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The Impact of Uruguay's 2007 Tax Reform on Equity and Efficiency

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Abstract
In 2007, the Uruguayan government implemented a new tax reform which introduced a new progressive labour income tax, a flat capital income tax, and reduced some indirect taxes, with the objective of improving fiscal balance, income distribution and economic growth. This paper presents an evaluation of the impact of such tax reform on equity and efficiency on the basis of data derived from the *Encuesta Continua de Hogares* (ECH) for the years 2006 and 2009. Using a Difference-in-Differences technique, the paper shows that the new tax system lowered inequality by 2 Gini points without producing any discernible disincentive effect. These results contrast with the conclusions of supply side-economics and suggest that suitably designed reforms of direct taxation can simultaneously achieve the goals of equity and efficiency.

Keywords: Tax reform, tax incidence, income distribution, efficiency, matching estimators

JEL Classification: C14, D63, H21

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1. Introduction

The neoliberal revolution influenced tax policy in many countries promoting the central role of the market, placing more attention on efficiency issues and less on equity. If the region most involved in these revolutionary changes was Latin America, then the 1974 Uruguayan Tax Reform was without doubt one of the most emblematic examples of this trend. Assuming that an economy works better with low levels of direct and overall taxation, this reform eliminated personal income tax, lowered the rates of other direct and trade taxes, and increased the role assigned to indirect taxation.

Nonetheless – in contrast to the intended aims – the Uruguayan "neoliberal" tax reforms of 1974 failed to spur economic performance or achieve an efficient allocation of resources. Thus, the recent changes in the political landscape, the increasing call for greater equity, the inability of taxation to produce the necessary resources and pro-cyclicality of fiscal policy, favoured the introduction of the new tax reform in 2007. Following a different strategy of development aiming at achieving more equity without sacrificing efficiency, government implemented a dual direct tax regime consisting of a non-linear labour income tax and a flat capital income tax.

The aim of this paper is to examine the efficiency and redistributive capacity of the Uruguayan tax reform of 2007. In order to do so, we will compare tax progressivity and inequality indicators under the old and the new tax regimes, and use the Difference-in-Differences (DD) technique to assess its impact on labour supply and economic efficiency. This paper is organized as follows: in Section 2, we discuss factors which led to the introduction of the tax reform; Section 3 describes the reform of 2007; Section 4 presents the results of an empirical analysis on the impact of the reform. Conclusions are drawn in Section 5.

2. Factors which Led to the Introduction of the 2007 Tax Reform

During the 1970s, Uruguay experienced important social, political and economic changes. In particular, the poor economic situation and the fragile institutional framework prevailing at that time created a favourable political environment for a non-democratic regime to take power in 1973. The military government introduced a set of neoliberal economic reforms promoting a strong simplification and neutrality in the fiscal field. Indeed, the 1974 tax reform focused firstly on efficiency and horizontal equity disregarding vertical equity or the needs of revenue for the development and the functioning of the public administration. The most important changes of this reform were related to the implementation of an *ex – novo* VAT, the abolition of the personal income and other sales taxes (Barreix and Roca, 2007).

However, the neoliberal reforms were not able to improve economic growth and ensure macroeconomic stability. To finance the rising public expenditure over the late 1980s and 1990s, the new democratic governments levied new taxes, reformed personal income taxation,[1] raised the

[1] Taxes on salaries and pensions were introduced in 1982 with two rates at 1 and 2 per cent raised to 2, 6 and 8 per cent during the 1990s (Tejera, 2008).

VAT and the corporate income tax rates as well as the taxes on petroleum products, net wealth and property (Barreix and Roca, 2007). These continuous changes and the increasing need for revenue shifted public finance into a vicious process which favoured the creation of a tax system consisting of approximately 30 taxes although just four of them[2] accounted for more than 90 per cent of total revenue (Amarante et al, 2007).

Overall, these changes worsened the already bad macroeconomic conditions. The capacity of the government to operate was limited due to the rigidity of some outlays such as wages and pensions. In 2003, the steady increase of the pension expenditure and the excessive burden generated by the interest payments on the public debt dramatically reduced the fiscal space (Villela et al, 2005). In such a context, taxation could no longer fulfill its traditional role of promoting growth, equity and macroeconomic stability.

