with the presidency of Michelle Bachelet (2006-2010), the fourth Concertación president.

The administration of Ricardo Lagos was marked by four important reforms: the recovery reform of 2001, the reform to finance social programs and health in 2003, the progressivity reform of 2005 and the mining tax of 2005. In 2001, facing a very slow economic recovery, the authorities decided to give the recovery a push and launched an ambitious anti-evasion package called the "Plan de Lucha Contra la Evasion Tributaria" together with Law 19753, which was supposed to reduce individual tax burdens by a reduction in the PIT rate from 45% to 40% and by increasing the level of income exempted from PIT, thus reducing the tax base. The reduction in PIT rates was compensated for by a modest increase in CIT from 15% to 17% over a period of three years. The whole idea of this recovery package was to increase revenues by reducing tax evasion, through the anti-evasion package and also through Law 19753 which, by narrowing the difference between the CIT and the PIT rate, reduced loopholes and opportunities for

evasion (Sanchez 2011). Law 19753 was also meant to accelerate the recovery process by reducing the distortions created by a PIT tax rate which was perceived as too high.

After 2003 the Concertación, at the same time that it was attempting to increase revenues via tax reforms, was eroding the tax system by the implicitly revenue-decreasing tax reforms that involved signing trade agreements with the most relevant trade partners, in pursuit of a further internationalization of the economy, an objective of the Concertación since the 1990s. During the Lagos administration, trade agreements were signed with important trade partners of Chile such as the European Union (2003), the United States (2004), South Korea (2004) and China (2006).

The second reform was implemented in 2003 with the objective of making progress in two social projects of great magnitude: Chile Solidario (the Chilean conditional cash transfer program) and health reform. For this purpose the VAT rate was increased from 18% to 19% (Law 19888).

In 2005, just a few months before elections, the government, through a clever political maneuver (Fairfield 2013), managed to pass a reform focused on equity. After many previous attempts, the authorities finally managed to eliminate the tax benefit inherited from the dictatorship known as "57 bis", which had provided substantial tax cuts for savings and investment activities, greatly benefiting the high-income individuals. Removing the "57 bis" broadened the tax base of the PIT, leading to increased revenues.

Finally, in 2005, after a previous unsuccessful attempt to make the mining sector contribute more to government coffers, the Lagos administration was able to take advantage of the inherent popularity of the nationalist idea of making mining assist in the development of Chile (Napoli and Navia 2012), to create the Specific Mining Tax.

The second period, coinciding with Bachelet's government, was characterized by few reforms: one approved during the economic boom before 2008, and two approved to confront the global economic turmoil of 2008 that affected Chile more than any other country in southern cone.

The first reform of Bachelet was approved in 2007 during a year of economic bonanza. In 2007 Chile was growing above its potential and was collecting the highest amount of tax revenues in Chilean history,[69] buoyed by the extraordinarily high price of copper and the positive cyclical conditions.[70] This reform (Law 20190 of 2007 known as MK2) was intended to strengthen Chilean capital markets through a series of tax incentives for investors.

The two further reforms were approved to combat the difficult economic situation seen in Chile after 2008. Reform Law 20291 of 2008 was meant to stimulate the economy by supporting key economic sectors. This reform's objective was to strengthen the bankarization, the use of new technologies and the development of small and medium enterprises (SME), while mitigating the effects of high prices of oil for families. This was meant to be achieved by a reduction in financial transaction taxes, new benefits for SME in terms of CIT and a reduction in the oil tax. The second reform during the crisis was Law 20326 of 2009, whose main objective was to protect the people from the crisis and to reduce taxes to stimulate private investment.

[69] Figure 5.2 shows the extraordinary increases in observable tax revenues experienced by Chile after 2004 and particularly during the first years of the Bachelet government.
[70] In Annex 1and Annex 6 it is possible to see the positive cyclical conditions and the extraordinarily high prices of commodities.

The approved reform included measures such as the advanced payment of income tax refunds, the elimination of stamp duties to be paid for loans and the reduction of the provisionary payment of CIT; most of these measures were temporary, applicable only to the year 2009. Note that both revenue-decreasing policies were possible because for several years Chile had built up an Economic and Social Stabilization Fund, fed by copper revenues when prices were high and acting as a cushion during the crisis.

The analysis so far is clear in explaining that the first period can be considered revenue-increasing mainly for the extraordinary efforts of Reform Law 18985 of 1990 (1990-1999). Other efforts in terms of collection came from the initiatives taken in 1991 to increase certain special taxes in order to compensate for the revenue losses resulting from the unilateral reduction of tariffs and enactment of new trade agreements. The substantially lower amount of revenue generated from tax policy during the second period (2000-2010) is explained by the fact that although some revenue-increasing initiatives were undertaken, as for instance the anti-evasion package and the VAT increase of the Lagos administration, other important revenue-decreasing policies outweighed these initiatives, as for instance the signature of trade agreements with the most important trade partners of Chile and the tax reductions undertaken in response to the economic crisis of 2008.

The structural analysis of the previous section also evidenced that in terms of progressivity, tax policy in both periods rendered the system more progressive. I found one attempt in the first period to make the system slightly more progressive, which was the decision in 1990 to widen the PIT tax base. In the second period (2000-2010) the most notable attempt to increase the progressivity of the tax system was the elimination of “57 bis” in 2005, leading to an increase in PIT collection. At the time that this reform was enacted, a series of revenue-decreasing policies decreased revenues

from import taxes, trade agreements and tax reductions in response to the 2008 crisis, increasing the total reliance on PIT.

In terms of cyclicality, the structural analysis has demonstrated that Chile pursued a countercyclical tax policy overall, which became more countercyclical in the later business cycle. It also shows that Chile's reaction to crises has been progressive and countercyclical, and a comparison between the crisis of the 1990s and the most recent crisis of 2008 shows an improvement both in terms of progressivity and cyclicality.

It is easy to explain these results in light of the tax reforms implemented in Chile. For instance, the most revenue-increasing tax policy of the 1990s, the reform of 1990, was approved during the years of a strong boom; this explains much of the countercyclicality found in the 1990s. But countercyclicality in the 1990s is also explained by the reaction to the crisis of 1999, which, by lowering tariffs for new free trade partners, acted as a revenue-decreasing and progressive policy (since it increased the reliance on PIT taxes). While the countercyclicality of the 1990s in Chile is explained by the policies approved during both the boom and the bust, the countercyclicality in the 2000s is explained mainly by the reaction to the 2008 crisis, which was deliberately countercyclical, and was presented by the government as such. The reform was also meant to be progressive because although PIT taxes were kept constant, other more regressive taxes were decreased.

5.3.3 COLOMBIA

According to the structural analysis, Colombia comes second only to Argentina in its revenue-increasing tax policies in the 1990-2010 period. The structural analysis shows as well that most of the efforts were made before 2002; after 2002 fewer efforts to increase revenues were seen in the country. How did Colombia implement a revenue-increasing discretionary

policy in these years? Which tax reforms passed during this period? And what were the main drivers of the reform?

With regard to the first period (1992-2002), qualitative studies on Colombian tax policy[71] agree that the time was in fact a period of revenue-increasing discretionary tax policy manifested in a series of revenue-increasing tax reforms, motivated mainly by three contextual factors. Firstly, just as in most of my case studies, the 1990s were years of trade liberalization in Colombia. In the early 1990s, under the administration of the liberal president Cesar Gaviria (1990-1994), Colombia began its trade liberalization process, colloquially called the "apertura", which involved decreasing trade revenues and required new fiscal resources.

Secondly, in 1991 a new constitution was launched in Colombia. The new constitution was a reaction against the difficult years at the end of the 1980s, when war among drug cartels, internal conflict between paramilitaries, guerrillas and the state, and the war waged by Pablo Escobar against the Colombian state had already claimed too many victims. The situation was so difficult that during the traumatic presidential elections of 1989, four candidates were brutally assassinated, including the charismatic candidate who was leading the polls, Luis Carlos Galán.

Against such a violent background, the constitution of 1991 had no hesitation in imposing on the government substantially higher social expenditures, since what was at stake was the possibility of a lasting peace

[71] See for instance the work of Sánchez and Espinoza (2005) or Olivera et al. (2010).

in Colombia. The constitution also modernized the institutional apparatus, increased fiscal transfers to decentralized entities and created new institutions, such as the constitutional court and the public prosecutor's office, among others. The constitutional assembly members believed that Colombia's public sector was too weak to deal effectively with the big challenges of the times; thus, as Olivera et al. (2010) describe: "Colombia was the only Latin American country in which the pro-market economic policies of the early 1990s were not accompanied by the objective of reducing the role of the State; on the contrary, the aim was to strengthen it" – and strengthening the state meant providing more ample and stable tax revenues.

The third factor is related to the crisis of 1999. In Colombia, the contagious effect of the Asian Crisis in mid-1997 and the subsequent Russian crisis made international investors reluctant to lend to the country and spurred them to flee, creating a deceleration of economic growth that ended in the worst economic depression of recent Colombian history. During this crisis, several factors made the pursuit of new revenues essential. On the one hand, lower economic growth had reduced tax revenues to such an extent that in 1997, for the first time since the 1980s, tax revenues declined both in absolute terms and as a share of GDP. While tax revenues decreased, expenditures continued growing, particularly due to the new demands of

the 1991 constitution and the need for strong government intervention that the effects of the El Niño climate phenomenon had created. [72]

On the other hand, lower capital inflows after 1998 created strong pressures on the exchange rate, and widespread expectations of devaluation led to speculative attacks against the peso. In the end, in 1999 the situation was so unsustainable that the president at the time, Andres Pastrana, moved to a free-floating exchange rate in 1999. The new exchange rate regime implied a fast depreciation of the currency, leading to an increase in the debt to be paid. New revenues were needed to pay the higher debt.

These three factors led to four tax reforms, all of them revenue-increasing. The first reform passed in 1995 (Law 223 of 1995) and the explicit objective of the legislators was to increase revenue to face the new demands of the constitution and the "apertura" (Acosta Herrera et al. 2012). Among the most relevant changes that these reforms brought were the expansion of the VAT base to include most services, exempting only basic necessities such as food, education and medicine, and the increase of the VAT from 14% to 16%. Other relevant changes were the increase in the income tax from 30% to 35% and the dismantling of the surcharge (sobretasa) of 25% on the income tax, which had been in place since 1993. Both the elimination of the sobretasa and the increase in the tax rate meant that the maximum PIT rate and the single CIT rate decreased from 37.5% to 35% (see Annex 2 for principal legal tax rates since the 1990s).

[72] In 1997-1998 the El Niño climate phenomenon caused extreme weather, floods and droughts, destroying a good part of the infrastructure and annual agricultural production in Colombia and also in Peru, as we shall see in the next section.

The remaining three reforms of this period were a consequence of the international shock of 1998 and the crisis of 1999. Again, all these reforms had as their objective to increase revenues to ensure macroeconomic sustainability. The first reform was created under a state of economic emergency, in 1998, when President Pastrana, through Emergency Decree 2331, created the financial transaction tax, with the initial objective of obtaining revenues to assist the financial sector, which was on the verge of collapse.[73] The second reform of 1998, Law 488, reduced from 407 to 135 the number of goods and services excluded from VAT, while at the same time authorizing a reduction in the VAT tax rate in 1999 from 16% to 15%. The third reform (Law 633 of 2000) increased the financial transaction tax rate from 0.2% to 0.3%, and returned the VAT rate from 15% to 16%.

The period 2002-2010 was again a period of revenue-increasing tax policies but much less intensely than the previous period. In general terms, this was because revenue-enhancing reforms continued only during the first two years (2002-2003) of the period; all subsequent reforms were either revenue-neutral or revenue-decreasing.

