Fiscal Policy and Income Distribution. Argentina 1995 – 2010(*) (**)

Walter Cont

FIEL – UNLP – UBA

walter@fiel.org.ar

Alberto Porto

UNLP – ANCE

alberto@depeco.econo.unlp.edu.ar

Abstract

This paper studies the effect of consolidate –national and provincial– fiscal policy in Argentina on income distribution, building a novel panel data for 1995-2010 considering the 24 jurisdictions and quintile groups within provinces. We allocate expenditures, taxes and transfers among provinces and among people within provinces, according to benefit and incidence principles, avoiding double accounting, and build three measures of income: ex ante, interim, and ex post (or extended) income. We find that i) personal income inequality increased between 1995 and 2002, and then reverted the trend; ii) the trends in income inequality have a parallel with the different macroeconomic regimes nested in the sample (convertibility between 1995 and 2001 and post convertibility since 2002); iii) the effect of fiscal policy is a reduction in the Gini coefficient of 6 points in 1995, 5 points in 2002 and 10 points in 2010; iv) the mix of instruments to redistribute income changed with time towards cash transfers and against in-kind expenditures; iv) provincial budgets contribute strongly to progressivity; v) social expenditure is the most important redistribution tool, but economic services have grown in size between sub-periods, pushed by government subsidies in energy and transport, and vi) the paper measures the distribution of budget but leave aside the distribution of results (e.g., expenditure performance).

JEL Code: H7, I3.

Fiscal Policy and Income Distribution. Argentina 1995 - 2010

I. Introduction

The aim of fiscal policy has changed in time according to the evolution of the theories of the state (see Musgrave, 1996). In the "services state" of Adam Smith, the main role of the state was to allow the proper functioning of the market economy by providing a legal system, protection to society from foreign aggressions, public works that –because of size– could not be provided by the private sector, and basic education for the poor. The tax principles according to benefit and ability to pay were assumed to coincide, so that the distributional impact of fiscal policy was –by assumption– neutral. Later on, especially since Second World War II, societies became fully aware of the differences in per capita income and life standards between rich and poor people and regions and were concerned about redistribution.[1] Since then, one of the functions of the government under the "welfare state" has been the reallocation of income which results from market forces.

The theoretical literature on the role of different levels of government on income redistribution put this function in the head of the central government (Musgrave, 1959; Oates, 1972). According to this point of view, allowing redistribution at sub-national level of government would be subject to two problems (Tresch, 2002). One arises from the mobility of people, as rich people have incentives to move to jurisdictions with lower taxes and poor people have incentive to move to jurisdictions with higher benefits. Migrations would tend to frustrate redistribution at the cost of a lower per capita income (this is the "competition problem"). Another problem –referred to as the "incompatibility problem"– would arise, even without mobility, when more than one level of government redistributes income if they target different beneficiary groups. In spite of these two problems, the experience from most countries shows that redistribution from sub-national fiscal budgets is important (see Sewell, 1996, and more recently Hoynes and Luttmer, 2012; Baicker, Clemens and Singhal, 2012; among others).[2] For Argentina, according to Cont and Porto (2014), provincial budgets are more important than the national budget as a tool for redistributing personal income, accounting for approximately 70% of the change in the Gini coefficient.

---

[1] See a recent review in Tanzi (2014).

[2] Prud´homme (1995) considers it hard to think of a country that carries out redistributive policies at sub-national level (p. 202), while Sewell (1995), in answer to Prud´homme (1995), finds it hard to think in one that does not. Hoynes and Luttmer (2012) estimate the total value (redistributive value and insurance value) that individuals obtain from state taxes and transfers. The insurance component increases with income while the redistribution component decreases with income. This way, citizens benefit one way – redistribution– or another –insurance–; and this could explain why mobility has not thwarted the tax-subsidy state policies. Under this explanation, there would be no the "competitive problem". Clemens and Singhal (2012) show that a significant share of state expenditures is destined to redistributive programs, but at the same time is strongly conditioned by federal transfers. Continuous interferences by the federal government have debilitated the forces of fiscal competition.

Another question concerns the relevant dimension of distribution: should the aim of fiscal policy be the regional distribution of income (called "horizontal distribution", from the central government to sub-national governments), the personal distribution (called "vertical distribution" from the central government to peoples), or both? In this regard, it is worth noting that this is not an outstanding distinction because *all* fiscal variables that redistribute among provinces do redistribute among people. Horizontal redistribution becomes vertical through provincial (or, for that matter, municipal) expenditures; meaning that redistribution is vertical. Hence, personal distribution of income should be the matter of concern, as the ultimate arguments included in the welfare function are individuals' utilities. Moreover, there is recognition of a possible failure in the regional distribution principle. In particular, it could be the case that regional redistribution could generate a result in which rich people from poor regions be subsidized by poor people from rich regions.

The empirical literature on the impact of fiscal policy on personal income distribution followed different, and mostly partial, approaches.[3] Concretely, papers analyze only a level of government, or focus on the incidence of the tax system or a subset of taxes, or analyze the incidence of total expenditure or a subset of expenditures (typically, social expenditure), or study the impact of inter-governmental transfers on income distribution (in many cases, focusing on destination of transfers, i.e., disregarding the source of funds considering that transfers are "*manna*", or in a few cases, correctly including the source of funds). Partial approaches may hide the full effect of fiscal policy and lead to incorrect policy results and recommendations.

This paper studies the effect of consolidate –national and provincial– fiscal policy in Argentina on income distribution, building a novel panel data for 1995-2010 considering the 24 jurisdictions (23 provinces and the City of Buenos Aires) and quintile groups within provinces (120 per year).[4] We allocate expenditures, taxes and transfers among provinces and among people within provinces, according to benefit and incidence principles, avoiding double accounting. Then, following the Reynolds-Smolensky approach (1977), assess progressivity of taxes and expenditures at both national and provincial levels of governments in Argentina. We study the evolution of three measures of income distribution: a) ex ante – which results from market forces; b) interim – which results from adding public cash transfers and subtracting direct taxes to a); and c) ex post (or extended) – which results from adding in-kind public goods and subtracting indirect taxes to b).

The results of the paper are summarized as follows: i) personal income inequality, increased between 1995 and 2002, and then reverted the trend; ii) the trends in income inequality have a parallel with two different macroeconomic regimes captured in the sample (convertibility between

---

[3] We omit a full literature review on the impact of fiscal variables on income distribution. The reader is referred to Cont and Porto (2014).

[4] At least for Argentina this is the first paper that measures the impact of consolidate fiscal policy on regional and personal income distribution for a long time span (see Cont and Porto, 2014, for a specific year).

1995 and 2001 and post convertibility since 2002); iii) the effect of fiscal policy is a reduction in the Gini coefficient of 6 points in 1995, 5 points in 2002 and 10 points in 2010; iv) the mix of instruments to redistribute income changed in time towards cash transfers and against in-kind expenditures; iv) provincial budgets contribute strongly to progressivity; v) social expenditure is the most important redistribution tool, but economic services have grown in size between sub-periods, pushed by government subsidies in energy and transport; and vi) the paper measures the distribution of budget but leave aside the distribution of results (e.g., expenditure performance).

