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Resumen:

Se mide el efecto redistributivo general en el sistema fiscal mexicano y en su frontera norte con dos enfoques de descomposición. La novedad de esta aplicación reside en el uso de técnicas no paramétricas y el hecho de que no asumimos ninguna relación funcional entre las variables de análisis. Nuestro trabajo contribuye con una evaluación de la nueva reforma fiscal 2014 de acuerdo con el Impuesto sobre el Valor Añadido (IVA) y sus efectos en los hogares. Se comprueba la existencia de un sistema fiscal con progresividad relativa pero alto efecto de Inequidad (HI), así como un aumento en los ingresos fiscales hasta lograr el 4 por ciento del PIB por el lado del IVA de la frontera. Nuestro método analítico para descomponer la progresividad total medida por las contribuciones de los diferentes pagos por el IVA en bienes y servicios, nos permite concluir que tipo de productos se deberían o no de ser gravados con la tasa general.

Palabras clave: *Impuesto al valor agregado; redistribución; equidad vertical; inequidad horizontal; análisis no-paramétrico.*

Abstract:

We measure the general redistributive effect in the Mexican fiscal system and its northern border with two decomposition approaches. The novelty of this application lies in the use of non-parametric techniques and the fact that we did not assume any functional relationship among the variables in analysis. Our paper contributes with an assessment of the new 2014 fiscal reform according to the Value Added Tax (VAT) and its effects on the households. A tax-benefit system with relative progressivity but high HI effect is found as well as an increase on tax revenues up to 4 percent of GDP from VAT in the border as well. Our analytical method to decompose the total progressivity measured by the contributions of different tax sources from VAT, allow us to conclude which sort of products should or should not be taxed with the general rate.

Keywords: *Value added tax; redistribution; vertical equity; horizontal inequity; non-parametric analysis.*
JEL: *D63, H22, H23, I32, C14.*

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➲ 1. Introduction.

Empirical analysis and the public opinion of the Value Added Tax (VAT) have criticized it as a tool that affects negatively the population, in this sense, Bird and Gendron (2011) give elements of why in the real world people keep the belief that indirect taxes such as VAT are usually regressive. Furthermore, they indicate that a well-designed VAT may be more progressive than a direct (on income) tax, because the latter strategy only impacts a portion of the taxable base (Bird and Gendron, 2011: 75).

The success or failure from the implementation of fiscal policies as the mentioned to meet its purpose have been evaluated over time, with respect to policies related to the pension systems, social security, health and medicare services, housing and even the targeting of different conditional transfers as the programs with greatest impact on the well-being of the most vulnerable agents. This is how fiscal policy appears with the power accrued in their redistributive essence, to the extent that part of the collection of revenues for social spending should be assigned to programs of benefits allocated to the contributors in the system (Musgrave, 2001: 68).

In the Mexican case, it can be seen a country with persistent levels of disparities and income inequality, then we provide some elements that contribute to highlight this inequality as a result from the fiscal system. In recent years, there has been a renewed interest in discussing theoretical and empirical issues about the redistributive mechanisms of income, where one role of the State can be to improve the social welfare of population through redistributive mechanisms of income which are the collection of taxes and the provision of benefit programs.

In the year 2012, some changes have emerged in the taxation ground in Mexico. At both the state and municipal level, the tax systems remained so weak and the informal sector grew to reach sixty percent of the workers resulting in a low taxable base (INEGI, 2014; Dougherty y Escobar, 2013). Also, the benefit programs have reached a peak and with a faster pace during this year. 2014 is a year that has begun with the implementation of a tax reform, with emphasis on making the application of direct taxes more progressive and increasing the general rate of the VAT. These facts can provide an ideal opportunity to examine the effects of this indirect tax and redistribution into the whole population as well as for the contributors.

Two other interesting features of this fiscal crisis are both, the null capacity of the Mexican government to increase the productivity of revenues from taxes as well as the rapid internal increase in food and energy prices during the recent years. This has involved in its turn the expansion of consumption subsidies and targeted benefits, as well as the need to improve the government revenues to face with this agenda.

In order to do so, our motivation is to analyze the tax-benefit system consisting on cash-transfers, personal income tax and indirect taxes in Mexico, with special emphasis on the impact from the VAT and

its effects on specific goods. Our aim is to compute total progressivity in the system to produce the fiscal reform on VAT at the national level and for the northern border of the country.

In our knowledge, this task has not been considered for the Mexican case using the generalization of a measure that combines the joint effects of the tax system as well as a decomposition which can integrate a number of sources of taxes (Duclos-Jalbert-Araar (2003) -DJA henceforth- and Huesca and Araar (2014)). To assess the extent of HI and its impact, we first adopt DJA (2003) approach and then, we apply an analytical method (Huesca and Araar, 2014) to decompose the sources from VAT payments. In this paper, we also apply the novel methodology of progressivity curves, which account for an order of stochastic dominance on evaluation of wellbeing and is able to determine the improvement of the fiscal reform or any fiscal system composed by taxes, mainly in our case.

The rest of the paper is organized as follows. In section 2, we present briefly the literature review of the studies on redistribution impact from fiscal systems and incidence of taxes; Section 3 explains the theoretical approach and the mathematical derivation of the method applied with the corresponding indices, also it describes the ordering of data; section 4 shows the empirical application for assessing the redistribution that emerges from the 2014 VAT reform in the tax-benefit system in the Border of the country, and reports the main findings; and the section 5 concludes with some particular recommendations.

➲ 2. Literature on redistribution in tax-benefit systems.

2.1. The International evidence on empirical studies of redistribution.

Policy recommendations for Latin American countries have been focused on the development of a tax structure that emphasizes government revenue through indirect taxes (Bird and Gendron, 2011) which can be the basis for an effective mechanism for redistribution; conversely, this recommendation can lead to a number of distant scenarios. However, a taxation system with efficiency, pay equity and its ability to redistribute among the various contributors should be considered. In order to increase revenues and to cope with inequality, the policy maker must consider if the tax system has to be modified (Musgrave, 1990).

Since the seminal work of Pechman and Okner (1974) for the United States, there has been a significant amount of related research that has enriched the original inquiry. In this seminal work, a proportional tax system was found as a result of the mutual mix neutralization induced by progressive and regressive taxes. More research of the topic can be found for other developed countries and more recently,

for some developing and transitional economies (Duclos and Tabi, 1996; Davidson and Duclos, 1997; Duclos, et al, 2003; Duclos, et al. 2005; Araar, 2008; Kaplanoglou and Newberry, 2008; Bibi and Duclos, 2010; Duclos, et al. 2010; Bird and Gendron 2011; Cok, et al, 2013; Lustig, et al. 2014; Scott, 2014).