In these first two years strong pressures to reform came from two sources. Firstly, in 2002, the Caguán peace talks with the FARC broke down, leading to a flare-up of the internal conflict and an increased demand for revenues, especially for security and for the armed forces. Secondly, in 2002, the recently elected president Alvaro Uribe entered office with a packet of

[73] Later, in 1999, after an earthquake heavily hit and destroyed part of Colombia's coffee-growing region, the resources coming from this tax were channeled to the reconstruction of this region.

orthodox and neoliberal economic policies aimed at reducing public deficit through the construction of an austere state. The original idea was to reduce public expenditure through a series of measures included in a constitutional reform which had to be approved by Colombian citizens in a referendum.[74] Uribe's planned austerity measures were rejected by voters, and the Plan B that was launched included a considerably smaller freeze of government spending and a need for new revenues from taxation.

These pressures for revenues materialized in two packets of reforms: the reforms of 2002 (Law 788 and Decree 1838) and the tax reform of 2003 (Law 863). The packet of reforms of 2002, in an unprecedented successful policy operation, compelled the wealthiest sectors of society to pay taxes.[75] The first initiative consisted in reestablishing the wealth tax under the name "democratic security tax", which was earmarked for modernizing the Colombian army and other defense expenditures. The second initiative reestablished the surcharge on income tax (sobretasa) at a 10% rate, which raised the maximum tax rate of the PIT and the single rate of the CIT from 35% to its historically highest value of 38.5%.

The reform of 2003 increased the financial transaction tax rate from 0.3% to 0.4%, as well as increasing the tax base of the PIT by reducing the minimum exempted income. It also increased the VAT base by increasing the number

[74] The approval of the referendum was supposed to save around 1.3% of Colombian GDP.
[75] The work of Flores-Macías (2013) attempts to determine the key factors that explain why, while other governments in developing countries often fail to tax elites, the Colombian government was able to levy a tax borne by the wealthiest Colombians .

of products and services subject to the general tax rate (16%) and created a system of deductions for investment in capital stock.

After 2003 Colombia experienced a period of robust economic growth and an improving fiscal situation. From 2003 to 2006, tax revenues as a share of GDP increased two percentage points: in 2003, Colombia was collecting 14.10% and in 2006 this value had reached 16.20%, the highest revenue collection in Colombian history. The good economic situation, together with the fact that a tax reform proposal[76] failed to pass in the congress, explains why Colombia did not have another important tax reform for almost three years, something unusual in the country.

After 2006 only two tax measures were undertaken. Firstly, in 2006 a revenue-reducing reform was approved (Law 1111). This reform implemented, on the one hand, an important reduction in income taxes from 38.5% to 33%[77] and, on the other hand, an increase in the wealth tax rate.

The second tax measure is related to the increase in preferential tax treatments during the last years of the Uribe administration, of which the most representative is the propagation of free trade zones. Colombia implemented a system of free trade zones in 2005[78] as a strategy to attract invest and generate jobs. These zones gave preferential tax treatment to the companies operating inside the zones; specifically, these companies were

[76] This tax proposal tried to increase the VAT rate from 16% to 17%.
[77] The reduction was gradual: it started by eliminating the surcharge of 10%, which reduced the effective rate from 38.5% to 35%, then it decreased the rate from 35% to 34% in 2007 and then to 33% in 2008.
[78] Free trade zones existed before 2005, but it was in 2005 that they were regulated as investment and job generation strategies; before they were used only by exporting sectors.

beneficiaries of a preferential 15% tax rate for CIT and special VAT treatment. The number of legalized zones and the number of companies operating in these zones increased markedly after 2008, around the time of the crisis; this is because there was a time gap between the moment of the legal creation of the free trade zones and the actual establishment of new zones and businesses in these zones. The proliferation of free trade zones meant a loss of revenue for the state. In fact, according to a study by the World Bank (2012), 2010 was the year of the greatest revenue loss for the Colombian government, when it failed to receive the non-negligible sum of 0.09% of GDP in tax resources from the companies established in the free trade zones.

Now that all the reforms have been examined, what can be said about progressivity and cyclicality? How do the reforms explain the trends in progressivity and cyclicality seen in the structural analysis? In terms of progressivity, the structural analysis showed that in both periods progressivity in Colombia decreased, but much more during the first. It is easy to see that progressivity in Colombia decreased over the period as a whole because there was a marked interest in increasing tax revenues from regressive taxes, mainly through increasing reliance on the VAT (increasing its tax rate and tax base several times) and through the creation of the wealth tax[79] and the financial transaction tax and the regular increases in their rates. Less interest was shown in progressive taxes such as the PIT. In

[79] The wealth tax can be considered a progressive tax because it is paid by the richest; however, the wealth tax in Colombia is not structured with different tax brackets, which raises the question as to whether it really follows the principles of *de jure* progressivity. In this work, it is not considered a progressive tax.

fact, during the entire period the maximum rate for the PIT was reduced from 37.5% in 1993 to 33% in 2010. There was only one short period during the Uribe administration when PIT tax rates were increased from 35% in 2003 to their historically highest level of 38.5%. But after this, the same administration reduced them to 33% in 2006.

In terms of cyclicality, the structural analysis showed that discretionary tax policy was countercyclical in both periods but more so in the second, thus indicating an improvement in terms of cyclicality. The same improvement is seen regarding tax policy reaction to economic crisis: the structural analysis reveals that while the Colombian reaction to the crisis of 1999 was procyclical and made the system more regressive, the policy reaction to the crisis of 2008 became countercyclical, and made the system more progressive. The improvements in both cyclicality and policy reaction to crisis are easy to see in light of the tax reforms described earlier. The policy in the first period appeared countercyclical because, although the reaction to the crisis of 1999 was very procyclical – the reforms linked to the crisis (the two reforms of 1998 and the reform of 2000) were revenue-increasing – during the preceding economic boom (1993-1998), taxation was very revenue-increasing and thus countercyclical. The countercyclicality of the second business cycle (2000-2010) is explained by the countercyclical reaction to the 2008 economic crisis. As I explained before, this reaction was not linked to any tax reform in particular but to a series of tax expenditures that started to spread in Colombia around 2008. Comparing the reactions to the 1999 crisis and 2008 crisis one can see that there was an improvement in terms of progressivity. While the reforms linked to the 1999 crisis increased the VAT tax rate and tax base and created new regressive taxes such as the financial transaction tax, the beneficial tax treatments for certain businesses in place during the 2008 crisis, decreased the reliance of the system on regressive taxation.

5.3.4 MEXICO

According to the structural analysis presented above, discretionary tax policy in Mexico during the years when inequality was increasing (1990s) was only slightly revenue-increasing. A quick look at the main tax measures during the 1990s shows indeed a lack of effort to increase revenues using the tax instrument. I attribute this weak result in terms of revenue efforts to three main contextual factors that affected the Mexican economy in the 1990s. First of all, tax reforms in the 1990s cannot be understood without looking at the big challenges entailed by the adoption of the North American Free Trade Agreement (NAFTA) with the US and Canada, and the entrance of Mexico into the OECD. This implied a "Herculean effort" (Stewart 2002) to reform the economy in order to face the new challenges of being integrated into the world economy and of joining the "developed world". In terms of tax legislation this meant adapting the tax system to the needs of an open and modern economy. Accordingly, tax initiatives were pursued to make the Mexican economy competitive and attractive to international investors, particularly from the new free trade partners of the north. For instance, at the end of the 1980s, the administration of President Salinas, reduced the CIT rate from 42% to 35%, and then again in 1993 to 34%, to make it comparable to the US tax rate.[80] In 1991, the VAT was also reduced from 15% and unified into a single rate of 10% with a 0% rate for necessities such as food and medicine. The revenue losses expected from tax rate reductions were meant to be compensated for by widening the tax base

[80] See Annex 2 for legal tax rates in the 1990-2010 period.

though the elimination of certain unjustified preferential regimes, the recognition of inflation effects on tax bases, and stronger tax enforcement, which meant that for the first time in Mexico, tax authorities were firmly prosecuting tax evaders (Urzúa 1993). These measures coincided with the objective of making the system more modern, efficient and simple, without necessarily increasing its collection capacity.

The second factor is related to the challenges imposed by the economic crisis of 1995, also known as the Tequila Crisis. In December of 1994, the administration of the recently elected president Zedillo announced the free floating of the US dollar, after a speculative attack on the peso had made inoperable the currency band that had been used in Mexico since 1991. The announcement trigged a rapid depreciation of the Mexican peso, and investors, fearing further currency depreciation, began fleeing the country in a historical capital stampede. The instability of the financial sector soon spread across the real sector in the form of a severe economic recession, hyperinflation and unemployment.

The government undertook several measures to restructure the economy. In terms of taxation, the Zedillo administration was able to introduce tax relief to mitigate the effects of the economic crisis. For instance, tax deductions for corporate investments were introduced, and the asset tax IMPAC (the minimum tax system of Mexico[81]) tax rate was reduced from 2%

[81] Mexico's minimum tax system is characterized by its high level of collection compared to other Latin American countries. In the comparison made by Corbacho et al. (2013), while in 2003 Mexico was collecting through IMPAC almost 0.20% of GDP, Peru was collecting 0.05% and Argentina not even 0.01%.

to 1.8% and one year later totally eliminated for small enterprises. Tax reductions were also granted to those companies hiring new personnel, and new and more beneficial amortization periods were allowed (CEFP 2007). The other response of the Zedillo administration was to reverse Salina's reforms of 1991 and again increase the VAT rate from 10% to the pre-Salinas level of 15%. The point of this measure, more than increasing revenues, was to counterbalance the reduction in tariff rates brought about by NAFTA, and also to demonstrate to creditors the commitment of the authorities to fulfilling all of their financial obligations (Villareal 2011).

Mexico was able to allow tax relief due to the strong support it received from the US and the IMF, which created an emergency financial support package consisting of loans of up to 50 billion dollars (Villareal 2011). Furthermore, in contrast to the classic Latin American economic crisis, commodity prices did not fall during the Tequila Crisis; on the contrary, oil prices rose slightly in 1995. This meant that although tax revenues were low and decreased from 1994 to 1996 by around 22% in real terms due to the deceleration of the economy, fiscal revenues actually increased an impressive 146% in the same period.[82] Thus, the positive terms of trade and the financial assistance from the IMF and Washington gave Mexico maneuvering space to implement a growth-oriented tax policy.

It is interesting to note that this discrepancy between changes in fiscal revenues and changes in tax revenues is a consequence of perhaps the most salient features of the Mexican fiscal system: its high dependence on oil

[82] This information is based on data from the Mexican Ministry of Economics.

revenues (specifically non-tax oil revenues) and the design of the IEPS on oil. Oil-related fiscal revenues accounted for 29% of total fiscal revenues in 1990-2010, while oil-tax revenues represented only 3% of total fiscal revenues. The Mexican dependency on oil fiscal revenues is among the highest in the region (Acquatella et al. 2013) and the highest of all the countries analyzed in this work. Another feature of the Mexican fiscal system has to do with the design of the IEPS on oil, which becomes a subsidy to Pemex whenever international oil prices are very high. These two features mean that in Mexico high commodity prices, high fiscal revenues and low tax revenues can comfortably coexist, contrary to the other commodity-dependent countries where such a scenario would be difficult to find. The features also mean that low tax revenues do not necessarily imply fiscal difficulties, nor do they impose pressure on authorities to approve revenue-increasing tax policies, as was the case during the Tequila Crisis just described; in the same vein, high levels of tax revenues in the Mexican case do not indicate an easy fiscal situation, as revealed by the circumstances during the Asian crisis, which I will shortly describe.