The paper is organized as follows. Section II presents the methodology and data. Section III summarizes the economic and social situation in Argentina, as well as the main public finance statistics. Section IV shows the main results. Finally, Section V presents some conclusions and recommendations.

II. Methodology and data

II.1. Methodology

National budget, transfers and provincial budgets

Consider a province n with i households (labelled $n=1,…,N$ and $i=1,…,I,$ respectively). The national government collects revenues from taxes subject to sharing regimes (VAT, income taxes, excise taxes, etc.), labelled t_{cn}, of which retains a share β, and other non-shared taxes (e.g., taxes on exports), indexed with the subscript t_{on}, to finance national expenditure. National expenditures (g_N) are allocated by categories (k) and provinces (n), i.e., g_{Nkn}. Also, the national government allocates discretionary transfers among provinces (d_{dn}) with national funds.

The contribution of the province n to the revenue sharing regime is $a_n = (1-\beta) \, \Sigma_c \, t_{cn}$. Provincial governments receive transfers according to the revenue sharing regime (d_{rn}) and other discretional transfers (d_{dn}), which, together with provincial taxes (t_{sn}), finance provincial expenditures that are allocated in j categories, g_{Pjn}.

The national budget is

$$\sum_n \sum_k g_{Nkn} + \sum_n d_{dn} = \sum_n \{\beta \sum_c t_{cn} + \sum_o t_{on}\} \tag{1}$$

while province n's budget is

$$\sum_j g_{Pjn} = \sum_s t_{sn} + d_{rn} + d_{dn} \tag{2}$$

Impact of fiscal variables on personal distribution of income

Let m_{in} be the individual income before national and provincial fiscal policies (in this paper, we consider i as a quintile). The individual benefits from the national (provincial) budget depending on the distributional patterns of taxes and expenditures. Let national expenditure g_{Nkn} be distributed

according to weights γ_{ikn}, provincial expenditure g_{Pjn} be distributed with weights γ_{ijn}, national taxes t_{cn} and t_{on} be collected with weights τ_{icn} and τ_{ion}, and provincial taxes with weights τ_{isn}.[5]

Let c_{in} be the ex-post income of household (quintile) i in province n, which, by construction is,

$$c_{in} = m_{in} + \sum_k \gamma_{ikn}.g_{Nkn} + \sum_j \gamma_{ijn}.g_{Pjn} - \sum_c \tau_{icn}.t_{cn} - \sum_o \tau_{ion}.t_{on} - \sum_s \tau_{isn}.t_{sn} \quad (3)$$

or put more simply,

$$c_{in} = m_{in} + g_{iNn} + g_{iPn} - t_{iNn} - t_{iPn} \quad (4)$$

that is, the ex-post (extended) income is the ex-ante income plus national and provincial expenditures minus national and provincial taxes. It is clear from the description and equation (3) that both national and provincial governments affect personal income through the levels and mix of taxes and expenditures, as long as $c_{in} \neq m_{in}$. The measurement of the impact of fiscal policy on income distribution can be done as a standard comparative statics exercise between ex-ante and ex-post income distributions.

Note, in passing, that neither transfers nor shares of coparticipable taxes (β) appear in equation (4). They are subsumed in individual taxes or provincial expenditures, implying that regional redistribution turns out being part of personal redistribution.

Summary of the effects of fiscal variables on income distribution

The effects of national and provincial fiscal policies on personal income distribution are summarized as follows:

1. Incidence of national expenditures and taxes on quintile i: g_{iNn} and t_{iNn} (equations (3) and (4)).

2. Incidence of provincial expenditures, provincial taxes and national taxes on quintile i: g_{iPn} and t_{iPn} (equations (3) and (4)).

Household (quintile) i benefits from fiscal policy (at both levels of government) if $c_{in} > m_{in}$, which results from the interaction of national and provincial expenditures and taxes, and the revenue sharing regime.

Gini coefficient of income inequality

This paper uses the Gini coefficient of income inequality, and similar mathematical formulas for concentration curves (expenditures and taxes). This coefficient is calculated as

---

[5] Matrix T_{Nn} (i × c+o) summarizes the national tax weights; matrix B_{Nn} (i × k) summarizes national expenditures weights; matrix T_{Pn} (i × s) summarizes provincial tax weights and matrix B_{Pn} (i × j) summarizes provincial expenditures weights. In all the cases, the sum of the weights adds one.

$$G = 1 + \frac{1}{I} - 2\sum_{i=1}^{I}\frac{(I+1-i)y_i}{I^2 y^P} \tag{5}$$

where households are ranked from lowest to highest income. The number of income groups is $I=5$, given the division of population into quintiles (having pooled quintiles-province into quintiles-country); y is the ex ante, interim or the ex post income; and y^P is the average income of the unit under analysis.[6]

To assess the impact of fiscal policy on income distribution, we use the indicator proposed by Reynolds and Smolensky (1977). The application of this indicator to a particular jurisdiction is

$$RS_p = -\frac{t_N K t_N + t_P K t_P + g_N K g_N + g_P K g_P}{1 - t_N - t_P + g_N + g_P} \tag{6}$$

where t_N (t_P) is the national (provincial) tax effort; g_N (g_P) is the national (provincial) expenditure, all relative to income; Kt_N (Kt_P) is the Kakwani index of national (provincial) taxes (equal to the difference between the concentration of taxes and (5)); and Kg_N (Kg_P) is the Kakwani index of national (provincial) expenditures (equal to the difference between (5) and the concentration of expenditures). We allow for government surplus or deficits, i.e, $t_N + t_P \neq g_N + g_P$.

II.2. Data

The starting point is the level of provincial income, summarized in the Gross Geographic Product (GGP), with base 1993, published by Council of Federal Investment (CFI) until 2006 and then updated by regional drivers (there is a recent update of the national GDP, with base 2004, but information is incomplete to replace the series with base 1993). Distribution of income is reported in the Permanent Household Survey (PHS, *Encuesta Permanente de Hogares*), published by the National Bureau of Statistics (INDEC, *Instituto Nacional de Estadísticas y Censos*). Given that income declared in PHS includes transfers from the government to people (cash transfers, benefits, social security payments, etc.) and is net from direct taxation (personal income taxes, social security contributions, etc.), it is an interim income.[7] We subtract cash expenditures and add direct taxes to arrive to the ex-ante income. Per capita income is obtained from dividing income by population (source: INDEC). On the other hand, starting from interim income, we add in-kind expenditures and subtract indirect taxes to arrive to ex-post (or extended) income.