For the Canadian case, Duclos and Tabi (1996) and Davidson and Duclos (1997) using microdata from the Canadian Surveys of Consumer and Finances assessed effective progressivity with the Tax-Redistributive approach (*TR*). These indices are based on social welfare evaluation and therefore, an effective progressive tax system in the country was found in the 1980s in the former paper despite a relative regressive scheme for some tax figures existed when the benefitssfers were added in the assessment. In the latter article a more progressive distribution was found in the post-fiscal distribution of income for the beginning of the 1990s.

Makdissi and Wodon (2002) settled a theoretical framework based on the stochastic dominance approach to study social efficiency of the indirect tax reforms. Duclos, et al. (2005) have applied, for instance, this approach to study the impact of two important programs in Mexico (Liconsa and Procampo). Meanwhile, Araar (2008) proposed an operational method to enable the comparison of progressivity of the fiscal systems overtime. His analysis shows an empirical application using the Canadian data to estimate the impact of fiscal system on the size and wellbeing of socio-economic classes. He concludes for the progressivity of the fiscal system that enables to maintain the size of the poor and the middle classes.

For the Greek case, Kaplanoglou and Newberry (2008) have estimated in 1999 the HI and Vertical redistribution components using only indirect taxes finding that a less vertical negative effect can be attained even when more HI is induced in the classical sense and re-ranking by the indirect reforms for this country. Bibi and Duclos (2010) develops a novel technique to study the poverty dominance of fiscal system for five developed countries, finding how the redistributive effect have major impact on reducing poverty for Sweden, the UK dominates all other countries in terms of social transfers, but Canada emerges as the country with the greatest success on taxation avoiding increasing poverty levels with this variable. Also, in Canada and Sweden the social transfers and the taxes support one of the best results on reducing poverty.

Bird and Gendron (2011) establishes that there is actually very little evidence at the time of their literature examination in terms of tax-benefit incidence for developing and transitional countries. They explain the need for research on these countries to work on reforms to reduce HI improving the indirect taxation.[1]

For two transitional countries, Slovenia and Croatia, Cok, et al. (2013) have performed one of the most complete empirical applications using a wide variety of figures to complete the whole fiscal system

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[1] By this time, Duclos, et al. (2003) had already developed a new fashioned methodology to estimate and decompose the change on inequality induced from the vertical equity, HI and re-ranking in a fiscal system using a non-parametric method to detect the "equals" in the distribution.

in both countries and obtain a comparison of the vertical and horizontal components from the two countries. They have applied the DJA approach for Croatia and Slovenia, finding that even when both countries share a similar background they present different outputs from their fiscal systems. They found how the fiscal system in Slovenia has created a much more impact on vertical effects than in Croatia, but for the former country the fiscal system also induced much more horizontal inequity when sensitivity analysis is carried out using greater aversion to inequality for the lower tail of distribution.

On the other hand, there is evidence that progressivity may increase current inequality, especially in countries having a weak law and a large informal nontaxable sector, where the evidence has been estimated for over one hundred countries worldwide (Duncan, 2010). Duncan's findings suggest that progressivity has a strong negative effect on inequality in reported gross and net income and that this negative effect is stronger in countries whose institutional framework supports a pro-poor redistribution. For the Colombian case Jaramillo and Tovar (2008) review the VAT evolution, using microdata to analyze its incidence. The work focus on the impact of VAT decomposed by a consumption function for a group of products, pointing out how the VAT structure should be differentiated by expenditure groups.

2.2. Studies of redistribution in the Mexico.

A nice work has been done in Valero-Gil (2002) using microdata from the 2000 year survey of income and expenditure for Mexico. He founds that some goods should not be subsidized when considering low levels of elasticity on food and medicines, once inequity aversion parameters have been taking into account for the entire population. Flores (2003) discusses the Mexican Government proposal of an increase in VAT on food and transferring cash to the lower groups of income, finding how the VAT increase would improve revenues and reduces inequality in less than a percentage point in the Gini index.

With a distributional and local approaches, Huesca and Serrano (2005) explore an application for VAT in Mexico. Their work focuses on the contribution of VAT to revenues and the redistribution of income giving insights that is weakly progressive and with low fundraising potential. Their results indicate that the Mexican VAT contributes to Vertical Equity (*VE*), but the problem arises to reduce the HI existing in that country due to the exemptions and zero rates on food, books, public transportation, drug medications as well as rents for leasing, giving a low taxable base for this tax figure.

Valero-Gil (2006) develops an estimation of optimal taxation and his results indicate the need for raising VAT on food for reasons of economic efficiency, but for redistribution asserts that those products should not be taxed. Vargas (2009) with a static approach departs from the evolution and distribution of income in Mexico for twenty years, analyzing the tax burden in the country and evaluating the incidence of benefits generated by public spending. Using microdata of income and expenditure and the traditional

concentration approach, found the tax system to be progressive due to the high concentration of the tax burden in the top deciles of income.

The research implemented in Lustig, et al, (2014) provides good insights in pursuing the progressivity incidence for the Mexican fiscal system figures and its impact on poverty measures comparing the latter fiscal system with five countries in Latin America. Using the concentration approach, their results show a more progressive tax-benefit system during 2000-2010. For the sort of countries in recent years; Bolivia, Mexico and Peru have the lowest impacts on poverty reduction, while Argentina, Uruguay and Brazil presented the greatest reductions as the countries with the most redistributive fiscal systems.

Scott (2014) presents a complete analysis for a short period of time, between 2008 and 2010, for the fiscal tax-benefit system in Mexico. He finds a situation that describes a fiscal system trapped in a low-revenue-low-benefits equilibrium, where this limitation of tax revenues does not arise from exceptionally low tax rates, but from low levels of tax productivity. His findings show a more progressive fiscal system in 2010, but this strategy treats both years not as a single episode of tax design, but as a comparative static measurement of progressivity when just using each tax and benefit rules for each year.

⟳ 3. Methodology: Kakwani and DJA.

3.1. Local approach: Kakwani and Decomposition progressivity by sources.

A tax is found to be progressive if it burdens more the non-poor group. This implies a decrease in inequality and a rise in the share for the net income in the poor group of households. In the literature of progressivity, there are two main distinct concepts of progressivity: the local and the global ones. In the pioneered work of Musgrave and Thin (1948) two main approaches were proposed for the measurement of local progressivity, which are the liability progression and residual progression. Kakwani (1977) and Duclos and Tabi (1996) have addressed a serious criticism to this approach since the latter looks only for the extent of local progressivity. Kakwani proposed an index of progressivity for taxes that is equal to the difference between the concentration index for the tax and the Gini index of gross income.[2]

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[2] Duclos and Tabi (1996) report that, the local progressivity can induce the same conclusion of global progressivity if and only if local progressivity is observed elsewhere.