The final contextual factor is actually related to the effects of the Asian crisis of 1997; this international crisis affected international prices of oil, which dropped to its lowest price since the 1980s (See Annex 6). The drop in oil prices did not affect tax revenues, due to the rapid recovery from the Tequila Crisis; however, total fiscal revenues dropped 18% from 1997 to 1998. Facing reduced fiscal revenues, the president at the time, Zedillo, pursued two revenue-increasing tax reforms. The first consisted in increases of income tax rates: the PIT was increased from 35% to 40% and the CIT from 34% to 35%, plus an extra 5% on distributed profits. The second consisted in the creation of the Repecos, a new regime for small taxpayers.

In the 2000s, my structural analysis reveals that on average, discretionary tax policy was slightly revenue-decreasing. Again, after looking at the tax reforms of the 2000s a qualitative analysis coincides with the finding at the structural level: a series of very revenue-decreasing policy measures were found in this period, particularly in first years of the decade. At the end of the decade we find as well some interest in pursuing more revenue-enhancing policies.

In 2000 Vicente Fox was elected president of Mexico. His victory represented a major shift in Mexican politics, because for the first time since the Mexican revolution, a candidate from the opposition won an election. Thus, the presidency of Vicente Fox ended the hegemonic rule of the PRI (Institutional Revolutionary Party), which had governed for 70 years, and gave rise to the era of the PAN (National Action Party), which was to govern during the entire coming decade.

The Fox administration was characterized by a difficult relationship with the congress, which was chiefly controlled by the opposition. The strained relationship between the legislative and the executive was very apparent in the tax arena. In 2001 Fox, in accordance with his presidential promises of structural changes in the economic field, presented to the congress a comprehensive tax reform proposal which attempted to increase revenues by replacing the complex system of exemptions in the VAT with a single 15% rate on most products, including necessities such as food and medicine.

At the same time, the proposal implied reductions to the PIT and the CIT rates and the flattening of the PIT structure.

The project faced stiff opposition in the congress. The main criticism came from those parliamentarians who considered it too regressive, particularly with regard to the proposed elimination of VAT exemptions.[83] Although the government sold it as a progressive tax reform and even called the fiscal reform package the "*New Distributive Public Finance"* appealing to its distributive character, the reform was mostly rejected. After the plenaries, the elimination of VAT exemptions was completely withdrawn from the project. However, the reduction of the PIT and the CIT were accepted and during the Fox administration the rate of the CIT dropped gradually from 35% to 28% and the 5% rate on distributed profits was eliminated. The PIT rate was also steadily reduced from 40% to 28%. Accordingly, during the Fox administration income taxes reached the lowest rate levels in Mexican fiscal history, and paradoxically enough a tax proposal that was meant to be revenue-increasing, at least in plans, ended up being probably the most revenue-decreasing policy in the period of analysis.

Another relevant aspect of the Fox administration was the high number of tax privileges granted. Probably the most relevant of these tax reliefs was given to the maquiladora sector, which was granted a partial exemption, equivalent to 50% of the CIT (Bernardi et al. 2013), but other sectors also enjoyed tax benefits: according to the study of Schatan quoted by Tello and

[83] The plenary discussions can be found at Cámara de Diputados (2006).

Hermandez (2010), during the Fox administration, some 79 measures granting tax privileges were approved.

After the reforms of Fox, some steps were made in attempt to increase the revenue collection capacity of the debilitated Mexican tax system. In 2006, the newly elected President Felipe Calderon received a country with a prosperous economy, driven largely by the commodity boom and the windfall of oil revenues. During the first years of his administration, the diagnosis was that rampant tax evasion and elusion exacerbated the most problematic aspect of the Mexican tax system: its low collecting capacity. Thus the Calderon administration managed to pass a fiscal reform proposal which targeted the biggest tax evaders and avoiders in Mexico: the business sector. The reform consisted in the creation of two new taxes: the Single Rate Business Tax (IETU) and the tax on cash bank deposits (IDE).

The IDE levies cash bank deposits at a rate of 2%. The idea of implementing this tax was to catch the informal sector (composed mainly of cash-based businesses). The IETU replaced the Impuesto al Activo (IMPAC) and consisted of a flat tax on all companies, as an alternative to the CIT.[84] By taxing all companies, the IETU is meant to eliminate many tax exemptions and loopholes, thus reducing opportunities for elusion and evasion. The revenue-enhancing capacity of the IETU has been questioned because, at the end, the IETU did not collect substantially more than the IMPAC (Corbacho, Fretes Cibils, and Lora 2013). Furthermore, for some observers, since the IETU was set lower than the CIT, it did not fully make up for the difference

[84] Taxpayers pay the higher of these two taxes.

in revenues and many tax avoidance opportunities remained in place (OECD 2012).

In 2009 Mexico suffered the most significant economic crisis since 1930.[85] The worldwide crisis of 2008 was rapidly transmitted to the domestic economy through an immediate reduction of exports, foreign investment and remittances. Total fiscal revenues decreased in 2009 by 6.5%, particularly due to the revenue decline of non-tax oil fiscal revenues. During this crisis, contrary to the previous Tequila Crisis, commodity prices fell, reducing oil revenues and any room for the Mexican government to maneuver.

In response to the revenue shortfall, the authorities reacted by creating new taxes and increasing others. The VAT was increased from 15% to 16%, reaching the highest tax rate since its establishment in 1980. The maximal PIT rate and the single CIT rate were also increased from 28% to 30%. Other minor taxes, such as the tax on gaming and levies on tobacco, beer and other alcoholic beverages also rose. A new 3% tax was imposed on telecommunications.

Now I would like to analyze issues of progressivity. According to my structural analysis, in both periods, tax reforms made the system slightly more progressive, but slightly more so in the first. With regards to the first period, this result is explained largely by the increase of the PIT rate to historically high levels undertaken during president Zedillo's

[85] If one measures a crisis by its social effects, the crisis of 1995 was more severe (Loría 2013).

administration. As to the period when inequality was decreasing, we do not find in this period any intent to rely more heavily on personal income taxation; in fact, PIT tax rates were reduced to historically low levels. One possible explanation was that as PIT decreased, particularly during the Fox administration, there was interest in lowering the burden of other regressive taxes such as the VAT and the CIT, both through tax rate reductions and by granting important tax benefits to special sectors. Thus the increase observed in my progressivity proxy was due to a revenue-decreasing policy where regressive taxes were reduced to a slightly greater extent than PIT taxes.

The structural analysis found a worsening in cyclicality over time, with Mexico the only one of the case studies that turned from pursuing a countercyclical tax policy in the 1990s to a procyclical one in the 2000s. Both the structural analysis and the review of the tax policies reveal that this trend was explained largely by the differentiated reaction to the two crises that afflicted the Mexican economy. While during the Tequila Crisis the stable price of oil allowed the government to approve tax relief, during the crisis of 2009, the difficult financial situation forced authorities to increase taxes in a very procyclical way. The structural analysis also indicates that these reactions were regressive; I found a regressive policy response to the 2009 crisis in my qualitative analysis, in the form of an effort to increase regressive taxes such as the VAT. There was no such regressive response to the Tequila crisis, however.

5.3.5 PERU

According to the structural analysis above, Peru pursued a revenue-decreasing discretionary tax policy during the years when inequality was increasing (1998-2002). In fact, Peru was the only country of the case studies that pursued a substantial revenue-decreasing tax policy in any of

the periods analyzed. As will be shown, the unusual political and economic situation of Peru in the last years of the 1990s and the first of the 2000s explains the revenue-reduction trend in discretionary policy. In fact, during this period there were three important tax policy measures: those implemented in the last years of the Fujimori administration; those implemented under the interim president Paniagua; and those implemented during the Alejandro Toledo administration. With the exception of Toledo's reform, all measures were revenue-reducing.

The last years of the Fujimori administration were characterized by a complicated political and economic situation. In the economic sphere, in 1998 a series of external shocks disturbed the Peruvian economy. On the one hand, the Russian and Asian crises negatively affected the economic development of Peru with their effects on the financial sector and by depressing metal prices. Secondly, the El Niño climate phenomenon of 1997-1998 devastated Peru's agricultural and fishing sectors. These two economic shocks conspired to create a challenging economic crisis similar to the one faced by Colombia in the same years.

In the political sphere, the difficult economic situation that began in 1998 coincided with the electoral campaign. In 1999, Fujimori announced that he would run for elections in 2000. In principle, running for a third period was not allowed under the Peruvian constitution, but Peruvian electoral bodies accepted the legal arguments of "authentic interpretation",[86] which the

[86] This law declared that, since Fujimori's government started in 1990 under a different constitution, that term did not count against the two-term limit of the present constitution.

congress had passed years before, allowing Fujimori to run for another term. The campaign period advanced amidst strong disagreement and uneasiness on the part of those who did not consider a third term legitimate for Fujimori.

Fujimori won the election of 2000 under confusing circumstances and allegations of electoral fraud. A few months afterwards, Fujimori's administration abruptly collapsed. The bribing scandal of the so-called "Vladi-videos"[87] and charges of human rights abuses forced Fujimori to flee to Japan and fax his resignation, leaving Peru in complete political chaos.

In the last years of the Fujimori era, two series of reforms passed, the first related to the immediate and modest policy response to the crisis in 1998. On this occasion, the Fujimori administration decided to replace a temporary and unpopular tax on payroll, the National Housing fund (FONAVI)[88] with an identical tax under a different name: the special solidarity tax (IES). The displeasure of Peruvian business elites with this merely cosmetic change resulted in the government agreeing to please them by eliminating in 2000 the tax on net assets (IEAN) (Arce 2010) – another tax unpopular among the elite.

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[87] A series of video recordings of meetings implicating key Peruvian political figures in money laundering and government corruption. The name comes from the video of the Peruvian intelligence chief, Vladimiro Montesinos, where he is seen apparently bribing a congressman.

[88] Whether the FONAVI was a payroll tax or a contribution has been at the center of the dispute in Peru. The former contributors to FONAVI have argued that the FONAVI was a contribution and that as such the money should be refunded. Through a referendum in 2010 Peruvian citizens decided that the money should be refunded to all the workers who contributed to the FONAVI.

The second reform consisted of a series of exemptions and preferential tax treatments for key sectors (World Bank 2003; Arce 2010) that Fujimori's administration granted during his last years in office, particularly during the campaign period. The size of these special treatments was considered scandalous and unjustifiable (Adrianzén et al. 2010), and definitively eroded the revenue capacity of the already weak Peruvian tax system.

After Fujimori's faxed resignation, the newly elected congressmen appointed Valentín Paniagua as interim president and gave him the responsibility of leading Peru's transition to democracy – the fourth transition to democracy in 50 years. Paniagua's administration lasted a mere seven months, but in that period his administration managed to obtain approval for a revenue-reducing policy that in 2001 reduced the maximum PIT rate from 30% to 20% (Arias Minaya 2009). The CIT rate was also reduced from 30% to 20% (Law 27394 of 2000).[89] Through this tax reduction, income taxation in Peru fell to its lowest historical rate.

In 2001, Paniagua transferred the government to Alejandro Toledo, the first elected president after the "Fujimorato". Toledo found a country in a difficult situation, with a still contracting economy and falling tax revenues. This situation pushed Toledo's administration to pursue a revenue-increasing tax policy for the first time since Fujimori was in office. This reform (Law 27513) consisted mainly in partially reversing the tax reductions of the Paniagua administration by increasing the CIT from 20% to 27%, and the PIT from 20% to 27% while the number of brackets was

[89] See Annex 2 for legal tax rates in the 1990-2010 period.

increased from 2 to 3. Another marginal reform of this administration was the reduction of the IES tax rate from 5% to 2%, in light of the constant lobbying for its elimination, which businesses had not ceased since its creation during the Fujimori administration (Arce 2010).

