The Distribution of Top Incomes in Mexico: How rich are the richest?*

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Abstract

This thesis presents the study of top income shares in Mexico between 2009 and 2012. Using microdata files of personal tax returns and employer-wage returns, results of top income shares, top income decompositions, Pareto coefficients, income mobility and top wage shares are presented. Due to the issue of tax evasion, a methodology is proposed to adjust the tax data, while using the 2009 Mexican Economic Census. After adjusting the data, 13.6% of total income is accrued to the top 1% of the adult population, whereas 3.2% of total income is accrued to the .01% of the adult population. As well, for the period 2009 - 2012, the fraction of total real growth captured by the top 1%, .1%, .01% and .001% was of 8%, 5%, 3% and 2%, respectively. With respect to taxation of top groups, average tax rates range from 3.6% to 13.36%. In 2011, inverted Pareto coefficients achieve their maximum values, by ranging from 2.72 at P99.0 to 3.89 at P99.99. Moreover, 13.81% of total wage is accrued to the top 1% of the employed population. Finally, income mobility depicts a low re-ranking of individuals, specially for the "richest of the rich".

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1 Introduction

In the last 25 years, Mexico has experienced several political, economic and cultural changes, which were largely different from the political shifts of the past decades. During this time, Mexico signed free trade agreements and the State started a privatization processes. For example, in 1994, the North American Free Trade Agreement *(NAFTA)* started operating, and in 1990, Mexican's national telecommunication company, *TELMEX*, was sold to *Carlos Slim*, who is nowadays of the richest persons on earth (Forbes, 2015b). These vertiginous changes can deeply affect a society and its income distribution; as Piketty (2014) explains, "*one should be wary of any economic determinism in regard to inequalities of wealth and income ... The history of the distribution of wealth has always been deeply political, and it cannot be reduced to purely economic mechanisms. ... It is shaped by the way economic, social, and political actors view what is just and what is not, as well as by the relative power of those actors and the collective choices that result. It is the joint product of all relevant actors combined. ... How this history plays out depends on how societies view inequalities and what kinds of policies and institutions they adopt to measure and transform them.*"

During these years, Mexico's economy had an important development, but still lagged behind other developing countries. For example, between 1995 and 2013, GDP per capita growth was of 1.5%, whereas the one of China and Chile represented 8.9% and 3.0% (as seen in Figure 1), respectively. Moreover, as the two largest countries in the region, Mexico and Brazil continue to be home to about half of the region's poor despite its recent success in pushing out of poverty millions of individuals. In 2000, Mexico and Brazil had a percentage of 20.1% and 38.3% of the Latin American population living with *US$*4 or less per day, whereas in 2013, they had 24.6% and 30.5%, respectively (SEDLAC and WDI, 2015).

Figure 1: GDP per capita in Latin America (1995 - 2013)
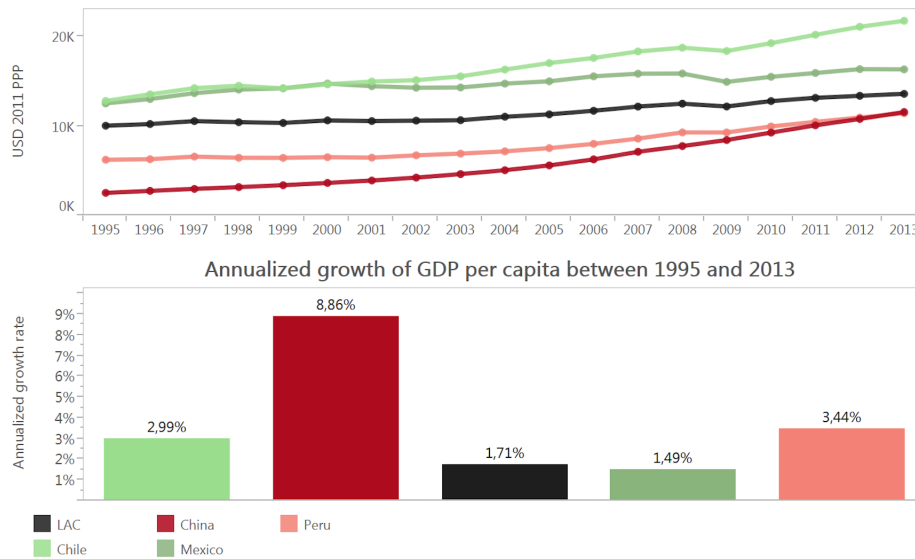
Source: SEDLAC and WDI (2015)
Note: Since the numbers presented here are based on SEDLAC, a regional data harmonization effort that increases cross-country comparability, they may differ from official statistics reported by governments and national statistical offices. The LAC aggregate is based on 17 countries in the region for which Microdata are available; they do not include Haiti.

Mexico's development helped millions of individuals escaped from poverty and increase their incomes, whatsoever, the improvement could have been highly skewed. It might have been the case that the sources of economic growth, such as capital, were only concentrated within a small percentage of individuals (as seen in

Figure 35). This possible situation raises the importance of making normative and positive analyses to study the development of income inequality within a country. As a first approach, between 2002 and 2012, the mean income growth of the bottom 40% was 1.9% relative to 1.1% for the overall population. This phenomenon was mainly led by an increase in Mexican's middle class[1], which passed from being 42% of total population in 2002 to 45.7% of total population in 2012 (SEDLAC and WDI, 2015). On the other side, Mexico's Gini coefficient[2] has decreased in the last 12 years (as seen in Figure 2) by passing from 0.59 in 2000 to 0.49 in 2012. Esquivel and Cruces (2011) explain that labor income, transfers and remittances have all played an important role in this process. They also argue that the equalizing effect of labor income and the reduction of wage inequality in Mexico can be explained as the combination of a late outcome of trade liberalization and a structural change in Mexico's workforce composition in terms of education and experience. Nevertheless, compared to other Latin American countries, Mexico's Gini coefficient still remains high (as seen in Figure 2), e.g., in 2012, Peru, Argentina and Uruguay had a Gini coefficient of 0.45, 0.42 and 0.41, respectively.

These recent developments represent an improvement for Mexico. However, an important caveat must be emphasized: the use of Gini coefficients to measure income inequality can be misleading. For example, on one side, we can have a country where the poorest 50% of the population has no income and the other 50% has the same income. In this case, the Gini coefficient would be of 0.5. On the other side, we can have a country where the poorest 75% of population has 25% of income and the richest 25% has 75% of income; in this case, the Gini coefficient would be again of 0.5. In this example, two different countries with different income distributions gave us the same Gini coefficients.

To improve our analyses, decile and centile concentrations could provide us with a better picture of the actual distribution of income and wealth, which aren't subject to the caveats previously explained. For example, table 25 presents historical decile income concentrations based on household surveys, and Figure 35 shows the proportion of income received by each quintile and the sources of each quintile's income during 2012. On a historical point of view, table 25 shows us that in 1950, the 10th household decile concentrated 45.5% of income, whereas in 2012 this proportion decreased to 34.9%; in spite of this reduction, this concentration remains considerably high. Figure 35 provides us with a picture on how the income source varies within quintiles. The last quintile has a more diversified income source, which includes income from capital. These analyses present us a first picture on how a small percentage of the population concentrates a big percentage of the total income and how their respective income sources greatly differ.

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[1]The middle class is defined as living with US$10 - US$40 per day.
[2]Gini index measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality (SEDLAC and WDI, 2015).

Figure 2: Gini coefficients in Latin America (2000 - 2013)
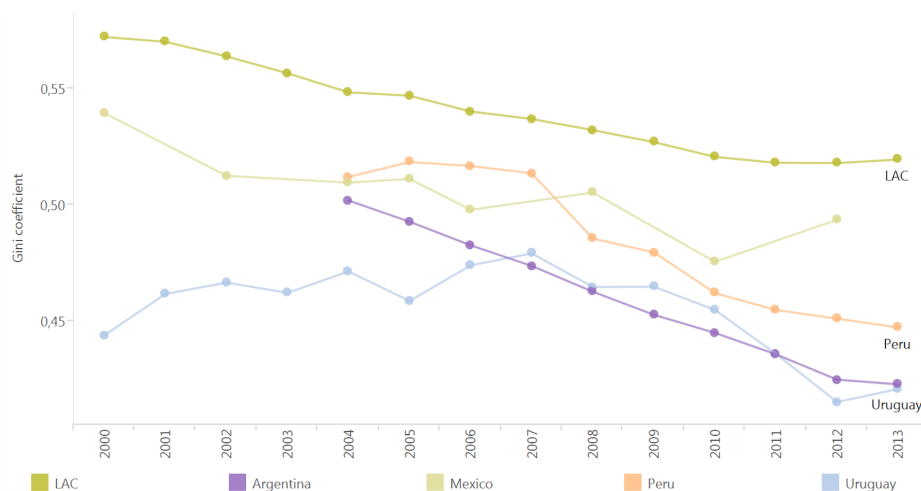
Note: Since the numbers presented here are based on SEDLAC, a regional data harmonization effort that increases cross-country comparability, they may differ from official statistics reported by governments and national statistical offices. The LAC aggregate is based on 17 countries in the region for which microdata are available; they do not include Haiti.

In Mexico, past studies to study income inequality have used household surveys to calculate measures of income concentration (see Esquivel and Cruces (2011), Gasparini and Lustig (2011), among others), up to the point that Gini coefficients have been used to estimate the impact of income inequality on violent crimes (Lopez-Calva et al., 2014). However, as Alvaredo (2011a), Alvaredo and Londono (2013) and Burkhauser et al. (2011) express, Household Surveys are all but ideal for studying top shares because the rich are usually missing from household surveys for (i) sampling reasons, (ii) low response rates (e.g. refusing to cooperate with the time-consuming task of completing a long form), or (iii) ex-post elimination of extreme values to minimize bias (Alvaredo and Londono, 2013), leading to a severe under-reporting at the top of the distribution. This is both because the richest individuals usually have diversified portfolios with income flows that are not easy to value, and because they are more reluctant to disclose their assets and wealth. This missing rich people are capable of significantly impacting changes in overall inequality and underestimating the magnitude of the changes at the very top, creating artificially low inequality within a country. If household surveys don't provide us with good estimates, a natural solution could be to use national accounts, specifically, by using the household account and its components. Whatsoever, as Lequiller and Blades (2014) explain, national accounts' quality is highly dependent on the quality of the statistical system that exists in a given country; at varying degrees, this system does not cover all units, leaving a significant number of adjustments to be made. National accounts data are therefore approximations.

As Atkinson et al. (2011) explain, there has been a marked revival of interest in the study of the distribution of top incomes using income tax data. Beginning with the research conducted by Piketty (2001) and Piketty (2003) of the long run distribution of top incomes in France , there has been a succession of studies constructing top income share time series over the long run for more than twenty countries. Tax data typically allows to decompose income inequality into labor income and capital income components. Economic mechanisms can be very different for the distribution of labor income (demand and supply of skills, labor market institutions, etc.) and the distribution of capital income (capital accumulation, credit constraints, inheritance law and taxation, etc.), so that it is difficult to test these mechanisms using data on

total incomes (Atkinson et al., 2011). The objective of this work is to analyze the evolution of top incomes in Mexico using tax data and complementing this datasource with Economic Census data, Household Surveys and National Accounts. This complementarity is needed since as Atkinson et al. (2011); Atkinson and Piketty (2007, 2014); Alvaredo and Londono (2013) explain it, tax noncompliance in developing countries represents challenges when building top incomes with tax files. Following the assumption that an income receiver who decides to evade tax payment will underreport her taxable income to tax authorities but declare the true income, or at least a closer approximation to the true income, to an interviewer who grants anonymity, we will use Economic Census data to adjust authorized deductions reported in tax files. Previous efforts to estimate top incomes in Mexico have been done, for example by Campos et al. (2014, 2015); however, these studies use household survey data, which could significantly underestimate income concentration due to the reasons previously described. Therefore, an analysis of the evolution of income distribution in Mexico using income tax is important. Even though we have a small period of years available to examine income concentration, it is important to have an accurate picture of the country's situation than having flawed historical series.

Piketty's (2014) book, *Capital in the 21st century,* brought back to Economics' discussions the importance of income distribution. Its book was an analytical historical narrative based on the cumulative efforts of several dozen scholars that were able to collect a relatively large historical database on the structure of national income and national wealth, and the evolution of income and wealth distributions, covering three centuries and over 20 countries (Piketty, 2015). Specifically, it focuses on the evolution of top incomes explaining that the share of total income going to top income groups has risen dramatically in the last decades in many countries. His analyses generated a huge variety of arguments in favor and against, and raised the following question: why should we care about the increases of top incomes? Several answers could be provided. The most general is that people have a sense of fairness and care about the distribution of economic resources across individuals in society (Atkinson et al., 2011). Second, the surge in top incomes over the last thirty years has a dramatic impact on measured economic growth. Piketty and Saez (2001) show that U.S. real income per family grew at a modest 1.2% annual rate from 1976 to 2007. However, when excluding the top 1%, the average real income of the bottom 99% grew at an annual rate of only 0.6 percent, which implies that the top 1% captured 58% of real economic growth per family during that period. Third, top shares can materially affect overall inequality. As Atkinson and Piketty (2007) and Alvaredo (2011a) show, the Gini coefficient can drastically change if we treat the very top group as infinitesimal in numbers, but with a finite share of total income. Finally, the role of top incomes in a country can have an impact in a global scale. Atkinson and Piketty (2007) shows that the number of globally rich doubled in the United States between 1970 and 1992, which accounts for half of the worldwide increase in the number of "globally rich" and hence makes a perceptible difference to the world distribution.

The rest of the work is organized in the following way: Section 2 shows the different sources of data used throughout this work, and it describes the methodology used to estimate top incomes; Section 3 describes Mexico's tax system, revenue and structure; Section 4 presents how tax evasion can affect the estimation of top incomes, methodologies used to estimate total tax evasion, a literature review of its estimation in Mexico, the possible loopholes that individuals use to evade taxes in tax files, the methodology proposed to adjust the data to minimize tax evasion and the analyses and results obtained; Section 5 analyses the top incomes shares, its decompositions, the real economic growth captured by top groups, an analysis of inverted Pareto coefficients, the importance for adjusting the data for tax evasion, the taxation of top income groups and an analysis of top wage shares; Section 6 presents results on top income mobility and Section 7 concludes and explains the contributions of this work.

2 Data and methodology

The analysis presented in this thesis derives from four different data sources, i.e., micro-data tax files, the economic census, household surveys and national accounts. The next subsections discuss the data.

2.1 Data

2.1.1 Tax files

Top 1% estimates, mainly come from tax files. These files were provided by the Mexican government, which contain the micro-data universe of personal income taxpayers from 2009 to 2012; the files contain to types of income declarations: (a) personal tax returns (2 – 2.5 million observations per year), and (b) employer-reported information on wages in the formal sector (20 – 25 million observations per year). Data source (a) offers detailed information on wages, rents, interest, dividends, prizes, self-employed income, business income (Intermediate and General scheme)[3], exempt income, allowances, deductions, and tax paid for the top 1 - 2% of the population, whereas data source (b) offers information on employer-reported gross and exempt wages for those employees that earn less than $400,000 MX on a yearly basis[4]. Data source (a) allows us to desegregate total income in salaries and wages, capital income, rents, self-employment and business.

Table 1 reports the number of tax files that are available each year; as we see, there are individuals, which report incomes in both databases. When merging both databases, table 2 shows the results of this merge: 1) the number of individuals that appear in both databases, 2) those only in personal tax returns and 3) those only in employer reported wages databases. For those appearing in both databases, there were inconsistencies on how gross wage was reported, i.e., there were cases where the gross wage reported in tax files was higher than the one reported in employer reported files (or the other way around)[5]. Moreover, it was realized that there were individuals that should have reported a "personal tax return"[6], but they didn't do it. Specifically, 390734, 406760, 463520 and 565475 individuals should have done it for years 2009, 2010, 2011 and 2012, respectively.

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[3]We don't have access to income coming from the *Small Business Scheme* (*REPECO*s in Spanish) or *Simplified Scheme*. The *simplified scheme* is a regime for corporate taxpayers with road transportation and primary activities (agriculture, fishing, cattle raising, forestry) that allows certain individuals dedicated to road transportation to participate in it as long as they are part of a "*coordinado*" (a special corporation that manage and operates fixed assets and land directed related to the road transportation activity integrated by individuals that perform those activities and own the assets managed by the "*coordinado*"). The *REPECO* is the regime applicable for taxpayers with entrepreneurial activities that only sale goods or provide services to the general public and have an annual income of up to 2 million Mexican pesos. Taxpayers in this regime were not allowed to issue invoices. A further explanation of these regimes can be found in Appendix A.1.1. We were told by the Mexican government that the information provided by taxpayers for these cases is not significant or representative.

[4]The tax returns are reported by the employees.

[5]In these cases, we decided to take as gross wage the one that was higher from both databases.

[6]They needed to report a personal tax return since their revenue was higher than 400,000 $MX

Table 1: Number of tax files (2009 - 2012)

	Personal tax returns	Employer reported wages
2009	2,028,771	20,467,515
2010	2,151,720	21,183,732
2011	2,338,111	22,576,101
2012	2,571,971	24,021,742

Table 2: Number of individuals appearing in both sources and only in one (2009 - 2012)

	Both databases	Only personal tax returns	Only employer reported wages
2009	866,859	1,161,912	19,605,048
2010	901,585	1,250,135	20,284,187
2011	1,117,664	1,220,447	21,463,922
2012	1,332,591	1,239,380	22,695,330

Source: Author's calculations based on tax data for years 2009, 2010, 2011 and 2012

For the final database, tax payers in table 4 that reported a gross income lower than 200,000 \$MX and were only in the employer reported wages database were not selected. In the end, this study works with 4154244, 4329237, 4777736 and 5364373 unique individuals for years 2009, 2010, 2011 and 2012, respectively.

2.1.2 Economic census

The 2009 Economic Census[7] provides economic information of virtually all economic activities[8] that take place in Mexico[9]. As the definition of an economic unit, the Census takes into account the permanent and semi-permanent businesses[10]; micro-enterprises aren't part of the Census's coverage for not complying with the requirements of the observation unit definition. The Census offers information on the identification of the economic unit, its organization, its start date, the amount of days worked, employed personnel, remuneration, expenses, revenue, value of production, stocks or inventories, fixed assets, loans and bank accounts. However, the Mexican National Institute of Statistics and Geography (*INEGI*) limits the information provided to a subset of variables.

In the 2009 Economic Census, there were 5,144,056 units[11] that employed 27,727,406 people. The economic census divides the units in private sector/quangos (quasi-autonomous non-governmental organizations), public/religious organizations, which have 3,724,019 and 224,002 economic units, respectively. Most likely, the Economic Census would provide better information than the self-assessments for the income tax with the assumption that an income receiver who decides to evade tax payment will underreport/overreport her taxable income/costs/expenses to tax authorities but declare the true income/costs/expenses, or at least a

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[7]The data collection of the Economic Census was held from March 2 to July 31, 2009, with the participation of a team of about 25,000 people. The Census survey covers all economic units in 2009, while the data requested are relative to the previous year, i.e., 2008. However, it wasn't possible that all institutions provided information on its activities in 2008 because part of them started their activities in the same year of the survey. For this reason, the latter only provides information on the number of establishments and their employed personnel.

[8]For the sectors of manufacturing, trade and services, the census covered entirely the following: I) all localities of 2500 inhabitants and more, as well as the municipalities, II) all parks and industrial corridors, III) rural localities with economic importance, IV) important establishments in rural areas; however for the rural areas, it was interviewed a sample. For the sectors of fisheries/aquaculture, mining, electricity/water/gas supply to the final consumer, construction, transportation, storage and financial services, the census covered the whole country.

[9]The Census doesn't take into account agricultural, livestock and forestry units; the Agricultural Census captures these units. Moreover, due to the nature of the following activities, they were not included in the Census: urban and suburban public transport, passenger transport in taxis, farmer insurance funds, associations and political organizations, and household employees.

[10]It doesn't take into account those economic units that carry out their activities as street vendors or facilities that are not considered somehow permanently attached to the ground (e.g., daily posts that are daily armed and unarmed), or the houses room where a productive activity is carried out for the purpose of self-consumption or services performed elsewhere, such as services offered by house painters or plumbers.

[11]From the 5,144,056 units, 4,724,892 already had a business in 2008 and 419,164 started in 2009.

closer approximation to them, to an interviewer who grants anonymity . So once an estimate of costs and expenses is carried from the Economic Census, it's going to be compared to the one from the income tax files. If it is lower, then costs and expenses from the Economic Census will be used; afterwards, a preferred measure of income based on the income tax assessments will be generated.

2.1.3   Household survey

With respect to the household survey, the data will come from the new[12] construction of the Mexican National Household Income and Expenditure Survey (*ENIGH*)[13]. This data set is nationally representative[14] and contains detailed information about the household's income and expenditure in terms of amount, origin and distribution; additionally, it provides information on occupational and sociodemographic characteristics of the household members, and the characteristics of the infrastructure of housing and household equipment. Specifically, it offers information of the total current income (monetary and non-monetary) of households, the current monetary expenditure of households, financial and capital perceptions of the household and its members, the characteristics of the house, sociodemographic characteristics of the residents in the house, the activity status and occupational characteristics of household members aged 12 and over, the home equipment/services and the household's businesses information.

Since the Economic Census available is from 2009, the ENIGH 2010[15] will be used. In 2010, there were 29,556,772 households and 114,559,931 inhabitants. The Household Survey will be used to compare the costs, expenses and authorized deductions that the household's businesses report to the ones reported in the tax files and the economic census; again, the results will provide a better approximation than tax files with the assumption that the incentives to inflate costs, expenses and authorized deductions in the Household Survey are weaker than in the tax assessments.

2.1.4   National accounts

Regarding the national accounts, these come from INEGI's National Accounts by institutional sectors[16] for years 2009 - 2012. The National Accounts by institutional sectors provide the results of each sector at 2008 current prices of each year and period. They provide the following accounts: I) production, II.1.1) generation of income, II.1.2) allocation of primary income, II.2) secondary income redistribution, II.3) redistribution of income in kind, II.4) use of income, III.1) capital accumulation (non-financial) and III.2) financial.

National accounts will be used as the control for total income and wages when calculating top income and top wages[17]. When estimating income concentration, we must divide the income amounts accruing to each fractile by an estimate of total personal income. The objective here is to relate the amounts recorded in the tax data (numerator of the top share) to a comparable control total for the full population (denominator of the top share) (Alvaredo and Londono, 2013). If everyone required to file a tax return did it, total income

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[12]INEGI produces two ENIGHs, the new and the traditional version. For this work, we will use the new version since it presents the income data in a more disaggregated way.

[13]The ENIGH is conducted every 2 years, and the data collection is held in the period spanning from August 17 to December 1 of each year when the survey is collected.

[14]It uses weights that match the population Census. Moreover, the ENIGH considers a locality as being urban if it has 2,500 or more inhabitants.

[15]The ENIGH 2010 was conducted during 2009.

[16]In Spanish, *PIB y Cuentas Nacionales de México. Sistema de Cuentas Nacionales de México Cuentas por Sectores Institucionales.*

[17]As a control for population, the Mexican Population Census of 2010, 2005 and 2000 will be used.

reported in the tax files would suffice; however, due to tax evasion, informality and problems of income coverage, this "control" would be biased.

2.2 Methodology

When estimating top incomes, one needs to be careful on how to address the methodological problems when using tax data. In our case, we have three main problems: i) the need to relate the number or persons in the tax data to a control, ii) the definition of income, and iii) the relation to an income control total.

2.2.1 Control for total population

Depending on the country, the tax unit could be individual, couples or families. In the Mexican case, the tax unit is individual. Following Atkinson et al. (2011), the control for total population will be approximated as the number of adults aged 20 and above from the national census, leading to calculate the top percentile as the total share of income accruing to the top percentile of adult individuals. The data is taken from INEGI based on Censuses and Population Surveys for years 2005 and 2010. In 2005, they were 58,693,543 (p_{t-5}) adults aged 20 or more, whereas in 2010 this number was of 67,397,224 (p_t). To compute the population in 2009, linear interpolation is used, whereas to compute the population control after 2010 (the last Census held), extrapolation using the average growth rate of the defined population control group between 2005 and 2010 was used. Where the average growth is defined as:

$$\text{Population growth} = (\frac{p_t}{p_{t-5}})^{\frac{1}{5}} - 1 = .028 \tag{1}$$

Table 3 depicts the control population used in this analysis:

Table 3: Control population. Adults aged 20 or more (2009 - 2012).

Year	Control population
2009	65,656,488
2010	67,397,224
2011	69,287,094
2012	71,229,957

Source: Author's calculations based on INEGI's Censuses and Population Surveys for years 2005 and 2010.
Notes: Data for year 2009 calculated using linear interpolation. Data for year 2011 and 2012 was calculated using the average growth rate calculated in formula 1.

In 2010, Mexico's population was of 112,336,538 and the control population was of 67,397,224 individuals (INEGI, 2015b). Consequently, the top 1% refers to 673,972 individuals with the highest incomes. It's worth to mention that Mexico has a high percentage of its population working in the informal sector; in 2014, it represented 28.8 millions of people, and it represented 26.8%, 26.2%, 25.7% and 25.4% of Mexico's GDP for years 2009, 2010, 2011 and 2012, respectively (INEGI, 2015a). Therefore, in the estimations, this portion of the population is not going to be taken into account or the other portion that includes the illegal market, as well. It's worth emphasizing that the the exclusion of the illegal market has a considerable impact on Mexican top shares. As an example, Forbes (2015a) calculates that the net worth of Sinaloa's Drug Cartel leader, Joaquin Gomez Loera ("El Chapo" Guzman), is of $US 1,000,000,000.

2.2.2 Control for total income

The aim of the analyses is to relate the amounts recorded in the tax data (numerator of the top share) to a comparable control total for the full population (denominator of the top share). Overall, Atkinson et al. (2011) propose two different approaches . One approach starts from the income tax data and adds the income of those not covered (the "non-filers"), which was used by Piketty (2003). The second approach starts from an external control total, typically derived from the national accounts, which was used by Piketty (2001, 2003). In this case, the income of "non-filers" appears as a residual. In this work, the second approach is going to be used, since only a fraction of individuals file a tax return in Mexico. Table 4 presents the steps required in order to arrive to the control for total income. These steps can be seen as correcting for the "non-household" elements and for the difference between returnable income and the national accounts definition (Atkinson et al., 2011).

Table 4: Control for total income (2009 - 2012)

	Balance of primary income, gross (B.5b)
(+)	*Social benefits, other than transfers in kind (D.62)*
(-)	*Employers' actual social contributions (D.611)*
(-)	*Employers' imputed social contributions (D.612)*
(-)	*Households' actual social contributions (D.613)*
(-)	*Imputed rent of owner occupiers (9% of GDP following INEGI (2013))*
(-)	*Attributed property income of insurance policyholders (D.441)*
(-)	*Attributed investment income payable on pension entitlements (D.442)*
(-)	*Fixed capital consumption of the households's sector*
(=)	*Control for total income*

Notes: Numbers and letters in parenthesis represent the System of National Accounts (SNA) codes

Appendix B (table 21) shows the income control totals, which they represent between 59 - 60% of GDP

2.2.3 Definition of Income

Depending on the type of tax data, one can calculate net income (income after deductions and exempted income) or revenue (income before deductions and including exempted income). In the Mexican case, the definition of income can substantially affect the results (as seen in Section 5). As Atkinson et al. (2011) explain, "*it is obvious that those paying tax have a financial incentive to present their affairs in a way that reduces tax liabilities* [...] *The rich, in particular, have a strong incentive to understate their taxable incomes* [...] *Those with high salaries seek to ensure that part of their remuneration comes in forms, such as fringe benefits or stock options, that receive favorable tax treatment*". This might be true for the Mexican case where Mexican taxpayers could overstate the amount of deductions and costs specially for self-employment and business activities. As explained in Section 4, I suggest a methodology to adjust incomes to take into account tax evasion, in order to arrive to a better approximation of an "actual" income.

To show the importance of tax evasion, different definitions of income are computed (described in detail in Section 5). The results show that the ranking of individuals by net income and revenue is quite different. In the end, an analysis of three types of income, i.e., 1) Revenue, 2) Net income and 3) Income adjusted to control for tax evasion is presented.

3 Mexico's tax system

3.1 Tax revenue in Mexico and its comparison with other countries

As seen in Figure 3, Mexico has experienced an increase in tax revenues as a percentage of GDP during the last three decades. Tax revenues had gone from 14.48% in 1980 to 19.67% in 2013. However, Figure 4 shows that this increase has been lead by taxes on hydrocarbons; without them, the tax revenue has remained almost constant by going from 12.6% in 1990 to 13.9% in 2010. With respect to Latin America, in 2010, Mexico's performance lagged behind countries like Argentina, Brazil, Uruguay, Costa Rica, Chile and Ecuador with tax revenues as a percentage of GDP of 33.5%, 32.4%, 25.2%, 20.5%, 19.6% and 19.6%, respectively (OECD/ECLAC/CIAT, 2012).

Moreover, compared to other OECD countries (as seen in Figure 3), Mexico has experienced a poor tax enforcement, e.g., France went from a tax revenue of 39.4% in 1980 to 45.0% in 2013 and the OECD average went from 30.1% in 1980 to 34.13% in 2013; these results ranked Mexico as country 34$^{\text{rd}}$ of 34 members in the OECD. This poor performance can be partially explained by narrow tax bases, a high level of informality, severe problems of income coverage (substantial income sources at the top may be missing from the statistics due to reporting rules), evasion and exaggeration of allowable deductions in the case of self-employed and business (OECD/ECLAC/CIAT, 2012).

