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TAX POLICY AS AN INSTRUMENT TO PROMOTE GROWTH AND POVERTY REDUCTION. CASE OF NICARAGUA

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Content

1. Introduction

Poverty and Inequality in income distribution are urgent issues in developing countries. Latin America (LA) is one of the most unequal regions of the world showing high levels of poverty and extreme poverty, furthermore poverty tends to be chronical in the region. By 2012, one in five Latin Americans had been chronically poor since 2004, representing more than 130 million people (World Bank, 2015).

As a Latin American country, Nicaragua faces high levels of poverty and extreme poverty (For the year 2015, general poverty is 29.6% of the total population whereas the extreme poverty is 8.3%) hence, public policies that targets the issue are extremely important and needed in order to reach a human development state. Conditions that favors economic growth must be accompanied with good redistributive policies whose impact benefit to the majority of the population and lead to an increase in the welfare of individuals.

For the last 10 years the average growth rate of the real Gross Domestic Product (GDP) of Nicaragua has been 4%, this implies a low-moderate but stable growth. For the last decades, the country has enjoyed of macroeconomic stability reflected in the main indicators such as low inflation, a constant growth of international reserves and a low fiscal deficit. However, some difficulties still remains related to the high level of public debt and the need to mobilized resources to finance poverty reduction and income distribution.

In Nicaragua, the amount of resource from international aid (multilateral institutions and bilateral aid) devoted to poverty reduction in the form of budget support or directed to specific programs has been historically very significant, therefore it is needed to increase to the Domestic Revenue Mobilization (DRM) to allow the country to be self-sustainable on financing it national budget and reduce dependency on international aid. In this context, macroeconomic policies, are of mayor importance for setting the economic conditions that favors poverty reduction and inequality. In particular, fiscal policy through the instruments of taxes and expenditure can have a big impact in modify the distribution of wealth.

The tax policy dimension of the fiscal policy is an area not so well covered and less discussed as an instrument to promote poverty reduction and development than the public expenditure or budgetary policy, however it is not less important. With the implementation of a good tax policy it is possible not only to increase government's revenues that would allow for a country to reach their own long term objectives of development with independency and sustainability, but also (with the definition of the taxes and charges) it would be possible to contribute to promote economic growth and development by not representing and obstacle for reaching poverty reduction and income distribution.

Taking into account the particularities of developing countries to design and implement tax policies that contribute to poverty reduction and income distribution, the impacts of such designs are extremely important for policies decisions. The objective of this paper is to analyze weather tax policy in Nicaragua has been used as an instrument to promote growth and poverty reduction and determine if the country is improving its policy by going to a direction where the amount of revenues obtained from the tax system increases in the sense that can have a strong redistributive impact in society, but it is done in a way that tackles inequality.

To conduct the analysis, it is going to be analyze what the theory states about the definition of the tax system to promote growth and poverty reduction and its implications in terms of the efficiency and equity in the economy. Also, to carry out this research we will use the statistics of the public finance of Nicaragua to analyze the evolution of Nicaragua's tax structure, its performance in the last decades and its impact in terms of growth and poverty reduction. Lastly, will be further analyzed the design of the Personal Income Tax established in the last three fiscal reforms in order to evaluate its impacts in reaching the objective of poverty reduction and income distribution.

The paper is organized as follow. In the Section 2 the review of literature is presented. In the Section 3 the methodological considerations are discussed, in the Section 4, is presented the analysis of the performance of the tax system and its tax structure including also description of the fiscal reforms, presenting some conclusions regarding the pro-poor dimension of the tax system in Nicaragua. In Section 5 is implemented and exercise of static microsimulation without behavioral response applied to the personal income tax of Nicaragua for the 2003, 2009 and 2012 tax reforms. In Section 6 is presented the conclusions of the study.

2. Literature Review

2.1 The Role of tax policy in the economy

Tax policy can have a big impact on inequality and poverty reduction, either positively or negatively. Tax policy is the definition of the level and methods by which the government collects its revenues, typically by levying taxes and charges on individuals or economic activities. In recent years special attention has been devoted to the role of tax policy in the economy and how it can impact specific social and economic objectives. In consequence there have been a change in thinking of the tax policy to consider it as an effective instrument to target inequality in income distribution and poverty reduction.

Empirically it is observed in Barreix, Roca and Bésl (2007) that inequality in western European countries improves significantly, with a decrease of 0.15 points in the Gini index, while this effect in the index is not observed for several countries of Latin America region, being the decrease of the index significantly inferior than the one observed for developed countries. , for some authors the role of the fiscal policy in combating inequality is of mayor importance due to its implication in social welfare. As stated by Kesselman and Cheung (2004); "while tax economists tend to focus on the efficiency and growth aspects of tax policies, politicians and the public are almost entirely fixated on the distributional dimension."

Exist different approaches of the role of the tax policy in the economy. For organizations such as the International Monetary Fund (IMF) during the decades of the 90's, more attention was put in achieving efficiency of the tax system because of the need to increase the revenues of the government in developing countries especially after facing political conflicted periods. An efficient tax system is a system that collects high levels of revenues over a broad base of tax payers, in consequence the legal and the administrative framework must be set up in a way that procures to meet the function of maintain high levels of revenues as a share of the Gross Domestic Product (GDP).

According to Oxfam, one traditional measure recommended by the IMF was to establish General Consumptions taxes in order to increase government revenues. The reason behind this recommendation was that this type of taxes are easy to collect and since they are applied in general over every individual and normally at one unique tax rate, this would represent a big source revenue. However, General Consumption taxes does not take into account that the poor consume more of their income than the rich, who have savings, this makes for instance, the Value Added Tax (VAT) and other consumption taxes often regressive, hitting the poorest hardest.

This view of the tax system has been very criticized by organizations such as Oxfam and the Inter-American Development Bank (IADB); who considers that nowadays is important to have a tax system that targets substantial development objectives and that at least had a neutral effect over the low income individuals. In consequence, it is necessary to undertake fiscal reforms that become an authentic instrument of economic growth and inclusive development.

2.2 How to define a pro poor tax system

A tax system is pro-poor if its impact (product of its definition) is progressive and its redistributive capacity is high therefore, to tackle poverty reduction and income distribution is needed a tax system that is progressive and with high redistributive capacity. Taxes can have a redistributive function that is define by its capability to make the distribution of income in a society more equal, in other words; the redistributive impact of a given tax system is defined by its capacity to reduce the market income dispersion. According to OCDE (2007); the overall redistributive impact of taxes depends on their share on disposable income (their size), the tax mix and their progressivity. This three aspects are conceptually defined as follow:

1. *The size of the tax* is referred to the fiscal burden that the tax represents on households or individuals, consequently the size of the tax is computed as the share of the tax on individual's disposable income. This helps to evaluate which segments of individuals are the ones that bears the highest fiscal burden.
2. *The tax mix* accounts for the overall structure of the tax system. It is computed as the share of each type of tax in the tax system in order to evaluate which type of tax has more weight in the tax structure. For example; if it is compose mostly of regressive taxes such as General Consumption taxes or progressive taxes such as the Personal Income Tax. This will give us a hint of the overall impact of the tax system on income distribution.
3. *The progressivity* is related to the individual impact of each tax on income distribution, hence is the evaluation of each tax in order to disentangle to what extent it affects more the low income's individuals. This concept is going to be further explained in the following paragraphs of this section.

Is important to remark that the level of taxes collected is of mayor relevance in order to increase the financing of programs of poverty reduction in developing countries and, as consequence decrease inequality in income distribution. This is of great relevance since, as describe in Stiglitz (2009), in many less developed countries, a shortage of funds impedes development efforts, and yet attempts to expand taxation not only meet enormous political resistance, but also often turn out to be futile.

According to Musgrave and Musgrave (1984) a progressive tax system is theoretically define as a tax system in which each individual contributes fairly according to its capacity. This means that the greater the earnings or income perceived, the higher the percentage in taxes that must be paid. If the rich pay proportionately more tax than is levied on the income of the poor, the system is progressive. If the reverse is true, the system is regressive. The theoretical concept of progressivity of a tax system is extremely related with the concept of Equity (horizontal or vertical), which, can also be taken as principle that must prevail in the definition of the system.

Horizontal equity means that equals should be treated the same fiscally (the same income should be taxed the same way), and Vertical equity means those that are not equal should be treated differently. If a tax system is based on taxing workers (through their wages) more than capital, it is an unjust fiscal system which may impede the fight against poverty and inequality with big implication in social mobility. The principle of efficiency is defined by taxes that cause as little interference as possible in economic decisions that would be made if the tax did not exist, in consequence the tax design will procure to have taxes that does not too much distort the economic decisions of individuals.

For evaluating the impact of a tax system on inequality and poverty reduction it is necessary to evaluate the share of each type of tax in the total tax structure of the system. If the tax structure resulting gives more weight on direct taxes (Personal Income tax and corporate tax) than indirect taxes (Consumption tax Applicable to all market consumers), the outcome in analyzing the tax structure will suggest a progressive tax system, and the opposite if it gives more weight to the indirect taxes.

There are type of taxes that are more progressive than others, this is determined by taking into account who bears the highest or the total burden of the tax; this is also known as the economic incidence of the tax. To analyze the economic incidence of a specific tax it is necessary to evaluate if the individuals with the highest income are the ones who bears the highest share of the tax or on the opposite side, if the individuals with the lowest income are the ones who pays in total most of the tax.

Evidently, each tax also will have implications in the efficiency therefore (in the sense that), as stated above some taxes are more efficient than others and this will be determined by how far it distorts the decisions that people or businesses makes about consumption, savings, and investment. In the Figure No. 1 is presented a summary of the theoretical impact of the principal taxes in equity and efficiency in the economy.