The structural analysis from the former section evidenced that during the period when inequality was decreasing in Peru (2003-2010), discretionary tax policy turned slightly revenue-increasing. In the policy arena, we find as well an interest in increasing revenue. In fact, in this period four tax measures were approved and three of them were unambiguously revenue-increasing policies.

The first revenue-increasing discretionary tax policy came in 2003. In this year the need for new revenues became apparent to the authorities; the continuous tax reduction policies had eroded the tax system to such an extent that in 2002 tax collection had reached a mere 12% of GDP, the lowest collection level in the entire time span of my analysis (see Figure 5.2 on page 126). The measures in 2003 involved three important revenue-increasing changes. Firstly, in 2003 the costs of existing preferential tax treatments for income and sales taxes were considered too high, at approximately 1.91% of GDP (Arce 2010). Thus, the first change consisted of letting certain tax exemptions expire, for instance, capital rents from dividends were now no longer exempt from taxation (Law 27804). Secondly, income tax rates were increased to the pre-Paniagua levels effective as of 2003: both the PIT maximal rate and the CIT single rate were increased from 27% to 30% (Laws 27895 and 27804) and the VAT was increased from 18% to 19% (Law 28033). Finally, a new tax was created. In 2003 Law 28194 created the financial transaction tax at a 0.15% rate, with the objective of reducing tax evasion and increasing tax revenues.

After 2003, the Toledo administration reformed the tax system only marginally. This inactivity was due to the fact that the economic situation

had significantly improved: after the political instability of the election period and the years of recession, a process of recovery was underway, with an average GDP growth of 4.8%. This economic recovery, together with favorable prices for metals, led to a dramatic increase in tax revenues. In the years from 2003 until the end of Toledo's administration (2006) tax revenues increased from 12.9% of GDP to 15.6%, constituting the fastest increase in tax revenues experienced since 1990 (see Figure 5.1 on page 124). Extraordinary tax revenues gave authorities room to maneuver without the need for reform. Probably the only two salient changes during these last years were the non-renewal of the IES in 2004, which implied a loss of revenue that was compensated for by the creation of the temporary tax on net assets (ITAN), and improvements in the tax administration (Pecho and Barreix 2009).

The second revenue-increasing discretionary tax policy came in 2006. This year Alan García was sworn in as the new president of Peru and started his presidential period with a reform of the PIT. The reason for reforming the PIT was that at that time the feeling was that while tax revenues were at a peak high, the structure of the tax system, particularly the exemption of most capital income, was creating financial speculation (León Pinedo 2010). Congress tasked the executive branch with the responsibility of modifying the PIT with the objective of eliminating tax exemptions on capital rents, with special care to prevent possible capital flight. García established the famous "dual income tax" effective as of 2009, which systematically separates the taxation of labor income from the taxation of capital income, levying a single and modest tax rate on capital income and a progressive tax schedule on labor income. However, the complete functioning of the scheme was delayed to begin in 2010 (Law 29308) instead of 2009, in order to protect the stock exchange of Peru (Bolsa de Valores de Lima) from the continuing turbulence in the global financial markets since 2008. Thus, the total effects of the reform were not seen before 2010.

The third revenue-increasing tax measure was also implemented by the García administration and consisted of an attempt to begin taxing the mining sector more heavily. During the 1990s, the Fujimori regime granted this sector a series of special treatments, such as tax exemptions pegged by tax stability contracts – contracts that allowed investors to benefit from tax stability, including exemptions on income, export, labor and certain other taxes for up to 10 years – with the purpose of attracting foreign investment in years when terrorism kept investment away. However, after the commodity prices boom that started in 2003, the sector attracted substantial investment and benefited enormously from the extraordinary prices of metals. Under this new scenario, special favorable tax concessions were seen as a completely unjustified privilege and, ever since his election, García had been under strong pressure to begin taxing this sector more heavily. Thus, in 2006, through Decree 071-2006-EM a solidarity and voluntary tax was created through the program "Programa Minero de Solidaridad con el Pueblo". Under this program, several major mining companies operating under tax stability contracts in Peru agreed to create a fund with a percentage of their profits derived from high metal prices.

The fourth discretionary tax policy came in 2008. After the first years of the García administration, the tax instrument was used again in 2008 in order to alleviate the effects of the economic deceleration resulting from the negative international circumstances. The response to this crisis consisted in three mainly revenue-decreasing measures oriented towards stimulating the economy. Firstly, as part of the anti-crisis program, the "obras por

impuestos" program was created, which allowed companies to pay their CIT partially through the construction of public infrastructure. Secondly, a new income regime for small enterprises was created with the objective of promoting competitiveness and the development of small enterprises (Decree 1086). Thirdly, in 2009 the "gratificaciones"[90] tax exemption was created to protect workers from the economic downturn.

To sum up, the period of increasing inequality was a period of revenue-decreasing discretionary tax policy because, during the last years of the Fujimori presidential era and the first years of democracy, a series of tax exemptions, tax rate reductions and a shrinking tax base substantially eroded the tax system. At the same time, during the period when inequality was decreasing, a revenue-increasing discretionary tax policy was implemented through a series of initiatives by president Toledo and the first years of the García administration, aimed at reversing some of the revenue-reducing policies implemented in the previous period. This period also saw some intervals of policy inactivity made possible by the extraordinary increases in tax collection during the times of high commodity prices, which made it unnecessary to initiate any further reforms. There was as well some discretionary tax reduction in order to overcome the effects of the economic shock of 2008.

The structural analysis had shown that the reforms of the first period made the system much more progressive than the reforms of the second period.

[90] Gratificaciones are the two legal extra salaries that Peruvian employees receive every year.

The already described changes in taxation during the period of increasing inequality show that although the tax rate of the PIT was reduced during this period, most of the revenue-decreasing tax policies in this period affected other taxes, as in the case of the reduction in the CIT rate, the reduction of the IES tax rates, the elimination of the IEAN and the tax exemptions of the Fujimori administration, which eroded the CIT base; as a result, the reliance of the tax system on progressive taxes, such as the PIT, increased. During the period of decreasing inequality, there were initiatives to increase PIT revenues as well as to increase taxation from other sources, but the efforts to increase PIT revenues, such as letting some tax exemptions expire or the creation of the dual PIT, were probably more significant.

In terms of cyclicality, the structural analysis showed that tax policy was countercyclical during the entire period, especially during crisis. After examining all reforms one can easily see that during the difficult years of the first period (1998-2002), discretionary tax policy was revenue-reducing and accordingly, very countercyclical. The same is true for the years of the economic crisis of 1999. We know from the above analysis that in the face of the economic crisis of 1999, which coincided with the electoral cycle, Fujimori's reaction was to grant preferential tax treatments and remove some temporary taxes, which rendered his response to the crisis very countercyclical. The cyclical position of the second period was also countercyclical, mostly due to the administration of Alan García, which implemented a revenue-increasing policy during the years of economic recovery (2006-2008), and a revenue-decreasing policy during the difficult times of 2009.

5.4 Conclusion

In this chapter I applied the structural methodology to compare how each of the three factors that comprise a pro-equity tax policy (revenue collection,

progressivity and cyclicality) performed during the years when inequality was increasing and the years when inequality was decreasing in five Latin American countries (Argentina, Chile, Colombia, Mexico and Peru). I complemented and contrasted this empirical study with other narrative data to gain a complete picture of how discretionary tax policy has been pursued in these countries.

The results from the empirical analysis are summarized in Table 5.1. We can determine from this table that country experiences in relation to taxation are very heterogeneous. In general terms we have four different results. The first is that of Mexico that did not improve in any of the factors. In terms of collection, this country pursued a revenue-increasing discretionary tax policy in the period of increasing inequality and a revenue-decreasing discretionary tax policy in the period of inequality decline. In terms of progressivity, discretionary tax policy in Mexico tended to make the system more progressive in both periods, but less so in the period of decreasing inequality, and in terms of cyclicality Mexico was the only case where tax policy was countercyclical in the 1990s and became procyclical during the period of decreasing inequality.

Table 5.1 Selected countries, summary of empirical results

	Was tax policy more revenue-increasing in the years of declining inequality than before?	Was tax policy more progressive in the years of declining inequality than before?	Did tax policy become more counter-cyclical?
Argentina	no	yes	yes
Chile	no	no	yes
Colombia	no	yes	yes
Mexico	no	no	no
Peru	yes	no	no

Source: Author´s elaboration

The second is the case of Chile, which improved only in terms of cyclicality: in both periods tax policy was countercyclical, but in the period of

decreasing inequality it was even more countercyclical. In terms of collection and progressivity, discretionary tax policy was more revenue-increasing and progressive in the 1990s than in the 2000s.

The third experience is that of Peru. Peru only improved in terms of collection. Tax policy was revenue-decreasing until 1998 and became revenue increasing afterwards. Tax policies after 2002 became less progressive and less countercyclical than before.

The last experience is that of Argentina and Colombia. Both countries improved in progressivity and cyclicality but did not improve in tax collection. In terms of collection, both countries had revenue-increasing tax policies in both periods, but Argentina had revenue-increasing tax policy of the same magnitude in both periods while Colombia had a less revenue-increasing tax policy in the period of inequality decline. In terms of progressivity, Argentina's discretionary tax policy made the system more progressive in both periods but less so in the second, while Colombian tax policy, on the other hand, tended to make the system more regressive in both periods but less so in the second. In terms of cyclicality, Argentinian tax policy was procyclical overall, but the procyclicality became less intense over time. In Colombia, tax policy was countercyclical in general and became more countercyclical during the last business cycle.

The empirical analysis also reveals some transversal results. We can see, for instance, that no country improved in terms of collection during the period of decreasing inequality, with the marked exception of Peru. The qualitative analysis shows the reasons behind this result. In the period of increasing inequality there was a marked interest in increasing collection due to certain radical institutional changes that my case studies examined, such as the transition to democracy in Chile, the new constitution in Colombia, and moments of economic crisis. In fact, crisis and economic instability explain why attempts to increase revenues are found in Argentina, as well as the

slight revenue-increasing tax policy of Mexico after the Asian crisis and the revenue-increasing policies in Colombia in 1998. In the period of decreasing inequality, however, the favorable economic situation experienced by all countries in this period is a shared factor explaining why reforms were less oriented towards increasing taxation with the same intensity as before.

We also see that overall tax policies in the period of increasing inequality were more progressive than in the period of decreasing inequality in the majority of countries. Only Argentina and Colombia improved in terms of progressivity. In the qualitative analysis we noted that increasing progressivity was not an objective in itself in most reforms; in fact, of the all the reforms reviewed in Section 5.3 only three were aimed explicitly at improving progressivity: the Chilean reform of 1990 which changed the structure of the PIT (although it was returned to the previous structure in 1993), the Chilean reform that eliminated the "57 bis" benefit in 2005, and Machinea's "impuestazo" in Argentina in the year 2000.

The factor which saw improvement in the majority of countries was cyclicality. Only two countries did not improve with regard to cyclicality in this period: Mexico and Peru. The rest of the countries pursued a more countercyclical or at least less procyclical policy over time. The review of tax reforms in each country evidenced that in the majority of the cases the change in cyclicality was explained by changes in the reaction to economic crisis. For instance, the improvement in cyclicality in Chile and Colombia is explained by the reaction to the crisis of 2008-2009, which was countercyclical in both cases; and the worsening of cyclicality in Mexico and Peru is explained, similarly, by the procyclical reaction to the crisis of 2008-2009 in the case of Mexico, and by Peru's extremely countercyclical reaction to the earlier crisis of 1998-1999. Argentina's improvement stems from the fact that although it continued to respond procyclically during downturns, these downturns were not as frequent after 2002.