We allocate taxes and expenditures among quintiles, by making assumptions on weights (γ_{ikn}, γ_{ijn}, τ_{icn}, τ_{ion}, τ_{isn}). The construction of these weights is a challenge in itself. In the case of taxes, a distinction is made between direct taxes (on families' income and wealth), in which case taxes are

---

[6] We may underestimate inequality when we pool quintiles-provinces within quintiles-country (i.e., there is a level of within-inequality), but we do not explore it in this paper.

[7] Notice that we distinguish direct taxes from indirect taxes in a somewhat different way than standard public finance literature. In this paper "direct" means that it is deducted from the declared income by households. Thus, a direct tax such as property tax is considered an indirect tax in the classification used in this paper.

allocated based on tax affidavits and household surveys, and indirect taxes (on goods and services), in which case taxes are allocated on consumption, production or trade patterns. In the case of expenditures, the allocation across households depends on the type of expenditure. The allocation of cash expenditures among households is quite straightforward, but the allocation of public and quasi-public goods is complex, depending on assumptions on the use services (whenever information is available), or in proportion of income or/and population.[8]

These individual allocations must be consistent with national taxes collected from different provinces, national expenditures distributed among provinces (and groups of provinces), national transfers to provinces,[9] which, together with provincial taxes, finance provincial expenditures.

III. The case of Argentina

Table A.1 in Appendix A summarizes some social and economic indicators of Argentina corresponding to year 2010. Per capita income is over US$ 9,000, which increases to near US$ 11,000 in the groups of Advanced provinces and Low Density provinces and less than US$ 5,000 in the Intermediate and Lagged groups (with some disparities within groups). A similar qualitative relationship holds for social indicators such as Unsatisfied Basic Needs, while in other indicators (such as Human Development Index) it displays less heterogeneity.

Table A.2 in Appendix A summarizes evolution of national and provincial budgets (as percentage of GDP).[10] Total expenditure averaged 32% of GDP in the period 1995-2010, with a minimum of 27% in 2002 and 2004, and a maximum of 41% in 2010 (and continued growing ever since). A little more than half of this expenditure is exerted by the national government. Government revenues averaged 31% of GDP, with a minimum of 26% in 2002 and a maximum of 41% in 2010. The national government contributed between 75% and 80% of total revenues, transferring the provincial government about 30% of total revenues collected at the central level (26% through revenue sharing –22% in 2010– and 4% of discretionary transfers –8% in 2010–).

About one-third of net-of-debt-interests expenditures take the form of cash transfers or direct payments while two-thirds consist of in-kind public or quasi-public expenditure. There was a little

---

[8] The description of the allocation rules, which is too long to be presented in an Appendix, is being published in a working paper. See Schwartz and Ter-Minassian (2000) for criticisms on allocation rules.

[9] Transfers to provinces are currently conformed by resources from revenue-sharing regimes (coparticipation, education fund, services transfers, and a regional compensating fund); resources to fund social security systems (a percentage of VAT and personal assets); road, electricity infrastructure and housing funds (collected from taxes on liquid combustibles); a percentage of income tax destined to social works and the *Conurbano Fund*; specific funds (collected from taxes on personal assets and the *monotributo*); electricity fund; and non-automatic or discretionary transfers.

[10] Municipal budget is excluded because detailed information is unavailable. They represent 8% of total expenditure in Argentina. Nonetheless, they are indirectly considered in the analysis through the transfers from provinces to municipalities (which represent about half of municipal expenditures).

bias towards cash expenditure in 2002 and 2003 (reaching 37% of total expenditure) and it is possible that this share increased again after 2010.

On another hand, about two-thirds of net-of-debt-interests expenditure was assigned to social services, 10% to economic services and 23% to administration, defence, safety and justice. More recently, the increase in subsidies to consumers of energy and transport services changed these shares to 63.5%, 15.5% and 21% respectively.

Finally, government revenues were collected from production, consumption and transfer activities (50%), income and assets (38%) and other sources (12%). These shares have remained stable during the time sample; however, they hide shifts in individual taxes. For example, VAT, income tax, turnover tax and export tax accounted for 43% of total revenues during 1995-2001 and 52% of total revenues during 2003-2010. Between 1995 and 2010, income taxes and export taxes increased 3% of GDP each.

IV. Results

Figure 1 and Table 1 present the evolution of the Gini coefficients of inequality in income distribution for Argentina, between 1995 and 2010. The first index –Gini ex ante– measures (a simulated) income inequality arising from market forces, without government intervention. This is a fictional starting point since it is widely known that market forces must coexist with a minimum provision of public goods. Also, since we started from the real situation to construct the ex-ante distribution of income, we omitted effects that would arise from removing taxes and government transfers (i.e., consumers finding other sources of income, adjusting consumption, etc.). The second index –Gini interim– measures income inequality after adding government cash expenditures (transfers and payments to households) to, and subtract corresponding taxes (referred to as "direct taxes") from, ex ante income. This is the income that households report in households surveys (like the Permanent Household Survey in Argentina). The third index –Gini ex post– adds to actual income a residuum coming from provision of in-kind public and quasi-public goods (education, health, etc.) and subtracts indirect taxes, which results in a measure of extended income.

As it was already shown in other papers, income inequality, as declared by surveyed households, increased between 1995 and 2002, then reverted the trend, although with a specific interruption in 2009 (see, for example, INDEC, 2015, Gasparini, 2006, and Gasparini and Cruces, 2009).[11] The evolution of the other two Ginis (ex ante and ex post) is qualitatively similar to that of the Gini interim.

---

[11] There may be differences in levels of inequality among the references and the figures reported here, which derive from different universe of households, pooling of income groups, computation methodologies, etc., but trends do not differ.

Figure 1. GINI ex ante (market forces); Gini interim (cash transfers and direct taxes), Gini ex post (public provision, indirect taxes)
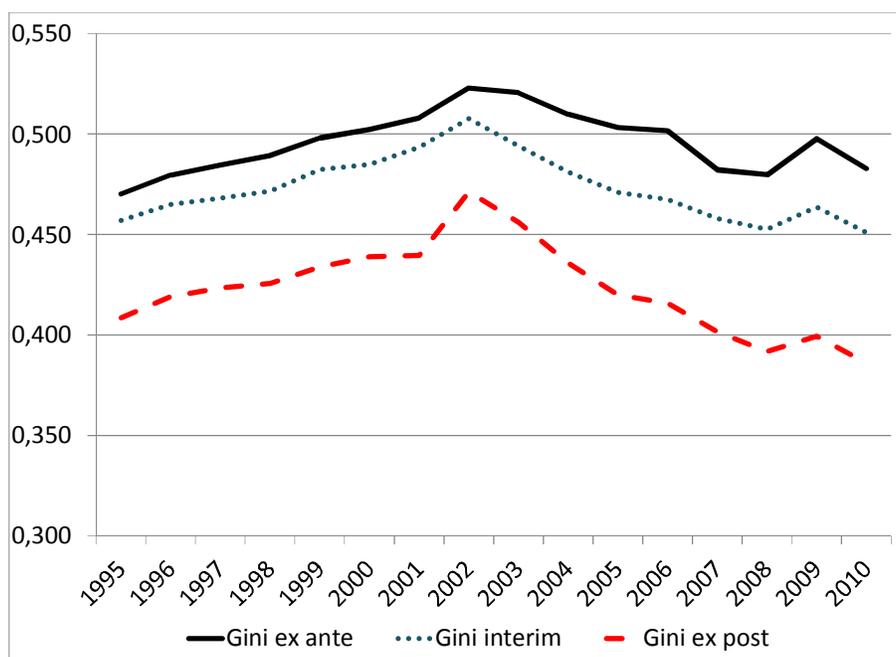
Table 1. GINI ex ante (market forces); Gini interim (cash transfers and direct taxes), Gini ex post (public provision, indirect taxes)