Figure No. 1 Taxes and their potential impact on efficiency and equity

Tax	Basic Features	Equity (Progresivity or Regresivity)	Efficiency
Value Added Tax	Applicable to all markets consumers. Affects consumers's final price, but not production cost	*Regressive* Equal taxing for the spending of rich and poor people. - The poor spend a higher proportion of their income on consumption than the rich.	Moderately efficient - A uniform tax is applied (making no distinction between sectors unless required). - Does not differentiate between imported and local goods.
Personal Income Tax	Taxes all income or profit whether wage-based or not. - The burden cannot be transferred to another agent; it is the responsibility of the individual.	*Progressive* - Individualised taxing. - People with more money pay proportionately more.	Not very efficient - Reduces people's savings capacity
Corporate Tax	Tax on company profits. - Affects the owner of capital or can be transferred to the consumer via product price.	*Progressive* - Payment based on income. - Evidence exists that it is regressive for low production levels and progressive thereafter.	Not very efficient - Discourages production because it reduces profits. Reduces savings capacity.
International Trade taxes	Import and export tariffs. - Charged at customs at the time the transaction is made.	*Possibly progressive* - Imports: In general the richest import more. - Exports: It depends whether the product is consumed in the country or not, and if it is produced by rich or poor sectors.	Not very efficient - Differentiating between local and foreign production creates market distortions. - Often protects the least efficient, e.g. import duties. - Discourages export sector production.
Exices	Only specific goods are taxed. - The tax is principally borne by consumers as the price of these inelastic goods has little effect on demand for them.	*Generally progressive* - Allows for different rates depending on the product (higher rates are applied to luxury goods and lower rates to those goods with greater demand among the poorest groups).	Relatively efficient - Creates differences between products but only for a few goods. -Taxes may also try to correct market flaws.

*Source: Oxfam, **Owning Development**, Oxfam Research Report, September 2011*

For assessing the impact of a tax system on welfare, exemption system or incentive system also must be take into account. If tax exemption are not target properly, this could have a regressive effect of income distribution. According to Oxfam, there has been an attempt in many countries to exempt some basic goods from VAT that are used mainly by the poor, such as food. Often VAT exemptions have also been made on agricultural products where the rural sector is often very important, but for the case of developing countries, exist evidence of misallocation of this type of exemption in the sense that big firms, that has the capability to pay taxes, are the ones that gets more benefits from the public resources in the form of tax exemptions.

Barreix, Bés and Roca (2007) establish a type of tax system for modern societies and identify its fiscal "pillars" and it complements. As pillar they defines a tax that; (a) is capable to generate significant and stable incomes, and (b) is applied over a wide base of people in order to incorporate neutrality and elasticity. In consequence, the three pillars are the Income Tax, the General Taxes to Consumption (specially the VAT) and the Social Security Contributions. On the other hand, these authors consider as complements of the tax system; the taxes applied to natural resources and no renewable resources, the international trade duties, patrimony taxes (especially immobile property), taxes applied to personal assets (assets transmission, legacies, and heritages) and lastly the Specific Consumption Tax.

2.3 Specific issues in developing countries

In developing countries several constraints exist that must be taken into account in policy design and implementation in order to have an efficient tax system. Following Oxfam the main constraint are:

1. the specific policies adopted; the policy decisions and the reforms undertaken don't have had positive results in terms of the tax structure achieved.
2. the lack of tax incentives rationalization. In other words, a big tax expenditure is observed in developing countries;
3. the existence of big informal economic sectors;
4. the institutional weaknesses in developing countries that make it hard for them to challenge those policies and avoid the diversion of resources; For instance to combat tax evasion.
5. a lack of coherence between the tax system at national and regional levels.

Taking into account the constrains mentioned above for the definition of a tax system in the specific context of developing countries, several studies have been developed by Oxfam, IADB and also the United Nations[1]; where it is suggested a definition of a tax system that

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[1] Specifically by the Economic Commission for Latin America and the Caribbean (CEPAL acronyms in Spanish)

overcomes the constrains observed and that moves forward to a better system that promotes growth and human development. Some of the measures recommended and that are consider to have a strong impact in social welfare are, for instance; i) combat the informality in order to widen the tax base of taxpayers highlighting that this must be done by the Incorporation of informality in the design of the tax system, ii) to reduce tax exemptions due to the high level of tax incentives that exist in developing countries, iii) to make the personal income tax and the corporate income tax more progressive and iv) to increase the collection capability of the tax administration.

The definition of the Income Tax has strong impact on welfare since it affect directly the disposable income of individuals. In this regard, what it is concretely recommended in literature by organizations such as Oxfam[2] and the IADB[3] in order to solve the issues that still remains in developing countries and that affect the progressivity of the income tax are:

1) to reduce the exempted threshold for the inferior levels of income; 2) to stablish a maximum for tax deductions with higher limitations for the individuals of higher income; 3) to broaden the tax base in order to include types of income that are not included such as interest, dividends, pensions and the capital gains; 4) to create a dual structure of the income tax that incorporate a progressive structure for wages and pensions and a moderate low fix tax for capital profits including capital gains; 5) to stablish the higher marginal rate of the personal income tax equal to the rate for corporate income tax, this in order to avoid arbitration within the income tax system.

Regarding to make the Personal Income Tax more progressive is recommended to broaden the collection of this tax in the sense that does not rely only on the taxpayers with high income, thus is necessary to increase the capacity of collection of the tax but maintaining its progressivity. Also is important to convert the personal income tax into a tax that is easy to administrate for the collection institutions.

This paper will focus on analyzing the progressivity and redistributive capacity of the personal income tax for the specific case of Nicaragua. The reason of this choice is that in the last decades, several fiscal reforms that has change the definition of the Personal Income Tax in Nicaragua has been enacted, hence is interesting to know whether this

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[2] Itriago, D. Owning Development, Taxation to fight poverty, Oxfam Research Report, September 2011

[3] Several publications has been conducted by the IADB that are the product of technical assistance in several Latin American countries. One of the studies taken as reference in this paper is Barreix Alberto, Bés Martín y Roca Jerónimo (2009). "Equidad Fiscal en Centroamérica, Panamá y Republica Dominicana". Washington D. C., USA: Inter-American Development Bank (IADB) y EUROsocial. Agosto.

reforms were design in a way that tackles inequality and facilitates income distribution and poverty reduction. Hence, the potential impact of the reforms carry on in Nicaragua will be analyzed in order to find out if this reforms contributes in reaching the development goal that are important for Nicaraguan society. It is selected to work with the personal income tax, because this tax affect mostly the disposable income of workers, hence the tax definition will have strong consequences on social mobility and income distribution which in turn will affect directly the welfare of individuals.

2.4 Assessing the progressivity and redistributive capacity of taxes.

Improved understanding of how taxes are distributed across the population and how to measure these impacts is vital in formulating and assessing taxation policies. For example, does greater progressivity in the rate schedule for personal taxes contribute to increases in effective progressivity and inequality reduction, and if so, to what extent? The procedure commonly applied is well rooted in the public economy with developments of authors such as Musgrave, Atkinson[4] and Stiglitz (1976), and it can be apply whether to specific taxes or to the entire tax system.

To assess more formally weather the outcome resulting from the application of a specific tax definition has a high progressive and redistributive impact on welfare, studies of the distributional impacts of taxation can generally be classified into three types based on their analytical frameworks and methodologies. According to Kesselman and Cheung (2004), they vary in the range of taxes considered, their treatment of the incidence of the taxes, their measure of economic well-being, the unit and time span of observation, the extent to which they incorporate economic modelling of behavior, and their use of inequality or progressivity to measure distributional impacts.

Kesselman et al, distinguish the three types of studies, which are denoted "inequality", "computable general equilibrium", and "fiscal incidence". For the case of inequality approach, this consist in estimate the difference in inequality measures between gross (or market) income and net (or disposable) income of households. Typically they make adjustments using family equivalence scales to gauge the well-being of individuals in households of differing sizes. Inequality studies usually consider only personal income taxes (PITs) and, in some cases, payroll taxes for social security programs. These types of taxes are assumed to be borne fully by the individual, thus obviating any incidence analysis.

Inequality is selected as an approach in this paper because, as stated above, this type of analysis fits good when analyzing the Personal Income Tax and, in the particular case of Nicaragua where the labor supply has typically low elasticity, the assumption that the tax is borne fully by the individual is very close to reality. In addition, the data base that is

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[4] A.B. Atkinson, "On the Measurement of Inequality" (1970) vol. 2, no. 3 Journal of Economic Theory 244-63.

available fits well for undertaking this type of analysis. More detail considerations about the inequality approach applied to the case of Nicaragua are presented in the Section 3, Methodological framework.

To look at the income distribution before and after the application of the tax policy, a series of indexes of inequality, progressivity and redistribution has to be performed in order to evaluate the impact of specific taxes or the impact of a specific tax reform on welfare. Also, some methodological aspects are retrieved from studies performed in Latin American region by experts from international organizations such as the IADB that has contributed to assess issues that are specific from the countries of the L.A region. The studies taken into consideration are; *Fiscal Policy and Equity Estimation of the Progressivity and Redistributive Capacity of Taxes and Social Public Expenditure in the Andean Countries* (2007) and *Equidad Fiscal en Centroamérica, Panamá y Republica Dominicana (2009)*.

When estimating the indexes, conceptually; inequality is defined over the entire income distribution, while progressivity is defined over the tax system as it applies at different income levels. Inequality measurement involves taking the distribution of incomes (whether pre-tax or post-tax) and transforming it into an index.

The characteristic common to all inequality indices is that they measure the dispersion, or spread, of income across the population. The indexes that are going to be used in this paper are the traditional *Gini index and its Lorenz Curve*, which are commonly used to measure income dispersion, however is going to be applied for different scenarios of income distribution product of different tax design.

Additionally, the Indexes developed for assessing more specifically the distributional impacts of taxes that are going to be implemented in this research are; *Tax Concentration Index, Concentration Curve, Kakwani Index and Reynolds-Smolenski Index*. Is important to remark that all this indexes are derivate from the original Gini Index.

One important aspect to conduct the estimations is the incidence of the tax. In this respect, the incidence of the tax goes beyond of who is responsible for paying the tax but try to determine the economic incidence of taxes that is, who actually bears the tax burden. This can be determinate theoretically by traditional assumptions, for example, for the more important taxes will be determine as follow:

1) Value Added Tax (VAT) is assumed to be borne by end consumers. Even within the framework of microsimulation models considering behavioral aspects, production prices are assumed to remain unaltered by tax reforms, while final consumer prices are assumed to be affected by them. Concerning the economic incidence of VAT, this assumes that the supply function has infinite elasticity and that the tax is passed

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on to the end consumer. This assumption was adopted in the different studies conducted.

2) The personal income tax is borne by the individual who receives such income.
3) The corporate income tax there is no widespread consensus as to who effectively bears the burden since it can be translated to the consumer.

The redistributive impact of taxes can be determined by the difference in the concentration coefficients for income before and after taxes, as derived from household surveys.

3. Methodology

Following the studies of the IADB; *Fiscal Policy and Equity Estimation of the Progressivity and Redistributive Capacity of Taxes and Social Public Expenditure in the Andean Countries* (2007) and the Ministry of Finance and Public Credit of Nicaragua; *Impacto Recaudatorio y Redistributivo de la Reforma a la Ley de Equidad Fiscal* (2009) the methodological considerations are presented in this section.