Furthermore, growing frustration with the poor results of the Washington Consensus policies and the process of democratic consolidation favoured a steady shift towards a new political scenario marked by the success of the left wing coalition *Frente Amplio - Encuentro Progresista - Nueva Mayoria* in the 2004 elections. As in other countries ruled by Left-of-Centre (LOC) governments, the new Uruguayan left-wing regime introduced a new economic paradigm (Cornia and Martorano, 2010) based on a specific programme in which one of the main objectives was the reform of fiscal policy.

3. The Tax Reform of 2007

The new government faced considerable problems as the growing inequality was worsened by the excessive weight of indirect taxes in the tax structure, the slow and limping performance of the national economy throttled by the excessive number of taxes, and the necessity to preserve an adequate level of revenue for economic and administrative reasons. To overcome these challenges, it introduced a tax reform according to an orthodox scheme which, however, assigned more importance to the role of personal income tax (Tejera, 2008).

The most interesting modification of the 2007 Reform was the introduction of a dual direct tax regime. Inspired on the Nordic countries system, aiming to achieve the objectives of equity, efficiency and revenue adequacy, the reform implemented a flat taxation of capital income and non-linear taxation of labour income.

Formerly, personal income tax (IRP) had been levied only to some kind of incomes as wages and pensions according to two rates of 2 and 6 per cent. Using a broad definition of taxable income, the IRPF taxed incomes accrued from labour or pensions according to a progressive scheme consisting of six rates ranging from 0 to 25 per cent (Table 1). As in the case of IRP, the IRPF is calculated on a tax base - the *Bases de Prestación y Contribución* (BPC) - measured in nominal terms by which deductions are allowed for health and social security payments (Llambi et al, 2009). Since 2008,

[2] Ranking them according to importance in terms of contribution on total tax revenue, they were VAT, IRIC (Income by Industry and Trade), IMESI (excise tax), and IP (Inheritance Tax).

pensions were levied by IASS (*Impuesto de Asistencia a la Seguridad Social*) even though "they were originally taxed as the labour component of the IRPF" (Amarante et al, 2011: 18).

As reported above, important changes were referred to taxation on income accrued by capital with the introduction of a flat rate of 12 per cent (Table 1). Some exceptions were related to dividends levied at a rate of 7 per cent, interests on deposits in national currency taxed at 5 per cent, but at 3 per cent on deposits for longer than one year and on bonds and other debt securities issued to terms of more than three years. Regarding corporate income, the reform assured the rationalization and simplification of the tax system, introducing a new tax called IRAE which substituted several ad hoc taxes – on industrial activities and trade (IRIC), agricultural activities (IRA) and commissions (ICOM). To promote investment, benefits and the deduction of losses were extended while the rate was lowered to the same level as the top rate of the IRPF, thus reducing avoidance behaviours (DGI 2008).[3]

Table 1. Treatment of Various Incomes under the New Tax Reform

	Concepts	**Deductions Allowed**	**Annual Tax Rate**	
Capital Income	Interests on deposits in national currency for more than a year in financial institutions	None	3%	
	Interests on deposits of one year or less in financial institutions		5%	
	Interests on bonds and other debt securities issued to terms more than three years		3%	
	Distributed profits		7%	
	Other rents		12%	
Labour Income	Salaries, commissions, distribution of profits	Health coverage for children under 18 years: 6.5 BPC in a year *aportes a la seguridad social*	Up to 60 BPC (84)* from 60 (84) to 120 BPC from 120 to 180 BPC from 180 to 600 BPC from 600 to 1200 BPC Over 1200 BPC	0% 10% 15% 20% 22% 25%

Source: Author's elaboration based on World Bank (2008) and Llambi et al (2009).
Notes: The value was changed from 60 to 84 BPC since of 1 September 2008.

The 2007 reform also concerned indirect taxation. Both basic and minimum VAT rates were lowered respectively by 1 and 4 points while the tax base was enlarged including certain goods and services before tax – exempt (e.g. health services, tobacco and cigarettes). To promote tax simplification, many taxes were abolished - e.g. COFIS, IMESSA - or substituted by new ones creating a more comprehensive tax system, although important expressions of inefficiency coming from the old system remained and have not yet been eliminated.

[3] This is considered the most evident difference with the 'Nordic Dual Tax Regime Approach'.