6 CONCLUSION

There has been a great deal of interest in recent years in understanding the reasons behind the reduction in inequality experienced by the Latin American region in the past decade; this dissertation was designed precisely to contribute to the discussion by focusing on tax policy. In particular, most studies assert that Latin America has managed to reduce inequality either due to unprecedented favorable economic conditions or, on the other hand, through policy changes rendering policies in areas such as education, labor and social welfare more pro-equity in recent years. In this dissertation I wanted to see whether the same was true for tax policy, by answering the research question of *whether tax policy in Latin America has been more pro-equity in the period of declining inequality compared to the period of high and increasing inequality in the 1990s.*

I maintain, in this dissertation, that the discussion about the reasons for the reduction in inequality is a very relevant one, because it is connected with the sustainability of the reduction. It is easy to see that if the decline in inequality has been merely the result of a favorable economic situation and simple good luck, the decline will last only as long as these factors last. By contrast, if the reduction was backed by policy fundamentals – if it was the result of intentional and effective changes in policy – then the gains in equality could be expected to last.

To conclude this dissertation I will begin by presenting my empirical results and demonstrating how they can be interpreted to answer my research question. I will then explore some theoretical implications of this research, and show how this study interacts with existing research on related topics. Finally, I will examine the limitations of this study and conclude with recommendations for further research.

The empirical findings of this study

In this dissertation I assessed the extent to which tax policy was pro-equity in five Latin American countries (Argentina, Chile, Colombia, Mexico and Peru) during years when inequality was increasing, compared to years when inequality was decreasing, in order to determine whether such policy was more pro-equity in the years of inequality reduction. I defined a pro-equity tax policy as determined by three factors: collection, progressivity and cyclicality. To analyze each factor, I used a structural methodology which allowed me to eliminate the effect of the cycle and prices of commodities from my tax variables; I complemented this structural analysis with qualitative information on tax reforms in these countries.

The empirical results of this exercise showed great heterogeneity among country experiences. For example, Argentina and Colombia improved in two factors: progressivity and cyclicality, but not in collection; Chile and Peru improved in only one factor each, Chile in cyclicality and Peru in collection; and, last but not least, the extreme case of Mexico did not improve in any factor – tax policy in Mexico was more revenue-increasing, more progressive and more countercyclical in the 1990s, when inequality was high and rising, than in the 2000s when inequality was declining. The empirical analysis also revealed some transversal results, such as an evident improvement in cyclicality in most countries, even as the collection and progressivity factors generally worsened in the majority of the cases studied.

Despite the heterogeneity of country experiences and some general improvements and deteriorations in particular areas, to the dichotomous question of whether taxation is becoming more pro-equity, the answer for all five countries is a categorical no: no country's tax policy became more pro-equity over time. This answer comes from applying the criterion discussed in Section 4.5, which specified that for evidencing a policy shift

towards pro-equity taxation, all three factors of pro-equity taxation must improve; no country in my case studies experienced an improvement in all factors.

The use of such a criterion was necessary for the investigation of the research question, which was dichotomous in character. By using a clear criterion I was able to avoid answering with a glass-half-empty/glass-half-full type of response, which was precisely the type of result I did not want. The criterion I used was grounded, on the one hand, in a common approach in statistical testing, which consists in trying to minimize the possibility of false positive errors. At the same time – and more importantly – it was grounded in the analytical idea that the three factors of pro-equity taxation (collection, progressivity and cyclicality) are so deeply intertwined that one can expect them to affect inequality only when improvements in all factors occur simultaneously. It is quite clear in light of the empirical results just presented why the criterion makes sense. Let's take, for instance, the case of Argentina, Colombia and Chile, countries that improved in factors other than collection. It is easy to see that without an improvement in collection, improvements in progressivity and cyclicality lose much of their redistributive power, since, as said before, in a way, it is collection that provides the magnitude of the effect. In fact, Musgrave (1959), the so-called father of modern public finance theory, always considered preferable a system that collects more and slightly less progressively than a system that collects very progressively but with low levels of revenue. However, it is worth mentioning that the extent to which the redistributive power is limited cannot be precisely estimated.

If we look at the case of Peru, in which only collection improved, we can also recognize that improvements in collection alone would be unlikely to have a significant effect on inequality. In fact, one could argue that if progressivity and cyclicality worsen, as happened in Peru, it might be preferable to have

no improvements in collection at all, since one can quite reasonably assume that in terms of the effect on inequality, it would be better to collect less rather than more revenue from a regressive (or less progressive) tax system.

Theoretical implications and related research

The empirical finding that none of the tax policies in the countries examined became more pro-equity over time, nor were there any policy shifts towards more pro-equity taxation, has one important implication for the understanding of the reduction of inequality in the region: namely, it *suggests* that the inequality momentum was not achieved as a result of the tax policies pursued, but rather in spite of them. It *suggests* as well that on the whole, if we want to find a policy explanation for the decline in inequality experienced over the last several years, we should turn our attention elsewhere.

The results of this dissertation also raise thoughtful questions about policy and suggest lines of potential action. For instance, the fact that tax policy as an instrument for reducing inequality remains underused in my case studies, and that the situation has not improved in recent years, implies that in these countries, and probably in Latin America as a whole, much remains to be done in the tax arena. Furthermore, by showing that more improvement was made in the 1990s – when the general mantra was that inequality could not be reduced using the tax system and, moreover, that inequality was not a pressing concern for economists – than in the 2000s , when the topic of inequality reemerged in economic cycles and in even in the political discourse, my research indicates not only that much more remains to be done in the region but that actually much more *can* be done. There is ample scope for improvement and a wealth of options to be pursued.

In this respect, the transversal results of this study suggest two areas where more efforts are needed: the area of collection and the area of progressivity. Interestingly enough, as noted in Chapter 3, these were the same areas that Kaldor recommended for improvement some 50 years ago. The good news is that now, contrary to the prevailing opinions of the past, new evidence presented in this dissertation (see Section 3,2,3) has shown that increasing collection and expanding progressivity need not be seen as contradictory objectives.

This dissertation is at the same time closely related with other academic discussions. I would like to mention briefly three discussions which my research touches upon, and explain how this dissertation can influence further understanding in these areas. The first discussion is that of the importance of taxation in reducing inequality. It is indisputable that the topic of taxation-promoted equality is becoming fashionable in the field, in Latin America and elsewhere, particularly since the best-selling publication of Piketty's *Capital in the Twenty-First Century* in 2014. My dissertation highlighted a very relevant point related to this discussion, namely, that the effect of taxation on inequality goes far beyond the direct mechanical and static impact of taxation and seems to affect inequality mostly in indirect ways. I have even identified three channels through which taxation can modify inequality indirectly: by modifying workers' economic behavior, by creating an equality-friendly macroeconomic atmosphere, and by creating a political environment which favors redistribution. This highlighted point has important implications for the discussion, as it evidences the need for research to emphasize such indirect effects instead of continuing to focus only on direct mechanisms. In the Latin American case, where most discussions about the effect of tax policy on inequality are based on incidence studies, this suggests the need to apply different and more holistic approaches, since incidence studies often fail to reveal indirect mechanisms;

in focusing the discussion on results from incidence studies alone, a good part of the story is being missed.

The second discussion is on the determinants of tax reforms in Latin America. There is a large quantity of literature interested in the reasons behind tax reforms in the region. I presented in Chapter 3 a set of studies that point to moments of crisis as a factor behind revenue-increasing tax reforms in the region. In this dissertation, particularly in the qualitative exercise, I provided further evidence for the thesis that macroeconomic crisis tends to coincide with tax reforms. I showed that, with only few exceptions,[91] economically difficult situations always brought tax reforms, and most of these were revenue-increasing. My qualitative analysis also introduced new elements that may be of interest for the discussion. For instance, in the case studies one can see that not only economic crisis but also political crisis tends to bring about revenue-increasing tax reforms as well. The most complicated political situations in the case studies – the political turmoil in Peru after Fujimori's flight in 2000, the five-presidents-in-one-week chaos in Argentina, and the flare-up of the internal conflict in Colombia in 2002 – all ended in revenue-increasing tax reforms. Furthermore, the case studies evidenced that the converse holds true as well: just as crises tend to encourage reforms, my study suggested that booms tend to deter them. The commodity boom of 2003, and the positive economic situation that it brought to the countries examined, tended to discourage reforms; this was particularly evident during the first years of

[91] The two exceptions were the reaction of Chile to the crisis of 1999 and the reaction of Colombia to the crisis of 2008-2009.

the Bachelet administration in Chile and during the Uribe administration in Colombia, where, during the three years of commodity boom (2003-2006), no reforms were enacted. The fact that booms stifle reforms while crises trigger them raises concerns about the possibility that in the region tax policy is seen merely as a collecting tool, used only when times are bad, rather than an important instrument with a relevant role to play in the economy.

The third discussion is that of escaping the procyclicality trap. There is growing evidence of a new pattern in economic policies in the developing world. In this dissertation my review of the literature revealed that about a third of the developing world has been able to escape the procyclicality trap of expenditure policies and actually become countercyclical, and Latin American countries seem to be following that trend (Frankel, Vegh, and Vuletin 2013). There is also evidence that Latin American countries have graduated in terms of their expenditure and monetary policy responses to moments of crises – in the sense that they have been able to switch from procyclical to countercyclical policy responses to crisis (Vegh and Vuletin 2013). My empirical results complement the existing literature by evidencing a tax policy shift towards more countercyclicality or, at least, less procyclicality, in the majority of the cases, more specifically Argentina, Chile and Colombia. I also showed that just as Latin American countries seem to be improving their expenditure and monetary policy responses to crisis, they seemed to have improved in terms of their tax policy reaction to crisis; with the exception only of Mexico, all the countries studies switched to more countercyclical (or less procyclical) reactions to the crisis of 2008 as compared to previous crises. My study showed, however, that the progressivity of their responses improved only in two (Colombia and Chile) out of the five case studies.

Limitations of the study

I would like to mention three important sources of limitations involved in this dissertation: the sample limitations, the methodological limitations and the data limitations.

The sample of this study is limiting in two aspects: first, the number of cases is relatively small and secondly, the selection procedure, in contrast to the classical procedures of case selection in social sciences or in economics, is methodology- and data-driven. These two aspects imply that the cases have a certain bias and that, although my selected cases successfully represent important characteristics of the region, such as economic dependency on mineral, oil and agricultural products, they do not guarantee representability in the formal statistical sense. Therefore, we cannot make inferences from the case studies and generalize to the region as a whole without the benefit of additional research, and the results found in my case studies are only *suggestive* in reference to other Latin American countries.

There are also limitations arising from the methodology used in this research. For instance, using structural revenues to assess discretionary tax policy entails certain assumptions that, once the effect of the cycle and other variables such as the price of commodities are excluded, changes in structural values must be triggered by tax policy of one kind or another. However, we know that there are many factors affecting tax revenues other than the cycle and commodity prices, and if such effects are strong enough, this could generate a bias in the results and limit the accuracy of this research. In this study I used qualitative information on tax reforms to complement the quantitative study and to reduce any inconsistencies or biases, but clearly the qualitative information can only reduce such errors, not erase them completely. Another caveat in this research is that the use of structural revenues can only be applicable to countries highly dependent on one single commodity product. Therefore, those with more diversified

economies, such as Brazil or some Central American countries, had to be eliminated from the sample, leading to the aforementioned sample bias.

A further limitation arising from the proposed methodology is that it has implicitly assumed, for simplicity, that taxation is always a result of economic conditions and never a cause of them. This is especially relevant when analyzing cyclicality and policy reactions to crisis. My methodology proposes using correlation analyses to evidence cyclicality and policy responses to crises, but correlation says nothing about causation; the causation is assumed, and this could potentially be a source of imprecision in my study. The qualitative analysis of this research was also intended to minimize such inaccuracies, but again, the qualitative analysis certainly cannot completely eliminate any errors.