In this paper, is perform static microsimulation not including behavior response, therefore it is not estimated the behavioral reaction functions of individuals to the introduction of the taxes. As a welfare indicator is selected the income and the unit of analysis is the individual, which is considered better for analyzing the personal income tax since, at descripted above, its incidence is more straightforward.

As outlined above, there is no consensus in literature of who bears burden of the corporate income tax whereas exist consensus on the Consumption Taxes and the personal Income Tax which are bear by consumers and individuals respectively[5]. In the estimation, it is computed the theoretical collection by determining the income taxable and then applying the corresponding tax rates to the wages of the year 2008. The data base was obtained from the Institute of Social Security of Nicaragua (INSS Spanish acronyms). It is important to clarify that the real collection is not consider since the data base is not available to public.

In this study we will estimate the following indexes:
- Gini index
- The progression of the average tax/income ratio in the different deciles as a local indicator of how progressive taxes are. The global progressivity of the Personal Income Tax in Nicaragua through the Kakwani Index and the redistributive impact of taxes through the Reynolds-Smolensky Index.

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[5] As stated in Barreix et al, Tax Incidence is not estimated in this paper, it is assumed based on the robust consensus stated in theoretical studies and empirical evidence.

The following is a brief description of the indicators.

The Gini Index:

Measures the inequality in income distribution. This index is related to the Lorenz curve, hence for any income distribution, the Gini coefficient is twice the area between the diagonal and its Lorenz curve. The smallest value of the Gini is 0, which occurs with complete equality when the Lorenz curve coincides with the 45-degree line. The mathematical formulation of the Gini Index for discrete variables is the following:

$$G = \sum_i \sum_j \frac{|X_i - X_j|}{2N^2 \bar{X}}$$

Or

$$G = 1 + \frac{1}{N} - \frac{2 \cdot \sum_{i=1}^{N} i \cdot X_{N-(i-1)}}{N^2 \bar{X}}$$

Where N stands for the number of observations of the discrete distribution of X and $\bar{X}$ stands for the mean of the variables.

When applied to the impact of a tax policy, the Gini Index is performed to have a measure of the income distribution before and after the application of the tax policy in order to know how the income dispersion changed with the application of the policy. In the specific case of Nicaragua, the Gini Index is going to be applied for the pre-fiscal scenario and then to three tax reforms scenario selected for the analysis. This in order to know the impacts of those reforms in the income distribution. What it is expected as a result is that the Gini Index decrease after the application of the taxes indicating a progressive tax system or an increase in progressivity of the tax system.

Lorenz curve:

The Lorenz curve is a simple way of illustrating inequality. The horizontal axis represents the proportion of the population, ordered by income from lowest to highest. The vertical axis plots the cumulative proportion of income held by that part of the population. In a completely equal society, where everybody has identical incomes, the Lorenz curve will be the straight line connecting the points along the diagonal in a 45-degree diagonal. If there is any inequality in the society, the Lorenz curve will lie below this diagonal because the poorer half of the population must have less than half of total income.

This deviation from the 45-degree diagonal allows some income distributions to be ranked. If the Lorenz curve of a distribution B lies entirely below that of distribution A, we say that distribution A "Lorenz-dominates" B, or that distribution A is more equal than B. However, this ranking criterion is not complete. If the Lorenz curves of two income distributions cross, neither can be said to dominate the other, and hence we cannot claim that one distribution is more equal than the other without further assumptions about how one values equality at various points in the income distribution and some summary indexes are required to do comparisons.

Concentration Curve:

The progressivity or regressivity of a certain tax may also be determined by comparing the Lorenz curve of household income prior to fiscal policy action with the concentration curve of the tax concerned, which is basically how the tax paid is distributed among population. For each cumulative percentage of the population, the concentration curve measures the cumulative percentage that actually pays the tax in question. Pursuant to this graphic analysis, a given tax will be progressive relative to total distribution if and only if its concentration curve is always below the Lorenz curve of household income prior to the fiscal policy action (Lorenz dominance).

If there is no Lorenz dominance because curves cross over one another one or more times, any calculation representing inequality in a single digit -such as the Gini index- will still allow a complete ranking of income distributions, that is, any distribution pair may be sorted unambiguously (Lambert, 1989).

Concentration Index:

Is computed as the Gini index, but on the concentration curve of the variable that is represented in the curve, which in this case is the Concentration Curve that orders the tax distribution among population. The procedure is similar to the performed for the calculation of the Lorenz Curve and Gini Index for a given income distribution, with the difference that for the Concentration Curve and the Concentration Index, the calculations are applied to the distribution of taxes paid by individuals.

Kakwani progressivity index:

Based on the Gini coefficient, gives a clear indication of the progressivity or regressivity of a given tax. It is calculated as the difference of the concentration curve of the tax and the Lorenz curve (of the welfare indicator) before taxes or tax policy. For the estimation preformed in this paper, the Kakwani indicator is defined as:

$$K = \textit{Concentration Index} \text{ (tax) - Gini (\textit{pre-fiscal policy income})}$$

Conclusions:

K > 0, (+): The tax is *Progressive*

That is, if the tax is more unequal distributed than the pre-fiscal policy or pre-transfer income, the tax contributes to reducing income distribution inequality; hence, it is deemed progressive.

K <0, (-): The tax is *Regressive*

That is, if the tax is more equitably distributed than the pre-fiscal policy or pre-transfer income, the tax contributes to reducing income distribution inequality; hence, it is deemed regressive.

The Kakwani index enables us to estimate how progressive or regressive a given tax is, but as it does not change depending on its actual collection, it provides almost no hint of its redistributive capacity.

Reynolds-Smolensky

A tax may be strongly progressive, but if it is insignificantly collected, its redistributive capacity will be equally insignificant. Therefore, this analysis has to be supplemented with the Reynolds-Smolensky (RS) index, a global indicator of the redistributive capacity of a tax. This indicator is calculated as the difference between the Lorenz curve (of welfare indicator) before taxes or tax policy and the concentration curve (of the welfare indicator) after taxes or the tax policy. This will implied the subtraction of their respective indexes of Gini and concentration. This index is defined as

RS = Gini (pre-tax policy income) - Gini (income after tax policy)

As consequence, the Reynolds-Smolensky index, indicates in absolutes values how many points of the Gini index, has increase or diminished the inequality in the distribution of the welfare indicator as consequence of the introduction of the tax or tax policy under analysis.

Conclusions:

RS > 0, (+): The tax **decrease Inequality**

RS < 0, (-): The tax **increase inequality**

Average Rate Progression:

The most common local progressivity indicator is the average rate progression. According to this indicator, any given tax will be progressive if, when expressed as a percentage of

household income -that is average rate- it increases as household income rises. They are called local indicators because they measure the progressivity (or regressivity) when moving from one income distribution bracket to another, but they do not provide a global measure of the progressivity (or regressivity) of the tax under consideration.

4. Performance of the tax system and Tax structure of Nicaragua

In this section will be presented the macroeconomic context of Nicaragua in order to have an overview of how the economy has performed in the last 15 years. Also, it is going to be analyzed the evolution of the tax policies and the fiscal reforms implemented in this period. Additionally the overall tax structure of Nicaragua is going to be presented and analyzed in order to have a general picture of how the system is structured and also to know its overall influence on equality. An analysis of the tax structure of Nicaragua in comparison with the average tax structure observed for Latin America and OECD countries is going to be presented, and some conclusions regarding the pro-poor dimension of the tax system in Nicaragua are showed at the end of this section.

4.1 Macroeconomic Context

For the last 10 years the average growth rate of the real Gross Domestic Product (GDP) of Nicaragua has been 4%, this implies a low-moderate but stable growth. Since the 2000's (after the program of stabilization implemented in the decades of the 90's) Nicaragua has had a period of stable macroeconomic performance which can be translated into a good climate for business and investment.

Despite the downturn of the international crises which prompted a fall of the real GDP of 2.8% observed in Figure No. 2, Nicaragua has experience throughout the last decades a stable economic growth. For the year 2015, the growth of the real GDP was 4.9%. In addition, according to official data from the Central Bank, the country has experience low inflation rates of 6%

Figure No. 2 Growth rate of Real GDP of Nicaragua

Source: Own Elaboration with data of Nicaraguan Central Bank.

at the end of the period 2015, and a constant growth of the International Reserves reaching 2.5 times the monetary base at the end of 2015.

The standard of living of Nicaragua measured by the GDP per capita was 1,965.9 U.S. dollars per habitants for the year 2015. According to the classification of the World Bank for the current 2016 fiscal year, Nicaragua is a Lower-middle-income economy (1,046 to 4,125 U.S dollars GNI per capita), however inequality in income distribution and high levels of poverty are still a big challenge and the main policy objective to be targeted by authorities.

The fiscal deficit has been reduced throughout the years and by the year 2015 it reaches 1.6% of the GDP. This was due to important efforts of the government to maintain stability in the fiscal sector by controlling public expenses and incrementing the fiscal resources. With regard to the total of public resources, the total of internal and external sources were 19.8% of the GDP for the year 2014. With regard to the external resources, for the years 2009-2014 this represented in average 2.8% of the GDP, whereas with respect to the total resources (total public budget) the external resources represented 15% on average for 2009-204 period (See Figure No. 3). It is observed that the trend of dependency of external resources is decreasing with the exception of the year 2014, in which the external resources as a share of the total resources increased.

Figure No. 3 Classification of Government Resources of Nicaragua as a share of GDP

	2009	2010	2011	2012	2013	2014
Total Revenues	17.4%	18.2%	18.5%	19.0%	18.9%	19.8%
Internal Revenues	13.9%	14.9%	16.0%	16.6%	16.5%	16.9%
External Revenues	3.4%	3.3%	2.5%	2.4%	2.4%	3.0%
Grants	1.5%	1.6%	1.3%	1.2%	1.0%	1.0%
Loans	1.9%	1.8%	1.2%	1.2%	1.4%	2.0%

Source: Own Elaboration base in MHCP

With regard to the public debt, the debt level has been reduced in the last decades, however the total debt of the government remains still high at 48% of GDP at the end of the year 2015. The main reason for the significant decrease in the debt level was the relief of the external debt given by the Hipper Indebt Poor Countries (HIPC) and the Paris Club, hence the reduction of the payment of the debt service has permitted to the government to devote resource to finance poverty reduction.