Figure 3: Tax revenues as a percentage of GDP (1990 - 2013)
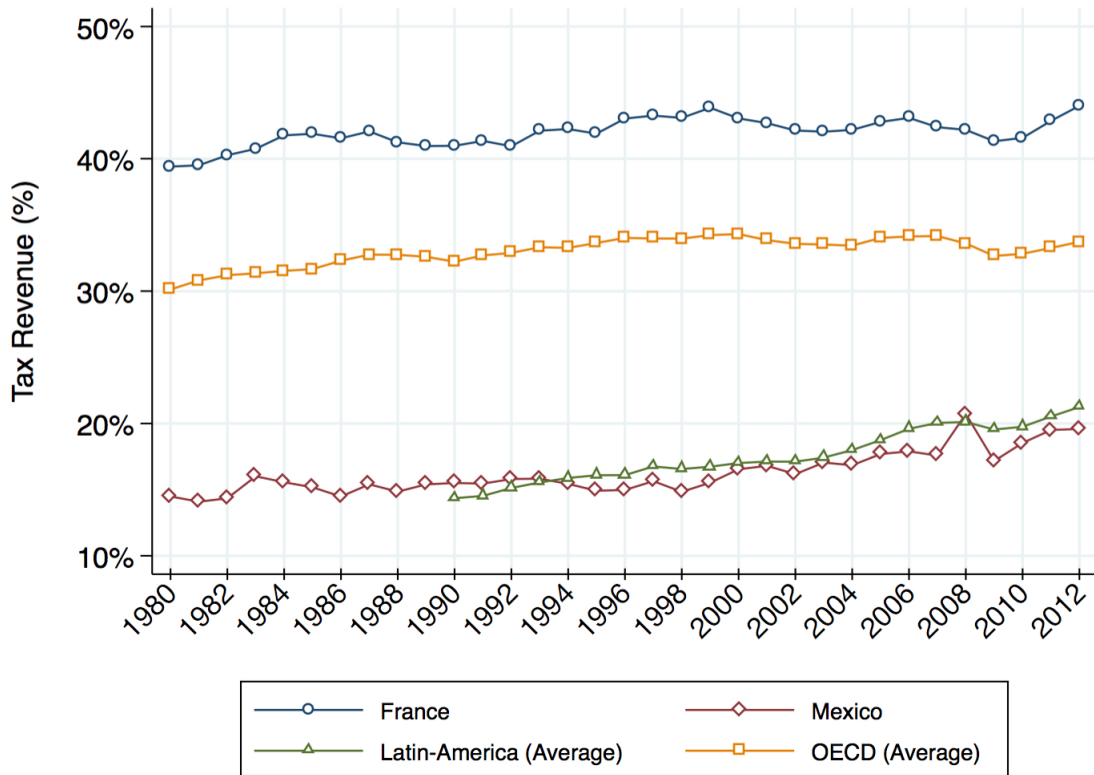
Source: Author's calculations using data from OECD, Mexico, France and Latin America

Notes: Latin - America represents 15 countries, i.e., Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, The Salvador, Guatemala, Mexico, Panama, Paraguay, Peru, Uruguay and Venezuela. Mexico and Chile are part of the OECD average.

Figure 4: Tax revenues as a percentage of GDP with and without taxes on hydrocarbons (1990 - 2010)
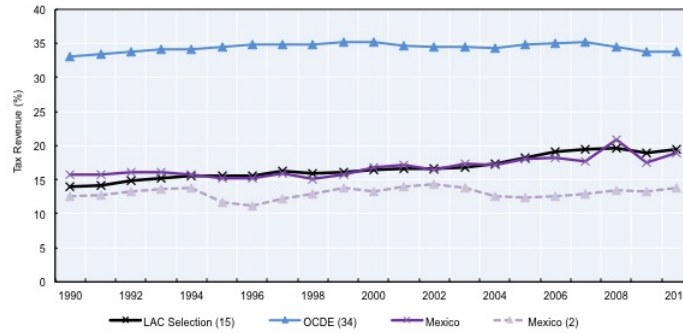
Source: OECD/ECLAC/CIAT (2012)
Notes: Mexico (2) represents the tax revenues as a percentage of GDP without taking into account taxes on hydrocarbons production. Latin - America represents 15 countries, i.e., Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, The Salvador, Guatemala, Mexico, Panama, Paraguay, Peru, Uruguay and Venezuela. Mexico and Chile are part of the OECD average.

3.2 Evolution of the tax structure

As depicted in Figure 3 and 4, the change in the tax revenue as a percentage of GDP in Mexico has experienced an evolution in its tax structure between 1990 and 2013. The six different categories of the tax structure, i.e., 1) "Goods and Services"[18], 2) "Income, profits and capital gains"[19], 3) "Social Security Contributions"[20], 4) "Taxes on Property"[21], 5) "Payroll and Workforce"[22] and 6) "Other Taxes"[23] show an interesting evolution and a shared reality of Latin-American countries. Figures 5 and 6 graph the pattern of the Mexican's tax structure between 1990 and 2013. In them, we can see that Mexican's tax revenue highly depends in indirect taxes such as those levied on "Goods and Services", which represented 55.3% of total tax revenue (8.7% of GDP) in 1990 and 52.6% of total tax revenue (9.9% of GDP) in 2010.

In Table 5, we can see that Latin-American countries share the same pattern as Mexico with respect to indirect taxes levied on "Goods and Services", while OECD countries show a relatively lower importance in their total tax revenue in these type of taxes (33.0% in 1990 and 33.1% in 2010). Moreover, Mexico's tax structure has changed considerably in the last two decades; as seen in Table 5, the importance of taxes on hydrocarbons increased by passing from 20.5% in 1990 to 26.2% in 2010. The dependance on these type of taxes indicates how the Public Finances of Mexico can be drastically impacted by the volatility of international oil prices. Additionally, Mexico's VAT doesn't represent an important source of revenue compared to other Latin-America or OECD countries; in 2010, it represented 3.9% of the GDP, while in Latin America countries it represented 6.6%. As explained in Appendix A.3, Mexico's VAT tax differs in geographical locations (as seen in Figure 34), and it suffers constant changes[24].

With respect to direct taxes, Mexico's taxes on incomes and profits have remained stable between 1990

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[18]It includes taxes levied on 1) production, sale, transfer, etc. (General, VTA, Sales and Specific goods and services), 2) use of goods and perform activities and 3) those unallocable between both last categories

[19]It includes taxes levied on 1) Individuals, 2) Corporate and 3) those unallocable between both last categories

[20]It includes taxes levied on 1) Employees, 2) Employers 3) Self-employed or non-employed and 4) those unallocable between the last three categories

[21]It includes taxes levied on 1) Immovable property, 2) Net wealth, 3) Estate, Inheritance and gift taxes 4) Financial and capital transactions and 5) Non-recurrent taxes

[22]It includes taxes levied on 1) Substitute tax on salary, 2) Payroll, 3) Remuneration to the personal work, 4) Professions and fees and 5) Operations by contract

[23]It includes taxes levied on 1) Paid solely by business and 2) Other

[24]The most recent change was its reform in 2010 that increased it in 1%

and 2013, and they are still lower than the OECD average. In 1990, they represented 27.1% of total tax revenue (4.3% of GDP), while in 2010 they represented 27.8% of total tax revenue (5.2% of GDP). Within these taxes, on one side, corporate ones remain lower than the OECD average by representing 2% of the GDP compared to 3% in OECD countries (OECD, 2012). In Appendix A.1.2, we see that profit corporate taxes are levied depending on the nature of the company: there is a general scheme[25] and a simplified one[26]. For the general scheme, there was a flat rate of 28% in 2009, which increased in 2010 to 30% during the presidency of Felipe Calderón[27] (as seen in Figure 32). On the other side, individual income taxes represent a lower proportion of total taxes compared to the OECD average; in 2010, they represented 15% of total tax revenue, whereas it represented 24% in OECD countries (OECD, 2012). As explained before, this lower proportion is partially due to narrow tax bases, a high level of informality, tax evasion, high level of low income taxpayers and an exaggeration of allowable deductions in the case of self-employed and businesses. In Sub-section 4.1.3, we see that the rules to declare the tax are complex[28] that could induce loopholes. The individual income tax is a progressive one, and it suffered a reform during the same period as the corporate tax.

Despite the increase in Social Security Contributions from 13.4% of total tax revenue (2.1% of GDP) in 1990 to 15.4% of total tax revenue (2.9% of GDP) in 2010, these taxes remain lower than the Latin-American average (17.2% of total tax revenue (3.6% of GDP) in 2010) and considerably lower than the OECD average (26.4% of total tax revenue (9.1% of GDP) in 2010). However, we need to take into account thatMexico has private social contribution scheme that prioritizes individual contributions.

Finally, with respect to taxes on property (including taxes levied on 1) Immovable property, 2) Net wealth, 3) Estate, Inheritance and gift taxes 4) Financial and capital transactions (Alienation of immovable property, Transfer of ownership of real estate and Purchasing property) and 5) Non-recurrent taxes), Mexico has remained completely stable during the last two decades by having a 1.5% of total tax revenue (0.2% of GDP) in 1990 and a 1.6% of total tax revenue (0.3% of GDP) in 2010. Within these taxes, on one side, the immovable property ones (*predial* in Spanish) are particularly lower (1% of total tax revenue) compared to the OECD average (3.3% of total tax revenue). The revenue from these taxes is relatively low, and this is explained by a combination of factors that limit their proper functioning. Among them, they stand out the limited operational capacity of tax administrations of subnational governments, low rates of coverage in the register of land, high levels of delinquencies, and a considerable undervaluation of properties due to the systematic lack of adequate update of assessed values (Jimenez, 2015). In Mexico, this low percentage isn't surprising since 60% of houses don't have property deeds (Torres, 2011).

Property taxes have always been of minor importance in Latin-America countries, up to the point of being virtually absent during many years as an alternative in discussions of tools to improve the distributional impact of tax systems in the region (Jimenez, 2015). On the other side, the fact that net wealth, inheritances, gifts and financial/capital transactions represent a very low percentage (in 2011, net wealth, inheritances and

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[25]This scheme applies to those companies conducting lucrative activities, i.e., for commercial companies (anonymous, limited responsibility, etc.), credit institutions (banks and brokerage firms) and decentralized organizations that sell goods or services.

[26]This scheme is dedicated to the companies that exclusively dedicate to the following activities: land transportation of cargo or passengers, agricultural, livestock, forestry, fishing and integrated companies.

[27]In 2009, under the presidency of Felipe Calderón, a second fiscal reform was passed (effectively working 1st January, 2010) by the Mexican congress in order to reduce the Mexican dependency of their budget to oil and reduce income inequality. Overall, this reform increased in 1% the Value Added Tax (VAT) rate, and increased in 2% the Income Tax Rate (ITR) for the top income earners.

[28]The individual income tax has several schemes such as wages, Business and Self-employment (General, Intermediate and *REPECOS*), simplified, among others.

gifts represented 0% of GDP, i.e., they were inexistent) of total tax revenue shows how easily capital can be transferred between and within generations exacerbating income and wealth inequality.

Figure 5: Tax structure in Mexico by sector as percentage of GDP (1990 - 2013)
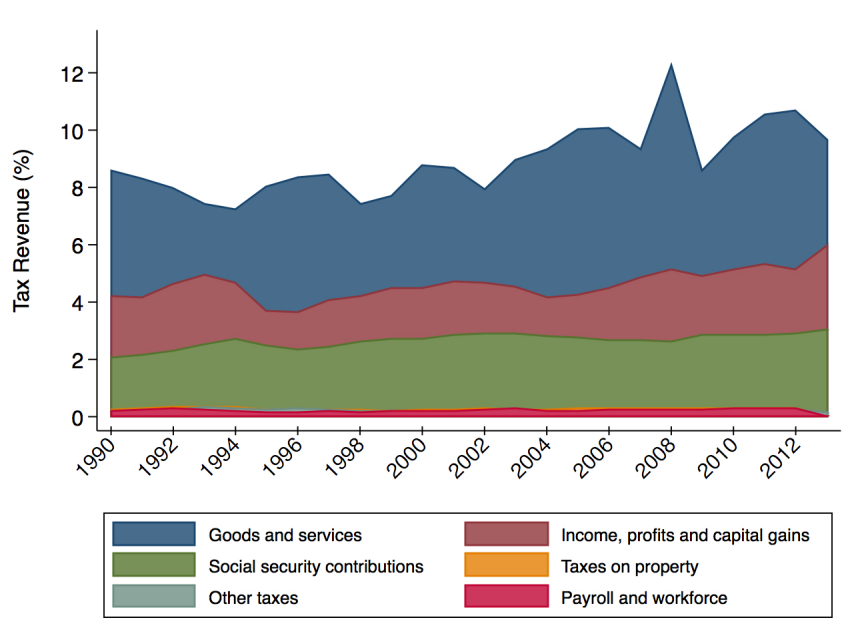
Source: Author's calculations using data from OECD.Stat
Notes: Each area under the curve represents the tax revenue of each sector as a percentage of GDP, e.g., in 1990, "Goods and services" represented 8.58% of GDP while "Income, profits and capital gains" represented 4.2% of GDP.

Figure 6: Tax revenue in Mexico by sector as percentage of total taxation (1990 - 2013)
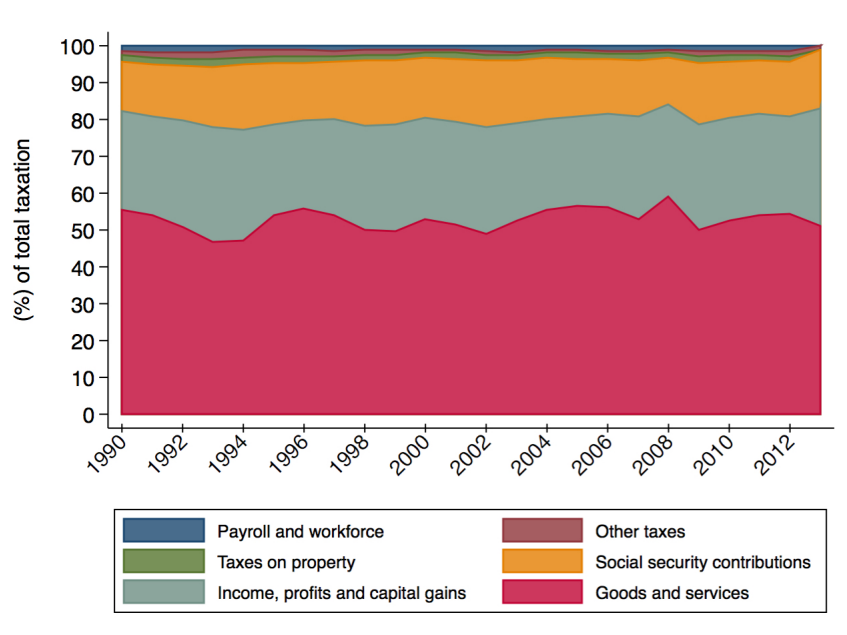
Source: Author's calculations using data from OECD.Stat
Notes: Each area under the curve represents the tax revenue of each sector as a percentage of total taxation, e.g., in 1990, "Goods and services" represented 55.3% of total taxation, "Income, profits and capital gains" represented 27.1% of total taxation, "social security contribution" represented 13.4%, and so on. The six taxes add up to 100%.

Table 5: Evolution of the Tax Structure in Mexico (1990 and 2010)

	1990			2010		
	Mexico	LAC	OECD	Mexico	LAC	OECD
Tax to GDP (%GDP)	15.8	13.9	33.0	18.8	19.4	33.8
Taxes on goods and services	8.7	7.1	10.4	9.9	9.9	11.0
	(55.3)	(53.0)	(33.0)	(52.6)	(52.1)	(33.1)
- General taxes (VAT and Sales tax)	3.3	3.3	5.9	3.9	6.7	6.9
	(20.8)	(21.6)	(18.1)	(20.5)	(34.7)	(20.5)
- Specific taxes	5.4	3.5	4.1	5.9	3.0	3.5
	(34.0)	(29.9)	(13.2)	(31.2)	(16.5)	(10.8)
↪ Taxes on hydrocarbons	3.2			4.9		
	(20.5)			(26.2)		
Taxes on Income and Profits	4.3	3.2	12.5	5.2	4.8	11.3
	(27.1)	(21.9)	(37.1)	(27.8)	(25.5)	(33.2)
Social Security Contributions	2.1	2.5	7.6	2.9	3.6	9.1
	(13.4)	(16.2)	(22.0)	(15.4)	(17.2)	(26.4)
Property Taxes	0.2	0.7	1.8	0.3	0.8	1.8
	(1.5)	(4.5)	(5.7)	(1.6)	(3.5)	(5.4)

Source: OECD/ECLAC/CIAT (2012)
Notes: Figures in brackets represent % of tax revenues. LAC = Latin-American countries

4   Tax noncompliance

As previously explained, between 1980 and 2013, tax revenues in Mexico remain low compared to other countries (as seen in Figure 3), and they remained stable if we don't take into account taxes on hydrocarbons (as seen in Figure 4). Previously, we described that this situation is the consequence of severe problems of income coverage (substantial income sources at the top may be missing from the statistics due to reporting rules), evasion and exaggeration of allowable deductions in the case of self-employed and business, among others. As explained in Alvaredo and Londono (2013), tax noncompliance in developing countries represents challenges when building top incomes with tax files. In Argentina, Alvaredo (2011b) suggested underreporting of between 27 and 40 percent. However, it varied with income. Evasion shows a lower impact at the bottom (where income from wage source dominates) and at the top of the tax scale (where inspections from the tax administration agency might be more frequent and enforcement through other taxes higher).

It's important to analyze it if we want to use tax files to estimate top income in Mexico. Is it the case like in Alvaredo and Londono (2013); Alvaredo (2011b) where underreporting of income uncovered a bigger unequal society? If tax evasion occurs and we are able to quantify it, we would be able to adjust the tax files to better approximate the "real income".

4.1   Tax evasion

Tax evasion occurs when individuals, corporations or trusts deliberately misrepresent or overrepresent the true state of affairs to the tax authorities in order to reduce their tax liability. Tax evasion is an obstacle to development and balanced growth, but also to justice in which tax systems should be based. It affects both horizontal equity (equal treatment of those who are in equal circumstances) and vertical equity (equal treatment of those who are in different circumstances). Regarding horizontal equity, tax avoidance can make individuals with the same ability to pay to not have the same tax burden, whereas vertical equity may be

affected, since people with greater tax capacity often have easier access to professional advice that often promote avoidance strategies (Jimenez et al., 2010).

4.1.1 Methodologies to estimate tax evasion

A fundamental difficulty in the process of analyzing tax evasion is the lack of relevant and first-hand information about the compliance of taxpayers. This is not surprising since tax evasion is illegal, and in general the economic agents have strong incentives to hide their deception (Fuentes, 2013). In order to quantify this behavior, a handful of methods have been developed to estimate tax evasion. Not all of these measurement methods stand-alone; it's possible, even advisable, to explore the possibilities of blending different methodologies.

In the first place, we have the method that uses audit based studies. This method uses data which results from a statistically valid sample of randomly selected tax returns which are subjected to audit. In terms of descriptive and predictive power, such data are generally agreed to provide a better measure of compliance with the tax laws (OECD, 2001). If the random sample has enough power and it's representative, the difference between each taxpayer's declaration and how much he/she should have been declared, would gives us an estimate of tax evasion.

In the second place, we have the case of conducting surveys to a sample of taxpayers. With these surveys, one would be able to have a broad range of explanatory variables that could allow to study behavioral responses to task compliance, risk expectations, among others. However, this method lacks in the answers' accuracy due to memory lapses, inability to report omissions, among others. These issues might be partially corrected while conducting carefully designed randomized controlled trials or laboratory experiments.

Finally, we have methods that use more aggregate types of data sources, such as the ones using National Accounts or the methods that use Household Surveys. In many cases, these two methods complement each other. For individuals, this method estimates a "theoretical" taxable base which comes from Household Surveys[29]; however, as previously explained, Household Surveys suffer from underreport of incomes, non-report and missing information from the richest individuals. In order to correct this, Jimenez et al. (2010) propose to adjust the underreport income[30] by comparing the total weighted income from different sources in the Survey (e.g. $\sum_{i=1}^{N}$ income$_i$ for $i = 1, \ldots, N$ individuals) with the ones in the National Accounts[31], in order to arrive to the following adjustment factor:

$$\text{Adjustment Factor} = \frac{\text{Adjusted National Accounts Income}}{\sum_{i=1}^{N} \text{income}_i} \tag{2}$$

Then, they multiply the income of each individual in the survey with the adjustment factor. After this, they calculate the "theoretical" taxable base in the following way:

$$\text{Theoretical Tax Base}_i = (\text{Adjusted income}_i - \text{Loses}_i - \text{Personal deductions}_i) * \tau_i \tag{3}$$

Where τ_i is the marginal tax rate for each individual. Afterwards, to calculate tax evasion[32]:

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[29]The benefit of using Household Surveys is that one can calculate a more precise "theoretical" taxable base since we have different levels of income. Normally, taxes levied on individuals have different tax rates depending on the level of income.

[30]To adjust for the non-report, they propose to impute income through three methods, i.e., mean imputation, *Hot Deck* or regression imputation

[31]The total amount in National Accounts needs to be adjusted to mimic as much as possible the actual income that Household receive. For example, to the income from the *wages* sector reported in National Accounts, one needs to deduct *Social Security Contributions, Social Insurance Contributions* and *Direct Taxes to wages* (Jimenez et al., 2010).

[32]Where the real tax base comes from National Accounts.

$$\text{Tax evasion rate} = \frac{(\sum_{i}^{N} \text{Theoretical Tax Base}_i) - \text{Real Tax Base}_i}{\text{Real Tax Base}_i} * 100 \qquad (4)$$

To correct for missing information from the richest individuals, Lakner and Milanovic (2013) propose to use a similar method as Jimenez et al. (2010), but making a Pareto imputation for the highest decile. First, they adjust the country-mean to equal the maximum of the survey mean and national accounts income. Second, they re-compute the decile shares for all deciles except the top using the original average decile incomes and the adjusted mean (the share in total income of those deciles therefore decreases). Third, they compute the new top decile share as the difference between 100% and the sum of the revised shares of the bottom 9 deciles. Finally, they use the revised top 10% and top 20% shares in the Pareto imputation (Lakner and Milanovic, 2013).

4.1.2 Literature Review of tax evasion in Mexico

In Mexico, it exists a small literature that analyses the noncompliance tax rates of individuals and societies (see for example, Jimenez et al. (2010); Fuentes (2013); Perez del Peral (2013); Fuentes (2011); ITAM (2006)), where almost all of these analyses were financed by the Mexican tax administration system (SAT for its acronym in Spanish). In general, these studies use one of the methods explain in Subsection 4.1.1, mostly the one that aggregates types of data sources. The complexity in the task of modeling tax evasion based on information from macroeconomic aggregates or household surveys is evident in the relative dispersion of estimated tax evasion in these studies. We will briefly explain the results of these studies.

Jimenez et al. (2010) analyze what is the income tax evasion rate for individuals and corporates. As data source and methodology, they use Household Surveys adjusting with National Accounts with the method described in the last section. Overall, they find that corporates evade 36% of "theoretical" income tax, individuals evade 7.7% for wages and 87% for business and self-employment, respectively. For individuals, income tax evasion decreased between 2002 and 2004 for wages, and it increased for business and self-employment, whereas for corporates, it increased between the same period. Fuentes (2013) follows the same methodology and data sources as Jimenez et al. (2010). He finds an evasion rate of 27.8% of value-added tax, 16.4% of income tax on wages, 74.1% of income tax on business and self-employment and 32.8% of income tax on corporates[33]. Fuentes (2011) uses the same methodology as previous studies while using a Survey specially design to capture micro-enterprises. For ITAM (2006), they find a tax evasion of 24.3% of value-added tax, 30.5% of income tax for corporates and 77.1% of income tax on business and professionals. Table 6 summarizes the results.

Table 6: Tax evasion (%) in Mexico

	Income Tax for Individuals		Income Tax	Value-Added
	Wages	Business/Profs.	Corporates	Tax
Jimenez et al. (2010)	7.7	87	36	-
Fuentes (2013)	16.4	74.1	32.8	27.8
Fuentes (2011)	-	94	-	-
ITAM (2006)	21.7	77.1	30.5	24.3

Source: Jimenez et al. (2010); Fuentes (2013); Perez del Peral (2013); Fuentes (2011); ITAM (2006)
Note: Numbers in percentages (%). For Fuentes (2011), *income tax and value-added tax are calculated as one number; as well, Business are represented as micro-enterprises.*

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[33]These percentages are averages of years 2004 - 2012.

Overall, the estimates differ due to different methodologies, data sources or years; however, we see a clear pattern in all the studies where those that conduct business and self-employment are the ones that evade a higher percentage of tax. Moreover, they use data sources, which don't represent the whole population of businesses or people. Since tax data is being used to estimate top incomes and this data contains businesses incomes as a source of total income, analyzing and correcting for tax evasion needs to be done. In the next section, it will be analyzed how individuals declare their income tax, how they evade it and the methodology that it's followed in order to adjust for tax evasion.

4.1.3 Tax erosion and exemptions

In the last 35 years, the income tax has suffered several structural reforms, which allowed to quasi-entirely cover several income sources of individuals and corporates (net wealth, inheritances and gifts are examples of sources of income that aren't taxed). In Mexico, the income tax changes depending on the legal and revenue situation of each person or business. Regarding the legal situation, we have two cases, i.e., individuals and corporates.

Within the "individual's" legal situation, taxes can be obtained from one of the following sources, i.e., I) wages, II) business and self-employment, III) leasing, IV) disposal of property, V) acquisition of goods, VI) interests, VII) prizes, VIII) dividends and IX) other income not included on the ones already mentioned, and it taxes them in a marginal way (as seen in figure 8, tables 7 and 8). During the end of the 80's, a period in which the Mexican economy moved through episodes of high inflation, the income tax structure was reformed on the basis that it also incorporates changes in the real value of assets and liabilities (Jimenez et al., 2010). If individuals[34] earn income from more than one source, they must present all their sources in one annual tax return (as seen in table 12). The following graphs depict the marginal income tax rates between 2009 - 2012 and the top income tax rate between 1986 - 2014:

Figure 7: Top income tax rate (1986 - 2014)
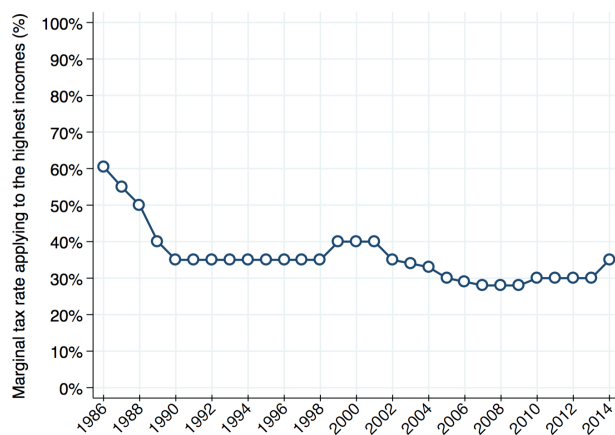
Source: Ley del impuesto sobre la renta (1986-2014)

Figure 8: Marginal Tax Rate (2009 - 2012)
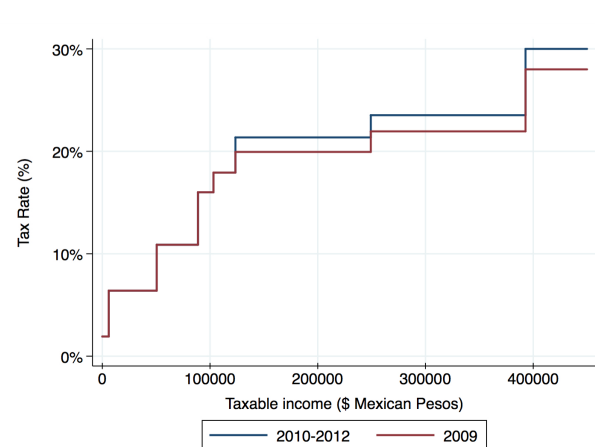
Source: Ley del impuesto sobre la renta (2009-2014)

As shown in figure 7, the top income tax rate has been reduced by almost 50% between 1986 and 2014, i.e., passing from 60.5% to 32%. Moreover, the following tables show in a more detailed way how in 2009,

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[34]Someone is considered an individual if it is a Mexican resident, i.e., when he/she establishes his/her home in Mexico or its main source of income comes from the country. In the case of non-resident individuals, the income tax exclusively levies the income received when the source is located in Mexico (Ley del impuesto sobre la renta, 2008-12)

under the presidency of Felipe Calderón, a fiscal reform was passed (effectively working 1st January, 2010) by the Mexican congress in order to reduce the Mexican dependency of their budget to oil and reduce income inequality. Overall, this reform increased in 1% the Value Added Tax (VAT) rate, and increased in 2% the Income Tax Rate (ITR) for the top income earners. These tables depict the different brackets as Figure 8 does:

Table 7: Income tax (2009)

Brackets of annual income ($MX)	Fixed payment	Marginal tax rate (%)
0 - 5,952.84	0	1.92
5,952.85 - 50,524.92	114.24	6.4
50,524.93 - 88,793.04	2,966.76	10.88
88,793.05 - 103,218.00	7,130.88	16
103,218.01 - 123,580.20	9,438.60	17.92
123,580.21 - 249,243.48	13,087.44	19.94
249,243.49 - 392,841.96	38,139.60	21.95
over 392,841.97	69,662.40	28

Source: Ley del impuesto sobre la renta (2009)
Note: Current Mexican Pesos

Table 8: Income tax (2010 - 12)

Brackets of annual income ($MX)	Fixed payment	Marginal tax rate (%)
0 - 5,952.84	0	1.92
5,952.85 - 50,524.92	114.24	6.4
50,524.93 - 88,793.04	2,966.76	10.88
88,793.05 - 103,218.00	7,130.88	16
103,218.01 - 123,580.20	9,438.60	17.92
123,580.21 - 249,243.48	13,087.44	21.36
249,243.49 - 392,841.96	39,929.04	23.52
over 392,841.97	73,703.40	30

Source: Ley del impuesto sobre la renta (2010)
Note: Current Mexican Pesos

In addition to adjusting the top income tax rate, a key part of the fiscal reforms efforts undertaken over the last twenty five years have focused on broadening the base of income tax applicable to individuals. In spite of significant gains in this direction, there are still sources of income enjoying special treatment without necessarily existing technical arguments to justify it. Some of the main areas that currently enjoy any kind of total or partial exemption of capital gains in transactions from selling households, some income from interests, royalties and certain type of employment benefits (Jimenez et al., 2010). This, coupled with the relative inequality in income distribution in Mexico are some reasons explaining why only 45 percent of employees (those with a gross income 4 minimum wages or more) are subject to the payment of income tax as can be seen in table 9. In the previous table, we are able to see that 54% of the population is subsidized in terms of the income tax rate.