When we denote the inequality index of gross income I_X, limited to the interval [0 , 1] and the index from the concentration of any given tax or benefit, by $IC_{T,B}$ which is bounded on the interval [-1 , 1], the formula for the Kakwani general index is written in the expression (1):

$$K_{T,B} = IC_{T,B} - I_X \qquad (1)$$

$K_{T,B}$ stands for an index of progressivity for any kind of tax T or transfer B and limited on the interval [-2 , 2], such technique is standard and has been applied in a wide range of empirical studies. Besides the quantification method of progressivity, a dominance stochastic approach has been used to take a judgment about the progressivity of a given tax (see Yitzhaki and Thirsk, 1990; Yitzhaki and Slemrod, 1991; Davidson and Duclos, 1997). Properly, in our case we denote parallel to expression (1) the Gini index of gross income by G_X and the concentration index of the tax T by C_T, the Kakwani index of progressivity is represented as follows:

$$TR_T = C_T - G_X \qquad (2)$$

This index enables us to assess the level of progressivity in one simple value. This value ranges between the value of [-2] –perfect regressivity- and [2] –perfect progressivity. By construction, the Kakwani index in the expression (2) is based on the scheme of distribution of the tax (Tax Redistribution) to capture the extent of the progressivity. Other indices can be based on the scheme of net incomes (C_{X-T}) -Income Redistribution approach- to assess the level of progressivity. For instance, the Reynolds-Smolensky (1977) index takes the following form:

$$IR_T = G_X - C_{X-T} \qquad (3)$$

Some taxes, like VAT, can be composed from different sources of taxes. More important, a given sources of a tax may comprise a higher level of progressivity, and this, relatively to that of the others sources. Departing from expression (2), let's assume that the tax T is composed from K tax sources. We denote the tax source k by T_k such as $T = \sum_{k=1}^{K} T_k$. Also, we denote the average tax T by μ_T and that of T_k by μ_{Tk}. Formally, the natural decomposition of the Kakwani index of progressivity that we propose takes the following form:

$$TR_T = \sum_{k=1}^{K} \frac{\mu_{Tk}}{\mu_T} (C_{Tk} - G_X) \qquad (4)$$

It is forthwith to note when the total taxes are equal to gross income, this decomposition turn in part to a decomposition of inequality by income sources (see Rao (1969), and Araar (2006)). Based on the proposed decomposition, a set of interesting conclusions can be drawn: The contribution of a given tax to the progressivity of total taxes depends on the importance of its share (μ_{Tk}/μ_T). Of course, when the average of the tax is very low, the contribution of the later to the total progressivity must be low and this even if the tax shows a higher level of progressivity. The contribution of a given tax to the progressivity of total taxes depends on its level of progressivity represented by the component ($C_{Tk} - G_X$) as stated by Huesca and Araar (2014: 7).

3.2 Duclos-Jalbert-Araar (DJA) global approach.

By HI we would like to show the extent of unequally tax treatment of equals (those that have the same level of gross income). By *reranking* (R) we refer to the impact of change in gross income rank caused by the tax/benefit system. By the term VE, we refer to the impact of a tax/benefit system on inequality where equals are treated equally. Duclos et al. (2003) have proposed a pleasant method to decompose the redistribution effect or change in inequality into these three components. First, the redistributive change in inequality that results from the effect of taxes and transfers can be expressed as:

$$\Delta I = I_X - I_N^E \tag{5}$$

Here I_X is generically an Atkinson class inequality and normative index (Atkinson, 1970) and I_N^E is defined as the concentration index of purged net income from local inequality (where each individual have the expected value of net income according to the level of his gross income). With this application, we can decompose the difference between gross income *X*, and net income *N* inequalities as written in the formula (6):

$$\Delta I(\varepsilon, \rho) = \underbrace{I_X - I_N^E}_{VE} - \underbrace{(I_N^P - I_N^E)}_{HI} - \underbrace{(I_N - I_N^P)}_{R} \tag{6}$$

Where $I(\varepsilon, \rho)$ is the Gini-Atkinson index[3]. I_N^P stands for the coefficient of concentration of *N* when the ranking variable is $X(p)$ and I_N^E as the concentration index of purged net income from local

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[3] See Araar and Duclos (2003) to understand the definition and conditions of the Atkinson-Gini index and its formalization.

inequality. Next, we explain how each of the three components captures the extent of what they are proposed to assess: 1. *Horizontal inequity* component ($I_N^P - I_N^E$): In the case where there is no local inequality in net incomes, we have that, $I_N^P = I_N^E$ and the horizontal inequality is nil. The more the local inequality of net incomes at percentile p, the lower is the local social welfare ($\xi(N \mid X = Q(p))$) and the higher is I_N^P and then the component *Horizontal inequity; 2. Re-ranking* ($I_N - I_N^P$): In the case where the rank based on gross income is similar to that based on net incomes, we have then: $I_N = I_N^P$ and the re-ranking component is nil. The more the re-ranking the lower is I_N^P, and then, the higher is the re-ranking component; and 3. *Vertical Equity* component ($I_X - I_N^E$): This component captures the change in inequality after removing the cost of horizontal inequality. The more the tax/benefit system equalizes net income, the higher is the vertical equity effect (VE).

3.3. The Mexican tax system and the ENIGH database.

We address the fiscal reform initiated by Mexican administration 2012- 2018 of President Enrique Peña Nieto, we proceed to illustrate the possible redistribution achieved in the country by the previous tax system of the year 2012, with the tax rules of that same year (Initial situation). Then, we proceed with an scenario of the tax reform that allow having a projection of its possible effects on the contributors and its households, considering the 2012 database using the new tax rules in the year 2014.

For the empirical exercise the 2012 ENIGH is used as the most recent data at the moment of this research, with a sample of 9,002 households and about 31 million expanded. Based on the information provided by its microdata we proceed to build the distribution according to per capita units of income following both, direct and indirect identification methods (Lustig, et al. 2014). Once disposable household income (denoted by N) is obtained, it is possible to calculate the figures shown in Table 1 to rebuild the pre-fiscal (Market income) denoted by X. In order to address the issue of the border, we estimate a sample for the border of the country considering the municipalities located in this geographical area included in the survey.

The boundary line is specified as the border of 20 kilometers parallel to the international boundaries of the north and south of the country, but also all the states of Baja California, Baja California Sur and Quintana Roo, the municipalities of Caborca and Cananea, Sonora, and the partial region of the State of Sonora within the following boundaries: to the north, the international boundary from the Colorado River to a point on that line 10 miles west of the municipality of Plutarco Elías Calles; from that point, a straight line down to the coast to a point located 10 kilometers east of Puerto Peñasco; hence, following the course of the river, towards the north to find the international boundary.