This change of pattern in the allocation of expenditure has permitted that during the years 2002 to 2014, the expenditures devoted to reduce poverty as a share of the total public expenditure increased from 44% in the year 2002 to 60% in the year 2014. In the last years the current account balance has been reduced due to the reduction of the deficit of the trade balance favoured by the decrease in the international prices essentially of crude oil. The current account deficit was 7% of the GDP in the year 2014.

4.2 Evolution of fiscal policies and fiscal reforms implemented

The fiscal burden (total income as a share of the GDP) has a positive trend in Nicaragua. The average fiscal burden in Nicaragua for the past 10 years is 15.4 and for the year 2015 the fiscal burden increased up to 17.3% (See Figure No. 4). As stated by OCDE (2013), the average tax to GDP ratio in developing countries is low compared to the developed economies, but more importantly it is low compared to its own potential. This can be observed in the figure No. 5, where the fiscal burden of Nicaragua is inferior to the average for the Latin American region and remarkably low in comparison with de OCDE countries, however Fiscal Burden of Nicaragua is superior to the average for Central America region.

Figure No. 4 Fiscal Burden of Nicaragua 2006-2015
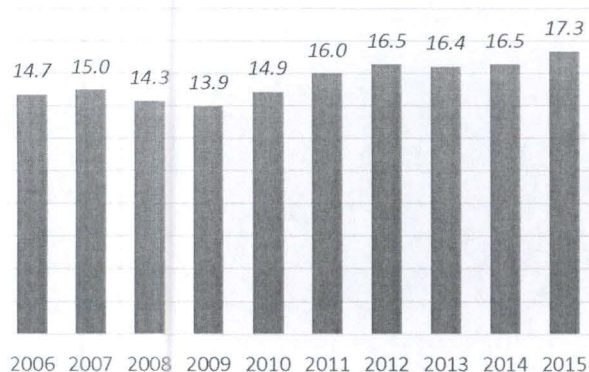
Figure No. 5 Comparatives Fiscal Burden 2010-2015
(Includes social security)
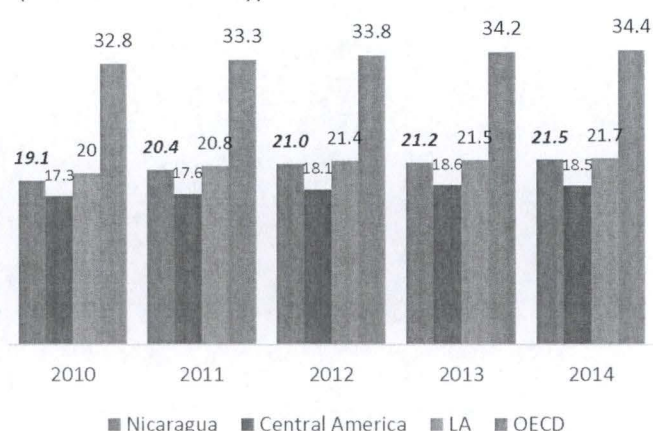
Source: Own Elaboration base in Ministry of Finance and Public Credit (MHCP)

The positive trend observed for Nicaragua's fiscal burden can be explained by the economic growth that the country has experienced and also for the fiscal reforms undertaken during the decade of the 2000's. The reforms have permitted to modernize the tax system and to broaden the tax base of the country, hence can be observed a sustained growth of the government's tax income in general, with the main sources of tax revenues growing smoothly such as the Value Added Tax (VAT) and the Income Tax (IT).

For the year 2015, the IT increased 18.2% with respect to the year before and the VAT increased 11.3%. Likewise the Selective Consumption TAX (SCT) increased 14.5% in the year 2015 and the Custom Rights to Import Tax (CRI) also grew 17.9% for the same year. In Figure No. 4 can be observed a positive trend for this four taxes, however for the year 2009 it is observed a drop in the main income taxes due to the 2008 international financial crises that hit Nicaragua through channel of trade, remittances and international aid.

Figure No. 6 Tax Collection by type of taxes 2008-2015
Seasonal Adjusted Variation Rates
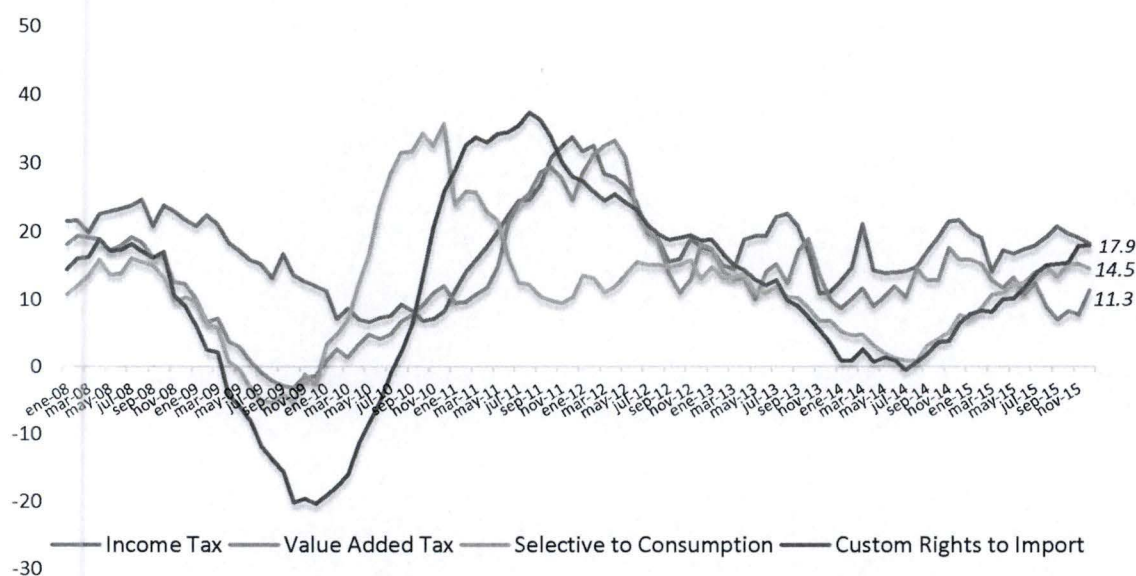
Source: Own elaboration with data from Ministry of Finance and Public Credit.

Despite the decrease in the total revenues of the government in 2009 and the international crises, during the same year the government enacted a fiscal reform named *Ley No. 712, Ley de Reforma a la Ley Equidad Fiscal,* or Law of Reform to the Law of Fiscal Equity (RLEF-2009), because of the need to mobilized additional resources to compensate the decrease in revenues observed in order to cover the budget deficit estimated for the year 2010.

The main provisions of the reform were related to the Income Tax (IT) such as the followings: 1) Increase the exempt base for the workers from wage earnings of 50,000 to 75,000 Córdobas (Nicaragua National Currency) per annum; 2) Substitute the minimal payment for legal persons of 1% over the assets and 0.6% of the average of the deposits for financial institutions for 1% of the gross income; 3) A final withholding of 10% over the dividends and 10% over the interest of every kind of deposits.

With regard to the General Consumption taxes, it was eliminated a big part of tax exemptions related to the Selective Consumption Tax (SCT) that were deem to be very distortive, and for some cases the tax rate was even increased for products such as vehicles and cigarettes. One pending issue in this matter was the elimination or reduction of tax exemptions on the Value Added Tax. This is important to remark that the Tax expenditure in Nicaragua is excessively high. According to estimations of the Ministry of Finance and Public Credit of Nicaragua (MHCP), for the year 2013 the tax expenditure represented 8.9% of the GDP with the VAT contributing to 7.7% of the total.

In the year 2012 was enacted a new fiscal reform named *Law No. 822, Ley de Concertación Tributaria or Law of Fiscal Consensus* (LCT-2012), the more important new contributions of this Law to the system was the incorporation of provisions concerning to international taxation such as the regulation of transfer pricing and thin capitalization and also aspects such as the taxation of nationals with foreign source returns among others provisions. In this reform, in the same way as in the RLEF, special attention was put to the decrease tax incentives hence, provisions of gradually elimination a lot of type of fiscal incentives to enterprises were enacted.

There is no information available related to the impact of this reform quantified in terms of the GDP, however in the statistics can be observed that the relative annual growth of the total income for the year 2013 was only 8.1%, which is considerably lower than the one experience when the RLEF-2009 was enacted and had its impact in the years 2010 (with inter-annual growth of 16.6%) and 2011 (Inter-annual growth of 26%).

4.3 Analysis of the tax structure in comparison with Latin America and OECD Countries.

With regard to the tax structure, in the case of Nicaragua, tax income represented 93% of the total income of the country. The participation of the direct taxes has increased throughout the years (See statistics tables in Annex I). Before the process of fiscal reforms undertaken since the year 2003, the share of the direct taxes in the total tax structure was 19% for the year 2002. This participation of the direct taxes has increase significantly after the period of tax reforms mentioned, reaching 37% in the year 2015 and implying an increase of almost the double of participation with an increase of 18 perceptual points.

The increase of the participation of the direct taxes of Nicaragua has been essentially due to the provisions enacted in the fiscal reforms of the years 2003 and 2009. According to estimations of the Ministry of Finance and Public Credit, after the reform of the year 2009, from the additional collection perceived for the government that was attributed to the reform, the Income Tax reported the higher contribution with revenues as a share of the GDP of 0.62%, whereas the VAT and the SCT, added together only reported 0.06% of the GDP product of the reform.

With regard to the Indirect taxes, it is observed that the participation in the total government income has diminished. If we compared the contribution of the Indirect taxes before and after the period of fiscal reforms, it is obtained that in the year 2002 the Indirect Taxes represented 72% of the total tax structure, whereas after the period of reform, their contribution has been reduce to 56% of participation for the year 2015. Is important to remark that the indirect tax that contributed the most in the total tax structure was the Value Added Tax with 36% of participation in the total income for the year 2015.

When doing a cross country comparison of the revenues structure including the contributions of the social security of Nicaragua with the rest of the countries of Latin America and with OECD countries, it is observed that for the year 2013, the share of Direct Taxes for Nicaragua is 1.4 percentage points below the level observed in average for Latin America and 7.7 percentage points below the level observed for the OECD.

For the case of indirect taxes, Nicaragua is below the average of Latin America countries for the year 2013 and above the average observed for OECD countries. For Latin America countries, the indirect taxes represented 49.5% of the total income for the year 2013, this is 18.8 points higher than the average observed for OECD which implies that the tax structure for Latin America overall tend to be more regressive than the one observed for developed countries because nearly half of the revenues come from indirect tax sources. This can be observed in the Figure No. 7.