Table 9: Proportion of individual income tax (wages) paid by minimum wage brackets (2006)

Gross-income (# of minimum wages)	(%) of total workers	(%) of income tax revenues
0 - 4	54	-8
4 - 10	31	17
10 - 20	9	25
over 20	6	66
Total	100	100

Source: SHCP (2006)

Setting aside the topic of income sources exemptions, Table 6 shows that tax evasion in Mexico represents a big problem with respect to tax erosion. According to four studies, the average tax evasion rate for income of salaries, business and professional, corporates and the value-added tax is 15.2%, 83.05%, 33.1% and 26.05%, respectively. As Alvaredo and Londono (2013) explain, developing countries benefit from a large number of tax reliefs that significantly erode the tax base and benefit the rich disproportionately. In this study, it is

believed that Mexico suffers a similar case as other countries, and this phenomenon impedes looking at the "real income" in the tax files, specially for business and self-employed. For example, as seen in Tables 10, 11 and 12, in order to arrive to a lower *total taxable income*, individuals can exaggerate three main steps, i.e., 1) total exempt income, 2) total authorized deduction 3) total personal deductions and 4) total payments for educational services[35] or underreport gross revenue or gross wages.

Table 10: Calculation of annual income tax for income from wages

	Total income from wages
(-)	*Total exempt income*
(=)	*Total net income from wages*
(-)	*Total personal deductions*
(-)	*Total payments for educational services*
(=)	*Total taxable income*
(-)	*Lower limit*
(=)	*Excess of lower limit*
(x)	*Marginal tax rate*
(=)	*Marginal tax*
(+)	*Fixed Payment*
(=)	*Determined income tax*

Source: Ley del impuesto sobre la renta (2009 - 2012)
Note: The specific marginal tax rate and fixed payment can be found in tables 7 and 8.

Table 11: Calculation of annual income tax for income from business and self-employment

	Total gross revenue
(-)	*Total authorized business deductions*
(=)	*Total net revenue from business act.*
(-)	*Total personal deductions*
(-)	*Total payments for educational services*
(=)	*Total taxable income*
(-)	*Lower limit*
(=)	*Excess of lower limit*
(x)	*Marginal tax rate*
(=)	*Marginal tax*
(+)	*Fixed Payment*
(=)	*Determined income tax*

Source: Ley del impuesto sobre la renta (2009 - 2012)
Note: The specific marginal tax rate and fixed payment can be found in tables 7 and 8.

Table 12: Calculation of annual income tax for an individual that receives income from wages, business activities and dividends.

	Total income from wages
(-)	*Total exempt income*
(=)	*Total net income from wages*

	Total gross revenue
(-)	*Total authorized business deductions*
(=)	*Total net revenue from business act.*

(=)	*Total income from dividends*

	Total net income from wages
(+)	*Total net revenue from business act.*
(+)	*Total income from dividends*
(=)	*Total net income*
(-)	*Total personal deductions*
(-)	*Total payments for educational services*
(=)	*Total taxable income*
(-)	*Lower limit*
(=)	*Excess of lower limit*
(x)	*Marginal tax rate*
(=)	*Marginal tax*
(+)	*Fixed Payment*
(=)	*Determined income tax*

Source: Ley del impuesto sobre la renta (2009 - 2012)
Note: The specific marginal tax rate and fixed payment can be found in tables 7 and 8.

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[35]These deductions were allowed starting 2012.

Thanks to the last tables, it's worth to note that there are four types of ways in which individuals can erode their totable taxable income: 1) over reporting total exempt incomes, 2) over reporting total authorized deductions 3) over reporting total personal deductions and 4) over reporting total payments for school tuition.

Exempted income   No income tax is payable by obtaining income from the following sources: (1) overtime within the limits established on the Federal Labor Law (*LFT* in Spanish)[36], (2) working during rest days[37], (3) compensation for occupational hazards or illnesses, (4) retirements, pensions, retirement assets and annuities, (5) reimbursement of medical, dental, hospital and funeral expenses (6) social security benefits granted by public institutions, (7) disability benefits, educational scholarships, child care, cultural and sports activities, (8) contributions and their returns from the hosing and saving funds, (9) social security fee paid by employers, (10) seniority bonuses, (11) retirement and compensation for up to 90 times the daily minimum wage[38], (12) bonuses for up to 30 days of the minimum wage, (13) vacation pay and employee participation in corporate profits for up to 15 days of the minimum wage, (14) Sunday premiums for up to a daily minimum wage for each Sunday worked, (15) travel expenses, (16) income received from the sale of the taxpayer's house and does not exceed 1,500,000 units of investment[39], (17) interests coming from checking accounts for the deposit of salaries, pensions, retirement assets or savings deposits, (18) payments of insurance institutions, (19) inheritances and legacies, (20) donations between spouses, descendants or straight ascendents and (21) the prizes awarded on the occasion of a scientific, artistic or literary contest

Authorized deductions   Depending on the income source of taxpayers, individuals may deduct expenses, costs, among others. We will describe each source's authorized deductions:

- Income coming from *business activities*: 1) returns, discounts or bonuses made to the merchandise (national and international), 2) purchases of goods and raw materials, semi-finished or finished products used to manufacture or sell the merchandise (national and international), 3) investments, 4) inflationary loss, 5) interests paid arising from loans as long as the capital have been invested in the purposes of their activities, 6) contributions paid by employers to the Mexican Social Security Institute (IMSS), even when they are paid by their workers, 7) contributions paid to the *SAR*, the *INFONAVIT* and retirement plans, 8) wages or benefits paid to other employees, 9) wages or benefits paid to the elderly and/or people with disabilities, 10) expenses paid due to natural disasters, 11) expenses on special sea diesel, 12) expenses on other type of diesel, 13) expenses on natural gas, 14) toll road payments, 15) expenses on technological development research, 16) expenses on domestic film production, 17) expenses on domestic theatrical production, 18) repairs and adaptations considered historical properties, located in the taxpayer's downtown, 19) maneuvers, packages and freight costs in the country for the disposal of food goods, 20) service fees, 21) royalties and technical assistance, 22) use or enjoyment of properties, 23) insurances and securities, 24) gas and vehicles maintenance, 25) other taxes already paid apart from income tax, business tax and value-added tax, 26) local taxes, 27) salaries for first job employees 28) fiscal stimulus of the elderly and/or people with disabilities, 29) payments due to the temporary use of cars and 30) "other" deductions

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[36]This applies for minimum wage earners, for non-minimum wage earners, one may deduct up to 50% of this type of income and not surpassing 5 minimum wages per week.

[37]Idem

[38]In 2012, there were two daily minimum wages. Those in area "A" ($MX 62.33) and those in are "B" ($MX 59.08)

[39]The Investment Units are units of value that are based on the price increase and are used to fund mortgage obligations or any commercial act. In this site, you can find the historical values.

- Income coming from *self-employed*: 1) Wages or benefits paid to the elderly and/or people with disabilities, 2) wages or benefits paid to other employees, 3) other taxes already paid apart from income tax, business tax and value-added tax, 4) insurances and securities, 5) per diem and travel expenses, 6) gas and vehicles maintenance, 7) contributions paid to the *SAR*, the *INFONAVIT* and retirement plans, 8) contributions paid by employers to the Mexican Social Security Institute (IMSS), 9) local taxes, 10) salaries for first job employees 11) fiscal stimulus of the elderly and/or people with disabilities, 12) expenses paid due to natural disasters, 13) payments due to the temporary use of cars and 14) "other" deductions.

- Income coming from *leasing properties*: 1) payments made by the corresponding property tax calendar year on those properties, 2) maintenance costs that do not involve additions or improvements to the property in question, 3) the real interest paid on loans used for the purchase, construction or improvement of the property, 4) the cost of insurance premiums that cover the property, 6) investments in construction, including additions and improvements to the property, 7) salaries for first job employees and 8) fiscal stimulus of the elderly and/or people with disabilities.

- Income coming from *selling a property*: 1) the amount of investments made in constructions, improvements and extensions to the property and 2) notary fees, taxes and duties paid for the deeds; also, the payments made to value the property.

Personal deductions Individuals may deduct the following personal expenses: (1) payments for medical, dental and hospital fees that taxpayers do for themselves, for their spouse, for whom living in union, for their ancestors or lineal descendants, (2) funeral expenses that the taxpayer makes to their spouse, ancestors or lineal descendants, (3) donations (up to 7% of the taxable income of the previous year) to the federation, the states or municipalities and decentralized agencies, nonprofit civil societies dedicated to research, associations and civil societies that grant scholarships, (4) voluntary contributions retirement, severance and old age account (up to 10% of taxable income of the taxpayer without exceeding five minimum wages), (5) the premiums for medical insurance for their spouse, ancestors or lineal descendants and (6) payments for mandatory school transportation for lineal descendants.

School tuition Starting 2012, taxpayers are able to deduct tuition incurred by the taxpayer, for themselves, their spouse, domestic partner, children or parents. In table 13, we have the specific quantities:

Table 13: Authorized tuition deductions (2012)

Category	Up to ($MX)
Kindergarten	14,200.00
Elementary school	12,900.00
Middle School	19,900.00
Technical professional	17,100.00
High School	24,500.00

Source: Ley del impuesto sobre la renta 2012.

As already explained, the amount of deductions and exempted income that erodes the tax base is quite large, if we take the last lists there are at least 82 ways to erode it. These broad lists erode the income used to calculate top rates, since taxpayers may over-report them in order to pay lower taxes (as depicted in Jimenez et al. (2010); Fuentes (2013); Perez del Peral (2013); Fuentes (2011); ITAM (2006)). However, not all

deductions have the same weight on the total amount of deductions. Figures 9 and 10 show the sources that represent the biggest percentage of total deductions for *business* and *self-employment*, respectively. Tables 26 and 27 show the complete tabulations.

Figure 9: Main *self-employment* deductions as a percentage of total deductions (2009)
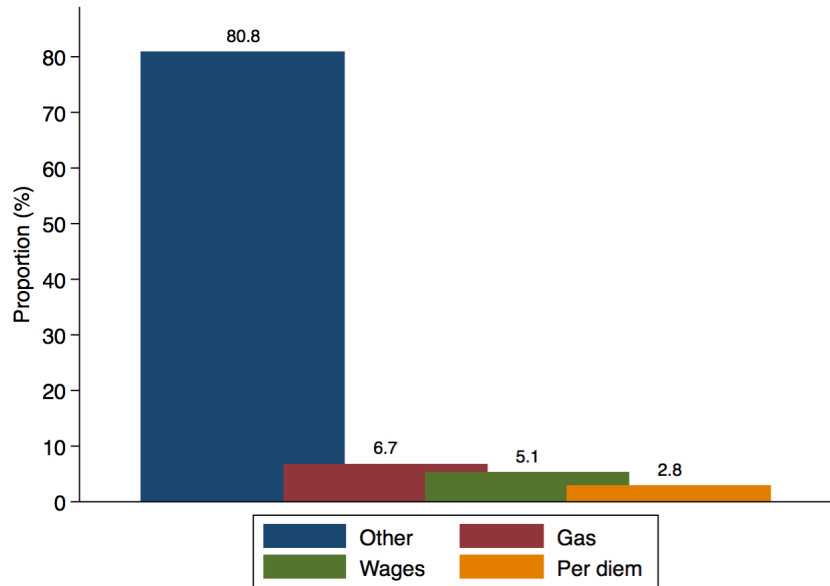
Source: Author's calculations based on tax data of 2009
Note: Deductions for all taxpayers that report positive deductions

Figure 10: Main *business* deductions as a percentage of total deductions (2009)
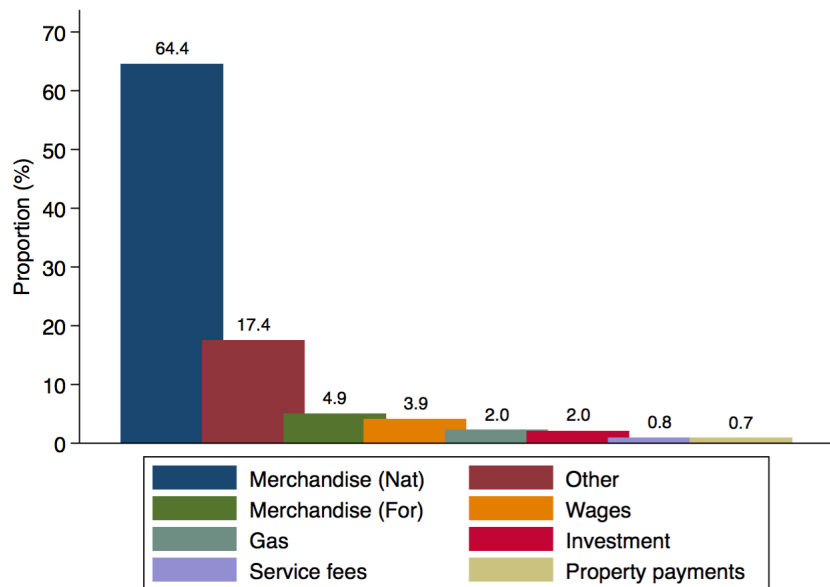
Source: Author's calculations based on tax data of 2009
Note: Deductions for all taxpayers that report positive deductions

As portrayed in Tables 26, 27 and figures 9, 10, income deductions for self-employment and businesses are concentrated in few categories. On one side, for self-employment activities, these categories are wages, per diem, gas expenditures and other deductions with a 5.13%, 2.79%, 6.68% and 80.78% of total deductions, respectively. On the other side, for business activities, these categories are purchases of goods and raw materials (national), purchases of goods and raw materials (foreign), investments, wages, gas expenditure, other deductions, services fees and property payments with a 64.42%, 4.86%, 1.97%, 3.91%, 2.01%, 17.41%, 0.8% and 0.7% of total deductions, respectively.

4.1.4 Methodology to adjust fiscal data in order to reduce tax evasion

The standard objection to the use of income tax data to study the distribution of income is that tax returns are largely works of fiction, as taxpayers seek to avoid and evade being taxed. The underreporting of income can affect cross-country comparisons where there are differences in prevalence of evasion and can affect measurement of trends where the extent of evasion has changed over time (Atkinson et al., 2011). Banerjee and Piketty (2005) use wage data, because taxes are typically deducted at the source and employers have a strong incentive to report what they pay because wage payments are deductible from employers' taxes. They conclude that there was a real increase in top incomes rising 81% between 1987/88 and 1999/2000 for the top percentile of the wage distribution compared with 71% for the top percentile of the income distribution. As (Atkinson et al., 2011) explain, the different pieces of evidence indicate that tax evasion and tax avoidance need to be taken seriously and can quantitatively affect the conclusions drawn. They need to be borne in mind when considering the results but they are not so large as to mean that the tax data should be rejected out of hand.

In Sub-section 4.1.2 and 4.1.1 , we reviewed the global rate of tax evasion in Mexico and how it is estimated, respectively. Sub-section 4.1.3 suggests deductions and income exemptions that individuals may use in order to evade taxes and underreporting income. In this subsection, we are going described the strategy to adjust for underreporting income. Measuring tax evasion is all but simple, as previously explained it can be approximated via different methodologies. In here, the direct method to estimate tax evasion will be used, while assuming that tax evaders might consider declaring a closer-to-true income in an anonymous interview, such as the Economic Census or a Household Survey. Specifically, the basic assumption is that an income receiver who decides to evade tax payment will underreport her taxable income to tax authorities but declare the true income, or at least a closer approximation to the true income, to an interviewer who grants anonymity.

Following this assumption, Fiorio and D'Amuri (2006) use the Italian Survey of Household Income and Wealth dataset and compare it with the tables of the Ministry of Finance on incomes and tax returns. For them, the difference between survey grossed-up income and population tax forms data can be considered as the sum of underground economy (tax avoidance and evasion concerning legal activities) and of informal economy. At first, the authors create income distribution by deciles by ordering incomes in ascending order and by dividing them in ten groups with the same number of individuals. Afterwards, the percentage of tax evasion is then estimated as the ratio between the mean income within a Household Survey decile and the mean income within the corresponding tax decile, as seen in equation 5:

$$\alpha_i = \frac{\bar{y_i}^{\text{Survey}}}{\bar{y_i}^{\text{Tax}}} \qquad \forall\, i = 1\,,\ldots,\,100 \tag{5}$$

Where $\bar{y_i}^{\text{Survey}}$ and $\bar{y_i}^{\text{Tax}}$ denote the average income at centile i as reported in tax returns and in the

survey respectively, whereas α_i denotes the tax evasion rate at at centile i. In the same road, Matsaganis et al. (2010) apply a variation of the discrepancy method developed by Fiorio and D'Amuri (2006), in the sense that they also estimate tax evasion by comparing the tax returns and income survey responses; however, tax evasion results aren't depicted by centiles, but by income source and geographical area for the entire income distribution[40]. In other words, they specifically assume that all income from source j earned by residents of area i is under-reported at the same rate, regardless of its level (Matsaganis et al., 2010). To "control" for tax evasion, they calculate "adjustment factors" for each source j earned by residents of area i in the following way:

$$\alpha_{ij} = \frac{\bar{y_{ij}}^{\text{Survey}}}{\bar{y_{ij}}^{\text{Tax}}} \tag{6}$$

However, in this study, the objective is not to calculate the total amount of evaded tax in Mexico, but to adjust the income declared in tax data with respect to tax erosion coming from exempted income, authorized deduction and personal deductions (as seen in Sub-section 4.1.3). To calculate it, three different data sources will be used (as described in Section 2), i.e., the 2009 Economic Census, 2009 micro-data files and the 2009 Mexican Household Survey (ENIGH). For each data source, the following proportions will be calculated:

$$\beta_{ilm} = \frac{\bar{c_{lm}}}{\bar{y_{im}}} \qquad m = \text{Tax, Survey, Census} \quad i = 1, \ldots t \quad l = 1, \ldots e \tag{7}$$

Where $\bar{c_{lm}}$ denotes average exempted income, authorized or personal deductions l from data source m, whereas $\bar{y_{im}}$ denotes average income or earning i from data source m. Finally, β_{ilm} represents the proportion of l "costs" over i "income" from data source m. After calculating, each proportion, tax evasion (λ_{il}) will be calculated as one minus the proportion of l "costs" over i "income" from data source n (β_{iln}) over the proportion of l "costs" over i "income" from data source m (β_{ilm}) :

$$\lambda_{il} = 1 - \frac{\beta_{iln}}{\beta_{ilm}} \qquad m \neq n, \quad i = 1, \ldots t \tag{8}$$

Considering the case where $m = \text{tax}$ and $n = \text{Census}$, if $\lambda_{il} > 0$, one would be suspecting that individuals in the tax data overreport their expenses to the tax authorities. If this is the case, taxable income would be underreported, and "cost" l should be adjusted in tax data by a factor of λ_{il}. λ_{il} will be analyzed for different brackets of income, this with the hypothesis that individuals behave differently throughout the income distribution. λ_{il} can be seen as a weight to deductions reported in tax files.

4.2 Results on tax evasion

Figures 9 and 10 give us a hint of which types of deductions could be overstated. Nevertheless, the methodology proposed in Sub-section 4.1.4 was followed in order to have a precise weight (λ_{il}) in order to adjust authorized deductions and investments. In order to follow the methodology proposed and calculate equations 7 and 8, this study selected those observations in the Economic Census data that best resembled the ones in the Tax files. The 2009 Economic Census provides economic information of virtually all economic activities that take place in Mexico; however, in order to make it comparable to the tax data, this study chose only those economic units from the private sector where the owner is defined as an individual or an owner without partners[41].

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[40]The authors don't follow Fiorio and D'Amuri (2006) since adopting their approach amounts to implicitly assuming away re-ranking effects, which in turn under-estimates the regressive impact of tax evasion.

[41]This left the number of observations in 3,356,300 compared to the 3,724,019 original ones.

Economic Census data provided detailed information on: 1) expenses made in order to conduct its business such as raw materials, water, electricity, rents, among others, 2) income from the sale of products, goods or the provision of services and 3) investments done. However, information that could be compared with tax files[42] was only used; in the end, this study will be comparing the following categories: 1) Total expenses on goods and services, 2) Goods purchased for resale, 3) Expenses on gas, 4) Expenses on rental of property, 5) Expenses on service fees, 6) "Other" expenses and 7) Investments. These categories constitute those expenses that represent the biggest proportion of total expenses (as seen in figures 9 and 10).

As a first approach, Figure 11 summarizes the results of equation 8 for all the business units in the Census and comparable categories with the ones in the tax data[43]. Overall, all available authorized deductions were exaggerated in the tax data, ranging from 17.9% for total expenditures to 41% in investment. However, it's more informative to calculate equation 8 for each category in the tax data, i.e., self-employed, intermediate business scheme and general business scheme.

Figure 11: Evasion rate (λ_{il}) in equation 8.

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[42]In the tax data, we are only able to see if an individual reported income from Self-employment, intermediate scheme and business scheme; therefore, if an individual reported an income greater than zero coming from one these sources, it was considered as a business. For example, if an individual reported incomes greater than zero for Self-employment, intermediate scheme and business scheme, it was considered as three different business, i.e., one business in self-employment, one in the intermediate scheme and one in the business scheme. Moreover, in the tax files, each business scheme wasn't required to fill each of the rows presented in this table. Expenses on goods and services and the number of observations were calculated for the three types of business. Goods purchased for resale, expenses on rental of property, expenses on service fees, machinery and equipment, property, transport equipment and furniture and office equipment was calculated for the business scheme only. Expenses on gas and "other" expenses was calculated for self-employment and business scheme. Finally, total of investments was calculated for the intermediate scheme and the business scheme. For the Economic census, a business was taken into account if it had an income greater than zero.

[43]The same analysis was conducted using the National Household Income and Expenditure Survey, *ENIGH*, since it contains a specific section for Household's businesses. However, this data isn't comparable with the tax data due to the fact that most of the businesses in the Survey are considered as micro-enterprises. During 2010, on average, their annual revenue was of $*US* 3,116, whereas the tax data mostly contains businesses with bigger revenue. Nevertheless, the evasion rate was computed for the total expenditures category, arriving to an evasion rate of 31.9%

In the Census data, INEGI granted access to each business North American Industry Classification System (SCIAN 2007). This allowed us to make a better comparison between tax and economic census data for the self-employed, since we could chose those businesses in the Census data that conducted a self-employed activity[44]. For this case, the comparison between tax and census data could be only done for total expenditures, gas expenditures and "other" expenditures.

To begin with, the three types of authorized deductions are exaggerated in tax declarations compared to the ones declared in the economic census. On one side, total and gas expenditures were overstated on average by 25% and 51%, respectively. On the other side, as seen in figure 9, the "others" section represents almost the entire proportion of total deductions for self-employed. When making the comparison, we see that this type of deduction is overestimated on average in the tax data in almost 52%.

When calculating the income adjusted by these results, self-employment income will be adjusted with weights of 0.5 for gas and "other" expenditures and 0.25 for total expenditures.

Figure 12: Evasion rate (λ_{il}) in equation 8 for self-employed.
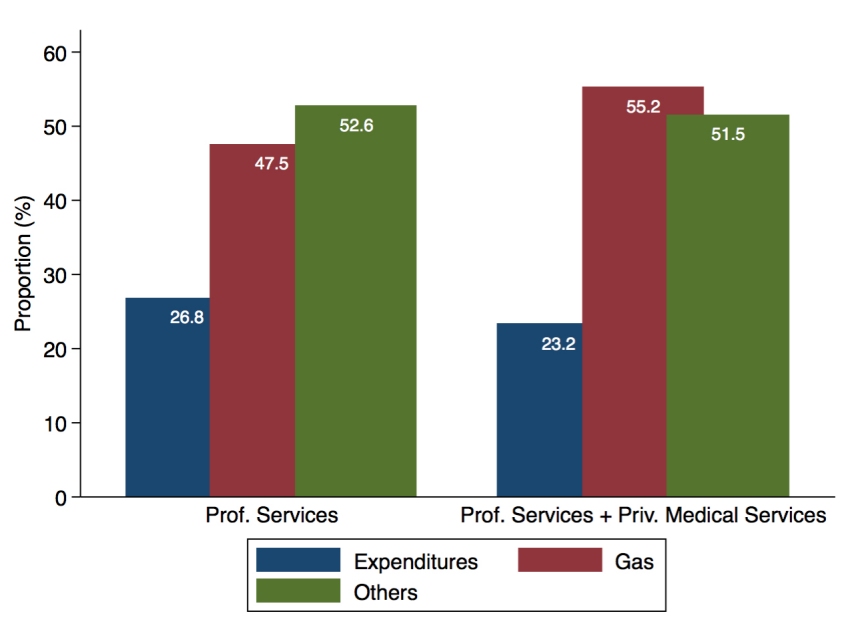
Source: Author's calculations based on tax and economic census data of 2009
Note: Evasion rate calculated for all observations in Economic Census and tax data. Detail regarding the construction of both databases can be seen in footnote 42. Income is referred as revenue in both tax and economic census data. "Others" and gas expenditures were calculated independently of total expenditures.

Finally, after having the weights for self-employed, equation 8 was calculated for different brackets of revenue, this with the hypothesis that individuals evade taxes differently throughout the revenue distribution. Figure 13 summarizes the results for the four most important authorized deductions for business, i.e., total expenditures, gas expenditures, merchandise expenditure and investments. Some evasion patterns resulted from this exercise. First, evasion rates tend to be smaller at the higher income ranges. Second, total

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[44]In the tax data, an individual is considered as doing a professional activity if its professional activity income is greater than zero. In the economic census, a business is considered as conducting professional activities if the business is classified, via SCIAN codes, as one that conducts professional, scientific, and technical services (as seen in the columns to the left of figure 12), or as one that conducts professional, scientific, and technical services and private offices of physicians, dentists, chiropractors, optometrists, mental health practitioners, physical, occupational and speech therapists, and audiologists, podiatrists and all other miscellaneous health practitioners (as seen in the columns to the right of figure 12)

investments represent the authorized deduction that is exaggerated the most at almost every revenue range level. Third, merchandise and total expenditures present an almost constant evasion rate throughout the revenue distribution. Lastly, gas expenditures and total investment present an inverted U-shaped pattern reaching its maximum at the 7-7.5 million threshold.

Figure 13: Evasion rate (λ_{il}) in equation 8 by revenue brackets.
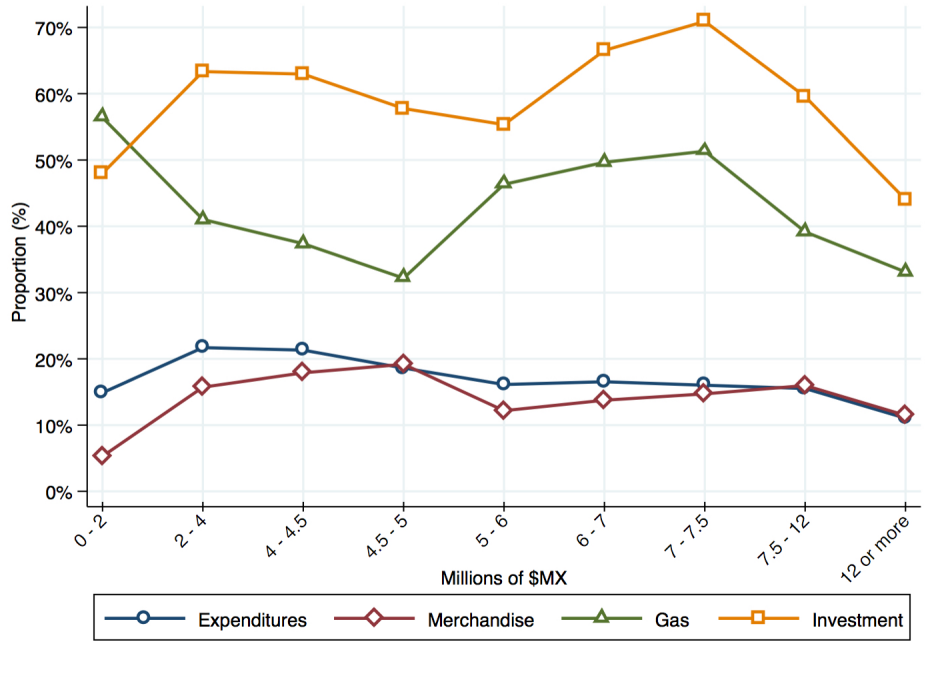
Source: Author's calculations based on tax and economic census data of 2009
Note: Evasion rate calculated for all observations in Economic Census and tax data. Income ranges are defined with respect to revenue.

These results will be used to adjust intermediate and general business schemes. On one side, general business income will be adjusted in two different ways. First, it will take an average of the results for income ranges higher than 4 millions of $MX. Second, it will apply the results for each point in the distribution (as seen in table 32)[45]. On the other side, intermediate scheme will be adjusted in two different ways as well. First, it will used the weights obtained for the threshold 2-4 millions of $MX[46], i.e., 0.63 for total investments and 0.21 for total expenditures. Second, it will apply the same process as the one done for general business and the income ranges (as seen in table 32)[47].