Ginis	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Gini ex ante	0,470	0,480	0,485	0,489	0,498	0,502	0,508	0,523	0,521	0,510	0,503	0,502	0,482	0,480	0,498	0,483
Gini interim	0,457	0,465	0,468	0,472	0,482	0,485	0,494	0,508	0,494	0,481	0,471	0,467	0,458	0,452	0,464	0,451
Gini ex post	**0,409**	**0,419**	**0,423**	**0,426**	**0,434**	**0,439**	**0,439**	**0,471**	**0,456**	**0,436**	**0,420**	**0,416**	**0,402**	**0,392**	**0,400**	**0,386**

The Gini ex ante increased from 0.470 in 1995 to 0.523 in 2002 (0.05 worse than 1995) and to 0.483 in 2010 (0.01 worse than 1995). The Gini interim increased from 0.457 to 0.508 in 2002 (0.05 worse than 1995) and decreased to 0.451 in 2010 (0.01 better than 1995). The Gini ex post increased from 0.409 in 1995 to 0.471 in 2002 (0.06 worse than 1995) and decreased to 0.386 in 2010 (0.02 better). The effect of fiscal policy is a reduction in the Gini of 6 points in 1995, 5 points in 2002 and 10 points in 2010. Moreover, in year 2002 (last macroeconomic crisis in Argentina), fiscal policy barely compensated the inequality in 1995 (i.e., the Gini ex post in 2002 –0.471– was almost the same as the Gini ex ante in 1995 –0.470–).

In order to interpret the effect of fiscal policy (in this case, the difference between Gini coefficients) we perform a Reynolds-Smolensky decomposition.[12] Figure 2 and Table 2 show the evolution of *RStrasnfers* (which measures the change from Gini ex ante to Gini interim) and *RSinkind* (which measures the change from Gini interim to Gini ex post).[13] Therefore, the difference between Ginis ex ante and ex post income corresponds to the sum of *RStransfers* and *RSinkind*.

Figure 2. Progressivity of expenditures (transfers, in kind) and taxes (to finance transfers, to finance in kind expenditures)
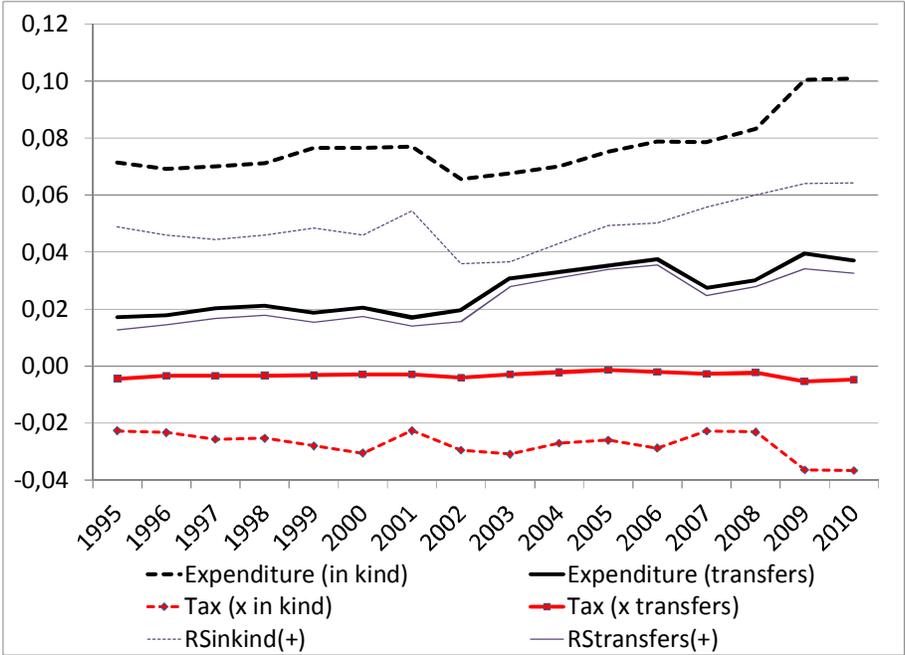
Observations: each line measures the contribution of expenditure (Kg * g) and taxes (Kt * t) Both *RSinkind* and *RStransfers* are positive-definite in this Figure and Table 2.

The mix of instruments to redistribute income changed with time: during the first years of the sample the ratio RStranfers / (RStransfers + RSinkind) was less than 25%; this ratio reached a maximum of 42% in 2003, then decreased to a 33% between 2008 and 2010. The intensity in the

---

[12] Given the way we pool quintiles in provinces into national quintiles, the reordering effect from consolidate budget is almost null (see Aronson and Lambert, 1994). We will discuss this effect in a companion paper.

[13] Alejo, Bérgolo and Carbajal (2013) decompose income distribution by the contribution of different sources of income (private and public, and social security, government transfers and others within public sources) in Argentina, Chile and Brazil during the decade of 2000s. The progressive results for Argentina coincide with those in this paper. While they concentrate on the different sources of income, the main difference with this paper is that we include revenues and expenditures –both cash and in kind–, consider national and provincial governments, and decompose effect among groups of provinces (and among provinces, forthcoming); but we pool some sources of income, which are analyzed separately in their paper.

use of instruments tilted towards cash transfers and against in-kind expenditures. The mix effect has two consequences. On the one hand, it creates dependence by cash-recipients, not only a financial dependence but also a political dependence, favoring clientelism. On the other hand, it is far from the most efficient tool to correct income distribution, because X pesos in transfers are spent in current consumption, while X pesos spent as in-kind public good (schools, transport infrastructure, hospitals, urban infrastructure, justice, water and sanitation, etc.) benefits large groups of recipients, during a long-time period. Of course, there may be exceptions (such as the years following the 2002 crisis) in which a temporary tool of monetary transfers may be justified.