Figure No. 7 Income structure by type of taxes in the year 2013
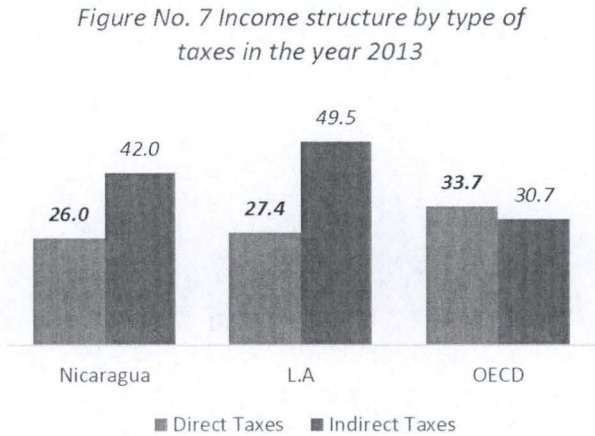
Source: Own Elaboration with data from MHCP and OECD

When analyzing a greater disaggregation of the tax structure of Nicaragua including the contributions to social security and comparing with L.A. and OECD as a benchmark, is observed that the participation of taxes on income and profits for Nicaragua are below the one observed for L.A countries and also below the observed for OECD countries (See Figure No. 8).

For the case of consumption taxes, the General Consumption taxes, which is mainly the VAT, is below the OECD level but above the one observed for the average for L.A. countries. In 2014, consumption taxes (mainly VAT, excises, import and export duties) represented the largest share of the total tax revenue for L.A. countries generating about half of their tax revenues. It is observed that the participation in the total income of the contributions of social security for Nicaragua is 6 point above than the one observed for L.A countries but 4 percentage points below the level observed for OECD.

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Figure No. 8 Tax structure in Nicaragua, L.A and OECD. 2013.
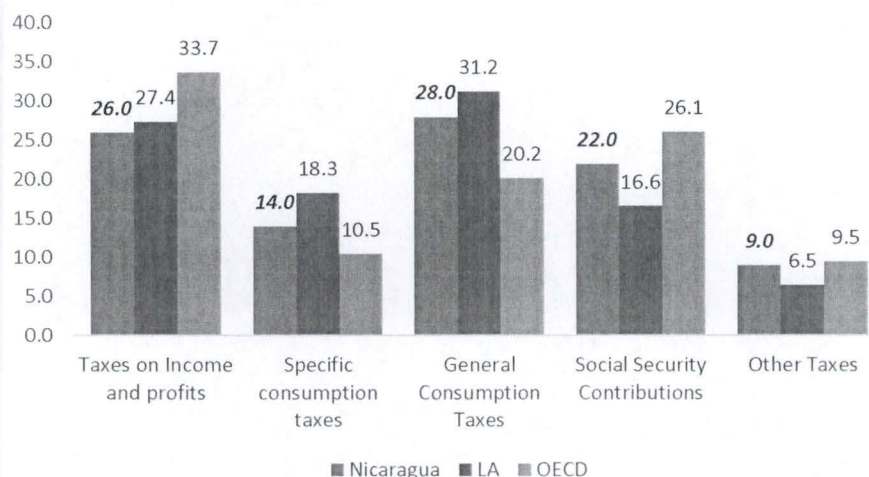
Source: Own Elaboration with data from MHCP and OECD

From the analysis of the tax structure of Nicaragua can be concluded that the tax structure of Nicaragua is more similar to the one observed in average for L.A countries in which consumption taxes are more significant than taxes on income and profits. The contrary is true in the case of advanced countries in which it is observed a more weight of taxes on income and profits.

4.4 Main conclusions regarding the pro-poor dimension of the tax system in Nicaragua

A big progress is observed in the transformation of the tax structure of Nicaragua due to the tax reforms undertaken since the year 2003, however despite the efforts carry on, a regressive tax structure still remains. When analyzing the overall tax structure of Nicaragua it can be noted that the indirect taxes are the ones that has the most significant share in the total tax structure with 56% of contribution in the total revenues in the year 2015, which is superior to the share of 37% observed for the direct taxes for the same year.

When comparing the tax structure of Nicaragua with the one observed for Latin America and OECDE countries, it is observed that the tax structure is very similar to the one detected in average for Latin America countries, however the performance with regard to the participation of the Direct Taxes is still considered very low in comparison with the tax structure observed for developed countries that have fiscal system more progressive and equal.

In conclusion Nicaragua presents a regressive tax system in its structure that is necessary to adjust in order to have a system pro-poor that contributes to reduce poverty and inequality.

This finding of a regressive tax structure gives us the insight that the way that the governments choose to collect their revenues is not the more pro-poor in the sense of the definition of taxes and implementation of the tax policy.

5. Analysis of the Personal income tax in Nicaragua: to what extent recent reforms have contributed to make the system more pro-poor?

5.1 Description of the recent reforms of the Personal Income Tax in Nicaragua

In the last decade, two important fiscal reforms that affected the design of the personal income tax has been enacted in Nicaragua. The first reform was the Law No. 712, Law of Reform to the Law of Fiscal Equity (RLEF Spanish acronyms) enacted in the year 2009. This reform permitted to mobilize additional resources to compensate the decrease in revenues observed in that year because of the international financial crisis.

The tax reform of the year 2009 represented important changes in the taxation of the personal income. It supposed an increase up to C$75,000[6] per annum of the exempt income not subject to taxation, this implied that workers that have very low income would not be subject to the tax. Before the RLEF, the threshold of the minimal exempt income was up to C$50,000 per annum, (See figure No. 9) which was the corresponding to the Law No. 453, Law of Fiscal Equity (LEF Spanish acronyms). With the 2009 reform the first level of income of the progressive scale was levy in a 0% rate and the income applicable was up to C$75,000 annual, whereas to the last level of income it is applicable a rate of 30% starting in C$ 500,001 annual (See figure No. 10).

Figure No. 9: Rates for the Personal Income Tax - Law No. 453, Law of Fiscal Equity

Taxable income $C	Base tax $C	Rate	Over the excess of $C
1.00 - 50.000	0	0.00	0
50.001 - 100.000	0	0.10	50.000
100.001 - 200.000	5.000	0.15	100.000
200.001 - 300.000	20.000	0.20	200.000
300.001 - 500.000	40.000	0.25	300.000
500.001 -	90.000	0.30	500.000

Source: Ley No. 453, Ley de Equidad Fiscal, Published in: La Gaceta Diario Oficial No. 241, Managua, Lunes 21 de Diciembre de 2009.

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[6] C$ is the notation for Córdobas which is the Nicaragua national currency.

Figure No. 10 Rates for the Personal Income Tax - Law No. 712, Reform to the Law of Fiscal Equity

Taxable income $C	Base tax $C	Rate	Over the excess of $C
1.00 - 75.000	0	0.00	0
75.001 - 100.000	0	0.10	75.000
100.001 - 200.000	2.500	0.15	100.000
200.001 - 300.000	17.500	0.20	200.000
300.001 - 500.000	37.500	0.25	300.000
500.001 -	87.500	0.30	500.000

Source: Ley No. 712, Ley de Reforma a la Ley de Equidad Fiscal, Published in: La Gaceta Diario Oficial No. 241, Managua, Lunes 21 de Diciembre de 2009.

The 2012; Law No. 822, Law of Fiscal Consensus, in the same way as in the 2009 fiscal reform, the personal income tax was restructured with important changes in the progressive scale. This law implied likewise than in 2009, and additional increase of the threshold for the exempt minimal income now up to C$100,000 per annum (See Figure No.11). The 10% rate disappeared because was the one corresponding to the scale of income C$75,001-C$100,000 (annual). For the remaining scales of incomes, all the tax rates continue the same as the ones in forced in 2009. However, for all the scales of income, the base tax was reduced in 2012 with the exception of the income scales of C$300,001 – C$500,000 for which the base tax was increased from C$37,000 established in the 2009-RLEF to C$45,000. The structure show in the Figure No. 8 is the one in force currently.

Figure No. 11 Rates for the Personal Income Tax - Law No. 822, Law of Fiscal Consensus.

Taxable income $C	Base tax $C	Rate	Over the excess of $C
1.00 - 100.000	0	0.00	0
100.001 - 200.000	2.500	0.15	100.000
200.001 - 300.000	17.500	0.20	200.000
300.001 - 500.000	37.500	0.25	300.000
500.001 -	87.500	0.30	500.000

Source: Ley No. 822, Ley de Concertación Tributaria, Published in: La Gaceta Diario Oficial No. 241, Managua, Lunes 17 de Diciembre de 2012.

Another important change to the personal income tax that were also enacted by this two fiscal reforms is that for the first time it was established to tax the returns of capital. Therefore, before the reform the interest of deposits, the returns on financial instruments with 4 years of maturity, the dividends, the treasury bonds and the capital gains were not

subject to any kind of taxation. After the reform all the before mention item where subject to a final withholding of 10%.

The exemptions that naturally are excluded from the taxable base of the personal income tax remain the same in the two reforms. For the Nicaraguan legislation, the items of incomes are the social security contributions, the workers' compensation stablished (such as bonus incomes) by law and the National Lottery awards below C$50,000. Another exemption is the workers' thirteen month bonus that in the view of Carlos Garcimartin (2009), it should not be exempted since it's constitute a rent and implies a regressive exemption.

5.2 Main characteristics of the income tax compared to L.A. countries and analysis of the design of the Personal Income Tax of Nicaragua.

With the two reforms enacted it was introduced in the Personal Income Tax, a system characteristics of semi-dual schemes that has emerged in the latest years in Latin America. This type of dual system was created in the European Nordic countries at the beginning of the 90's and its main characteristic are: 1) the base is separated in two components: rents from work and rents from capital; 2) to the firs component it is apply a progressive tariff and to the second it is applied a unique and uniform tariff; and 3) the unique tariff applied to the rents from capital concurs with the minimal rate applied to the rents from work, which in the case of Nicaragua is 10%. It is observed empirically that the definition of dual systems can have positive effects in the equity of the system.

It is important to highlight that the collection of the Personal Income Tax is relatively high for the case of Nicaragua, representing 3.4% of the GDP for the year 2009, with the wages representing 1.62% of the total of withholdings[7]. To analyze whether the tax is well designed it is necessary to explore how many tax payers it captures in order to know if the base of taxpayers is broad enough to have a good redistributive capacity. Following Carlos Garcimartin (2009), one indicator of the capability of the personal income tax is to analyze how many per-capita income is needed to reach each stratifications of the progressive scale.