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[45]Appendix E, Sub-section E.4 presents top shares, thresholds and averages for this definition
[46]In order to be part of the Intermediate Business Scheme, the Tax Income Law (2009 - 2012) requires taxpayers to exclusively obtain income from business activities, and the amount has not to be between $2,000,000 and $4,000,000 Mexican Pesos.
[47]Idem

5   Top incomes

Top income shares are presented for three definitions of income: 1) Revenue, 2) Net income and 3) Income adjusted by tax evasion, which is adjusted in five categories, i.e., rents, other income, self-employment, intermediate business scheme and general business scheme. They were constructed series for a number of higher fractiles within the top decile: the top 5 percent (P95 – 100), the top 1 percent (P99 – 100), the top 0.5 percent (P99.5 – 100), the top 0.1 percent (P99.9 – 100), and the top 0.01 percent (P99.99 – 100). Each fractile is defined relative to the total number of potential tax units (aged 20 or more) in the Mexican population.

As previously explained, different definitions of income were explored, which considerably affected the top shares. These definitions are described in detail in table 24, and they all exclude capital gains. The definitions of incomes includes all incomes reported on personal and employer-reported tax returns, 1) Wages and salaries, 2) Rents, 3) Interests, 4) Prizes, 5) Dividends, 6) "Other" income, 7) Self-employment, 8) Intermediate business scheme and 9) General Business scheme, and it is before personal income taxes.

The first definition of income, "revenue", includes exempted income, authorized deductions, investments, local taxes and profit sharing. This definition includes personal deductions, such as medical expenses, gifts and donations, interests on mortgages, deposits in savings accounts, education expenses, among others. This definition doesn't approximate the "actual" income obtained by individuals; however, it provides us with good representations of income decompositions and shares. The second income definition, "net income", starts from "total revenue" and deducts exempted income, authorized deductions, investments, local taxes and profit sharing. It's worth noting that this definitions is susceptible to be underestimated due to tax evasion and tax avoidance. Finally, the last definition of income, "Income adjusted" uses the results obtained from the Economic Census data to adjust "authorized deductions" and "investments" in order to arrive to a better approximation of them. It starts with "total revenue" and deducts "adjusted authorized deductions", "adjusted investments", local taxes and profit sharing[48]. This definition is used as a better approximation of "actual" income with the assumption that an income receiver who decides to evade tax payment will underreport her taxable income to tax authorities but declare the true income, or at least a closer approximation to the true income, to an interviewer who grants anonymity such as the Economic Census. This last definition will be adjusted by income range, since we saw in Subsection 4.2 that business evade taxes differently throughout the income distribution.

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[48] A detailed explanation on how "adjusted authorized deductions" and "adjusted investments" were computed is explained in table 24. Overall, the weights for self-employed were taken from table 34, as an average from columns (1) and (2). Weights for intermediate scheme were taken from table 32 column (2) since business that earn between 2 - 4 $MX millions are considered part of the intermediate scheme in Mexico. Finally, weights for the general business scheme were taken by averaging columns (3) - (9) from table 32, since business that earn more than 4 $MX millions are considered inside this scheme.

5.1   Trends in top incomes

Figure 14 depicts the average real income per adult estimated from National Accounts that is used as the denominator for the top income calculations in conjunction with the consumer price index between 2009 and 2012. Between 2009 and 2011, real economic growth was positive and became negative during 2012, which coincides with a CPI of 107. In 2011, average real income per adult reached its maximum in around *$MX* 122,491.5

Figure 14: Average real income per adult and consumer price index in Mexico (2009 - 2012)
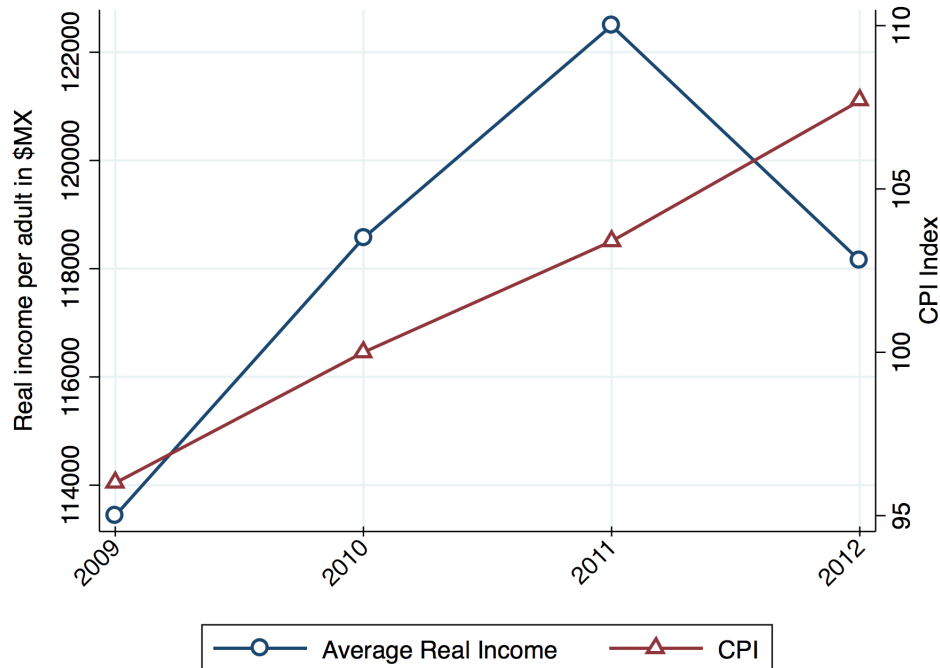
Source: Authors' calculations based on national accounts for years 2009 - 2012, INEGI's Censuses and Population Surveys for years 2005 and 2010 and the World Bank webpage.
Note: Figure report the average real income per adult (aged 20 and above) expressed in real 2010 Mexican Pesos. CPI index is equal to 100 in 2010.

The results for the adjusted income definition from 2009 to 2012 are presented in Table 14[49]. The top 1% accounted for 13.2% of total income in 2009. During the financial recession, the top 1% accounted for 12.4% of total income, falling down from the previous year. After 2010, it started recovering in order to account for 13.0% and 13.6% of total income during 2011 and 2012, respectively. With respect to the top 5%, it presented the same pattern as the top 1%. On one side, it reached its minimum during 2010 by accounting for 23.1% of total income, and, on the other side, it achieved its maximum during 2012, where it accounted for 25.2% of total income. As seen in Table 14, the financial crisis affected almost all the top shares except for the super wealthy, i.e., the top 0.01% and over. To these individuals, its share with respect to total income didn't decrease during 2010.

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[49]Tables 41 and 42 present the results for the threshold within the top percentile and average income within the top percentile, respectively.

Table 14: Top income shares in Mexico (in %), 2009-2012 (Income with Economic Census adjustments)

	Top 5%	Top 1%	Top 0.5%	Top 0.1%	Top 0.05%	Top 0.01%	Top 0.005%	Top 0.001%
2009	24.6	13.2	10.1	5.8	4.6	2.7	2.2	1.3
2010	23.1	12.4	9.6	5.5	4.4	2.7	2.2	1.3
2011	23.8	13.0	10.2	6.1	5.0	3.3	2.7	1.9
2012	25.2	13.6	10.6	6.3	5.1	3.2	2.6	1.7

Source: Authors' calculations based on tax data for years 2009 - 2012 and adjusted with 2009 Economic Census data.
Note: Estimates before Income Tax and excluding capital gains.

Figure 15 presents the decomposition of the top 1% into three sub-groups[50]: 1) the top 1-0.5%, 2) the top 0.5-0.1% and 3) the top 0.1-0.05%. Each point represents the total income accrued to the mentioned income range[51], and it allows us to explore how the income is distributed among the wealthy. The three sub-groups decreased its share during 2010, while recovering it afterwards; in 2010, the top 1-0.5%, 0.5-0.1% and 0.1-0.05% accounted for 2.85%, 4.05% and 1.09% of total income, respectively, whereas in 2012, they accounted for 3.03%, 4.27% and 1.17%. These results are interesting since the top 1-0.5% has 71,224 more individuals than the top 0.5-0.1%[52], but it consistently controls a lower share compared to the one of the top 0.5-0.1%.

Figure 15: Top 1-0.5%, 0.5-0.1% and 0.1%-0.05% Income Shares in Mexico (2009 - 2012)
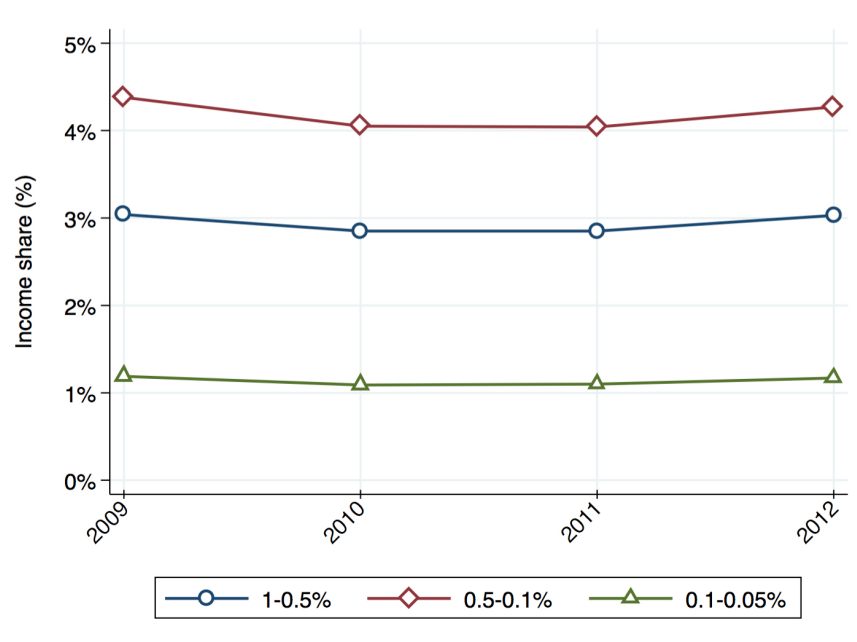
Source: Author's calculations based on tax data of (2009 - 2012).
Note: Incomes excluding capital gains and estimates before income tax

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[50]Table 42 presents averages for the same decomposition.
[51]For example, the 1-0.5% line represents the total income accrued to individuals ranked between the top 1% and 0.5%.
[52]During the year 2012.

Extending the analysis to higher fractiles, Table 16 presents a decomposition of the richest 0.05% into three sub-groups, i.e., 1) the 0.05-0.01%, 2) the top 0.01-0.001% and 3) the top 0.001%. On one side, the top 0.05-0.01% and 0.01-0.001% felt the shock of the financial crisis, but recovered afterwards On the other side, interestingly, the top 0.001% wasn't affected by the financial crisis, and it even surpassed the top 0.05-0.01% in 2011. Astonishingly, the top 0.001% of the individuals, nearly 709 individuals, controlled between 1.33%-1.85% of total income in Mexico. In other words, during 2012, the richest of the rich, the top 0.001%, earned an average income of *$US PPP* 30,508,475.00 millions or *$MX* 234,000,000.00 millions, and controlled a total of *$US PPP* 20,342,353,482 or *$*MX 162,535,404,319. This "richest of the rich" phenomenon was expected due to the high number of billionaires living in Mexico; in 2015, Forbes (2015b) listed 16 billionaires with a Mexican citizenship, where the richest one of them, *Carlos Slim*, was the richest man on the whole list.

Figure 16: Top 0.05-0.01%, 0.01-0.001% and 0.001% Income Shares in Mexico (2009 - 2012)
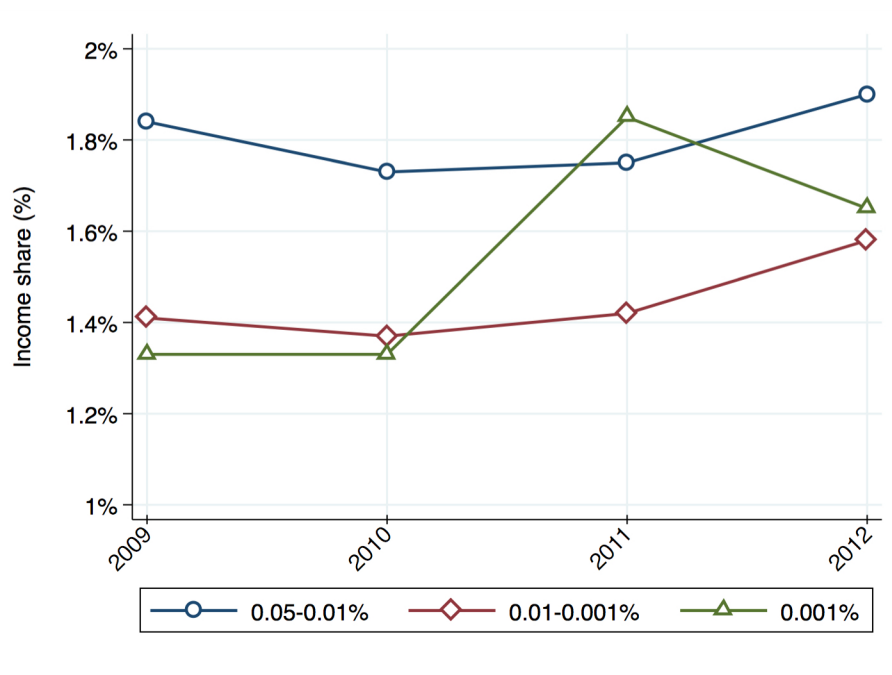
Source: Author's calculations based on tax data of (2009 - 2012).
Note: Incomes excluding capital gains and estimates before income tax

How does Mexico compares to other countries? Figure 17 uses data from The World Top Incomes Database and compares the top 1% in Mexico (adjusted and gross) with the one of Argentina, Australia, Canada, Colombia, France, Spain, USA and Uruguay for years 2000 to 2012. As described earlier, the revenue definitions overstates "actual" income, since it doesn't deduct costs nor wages paid. As explained in Subsection 4.1.3, Business and Self-employed have strong incentives to over-report deductions.

On one side, when revenue is used, Mexico's top 1% is higher than almost every country, apart from Colombia. The top 1% reaches its maximum in 2012, while arriving to 19.5% of total income. On the other side, when using the preferred income definition, adjusted income, Mexico's top 1% is higher than most countries, but lower than Colombia, Argentina and USA. The Mexican top 1% is between 1.5-1.7 times bigger than the one of Spain, 1.4-1.7 times bigger than the one of France, 1.01-1.07 times bigger than the one in Canada and 1.35-1.5 times bigger than the one in Australia.

Figure 17: Top 1% in selected countries (2000 - 2012)
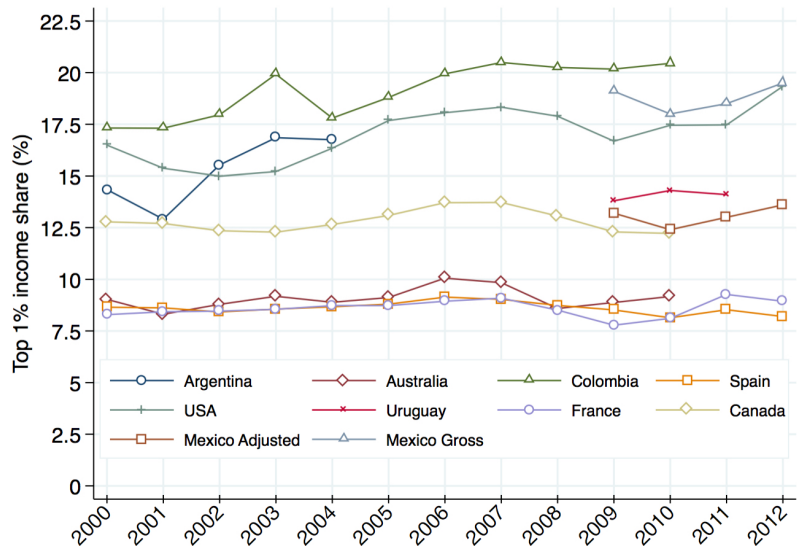
Source: Author's calculations based on tax data of (2009 - 2012) and The World Top Incomes Database
Note: Incomes excluding capital gains and estimates before income tax. Exact numbers can be seen in table 46

Despite being the lowest top 1% in Latin-America, Mexico remains highly unequal among higher fractiles. Figure 18 compares Mexico's top .01% with the same countries as before. In this case, the top .01% income concentration is very high compared to the other countries, no matter which income definition is used. In 2011, the top .01% was the biggest one among the countries selected. During this year, it was 3.5, 1.04, 1.73, and 2.70 times bigger than the one in Spain, USA, Uruguay and France, respectively.

Figure 18: Top .01% in selected countries (2000 - 2012)
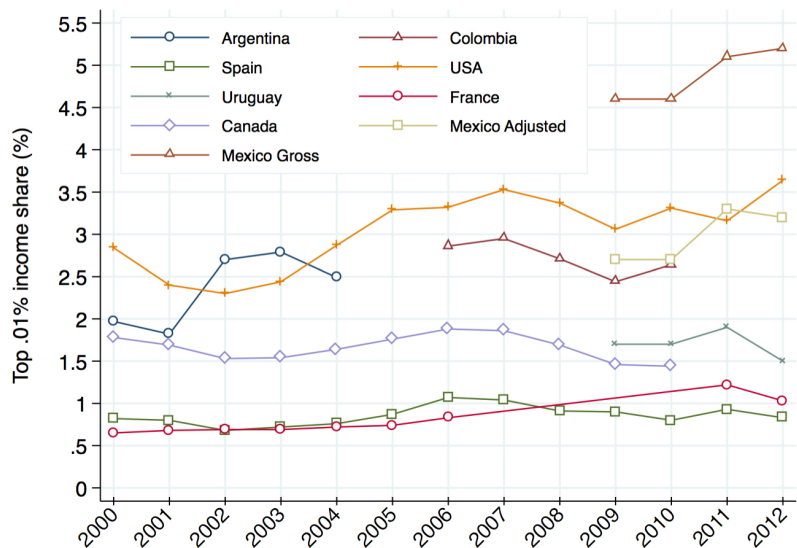
Source: Author's calculations based on tax data of (2009 - 2012) and The World Top Incomes Database
Note: Incomes excluding capital gains and estimates before income tax. Exact numbers can be seen in table 47

5.2 Top incomes decomposition

In order to understand the mechanisms behind this increase in income concentration at the top, we next turn to the analysis of the composition of top incomes. Examining the composition of top incomes offers important hints to the understanding of the development of top income shares. For example, shocks and to capital income during the First and Second World Wars explain much of the decline in French top income (Piketty, 2003), large increases in wage and salaries at the top has been the primary factor behind the increased income inequality in the USA during the 1980s and 1990s (Piketty and Saez, 2001), and the fact that capital income is an important source of income inequality in Sweden at the very top of the distribution (Roine and Waldenstrom, 2014).

Figure 19 decomposes the top 1% income fractile during 2012 in 5 different sources: 1) Salaries and Wages, 2) Capital Income[53], 3) Self-employment, 5) Business[54] and 6) Other income[55]. Four elements should be noted. First, the share of Salaries and Wages plays an important role at the beginning of the income fractile, and it steeply decreases its importance while one starts moving to the right of the distribution. Second, an interesting situation is the inverted u-shape pattern that income business shows and its importance throughout the top fractile distribution. It represents 8.8% of the income of the 1-0.5% group, 40.3% for the 0.01-0.005% group and 15.6% for the 0.001% group. Third, capital income starts increasing its importance while one starts moving to the right of the distribution representing 75% for the richest fractile of the distribution. Finally, the remaining two sources, rents and self-employment income, remain fairly constant throughout the upper-fractile.

Figure 19: Decomposition of top 1% by adjusted income source (2012)
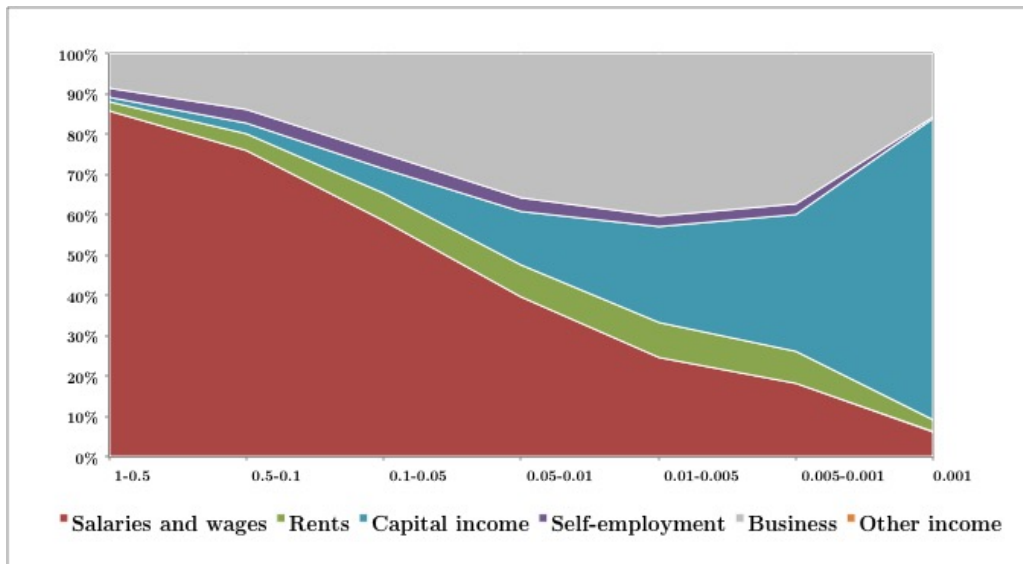
Source: Author's calculations based on tax data of 2012.
Note: The figure displays how the top 1% (adjusted income) is divided into six income components: salaries and wages, rents, capital income, self-employment, business and other income. It decomposes the income sources by fractile ranges; for example, for the 1-0.5% top percent, salaries and wages represented 86% of the total share, whereas for the 0.005-0.001%, it represented 18%.

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[53]Capital income is define as the sum of interests, dividends and other income.
[54]Business income is defined as the sum of intermediate business scheme and general business scheme.
[55]Other income is defined as total prizes obtained

To provide a longitudinal decomposition of the top fractiles, Figure 20 displays the share and composition of the top 0.1% income fractile from 2009 to 2012. The figure shows that the top 0.1% share oscillates between 5.8% in 2009 to 6.3% in 2012. The figure shows how diversified the income sources remain for this fractile, since salaries and wages, capital income and business income represent around 1.8%, 1.6% and 1.6% of total income, respectively. During 2010, year where the top marginal rate was increased, business income and capital income suffered a slightly decrease, while recovering in the following two years.

Figure 20: The top .1% adjusted income share and its composition (2009-2012)
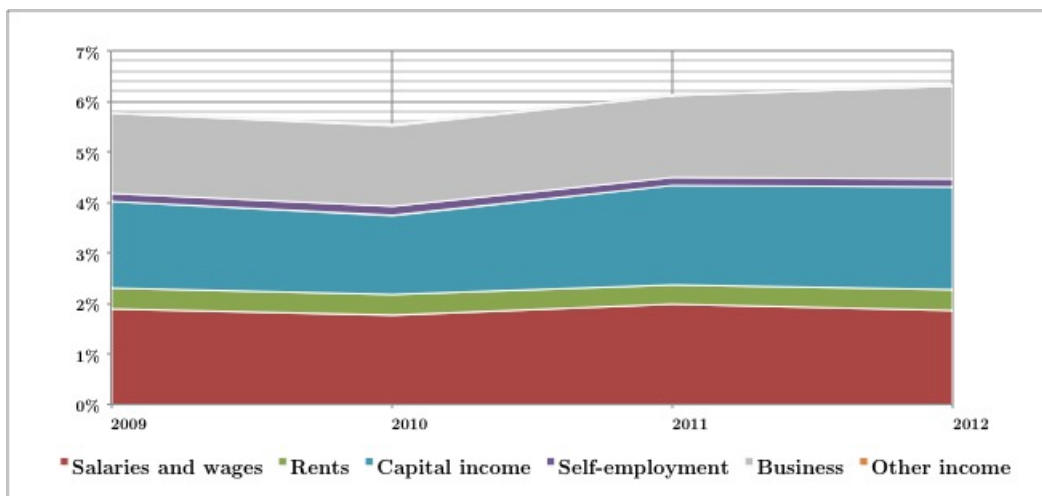
Source: Author's calculations based on tax data of 2009 - 2012.
Note: The figure displays how the decomposition of the top 1% evolved from 2009 to 2012.

5.3 Real income growth captured by the top percents

An interesting question is to analyze how much growth the top income earners captured between $t_0 = 2009$ and $t_1 = 2012$. In a perfect egalitarian society, the top 10% would capture 10% of real income growth, the top 5% would capture 5% of real income growth, and so on. To cast further light in this subject, with equation (9) and (10), we calculated the real average growth (υ) and the fraction of total real growth (θ) captured by the top "i" between $t = 2012$ and $t - 4 = 2009$, respectively. Where y_{ti} represents the total real income[56] captured by the top "i" in year t, and Y_t represents the total real income in the whole economy.

$$\upsilon_{ti} = \left(\frac{(y_{ti} - y_{t-4i})}{y_{t-4i}}\right) * 100 \qquad (9) \qquad\qquad \theta_{ti} = \left(\frac{(y_{ti} - y_{t-4i})}{(Y_t - Y_{t-4})}\right) * 100 \qquad (10)$$

Saez (2015) finds that the United States is far away from a perfect egalitarian society, since between 2009 and 2014, the top 1% captured a fraction (υ_{t1}) of 58% of the total growth, the top 1% incomes real growth (υ_{t1}) was of 27% and the bottom 99% incomes real growth (υ_{t99}) was of 4.3%. Mexico is far away from the United States, but away from a perfect egalitarian society. For the period 2009 - 2012, on one side, the fraction of total real growth (θ) captured by the top 1%, .1%, .01% and .001% was of 8%, 5%, 3% and 2%, respectively. We need to remember that the top .001% represent around 650 individuals and they capture 2% of the total real income growth in Mexico. On the other side, the income real growth of the top 1%, .1%,

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[56]As to remove the effects of inflation, income is adjusted to 2008 Mexican Pesos using the Consumer Price Index

.01% and .001% was of 16.32%, 23.30%, 33.31% and 40.81%, respectively. Thanks to these results, we are able to notice that incomes gains after the financial recession were heavily captured by the top percents.

5.4 Pareto coefficients

As Alvaredo and Piketty (2014) explain, in countries where tax evasion is pervasive, the top income levels reported in fiscal declarations should certainly be considered as a lower bound for the true economic levels. The top tail of the income distribution is very closely approximated by a Pareto distribution. The Pareto law is usually considered as a good approximation of the top segment - say, the top 10% - of the observed income distribution. In its simplest form, the Pareto law applies with a constant coefficient to the top μ% of the distribution. A Pareto distribution has the following cumulative distribution function[57]:

$$F(y) = 1 - (k/y)^a, \; k > 0 \; a > 1 \tag{11}$$

Where k and a are constants, and a is the Pareto coefficient. Its density function is given by:

$$f(y) = \frac{ak^a}{y^{1+a}} \tag{12}$$

The Pareto distribution has the property that the ratio of average income $y^*(y)$ of individuals with income above a given threshold y is exactly proportional to y:

$$y^*(y) = (\int\limits_{z>y} z\,f(z)\,dz\,)/(\int\limits_{z>y} f(z)\,dz\,) = (\int\limits_{z>y} dz/z^a)/(\int\limits_{z>y} dz/z^{1+a}) = a/(a-1)\,y \tag{13}$$

We see that the ratio $b(y)$ between the average income above $y^*(y)$ and y does not depend on the income threshold y. That is:

$$b(y) = \mathbb{E}(z \mid z \geq y)/y = b = \frac{a}{a-1} \tag{14}$$

Intuitively, the constant $b = \frac{a}{a-1}$, which can viewed as the "inverted Pareto coefficient", measures the fatness of the upper tail of the income distribution[58]. For example, a coefficient $b = 2$ means that the average income above MX 1,000,000 is equal to $MX 2,000,000, the average income above MX 4,000,000 is equal to $MX 8,000,000, and so on. The inverted Pareto coefficient generally moves in the same direction as inequality and is arguably more intuitive than the standard Pareto coefficient $a = \frac{b}{b-1}$ (which runs counter to inequality). Inverted Pareto coefficients vary widely over country and time period. In the The World Top Incomes Database, one can find Pareto coefficients typically going from 1.5 to 3. For example, in 2003, the Pareto coefficients of the following countries: USA, UK, France, Argentina, Australia, Canada, Colombia, Denmark and Sweden were 2.52, 2.18, 1.79, 2.7, 1.99, 2.26, 1.92, 1.65 and 1.95, respectively, whereas Mexico has an inverted Pareto coefficient of the top $\mu = 1$% ranging from 2.6 to 2.72. This situation positions Mexico as one of the countries with the highest inverted Pareto coefficients in recent years, and at the same level of the ones during the 1920s of the USA and the UK.

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[57]The Pareto distribution function can also be decomposed in the following way: $F(y) = 1 - \mu(y_\mu/y)^a$. Where $1 - F(y)$ is the distribution function (i.e., the fraction of the population with income above y), y_μ is the income threshold that one needs to pass in order to belong to the top μ%, and a is the Pareto coefficient.

[58]The standard way of investigating the shape of the upper part of the income distribution is to compute the Pareto-Lorenz coefficient α by regressing the logarithm of the reverse cumulative distribution, $1 - F(y)$ on the income level y. The relationship between $log(1 - F(y))$, $log(y)$ and α can be computed as: $log(1 - F(y)) = log((k/y)^\alpha) = \alpha(log(k)) - \alpha(log(y))$.