Table 2. Progressivity of expenditures (transfers, in kind) and taxes (to finance transfers, to finance in kind expenditures)

Ex ante vs Ex post	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Kg(transfers)	0,194	0,195	0,239	0,236	0,207	0,218	0,186	0,220	0,328	0,351	0,380	0,400	0,287	0,304	0,339	0,304
g(transfers)	0,089	0,092	0,085	0,090	0,091	0,094	0,091	0,090	0,094	0,094	0,093	0,094	0,096	0,099	0,117	0,122
Transfers	**0,017**	**0,018**	**0,020**	**0,021**	**0,019**	**0,020**	**0,017**	**0,020**	**0,031**	**0,033**	**0,035**	**0,038**	**0,028**	**0,030**	**0,040**	**0,037**
Kg(in kind)	0,366	0,375	0,396	0,399	0,407	0,419	0,428	0,432	0,411	0,412	0,404	0,405	0,381	0,373	0,400	0,380
g(in kind)	0,195	0,185	0,177	0,178	0,188	0,183	0,180	0,152	0,164	0,170	0,186	0,195	0,206	0,223	0,251	0,265
G in kind	**0,071**	**0,069**	**0,070**	**0,071**	**0,077**	**0,077**	**0,077**	**0,066**	**0,068**	**0,070**	**0,075**	**0,079**	**0,079**	**0,083**	**0,100**	**0,101**
Kt(x transfers)	-0,061	-0,053	-0,058	-0,056	-0,056	-0,049	-0,054	-0,071	-0,051	-0,036	-0,024	-0,030	-0,034	-0,029	-0,056	-0,045
t(x transfers)	0,073	0,064	0,059	0,059	0,058	0,061	0,053	0,057	0,058	0,059	0,059	0,066	0,078	0,080	0,097	0,104
T x transfers	**-0,004**	**-0,003**	**-0,003**	**-0,003**	**-0,003**	**-0,003**	**-0,003**	**-0,004**	**-0,003**	**-0,002**	**-0,001**	**-0,002**	**-0,003**	**-0,002**	**-0,005**	**-0,005**
Kt(x in kind)	-0,124	-0,129	-0,137	-0,137	-0,158	-0,167	-0,149	-0,168	-0,143	-0,111	-0,113	-0,122	-0,099	-0,094	-0,146	-0,129
t(x in kind)	0,182	0,180	0,188	0,185	0,177	0,183	0,151	0,176	0,217	0,243	0,230	0,236	0,232	0,246	0,250	0,283
T x in kind	**-0,023**	**-0,023**	**-0,026**	**-0,025**	**-0,028**	**-0,030**	**-0,023**	**-0,030**	**-0,031**	**-0,027**	**-0,026**	**-0,029**	**-0,023**	**-0,023**	**-0,036**	**-0,037**
RStransfers(+)	**0,013**	**0,015**	**0,017**	**0,018**	**0,015**	**0,017**	**0,014**	**0,016**	**0,028**	**0,031**	**0,034**	**0,036**	**0,025**	**0,028**	**0,034**	**0,032**
RSinkind (+)	**0,049**	**0,046**	**0,044**	**0,046**	**0,049**	**0,046**	**0,054**	**0,036**	**0,037**	**0,043**	**0,049**	**0,050**	**0,056**	**0,060**	**0,064**	**0,064**

The trends depicted in Figure 1 have a parallel with the different macroeconomic regimes nested in the sample (convertibility between 1995 and 2001 and post convertibility since 2002). From a macroeconomic perspective, the period between 1991 and 2001, known as the *90s* decade, was characterized by an economy with an exchange rate pegged to the U.S. dollar subject to the Convertibility Law, strict monetary rules, but lax fiscal rules that ended in deficits during the second half of the decade and a social and economic crisis by the end of 2001. After the critical year of 2002, the next eight years were characterized by an expanding economy exposed to very favorable external conditions, a fixed exchange rate albeit free from the constraints imposed by the Convertibility Law, and more flexible monetary and fiscal environments (see Figure 3).

Given these differences, Table 3 summarizes the Gini coefficients and decompositions corresponding to sub-periods 1995-2001 and 2003-2010. The results in this Table are useful to strengthen the explanations of the increasing share of cash expenditures after 2002 (36% of progressivity effect in 2003-2010 vs 25% in 1995-2001), and also of progressivity (RS of -0.084 vs -0.063), given a quite similar ex ante distribution of income (Gini of 0.497 vs 0.490).

Figure 3. Evolution of the consolidate (national and provincial) fiscal balance (% of GDP) and per capita GDP (in thousands of constant Pesos of 2010)

GDP per capita ('000 Pesos of year 2010)
--•-- Consolidate fiscal balance (+ surplus / - deficit)
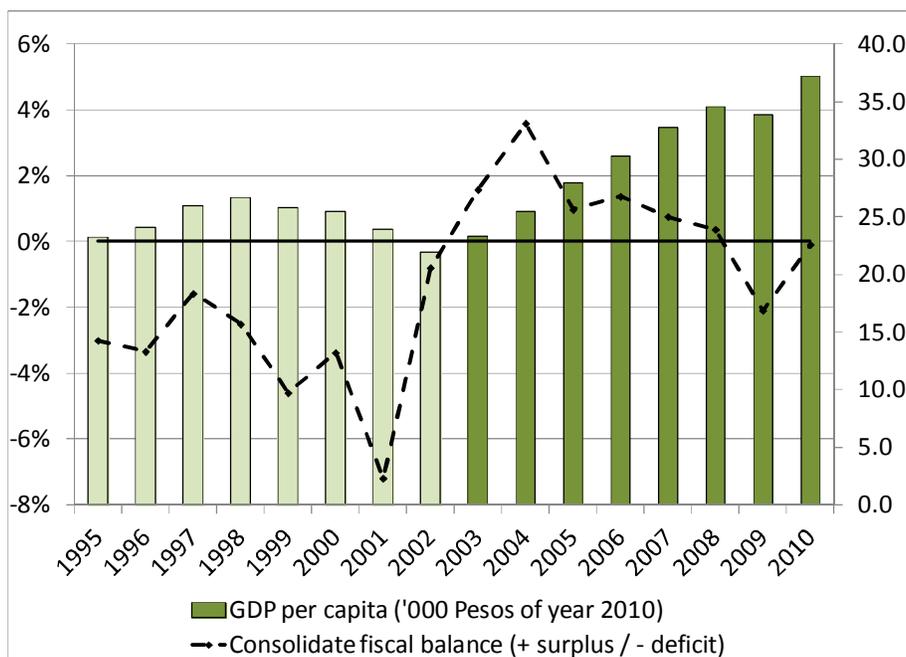
Table 3: Summary of RS effects: Argentina. Average 1995-2010 and sub-periods 1995-2001 and 2003-2010.

	Gini and Reynolds-Smolensky coefficients					Relationships	
	Gini ex ante	RS (cash)	Gini interim	RS (in kind)	Gini ex post	Gini ep / Gini ea	RS cash / (RS cahs+kind)
1995-2010	**0.496**	**-0.023**	**0.473**	**-0.050**	**0.423**	**85%**	**31%**
1995-2001	0.490	-0.016	0.475	-0.048	0.427	87%	25%
2003-2010	0.497	-0.030	0.467	-0.054	0.413	83%	36%

Next, we proceed with the analysis along two lines: the contribution of national budget and provincial budget to progressivity and the contribution of selected instruments to progressivity.