For the case of Nicaragua it is observed that for the year 2009 it is necessary an annual income of 2.5 times the income per-capita of the country to start paying the tax[8]. This is level is higher than the one existing for L.A. which is 1.4 times and also is considered high

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[7] The Personal Income Tax has several components or sources of income that are subject of taxation, for instance the incomes received from capital rents must be incorporated in the tax refund of each individual but the withholding procedure of the capital rent is different that the incomes from work. Capital rents, for instance, are considered personal income but not from a work source.

[8] The income per capita of Nicaragua for the year 2009 according to official data from the Central Bank of Nicaragua was U$ 1,432.5 (United States Dollars) which was equivalent to C$29,135.96 in national currency.

for the medium-low income countries in which the ratio is 0.94 times and for the OECD countries with 0.25 times.

In addition, when analyzing how many times the income per-capita is needed to start paying the highest rate of the scale (maximal rate), it is observed that for the year 2009 is necessary to obtain incomes superior of 17 times the income per capita of the country. This result is considered very high in comparison with the average observed for L.A of 9.1 times and also for the low-middle income countries with an average of 11.9. For developed countries, the indicator is considerable low in comparison with all the groups of countries here analyzed, with 2.37 times the income per-capita (See Figure No. 12).

Figure No. 12 Income required to be subject to the minimum and maximal tax rates of the Personal Income Tax (Number of times the income per-capita)
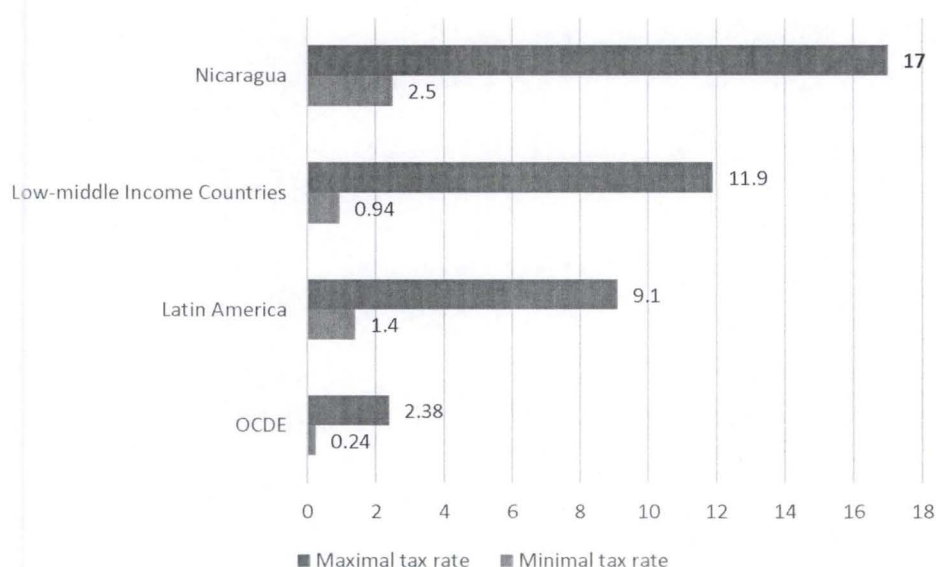
Source: Own Elaboration with data from MHCP and OECD

For the fiscal reform of the year 2012, the ratios of income per capita required to start paying the tax is maintain in 2.5 and for the higher marginal rate is reduced to 12.3 times the income per capita of that year. It is important to remark that this are a point calculations for which the ratios change essentially due to the nominal growth of the economy, hence with no modification of the scales of income and no changes in the nominal rates, eventually more workers will be incorporated into the system.

This give us the intuition that are few individuals the ones that actually pay the highest tax rate and that bears the maximal burden because the income required in order to be subject to the highest rate is too big. In addition the magnitude of the exempt wages is very broad

due to the increase in the threshold of income not subject to taxation enacted in the lasts tax reforms. In summary, the result that is obtained from the definition or design of the personal income tax in Nicaragua, is that the tax does not have a broad base of taxpayer as it should have and few individuals are the ones that bears the highest burden.

When analyzing the data base of wages of the formal sector corresponding to the year 2008 obtained from the Institute of Social Security of Nicaragua (INSS Spanish acronyms), it can be noted that in the income distribution before tax policy, the share of the total incomes that are not subject of the Personal Income Tax because they are below the minimal income require to start paying the tax, is 36% of the total income distribution (See Figure No. 13). This gives as a result that only the 64% of the incomes are the ones that pay the tax which correspond to the upper deciles; 8, 9 and 10.

Figure No. 13 Distribution of the pre-fiscal income year 2008.

Deciles	Annual Income in C$	Income Distribution	Cumulative Income	Individuals
1	11,130.24	2%	2%	48,512.00
2	20,208.84	4%	6%	46,550.00
3	24,877.44	4%	10%	46,693.00
4	29,816.28	5%	15%	53,800.00
5	34,838.64	6%	21%	47,887.00
6	39,950.28	7%	28%	47,604.00
7	45,968.76	8%	36%	48,198.00
8	56,821.56	10%	46%	53,750.00
9	80,852.88	14%	60%	46,691.00
10	225,004.20	40%	100%	53,671.00
Total	569,469.12	100%		493,356.00

40 inferior	15%
10 upper	40%
20 upper	54%
10 upper / 40 inferior	2.62
20 upper / 40 inferior	3.56
Gini Index	*0.452*

Source: Own elaboration with information of the data base of the INSS.

In addition, the data analyzed clearly shows that exists a high concentration of the income in the upper deciles of the distribution. As can be noted in the Figure No. 13, that illustrates the distribution of the pre-fiscal income, the ratio of the richest decile and the four poorest decile is 2.62, this means that the first decile of the income distribution perceives more than twice times the income of the poorest 4 deciles (in other words the 40% poorest

individuals). This can be explained by the fact that the majority of the individuals are grouped in the inferior levels of the income distribution and since the income is highly concentrated in the upper levels it is obtained that the 80% of individuals perceived only 36% of the total income.

The high concentration in income distribution observed for the case of Nicaragua is not particular only for this country, because the same pattern is observed also for the Latin America region. According to the World Bank, if we look at the measure of income inequality in Latin America region we obtained that the Gini Index is set in average at around 0.5, which is in line with the result obtained for Nicaragua of 0.45 presented in Figure No. 13.

With regard to the evolution of the income dispersion in Nicaragua, taking into account the official results of the National Survey of Measurement of Living Standards of Nicaragua (EMNV Spanish Acronyms), Report 2014, obtained from the National Institute of Statistic and Development (INIDE), it is observed that for this data set (National survey) the changes in time of the Gini Index of income are very small, showing an increase of 2 Gini points from 2009 to 2014 with a Gini of 0.46 and 0.48 respectively. This results of the National Survey are in line with the ones obtained in this paper for the income dispersion of wages, therefore we can assumed that the income dispersion of wages does not evolved very drastically from the one observed in the year 2008.

Is important to remark that data base of wages obtained from the National Institute of Social Security (INSS) is the one that is going to be used for the calculations of the tax policy in the next section of this study, and not the data from the National Survey. The reason of this is because, methodologically the income reported in the National Survey is not accurate for fiscal propose and it will required several adjustments in order to find the taxable income, whereas the wages data base provides directly the income subject to tax.

When applying the static microsimulation of the tax reforms to the pre-fiscal income distribution presented in Figure No. 13, what it is expected is that the Gini Index experience a decrease after the application of the taxes indicating a progressive tax system or an increase in progressivity of the tax system as a result of the impact of the tax reform.

5.3 Measure of Impact of the reforms - Assessing the progressivity and redistribution of the Personal Income Tax.

In this section will be analyze the effects of the reforms of the personal income tax in Nicaragua on the income of the individuals, therefore the results of the calculations of the progressivity and redistributive capacity of the personal income tax will be presented. As stated in the literature review, a static microsimulation not included behavior response is performed for undertake this type of analysis, therefore it is not estimated the behavioral

reaction functions of individuals to the introduction of the taxes. As a welfare indicator is selected the income and the unit of analysis is the individual.

Three calculations where performed in order to visualize the impacts on income distribution. This are the reforms LEF-2003, RFEL-2009 and LCT-2012. As commonly is done in this type of analysis, the comparison scenario is the corresponding to the income distribution before any fiscal intervention, this is before the application of taxes. Therefore our comparison scenario is the pre-fiscal income distribution of the year 2008. Once having this set up, the steps tracked were the followings:

1) To the pre-fiscal scenario (income distribution of the year 2008) is performed separately the personal income tax regime of the following legislations: LEF-2003, RLEF-2009 and LCT-2012. This step is known in literature as the computation of the theoretical collection[9]. This allow us to analyze the impact of each specific fiscal design and also to analyze the evolution of the impacts on the personal income tax.
2) After the application of taxes, indicators of progressivity and redistribution where computed for the three outcomes.

The results obtained from the static microsimulation show that for the reforms analyzed, the resulting income distribution is clearly progressive. As it can be perceived in Figure No. 14, the Gini index improves with the application of the taxes for all the fiscal designs of the reforms analyzed. This general result is in line with what it is expected because by definition the tax (for the three reforms) is design in a progressive scale, therefore when the taxes are applied to the pre-fiscal income distribution is expected that the post-fiscal income distribution be also progressive.

What is interesting is the comparison of the results for each tax design or each tax reform. The most significant improved in terms of progressivity is observed with the LEF-2003, however with the next two reforms the progressivity is maintained but the Gini index obtained is superior, showing a slight loss of progressivity with the new tax designs of RLEF-2009 and LCT-2012. This finding shows that the tax design of the latest reforms has a less progressive effect in income distribution than the one obtained with the LEF-2003. What it is commonly seek with tax design is to obtained the higher progressive effect in income distribution, however the result obtained for 2012 goes in the opposite direction if the results are compare with the outcome of 2003.

The results also shows a high concentration of the tax, implying that the distribution of the collection of the personal income tax among individuals represented by the concentration

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[9] For this paper was not possible to obtain information of the real collection of the personal income tax since such information is confidential. That is the reason why it was followed the procedure that considers the theoretical collection instead.

curve of the personal income tax and the concentration index is highly concentrated in the upper deciles of the distribution. For all the cases, the 20% of the individuals with higher incomes, pays more than 90% of the tax, and the 40% poorer individuals are not affected by the tax, hence the concentration index is observed to be very high for all the reforms analyzed showing increases in the concentration index with the recent fiscal modifications until reach 0.9288.