Moreover, for a given country and year, the inverted Pareto coefficient $b(y)$ is not constant, specifically in the upper part of the distribution. For any given distribution function $1-F(y)$, one can define the "empirical" inverted Pareto coefficient $b(p) = \mathbb{E}(y \mid y > y)/y$, by knowing the income threshold and the average income above that threshold. One can also express this empirical coefficient $b(p)$ as a function of the percentile p at which it is computed. With observed distributions, one finds that $b(p)$ is only approximately constant within the top 10% of the distribution, and generally rises quite substantially between $p = 0.1$ and $p = 0.01$ (i.e. between the level of the top 10% and the level of the top 1%) (Alvaredo and Piketty, 2014).

Figure 21 depicts the inverted Pareto coefficient b as a function of percentile p for Mexico between years 2009 and 2012. In all years, they rise substantially, specially after $p = 0.93$. Year 2011 shows the biggest inverted Pareto coefficients from all years, increasing steeply after $p = 0.97$. During the same year, the average income within the top percentile is 2.72 times larger than the income threshold that one needs to pass in order to enter the top decile. That is, $b(p) = \mathbb{E}(y \mid y > yp)/yp = 2.72$ if $p = 0.9$. Moreover, the average income for the fractile $p = 0.95$ is 2.92 times larger than the income threshold. Finally, for the last fractile, $p = 0.99$, the average income is 3.16, 3.28, 3.89 and 3.46 times larger than the income threshold for years 2009, 2010, 2011 and 2012, respectively.

Figure 21: Inverted Pareto coefficient b as a function of percentile p for Mexico (2009 - 2012)

These results point out that the level of income concentration depicted by the tax data at the very top is very big (as previously shown in Sub-section 5.1) and the inverted Pareto coefficients b and $b(p)$ represent one of the highest for which the data is available.

5.5 Importance of adjusting income

In the previous section, we have been using an "adjusted income" as a source for the top income calculations. This section points out the importance of adjusting the income provided in the micro-tax data, and how the results vary when using revenue or net income. To begin with, Figure 22 shows the top income shares when using the three different definitions of income, i.e., revenue, adjusted income and net income[59]. As expected, the results have different orders of magnitudes depending on the chosen income definition. On one side, in 2009, "net income", "adjusted income" and "revenue" top percentile accounted for 10.1%, 13.2% and 19.1% of total income, respectively. On the other side, in 2012, the top percentile accounted for 10.2%, 13.6% and 19.5% of total income for the same categories. On average, the revenue top 1% is 1.9 times bigger than the net one.

Figure 22: Top 1% Income Share in Mexico (2009 - 2012)
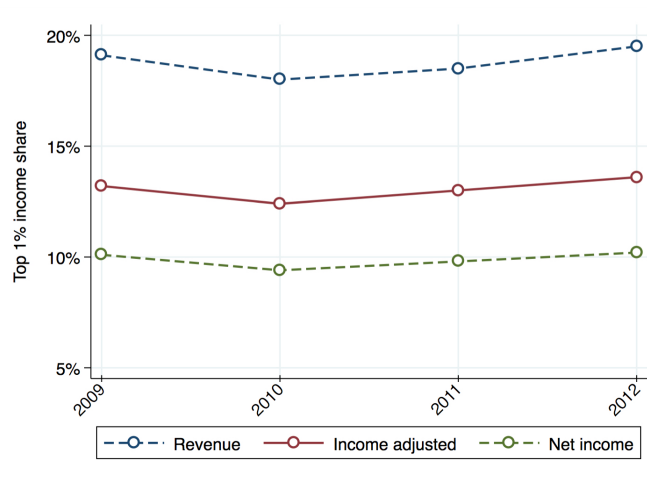
Source: Author's calculations based on tax data of (2009 - 2012).
Note: Incomes excluding capital gains and estimates before income tax

This situation portrays the importance on finding a way to adjust this big discrepancy between the two estimations. In order to explain the discrepancy, figures 23 and 24 decompose the top 1% income fractile during 2012 for revenue and net income, respectively. The two figures depict completely different situations. On one side, Figure 24, i.e. net income, depicts the null importance of business income throughout the top 1%, while being dominated by wages (at the left of the distribution) and capital income (at the right of the distribution). On the other side, Figure 23, i.e. revenue, exemplifies the importance of business income for the entire top 1%. The difference between the top 1% share of revenue and the top 1% share of net income is entirely due to business income. Let's remember that net income doesn't include "authorized deductions", while revenue does; therefore, this difference can be attributed to the inclusion of "authorized deductions" as income received by the individual. Sub-section 4.1.3 explains the possible "authorized deduction" an individual can have, such as costs of raw material and remunerations that adding them to the income of the individual would artificially inflate its income. Nevertheless, as explained in Sub-section 4.2, business and self-employed tend to overstate their authorized deductions in order to pay less taxes. The adjusted income

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[59]Table 24 presents in detail the definitions of each income. Tables 38, 14 and 35 present detailed top income shares for revenue, adjusted income and net income, respectively. Tables 40, 42 and 37 present average incomes within the top percentiles for revenue, adjusted income and net income, respectively. Tables 39, 41 and 36 present thresholds within the top percentile for revenue, adjusted income and net income, respectively.

it's proposed can be seen as a better approximation of the true top income distribution.

Figure 23: Decomposition of top 1% by revenue source (2012)
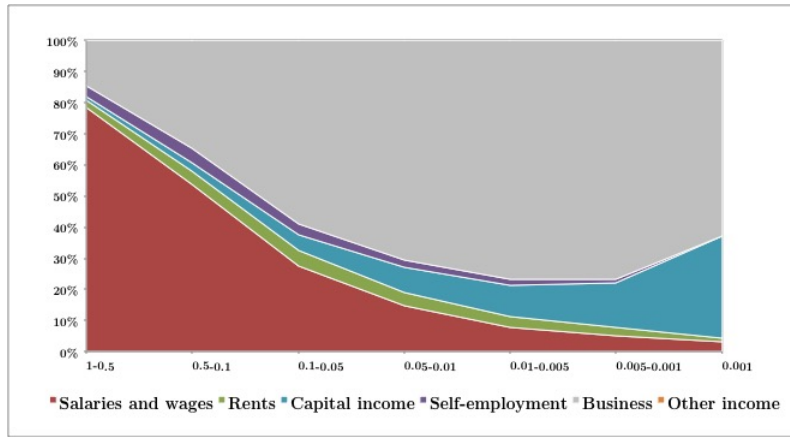
Figure 24: Decomposition of top 1% by net income source (2012)
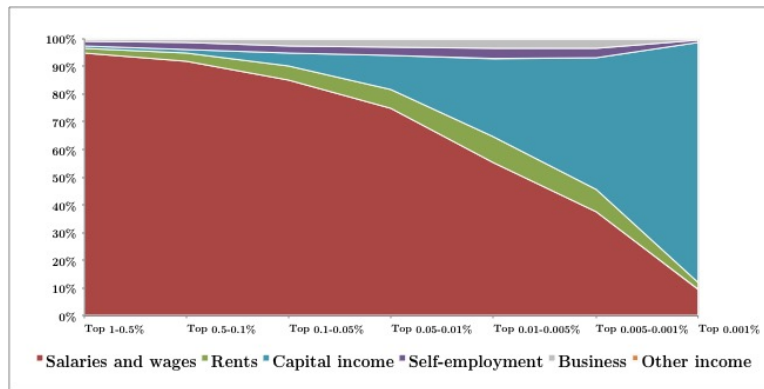
Is it reasonable to assume that ranking of individuals by net income and revenue are approximately the same? Figure 25 summarizes the re-ranking of individuals at the top 5% for the following categories: 1) 5-1%, 2) 1-0.5%, 3) 0.5-0.1%, 4) 0.1-0.05%, 5) 0.05-0.01% and 6) 0.01% or over. Each bar represents a specific subgroup of the top 5% measured by revenue, and each color of the same bar represents a specific subgroup of the top 5% measured by net income. For example, in the first bar, 5-1% sub-group measured by revenue, we see that 70.89% of individuals remain in the same sub-group when measured by net income (blue color).

In the figure, we see that 70.87%, 79.71%, 33.4%, 46.77%, 4.3%, 12.26% and 25.39% of individuals remain in the same sub-group for the sub-groups 5-1%, 1-0.5%, 0.5-0.1%, 0.1-0.05%, 0.05-0.01% and 0.01% or over, respectively. Most of the re-rankings take place at the upper-part of the distribution. At the highest sub-group ranked by revenue, 0.01% or over, 35% of individuals are re-ranked to the lowest sub-group when measured by net income (blue color). The last situation points out the fact that when using different income definitions, we will be using different individuals to compute the top 1%, e.g., the last 35% of individuals

won't be considered as the top 1% when using net income. Therefore, it is not reasonable to assume that ranking of individuals by net income and revenue are approximately the same.

Figure 25: Re-ranking of top incomes when passing from Revenue to Net income (2012)
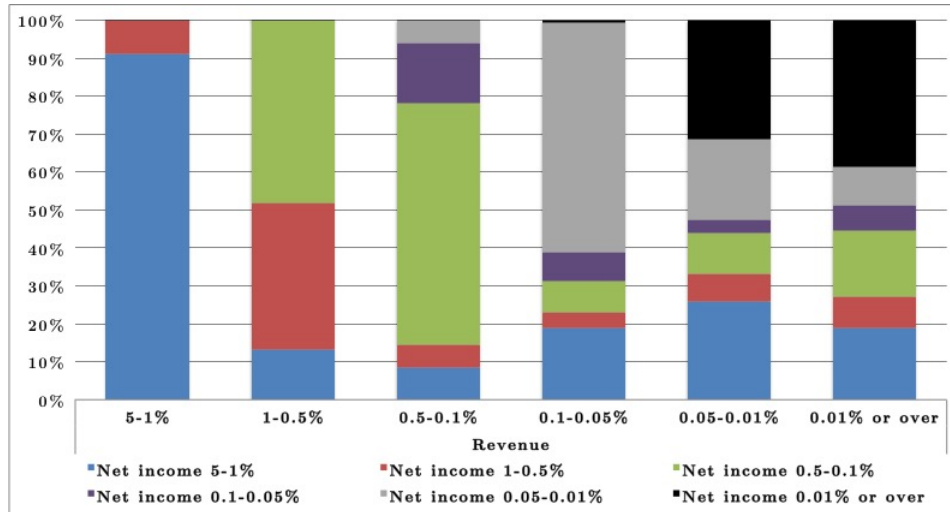
Source: Table 48
Note: Each bar represents a specific subgroup of the top 5% as measured by revenue, whereas each color represents a specific subgroup of the top 5% as measured by net income. For the fourth bar, sub-group measured by revenue, we see that only 4.3% of individuals remain in the same sub-group when measured by net income (purple color).

5.6 Taxation of top groups

As seen in Sub-section 4.2 and 4.1.3, individuals rely on different mechanisms to reduce their taxable income generating a low tax revenues for the Mexican State (as seen in Figure 3 and 4). To investigate these arguments, taxable income was calculated, following the income tax law (2009 - 2012), as the sum of gross income/revenue from all sources (excluding capital gains) net of exempted income, authorized deductions, investments, stimulus, profit sharing, local taxes, losses and personal deductions[60]. Afterwards, the progressive tax scales shown in Tables 7 and 8 and Figure 8 were used to calculate the tax owed from taxable income. Individuals were ranked with respect to gross income/revenue in order to calculate different tax statistics such as effective average tax rate, average tax rate and the ratio of average taxable income to average revenue of top groups[61]. On one side, effective average tax rates are defined as the ratio of average tax owed to average taxable income within each top group; on the other side, average tax rate are defined as the ratio of average tax owed to average revenue within each top group.

Figure 26 depicts the average income tax rate in Mexico between 2009 and 2012, separating by fractiles within the top percentile of the income distribution. Overall, they range from 3.6% to 13.36%, depending on the year and fractile chosen. The change in the marginal tax rate during 2010 increased the effective average tax rate for all fractiles, except for the top .001%. An interesting outcome from this graph is that effective average tax rates for fractiles 0.1-0.05%, 0.05-0.01% and 0.01-0.001% are lower than the ones of fractiles 1-0.5% and 0.5-0.1%; Figure 23 and 24 provides us with a plausible explanation of this outcome. When ranking individuals by revenue (as in Figure 23), business income is higher for fractiles 0.1-0.05%, 0.05-0.01%

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[60]This process is exemplified in Tables 10, 11 and 12. Exempted income, authorized deductions, investments and personal deductions are explained in detail in Sub-section 4.1.3.

[61]Appendix H presents tables of these estimations and other tax rate statistics, such as the ratio of average exempted income to average revenue (Table 57) and the ratio of average personal deductions to average revenue (Table 58).

and 0.01-0.001%. As described in Sub-section 4.2, businesses tend to over-report authorized deductions in order to have a lower taxable base, meaning that the higher fractiles tend to deduct more (in relative terms) than lower fractiles, except for the highest fractile, 0.001%, where its' income is mainly comprised by capital income that is harder to misreport.

Figure 26: Average tax rates of top groups in Mexico, 2009-2012.
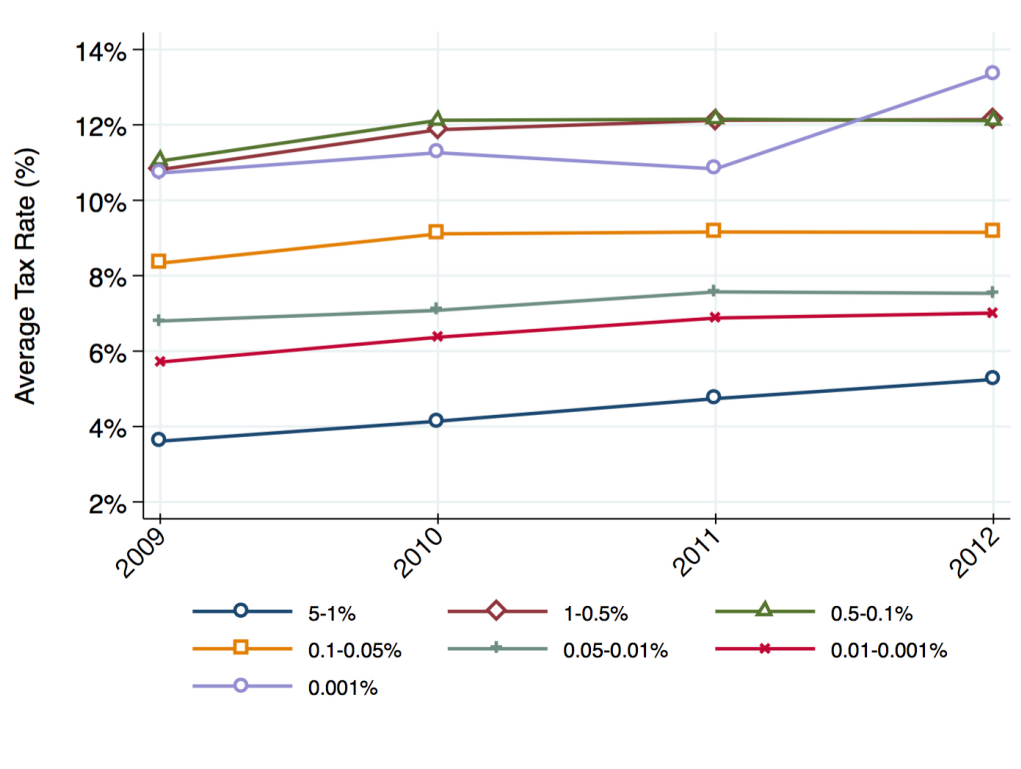
Source: Table 55
Note: Individuals were ordered by revenue. Excluding capital gains

Figure 27 sheds more light in the issue that higher fractiles tend to deduct more (in relative terms) than lower fractiles, since we see that the percentage of taxable income to revenue is higher among less rich people than richer people. We can exemplify the latter with two cases. On one side, the taxable income of fractile 5-1% is almost 80% of their revenue. This is the case since this fractile is mostly comprised by wage earners, which have lower degrees of freedom to file authorized deductions compared to businesses or self-employed. On the other side, the taxable income of fractile 0.01-0.001% oscillates around 20%. Within this fractile, 75% of its income comes from businesses, which report almost null taxable income. Finally, as seen in Figure 28 (effective average tax rate of top groups), we see that richer fractiles tend to have a higher rate than lower fractiles. This situation was expected due to the Mexican's graduated progressive tax system, ranging from a rate of 4.5% to 30.32% of the ratio of average taxable income to revenue.

These situations hint the restricted redistributive capacity of the income tax, and its inability to correct for the income disparities that were previously shown. It emphasizes the fact that there are still sources of income enjoying special treatment without necessarily existing technical arguments to justify it. Some of the main areas that currently enjoy any kind of total or partial exemption of capital gains in transactions in the stock market or from selling households, some income from interests, royalties and certain type of employment benefits.

Figure 27: Ratio of average taxable income to revenue of top groups in Mexico, 2009-2012.
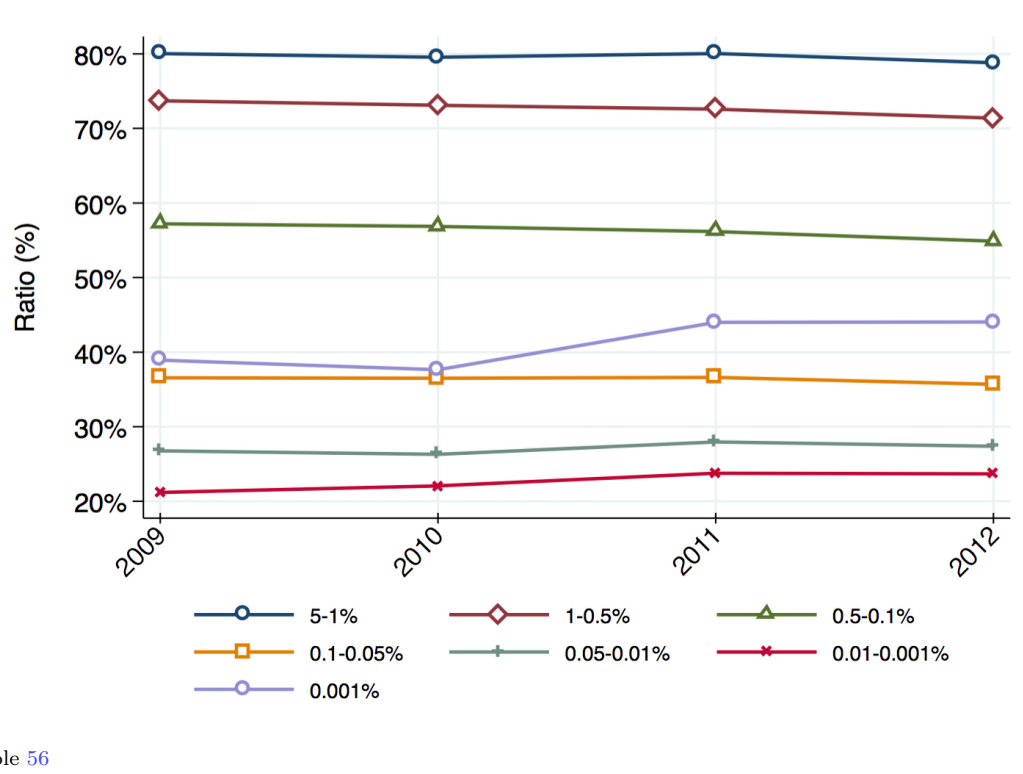
Figure 28: Effective average tax rates of top groups in Mexico, 2009-2012.
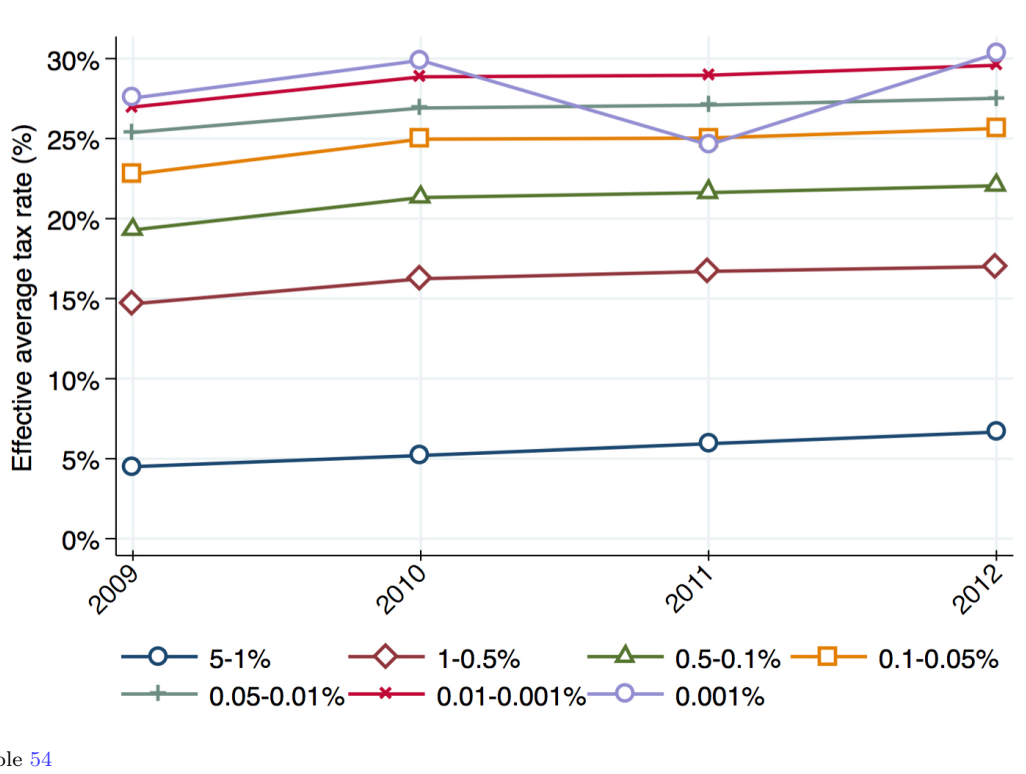
5.7 Top wage shares

A natural extension to the analysis of top incomes is the one of top wage shares. In the United States, due to the very large rise of top wages since the 1970s, the coupon-clipping rentiers have been overtaken by the working rich (Piketty and Saez, 2001), while in France, wage inequality, measured both in terms of top wage shares and in terms of interdecile ratios appears to have been extremely stable over the course of the twentieth century (Piketty, 2003). Following Saez and Veall (2005); Piketty and Saez (2001), the microfiles of tax returns and employer-reported information allow a detailed analysis of the wage income distribution where wage income is taken as the employment income of both wage and salary earners. Wage shares are estimated by computing the share of total employment income accruing to various upper groups of the wage income distribution. Top groups are defined relative to the total number of individuals with positive wages. Wage shares were computed using the same methodology as the one of top incomes; however, there are differences with respect to the control for total population and the control for total wages. On one side, the total number of tax units with wage income in the full population is estimated as the number of subordinate and paid wage earners from INEGI's webpage (which is the yearly average of the quarterly reports). On the other side, the control for total wages is taken from National Accounts as *Wages and Salaries (D.11)* net of effective social contributions[62].

Table 15 displays top wage shares from 2009 to 2012. In the first place, top wage shares are as high as top income shares. Wage shares are highly concentrated at the top 1% representing between 13.04% and 13.58% between 2009 - 2012. Thanks to the employer-reported information on wages, it was possible to compute top 20% and 10% shares. In the same way as the top 1% shares, top 20% and top 10% shares are considerably high. The top 20% represents 59.60% at its maximum, whereas the top 10% represents 44.28% at its maximum. Figure 29 displays the wage shares of the P90–95, P95–99, and P99–100 groups from 2009 to 2012. It shows that, exactly as with the total income shares, the increase is concentrated within the top percentile. In all available years, the top P99-100 is always higher than the top P90-95, despite the fact that it contains a lower number of individuals. This phenomenon presents difficulties when calculating wage inequality with survey data, because there are very few individuals in the top income groups. The fact that the rise in top wage shares is so concentrated is a problem for the simple skill-biased technology explanation. It suggests rather that the change in inequality is driven by a change in the compensation practice for highly ranked officers and executives (Saez and Veall, 2005). From our point of view, a potential explanation of this phenomenon is that highly skilled businessmen or professionals in Mexico have the possibility of migrating to other countries, therefore, in order to retain them or attract them, Mexican firms might increase their salaries.

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[62]Appendix G calculates wage shares with a different definition for the control of population and the control for total wages.

Table 15: Top wage shares in Mexico using occupied population definition (in %), 2009-2012

	Top 20	Top 10	Top 5	Top 1	Top 0.5	Top 0.1	Top 0.05	Top 0.01	Top 0.005	Top 0.001
2009	56.59	42.30	30.37	13.23	9.20	3.89	2.67	1.14	0.80	0.35
2010	56.12	41.97	30.16	13.04	9.06	3.87	2.68	1.19	0.85	0.39
2011	58.15	43.49	31.31	13.81	9.76	4.49	3.27	1.70	1.34	0.84
2012	59.60	44.28	31.60	13.58	9.46	4.14	2.91	1.32	0.95	0.44

Source: Authors' calculations based on tax data from personal tax returns and employer-reported informations on wages for years 2009 to 2012.
Note: Estimates before Income Tax. Wage income includes exempted income.

Figure 29: Wage income shares for P90-95, P95-99 and P99-100 in Mexico, 2009-2012
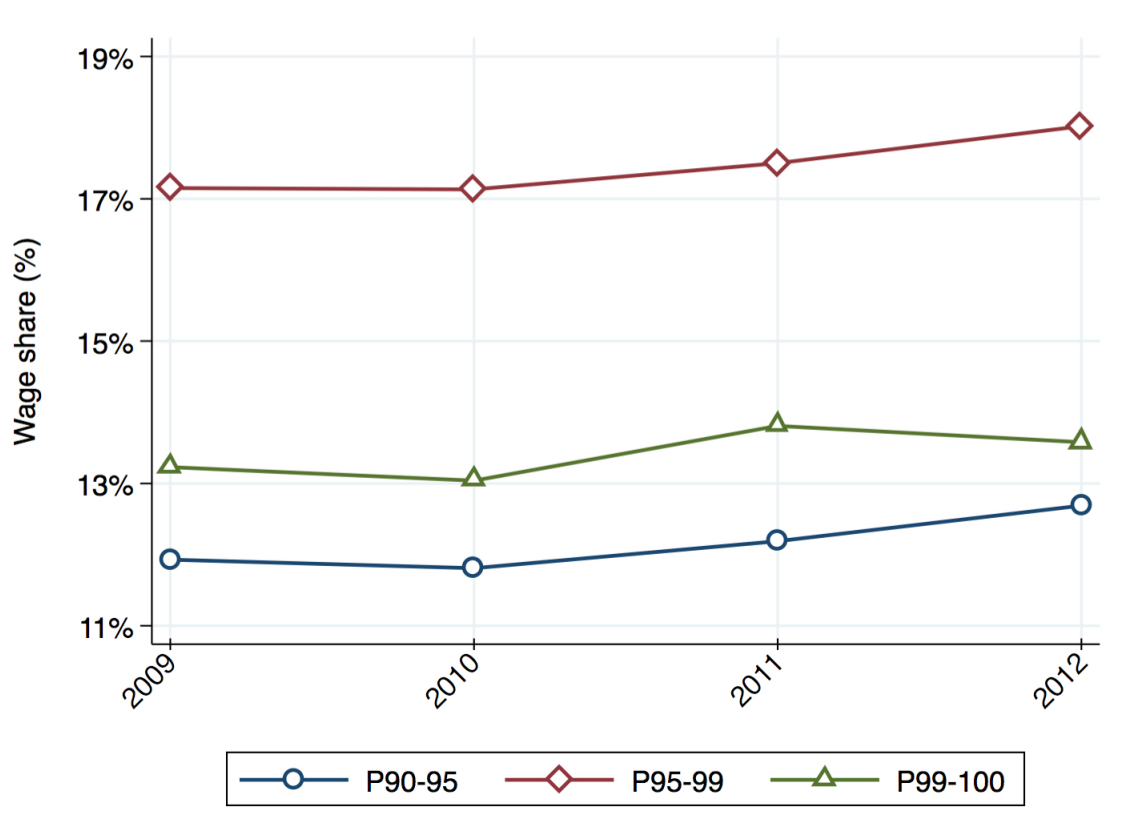
Source: Author's calculations based on tax data of (2009 - 2012).
Note: Wages before income tax

6 Mobility among the rich

Has the surge in top incomes been followed by an increase in mobility for the high income groups? The results presented earlier are measured at time t of the income distribution. This static analysis provides incomplete results, since top 1% individuals may re-rank positions in $t + 1$, $t + 2$, ..., $t + n$. That is, if the high static income concentration previously depicted has been combined with a low re-ranking of individuals, then the lasting inequality has not changed much. Why is it interesting to answer this question? In an intergenerational context, origin independence seems to capture our intuitions about "equality of opportunity" which can be roughly defined as the extent to which personal characteristics (like talent) rather than parental background determine monetary rewards. Since the tax files used in this work had a unique identification across years, a balanced panel between 2009 and 2012 was created. The use of tax return data generally provides more accurate measures of income and results in less attrition bias compared to most survey data, especially when focusing on the very top of the distribution (Auten and Gee, 2009).

In this section, *relative* and *absolute* income mobility measures will be presented. On one side, *relative* income mobility refers to individuals trading relative positions in the income distribution between an initial and a terminal period of time. On the other side, *absolute* income mobility informs about which groups benefited or lost from economic growth and by how much, studying income and not rank movements across the initial income distribution (Londono, 2012). *Relative* mobility using transition matrices and Spearman's rank correlation coefficient will be reported, whereas *absolute* mobility will be presented by using non-anonymous growth incidence curves and growth incidence curves.