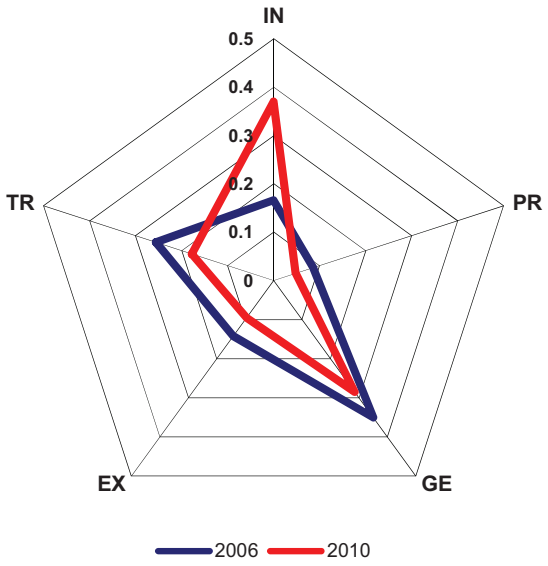
Significant changes were introduced in the field of tax administration, in particular in terms of technological and infrastructural improvements. Nonetheless, the new government was conscious that all these actions could be ineffective if they were not accompanied by an increase of tax morale and a speculative reduction of evasion and avoidance behaviours in the society. Checking the fiscal position of large companies and closing down those where important violations were observed, the fiscal authority gave an important sign of change with respect to the past, creating a different perception of the legal risks and of the consequent punishments (Romano, 2008). At the same time, the government launched a campaign of fiscal education aimed at creating a new standard of fiscal morality in the society, especially targeted towards the younger generation (Romano, 2008).

3.1 First Results of the Tax Reform

The *Boletín Estadístico* 2008, 2009 and 2010 give a broad picture of the changes both in tax level and composition produced by the reform. These reports show that total tax revenue grew at a yearly rate of 7.3 per cent over the period 2006 to 2010, while its ratio to GDP increased from 18.2 to 18.9 per cent.

Of greater interest are the tax composition modifications (Figure 1). Between 2006 and 2010, the contribution of indirect taxation to total tax revenue fell from 74 to 53 per cent due to the drop of the IMESI and especially VAT revenue - by more than 3 and 11 points respectively - and the abolishment of other sale taxes (e.g. COFIS). On the other hand, the contribution of direct taxation to total tax revenue rose from 17 to 35 per cent (Figure 1). While the share of corporate taxation on total tax revenue remained stable, that of personal income taxation (IRPF) increased by 6 points. However, it should be pointed out that the contribution of the taxation of capital income is still marginal, representing only about 1/10 of the IRPF revenue.

Figure 1. Effects of Tax Reform on Contributions to Total Tax Revenue (excluding social security contributions)



NOTES:

IN: Taxes on income, profits
PR: Tax on property + other
GE: General taxes on goods & services
EX: Taxes on specific goods & services
TR: Taxes on international trade

Source: DGI (2010)

4. Empirical Analysis of the Impact of the Tax Reform on Income Distribution and Economic Efficiency

4.1 Data and Methodology for the Empirical Analysis

This section provides an econometric analysis of the effect of the Uruguayan Tax Reform on equity and efficiency on the basis of survey data as the *Encuesta Continua de Hogares* (ECH), elaborated by the *Instituto Nacional de Estadísticas* (INE).[4]

It is well-known that the use of micro-data presents several advantages including the possibility of having a broad and exhaustive picture of a country's economic and social conditions. On the other hand, ECH data present other problems as the lack of information on family expenditure or the unreported information on income accrued from capital (Amarante et al, 2007). Therefore, it is almost impossible to measure the overall impact of the 2007 reform considering the inability to catch the changes referred to indirect or capital taxation.

However, the ECH survey remains a valid source of information for labour income allowing us to develop an analysis referred to the reform's effects on labour effort and on income distribution. Yet, we have to face two additional technical challenges when using data from the ECH survey. First, it does not report information on tax payments. Following the same methodology adopted by Llambi et al (2009), we compute them by each worker operating in the formal sector by adding up all employment taxes.[5] To obtain the amount of tax paid by each worker in the post - reform period, we have to multiply the different income level by tax rate referred to the specific income bracket. Conversely, in the pre-reform period, the tax rate was not applied marginally (i.e. with different tax rates for different income brackets) and so, we have to multiply the single rate – 2 or 6 per cent - by the entire taxable income (Perazzo and Rodriguez, 2006).