When the vector on N is obtained after taxes, the current tax rules per each source of income are applied. Thus, different tax brackets were taken into account for the taxpayers, tax credits and tax allowances per wage-earners were used as well. In order to rebuild the fiscal system from N in the surveys the tax translation hypothesis in Pechman (1985) are considered. For the empirical exercise, we use the income tax from both wage-earners and individuals that reported income sources as benefits obtained from business, so we are able of estimating the progressivity and incidence for these sorts of direct taxes in the survey as well. The Mexican tax system has a scheme of limits and quotas for the assessment of the income tax (ISR) with 8 brackets of income in 2012 (11 for 2014). Each bracket must pay the corresponding annual income fee in Mexican pesos [0.00, 114.24, 2,966.76, 7,130.88, 9,438.60, 13,087.44, 39,929.04, 73,703.40], (also 180,850.82, 260,850.81, 940,850.81 in the 2014 rules) as well as a percentage of the salary for the marginal income tax ranging from 1.92 percent up to 30 percent in the most current fiscal year of 2012 (1.92 percent up to 35 percent in 2014 rules). The survey allows obtaining sources of incomes (up to 81 sources) and we use the four corresponding to address ISR.[4]

Table 1
Tax and benefit system in Mexico

Taxes [a]	Indicators
ISR	-Income tax
VAT	-Value added tax
IEPS	-Special consumption tax
Employer's social security contributions	- -For health insurance - -For pensions - -For housing (public lending to finance a house)
Employees' social security contributions	- -For health insurance - -For pensions -For housing (public lending to finance a house)
Benefits [b]	
Means-tested	-Oportunidades -Elderly -Program for food support -Scholarships -Procampo -Unemployment assistance (Temporal Employment)
Non-means-tested	-Pensions (Not included in benefits, but included in net income) -Others (Are transfers from unknown source in the survey)

Notes: [a] Obtained by using simulation methods.
          [b] Obtained by using direct identification methods.
Source: Author's classification based on administrative sources.

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[4] The five main sources of income addressing to income tax are: 1. Wages and salaries, income from subordinates, benefits, commissions, incentives; 2. Income from business and profits; 3. Income from business and activities in the primary sector; 4. Financial and capital earnings (includes insurance and other payments); and 5. Income from self-employment.

In the case of indirect taxes, besides VAT we consider the IEPS (special tax on production and services), these being the two largest tax figures after ISR. We estimate VAT and IEPS according to the tax rules, those controlled by informal activities related to the place of purchase provided by the same survey.[5]

The survey also allows analysis of 726 products and generic services, from which 27 add to VAT, at a rate general of 16%; In addition to the 27 goods and services that generate VAT, 10 of those are taxed with IEPS, with rates of up to 160 percent for tobacco products. In the year 2012 the border has a special VAT treatment different from the rest of the country, so this has been controlled as well applying the 11% to the expenditures located in all these cities included in the survey. We believe this process do not add taxes beyond the actual paid by taxpayers.

In the case of benefits we collect them at the household level from the same survey using the following: scholarships and cash transfers for education, *Oportunidades* social assistance program, 70 and more (for the *elderly* without pension); *Programa de Apoyo Alimentario* (PAL, program for food assistance); transfer for *temporary employment*; and finally, *other assistance* programs.[6]

Market (gross) income is estimated just adding the total taxes and federal contributions from wages to the social security system (*SSC*) minus the pensions and the benefits received per household as follows:

$$X = N + T - P + SSC - B \tag{7}$$

Where *X* stands for the pre-fiscal or market income, *N* as the post-fiscal income, *T* as the total tax burden, *P* the pensions, *SSC* as the social security contributions and *B* are the benefits (See table 1). We do not consider transfers at a more aggregated level such as public education or health care, since our purpose is to determine progressivity isolated from the taxes paid as well as from the benefits received directly in a microeconomic perspective. Also for indirect taxes, we do not use a system of demand elasticity estimation to assess the marginal economic efficiency of various sources of tax payments, instead, we propose to use non-parametrical techniques leaving the information to "speak by themselves" as the analysis focus on a static comparative framework (Duclos and Araar, 2006).

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[5] See the Appendix 3 Tables A3.1 and A3.2 to meet the indirect taxes and the 15 different places where at least five do not collect VAT or IEPS according to our methodology.
[6] Just as the research of Cok, et al (2013) and Lustig, et al (2014) we do not add retirement and pensions as a benefit component because of its contributive nature, but this is included in the net income figure.

3.4. Unit of analysis and indicator of wellbeing.

There is a consensus on the relevance of using the individual as the main unit of distributive analysis and to ensure an accurate estimation of wellbeing for household members. Hence, the primary step is to assess wellbeing of individuals and one has to adjust the total household income by the family size and its composition. The simplest method is to use per capita income, that is, to divide the household income by the household size. In our case, we use the equivalence scale from CONEVAL to account for social welfare which considers four different values to equalize income according to the value of one for the household head plus the corresponding values for the ages of each member in the household, ranging as follows: [0-5]= 0.7, [6-12]= 0.74, [13-18]= 0.71, and [19-65+]= 0.99. In this sense we are comparing equal units affecting the shape on the distribution when giving the corresponding weight to each household member as well as assigning the respective weighs of the official economies of scale for the Mexican households.

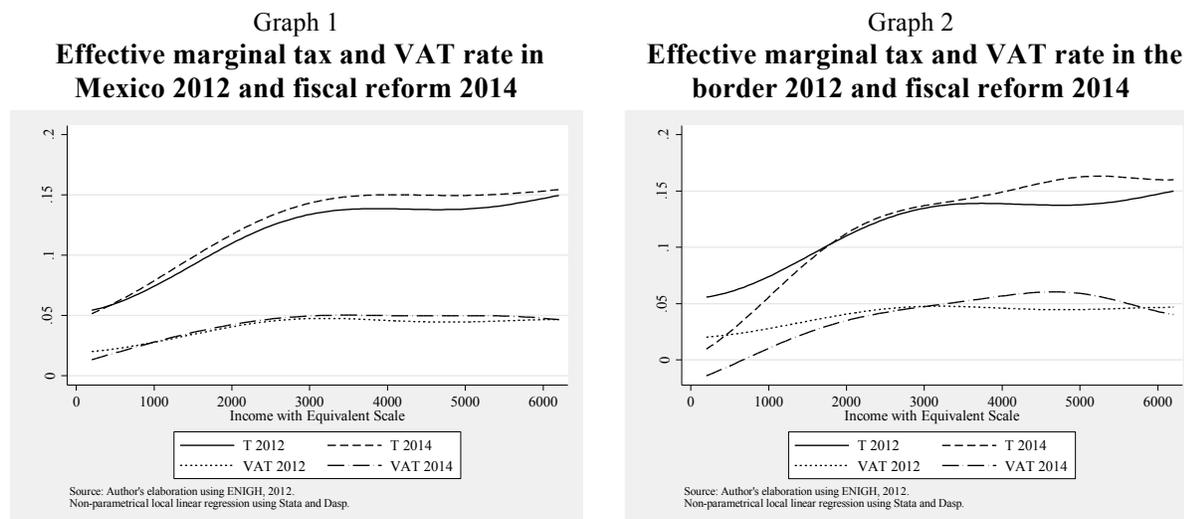### ➲ 4. Impact on the fiscal system and redistribution: the VAT case.