The proposed methodology comes with yet a further caveat, related to the way in which it proposes to measure pro-equity tax policy. The methodology involves examining three factors: collection, progressivity and cyclicality, and provides a criterion for determining whether there was a policy shift towards more pro-equity taxation, but it does not let us compare among country experiences. In other words, although the proposed methodology allows me to establish that neither Argentina nor Chile have become more pro-equity over time, it does not indicate which country saw greater improvement in that respect.

There were also strong data limitations in this study, particularly because, with the exception only of Peru, there are no official data on tax revenues paid by commodity sectors over long timespans, and this was indispensable data for my empirical investigation. My solution was to use imputation techniques to construct my own data set of revenues paid by commodity sectors in each country, with the limiting factor that I could not compare differences across countries without certain caveats concerning the data.

Recommendations for further research

Based on the limitations mentioned above, I can envisage two lines of research that could potentially expand and complement the results found in this dissertation. Firstly, one possible complement to this study consists of extending the methodology in order to adapt it for countries with more diversified economic systems. I can imagine that, using the same principles behind the methodology developed for countries dependent on one single product, one could adapt the method to more than one product without much difficulty. With an extended methodology one could add more case studies to improve the options for generalization. One could even attempt to replicate the exercise in all Latin American countries, to the extent that the data limitations allow.

Finally, one could attempt to add a way to measure changes in the degree of pro-equity taxation. This could be achieved either by giving weight to improvements in each of the three factors of pro-equity taxation (collection, progressivity and cyclicality), or by weighting each possible combination of factors in the results[92], based on theoretical grounds.

[92] Since there are three factors, and each factor can either improve or worsen, there are 9 possible combinations of results.

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ABSTRACT

Inequality in Latin America remains scandalously high but has improved remarkably in the last decade. Multiple reasons for this inequality reduction have been posited, but until now few have inquired as to the role of tax policy in this decline. Therefore, in this dissertation I attempt to fill this gap by investigating whether tax policy in Latin America has been more pro-equity during the recent period of declining inequality in comparison with the period of high and increasing inequality in the 1990s, such that it might have contributed to the decline in inequality observed in recent years. To answer this question, this dissertation begins by explaining, using both empirical and theoretical arguments, the importance of looking at taxation to explain changes in inequality. It then defines pro-equity taxation as dependent on three factors – collection, progressivity and cyclicality – and proposes measuring these factors using a novel methodology consisting of adjusting tax variables to business and commodity cycles. Using case studies of the five largest commodity-dependent economies in the region – Argentina, Chile, Colombia, Mexico and Peru – this study derives the conclusion that, although some improvements were made, particularly in cyclicality, the authorities' use of the tax instrument when inequality was declining was no more pro-equity than in the 1990s, when inequality was high and increasing. This suggests that the inequality reduction was not achieved as a result of the tax policy pursued, but mainly in spite of it. It suggests as well that tax policy as an instrument for reducing inequality remains underused in the region and therefore much remains to be done - and certainly can be done- in the tax arena.

ZUSAMMENFASSUNG

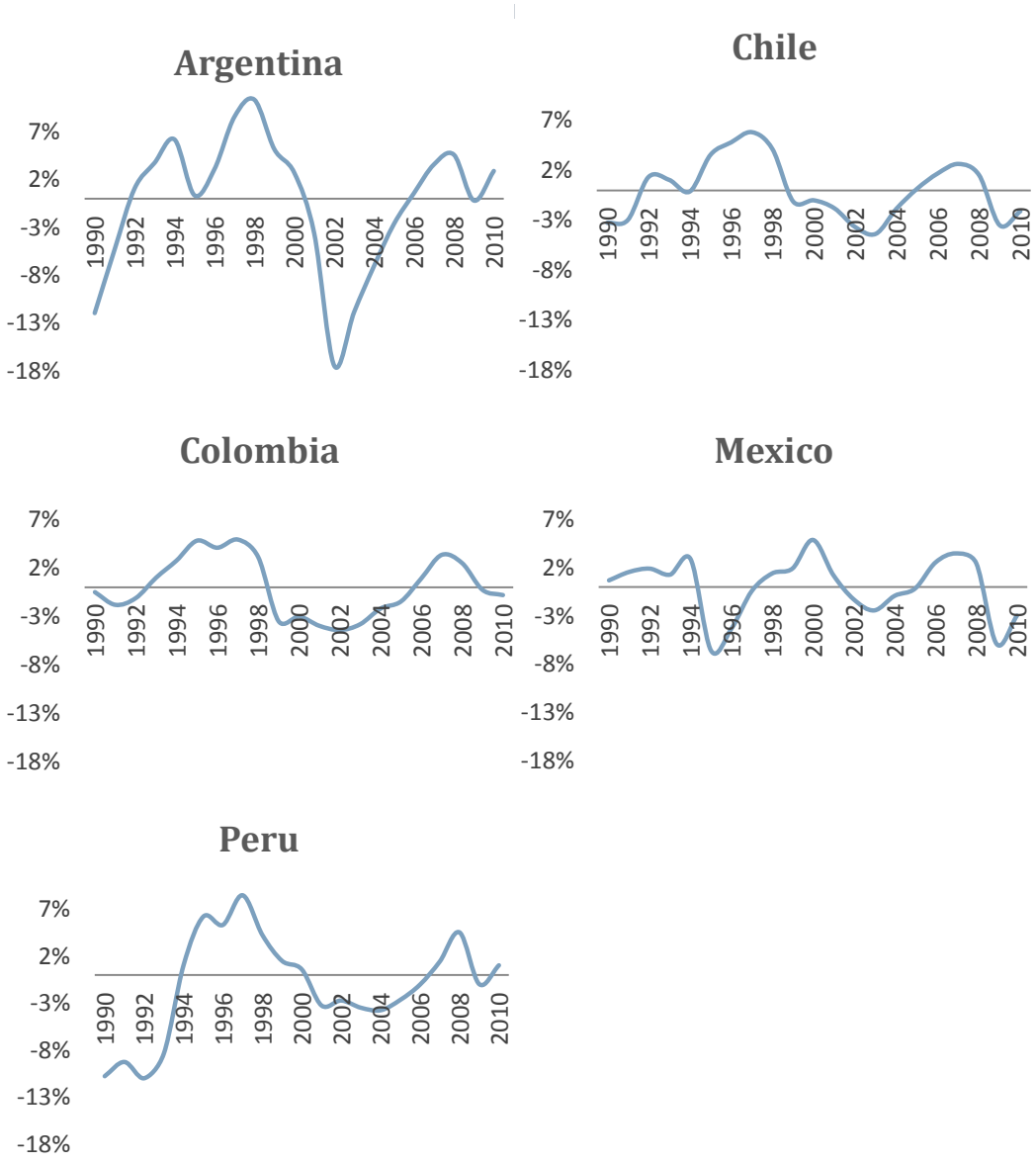
Die sozio-ökonomische Ungleichheit in Lateinamerika ist bis heute schockierend hoch, obwohl im letzten Jahrzehnt bemerkenswerte Verbesserungen erzielt werden konnten. Zahlreiche Gründe wurden für die positive Entwicklung der Ungleichheitsreduzierung postuliert. Gleichwohl, wurde der Rolle der Steuerpolitik in dieser Entwicklung kaum nachgegangen. Diese Forschungslücke versuche ich in der Dissertation zu schließen. Ich untersuche ob die Steuerpolitik in fünf Lateinamerikanischen Ländern im jüngsten Zeitraum abnehmender sozio-ökonomischer Ungleichheit, im Vergleich zum Zeitraum hoher und zunehmender sozio-ökonomischer Ungleichheit in den 1990er Jahren, Verteilungsgerechtigkeit stärker förderte, sodass sie zur beobachtbaren Ungleichheitsabnahme in den letzten Jahre hätte beigetragen können. Um diese Frage zu beantworten analysiert die Dissertation, mittels der Revision empirischer und theoretischer Argumente, die Rolle der Besteuerung und ihren Zusammenhang mit einer Veränderungen der sozio-ökonomischen Ungleichheit zu erklären. Drei Faktoren bedingen eine verteilungsgerechtere (pro-equity) Besteuerung – Steueraufwand, Progressivität und Zyklizität. Diese drei Faktoren werden mittels einer innovativen Methode bestimmt, die darin besteht Steuervariablen an Geschäfts- und Rohstoffzyklen anzupassen. Mittels fünf Fallstudien der größten rohstoffabhängigen Volkswirtschaften in der Region – Argentinien, Chile, Kolumbien, Mexiko und Peru – kommt die Untersuchung zu dem Ergebnis, dass obwohl einige Verbesserungen in der Steuerpolitik erzielt wurde, insbesondere bei dem Faktor Zyklizität, die Nutzung der Steuerpolitik nicht signifikant verteilungsgerechter (pro-equity) war als in den 1990ern. Dieses Ergebnis legt nahe, dass die Abnahme sozio-ökonomischer Ungleichheit nicht als Ergebnis einer distributiven Steuerpolitik gewertet werden kann, sondern vielmehr trotz der existenten Besteuerung stattgefunden hat. Ferner zeigt das Ergebnis der Arbeit, das die Steuerpolitik als Instrument zur Reduzierung von sozio-ökonomischer Ungleichheit in der Region zu wenig genutzt wird und viel getan werden kann um eine weitere Reduktion der Ungleichheit zu erzielen.

LIST OF PUBLICATIONS

None

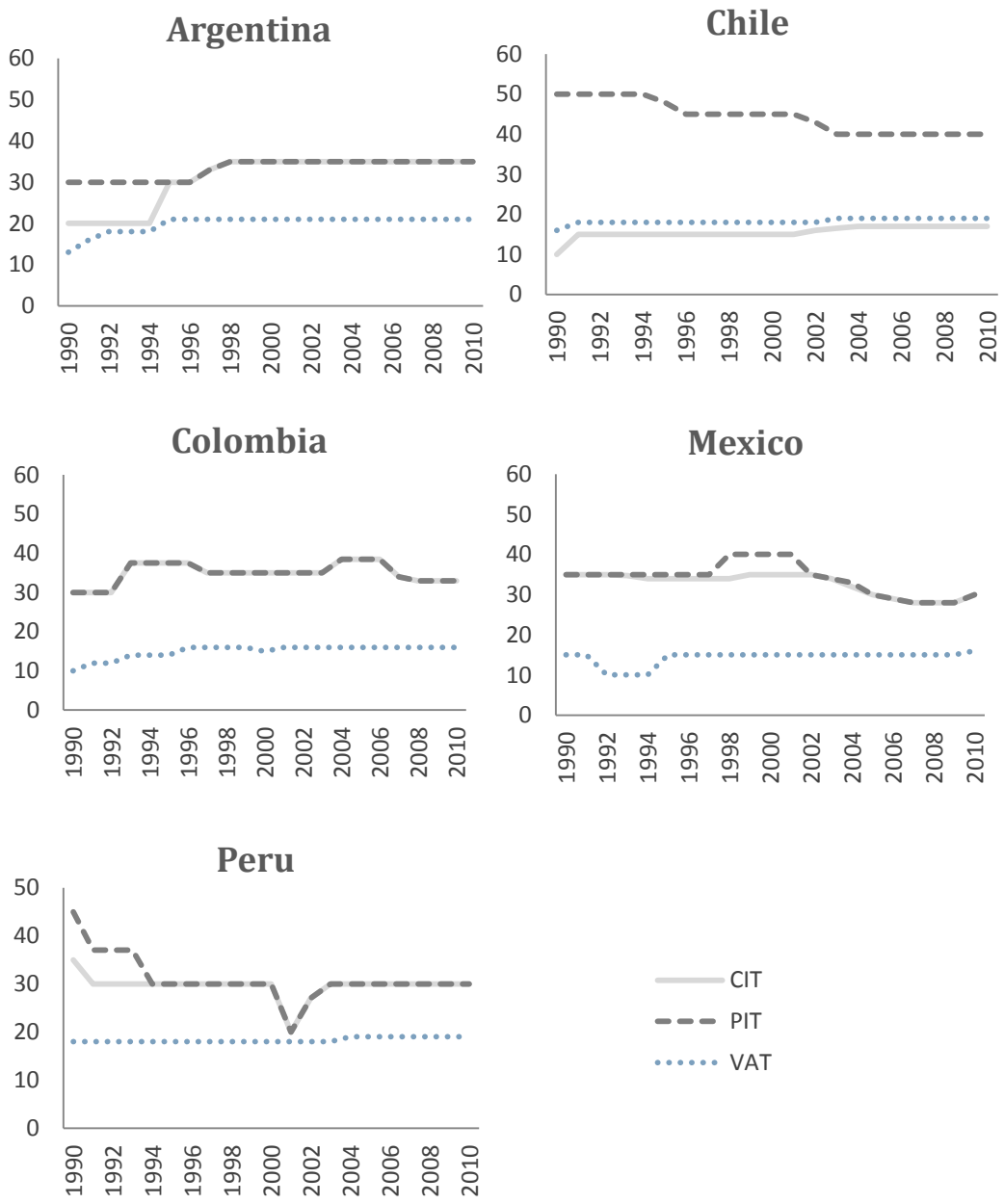
ANNEXES

Annex 1 (1990-2010) Selected countries, output gap (%) from HP filter



Source: Author's calculations.