Secondly, the ECH survey does not have a panel structure. To overcome this problem, we follow the suggestions of Deaton (1985) and employ a pseudo panel technique built through information collected on a stable cohort of individuals defined on relevant features. Formally, in a panel context we have,

$$y_{it} = x_{it}'\beta + \mu_i + v_{it} \qquad t = 1,...,T \tag{1}$$

[4] The ECH is a survey which provides yearly information on economic and living conditions for the population.

[5] In particular, "taxes included were the employee social security tax (15%), health coverage tax (3%) and the *Fondo de Reconversión Laboral* (FRL) (0.125%). Workers from the banking sector had a specific social security tax rate of 17.5% on gross wage. Workers in the public sector were only taxed with the employee social security tax and the FRL. Military and police employees are taxed with a different social security tax rate (13%). Another special case are workers in cooperatives, whose gross income was obtained by adding up wages, commissions, overtime pay, distributions for expenses and profits. They are taxed with the 15% social security rate plus the FRL. In contrast, the social security and IRP contributions of non-wage earners are based on a pre-determined amount according to a scale of categories regarding experience (or starting working age). In the case of self-employed workers with less than completed tertiary education, the starting working age is assumed to be 20. For workers with completed tertiary education, potential experience was estimated. In all cases we assume that a change of category occurs every 3 years (i.e. a 20 year-old self-employed worker is taxed on a fixed tax base corresponding to the first category; a 23 year-old self-employed worker is taxed according to the second category; and so on)" (Llambi et al, 2009: 58).

where *i* and *t* indicate respectively the individual unit observed and the year. When we move to a pseudo – panel context, we combine data coming from a different set of T cross-section waves computing the mean value of each stable cohort observed over time (e.g $\bar{y}_{ct}$). Formally, we have:

$$\bar{y}_{ct} = \bar{x}_{ct}'\beta + \bar{\mu}_{ct} + \bar{v}_{ct} \quad c = 1,...,C; t = 1,...,T \tag{2}$$

"Since the economic relationship for the individual includes an individual fixed effect, the corresponding relationship for the cohort will also include a fixed cohort effect. However, $\bar{\mu}_{ct}$ now varies with *t*, because it is averaged over a different number of individuals belonging to cohort *c* at time *t*. These $\bar{\mu}_{ct}$ are most likely correlated with the x_{it} and a random effect specification will lead to inconsistent estimates. On the other hand, treating the $\bar{\mu}_{ct}$ as fixed effects leads to an identification problem, unless $\bar{\mu}_{ct} = \bar{\mu}_{c}$ and is invariant over time. The latter assumption is plausible if the number of observations in each cohort is very large" (Baltagi, 2005: p. 193). Thus,

$$\bar{y}_{ct} = \bar{x}_{ct}'\beta + \bar{\mu}_{c} + \bar{v}_{ct} \quad c = 1,...,C; t = 1,...,T \tag{3}.$$

All in all, the cohorts are built starting from two ECH waves – 2006 and 2009 considering only individuals aged 16 or more in 2006, disregarding other information. Households included in ECH are 87,228 in 2006 and 46,936 in 2009, while individuals are respectively about 259,000 in 2006 and 132,599 in 2009.

Nonetheless, the building of a 'pseudo-panel' faces additional problems. Due to the existence of a trade-off, it is necessary to balance the number of cohorts with the number of individuals, while assuring the necessary degree of representativeness for the population cohort and for the entire sample (Baltagi, 2005). In this way, the variables used to identify and construct the cohorts are also very important. In our case, they are the following: gender, year of birth, education level, experience and the place of residence (urban/rural). As a result, we have 5,530 cohorts (hereafter *pseudo-individuals*) for the period 2006-2009.

4.2. The Impact of Tax Reform on Income Distribution

The first aim of this paper is to measure the impact of the reform on income distribution. As illustrated above, the reform introduced a non – linear scheme of tax rate to assure a different participation by taxpayers according to the level of their income.