This finding shows the consequences of the increase in the minimal level of income not subject to pay taxes enacted in the two latest reforms. As presented in *Section No. 5.1, Description of the recent reforms of the Personal Income Tax in Nicaragua*; the increase of the threshold of income not subject to taxation was more significant in the reform of the year 2012, in which the minimal income exempt went from C$75,000 to c$100,000 per annum. The consequence of the measure is that several individuals does not pay the tax anymore, hence the tax is concentrated on the upper levels of the income distribution.

This results are in line with the ones find in previews studies such as Carlos Garcimartín (2010) and MHCP (2009), where it is stated that the results of the progressivity of the personal income tax in Nicaragua are similar to what commonly happens in many countries of Latin America, where nearly 10% of the workers of the formal sector with higher incomes pays a very important share of the tax.

Figure No. 14 Progressivity and redistribution Indexes for the Personal Income Tax of Nicaragua.

	Gini	Tax Concentration	Kakwani	Reynolds-Smolenski
Pre-fiscal scenario	0.4520			
LEF-2003	0.4298	0.8691	0.4172	0.0222
RLEF-2009	0.4335	0.9199	0.4679	0.0184
LCT-2012	0.4357	0.9288	0.4768	0.0163

Source: Own Elaboration with information of INSS

With regard to the Kakwani index, it is confirmed that for all the cases the Personal Income Tax in Nicaragua is more equitably distributed than the pre-fiscal policy, hence the tax contributes to reduce income distribution inequality and it is deemed progressive. As stated in the conceptual framework, since the Kakwani index is nothing more than the subtraction between the tax concentration index and the Gini index for each tax reform, it is observed more a progressive distribution in the tax design of LEF-2003 than in the other reforms. This is established by the outcome with the lower Kakwani index of 0.4172.

With regard to the result obtained for the Reynolds-Smolensky index, it is observed to be very low for all the cases with the lowest result in LCT-2012 corresponding to an index of 0.0163. The higher index is observed for the LEF-2003 (0.0222) indicating a higher decrease in terms of points of the Gini index. As detailed in literature review, this index serves as an indicator of the global redistributive capacity of the tax analyzed, in consequence can be stated that for the case of Nicaragua the personal income tax has a low redistributive capacity despite the reforms undertaking.

From the results obtain can be concluded that the Personal Income Tax in Nicaragua is characterized by a high progressivity but a very low redistributive capacity as consequence of its low collection. This finding is in line with the results obtained by previews studies of Barreix et al, Deshong and Garcimartin for the 2009 reform[10]. It is important to point out that in the study of Barreix et al, the indexes are computed for all the countries of Central America, and the results obtained are compared also with the rest of countries of Latin America. In the analysis, he finds that the characteristic of high progressivity and low redistributive capacity of the personal income tax is a constant for all the countries of the region.

As mentioned above, the impact of all the reforms analyzed resulted in a progressive personal income tax with the higher distributive effect observed in the fiscal design of 2003 corresponding to the Law of Fiscal Equity. This leads us to the conclusion that measures implemented with the latest fiscal reform (RLEF-2009 and LCT-2012), worsen the situation of the income distribution if the result is compare to the outcome obtained with the 2003 reform. This is true because with the latest reforms the share of total incomes that does not pay the personal income tax was incremented from 38% to 63% of the total income distribution.

The results shows that the 10 decile of workers with highest incomes bear 89% of the tax, this imply a highly progressive tax but with low impact in the income distribution overall in the sense that the income concentration barely changes with the application of the tax policy. In addition, the income collected from this segment is not enough for having a significant impact in the income distribution overall, hence inequality remains the same with very small changes in the Gini Index as showed before in the analysis.

The results can be observed graphically. For the three simulations, it is observed that there is not a significant change in the position of the Lorenz Curve with respect to the 45 degree line that indicates the perfect equality in income distribution. The results shows that the Lorenz Curve barely moves when passing from one scenario of microsimulation to the other

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[10] In all this studies the indexes were computed only taking into account the 2009 reform. The reform of 2012 is relatively new with respect to the date in which these studies were elaborated.

(See Figure No. 15). When plotted the Lorenz Curve with the Concentration Curve of the tax for each specific scenario, it is observed a Lorenz Dominance for the reforms RLEF-2009 and LCT-2012 because the Concentration of the Curve of the tax is always below the Lorenz Curve, hence the Personal Income Tax is progressive in all the distribution (See Figure No. 2, 3 and 4 of the Annex).

Figure No. 15 Lorenz Curve for Pre-Fiscal scenario and Reforms
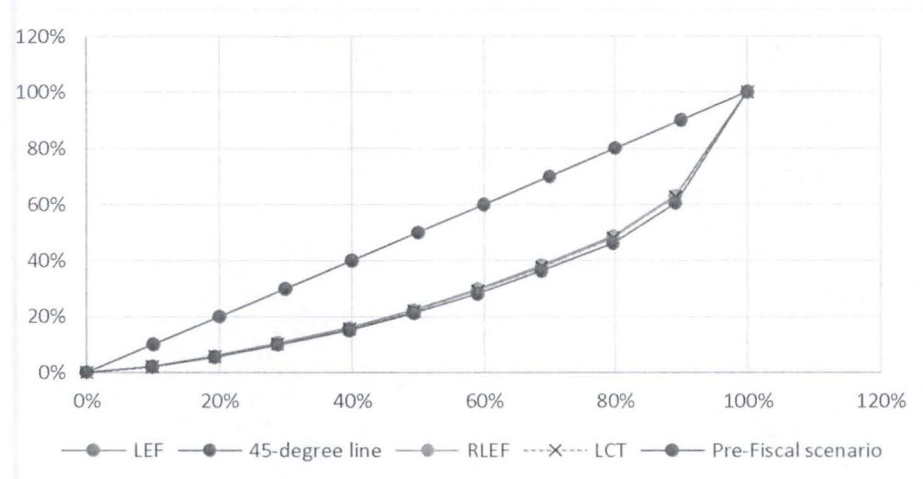
Source: Own Elaboration with information of INSS

The measure of increase the threshold of exempt income is problematic not only from perspective of the design of the personal income tax and its impacts on income distribution, but also from the perspective of the characteristics of the labor market of Nicaragua. The increase in the threshold implies as demonstrated in this paper that a high percentage of the incomes of the formal sector does not pay taxes, if we take into account the particularities of the labor market of Nicaragua which is characterized by high levels of informality, we find that the reform fails to increase the problem because does not contribute to actually incorporate informality into the system.

With regard to individuals who lose from the application of the personal income tax because its income decrease are for the case of LEF-2003; the deciles number 8, 9 and 10, whereas for the cases of RLEF-2009 and LCT-2012 the only individuals that lose are the individual of the decile number 10. The progressivity of the personal income tax is confirmed also by the indicator of progressivity of the effective rate for all the simulations performed.

6. Conclusions

Tax policy can have a strong impact in reaching development goals such as poverty reduction and income distribution. In this study has been analyzed how Nicaragua is doing with regard to reaching the development objectives of poverty reduction and income distribution using tax policy as an instrument and focusing specifically in the impact of the Personal Income Tax on the welfare of individuals.

It is found that Nicaragua has a good performance in terms of macroeconomic stability, with regard to the fiscal area; the revenues of the government has increased in time showing a fiscal burden with a clear positive trend for the past 10 years. In addition, a big progress is observed in the transformation of the tax structure of Nicaragua essentially due to the fiscal reforms undertaken since the year 2003.

The fiscal reforms has contributed greatly to increase the participation of the Direct Taxes in the total tax structure and to reduce the participation of the Indirect Taxes which are considered to have a regressive impact on welfare. However, despite the efforts carry out, a regressive tax structure still remains, hence Nicaragua needs to adjust its regressive tax structure in order to have a system pro-poor that contributes to reduce poverty and inequality and generates a substantial impact on welfare.

With regard to the Personal Income Tax of Nicaragua, with the reforms undertaken since the year 2003, it was introduced characteristics of semi-dual schemes in line with what it is observed as a tendency for the Latin America region. However, still exists several limitations that could be improved in the design of the tax and that should be taken into consideration for future reforms.

The results obtained from the static microsimulation performed in this study, shows that the impact on welfare of the Personal Income Tax of Nicaragua is very low. This is because despite the fact that the tax is very progressive, it does not have a broad base of taxpayer as it should have, and hence its redistributive capacity is very limited. As a consequence, few individuals are the ones that pays the highest tax rate and that bears the maximal burden, this is because the income required in order to be subject to the highest rate is too big. In addition, it is observed a slight loss in progressivity of the personal income tax with the latest fiscal reform of the years 2009 and 2012, observing a bigger impact with the first fiscal reform of 2003.

When contrasting the results obtained from the analysis of the Personal Income Tax of Nicaragua, with the recommendation outlined by Oxfam and IADB, it is observed that Nicaragua meet the recommendation of creating a dual structure of the income tax that incorporate a progressive structure for wages, however does not comply with the recommendation of broaden the collection of the tax in order to not rely only on the taxpayers with high income. Also, Nicaragua is not doing what it is recommended by

organizations with respect to reduce the exempted threshold for the inferior levels of income, observing a policy that goes in the opposite direction of increasing the exempted threshold instead of reduce it.

The results presented in this paper represents an area of work for authorities with a lot of challenge involved especially if it is take into consideration the reality of the labor maker in Nicaragua which is characterized by high unemployment and sub-employment and a big informal sector. Therefore, if policy makers wish to improve the impact of the Personal Income Tax is necessary to combat the informality in order to widen the tax base of taxpayers highlighting that this must be done by the Incorporation of informality in the design of the tax system.

With regard to the limitations of this study, is important to state that when assessing the impact of the tax and transfer system on income distribution, most analyses (including this study), assume that taxes and transfers do not affect economic behavior. It also entails that the efficiency costs of redistributive policies –e.g. output foregone and lower real wages – are not accounted for. Therefore, in order to strictly account for efficiency impact/cost of a tax policy, other type of analysis should be performed such as a Computable General Equilibrium (CGE) approach. Is important to highlight that due to the time and information constrains faced, it was not possible to applied CGE approach in this research but it is going to be considered for further researches.