To begin with, mobility matrices for 2009 and 2012 were built. Transition matrices are particularly useful devices for summarizing the mobility content of distributional transformations. Indeed, they provide a simple picture of the "movement" of the individuals among the specified income classes, and they can thus be quite telling at times (Fields and Ok, 1999). Suppose that we have specified $m = 7$ income ranges by one criterion or another, and let P be a matrix of $(n \times n) = (7 \times 7)$ transitions, the ij^{th} element of which, P_{ij}, is the percentage in the income class i (percentile) at time $t_0 = 2009$ of those who at time $t_1 = 2012$ were in class j. The first mobility matrix (Table 16) considers how the incomes of taxpayers in each upper-fractile in 2009 changed relative to the incomes of all taxpayers in the filing population in 2012. The diagonal of the mobility matrix shows the percentage of those taxpayers remaining in the same income group. The diagonal shows that $P_{3\times3} = 41.86$, $P_{4\times4} = 53.62$, $P_{5\times5} = 31.68$, $P_{6\times6} = 43.35$ and $P_{7\times7} = 52.89$ of individuals, relative to the total filing population, remained in the income class i at time $t_1 = 2012$. Moreover, there was also downward mobility at the top 1%, for example, $P_{3\times2} = 18.85$, $P_{4\times3} = 10.27$, $P_{5\times4} = 22.74$, $P_{6\times5} = 12.8$ and $P_{7\times6} = 20.55$ of individuals descended from their income class i at time $t_o = 2009$ to income class j at time $t_1 = 2012$. Compared to other Latin-American country, such as Colombia, Mexico presents stronger highly immobile society, since $P_{7\times7}$ in Colombia after 6 years oscillated between 33.7 and 26.7, whereas in Mexico it represents 52.89.

Table 16: Mobility Relative to Total Filing Population from 2009 to 2012, adjusted income.

		2	0	1	2		
		7.5-5%	5-1%	1-0.5%	0.5-0.1%	0.1-0.05%	0.05-0.01%	0.01% or over
	7.5-5%	44.5	5.76	0.67	0.57	0.09	0.08	0.02
2	5-1%	6.72	58.78	4.5	1.29	0.06	0.03	0.01
0	1-0.5%	2.88	18.85	41.86	16.21	0.43	0.2	0.02
0	0.5-0.1%	3.07	8.2	10.27	53.62	4.53	1.38	0.14
9	0.1-0.05%	3.52	4.41	2.98	22.74	31.68	13.93	0.84
	0.05-0.01%	3.47	3.63	2.03	10.02	12.8	43.35	5.67
	0.01% or over	2.94	2.07	1.02	4.19	3.52	20.55	52.89

Source: Authors' calculations based on tax data 2009 and 2012
Note: Each cell entry, (P_{ij}), indicates the percentage of total tax filers in sub-group i in $t_0 = 2009$ that are in sub-group j in $t_1 = 2012$. Due to attrition, rows do not add to 100 per cent. Estimates before Income Tax.

Table 17: Mobility Relative to Total Filing Population from 2009 to 2012, adjusted income.

		2012	
		7.5-1%	1% or over
2			
0	7.5-1%	61.7	4.78
0	1% or over	16.1	64.72
9			

Source: Authors' calculations based on tax data 2009 and 2012
Note: Each cell entry, (P_{ij}), indicates the percentage of total tax filers in sub-group i in $t_0 = 2009$ that are in sub-group j in $t_1 = 2012$. Due to attrition, rows do not add to 100 per cent. Estimates before Income Tax.

The second mobility matrix shows how the incomes of taxpayers in each upper-fractile in 2009 changed relative to that same group of taxpayers in 2012 (as seen in Table 18)[63]. Since no new lower-income households enter the comparison population in this table, there is no considerable overall upward movement of these taxpayers within the overall income distribution. Thus, under this measure of income mobility, taxpayers in bottom percentiles are less likely to rise in to a higher quintile because the only new entrants to the bottom percentiles are taxpayers whose incomes have fallen (Auten and Gee, 2009). Nevertheless, in contrast to the last matrix, we can see that there was almost no upward mobility from individuals below the top 1% to the top 1%. $P_{1\times1}$ and $P_{2\times2}$ represent 86.09 and 82.34, respectively. Meaning that less than 13% of those in the 7.5-5% in 2009 were able to experience upward mobility in 2012, whereas around 17.5% of those in the 5-1% in 2009 were able to enter into the top 1% in 2012. In general, we see that it existed higher downward mobility compared to upward mobility, since in almost every case $P_{n\times n-1} > P_{n\times n+1}$. Nevertheless, at the upper-fractile, 0.01% or over, almost 61% of the individuals remained in the same upper-fractile, besides the ones that descended of fractile, barely descended one upper-fractile ($P_{7\times6} = 23.57$). It appears that the richest panel individuals experienced low mobility in Mexico. Table 19 reduces the number of columns and

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[63]Note that unlike Table 16 in which the comparison is to all taxpayers in the filing population in 2012, the comparison in Table 18 is only to the other taxpayers included in the balanced panel. Since no new upper-rich taxpayers enter the comparison population in this matrix, there is no overall upward movement of these taxpayers within the overall income distribution. Thus, under this measure of income mobility, taxpayers in the bottom upper-fractile are less likely to rise in to a higher upper-fractile because the only new entrants to the bottom upper-fractile are taxpayers whose incomes have fallen

rows, and it presents what is the probability (P_{ij}) of the top income fractiles to remain in the top 1% with respect to the Panel Population.

Table 18: Mobility Relative to the Panel Population from 2009 to 2012, adjusted income.

		2	0	1	2			
		7.5-5%	5-1%	1-0.5%	0.5-0.1%	0.1-0.05%	0.05-0.01%	0.01% or over
2	7.5-5%	86.09	11.14	1.29	1.1	0.18	0.16	0.04
0	5-1%	9.42	82.34	6.31	1.8	0.08	0.05	0.01
0	1-0.5%	3.57	23.44	52.04	20.14	0.54	0.24	0.03
9	0.5-0.1%	3.78	10.1	12.64	66.04	5.57	1.7	0.17
	0.1-0.05%	4.4	5.51	3.72	28.39	39.55	17.38	1.05
	0.05-0.01%	4.28	4.48	2.5	12.37	15.81	53.55	7.01
	0.01% or over	3.37	2.38	1.17	4.81	4.04	23.57	60.67

Source: Authors' calculations based on tax data 2009 and 2012
Note: Each cell, (P_{ij}), entry indicates the percentage of panel tax filers in sub-group i in $t_0 = 2009$ that are in sub-group j in $t_1 = 2012$. Estimates before Income Tax.

Table 19: Mobility Relative to the Panel Population from 2009 to 2012, adjusted income.

		2012	
		7.5-1%	1% or over
2 0 0 9	7.5-1%	92.82	7.18
	1% or over	19.92	80.08

Source: Authors' calculations based on tax data 2009 and 2012
Note: Each cell entry, (P_{ij}), indicates the percentage of total tax filers in sub-group i in $t_0 = 2009$ that are in sub-group j in $t_1 = 2012$. Due to attrition, rows do not add to 100 per cent. Estimates before Income Tax.

So far, these two matrices point out that the increase in annual income concentration that it has been documented is associated with a similar increase in longer-term income concentration. However, as (Fields and Ok, 1999) point out, mobility analyses based on fractile matrices are not without problems. First, a fractile matrix ignores the income churning that takes place within smaller subgroups. Second, it does not take into account the fact that the absolute income changes that are needed to move between classes would be radically different in the higher fractiles due to the empirically observed positive-skewness of the income distributions; ideally, one would like to know which groups benefited or lost and by how much, studying income movements across the initial income distribution to examine the distributional incidence of growth (Londono, 2012). Of course, this does not mean that fractile matrices should not be used in practice. They are indeed very useful devices in assessing the essential "reranking" content of distributional transformations. Rather, we maintain that, given the multifarious nature of "income mobility", it might be useful to complement other fractile mobility analyses with other mobility measurement methods. As a first approach of other mobility measurement methods, we calculated the Spearman's rank correlation coefficient between $t_0 = 2009$ and $t_1 = 2012$. This coefficient calculates the non-parametric strength of a monotonic

relationship between income in t_0 and income in t_1. The higher the Spearman's coefficient is, we will see lower income mobility between t_0 and t_1. In effect, it was found a Spearman's $\rho = 0.81$ with a p-value of 0.001.

Moreover, a complement analysis for income mobility would be to study movements across much smaller fractiles, e.g., those movements between P99-99.01, ..., P99.99-100, while using the initial ranking as reference. This leads to consider "non-anonymous" Growth Incidence Curves that plot income growth rates against the various quantiles of the initial distribution, by taking the view that "status quo matters" and that social welfare should logically be defined on both initial and terminal income. As Bourguignon (2010) explains, in non-anonymous Growth Incidence Curves, individuals in the top 1% are ranked in ascending order according to their initial quantile $p(y_t)$, which depends on income y_t, and it basically measures the quantile-specific mean income growth rate from t to $t+1$, $g_{t+1}(p(y_t))$, based on the initial quantile $p(y_t)$, and it's calculated as:

$$g_{t+1}(p(y_t)) = \frac{y_{t+1}(p(y_t))}{y_t(p(y_t))} - 1 \tag{15}$$

Equation 15 is plotted in Figure 30 for $t = 2009$ and $t+1 = 2012$; as to remove the effects of inflation, income is adjusted to 2010 Mexican Pesos using the Consumer Price Index. In the first place, it's worth noting that all individuals in the top 1% presented a positive income growth (or barely negative income growth) between 2009 and 2012. Individuals that gained a higher income growth are ranked at the left of the top 1%, meaning that positive economic growth decreases with the initial rank. However, it's worth noting that certain quantiles at the top of the top 1% had big economic growth, e.g., P99.87 and P99.99 had a positive economic growth of 8.15% and 7.97%, respectively.

Figure 30: Non-anonymous growth incidence curve (2009 - 2012)
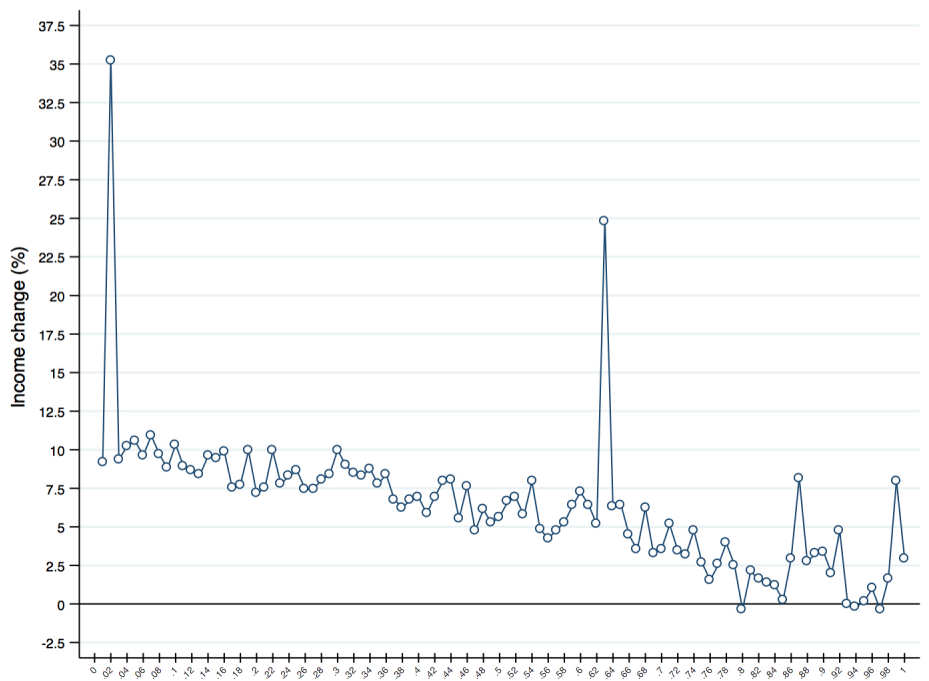
Source: Author's calculations based on tax data of (2009 and 2012)
Note: Incomes excluding capital gains and estimates before income tax. Estimates using Equation 15, i.e., in the top 1% are ranked in ascending order according to their initial quantile $p(y_t)$, which depends on income y_t, and it basically measures the quantile-specific mean income growth rate from t to $t+1$, $g_{t+1}(p(y_t))$.

Compared to "non-anonymous" growth incidence curves, Growth Incidence Curves (GIC) compare the income of individuals which were not necessarily in the same initial position. The cumulative GIC shows the difference between the initial income of those individuals who are initially among the p richest and the income of the p richest individuals in the terminal distribution. They are not necessarily the same individuals. As redistribution analysis when it excludes re-ranking, GICs somehow ignore the issue of income mobility(Bourguignon, 2010). A downward sloping Growth Incidence Curve indicates that growth contributes to equalizing the distribution of income and vice-versa for an upward sloping curve. Formally GICs are defined in the following way:

$$g_{t+1}(p) = \frac{y_{t+1}(p)}{y_t(p)} - 1 \tag{16}$$

One can plot in the same graph, "non-anonymous" GICs and GICs, and if the "non-anonymous" GICs and GIC result to be very different, it suggests there is a significant degree of "re-ranking" of individuals. Figure 31 plots Equation 15 and Equation 16 for the period of 2009 to 2012; ; as to remove the effects of inflation, income is adjusted to 2010 Mexican Pesos using the Consumer Price Index. The GIC shows us that in 2012 the entire top 1% was on average richer than in 2009. Impressively, the "richest of the rich", top P99.93-100, experienced an impressive economic growth compared to 2009, P99.99 and P100 experienced a real growth of 9.98% and 24.98%, respectively. These results emphasize the results already taken out from the transition matrices: the re-ranking of individuals in Mexico appears to be low.

Figure 31: Non-anonymous GIC vs GIC (2009 - 2012)
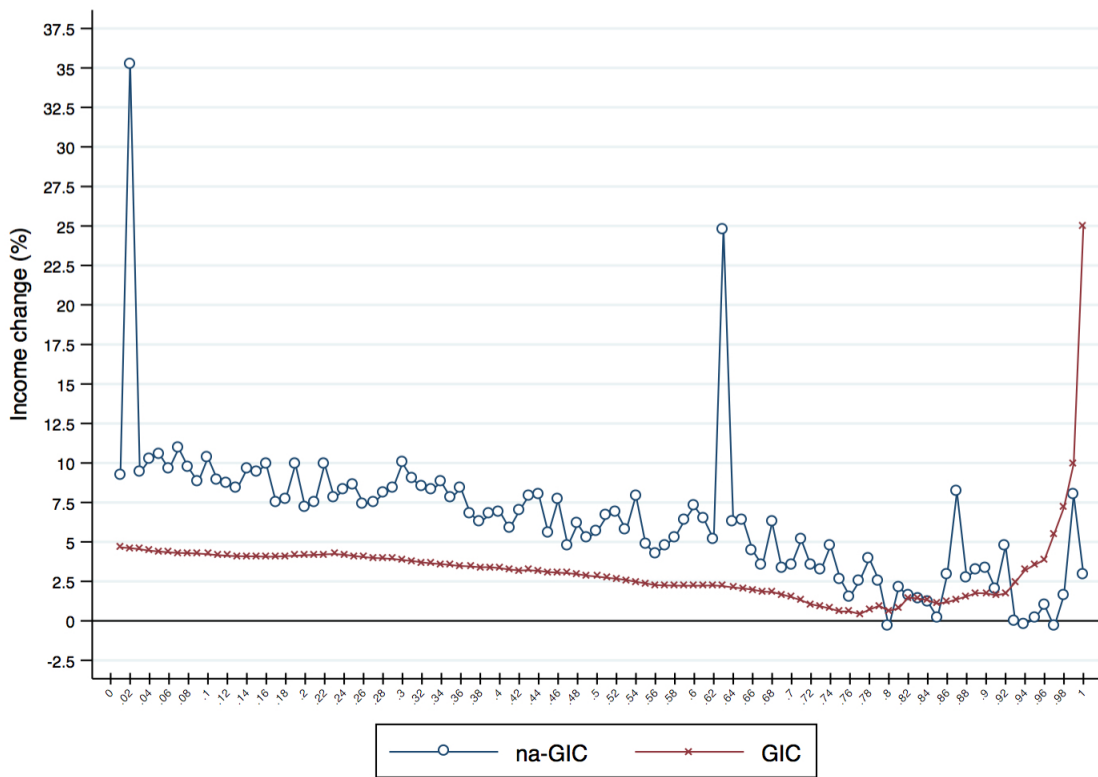
Source: Author's calculations based on tax data of (2009 and 2012)
Note: Incomes excluding capital gains and estimates before income tax

7   Contributions and conclusions

The contributions of this work are the following: 1) For the first time, it's presented a detailed analysis of top incomes in Mexico by using personal tax returns and employer-reported wages for the period 2009 - 2012. 2) Due to the issue of tax evasion (depicted in Section 4), this work proposes a methodology to adjust the data in order to arrive to a better measurement of "true" income. The credibility of this methodology resides in the data quality of the data being used to make the adjustments. 3) A detailed decomposition of Pareto coefficients at the top 1% is presented for the first time, 4) results of the real income growth captured by the top groups, 5) an analysis of the taxation of top incomes, 6) An analysis of top wages in Mexico and 7) recent trends of top income mobility are presented.

The results suggests that self-employed and business over-estate their expenses in between 20-70% depending on the type of expenses and investments. Failing to adjust this evasion leads to an over (lower) estimation of top shares when using revenue (net income). When income is adjusted, top 1% and .5% incomes shares reached a maximum of 13.6% and 10.6%, respectively. This level of income concentration places Mexico over the majority of countries in The World Top Incomes Database, but under other Latin American countries such as Colombia or Argentina. However, when calculating top .1% or .001% income shares, this situation changes by placing Mexico as one of the leaders in inequality; this result is in line with the big number of billionaires residing in Mexico. As well, for the period 2009 - 2012, the fraction of total real growth captured by the top 1%, .1%, .01% and .001% was of 8%, 5%, 3% and 2%, respectively. With respect to taxation of top groups, average tax rates range from 3.6% to 13.36%, depending on the year and fractile chosen; depicting a low capacity from the state to collet tax revenues. Furthermore, income concentration depicted through the inverted Pareto coefficients achieves its maximum values in 2011, by ranging from 2.72 at P99.0 to 3.89 at P99.99. With respect to wages, Mexico presented top wage shares of 58.15%, 43.49%, 31.31% and 13.81% for the top 20%, 10%, 5% and 1%, respectively. As well, in all available years, the top P99-100 is always higher than the top P90-95, despite the fact that it contains a lower number of individuals. The last suggests that the change in inequality is driven by a change in the compensation practice for highly ranked officers and executives. Finally, when analyzing income mobility, it's find that the high static income concentration previously depicted has been combined with a low re-ranking of individuals, and that the lasting inequality has not changed much.

This study has limitations. First, in Mexico, tax data is only filed by a fraction of the population restricting this study to the measuring of top shares, and not analyzing movements between other parts of the income distribution. Second, in the estimations, the informal market is not taken into account, while representing a big proportion of the working population in Mexico. In the same sense, the illegal market, such as the drug market, isn't taking into account, even though it could represent a big amount of income. Third, despite the methodology used to adjust tax evasion, individuals have other ways to evade taxes, e.g., Zucman (2013) finds that around 8% of the global financial wealth of households is held in tax havens, three-quarters of which goes unrecorded. Finally, the number of years available for analysis is small (2009-2012) compared to other countries, not allowing us to provide a historical evolution. However, even though we have a small period of years, it is important to have a better picture of the country's inequality situation than having flawed historical series.

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A   Appendix 1 - Taxes in Mexico

In order to understand Mexican's top incomes, we need to describe the Mexican's fiscal rules to understand how we are adjusting incomes to expenses, costs and deductions. During the years that we have tax data (2009 - 2012), Mexico had four major taxes, i.e., an Income Tax (*ISR* in Spanish), a Business Flat Tax (*IETU*), a Value-Added Tax (*IVA*) and a Special Tax on Production and Non-Oil Services (*IEPS*). We are going to briefly describe them, respectively.

A.1   Income tax

A.1.1   Different schemes for the income tax for individuals

Wages scheme   Inside this scheme, we have employees that receive income from wages, vacation bonus, Sunday bonus, overtime, profit sharing and payments for termination of employment. For the wages scheme, there are sources of income that are exempt of paying the income tax, i.e., extra time, provision of services in days off, compensation for work risks or illness, pensions, annuities, reimbursement of medical, dental, hospital and funeral expenses, social security benefits granted by public institutions, disability benefits, educational grants, child care, social security fee paid by employers, seniority premiums, vacation payments and company profits not exceeding 15 days of minimum wage, interests from checking accounts for depositing wages and donations between spouses or straight descendants/ascendants.

The employer must make the calculation of the annual income tax except in the cases where the employee has an annual income that exceeds \$400,000 Mexican Pesos, starts working for the employer after the 1st of January or finishes working for the employer before the 1st of December. In this scheme, the employee is allowed to make personal deductions in order to reduce the taxable income, e.g., medical fees, funeral expenses, donations, real interests from mortgages, voluntary contributions for retirement, severance and old age, insurance premiums, medical expenses premiums, payments for school transport and payments for educational services of basic and upper secondary.

Business and self-employment scheme   Inside this scheme, we have those individuals that work independently, either by conducting a business, or by providing independent personal services. This scheme is divided in three sub-schemes, i.e., i) general business and self-employment, ii) intermediate scheme of individuals with business activities and iii) small contributors scheme (*REPECOS*).

This scheme considers sources of income the ones that are generated from the two following categories, i.e., a) Commercial, agricultural, industrial, livestock, fishing or forestry activities and b) Professional independent services not considered within income from wages. Regarding the authorized deductions, we have the following ones: returned merchandise, previously accumulated discounts and bonuses, purchasing (whether of goods, raw materials, semi-finished or finished products), expenses, investment deductions through depreciation and amortization, paid interests related to their business and lending, fees paid to the Mexican Social Security Institute.

General business and self-employment   Inside this scheme, we have business taxpayers with incomes over \$4,000,000 Mexican Pesos in a fiscal year and any independent professionals regardless of their income level. In order to arrive to the taxable income, we start with the income collected minus authorized deductions, employee profit sharing and personal deductions.

Intermediate scheme of individuals with business activities To be part of this scheme, the taxpayer needs to exclusively obtain income from business activities, and the amount has not to exceed $4,000,000 Mexican Pesos. Taxpayers inside this scheme enjoy certain administrative simplifications compared to the General scheme previously described, e.g., they need to have a simplified accounting by recording their incomes, expenses and deductions in one book, and they are exempt from making statement of financial and inventory positions; another difference is that within this scheme, they are authorized to deduct asset acquisitions, expenses or deferred charges. This scheme follows the same procedure to arrive to the taxable income as the *General business and self-employment* one.

Small contributors scheme (REPECOS). Taxpayers who directly sell goods or provide services to the general public and obtain an income not exceeding $2,000,000 Mexican Pesos may optionally apply to this regime. Taxpayers in this regime were not allowed to issue invoices. Most REPECOS paid their taxes as a fixed quota paid to the States

Simplified scheme This scheme is a regime for corporate taxpayers with road transportation and primary activities (agriculture, fishing, cattle raising, forestry) that allows certain individuals dedicated to road transportation to participate in it as long as they are part of a "*coordinado*" (a special corporation that manage and operates fixed assets and land directed related to the road transportation activity integrated by individuals that perform those activities and own the assets managed by the "*coordinado*"), and whose income obtained in the preceding year didn't exceed $ 10 million Mexican Pesos.

A.1.2 Income Tax for corporates

Corporates or legal entities are taxed for income tax purposes by two different schemes, i.e., the general or the simplified. The marginal tax rate is the same for all corporates no matter their income; the following graph depicts it for the years 2009 – 2012:

Figure 32: Tax rate for corporates (1986 - 2014)
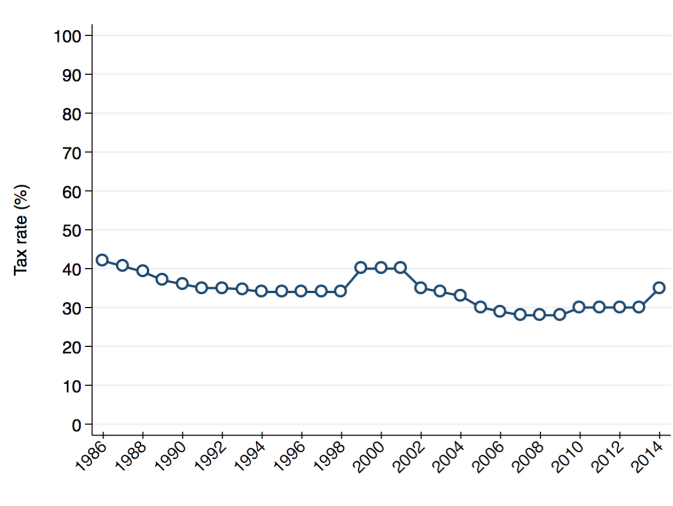
Source: Ley del impuesto sobre la renta (1986-2014)

The tax rate for corporates has been the top marginal tax rate for the individuals between 2009 – 2012.

General scheme This scheme applies to those companies conducting lucrative activities, i.e., for commercial companies (anonymous, limited responsibility, etc.), credit institutions (banks and brokerage firms) and decentralized organizations that sell goods or services.

Simplified scheme This scheme is dedicated to the companies that exclusively dedicate to the following activities: land transportation of cargo or passengers, agricultural, livestock, forestry, fishing and integrated companies. Among the advantages of this scheme, the corporates affiliated to this scheme have: a lower income tax rate, they deduct purchases instead of cost of sales, among others.

A.2 Business Flat Tax (IETU)

In 2008, the *IETU* was created in an attempt to strengthen tax revenues. It is levied on the following activities: the selling of goods, the independent personal services and leasing; its determination is based on cash flows. The following graph represents the *IETU* from 2009 to 2012:

Figure 33: Business flat tax (2009 - 2012)
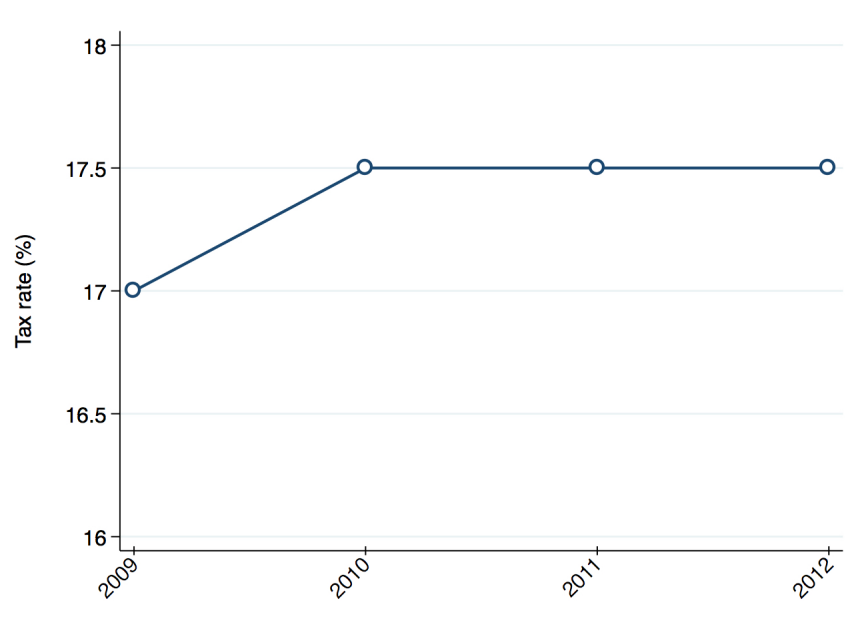
Source: Ley del impuesto empresarial a tasa unica (2009-2012)

The *IETU* is calculated starting with the income and subtracting the authorized deductions; this will give the taxable base that is multiplied by the flat rate.

A.3 Value-Added Tax (VAT)

The value-added tax (*IVA*) is a consumption tax, so it is moving and crediting through the various members of the production and marketing chain. It was first introduced in 1980 and has undergone important reforms in 1983, 1991, 1997 and 2010. They are required to pay this tax all individuals or corporates performing, within the national territory, any of the following activities:

- The sale of goods.

- The provision of independent services.

- The granting of use of property.

- The import of goods or services.

The activities are taxed under different rates depending on the location. Those activities that reside aside the United States frontier have a lower VAT. The following graph represents the different VAT rates for the boarder and non-boarder regions during 2009 – 2012:

Figure 34: Value-added tax rate (2009 - 2012)
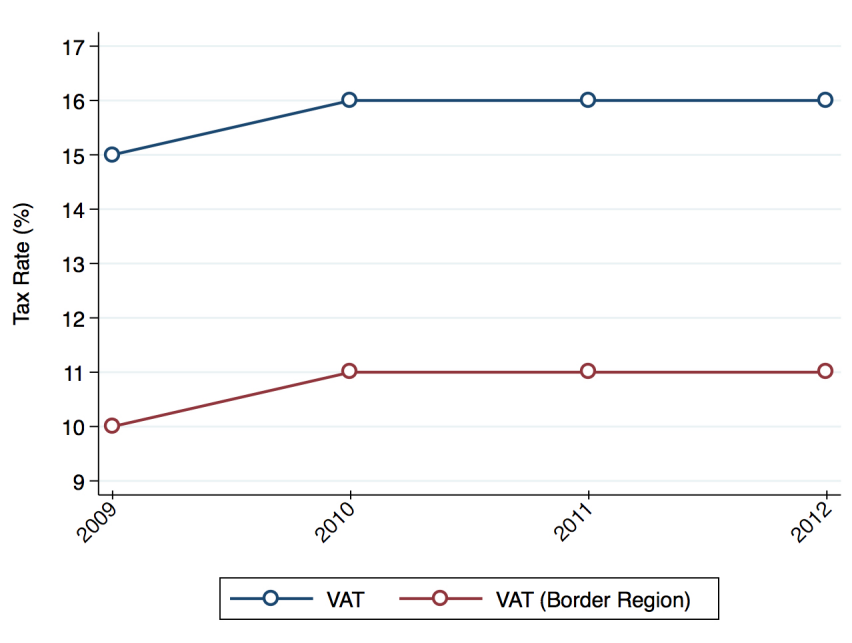
Source: Ley del impuesto al valor agregado (2009-2012)

The calculation and payment of the *VAT* are done monthly. The latter has the characteristic of being a final payment. therefore, individuals or corporates are not required to file an annual calculation of the *VAT*.