There are many different ways to compute the equity impact of the reform. For instance, previous studies measured the so-called 'next day effect' applying the new rules on information referred to the pre – reform period and assuming no changes in the worker's behaviour. Barreix and Roca (2007) employ data taken from the *Encuesta Nacional de Hogares (*ENHA, 2004) and the *Household Income and Expenditures Survey* (EGIH 1994-1995) to compute the reform's ability to improve the progressivity and redistributive character of taxation. Their analysis highlights the success of the reform in achieving its aims thanks to the changes implemented both on direct and indirect taxation.

Similar results are reported by Amarante et al. (2007). Using data from the *Encuesta Nacional de Hogares Ampliada* (2006) and the *Household Income and Expenditures Survey* (1994-1995), they show that the introduction of the IRPF reduced the tax burden of the poorest taxpayers while increased that on the richest taxpayers. On labour income, the average effective tax rate rose for the ninth and the tenth decile - respectively by 0.3 percentage points and by 7 points - while on income accrued by pension the average effective tax rates increased for the richest three deciles - by 8 percentage points. In contrast to the previous period, Amarante et al (2007) show that the new tax system generates a positive effect in terms of redistribution - as the Gini coefficient decreases by one point after taxes - even though the reform was not able to change the regressive character of indirect tax system.

Nonetheless, the previous simulated analyses are based on information referred to the pre–reform period. Using post – reform information, Amarante et al. (2011) point out that the reform favoured a move from a regressive towards a redistributive tax system confirming that Gini coefficient decreases by one point after taxes.

Considering the pre- and post-reform periods (2006–2009), our analysis confirms the results reported by the previous studies. Table 2 shows how the reform affected the average effective tax rates comparing the IRP incidence in 2006 against the IRPF incidence in 2009. While the condition for taxpayers in the bottom part of the distribution was similar under the two tax regimes, the main changes are related to the average effective tax rates referred to the highest deciles showing a shift toward a more progressive tax system. In particular, Table 2 shows that taxpayers in the tenth decile pay about 6.3 percentage points more, while the other deciles pay less than under the IRP system.

In addition, Table 2 shows how tax reform influences positively income distribution due to a greater participation in tax payments by the richest compared to the poorest. While under the IRP system the Reynolds – Smolensky index was equal to 0.7 points, under the IRPF system the Gini Coefficient before and after taxes decreased by 2.2 points (Table 2).

All in all, the results of our analysis confirm that the 2007 reform favoured a shift toward a new tax system characterized by greater progressivity and redistribution. In addition, they contradict the results of part of the literature which reduce the redistribution role of taxation in developing countries (see World Bank, 1991).

Table 2. Average Effective[6] Rates by Deciles Comparing IRP (2006) and IRPF System (2009)

Decile	IRP_2006	IRPF_2009	Difference
1	0.01	0.00	0.01
2	0.01	0.00	0.01
3	0.00	0.00	0.00
4	0.40	0.00	0.40
5	0.99	0.00	0.99
6	1.54	0.06	1.48
7	1.42	0.75	0.67
8	3.51	1.59	1.92
9	3.66	2.93	0.73
10	3.59	9.93	-6.34
Gini Before Taxes	46.1	45.4	0.7
Gini After Taxes	45.5	43.3	2.2
Reynolds-Smolensky	0.6	2.1	-1.5

Source: author's elaboration

4.3 The Impact of Tax Reform on Labour Supply

A good reform has to achieve both equity and efficiency. In this regard, the 'optimal taxation theory' focuses on this problem and tries to maximize a social welfare function. As argued by Diamond and Saez (2011: 1): "Social welfare is larger when resources are more equally distributed, but redistributive taxes and transfers can negatively affect incentives to work, save, and earn income in the first place. This creates the classical trade-off between equity and efficiency which is at the core of the optimal income tax problem."

This famous trade-off was analyzed for the first time by Mirrlees (1971). The analysis showed a high degree of complexity because "for each income we must specify the tax payment, and the optimization occurs in a space of all admissible functions" (Newbery and Stern, 1987: 36). In its first results in particular, optimal income tax theory demonstrated that progressive income taxation increases the loss of efficiency affecting the agent economic decisions and introducing an extreme suggestion, such as the famous zero rate for the top earners (Slemrod, 1990). Nonetheless, these conclusions became less extreme when other factors were included in the analysis. For example, Stern (1976) introduces the inequality aversion in the society and the level of revenue required by the government, which promotes the introduction of a higher level of taxation at the top of the distribution. Saez et al (2009) point out the design of tax system has to take into account the avoidance response by taxpayers. According to this view, unfavorable tax changes spur taxpayers to try to adjust their taxable income in order to pay less. Obviously, the capacity for taxpayers to introduce changes in income reported is mostly related to the opportunity allowed by tax codes.