Table 4 summarizes the contribution of national and provincial budgets to progressivity (see also Figures A.1 and A.2 in Appendix A). The average progressivity of 0.073 (-0.063 in 1995-2001 and -0.084 in 2003-2010) is the result of progressive expenditure (0.104 in average, 0.092 in 1995-2001 and 0.116 in 2003-2010) and regressive taxation (approximately -0.03 in average and in the corresponding sub-periods). Provincial expenditure accounts for 66% of expenditure progressivity (68% in 1995-2001 and 65% in 2003-2010). On the other hand, national revenues explain regressive taxation, while provincial taxes contribute very little. Also, provincial expenditures are more progressive than national expenditures: the Kakwani coefficient averaged 0.481 in the first

case and 0.237 in the second case (because education and health represent a high share of provincial expenditure while cash payments represent a lower share of national expenditure). Finally, Figures A.1 and A.2 in the Appendix show an increasing progressivity of public policy, which is due to progressivity in expenditures, both at the national and provincial levels (slightly compensated by regressive taxes). The fact that provincial budgets contribute to progressivity was already noticed by Cont y Porto (2014) concerning year 2004, which we extend to the whole period of analysis.

Table 4. Reynolds-Smolensky: National and Provincial budgets

Ex ante vs Ex post	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
g	0,089	0,087	0,090	0,092	0,095	0,097	0,094	0,085	0,098	0,103	0,111	0,116	0,106	0,113	0,140	0,138
g_N	0,031	0,030	0,030	0,029	0,028	0,030	0,026	0,028	0,036	0,039	0,040	0,043	0,033	0,036	0,049	0,049
Kg_N	0,203	0,205	0,229	0,218	0,201	0,217	0,200	0,233	0,272	0,294	0,290	0,306	0,222	0,220	0,255	0,232
$g_N/(1-t+g)$	0,150	0,148	0,132	0,134	0,139	0,136	0,128	0,120	0,134	0,132	0,137	0,141	0,149	0,162	0,192	0,212
g_P	0,058	0,057	0,060	0,063	0,067	0,067	0,069	0,057	0,062	0,064	0,071	0,073	0,073	0,078	0,091	0,089
Kg_P	0,436	0,443	0,463	0,472	0,480	0,482	0,478	0,473	0,497	0,486	0,498	0,496	0,478	0,485	0,518	0,506
$g_P/(1-t+g)$	0,133	0,128	0,130	0,134	0,140	0,140	0,143	0,121	0,125	0,132	0,142	0,148	0,153	0,160	0,175	0,176
t	-0,027	-0,027	-0,029	-0,029	-0,031	-0,033	-0,026	-0,034	-0,034	-0,029	-0,027	-0,031	-0,026	-0,025	-0,042	-0,041
t_N	-0,022	-0,020	-0,022	-0,022	-0,024	-0,025	-0,018	-0,024	-0,024	-0,020	-0,018	-0,021	-0,019	-0,018	-0,032	-0,033
Kt_N	-0,118	-0,113	-0,124	-0,122	-0,141	-0,145	-0,127	-0,142	-0,117	-0,086	-0,084	-0,093	-0,078	-0,072	-0,121	-0,109
$t_N/(1-t+g)$	0,190	0,179	0,177	0,177	0,168	0,175	0,140	0,170	0,204	0,230	0,218	0,229	0,238	0,248	0,264	0,303
t_P	-0,005	-0,006	-0,007	-0,007	-0,008	-0,008	-0,008	-0,009	-0,010	-0,009	-0,009	-0,009	-0,007	-0,007	-0,010	-0,008
Kt_P	-0,073	-0,099	-0,104	-0,107	-0,112	-0,117	-0,120	-0,148	-0,142	-0,131	-0,129	-0,128	-0,096	-0,096	-0,117	-0,099
$t_P/(1-t+g)$	0,065	0,065	0,069	0,066	0,067	0,068	0,065	0,064	0,071	0,071	0,071	0,074	0,072	0,078	0,083	0,084
RSp	-0,062	-0,060	-0,061	-0,064	-0,064	-0,064	-0,069	-0,052	-0,065	-0,074	-0,083	-0,086	-0,081	-0,088	-0,098	-0,097

Back to Table 2 and Figure 2, notice the increasing role of cash transfers, both in progressivity (the Kg coefficient increases from 0.211 in 1995-2001 to 0.337 in 2003-2010) and size (the size coefficient increases from 0.09 in 1995-2001 to 0.10 in 2003-2010) in the execution of government budgets. Instead, the importance of in-kind expenditures comes from size (the size coefficient increases from 0.184 in 1995-2001 to 0.208 in 2003-2010) rather than progressivity (the Kg coefficient changes from 0.399 in 1995-2001 to 0.396 in 2003-2010). Both direct and indirect taxes become less regressive: the Kt coefficient of direct taxes (Kt x transfers) changes from -0.055 in 1995-2001 to -0.038 in 2003-2010) and the Kt coefficient of indirect taxes (Kt x in kind) increases from -0.143 in 1995-2001 to -0.119 in 2003-2010). But this effect is compensated by an increase in the tax levels, from 17.8% of GDP in 1995-2001 to 24.2% of GDP in 2003-2010 for indirect taxes (from 6.1% to 7.5%, respectively, for direct taxes).

A final aggregate comparison concerns the expenditure functions and sources of taxes. Table A.3 and Figure A.3 in the Appendix show the RS decomposition between expenditures, distinguishing social services, economic services, and administration-safety and justice (administration, in short), and taxes, distinguishing between production-consumption-transactions, income-assets and others. As expected, social expenditure (Kg averaging 0.396, being 0.360 in 1995-2001 and 0.430 in 2003-2010) is most important than economic services (Kg averaging 0.097, being 0.108 in 1995-2001 and 0.085 in 2003-2010). However, the size of economic expenditures almost doubled from

2.1% of GDP in 1995-2001 to 4% of GDP in 2003-2010, pushed by government subsidies in energy and transport (in these sectors consumption is more evenly distributed across population than in other sectors). On the other hand, taxes based on consumption and production increased from 11.4% of GDP in 1995-2001 to 16.7% of GDP in 2003-2010, mostly explained by increases in VAT and the introduction of export taxes; while taxes based on income and assets increased from 9% of GDP in 1995-2001 to 11.8% of GDP in 2003-2010. Again, sizes compensated the lower component of regressive taxation.