B   Appendix 2 - Population controls, Income/wage control and Income definitions

Table 20: Population Control for top income shares, aged 20 or more (2009 - 2012)

Year	2009	2010	2011	2012
Linear interpolation	65,656,488	67,397,224	69,287,094	71,229,957
Population Censuses		67,397,224		

Source: Author's calculations based on INEGI's Censuses and Population Surveys for years 2005 and 2010.
Notes: Data for year 2009 calculated using linear interpolation. Data for year 2011 and 2012 was calculated using the average growth rate calculated in formula 1.

Table 21: Income Control (in millions of $MX), 2009 - 2012.

	2009	2010	2011	2012
Control income	7,149,972	7,991,013	8,775,642	9,063,815
(% of GDP)	59	60	60	60
GDP	12,072,542	13,263,517	14,536,923	15,106,359

Source: Author's calculations based on INEGI's National Accounts by Sector for years 2009, 2010, 2011 and 2012
Note: Control income and GDP are in millions of $MX

Table 22: Population Control for top wage shares, 2008 - 2012.

Year	2009	2010	2011	2012
Wage population	27,749,639	28,623,594	29,211,697	30,531,602

Source: Total number of tax units with wage income in the full population is estimated as the number of subordinate and paid wage earners from INEGI's webpage (which is the yearly average of the quarterly reports)

Table 23: Wage Control (in millions of $MX), 2009 - 2012.

	2009	2010	2011	2012
Control wage	3,003,285	3,178,869	3,401,508	3,668,535
(% of GDP)	25	24	23	24
(Control wage)/(Control income) (in %)	42	40	39	41
GDP	12,072,542	13,263,517	14,536,923	15,106,359

Source: Author's calculations based on INEGI's National Accounts by Sector for years 2009, 2010, 2011 and 2012. *Wages and Salaries (D.11)* net of effective social contributions
Note: Control wage and GDP are in millions of $MX

Table 24: Income definitions

Income source	Revenue	Adjusted income	Net income
Salaries and Wage	Gross income from wages and salaries	Gross income from wages and salaries	Gross income from wages and salaries - Exempted income - Non cumulative income
Rents	Gross rent collected	Gross rent collected - (0.5*Authorized deductions) - profit sharing - local taxes	Gross rent collected - Exempted income - Authorized deductions - Specific stimulus - profit sharing - local taxes
Interests	(Nominal interests from the financial system + nominal interests from the non-financial system + nominal interests from insurance institutions) - (losses from the financial system + losses from the financial system)	(Nominal interests from the financial system + nominal interests from the non-financial system + nominal interests from insurance institutions) - (losses from the financial system + losses from the financial system)	Real interests from the financial system + real interests from the non-financial system + real interests from insurance institutions
Prizes	Gross prizes	Gross prizes	Gross prizes - exempted income
Dividends	Amount of dividends or profits	Amount of dividends or profits - Taxes already paid and retained by the company	Amount of dividends or profits - Taxes already paid and retained by the company
Other income	Gross income from "other" sources	Gross income from "other" sources - (0.5*Authorized deductions)	Gross income from "other" sources - Exempted income - Authorized deductions
Self-employment	Revenue from self-employment	Revenue from self-employment - (0.5*(Gas expenditure + "Other" deductions)) - (0.75*(Per diem expenditure + Car rental + Expenses made due to natural disasters)) - (Other authorized deductions not mentioned before) - profit sharing - local taxes	Revenue from self-employment - Exempted income - Authorized deductions - profit sharing - local taxes
Intermediate scheme	Total revenues collected	Total revenues collected - (0.36*Investments) - (0.78*Authorized deductions) - local taxes - profit sharing	Total revenues collected - Exempted income - Investments - Authorized deductions - Specific stimulus - profit sharing - local taxes
Business scheme	Total revenues	Total revenues - (0.4*Investments) - (0.85*(Net purchases of goods (National and Foreign))) - (0.587*Gas expenditures) - (0.209*Property use) - (0.647*Service fees) - (0.048*"Other" deductions) - (0.835*(Expenses made due to natural disasters + Toll road payments + Expenditures in research + National movie and theater productions + Repairs done to historical buildings + Cargo and maneuvers + Per diem + Royalties + Car rental)) - (Other authorized deductions not mentioned before) - profit sharing - local taxes	Total revenues - Exempted income - Investments - Authorized deductions - Specific stimulus - profit sharing - local taxes

C Appendix 3 - Income distribution by deciles and composition by quintiles

C.1 Income distribution by deciles

Table 25: Household income distribution in Mexico by deciles (1950 - 2012)

					Decil					
Year	I	II	III	IV	V	VI	VII	VIII	IX	X
2012	1.84	3.09	4.13	5.12	6.27	7.57	9.33	11.76	16.00	34.89
2010	1.77	3.11	4.15	5.23	6.38	7.73	9.48	12.00	16.27	33.88
2008	1.66	2.91	3.92	4.90	5.98	7.35	9.19	11.68	16.13	36.28
2006	2.27	3.63	4.25	5.35	6.29	7.42	9.37	11.71	15.57	34.15
2005	1.64	2.93	3.92	4.91	5.97	7.36	9.14	11.66	15.97	36.49
2004	1.58	2.89	3.91	4.91	5.97	7.29	9.09	11.62	16.16	36.57
2002	1.64	2.91	3.90	4.92	6.12	7.43	9.25	11.86	16.42	35.56
2000	1.52	2.64	3.60	4.59	5.70	7.08	8.84	11.24	16.09	38.70
1998	1.52	2.69	3.68	4.73	5.85	7.25	8.96	11.52	15.98	37.83
1996	1.79	3.01	3.95	4.91	5.98	7.34	8.97	11.46	15.94	36.65
1994	1.61	2.79	3.71	4.67	5.72	7.09	8.78	11.38	16.13	38.12
1992	1.59	2.80	3.76	4.76	5.80	7.19	8.98	11.40	16.03	37.70
1989	1.58	2.81	3.74	4.73	5.90	7.29	8.98	11.42	15.62	37.93
1984	1.72	3.11	4.21	5.32	6.40	7.86	9.72	12.16	16.73	32.77
1983	1.33	2.67	3.84	5.00	6.33	7.86	9.76	12.56	17.02	33.63
1977	1.08	2.21	3.23	4.42	5.73	7.15	9.11	11.98	17.09	37.99
1975	0.69	1.28	2.68	3.80	5.25	6.89	8.56	8.71	17.12	45.02
1970	1.42	2.34	3.49	4.54	5.46	8.24	8.24	10.44	16.61	39.21
1968	1.21	2.21	3.04	4.23	5.07	6.46	8.28	11.39	16.06	42.05
1963	1.69	1.97	3.42	3.42	5.14	6.08	7.85	12.38	16.45	41.60
1958	2.32	3.21	4.06	4.98	6.02	7.49	8.29	10.73	17.20	35.70
1950	2.43	3.17	3.18	4.29	4.93	5.96	7.04	9.63	13.89	45.48

Source: Kalifa, Salvador. La Distribución del Ingreso en México. Una Reconsideración al Problema Distributivo. CENIET, Centro Nacional de Información de Estadísticas del Trabajo. Encuesta del Ingresos y Gastos Familiaries, 1975. INEGI. Encuesta Nacional de Ingresos y Gastos de los Hogares. Datos de la "Parte especial" del Censo de Población, 1950. Datos de la revisión de la encuesta del Banco de México realizada por la Secretaría de la Presidencia, 1968. Secretaría de Programación y Presupuesto, Coordinación General del Sistema Nacional de Información. Encuesta Nacional de Ingresos y Gastos de las Familias, México 1979.

C.2 Income composition by quintiles

Figure 35: Proportion of income received by each quintile and the sources of each quintile's income in Mexico (2012)
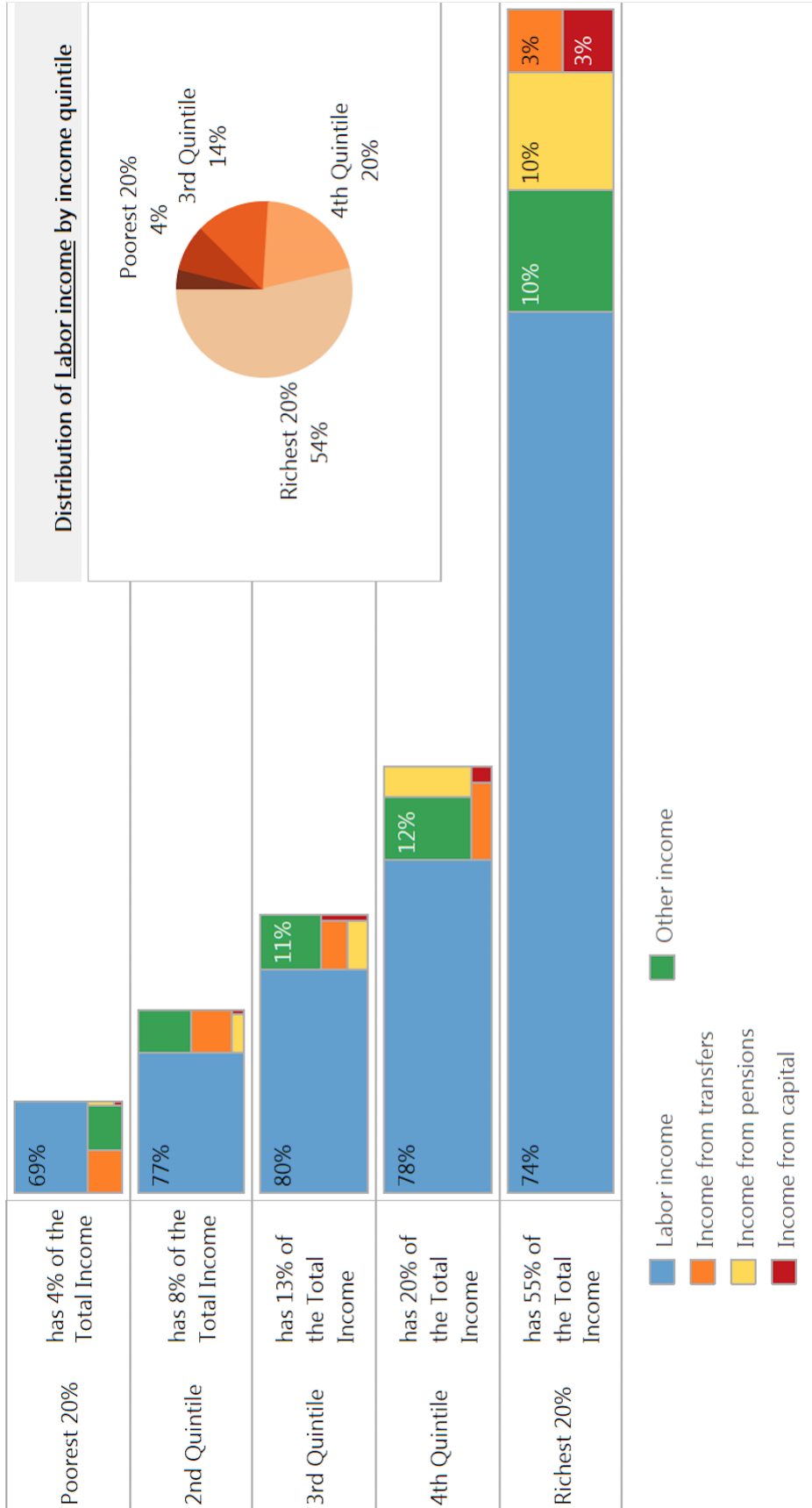
Distribution of Labor income by income quintile

Poorest 20%
4%

3rd Quintile
14%

4th Quintile
20%

Richest 20%
54%

Poorest 20%	has 4% of the Total Income
2nd Quintile	has 8% of the Total Income
3rd Quintile	has 13% of the Total Income
4th Quintile	has 20% of the Total Income
Richest 20%	has 55% of the Total Income

69%
77%
80%
78%
74%

11%
12%
10%
10%
3%
3%

Labor income
Income from transfers
Income from pensions
Income from capital
Other income

D   Appendix 4 - Tax evasion tables

D.1   Different types of authorized deductions as a percentage of total authorized deductions

Table 26: *Self-employment* deductions as a percentage of total deductions (2009)

Source	Percentage
Wages (disabilities)	0.97%
Wages	5.13%
Other taxes	0.33%
Insurances/securities	1.65%
Per diem	2.79%
Gas expenditure	6.68%
SAR/INFONAVIT	0.58%
IMSS	0.74%
Local taxes	0.10%
Stimulus (disabilities)	0.01%
Natural disasters	0.24%
Other deductions	80.78%
Total	100%

Source: Authors' calculations based on 2009 tax data
Note: Deductions for all taxpayers that report positive deductions

Table 27: *Business* deductions as a percentage of total deductions (2009)

Source	Percentage
Returns (National)	0.49%
Returns (Foreign)	0.14%
Purchases of goods and raw materials (National)	64.42%
Purchases of goods and raw materials (Foreign)	4.86%
Investments	1.97%
Lost credits	0.02%
SAR/INFONAVIT	0.35%
IMSS	0.52%
Wages	3.91%
Wages (disabilities)	0.06%
Natural disasters	0.00%
Sea diesel	0.03%
Other diesel	0.29%
Natural gas	0.02%
Toll road payments	0.12%
Research	0.00%
Films	0.00%
Downtown buildings	0.01%
Maneuvers/packages	0.03%
Per diem	0.31%
Interests payed	0.25%
Inflationary loss	0.00%
Service fees	0.77%
Royalties	0.06%
Property use	0.68%
Insurances/securities	0.33%
Freight and cartage	0.70%
Gas expenditure	2.01%
Other taxes	0.11%
Local taxes	0.04%
Stimulus (disabilities)	0.09%
Other deductions	17.41%
Total	100%

Source: Authors' calculations based on 2009 tax data
Note: Deductions for all taxpayers that report positive deductions

D.2 Tax evasion results

Table 28: Tax and Economics census results (in %) for β_{ilm} in equation 7.

	Tax Data	Economic Census
Expenses on goods and services	87.87	72.18
Goods purchased for resale	68.21	47.82
Expenses on gas	2.49	1.7
Expenses on rental of property	0.67	0.21
Expenses on service fees	0.75	0.5
"Other" expenses	20.61	0.84
Total of investments	2.1	1.2
Machinery and equipment	0.32	0.3
Property	0.11	0.3
Transport equipment	0.98	0.1
Furniture and office equipment	0.27	0.4
Number of observations	816,256	3,356,300

Table 29: Evasion rate results for λ_{il} in equation 8.

	Evasion rate
Expenses on goods and services	17.86%
Goods purchased for resale	29.89%
Expenses on gas	31.73%
Expenses on rental of property	68.66%
Expenses on service fees	33.33%
"Other" expenses	95.92%
Total of investments	40.95%
Machinery and equipment	12.5%
Property	-136%
Transport equipment	85.71%
Furniture and office equipment	-62%

Source: Authors' calculations based on tax and economic census data for 2009.
*Note*s: In the tax data, We are only able to see if an individual reported income from Self-employment, intermediate scheme and business scheme; therefore, if an individual reported an income greater than zero coming from one these sources, it was considered as a business. For example, if an individual reported incomes greater than zero for Self-employment, intermediate scheme and business scheme, it was considered as three different business, i.e., one business in self-employment, one in the intermediate scheme and one in the business scheme. Moreover, in the tax files, each business scheme wasn't required to fill each of the rows presented in this table. Expenses on goods and services and the number of observations were calculated for the three types of business. Goods purchased for resale, expenses on rental of property, expenses on service fees, machinery and equipment, property, transport equipment and furniture and office equipment was calculated for the business scheme only. Expenses on gas and "other" expenses was calculated for self-employment and business scheme. Finally, total of investments was calculated for the intermediate scheme and the business scheme. For the Economic census, a business was taken into account if it had an income greater than zero.

Table 30: Tax data results (in %) for β_{iltm} in equation 7, by income ranges.

	$0.01 - $2,000	$2,000.01 - $4,000	$4,000.01 - $4,500	$4,500.01 - $5,000	$5,000.01 - $5,500	$6,000.01 - $6,500	$7,000.01 - $7,500	$7,500.01 - $12,000	$12,000.01 or over
Expenses on goods and services	80.68	88.7	89.58	88.75	87.86	88.18	88.4	89.23	92.18
Goods purchased for resale	41.36	56.52	60.03	63.54	61.84	63.46	64.88	67.35	76.82
Expenses on gas	4.47	2.9	2.81	2.61	3.13	2.94	3	2.58	1.51
Expenses on rental of property	1.39	1.08	1.04	0.76	0.94	0.66	0.66	0.7	0.42
Expenses on service fees	1.66	1.4	1.22	0.83	0.78	0.73	0.86	0.73	0.43
"Other" expenses	39.65	28.22	25.64	21.46	21.7	20.95	19.77	17.99	12.09
Total of investments	2.98	2.7	2.24	2.13	2.35	2.45	2.2	1.78	1.34
Machinery and equipment	0.48	0.39	0.31	0.29	0.4	0.29	0.32	0.31	0.27
Property	0.19	0.12	0.08	0.12	0.07	0.088	0.09	0.07	0.1
Transport equipment	2.29	1.33	1.24	1.18	1.11	1.05	1.11	0.98	0.6
Furniture and office equipment	0.4	0.22	0.18	0.16	0.21	0.17	0.15	0.14	0.29
Number of observations	732,383	36,936	3,977	3,183	2,632	1,819	1,393	6,922	9,164

Source: Authors' calculations based on tax data for 2009.

Notes: Ranges in thousands of $MX. In the tax data, we are only able to see if an individual reported an income greater than zero coming from one these sources, it was considered as a business. For example, if an individual reported incomes greater than zero for self-employment, intermediate scheme and business scheme, it was considered as three different business, i.e., one business in self-employment, one in the intermediate scheme and one in the business scheme. Moreover, in the tax files, each business scheme wasn't required to fill each of the rows presented in this table. Expenses on goods and services and the number of observations were calculated for the three types of business. Goods purchased for resale, expenses on rental of property, expenses on service fees, machinery and equipment, property, transport equipment and furniture and office equipment was calculated for the business scheme only. Expenses on gas and "other" expenses was calculated for self-employment and business scheme. Finally, total of investments was calculated for the intermediate scheme and the business scheme.

Table 31: Economic census results (in %) for β_{ilm} in equation 7, by income ranges.

	$0.01 - $2,000	$2,000.01 - $4,000	$4,000.01 - $4,500	$4,500.01 - $5,000	$5,000.01 - $5,500	$6,000.01 - $6,500	$7,000.01 - $7,500	$7,500.01 - $12,000	$12,000.01 or over
Expenses on goods and services	68.67	69.46	70.49	72.24	73.69	73.59	74.24	75.37	82
Goods purchased for resale	39.17	47.63	49.29	51.36	54.31	54.73	55.33	56.59	68.01
Expenses on gas	1.95	1.71	1.76	1.77	1.68	1.48	1.46	1.57	1.01
Expenses on rental of property	0.26	0.17	0.13	0.15	0.11	0.14	0.19	0.15	0.13
Expenses on service fees	0.53	0.51	0.53	0.58	0.5	0.46	0.48	0.48	0.39
"Other" expenses	0.71	0.65	0.83	0.64	0.82	0.78	0.71	1.01	1.27
Total of investments	1.6	0.99	0.83	0.9	1.05	0.82	0.64	0.72	0.75
Machinery and equipment	0.3	0.29	0.24	0.21	0.24	0.29	0.18	0.24	0.24
Property	0.4	0.17	0.13	0.26	0.38	0.05	0.08	0.08	0.13
Transport equipment	0.1	0.18	0.19	0.14	0.19	0.19	0.18	0.16	0.11
Furniture and office equipment	0.7	0.28	0.21	0.24	0.16	0.21	0.15	0.16	0.11
Number of observations	3,250,273	48,728	4,626	3,553	3,086	2,453	1,782	6,766	8,826

Source: Author's calculations based on economic census data for 2009.
Notes: Ranges in thousands of $MX. A business was taken into account if it had an income greater than zero.

Table 32: Evasion rate results for λ_{il} in equation 8, by income ranges.

	$0.01 - $2,000 (1)	$2,000.01 - $4,000 (2)	$4,000.01 - $4,500 (3)	$4,500.01 - $5,000 (4)	$5,000.01 - $5,500 (5)	$6,000.01 - $6,500 (6)	$7,000.01 - $7,500 (7)	$7,500.01 - $12,000 (8)	$12,000.01 or over (9)
Expenses on goods and services	14.9%	21.7%	21.3%	18.6%	16.1%	16.5%	16.0%	15.5%	11.0%
Goods purchased for resale	5.3%	15.7%	17.9%	19.2%	12.2%	13.8%	14.7%	16.0%	11.5%
Expenses on gas	56.4%	41.0%	37.4%	32.2%	46.3%	49.7%	51.3%	39.1%	33.1%
Expenses on rental of property	81.3%	84.3%	87.5%	80.3%	88.3%	78.8%	71.2%	78.6%	69.0%
Expenses on service fees	68.1%	63.6%	56.6%	30.1%	35.9%	37.0%	44.2%	34.2%	9.3%
"Other" expenses	98.2%	97.7%	96.8%	97.0%	96.2%	96.3%	96.4%	94.4%	89.5%
Total of investments	48.0%	63.3%	62.9%	57.7%	55.3%	66.5%	70.9%	59.6%	44.0%
Machinery and equipment	35.4%	25.6%	22.6%	27.6%	40.0%	0.0%	43.8%	22.6%	11.1%
Property	-84.2%	-41.7%	-62.5%	-116.7%	-442.9%	43.2%	11.1%	-14.3%	-30.0%
Transport equipment	93.9%	86.5%	84.7%	88.1%	82.9%	81.9%	83.8%	83.7%	81.7%
Furniture and office equipment	-62.5%	-27.3%	-16.7%	-50.0%	23.8%	-23.5%	0.0%	-14.3%	62.1%

Source: Author's calculations based on tax data and economic census data for 2009.
Notes: Ranges in thousands of $MX.

Table 33: Tax and Economics census results (in %) for β_{ilm} in equation 7, for self-employment

	Tax Data	Professional Services[1]	Prof. Serv. + Private Medical Services[2]
Expenses on goods and services	51.01	37.36	39.19
Expenses on gas	3.77	1.98	1.69
"Other" expenses	45.69	21.65	22.18
Number of observations	288,277	65,259	167,745

Source: Authors' calculations based on tax and economic census data for 2009.

Table 34: Evasion rate results for λ_{il} in equation 8, for self-employment

	Professional Services[1] (1)	Prof. Serv. + Private Medical Services[2] (2)
Expenses on goods and services	26.76%	23.17%
Expenses on gas	47.48%	55.17%
"Other" expenses	52.62%	51.46%

Source: Authors' calculations based on tax and economic census data for 2009.
Notes: In the tax data, a business is considered as a professional activity if the individual has a professional activity income greater than zero. For the Economic census, a business was taken into account if it had an income greater than zero. Specifically, a business is considered as a professional activity if the business is classified as one that conducts professional, scientific, and technical services in [1] and as one that conducts professional, scientific, and technical services and private offices of physicians, dentists, chiropractors, optometrists, mental health practitioners, physical, occupational and speech therapists, and audiologists, podiatrists and all other miscellaneous health practitioners in [2]

E   Appendix 5 - Top income shares, thresholds, averages and international comparisons

E.1   Net income

Table 35: Top income shares in Mexico (in %), 2009-2012 (Net income)

	Top 5%	Top 1%	Top 0.5%	Top 0.1%	Top 0.05%	Top 0.01%	Top 0.005%	Top 0.001%
2009	19.1	10.1	7.6	4.1	3.2	2.0	1.6	1.0
2010	18.0	9.4	7.1	3.9	3.1	1.9	1.6	1.0
2011	18.7	9.8	7.5	4.3	3.5	2.3	2.0	1.4
2012	19.7	10.2	7.8	4.4	3.6	2.4	2.0	1.3

Source: Authors' calculations based on tax data
Note: Estimates before Income Tax

Table 36: Thresholds within the top incomes in Mexico, 2009-2012 (Net income)

	P95	P99	P99.5	P99.9	P99.95	P99.99	P99.995	P99.999
2009								
Pesos (MX$)	48,000	462,386	672,537	1,584,240	2,340,976	5,956,244	9,657,568	31,800,000
US$	3,553	34,225	49,781	117,264	173,277	440,877	714,846	2,353,812
US$ (PPP)	6,452	62,149	90,395	212,935	314,647	800,570	1,298,060	4,274,194
2010								
Pesos (MX$)	61,509	468,540	679,865	1,575,491	2,341,855	6,060,815	10,000,000	33,700,000
US$	4,866	37,068	53,787	124,643	185,273	479,495	791,139	2,666,139
US$ (PPP)	8,040	61,247	88,871	205,947	306,125	792,263	1,307,190	4,405,229
2011								
Pesos (MX$)	154,490	499,921	725,086	1,679,726	2,493,989	6,761,265	11,200,000	38,400,000
US$	12,439	40,251	58,381	135,244	200,804	544,385	901,771	3,091,787
US$ (PPP)	20,142	65,179	94,535	218,999	325,162	881,521	1,460,235	5,006,519
2012								
Pesos (MX$)	188,917	530,407	764,910	1,760,296	2,618,253	7,263,398	12,200,000	44,200,000
US$	14,344	40,274	58,080	133,660	198,804	551,511	926,348	3,356,112
US$ (PPP)	23,644	66,384	95,733	220,312	327,691	909,061	1,526,909	5,531,915

Source: Authors' calculations based on tax data
Note: Estimates before Income Tax. Current prices

Table 37: Average income within the top incomes in Mexico, 2009-2012 (Net income)

	5-1%	1-0.5%	0.5-0.1%	0.1-0.05%	0.05-0.01%	0.01-0.001%	0.001%
2009							
Pesos (MX$)	246,762	549,707	950,418	1,890,203	3,361,137	11,200,000	114,000,000
US$	18,265	40,689	70,349	139,911	248,789	829,016	8,438,194
US$ (PPP)	33,167	73,885	127,744	254,060	451,766	1,505,376	15,322,581
2010							
Pesos (MX$)	253,033	556,221	956,441	1,886,640	3,385,114	11,700,000	123,000,000
US$	20,018	44,005	75,668	149,259	267,810	925,633	9,731,013
US$ (PPP)	33,076	72,709	125,025	246,620	442,499	1,529,412	16,078,431
2011							
Pesos (MX$)	281,218	593,304	1,015,261	2,010,778	3,677,880	13,100,000	177,000,000
US$	22,642	47,770	81,744	161,898	296,126	1,054,750	14,251,208
US$ (PPP)	36,665	77,354	132,368	262,161	479,515	1,707,953	23,076,923
2012							
Pesos (MX$)	302,229	628,359	1,066,279	2,109,552	3,903,288	14,300,000	172,000,000
US$	22,948	47,711	80,963	160,179	296,377	1,085,801	13,059,985
US$ (PPP)	37,826	78,643	133,452	264,024	488,522	1,789,737	21,526,909

Source: Authors' calculations based on tax data
Note: Estimates before Income Tax. Current prices

E.2   Revenue

Table 38: Top income shares in Mexico (in %), 2009-2012 (Revenue)

	Top 5%	Top 1%	Top 0.5%	Top 0.1%	Top 0.05%	Top 0.01%	Top 0.005%	Top 0.001%
2009	31.2	19.1	15.6	9.8	8.0	4.6	3.5	1.8
2010	29.3	18.0	14.8	9.4	7.7	4.6	3.5	1.9
2011	29.9	18.5	15.3	9.9	8.2	5.1	4.1	2.4
2012	31.7	19.5	16.1	10.4	8.6	5.2	4.1	2.2

Source: Authors' calculations based on tax data
Note: Estimates before Income Tax

Table 39: Thresholds within the top incomes in Mexico, 2009-2012 (Revenue)

	P95	P99	P99.5	P99.9	P99.95	P99.99	P99.995	P99.999
2009								
Pesos (MX$)	202,276	612,727	963,609	3,174,062	5,348,404	18,800,000	31,000,000	86,600,000
US$	14,972	45,354	71,326	234,942	395,885	1,391,562	2,294,597	6,410,067
US$ (PPP)	27,188	82,356	129,517	426,621	718,872	2,526,882	4,166,667	11,639,785
2010								
Pesos (MX$)	205,120	625,450	976,215	3,212,335	5,417,996	19,500,000	32,100,000	90,000,000
US$	16,228	49,482	77,232	254,140	428,639	1,542,722	2,539,557	7,120,253
US$ (PPP)	26,813	81,758	127,610	419,913	708,235	2,549,020	4,196,078	11,764,706
2011								
Pesos (MX$)	220,811	667,456	1,039,238	3,401,176	5,741,904	20,600,000	34,200,000	102,000,000
US$	17,779	53,740	83,675	273,847	462,311	1,658,615	2,753,623	8,212,560
US$ (PPP)	28,789	87,022	135,494	443,439	748,619	2,685,789	4,458,931	13,298,566
2012								
Pesos (MX$)	240,511	714,538	1,106,617	3,649,463	6,244,996	22,900,000	37,600,000	112,000,000
US$	18,262	54,255	84,026	277,104	474,183	1,738,800	2,854,973	8,504,176
US$ (PPP)	30,102	89,429	138,500	456,754	781,602	2,866,083	4,705,882	14,017,522

Source: Authors' calculations based on tax data
Note: Estimates before Income Tax. Current prices

Table 40: Average income within the top incomes in Mexico, 2009-2012 (Revenue)