[6] For each decile, the average effective tax rate is given by the ratio of the tax paid on total income from primary and secondary occupations.

In the last period, several analyses demonstrate the weakness of the results emphasized by the supply side economists introducing income uncertainty (Dahan and Strawczynski, 2000) or imperfection in the functioning of the labour market (Petretto, 2009). For example, a non - linear tax schedule levied on labour income could generate a positive effect on employment reducing wage in the presence of imperfection such as search frictions etc. (Sørensen, 1999). More broadly, Piketty et al. (2011) define three possible taxpayer responses to changes in taxation: labour supply changes, avoidance behavior and bargaining effects. Assuming imperfection in the functioning of the labour market, the bargaining effect refers to the gap between the difference in pay perceived by top earners and their marginal economic product due to their relative bargaining powers. In this context, a high tax rate on top earners reduces their bargaining power. Thus, contrary to previous results, Piketty et al. (2011) argue that elasticity referred to tax avoidance response is small considering the long-term and a broad definition of taxable income, while bargaining elasticity is higher than that of labour supply. Consequently, the top tax rate should be higher than that estimated by supply side economists.

In the same way, other authors emphasize other roles of taxation. For example, Buchholz and Peters (2007: 3) argue that "the equal sacrifice principle requires that taxation should lead to the same (absolute or relative) loss of utility for everyone". Satisfying both the principles of ability-to-pay and benefits, they consider that tax payment is correlated to the benefits derived from the supply of public goods. Thus, the progressivity of taxation is justified if the benefits for people in the top deciles are higher than those of taxpayers in the bottom deciles. Indeed, it is possible demonstrate the validity of this condition in several situation. "For instance, public protection of private property against theft or destruction is more valuable to taxpayers who actually own property. A better educated labour pool disproportionately benefits owners of capital" (Chen, 2012: 19 – 20).

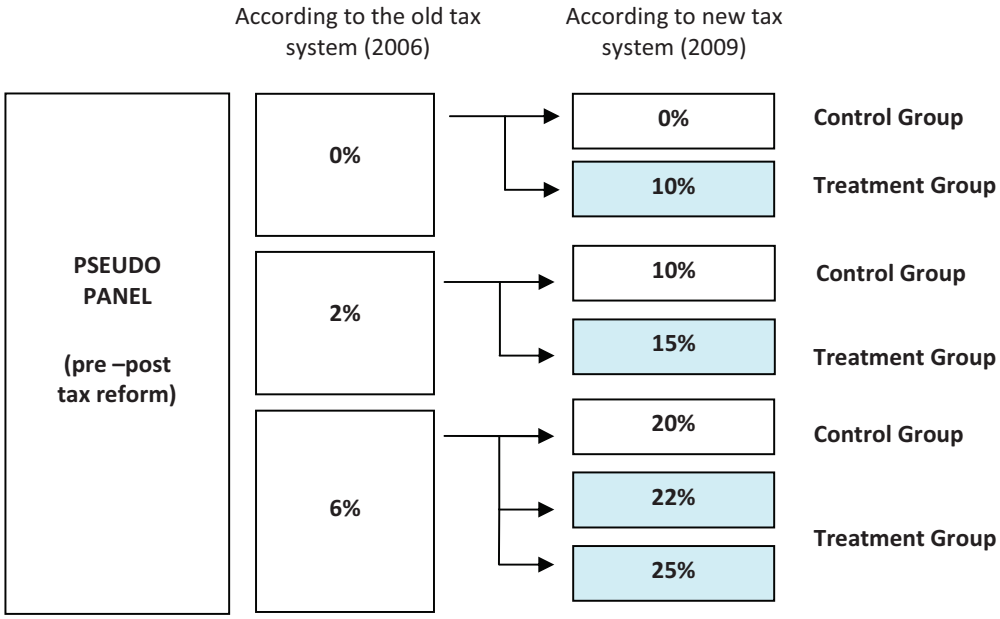
In addition, we also have to consider people's perception of tax system fairness. A taxpayer could consider tax paid to be unfair not only in relation to the quantity and quality of services supplied by the state, but also comparing their situation to that of other taxpayers. In a context of a growing demand for equity, Fleurbaey and Maniquet (2006: 1) argue that "redistribution through an income tax usually entails distortions of incentives, but the resulting efficiency loss has to be weighed against potential improvements in the fairness of the distribution of resources".