Annex 2 (1990-2010) Selected countries, legal maximal PIT, CIT and VAT rates (%)



Source: Author's elaboration based on CIAT reports and country legislation.

Annex 3 Selected countries, results of Augmented Dickey-Fuller Test

Panel A. test of the variables

null hypothesis: the series has a unit root

Argentina	**without intercept**	**with intercept**	**with trend**	**First difference**
GDP	3,14 (0)	-0,57 (0)	-2,85 (7)	-2,83 (0)*
Tax no commodity	2,78 (0)	-1,49 (0)	-2,61 (1)	-3,44 (0)**
PIT	-2,19(0)**	-3,39 (0)***	-3,19 (0)***	-7,01 (0)***
Regressive taxes	2,39 (0)	-0,56 (0)	-1,76 (0)	-3,85 (0)***
Chile				
GDP	7,20 (0)	-3,12 (0)**	-2,42 (0)	-2,68 (0)*
Tax no commodity	2,66 (0)	-2,40 (8)	-4,15 (0)***	-4,96 (0)***
PIT	3,31 (0)	-2,10 (0)	-2,13 (0)	-3,16 (0)**
Regressive taxes	2,53 (0)	-3,49 (0)***	-2,88 (4)	-3,96 (2)***
Colombia				
GDP	6,11 (0)	-0,26 (1)	-3,26 (3)*	-2,61 (0)*
Tax no commodity	5,84 (0)	-0,60 (8)	-5,11 (7)***	-2,89 (0)*
PIT	0,24 (0)	-2,30 (0)	-2,84 (0)	-6,50 (0)***
Regressive taxes	5,89 (0)	-1,68 (0)	-4,51 (7)***	-4,16 (7)***
Mexico				
GDP	3,13 (0)	-1,13 (0)	-2,36 (0)	-4,28 (4)***
Tax no commodity	1,69 (0)	-0,41 (0)	-2,24 (0)	-4,00 (0)***
PIT	1,44 (0)	-0,99 (7)	-4,19 (6)***	-3,75 (6)***
Regressive taxes	1,63 (0)	-0,23 (0)	-2,19 (0)	-4,20 (0)***
Peru				
GDP	5,38 (0)	1,84 (0)	-1,94 (0)	-2,61 (0)*
Tax no commodity	3,00 (0)	1,07 (0)	-3,12 (0)	-3,77 (0)***
PIT	1,81 (0)	-0,68 (0)	-1,46 (0)	-3,67 (0)***
Regressive taxes	2,38 (0)	0,74 (0)	-5,03 (0)***	-3,95 (0)***

Source: author's estimation. * = statistically significant at the 10% level, ** = statistically significant at the 5% level, *** = statistically significant at the 1% level. Figures in parenthesis indicate the lags used to undertake the ADF test. The customary level of significance is 5%. However, given that I have limited data, and it is more difficult to achieve significance in this case, I accept a level of 10% significance in some cases.

Panel B. Test of the residuals

null hypothesis: the series has a unit root

Argentina	**Level**
Tax no commodity	-2,46 (1)
PIT	-7,01 (0)***
Regressive taxes	-3,81 (0)***
Chile	
Tax no commodity	-4,03 (0)**
PIT	-2,55 (1)
Regressive taxes	-4,29 (0)***
Colombia	
Tax no commodity	-3,86 (5)***
PIT	-3,10 (0)**
Regressive taxes	-3,95 (5)***
Mexico	
Tax no commodity	-1,59 (0)
PIT	-4,26 (6)***
Regressive taxes	-2,18 (2)
Peru	
Tax no commodity	-3,23 (0)*
PIT	-2,29 (0)
Regressive taxes	-3,11 (0)**

Source: author's estimation. * = statistically significant at the 10% level, ** = statistically significant at the 5% level, *** = statistically significant at the 1% level. Figures in parenthesis indicate the lags used to undertake the ADF test.

Annex 4 Selected countries, estimated long-run and short-run elasticities

Panel A. Elasticities of tax revenues of PIT

	long-run (OLS)		long-run (DOLS)		short-run			
	GDP	Intercept	GDP	Intercept	GDP	Intercept	Error correction term	r-squared
AR								
	---	---	---	---	1,93 (0,21)***	0,00 (0,15)	---	0,83
CL								
	1,10 (0,07)***	-3,01 (0,73)***	0,82 (0,07)***	0,31 (0,75)	1,27 (0,56)**	0,00 (0,03)	-3,48 (0,00)	0,96
CO								
	1,98 (0,08)***	-14,42 (1,04)***	2,03 (0,12)***	-15,12 (1,50)***	1,1 (0,43)**	0,03 (0,02)	-0,01 (-0,01)	0,32
ME								
	---	---	---	---	1,84 (0,32)***	-0,02 (0,01)	---	0,65
PE								
	1,03 (0,04)***	-2,55 (0,5)***	0,89 (0,19)**	-0,90 (2,21)	1,06 (0,29)**	0,01 (0,02)	-0,97 (0,31)**	0,76

Source: author's estimation, * = statistically significant at the 10% level, ** = statistically significant at the 5% level, *** = statistically significant at the 1% level. Standard errors are given in parenthesis. The standard errors of the DOLS estimations are the Newey-West correction value.

Panel B. Elasticities of tax revenues of regressive taxes

	long-run (OLS)		long-run (DOLS)		short-run			
	GDP	Intercept	GDP	Intercept	GDP	Intercept	Error correction term	r-squared
AR								
	-1,17 (1,62)	16,36 (20,39)	-1,58 (3,81)	20,91 (47,65)	5,8 (5,19)	-0,36 (0,36)	-0,8 (0,22)***	0,45
CL								
	---	---	---	---	1,39 (0,68)*	0,01 (0,04)	---	0,19
CO								
	0,84 (0,3)**	-4,60 (3,82)	0,83 (0,34)**	-4,74 (4,32)	2,58 (2,64)	-0,06 (0,11)	-0,75 (0,24)**	0,36
ME								
	1,23 (0,13)***	-5,74 (1,11)***	1,11 (0,20)***	-4,66 (1,79)**	1,52 (0,53)**	-0,01 (0,02)	-0,35 (0,21)	0,49
PE								
	---	---	---	---	0,78 (0,78)	0,03 (0,07)	---	0,04

Source: author's estimation, * = statistically significant at the 10% level, ** = statistically significant at the 5% level, *** = statistically significant at the 1% level. Standard errors are given in parenthesis. The standard errors of the DOLS estimations are the Newey-West correction value.