We would declare first as a hypothesis that the payments on total taxation are slightly progressive in Mexico, but the VAT payments induce certain level of regresivity, where the low and middle income earners have a greater pressure of the burden, and this progressivity becomes faded, then, it reverses the positive outcome allowed by the scenario of the new fiscal reform in the country. Secondly, we proceed to estimate the impact for each scenario with the effective marginal rate essentially for the VAT case, then, in the next part we present the DJA decomposition as well as for the VAT payments on goods and services to obtain the redistributive effect and be able to give more accurate policy recommendations.

4.1. The Progressivity in the fiscal system using a local approach.

We start our discussion by showing the progression in the effective marginal tax/benefit rates (*LP* and *RP* approaches). First, let us recall that for a given level of gross income, the effective tax rate shows the expected total taxes (direct and indirect taxes) for an additional earned peso, and results for current and fiscal reform are shown in graphs 1 and 2[7]. For instance, in 2012 those families with an equivalent gross income of $4,000 pesos, must pay for an additional earned unit of income a total tax of near 15 cents

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[7] These curves are estimated based on the local linear approach. See the Appendix 1 for more information concerning the estimation.

considering the total tax-burden; meanwhile, for the VAT the average tax to pay is 5 cents in the country and about 7 cents in the northern border. Graph 2 shows that this effective tax rate would increase more for the fiscal reform in the border with the rules of 2014.

Graph 1
Effective marginal tax and VAT rate in Mexico 2012 and fiscal reform 2014

Source: Author's elaboration using ENIGH, 2012.
Non-parametrical local linear regression using Stata and Dasp.

Graph 2
Effective marginal tax and VAT rate in the border 2012 and fiscal reform 2014

Source: Author's elaboration using ENIGH, 2012.
Non-parametrical local linear regression using Stata and Dasp.

The simulation (rules of 2014) presents for the same level of income in a lesser extent the increase in revenues in about 15 cents for an additional earned income unit, but depicts the trajectory of the new tax reform. It seems those agents located below $6,000 equivalent pesos would present a greater pressure than the counterpart agents; secondly, the marginal burden of taxes is much higher for the reform. This can be potentially explained by a set of combined factors such as: 1. An increasing informal sector (which enables to avoid direct taxes and regulations for some agents); and 2. The corporate tax evasion and ineffective corporate tax alleviation which reduces the income tax-burden, even for the formal workers (as confirmed by Kumler, et al, (2013).

Either way, the results tell us about the urgent need of revision in the Mexican tax systems to enhance its effectiveness. In Graph 2, we show the effective marginal tax rate for the border of the country. It can be seen in this graph that the marginal taxation increases faster than in the country, giving raise for an additional tax pressure on the households located in this region. For each earned unit of peso the average effective marginal tax rate would take 17 cents at the maximum level, particularly due to the general VAT rate, which adds to the total tax-burden.

As it was stated, benefits are held constant in the simulations, so that benefits are inducing the same effect for the considered scenarios. In the limit, the poverty line of wellbeing from CONEVAL in 2012 ($2,400 equivalent pesos) the tax burden begin to increase and it exceeds considerably the pressure above $4,000 equivalent pesos.

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Table 2 presents the Kakwani and RS indices of redistribution with the local approach obtained from the expressions (2) and (3) respectively. In general, the current fiscal situation shows a progressive condition with a positive index of RS= 4.03, as taxes includes both direct and indirect figures, it can be checked that just adding a greater pressure on indirect taxes progressivity decreases in the border region to an index of 2.88, it can be observed how the second simulation presents the least effect on progressivity in the fiscal system, but still remains positive due to the effect induced through the benefits.

Table 2
Kakwani index for pre-fiscal and post-fiscal reforms, Mexico 2014

Variables	G_X	C_N	(KT/B) x 100	*std. Error*
Fiscal Reform (2014)	0.5934	0. 5136	7. 9777	0.0050
Border Fiscal Reform (2014)	0.5318	0. 4712	6.0546	0.0092
C(Ti, Bi)				
Total Taxes	0.5934	0. 6334	3.9980	0.0104
Fiscal Reform 2014 (RS)	0.5934	0.5531	4.0342	0.0033
Border's Fiscal Reform 2014 (RS)	0.5318	0.5029	2.8817	0.0043
VAT Reform (2014)	0.5934	0.5407	-5.2698	0.0134
Border's VAT Reform (2014)	0.5318	0.4157	-11.6068	0.0216
Total Benefits	0.5934	-0.3698	96.3268	0.0284

Source: Author's elaboration using ENIGH, 2012.

In the simulation of 2014, the progressivity decreases in a lesser extent, due to the new brackets configuration (3 more brackets were added) plus, the elimination of the 5 percent in VAT reduction in the bordering municipalities. For the specific case of the VAT in the border, it shows a greater effect in regressivity where the concentration index is lower, then a lower Kakwani of -11.1 points is estimated, meanwhile -6.4 for the country. As benefits are held constant those are inducing progressivity in the fiscal system with the greatest Kakwani index of 96.3. As this approach is local, we proceed to estimate the total impact estimating the total effect of the global system (with total taxes and benefits) as well as the progressivity curves for the VAT impact, departing from the ex-ante situation with the simulation of the 2014 reform on this tax figure. We move in the next section to apply the decomposition of the VAT by source of each good and service, then it will be noticeable which source from VAT is generating the greater effect on regressivity in the system for this sort of tax.

4.2. Redistributive effect with VAT on Net incomes and the global approach.

In order to determine the overall effect for the tax-benefit system on inequality and to show the different redistributive components we use the DJA model in this section. First, we proceed with a prediction of the reform with the DJA approach. It is important to recall for the estimation that the fiscal system is estimated according to the initial position on its gross equivalent income. In table 3 we show the DJA decomposition for each simulation and are able giving more details about the redistribution effects. It can be seen how the vertical equity component of the tax/benefit system is important and reacts with a decrease of about 20.37 percent of the Gini-Atkinson index of inequality. However, the HI component reduces the VE by about 34.36 percent, which is in our view relatively huge.   The   re-ranking component reverses the positive effect as well by 19.46 percent, which is a signal that the initial fiscal condition moves the position of equal's households affecting their situation on the distribution after taxes and benefits have been applied. Then, the positive redistributive effect with 12.71 points of *VE* is reduced by the sum of the components *HI* and *R* with an impact of 6.83 points of the index.

In the scenario of reform 2014 the DJA model shows a similar pattern to 2012, with a small increase of VE and *R* and a small reduction of HI, finally the redistributive effect would be almost unchanged (ΔI = 0.0004). Despite initial inequity is lower in the bordering cities (0.6197) it shows that *HI* is greater in relative terms (36.46 percent), so does *R* (21.45 percent), as an indicative of more inequity in the Mexican border than in the country due to the tax system.