(i) Methodology. Our analysis tries to compute the efficiency impact of the reform by using both information for the pre and post - reform period. The initial assumption is that the repercussions of the 2007 tax reform on workers' economic conditions are different even though the same workers were in a similar tax situation before the reform. Thus, we seek to investigate if the taxpayers who experience greater changes (hereafter treatment group) reduce their labour supply more than other taxpayers (control group).

For this purpose, we take advantage of the fact that the pre-reform tax system was constituted by only three tax brackets, in contrast to the post tax reform which consists of six tax brackets. Thus, we first focus on people who did not pay taxes in the pre-reform period. Considering also that the reform changed the definition of taxable income covering more revenue sources, we include the new taxpayers in the treatment group and citizens who continue not to pay in the control group (Figure 2).

In addition, we consider two other sub-samples starting from the corresponding tax brackets in 2006: the second sub-sample is composed of people who paid a rate of 2 per cent; the third is composed of taxpayers who paid a rate of 6 per cent (Figure 2). Concerning the second sub-sample, the most obvious choice for the treatment group is all those individuals who pay a rate of 15 per cent, while in the third sub-sample, we include in the treatment group those taxpayers who pay more than 20 per cent.

Figure 2. Treatment vs Control Group in Different Sub-samples



Source: author's elaboration

Nonetheless, all the previous operations are not sufficient to remove the potential bias in our measurements due to the lack of the counterfactual situation. In order to tackle this problem, we use a matching estimation technique which allows us to match "quasi – identical" observations in the two groups (treatment and control group) reproducing in the same way an experimental background (Blundell and Costa Dias, 2009).

This technique follows two main stages. Firstly, pseudo-individuals are sorted according to the propensity score which defines the probability (measured by a standard probit model) that the pseudo-individual will be affected more dramatically by the reform given a set of similar observed covariates. The variables introduced in the regression are the following: the worker's gender, the

year of birth and some dummies in order to account for the difference between rural and urban areas, skilled and unskilled workers.

Following this, we use the 'nearest neighbour matching' in order to define the pseudo-individual in the control group which could be suitably matched to a pseudo-individual in the treatment group using the closest propensity scores (Caliendo and Koepening, 2005).[7] Finally, the pseudo - panel structure allows the use of a difference-in-differences (DID) technique to assess the effect of tax rate changes on labour supply in the two groups.

Regarding outcomes on interest, the empirical literature focuses on how workers respond to changes in the tax system. In particular, "individuals can adjust their labour supply along two margins, i) by deciding to participate to the labour market (extensive margin), and ii) by deciding on the duration of the working time (intensive margin). Although labour supply effects on the extensive margin tend to be more important (Heckman, 1993) it is necessary to study the intensive margin as well when analysing the labour supply behaviour" (Blundell et al, 2006: 1). Considering the information reported directly by survey's respondents, we can easily test the efficiency effect of the Uruguay tax reform on the intensive (variation in the hours worked in the formal sector) but not on the extensive margin (variation on the labour supply in the formal sector) due to the aggregation of individual information on cohorts.

(ii) Results. Table 3 reports the changes in the hours worked (during the last week) for the period 2006 - 2009. The main result is that tax changes – and thus the increase of tax payments - did not generate a labour supply contraction, as supposed by the supply side economists.

For the first sub-sample, there is a reduction in the hours worked. However, the reduction for taxpayers who start to pay taxes in the post reform period is less dramatic than for taxpayers who do not pay taxes (+0.6). Yet the result is not statistically significant (Table 3). A similar result refers to the sub-sample constituted by taxpayers who paid a tax rate of 2 per cent in 2006. Those in the treatment group work 0.4 hours less than in the pre-reform period, while taxpayers in the control group work 0.2 hours less than in the previous period. Although the treated group works fewer hours than the control group this difference is negligible and again is not statistically significant (Table 3). Finally, in the case of a taxpayer who paid a tax rate of 6 per cent in 2006, the change in hours worked is again negative for the treatment group (-1.2) and especially for the control group (-2.3), but in this case too it is not statistically significant (Table 3).