V. Conclusions

This paper analyzes the effect of consolidate (national-provincial) fiscal policy on personal income distribution during 1995-2010 with three Gini coefficients. The first index –Gini ex ante– measures (a simulated) income inequality arising from market forces, without government intervention. The second –Gini interim– measures income inequality after adding government cash expenditures (transfers and payments to households) to, and subtracting the corresponding taxes (referred to as "direct taxes") from, ex ante income. The third –Gini ex post– adds to actual income a residuum coming from provision of in-kind public and quasi-public goods (education, health, etc.) and subtracts indirect taxes, which results in a measure of extended income.

The *Gini ex ante* increased from 0.470 in 1995 to 0.523 in 2002 (0.05 worse than 1995) and to 0.483 in 2010 (0.01 worse than 1995). The *Gini interim* increased from 0.457 to 0.508 in 2002 (0.05 worse than 1995) and decreased to 0.451 in 2010 (0.01 better than 1995). The *Gini ex post* increased from 0.409 in 1995 to 0.471 in 2002 (0.06 worse than 1995) and decreased to 0.386 in 2010 (0.02 better). The effect of fiscal policy is a reduction in the Gini of 6 points in 1995, 5 points in 2002 and 10 points in 2010.

The mix of instruments to redistribute income changed with time. The intensity in the use of instruments tilted towards cash transfers and against in-kind expenditures. The "mix effect" has two consequences. On the one hand, it creates dependence by cash-recipients, not only a financial dependence but also a political dependence, favoring clientelism. On the other hand, it is far from the most efficient tool to correct income distribution.

The trends in income inequality have a parallel with the different macroeconomic regimes nested in the sample (convertibility between 1995 and 2001 and post convertibility since 2002). From a macroeconomic perspective, the period between 1991 and 2001, known as the *90s* decade, was characterized by an economy with an exchange rate pegged to the U.S. dollar subject to the Convertibility Law, strict monetary rules, but lax fiscal rules that ended in deficits during the second half of the decade and a social and economic crisis by the end of 2001. After the critical year of 2002, the next eight years were characterized by an expanding economy exposed to very favorable external conditions, a fixed exchange rate albeit free from the constraints imposed by the Convertibility Law, and more flexible monetary and fiscal environments.

The average progressivity of -0.073 (-0.063 in 1995-2001 and -0.084 in 2003-2010) is the result of progressive expenditure (0.104 in average, 0.092 in 1995-2001 and 0.116 in 2003-2010) and regressive taxation (approximately -0.03 in average and in the corresponding sub-periods). Provincial expenditure accounts for 66% of expenditure progressivity (68% in 1995-2001 and 65% in 2003-2010). National revenues explain regressive taxation, while provincial taxes contribute very little.

Finally, as expected, social expenditure is the most important redistribution tool. However, we notice the increasing role of economic services (which are less progressive than social services) in the post-convertibility sub period, pushed by government subsidies in energy and transport.

We alert of the importance of understanding the limitations of works that measure (partial or full) incidence of fiscal policy, which go beyond assumptions made to allocate expenditures and taxes among households. Typically, papers measure the distribution of budget but leave aside the distribution of results. For example, some papers have found pro-poor expenditures alongside pro-rich results (see Skinner and Zhou, 2006, and comment by Le Grand, 2006). Among other reasons, Dixon et al. (2007) find significant results from the substitution of low-quality public goods or services for high-quality private goods, differences in information of different groups and their control on the way services are provided (not only through "exit" as in the previous case, but also through "voice"), or the cost of complementary services (transport costs or indirect cost of forgone labor to receive health services, etc.).

Another example, concerning education in Argentina, is that expenditure in elementary and high-school education is pro-poor; however, performance results by public schools is significantly lower that performance by private schools. This is reflected, for example, in trend changes in school enrolment (83 out of 100 new students in elementary and high-school enrolled in private schools during 2003-2010; this ratio was 22 in 1996-2003), success rates (70 percent of enrolled students in private schools finish high-school; this rate is 27 in public schools), and geographic performance (40 percent of enrolled in CABA graduated from high school; 14 in Santiago del Estero); see CEA (2015).

Provincial budgets contribute strongly to progressivity. A direct conclusion from this result is the need to strengthen relationships between national government and provincial and municipal governments, and to improve efficiency in provision of services (complementing the potential negative results on performance).

References

Alejo, J., Bérgolo, M. and Carbajal, F. (2013), "Las transferencias públicas y su impacto distributivo: La experiencia de los países del Cono Sur en la década del 2000", *DT No 141*, CEDLAS, FCE-UNLP.

Aronson, J. and Lambert, P. (1994). "Decomposing the Gini coefficient to reveal the vertical, horizontal, and re-ranking effects of income taxation", *National Tax Journal*, 47:273-294.

Boletines del Centro de Estudios de la Educación Argentina (CEA) de la Universidad de Belgrano, Buenos Aires, varios números.

Cont, W. and Porto, A. (2014). "Personal and regional redistribution through public finance in a federal setting", The *Quarterly Review of Economics and Finance*, 54, 563-578.

Dixon A., Le Grand, J., Henderson, J., Murray, R. and Poteliakhoff, E. (2007). "Is the British National Health Service equitable? The evidence on socioeconomic differences in utilization", *Journal of Health Services Research & Policy*, 12:104-109.

Gasparini, L. (2006). "Las demandas distributivas y su impacto sobre los gobiernos locales", *9º Seminario de Federalismo Fiscal,* UNLP, IAE-Universidad Austral, Cippec and Senado de la Nación.

Gasparini, L. and Cruces, G. (2009). "A distribution in motion: the case of Argentina. A review of empirical evidence", *United Nations Development Programs;* Regional Bureau for Latin America and Caribbean.

Hoynes, H. and Luttmer, E. (2012). "The insurance value of state tax-and-transfer programs", *Journal of Public Economics,* 96:1110-1128.

INDEC (2015), "Evolución de la distribución del ingreso", Argentina.

Le Grand, J. (2006), "Comment on Skinner and Zouh, The measurement of health inequality", available on *urbanpolicy.berkeley.edu/pdf/Ch.7*

Musgrave, R.A. 1959. *The theory of public finance: A study in public economy*. McGraw-Hill. NY.

Musgrave, R. (1996). "The role of the state in fiscal theory". *International Tax and Public Finance*, 3:247-258.

Nuñez Miñana, H. (1972). "Indicadores de Desarrollo Regional en la República Argentina: Resultados Preliminares", Documento Interno Nº 10 del Instituto de Investigaciones Económicas, Universidad Nacional de La Plata. Republished in: Porto, A. (ed). *Finanzas Públicas y Economía Espacial*. Universidad Nacional de La Plata (1995). pp. 11-24.

Oates, W. (1972), Fiscal federalism, Harcourt Brace Jovanovich. USA. Versión en español del Instituto de Estudios de Administración Pública, Madrid, 1977.

Prud´homme, R. (1995). "The dangers of decentralization", *World Bank Research Observer,* 10:201-220.

Reynolds, M. and E. Somlensky (1977). *Public Expenditures, Taxes, and the Distribution of Income: The U.S., 1950, 1961, 1970*. New York: Academic Press.