Annex 5 Selected countries, measurement techniques and data sources

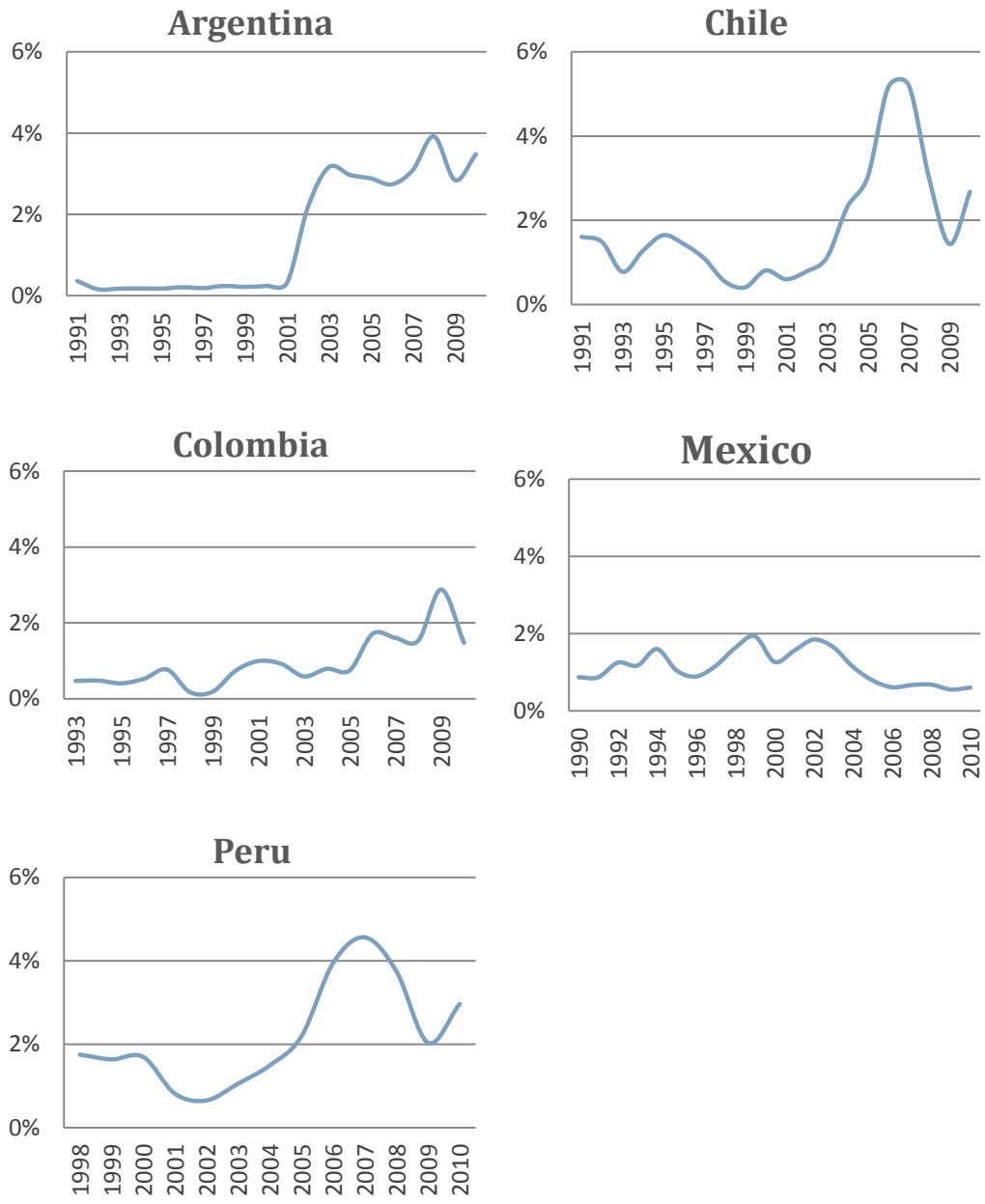
Panel A. Data sources

Country	Definition of commodity-related tax revenue	Measurement techniques and data sources
Argentina	all the taxes paid by the soy sector including the export tax	I use the sum of the revenues from the export tax found in OECD statistics and the taxes paid by the soy sector to the state (excluding the export tax). For computing the taxes paid by the soy sector to the state other than the export tax I assumed that the participation of the commodity sector in the total tax revenues is parallel to the participation of those sectors in the economy. To estimate the participation of the commodity sectors as a share of GDP I used data from Faostat.
Chile	taxes paid by private mining companies and CODELCO	I add the value of taxes paid by CODELCO to the taxes paid by other private companies. The information about the taxes paid by CODELCO was taken from two sources. For 1990-2002, I used the information on public finance issued annually by the Dipres of the Finance Ministry of Chile, in which they state how many taxes were paid by public enterprises: I used the value paid by CODELCO. For the years after 2002, I used the reports of CODELCO in Dollars and convert into Pesos using the yearly exchange rate found in Cepalstat. For the taxes paid by the private sector I used the information from the study of Cenda (2010).
Colombia	taxes paid by oil companies plus the special taxes on oil	I use the sum of the total taxes paid by Ecopetrol compilated from Ecopetrol annual reports and the VAT paid by the total oil sector taken from DIAN statistics.
Mexico	taxes paid by Pemex	I use the information of the excise tax (IEPS) paid by the oil sector to the state and the Oil Revenue Tax, based upon data found in the Mexican Ministry of Finance statistics. The IEPS paid by Pemex to the state becomes a subsidy whenever the difference between the price of production and the market price is too high. Whenever the tax is negative I use a zero value.
Peru	regular taxes paid by mining companies in Peru	Sunat (Peru's Tax Administration) splits tax revenues by economic sector; given this availability, commodity-related tax revenues used for Peru were the total taxes paid by the mining sector.

Panel B. Background talks with researchers and experts

Name	Position
Juan Pablo Jiménez	Expert in fiscal policies, Economic Affairs Officer, Cepal, Santiago de Chile
Olga Lucía Acosta	Expert in public policy, Regional adviser, Cepal, Bogotá
Cecilia Matilde López Montaño	Expert in public policy, ex director of Colombian National Planning Department
William Rodriguez	Expert in tax statistics, researcher at Colombian National Tax and Customs Direction, Bogotá
Julio Roberto Piza	Expert in tax policy, director of the department of fiscal law, Externado University of Colombia.
Horacio Ayala	Expert in tax policy, ex director of the Colombian National Tax and Customs Direction, Bogotá
Francisco Azuero	Expert in public policy, professor at Andes University, Bogotá
Jorge Ivan Bula	Expert in Public Policy, Dean of the Economic Deparartment, National University of Colombia
Dante Sanguinetti	Expert in tax and customs law, lawyer at Ferrero Abogados in Lima, Peru

Annex 6 (1990-2010) Selected countries, tax revenues from commodity sectors as % of GDP



Source: Author's calculations

Annex 7 (1990-2010) Selected countries, crisis periods

Country/Year	Argentina	Chile	Colombia	Mexico	Peru*
1990	c,i,s,d,e,b				
1991					
1992					
1993					
1994					
1995	b			c,i,s,b	
1996					
1997					
1998		s	c,s		
1999			c,s		
2000	s			s,b	
2001	s,d,e,b				
2002	c,i,d,e,b				
2003					
2004					
2005					
2006					
2007					
2008		c,s	s	c,s	
2009	d				
2010					

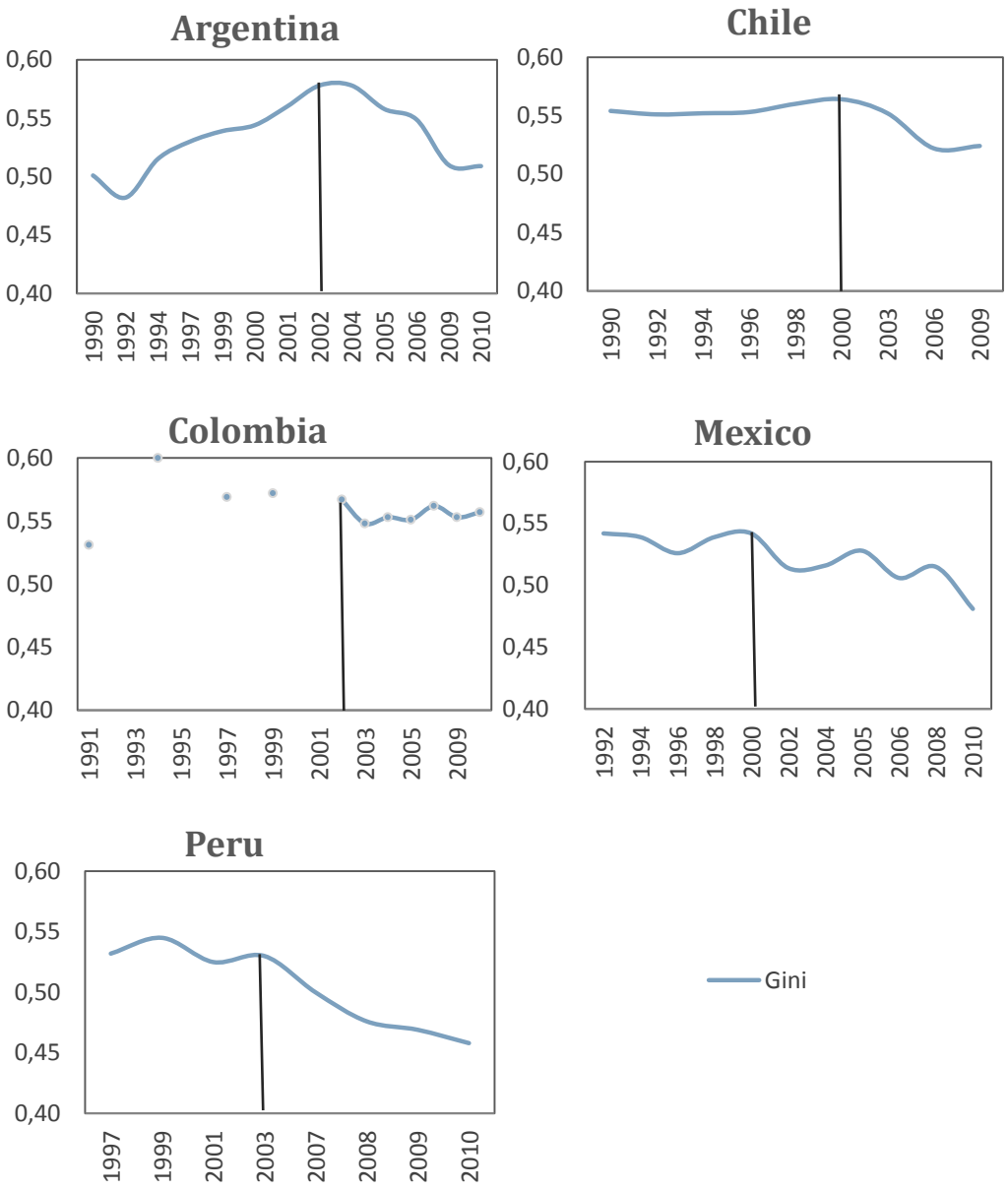
Source: Author´s calculations based on Vegh and Vuletin (2013; 2014) and Reinhart and Rogoff (2009)

Crisis year

c= currency crisis
i=inflation crisis
s= Stock market crash
d= domestic debt crisis
e= external debt crisis
b=banking crisis
* there is no data on financial crises for Peru.

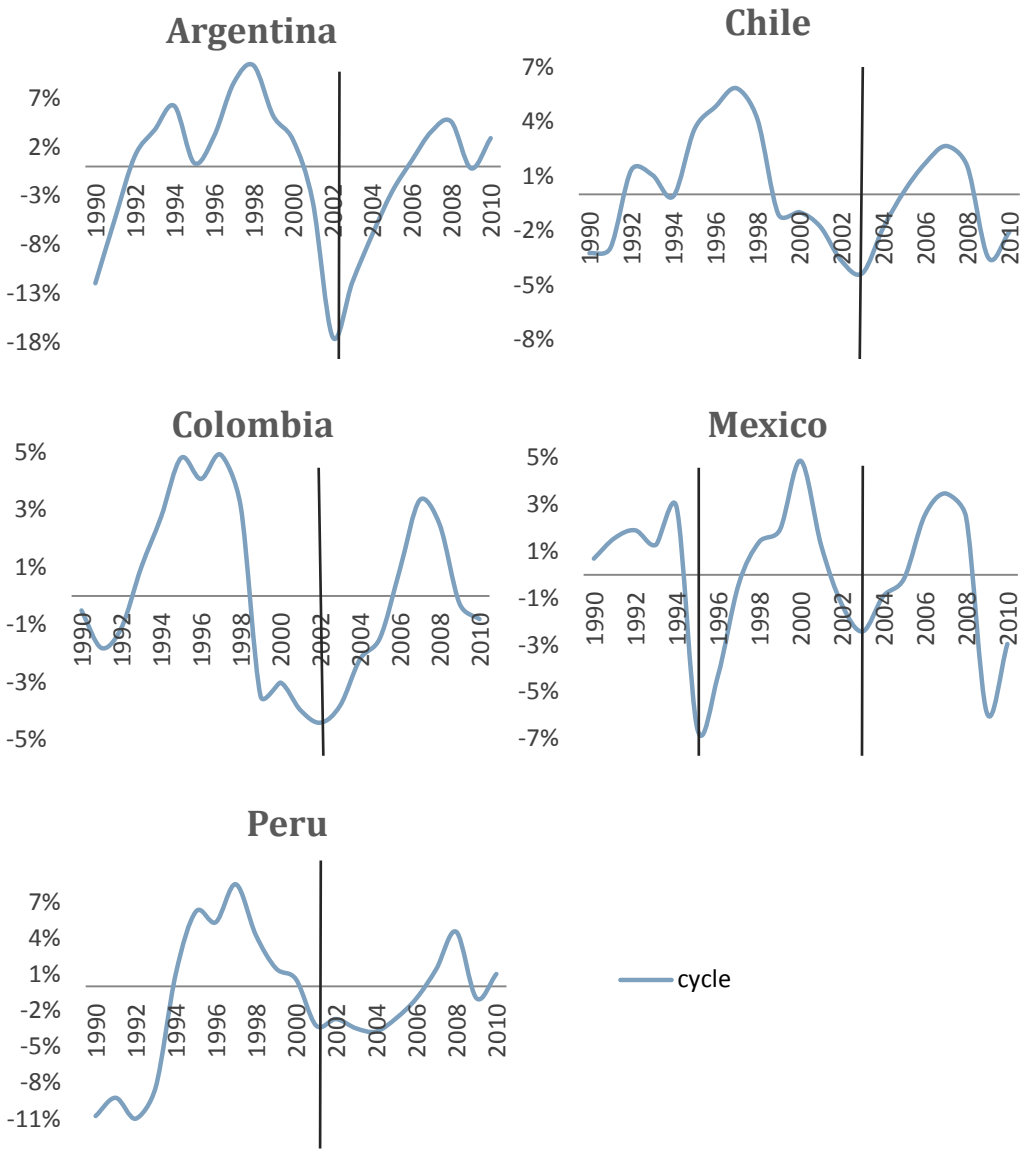
Annex 8 (1990-2010) Selected countries, turning points

Panel A. Inequality turning point



Source: Authors calculations based on data of Cepalstat

Panel B. Business cycle turning point



Source: Author´s calculations