Table 3. Change in Hours Worked (during the last week) between 2006 and 2009

	T	C	DID	T	C	DID	T	C	DID
Tax Rate – *Post Reform Period*	(10%)	(0%)		(15%)	(10%)		(22 – 25%)	(20%)	
Change in total hours worked	-0.5	-1.1	+0.6 (1.6)	-0.4	-0.2	-0.2 (0.8)	-1.2	-2.3	+1.1 (1.1)

Source: author's elaboration.

[7] For our purpose, we adopt the 4 Neighbour Matching Estimator, with replacement (i.e. pseudo individuals in the control group could be employed more than once for the matching).

Notes: DID defines difference between groups; C defines control group; T defines treatment groups. *, **, *** significant at 10, 5 and 1 per cent. Standard errors in parenthesis.

All in all, these results are very different to those of the supply-side economists and could be related to the presence of an inelastic labour supply or simply justified by the irrational behaviour of economic agents which face changes in the tax rate in a way unlike that predicted by the standard model, especially when the tax rate changes are modest. However, they are closer to the results coming from experimental analyses which emphasize the insensitivity of taxpayer to tax modifications (see for example Blackwell, 2007).

In addition - beyond the role of the labour supply elasticity - we can suppose the existence of different factors affecting the taxpayer's behaviour. For example, Stern (1976) introduces parameters such as inequality aversion to measure the optimal level of tax rate. As reported above, if income distribution is perceived as *unfair* by the majority of citizens according to their motivations and social values this motivates the call for a progressive taxation. Moreover, when it is perceived that an important share of personal income is due to corruption, connections and inheritance there will be more preferences for redistribution (Alesina et al, 2009). Indeed, successive waves of the Latinobarómetro in the early 2000s show that taxpayers had a growing aversion to inequality and the government's management of fiscal policy in Uruguay as well as in other Latin American countries (Cornia et al 2011).

Alternatively, human behaviour could be explained by other arguments as the existence of a 'fiscal exchange' between institutions and taxpayers. In a similar framework, citizens justify an increase in tax payments if they have at least the perception of an equal rise of the quantity and quality of the social services supplied by the state (Fjeldstad et al. 2009). Latinobarometro supports the conclusion that people's satisfaction with public services in Uruguay is greater than in other Latin American countries while the justification for avoiding taxation is the lowest in the region and decreasing with time.

In particular – in the Uruguayan case - the social and political metamorphosis suffered in the last decade has led to a renaissance and promotion of tax policy role. The processes of institutional consolidation together with citizens' increasing participation have allowed the government to implement a new tax reform without popular resistances. Thanks to a new "fiscal pact", people were more likely to accept a more progressive taxation without assuming unproductive behaviours as expected by the optimal taxation theory. Hence, this case study provides a challenging new conclusion offering an alternative scenario where efficiency could be achieved without sacrificing equity.

5. Conclusions

As reported above, the 1974 Uruguayan Tax Reform was without doubt one of the most emblematic examples of the so – called neoliberal revolution which influenced tax policy in many Latin American countries. Trying to reduce the tax burden and to use more indirect taxation, it was unable

to improve economic growth promoting at the same time a growing macroeconomic instability and income inequality. Thus the recent political changes and the increasing call for greater equity favoured the election success of the left-wing coalition *Frente Amplio-Encuentro Progresista-Nueva Mayoria*. As other Left-of-Centre (LOC) governments, the new Uruguayan left-wing regime follows a different strategy of development aiming at achieving a more equitable growth. To reach this goal a new tax reform based on a dual tax regime was implemented in 2007.

This paper has provided an impact evaluation of this reform on equity and efficiency extracting information from the *Encuesta Continua de Hogares* (ECH) for the years 2006 and 2009. The analysis shows that the new tax on labour income (IRPF) lowered inequality by 2 Gini points promoting the redistribution role of taxation also in middle income developing countries. In addition, the empirical results point out that the reform had not disincentive effects even though there was an increase of the workers' tax burden. Contrary to the supply side theory conclusions, the lack of a clear contraction in labour supply could be related to the presence of an inelastic labour supply or other arguments such as fiscal exchange.

All in all, our analysis contradicts the existence of a trade-off between equity and efficiency and thus the Uruguayan Tax Reform demonstrates that a successful development strategy could conciliate growth and equity.

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