Table 3

Decomposition of vertical and horizontal components of the tax-benefit system in Mexico 2012 (income with equivalent scale of CONEVAL and 2 scenarios)

Component	Notation	2012 situation	%	Reform 2014[1]	%	Reform 2014 border	%
Inequality in gross income	$I_X(\varepsilon = 0.5, \rho = 2)$	**0.6825**		**0.6825**		**0.6197**	
Inequality in net income	$I_N(\varepsilon = 0.5, \rho = 2)$	**0.6238**		**0.6235**		**0.5790**	
Concentration index of net income	$I_N^P(\varepsilon = 0.5, \rho = 2)$	0.5991		0.5984		0.5582	
Concentration index of purged net income	$I_N^E(\varepsilon = 0.5, \rho = 2)$	0.5554		0.5554		0.5229	
Redistributive effect:	$\Delta I(\varepsilon, \rho)$	*0.0586*		*0.0590*		*0.0407*	
Vertical equity	V: $I_X - I_N^E$	0.1271	20.37	0.1271	20.38	0.0968	16.72
Horizontal inequity	H: $(I_N^P - I_N^E)$	0.0436	34.36	0.0430	33.83	0.0353	36.46
Re-ranking	R: $(I_N - I_N^P)$	0.0247	19.46	0.0250	19.67	0.0207	21.45
$(I_X - I_N^E) - (I_N^P - I_N^E) - (I_N - I_N^P)$		0.0586		0.0590		0.0407	

[1] Rules of 2014 with 2012 data.

[2] VAT 16% (general rate) in all goods and services, without exemptions and reductions.

Source: Author's elaboration using ENIGH, 2012, and non-parametrical DJA with scenarios.

These results have been estimated using the parameters for the Gini-Atkinson indices in a moderate condition of aversion ($\varepsilon = 0.5$, $\rho = 2$) highly recommended in the literature (Duclos, et al 2003); at the same time, our results can be totally comparable with those from countries such as Slovenia and Croatia in Cok, et al, (2013). While for these countries it can be seen initial inequity is lower than in Mexico, its redistributive effects reduce over 10 percent of inequality, whereas in the current situation (and the reform 2014) for the Mexican and the border cases the tax systems just reduced it in 5.86, 5.90 and 4.07 points respectively.

4.3. Estimation of the VAT progressivity curves.

VAT progressivity curves are depicted in graphs 3 and 4. It can be confirmed in the curves that in the border of the country the VAT reform has affected deeply into the distribution structure of equalized incomes of the families. In Mexico as a whole (Graph 3) the simulation shows a lower impact due to the new VAT payments that have raised just one point for the general rate (from 15 to 16 percent); meanwhile, in the border of the country the structure of VAT payments is much more regressive, where the curve is almost restrictive convex in shape (graph 4), as a result, it can be assured that the post-reform distribution has affected much more to the contributors in the system for that region.

Graph 3
Progressivity of VAT payments pre and post reform, México 2012, 2014
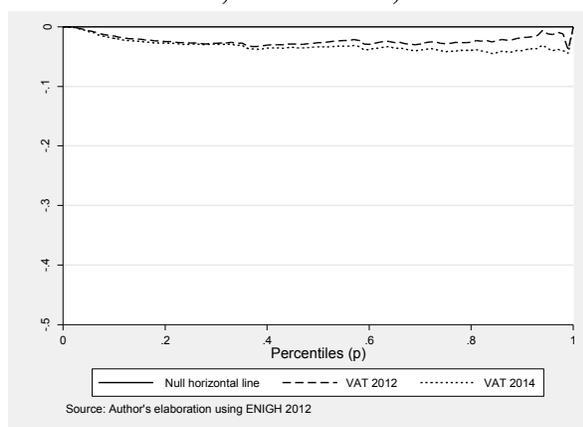
Graph 4
Progressivity of VAT payments pre and post reform, Mexican border, 2012, 2014
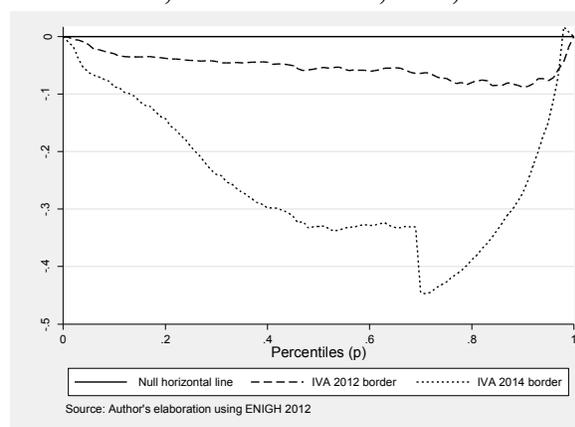
At first sight, the VAT structure applied using 16 percent in the border increased 5 points (from 11 to 16 percent) and is high enough to deteriorate the economic conditions of the families, and the burden of the tax presents more pressure on the lower and middle income individuals, as it can be seen the negative values in the same range of the vertical axis for the Border region.

4.4. Decomposing progressivity by VAT sources.

In order to detect the main sources for the tax burden of the VAT payments, we follow Huesca and Araar (2014) approach. Main findings reveal that some indirect taxes contribute significantly to reduce the progressivity of the VAT. Our decomposition is shown in Table 4 and 5, and it allows to identify which sources of VAT render nil the progressivity of this tax, which in the ex-post conditions are: *health-care* and *housing* expenditures, accounting for 48.4 and 44.1 percent correspondingly at the national level. On the opposite side, it can be seen the concepts of *Accommodation services* and *transportation* with -17.7 and -15.4 percent respectively, as well as Restaurants, recreation and entertainment with -11.4 and -8.2 percent.

Table 4
**Decomposition of the Kakwani progressivity index by VAT sources,
México, reform 2014**

VAT by source	Income Share	Gini index of Gross Income	Concentration Index	Absolute Contribution	Relative Contribution
Food and beverages	3.08	0.5934	0.2569	-0.0104	19.66
Alcohol and Tobacco	1.89	0.5934	0.5757	-0.0003	0.63
Restaurants & related services	8.68	0.5934	0.6626	0.0060	-11.39
Housing, including utilities	10.32	0.5934	0.3461	-0.0255	48.45
Transport	16.70	0.5934	0.6423	0.0082	-15.48
Furniture and equipment	2.82	0.5934	0.5924	0.0000	0.06
Clothing and footwear	9.19	0.5934	0.5373	-0.0052	9.80
Recreation, entertainment	6.99	0.5934	0.6554	0.0043	-8.22
Communication	5.33	0.5934	0.4462	-0.0078	14.88
Education	14.24	0.5934	0.5368	-0.0081	15.29
Health care	12.87	0.5934	0.4129	-0.0232	44.09
Accommodation services	7.89	0.5934	0.7121	0.0094	-17.76
Total	**100.00**	**0.5934**	**-0.0527**	**-0.0527**	**100.00**

Source: Author's elaboration using ENIGH, 2012.

Also, in Table 4 it can be seen how *Food and beverages*, *Communication* as well as *education* including *Clothing and footwear* are the next sources of VAT payments that contribute the most to regressivity, with positive values of 19.6, 14.8, 15.3, and 9.8 percent on each category. Of course, this is

related to the pattern of distribution of consumption from the different taxed goods. In table 5 the estimates of the decomposition for the border region is shown. Despite the impact of the VAT has been more regressive (more than double than in the country), the relative contribution is lower, which tell us how the indirect tax affects in a more regular basis, following the same pattern of the national effect of the tax.