As a recommendation is necessary to continue the adjustments through the process of fiscal reforms in Nicaragua in order to make the system more pro-poor. In consequence, it is recommended to continue improving the tax structure in the sense that reflects a clear policy impulse of combat inequality with a pro-poor tax definition. In addition, it is recommended to implement changes in the design of specific taxes that are not generating the expected impact in reaching development goals in order to have a tax system that functions as an effective instrument to target inequality in income distribution and poverty reduction.

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8. Annex.

*Figure No. 1 Evolution of Nicaragua Tax Structure not including Social Security*

	Tax Structure				Tax Structure			
	% of Total Income				% of GDP			
	2012	2013	2014	2015	2012	2013	2014	2015
Total Income	100%	100%	100%	100%	17%	16%	17%	17%
Current Income	100%	100%	100%	100%	17%	16%	17%	17%
Tax Income	91%	92%	93%	93%	15%	15%	15%	16%
Direct Taxes	33%	34%	36%	37%	5%	6%	6%	6%
Indirect Taxes	58%	59%	57%	56%	10%	10%	10%	10%
Transaction of Good and Services	54%	55%	54%	53%	9%	9%	9%	9%
Value Added Tax	37%	36%	37%	36%	6%	6%	6%	6%
Domestic	13%	13%	13%	12%	2%	2%	2%	2%
Imports	24%	24%	23%	23%	4%	4%	4%	4%
Selective to Consumption Tax	17%	18%	17%	17%	3%	3%	3%	3%
Internal Selective to Consumption	4%	4%	4%	4%	1%	1%	1%	1%
Selective Consumption to Oil	7%	8%	8%	8%	1%	1%	1%	1%
Selective Consumption to Imports	5%	6%	5%	5%	1%	1%	1%	1%
Other Tax Income	0%	0%	0%	0%	0%	0%	0%	0%
Tax to International Trade	4%	4%	4%	4%	1%	1%	1%	1%
Custom Rights to Import	4%	4%	4%	4%	1%	1%	1%	1%
Sovereign Tax	0%	0%	0%	0%	0%	0%	0%	0%
Non Tax Income	9%	8%	7%	7%	1%	1%	1%	1%
Capital Income	0%	0%	0%	0%	0%	0%	0%	0%

Source: Own Elaboration with information of the Ministry of Finance and Public Credit (MHCP)

Figure No. 2 Income Distribution after tax policy – 2003 Law of Fiscal Equity (Simulation of minimum income exemption of C$50,000 in the Personal Income Tax)

Deciles	Monthly Income	Income Distribution	Cumulative Income	Individuals	Individuals Distribution
1	927.52	2%	2%	48,512.00	10%
2	1,684.07	4%	6%	46,550.00	10%
3	2,073.12	5%	10%	46,693.00	10%
4	2,484.69	6%	16%	53,800.00	10%
5	2,903.22	6%	22%	47,887.00	10%
6	3,329.19	7%	30%	47,604.00	10%
7	3,830.73	9%	38%	48,198.00	10%
8	4,678.28	10%	49%	53,750.00	10%
9	6,480.63	14%	63%	46,691.00	10%
10	16,666.95	37%	100%	53,671.00	10%
Total	45,058.40	100%		493,356.00	100%

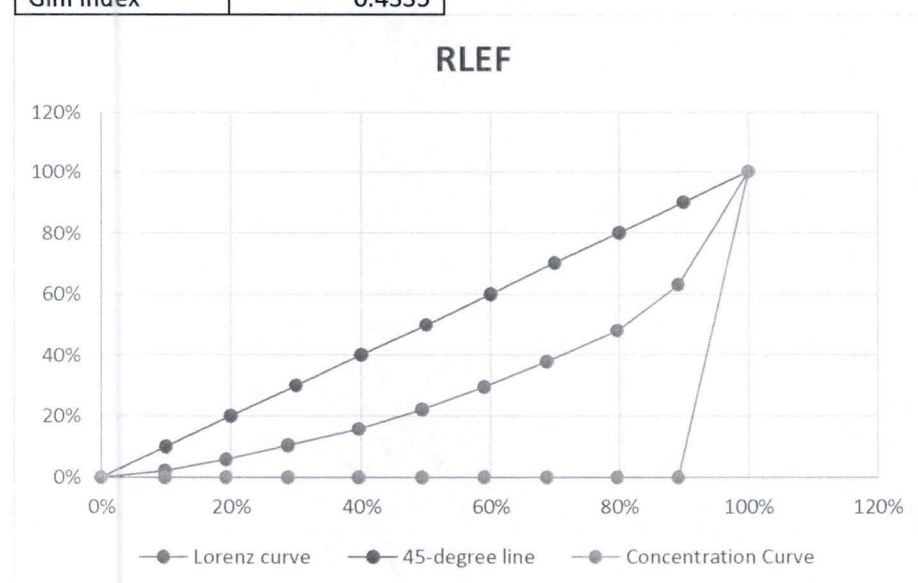|	
40 inferior	16%
10 upper	37%
20 upper	51%
10 upper / 40 inferior	2.32
20 upper / 40 inferior	3.23
Gini Index	0.4299
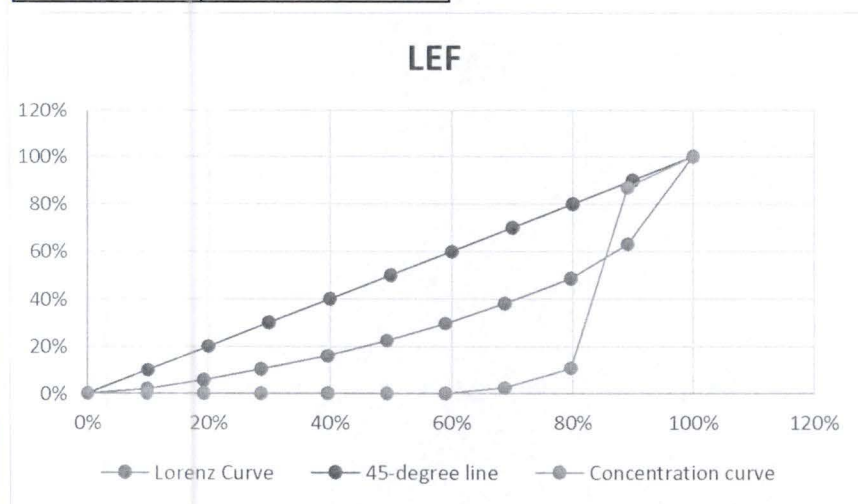
Source: Own elaboration with information of the data base of the INSS

Figure No. 2. Income Distribution after tax policy – 2009 Law Reform to the law of Fiscal Equity (Simulation of minimum income exemption of C$75,000 in the Personal Income Tax)

Deciles	Monthly Income	Income Distribution	Cumulative Income	Individuals	Individuals Distribution
1	927.52	2%	2%	48,512.00	10%
2	1,684.07	4%	6%	46,550.00	10%
3	2,073.12	5%	10%	46,693.00	10%
4	2,484.69	5%	16%	53,800.00	10%
5	2,903.22	6%	22%	47,887.00	10%
6	3,329.19	7%	29%	47,604.00	10%
7	3,830.73	8%	38%	48,198.00	10%
8	4,735.13	10%	48%	53,750.00	10%
9	6,737.74	15%	63%	46,691.00	10%
10	16,875.28	37%	100%	53,671.00	10%
Total	45,580.69	100%		493,356.00	100%

40 inferior	16%
10 upper	37%
20 upper	52%
10 upper / 40 inferior	2.35
20 upper / 40 inferior	3.29
Gini Index	0.4335

RLEF
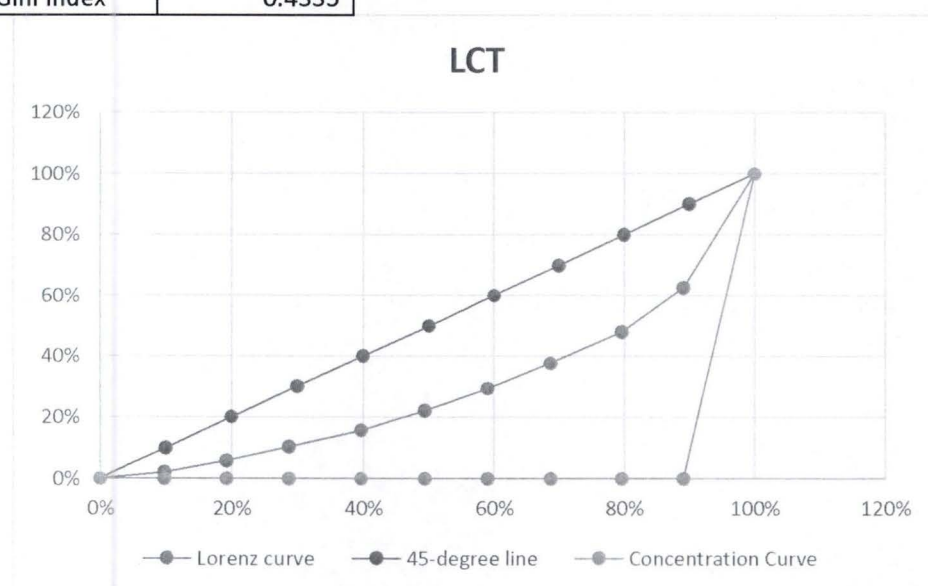
Lorenz curve — 45-degree line — Concentration Curve

Source: Own elaboration with information of the data base of the INSS

Figure No. 3 Income Distribution after tax policy – 2012 Law of Fiscal Consensus (Simulation of minimum income exemption of C$100,000 in the Personal Income Tax)

Deciles	Monthly Income	Income Distribution	Cumulative Income	Individuals	Individuals Distribution
1	927.52	2%	2%	48,512.00	10%
2	1,684.07	4%	6%	46,550.00	10%
3	2,073.12	5%	10%	46,693.00	10%
4	2,484.69	5%	16%	53,800.00	10%
5	2,903.22	6%	22%	47,887.00	10%
6	3,329.19	7%	29%	47,604.00	10%
7	3,830.73	8%	38%	48,198.00	10%
8	4,735.13	10%	48%	53,750.00	10%
9	6,737.74	15%	63%	46,691.00	10%
10	16,875.28	37%	100%	53,671.00	10%
Total	45,580.69	100%		493,356.00	100%

40 inferior	16%
10 upper	37%
20 upper	52%
10 upper / 40 inferior	2.35
20 upper / 40 inferior	3.29
Gini Index	0.4335

LCT

Lorenz curve   45-degree line   Concentration Curve

Source: Own elaboration with information of the data base of the INSS