	5-1%	1-0.5%	0.5-0.1%	0.1-0.05%	0.05-0.01%	0.01-0.001%	0.001%
2009							
Pesos (MX$)	329,294	752,933	1,573,908	4,023,416	9,137,465	34,600,000	194,000,000
US$	24,374	55,731	116,499	297,810	676,348	2,561,066	14,359,734
US$ (PPP)	44,260	101,201	211,547	540,782	1,228,154	4,650,538	26,075,269
2010							
Pesos (MX$)	336,230	765,767	1,583,968	4,061,076	9,340,027	35,700,000	220,000,000
US$	26,600	60,583	125,314	321,288	738,926	2,824,367	17,405,063
US$ (PPP)	43,952	100,100	207,055	530,860	1,220,919	4,666,667	28,758,170
2011							
Pesos (MX$)	360,400	816,495	1,684,738	4,293,431	9,895,083	38,600,000	299,000,000
US$	29,018	65,740	135,647	345,687	796,706	3,107,890	24,074,074
US$ (PPP)	46,988	106,453	219,653	559,769	1,290,102	5,032,595	38,983,051
2012							
Pesos (MX$)	389,380	871,378	1,798,735	4,628,883	10,800,000	42,600,000	278,000,000
US$	29,566	66,164	136,578	351,472	820,046	3,234,624	21,108,580
US$ (PPP)	48,733	109,059	225,123	579,335	1,351,690	5,331,665	34,793,492

Source: Authors' calculations based on tax data
Note: Estimates before Income Tax. Current prices

E.3 Adjusted income

Table 41: Thresholds within the top incomes in Mexico, 2009-2012 (Income with Economic Census adjustments)

	P95	P99	P99.5	P99.9	P99.95	P99.99	P99.995	P99.999
2009								
Pesos (MX$)	149,468	553,307	812,753	2,115,424	3,267,379	9,436,578	15,100,000	48,100,000
US$	11,064	40,955	60,159	156,582	241,849	698,488	1,117,691	3,560,326
US$ (PPP)	20,090	74,369	109,241	284,331	439,164	1,268,357	2,029,570	6,465,054
2010								
Pesos (MX$)	178,320	566,658	827,248	2,115,768	3,298,988	9,791,403	15,900,000	49,100,000
US$	14,108	44,831	65,447	167,387	260,996	774,636	1,257,911	3,884,494
US$ (PPP)	23,310	74,073	108,137	276,571	431,240	1,279,922	2,078,431	6,418,301
2011								
Pesos (MX$)	213,490	606,260	880,830	2,261,872	3,544,100	10,700,000	17,400,000	56,500,000
US$	17,189	48,813	70,920	182,115	285,354	861,514	1,400,966	4,549,114
US$ (PPP)	27,834	79,043	114,841	294,899	462,073	1,395,046	2,268,579	7,366,362
2012								
Pesos (MX$)	232,760	649,666	936,456	2,413,207	3,822,123	11,900,000	19,600,000	62,900,000
US$	17,674	49,329	71,105	183,235	290,214	903,569	1,488,231	4,776,006
US$ (PPP)	29,131	81,310	117,204	302,028	478,363	1,489,362	2,453,066	7,872,340

Source: Authors' calculations based on tax data
Note: Estimates before Income Tax. Current prices

Table 42: Average income within the top incomes in Mexico, 2009-2012 (Income with Economic Census adjustments)

	5-1%	1-0.5%	0.5-0.1%	0.1-0.05%	0.05-0.01%	0.01-0.001%	0.001%
2009							
Pesos (MX$)	309,843	661,726	1,191,628	2,585,187	5,017,531	17,100,000	145,000,000
US$	22,934	48,980	88,203	191,354	371,394	1,265,729	10,732,791
US$ (PPP)	41,646	88,942	160,165	347,471	674,399	2,298,387	19,489,247
2010							
Pesos (MX$)	317,261	675,892	1,201,296	2,596,112	5,114,254	18,100,000	158,000,000
US$	25,100	53,473	95,039	205,389	404,609	1,431,962	12,500,000
US$ (PPP)	41,472	88,352	157,032	339,361	668,530	2,366,013	20,653,595
2011							
Pesos (MX$)	340,582	721,492	1,278,492	2,781,312	5,539,346	20,100,000	234,000,000
US$	27,422	58,091	102,938	223,938	446,002	1,618,357	18,840,580
US$ (PPP)	44,404	94,067	166,687	362,622	722,209	2,620,600	30,508,475
2012							
Pesos (MX$)	368,326	770,353	1,357,393	2,980,441	6,054,203	22,300,000	211,000,000
US$	27,967	58,493	103,067	226,305	459,697	1,693,242	16,021,260
US$ (PPP)	46,098	96,415	169,886	373,021	757,723	2,790,989	26,408,010

Source: Authors' calculations based on tax data
Note: Estimates before Income Tax. Current prices

E.4 Adjusting income by tax evasion ranges

Following Sub-section 4.1.4 and Figure 13, "authorized income deductions" were adjusted depending on the specific Revenue range of the business. Compared to the top shares obtained while using the original "adjusted income" definition (as seen in Table 14), the new top shares (as seen in Table 43) remain almost identical, meaning that the original "adjusted income" provides a good approximation.

Table 43: Top income shares in Mexico (in %), 2009-2012 (Income with Economic Census adjustments by ranges)

	Top 5%	Top 1%	Top 0.5%	Top 0.1%	Top 0.05%	Top 0.01%	Top 0.005%	Top 0.001%
2009	24.3	13.0	10.0	5.6	4.4	2.7	2.1	1.3
2010	22.9	12.3	9.4	5.4	4.3	2.6	2.1	1.3
2011	23.6	12.8	10.0	6.0	4.9	3.2	2.7	1.8
2012	24.9	13.4	10.4	6.1	5.0	3.1	2.6	1.6

Source: Authors' calculations based on tax data
Note: Estimates before Income Tax

Table 44: Thresholds within the top incomes in Mexico, 2009-2012 (Income with Economic Census adjustments by ranges)

	P95	P99	P99.5	P99.9	P99.95	P99.99	P99.995	P99.999
2009								
Pesos (MX$)	139,500	552,687	812,425	2,096,558	3,202,825	9,005,582	14,400,000	46,300,000
US$	10,326	40,909	60,135	155,186	237,071	666,586	1,065,877	3,427,091
US$ (PPP)	18,750	74,286	109,197	281,795	430,487	1,210,428	1,935,484	6,223,118
2010								
Pesos (MX$)	168,529	566,159	827,063	2,094,990	3,240,864	9,313,069	15,200,000	47,100,000
US$	13,333	44,791	65,432	165,743	256,397	736,793	1,202,532	3,726,266
US$ (PPP)	22,030	74,008	108,113	273,855	423,642	1,217,395	1,986,928	6,156,863
2011								
Pesos (MX$)	212,530	605,887	880,056	2,237,239	3,469,846	10,200,000	16,400,000	54,200,000
US$	17,112	48,783	70,858	180,132	279,376	821,256	1,320,451	4,363,929
US$ (PPP)	27,709	78,994	114,740	291,687	452,392	1,329,857	2,138,201	7,066,493
2012								
Pesos (MX$)	231,739	649,374	934,792	2,384,167	3,738,776	11,300,000	18,600,000	60,400,000
US$	17,596	49,307	70,979	181,030	283,886	858,011	1,412,301	4,586,181
US$ (PPP)	29,004	81,273	116,995	298,394	467,932	1,414,268	2,327,910	7,559,449

Source: Authors' calculations based on tax data
Note: Estimates before Income Tax. Current prices

Table 45: Average income within the top incomes, 2009-2012 (Income with Economic Census adjustments by ranges)

	5-1%	1-0.5%	0.5-0.1%	0.1-0.05%	0.05-0.01%	0.01-0.001%	0.001%
2009							
Pesos (MX$)	308,228	661,389	1,188,550	2,548,238	4,858,855	16,300,000	142,000,000
US$	22,815	48,956	87,976	188,619	359,649	1,206,514	10,510,733
US$ (PPP)	41,428	88,896	159,751	342,505	653,072	2,190,860	19,086,022
2010							
Pesos (MX$)	315,901	675,620	1,198,115	2,558,842	4,945,000	17,300,000	155,000,000
US$	24,992	53,451	94,788	202,440	391,218	1,368,671	12,262,658
US$ (PPP)	41,294	88,316	156,616	334,489	646,405	2,261,438	20,261,438
2011							
Pesos (MX$)	339,465	721,275	1,274,103	2,736,774	5,359,667	19,200,000	230,000,000
US$	27,332	58,074	102,585	220,352	431,535	1,545,894	18,518,519
US$ (PPP)	44,259	94,038	166,115	356,815	698,783	2,503,259	29,986,962
2012							
Pesos (MX$)	367,288	769,991	1,351,669	2,928,806	5,846,461	21,300,000	207,000,000
US$	27,888	58,466	102,632	222,385	443,923	1,617,312	15,717,540
US$ (PPP)	45,968	96,369	169,170	366,559	731,722	2,665,832	25,907,384

Source: Authors' calculations based on tax data
Note: Estimates before Income Tax. Current prices

E.5 International comparisons and Transition matrices

Table 46: Top 1% for selected countries (2000-2012)

	Argentina	Australia	Canada	Colombia	France	Spain	Uruguay	USA
2000	14.34	9.03	12.78	17.32	8.29	8.65		16.49
2001	12.91	8.31	12.7	17.31	8.43	8.62		15.37
2002	15.53	8.79	12.35	17.96	8.46	8.42		14.99
2003	16.85	9.18	12.28	19.92	8.55	8.56		15.21
2004	16.75	8.89	12.65	17.8	8.73	8.67		16.34
2005		9.12	13.09	18.8	8.73	8.8		17.68
2006		10.06	13.71	19.94	8.94	9.14		18.06
2007		9.84	13.72	20.49	9.09	9.03		18.33
2008		8.59	13.06	20.25	8.51	8.74		17.89
2009		8.88	12.29	20.17	7.78	8.52	13.8	16.68
2010		9.17	12.22	20.45	8.11	8.14	14.3	17.45
2011					9.27	8.53	14.1	17.47
2012					8.94	8.2		19.34

Source: The World Top Incomes Database
Note: Incomes excluding capital gains and estimates before income tax. Estimates can be seen in table

Table 47: Top .01% for selected countries (2000-2012)

	Argentina	Australia	Canada	Colombia	France	Spain	Uruguay	USA
2000	5.68	3.06	4.93	6.1	2.25	2.51		7.13
2001	5.22	2.51	4.78	5.99	2.33	2.46		6.26
2002	6.92	2.68	4.49	5.97	2.35	2.35		5.94
2003	7.4	2.89	4.44	6.03	2.37	2.44		6.11
2004	7.02	2.93	4.67		2.45	2.5		6.9
2005		3.05	4.97		2.48	2.62		7.76
2006		3.65	5.38	7.62	2.65	2.84		7.92
2007		3.58	5.33	7.78		2.87		8.16
2008		2.91	4.91	7.49		2.69		7.82
2009		2.93	4.37	7.13		2.62	4.4	7.04
2010		3.15	4.31	7.37		2.4	4.7	7.52
2011					3.23	2.67	4.8	7.38
2012					2.9	2.49		8.82

Source: The World Top Incomes Database
Note: Incomes excluding capital gains and estimates before income tax. Estimates can be seen in table

Table 48: Transition Matrix at the top for two different definitions of income (2012)

	Revenue							
	7.5-5%	5-1%	1-0.5%	0.5-0.1%	0.1-0.05%	0.05-0.01%	0.01% or over	Total
7.5-5%	1,250,551 (71.09) [70.87]	354,435 (20.15) [12.45]	48,883 (2.78) [13.76]	75,409 (4.29) [26.59]	15,411 (0.88) [43.64]	12,013 (0.68) [42.52]	2,437 (0.14) [34.49]	1,759,139 (100) [33.06]
5-1%	513,200 (18.01) [29.08]	2,268,952 (79.63) [79.71]	40,407 (1.42) [11.37]	17,761 (0.62) [6.26]	3,783 (0.13) [10.71]	4,207 (0.15) [14.89]	880 (0.03) [12.45]	2,849,190 (100) [53.55]
1-0.5%	186 (0.05) [0.01]	222,655 (62.52) [7.82]	118,671 (33.32) [33.4]	12,283 (3.45) [4.33]	800 (0.22) [2.27]	1,171 (0.33) [4.14]	374 (0.11) [5.29]	356,140 (100) [6.69]
0.5-0.1%	380 (0.13) [0.02]	386 (0.14) [0.01]	147,294 (51.7) [41.46]	132,606 (46.54) [46.77]	1,660 (0.58) [4.7]	1,779 (0.62) [6.3]	805 (0.28) [11.39]	284,910 (100) [5.35]
0.1-0.05%	94 (0.26) [0.01]	11 (0.03) [0]	9 (0.03) [0]	33,124 (93.01) [11.68]	1,518 (4.26) [4.3]	540 (1.52) [1.91]	316 (0.89) [4.47]	35,612 (100) [0.67]
0.05-0.01%	166 (0.58) [0.01]	17 (0.06) [0]	8 (0.03) [0]	12,355 (43.38) [4.36]	12,012 (42.17) [34.02]	3,464 (12.16) [12.26]	460 (1.62) [6.51]	28,482 (100) [0.54]
0.01% or over	102 (1.43) [0.01]	5 (0.07) [0]	3 (0.04) [0]	13 (0.18) [0]	127 (1.78) [0.36]	5,077 (71.3) [17.97]	1,794 (25.19) [25.39]	7,121 (100) [0.13]
Total	1,764,679 (33.17) [100]	2,846,461 (53.5) [100]	355,275 (6.68) [100]	283,551 (5.33) [100]	35,311 (0.66) [100]	28,251 (0.53) [100]	7,066 (0.13) [100]	5,320,594 (100) [100]

(Row label column: Net income)

Source: Authors' calculations based on tax data 2012
Note: Estimates before Income Tax. Numbers in parenthesis represents row percentages, whereas numbers in brackets represent column percentages.

Table 49: Mobility Relative to Total Filing Population from 2009 to 2012, adjusted income.

Adjusted income 2009 (rows) × Adjusted income 2012 (columns)

		7.5-5%	5-1%	1-0.5%	0.5-0.1%	0.1-0.05%	0.05-0.01%	0.01% or over
	7.5-5%	387,780	50,158	5,830	4,968	819	730	167
		(44.5)	(5.76)	(0.67)	(0.57)	(0.09)	(0.08)	(0.02)
		[21.78]	[1.76]	[1.64]	[1.74]	[2.3]	[2.56]	[2.34]
	5-1%	176,558	1,543,735	118,216	33,800	1,483	897	153
		(6.72)	(58.78)	(4.5)	(1.29)	(0.06)	(0.03)	(0.01)
		[9.91]	[54.18]	[33.19]	[11.86]	[4.16]	[3.15]	[2.15]
	1-0.5%	9,439	61,896	137,432	53,198	1,421	642	81
		(2.88)	(18.85)	(41.86)	(16.21)	(0.43)	(0.2)	(0.02)
		[0.53]	[2.17]	[38.59]	[18.67]	[3.99]	[2.25]	[1.14]
	0.5-0.1%	8,054	21,536	26,963	140,828	11,886	3,633	356
		(3.07)	(8.2)	(10.27)	(53.62)	(4.53)	(1.38)	(0.14)
		[0.45]	[0.76]	[7.57]	[49.43]	[33.37]	[12.75]	[5]
	0.1-0.05%	1,156	1,449	978	7,465	10,398	4,571	276
		(3.52)	(4.41)	(2.98)	(22.74)	(31.68)	(13.93)	(0.84)
		[0.06]	[0.05]	[0.27]	[2.62]	[29.2]	[16.05]	[3.87]
	0.05-0.01%	910	952	532	2,630	3,360	11,385	1,490
		(3.47)	(3.63)	(2.03)	(10.02)	(12.8)	(43.35)	(5.67)
		[0.05]	[0.03]	[0.15]	[0.92]	[9.43]	[39.96]	[20.92]
	0.01% or over	193	136	67	275	231	1,349	3,472
		(2.94)	(2.07)	(1.02)	(4.19)	(3.52)	(20.55)	(52.89)
		[0.01]	[0]	[0.02]	[0.1]	[0.65]	[4.74]	[48.74]

Table 50: Mobility Relative to the Panel Population from 2009 to 2012, adjusted income.

Adjusted income 2009		7.5-5%	5-1%	1-0.5%	0.5-0.1%	0.1-0.05%	0.05-0.01%	0.01% or over	Total
	7.5-5%	387,780 (86.09) [66.39]	50,158 (11.14) [2.99]	5,830 (1.29) [2.01]	4,968 (1.1) [2.04]	819 (0.18) [2.77]	730 (0.16) [3.15]	167 (0.04) [2.79]	450,452 (100) [15.77]
	5-1%	176,558 (9.42) [30.23]	1,543,735 (82.34) [91.9]	118,216 (6.31) [40.76]	33,800 (1.8) [13.9]	1,483 (0.08) [5.01]	897 (0.05) [3.87]	153 (0.01) [2.55]	1,874,842 (100) [65.65]
	1-0.5%	9,439 (3.57) [1.62]	61,896 (23.44) [3.68]	137,432 (52.04) [47.39]	53,198 (20.14) [21.88]	1,421 (0.54) [4.8]	642 (0.24) [2.77]	81 (0.03) [1.35]	264,109 (100) [9.25]
	0.5-0.1%	8,054 (3.78) [1.38]	21,536 (10.1) [1.28]	26,963 (12.64) [9.3]	140,828 (66.04) [57.91]	11,886 (5.57) [40.16]	3,633 (1.7) [15.65]	356 (0.17) [5.94]	213,256 (100) [7.47]
	0.1-0.05%	1,156 (4.4) [0.2]	1,449 (5.51) [0.09]	978 (3.72) [0.34]	7,465 (28.39) [3.07]	10,398 (39.55) [35.13]	4,571 (17.38) [19.7]	276 (1.05) [4.6]	26,293 (100) [0.92]
	0.05-0.01%	910 (4.28) [0.16]	952 (4.48) [0.06]	532 (2.5) [0.18]	2,630 (12.37) [1.08]	3,360 (15.81) [11.35]	11,385 (53.55) [49.06]	1,490 (7.01) [24.85]	21,259 (100) [0.74]
	0.01% or over	193 (3.37) [0.03]	136 (2.38) [0.01]	67 (1.17) [0.02]	275 (4.81) [0.11]	231 (4.04) [0.78]	1,349 (23.57) [5.81]	3,472 (60.67) [57.91]	5,723 (100) [0.2]
	Total	584,090 (20.45) [100]	1,679,862 (58.82) [100]	290,018 (10.15) [100]	243,164 (8.51) [100]	29,598 (1.04) [100]	23,207 (0.81) [100]	5,995 (0.21) [100]	2,855,934 (100) [100]

Source: Authors' calculations based on tax data 2009 and 2012

Note: Each cell entry indicates the total panel tax filers in each sub-group in 2009 that are in a given sub-group in 2012. Estimates before Income Tax. Numbers in parenthesis represents row percentages, whereas numbers in brackets represent column percentages.

F Appendix 6 - Inverted Pareto coefficients

Table 51: Inverted Pareto coefficients b for Mexico (2009 - 2012)

	Year					Year			
Fractile	2009	2010	2011	2012	Fractile	2009	2010	2011	2012
99.01	2.60	2.60	2.72	2.66	99.51	2.72	2.75	2.93	2.88
99.02	2.60	2.60	2.72	2.67	99.52	2.73	2.76	2.94	2.89
99.03	2.60	2.60	2.72	2.67	99.53	2.73	2.76	2.95	2.89
99.04	2.60	2.60	2.72	2.67	99.54	2.73	2.77	2.95	2.90
99.05	2.60	2.60	2.73	2.67	99.55	2.73	2.77	2.96	2.91
99.06	2.60	2.61	2.73	2.68	99.56	2.74	2.78	2.97	2.91
99.07	2.60	2.61	2.73	2.68	99.57	2.74	2.78	2.97	2.92
99.08	2.60	2.61	2.73	2.68	99.58	2.75	2.79	2.98	2.93
99.09	2.60	2.61	2.74	2.68	99.59	2.75	2.80	2.99	2.94
99.10	2.60	2.61	2.74	2.69	99.60	2.76	2.80	3.00	2.95
99.11	2.61	2.62	2.74	2.69	99.61	2.77	2.81	3.00	2.95
99.12	2.61	2.62	2.75	2.69	99.62	2.77	2.81	3.01	2.96
99.13	2.61	2.62	2.75	2.70	99.63	2.78	2.82	3.02	2.97
99.14	2.61	2.62	2.75	2.70	99.64	2.78	2.82	3.03	2.98
99.15	2.61	2.62	2.76	2.70	99.65	2.79	2.83	3.04	2.99
99.16	2.61	2.63	2.76	2.70	99.66	2.79	2.84	3.05	3.00
99.17	2.62	2.63	2.76	2.71	99.67	2.80	2.85	3.06	3.01
99.18	2.62	2.63	2.76	2.71	99.68	2.80	2.85	3.07	3.02
99.19	2.62	2.63	2.77	2.71	99.69	2.80	2.86	3.08	3.02
99.20	2.62	2.64	2.77	2.71	99.70	2.80	2.86	3.08	3.03
99.21	2.63	2.64	2.77	2.71	99.71	2.80	2.86	3.09	3.04
99.22	2.63	2.64	2.77	2.72	99.72	2.80	2.86	3.10	3.05
99.23	2.63	2.64	2.78	2.72	99.73	2.80	2.87	3.11	3.06
99.24	2.63	2.64	2.78	2.73	99.74	2.80	2.88	3.13	3.07
99.25	2.63	2.65	2.78	2.73	99.75	2.81	2.88	3.13	3.08
99.26	2.64	2.65	2.79	2.73	99.76	2.82	2.90	3.14	3.10
99.27	2.64	2.65	2.79	2.74	99.77	2.83	2.91	3.17	3.11
99.28	2.64	2.65	2.79	2.74	99.78	2.84	2.92	3.18	3.12
99.29	2.64	2.66	2.80	2.74	99.79	2.85	2.93	3.19	3.14
99.30	2.64	2.66	2.80	2.75	99.80	2.86	2.94	3.22	3.16
99.31	2.65	2.66	2.80	2.75	99.81	2.90	2.96	3.24	3.18
99.32	2.65	2.66	2.81	2.76	99.82	2.91	2.99	3.27	3.20
99.33	2.65	2.67	2.81	2.76	99.83	2.92	3.01	3.30	3.22
99.34	2.65	2.67	2.82	2.76	99.84	2.93	3.03	3.32	3.24
99.35	2.65	2.67	2.82	2.77	99.85	2.93	3.04	3.33	3.25
99.36	2.66	2.67	2.83	2.77	99.86	2.94	3.04	3.34	3.26
99.37	2.66	2.68	2.83	2.78	99.87	2.95	3.06	3.37	3.28
99.38	2.67	2.68	2.84	2.78	99.88	2.97	3.08	3.39	3.29
99.39	2.67	2.69	2.84	2.79	99.89	2.97	3.09	3.41	3.31
99.40	2.67	2.69	2.85	2.80	99.90	2.97	3.10	3.43	3.32
99.41	2.68	2.70	2.86	2.80	99.91	2.98	3.10	3.45	3.34
99.42	2.68	2.70	2.86	2.81	99.92	2.99	3.12	3.48	3.36
99.43	2.69	2.71	2.87	2.82	99.93	3.01	3.15	3.51	3.37
99.44	2.69	2.71	2.88	2.83	99.94	3.03	3.17	3.54	3.39
99.45	2.70	2.72	2.89	2.84	99.95	3.06	3.19	3.59	3.42
99.46	2.70	2.72	2.89	2.84	99.96	3.10	3.23	3.67	3.48
99.47	2.71	2.73	2.90	2.85	99.97	3.12	3.27	3.73	3.48
99.48	2.71	2.74	2.91	2.86	99.98	3.14	3.28	3.78	3.48
99.49	2.72	2.74	2.91	2.87	99.99	3.16	3.28	3.89	3.46
99.50	2.72	2.75	2.92	2.87					

Source: Authors' calculations based on tax data 2009 and 2012
Note: Estimates before Income Tax.

G   Appendix 7 - Top wage shares using "formal sector" methodology

If it is assumed that the employer-reported wages plus the personal tax returns represent the entire formal market population, one can calculate top wage shares and descriptive statistics for the entire formal market with a positive wage. In this case, on one side, the total wage denominator is taken as equal to total employment wages reported on tax returns. On the other side, there is no need to control for population, since we observe it entirely. To give an entire snapshot, Table 52 presents basic summary statistics for the entire wage formal market distribution. The distribution is highly unequal with a ratio between thresholds ($P95/P5 = 312$) and ($P90/P10 = 76$).

Table 52: Summary statistics of wage in the formal sector (2012)

	Mean	Std. Dev.	Min	Max			
	125,804	442,192	1	1,000,000,000			

Threshold in (MX)							
5%	10%	25%	50%	75%	90%	95%	99%
1,431	3,855	17,853	58,319	147,289	291,872	446,829	960,000

Number of observations: 23,734,980

Source: Authors' calculations based on personal tax returns and employer-wage reported data 2012
Note: Estimates before Income Tax with positive wages.

Table 53 present the top wage shares in the formal market for years 2009 to 2012. To caveats need to be taken into account, firstly, total income in the formal market definition is 80% of the one used in Sub-section 5.7. Secondly, total population control in the formal market is around 77.7% of the one used in Sub-section 5.7. Compared to Table 15 (which estimates wage shares with a different methodology), top wage shares tend to be lower by around 2-3% points. As previously discussed, both calculations differ on the methodology used. Nevertheless, the Mexican formal sector remains highly unequal at the top of the distribution.

Table 53: Top wage shares in Mexico using formal market definition (in %), 2009-2012

	Top 90	Top 70	Top 50	Top 20	Top 10	Top 5	Top 1	Top 0.5	Top 0.1	Top 0.05	Top 0.01	Top 0.005	Top 0.001
2009	99.89	97.94	91.48	66.08	48.44	34.30	14.88	10.31	4.34	2.98	1.28	0.90	0.39
2010	99.87	97.90	91.57	66.27	48.68	34.44	14.83	10.29	4.40	3.05	1.37	0.98	0.45
2011	99.87	97.89	91.61	66.50	49.01	34.85	15.37	10.88	5.05	3.70	1.97	1.57	1.01
2012	99.87	97.84	91.49	66.02	48.35	34.08	14.62	10.20	4.47	3.15	1.44	1.03	0.47

Source: Authors' calculations based on tax data
Note: Estimates before Income Tax

H   Appendix 8 - Tax rate tables

Table 54: Effective average tax rate of top groups in Mexico, 2009-2012.

	5-1%	1-0.5%	0.5-0.1%	0.1-0.05%	0.05-0.01%	0.01-0.001%	0.001%
2009	4.50	14.67	19.29	22.76	25.38	26.97	27.53
2010	5.20	16.24	21.32	24.96	26.91	28.86	29.89
2011	5.93	16.70	21.63	25.03	27.09	28.96	24.61
2012	6.66	17.00	22.06	25.63	27.52	29.58	30.32

Source: Authors' calculations based on tax data (2008 - 2012)
Note: Individuals were ordered by revenue. Excluding capital gains

Table 55: Average tax rate of top groups in Mexico, 2009-2012.

	5-1%	1-0.5%	0.5-0.1%	0.1-0.05%	0.05-0.01%	0.01-0.001%	0.001%
2009	3.61	10.81	11.04	8.33	6.80	5.71	10.72
2010	4.14	11.87	12.12	9.11	7.08	6.37	11.26
2011	4.74	12.12	12.15	9.16	7.57	6.88	10.83
2012	5.25	12.14	12.11	9.15	7.53	7.01	13.36

Source: Authors' calculations based on tax data (2008 - 2012)
Note: Individuals were ordered by revenue. Excluding capital gains

Table 56: Ratio of average taxable income to revenue of top groups in Mexico, 2009-2012.

	5-1%	1-0.5%	0.5-0.1%	0.1-0.05%	0.05-0.01%	0.01-0.001%	0.001%
2009	80.04	73.70	57.21	36.57	26.77	21.19	38.94
2010	79.55	73.10	56.86	36.51	26.30	22.07	37.65
2011	80.05	72.58	56.17	36.62	27.96	23.77	44.01
2012	78.81	71.37	54.88	35.69	27.37	23.68	44.06

Source: Authors' calculations based on tax data (2008 - 2012)
Note: Individuals were ordered by revenue. Excluding capital gains

Table 57: Ratio of average exempted income to average revenue of top groups in Mexico, 2009-2012.

	5-1%	1-0.5%	0.5-0.1%	0.1-0.05%	0.05-0.01%	0.01-0.001%	0.001%
2009	12.49	7.69	4.00	1.86	1.04	0.47	0.43
2010	13.00	8.65	4.24	1.91	0.98	0.55	0.06
2011	12.33	9.11	4.41	1.90	1.03	0.58	0.23
2012	13.51	10.30	4.84	2.00	1.03	0.83	0.20

Source: Authors' calculations based on tax data (2008 - 2012)
Note: Individuals were ordered by revenue. Excluding capital gains

Table 58: Ratio of average personal deductions to average revenue of top groups in Mexico, 2009-2012.

	5-1%	1-0.5%	0.5-0.1%	0.1-0.05%	0.05-0.01%	0.01-0.001%	0.001%
2009	1.34	2.30	1.87	0.90	0.42	0.20	0.29
2010	1.14	2.24	1.94	0.95	0.41	0.18	0.18
2011	1.43	2.64	2.09	0.98	0.44	0.18	0.20
2012	1.66	2.65	2.07	0.96	0.43	0.16	0.17

Source: Authors' calculations based on tax data (2008 - 2012)
Note: Individuals were ordered by revenue. Excluding capital gains