This empirical application provides some insights of having the confidence in the discussion of whether or not increase VAT, to the range of goods and services (including food and medicines). In our empirical exercise and for normative terms, VAT should be increased for those goods and services with a negative relative contribution (last column in Tables 4 and 5), and the opposite is the case for the counterpart figures.

Table 5
**Decomposition of the Kakwani progressivity index by VAT sources,
México Border, reform 2014**

VAT by source	Income Share	Gini index of Gross Income	Concentration Index	Absolute Contribution	Relative Contribution
Food and beverages	3.99	0.5318	0.1657	-0.0146	12.57
Alcohol and Tobacco	1.95	0.5318	0.4073	-0.0024	2.09
Restaurants & related services	12.39	0.5318	0.5110	-0.0026	2.22
Housing, including utilities	10.19	0.5318	0.2510	-0.0286	24.64
Transport	22.40	0.5318	0.4894	-0.0095	8.18
Furniture and equipment	2.47	0.5318	0.4401	-0.0023	1.95
Clothing and footwear	6.20	0.5318	0.4509	-0.0050	4.32
Recreation, entertainment	5.34	0.5318	0.6094	0.0041	-3.57
Communication	5.97	0.5318	0.3369	-0.0116	10.02
Education	9.99	0.5318	0.3605	-0.0171	14.75
Health care	13.82	0.5318	0.3174	-0.0296	25.54
Accommodation services	5.30	0.5318	0.5913	0.0032	-2.72
Total	**100.00**	**0.5318**	**-0.1161**	**-0.1161**	**100.00**

Source: Author's elaboration using ENIGH, 2012.

4.5. Revenue effects from indirect and direct Taxes.

In general, it can be assured that for the new fiscal reform of 2014 in Mexico, that even is not as progressive as the 2012/2013 situation; it would also produce in parallel an improvement of more than 1 percent on revenues. This situation would aim at reducing the *HI* component allowing those agents to

offset the negative new tax schemes from VAT. Comparing the total amount and fundraising that would allow the 2014 fiscal reform, it is observed in Table 6 that VAT would increase up to 4.0 percent of GDP in the reform and, income taxes (ISR) would achieve an increase of up to 5.2 percent of GDP (0.4 more points with respect to its initial level).

It is relevant to recall that the border improves its participation (and productivity) on the national VAT figure, but this improvement pushes the burden and produce a high level of regressivity for the contributors located in this region of the country. VAT productivity rate (3.92 percent) is well below the general rate of 16 percent, which is a signal that an open margin to operate increasing VAT on medicines as well as on food can be found and used. Despite the greater burden pressure, it will assure a good standard of tax pressure at the international level scenario with respect to other countries with similar economic conditions.

Table 6
Tax revenues in Mexico, 2012.
Captured by ENIGH and fiscal reform 2014, (Millions of pesos) *

Tax	*2012 Situation*	*% of GDP*	*reform 2014[1]*	*% of GDP*	*Border 2014[1]*	*% of productivity [+]*
ISR	741,645.3	4.8	808,636.22	5.2	29,057.31	12.82
VAT	556,234.0	3.6	568,196.02	4.0	22,279.27	24.51
IEPS	160,791.2	.7	169,556.13	1.1	9,852.99	72.61
Total	1,459,886.3	9.1	1,546,388.37	10.3	61,189.57	36.64

[*] Departing point with revenues from direct taxes accounted for 4.8% and indirect taxes for 3.6% of GDP.
[+] It is obtained as the ratio for each border tax figure revenues on the total corresponding revenues in the country, dividing over the total (average) tax rate.
Source: Author's elaboration using ENIGH, 2012.

➲ 5. Conclusions.

This research conducts a study of the redistributive effect produced essentially by the VAT considering this tax figure as part of the new Tax reform implemented in January 2014 in Mexico. We measure this task with simulations on micro-data in 2012 from ENIGH applying the new fiscal reform on VAT as well as for the rest of the corresponding tax and transfers figures in the fiscal system. We answer a question that seems to be quite complex according to the hidden effects of the VAT: Is the VAT structure system regressive? And if it was, how regressive is this tax figure in the regional context of the north border of the country?, where the tax rates increased 5 more points than in the country. The answer is affirmative.

When the 2014 reform tax rules are applied, the total tax burden becomes more regressive in the Mexican border. We summarize the main findings as follow:

- The 2014 tax reform induces improvement and equity in the treatment of "equals" for the tax payers, but the marginal efficiency found from VAT is low at least, for the very first implemented year.

- 2014 versus 2012 improves government revenues (in about 5.2 percent of GDP), but in the Border region the productivity from VAT is not as high as expected, with a level of 15 percent from the total revenues of the country; meanwhile, regressivity increased in general for the contributors.

- The bottom-income groups of contributors remain almost the same in their position according to the new tax-burden from VAT (those located below the 40th percentile in the distribution); meanwhile the middle and top contributors pay more which leads to an improvement in horizontal equity (higher income groups pay more for the new situation according to their expenditures pattern). An issue of importance is related to pre and post-fiscal inequity, which remains high despite that the fiscal system induces an improvement on *VE* (redistribution) in about 5 points according to DJA decomposition.

- We can not conclude that the 2014 reform on VAT is welfare dominant over the previous tax system because it would not improve the situation of the "equals" in the middle and top parts of the distribution of households, making these sort of contributors to pay more of the new tax-burden.

- For the goods and services, this research is able to normative recommend to increase VAT on those products that end up with the more negative relative contribution, and to reduce the level of the tax for those with the positive value in relative participation. The results identify as the more regressive health-care and housing expenditures, as well as communication services, clothing and footwear. Of course, this is related with the pattern of distribution of consumption of the different taxed goods, and how these patterns are distributed across the income distribution of the contributors and households.

This novelty approach is aimed at supporting the evaluation for policy makers or even for the tax authorities in the country, such as the work in the Congress or that of CONEVAL, to provide monitoring and be able to determine the most viable fiscal adjustment for any kind of taxes or even for transfers, according to their distributional effects and its costs.

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Appendix 1

Non-parametric regression and the derivative non-parametric regression

Non-parametric regression is useful to show the link between two variables without specifying beforehand a functional form. It can also be used to estimate the local derivative of the first variable with respect to the second without having to specify the functional form linking them.

Nadaraya-Watson approach: A Gaussian kernel regression of y on x is given by:

$$E(y|x) = \Phi(y|x) = \frac{\sum_i w_i \, K_i(x) y_i}{\sum_i w_i \, K_i(x)} \tag{A.1}$$

where

$$K_i(x) = \frac{1}{h\sqrt{2\pi}} \exp\left(-0.5 \, \lambda_i(x)^2\right) \quad and \quad \lambda_i(x) = \frac{x - x_i}{h} \tag{A.2}$$

From this, the derivative of $\Phi(y|x)$ with respect to x is given by:

$$E\left(\frac{dy}{dx}|x\right) = \frac{\partial \Phi(y|x)}{\partial x} \tag{A.3}$$

Local linear approach The local linear approach is based on a local OLS estimation of the following functional form:

$$K_i(x)^{1/2} y_i = \mu(x) K_i(x)^{1/2} + \mu'(x) K_i(x)^{1/2} (x_i - x) + v \tag{A.4}$$

or, alternatively, of:

$$K_i(x)^{1/2} y_i = \alpha(x)^{1/2} + \beta K_i(x)^{1/2} (x_i - x) + v \tag{A.5}$$

Estimates are then given by:

$$E(y|x) = \alpha \tag{A.6}$$

and,

$$E\left(\frac{dy}{dx}|x\right) = \beta \tag{A.7}$$

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Appendix 2

Basic statistics of the database

Table A.2.1.
Basic statistics of the database in the tax-benefit system
Using CONEVAL equivalence of scale, Mexico 2012 (Monthly pesos)

Variable	Weighted data	Mean	Std. dev.	Min	Max
X (Market income)	31,005,452	4455.73	9932.432	0	366114.2
N (post-fiscal 2012)	31,005,452	4183.43	7907.571	0	260869.6
N (Reform 2014)	31,005,452	4146.57	7770.729	0	247826.2
P (Pensions)	31,005,452	334.62	1926.777	0	110058.5
Tax burden (T):					
T	31,005,452	604.32	2302.541	0	105244.7
ISR	31,005,452	321.42	1876.317	0	91348.3
VAT	31,063,271	217.64	623.809	0	22741.84
IEPS	31,063,271	64.89	186.8715	0	5731.191
SSC	31,005,452	88.84	339.2924	0	13547.79
Benefits (B):					
B (total)	31,005,452	420.86	1940.762	0	110058.5
B (no pension)	31,005,452	86.24	274.2289	0	21615.65
Scolarships	31,005,452	9.65	168.9501	0	21615.65
Oportunidades	31,005,452	34.49	94.43581	0	1956.52
Procampo	31,005,452	10.96	121.9114	0	7716.52
"70 y mas"	31,005,452	21.06	105.9238	0	3423.91
PAL	31,005,452	0.77	12.73922	0	786.5394
"Empleo Temp."	31,005,452	0.42	10.00658	0	577.1445
Other transfers	31,005,452	4.64	54.05405	0	2710.546

Note: The way to verify the integration of the variables in gross income (market income)
is the sum of the following components: $X = N + T + SSC - B - P$.
Source: Author's elaboration based on methodology ENIGH, 2012.

Appendix 3

ENIGH (Encuesta Nacional de Ingresos y Gastos de los Hogares)

The indirect tax rates for consumption to obtain the Value Added Tax (VAT) and Special Tax for Products and Services (IEPS) from the data of expenditures in ENIGH as well as the exempted goods for the year 2012 are shown in the next tables (A3.1 to A3.2).

Table A.3.1
Classification of Categories Households' spending and their corresponding rates for indirect and special consumption taxes, 2012

	Categories	VAT rate	Rate of IEPS	Exemptions
1	Cereals (corn, wheat, tortillas, bread)	0	*8	Yes
2	Meats	0	0	Yes
3	Fish and Seafood	0	0	Yes
4	Dairy, eggs and oils	0	0	Yes
5	Vegetables, legumes and beans	0	0	Yes
6	Fruits	0	0	Yes
7	Sugars, coffee and tea	0	*25	Yes
8	Spices, extracts	0	0	Yes
9	Processed and ready to use	0	0	Yes
10	Sweets, puddings, jams and candies	0	*8	Yes
11	Other foods (pantry, pets and water)	0	*25	Yes
12	Juices, nectars and soft drinks	16	*25	
13	Energetic drinks and light alcohol (beer and cider)	16	*25	
14	Table alcoholic beverages (wine, anise and sherry)	16	30	
15	High grade alcoholic beverages	16	50	
16	Cigars, cigarettes and tabaco	16	160	
17	Organizational pantry foods.	0	0	Yes
18	Food eaten outside of home.	16	0	
19	Public transportation	0	0	Tasa 0%
20	Home Care	16	0	
21	Domestic Services	16	0	
22	Personal Care	16	0	
23	School expenses	16	0	
24	Books and school transportation	0	0	Tasa 0%
25	School incidentals	16	0	
26	Amusement	16	0	
27	Gambling	16	30	
28	Telecommunications (networks)	16	3	
29	Telecommunications and car repair	16	0	
30	Gasoline	16	36	

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31	Premium Gasoline	16	44	
32	Diesel	16	30	
33	Housing services	16	0	
34	Dress, household items, bedding and towels	16	0	
35	Medical Services	16	0	
36	Drugs and medications	0	0	Yes
37	Denatured alcohol	0	50	Yes
38	Household goods	16	0	
39	Recreational items	16	0	
40	Foreign Transportation	16	0	
41	Professional services, tourism, insurance	16	0	
42	Official procedures	16	0	
43	Contributions, losses, cash aid	0	0	No apply
44	Gifts of food, beverages and tabaco	0	0	Yes
45	Gifts and miscellaneous expenses	16	0	
46	Rents or leasing	0	0	Yes
47	Estimates of rent, but owned or borrowed	0	0	No apply

*IEPS taxed for some products, extra tax for 100grs, was not added in 8 percent rate, and categories 12 and 13 extra 1 percent of IEPS is not added when drink exceeds 1 liter.
Source: Author's elaboration based on methodology ENIGH, 2012 and SHCP, 2012.

Table A.3.2.
Classification of grocery shopping place, informal and formal

Informal markets:	Formal markets:
Tianguis market or market on "wheels"	Grocery store
Street vendors	Specific department store
purchases outside the country	Supermarkets
Loncherías, fondas, torterías,	Retailer stores
Informal cafeterías, taquerías, dinning places	Membership stores
Canteen or bar (Pulquerías)	Other formal stores
Diconsa stores, Liconsa milk peddler	Restaurants
Particular vendors or by individuals (not registered)	Coffee shop
	Internet shops

Fuente: Author's elaboration based on methodology ENIGH, 2012 and Lozano, et.al (2010: 103-109).

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Villarreal, René (2005). Industrialización, competitividad y desequilibrio externo en México. Un enfoque macroindustrial y financiero (1929-2010), México, Fondo de Cultura Económica.
Book chapter:

Castillo, Manuel Ángel (2003). "La política de inmigración en México: un breve recuento", en Manuel Ángel Castillo, Alfredo Lattes y Jorge Santibáñez (coords.), Migración y fronteras, Tijuana, El Colegio de la Frontera Norte / Asociación Latinoamericana de Sociología / El Colegio de México, pp. 425-451.

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