Sewell, D. (1996). "The dangers of decentralization according to Prud´homme: Some further aspects", *World Bank Research Observer,* 11:143-150.

Skinner J. and Zhou, W. (2006). "The measurement and evolution of health inequality: Evidence from the U.S. Medicare population", in Auerbach, Card and Quigley (eds. 2006): *Public policy and income distribution,* Russell Sage Foundation, pp. 288-316.

Tanzi (2014): "Taxation and equitable economic development: A historical note", Conference on Hacia una nueva reforma tributaria", Fedesarrollo and Woodrow Wilson Center, Bogotá.

Tresch, R. (2002), Public Finance: A normative theory, Academic Press, San Diego.

Appendix A. Complementary Tables and Figures

Table A.1. Argentina. Regional indicators, 2010

|	Jurisdiction	Surface (sq km)	Population ('000)	Population density	GGP (million dollars)	Per capita GGP ('000 dollars)	Human Development Index (2011)	Unsatisfied basic needs
A	Buenos Aires	307,571	15,316	49.8	130,332	8,510	0.84	8%
A	City Bs As (CABA)	200	3,058	15,291.5	84,128	27,508	0.89	6%
A	Córdoba	165,321	3,397	20.5	26,671	7,852	0.86	6%
A	Mendoza	148,827	1,766	11.9	12,282	6,956	0.85	8%
A	Santa Fe	133,007	3,285	24.7	32,966	10,035	0.85	6%
A	**Advanced (5 prov.)**	**754,926**	**26,822**	**35.5**	**286,379**	**10,677**	**0.85**	**7%**
I	Entre Ríos	78,781	1,282	16.3	7,861	6,132	0.84	8%
I	Salta	155,488	1,267	8.2	5,006	3,950	0.83	19%
I	San Juan	89,651	715	8.0	3,293	4,605	0.83	10%
I	San Luis	76,748	457	6.0	3,020	6,611	0.83	8%
I	Tucumán	22,524	1,512	67.1	6,615	4,377	0.84	13%
I	**Intermediate (5 prov.)**	**423,192**	**5,233**	**12.4**	**25,794**	**4,929**	**0.84**	**12%**
LD	Chubut	224,686	471	2.1	5,854	12,436	0.85	8%
LD	La Pampa	143,440	341	2.4	1,823	5,338	0.86	4%
LD	Neuquén	94,078	565	6.0	7,780	13,764	0.86	10%
LD	Río Negro	203,013	604	3.0	4,790	7,933	0.85	9%
LD	Santa Cruz	243,943	234	1.0	3,767	16,092	0.87	8%
LD	Tierra del Fuego	21,571	134	6.2	2,551	19,081	0.88	14%
LD	**Low Density (6 prov.)**	**930,731**	**2,349**	**2.5**	**26,565**	**11,309**	**0.86**	**9%**
L	Catamarca	102,602	404	3.9	3,253	8,047	0.84	11%
L	Chaco	99,633	1,071	10.8	4,117	3,844	0.81	18%
L	Corrientes	88,199	1,036	11.7	4,259	4,112	0.83	15%
L	Formosa	72,066	556	7.7	1,919	3,453	0.81	20%
L	Jujuy	53,219	698	13.1	3,089	4,422	0.83	15%
L	La Rioja	89,680	355	4.0	1,526	4,294	0.83	12%
L	Misiones	29,801	1,111	37.3	7,402	6,660	0.82	16%
L	Santiago del Estero	136,351	884	6.5	3,340	3,781	0.81	18%
L	**Lagged (8 prov.)**	**671,551**	**6,116**	**9.1**	**28,905**	**4,726**	**0.82**	**16%**
	Argentina	**2,780,400**	**40,519**	**14.6**	**367,643**	**9,073**	**0.85**	**9%**
	(std. deviation)					0.64	0.03	0.51

Source: own elaboration based on INDEC Argentina (surface, population, and Unsatisfied Basic Needs), and United Nations (Human Development Index). Note: A: Advanced; I: Intermediate; LD: Low Density; L: Lagged.

Table A.2. National, provincial and consolidate budgets. Period 1995-2010. Values as % of GDP.

|	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
National Expenditure	17%	17%	15%	16%	18%	18%	18%	14%	15%	14%	16%	16%	17%	18%	22%	23%
Discretionary Transfers	0%	1%	0%	0%	0%	1%	0%	1%	1%	1%	1%	1%	2%	1%	2%	3%
Cash expenditure	7%	8%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	9%	10%
In-kind expenditure	8%	8%	7%	7%	7%	7%	7%	5%	6%	6%	7%	7%	8%	9%	11%	12%
Social services	11%	11%	10%	10%	10%	11%	10%	9%	9%	9%	9%	10%	10%	10%	13%	14%
Economic services	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	3%	4%	4%	5%
Administration, justice, defence	3%	3%	3%	3%	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	3%	3%
Debt interests	2%	2%	2%	2%	3%	4%	4%	2%	2%	1%	2%	2%	2%	2%	2%	2%
National Resources	16%	15%	14%	15%	15%	16%	14%	15%	17%	17%	18%	18%	19%	20%	23%	25%
Direct taxes	6%	5%	4%	5%	4%	5%	4%	4%	4%	4%	4%	4%	6%	6%	7%	8%
Indirect taxes	10%	10%	10%	10%	10%	12%	10%	11%	13%	14%	14%	14%	13%	15%	15%	17%
Production, consumption, transfers	6%	6%	6%	6%	6%	6%	6%	7%	9%	10%	9%	9%	10%	11%	10%	11%
Income, assets	7%	6%	6%	6%	6%	6%	6%	5%	6%	6%	7%	7%	8%	8%	9%	10%
Other	3%	2%	3%	2%	3%	4%	2%	3%	3%	1%	2%	2%	2%	2%	4%	4%
National Balance	-2%	-3%	-2%	-2%	-3%	-2%	-5%	0%	1%	3%	1%	1%	1%	1%	-1%	-1%
Provincial Expenditure	14%	14%	14%	14%	15%	15%	16%	13%	13%	13%	14%	15%	15%	16%	18%	18%
Cash expenditure	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	2%	3%	3%
In-kind expenditure	12%	11%	11%	12%	12%	12%	13%	10%	10%	11%	12%	12%	13%	13%	15%	15%
Social services	8%	8%	8%	8%	9%	9%	10%	8%	8%	8%	9%	9%	9%	10%	12%	11%
Economic services	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Administration, justice, defence	4%	4%	4%	4%	4%	4%	5%	4%	4%	4%	4%	4%	4%	5%	5%	5%
Debt interests	0%	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Resources - Provincial Budget	13%	13%	14%	13%	14%	14%	14%	12%	13%	14%	15%	15%	15%	16%	17%	18%
Provincial Resources	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	8%	9%	9%
Direct taxes	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%	2%
Indirect taxes	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	6%	5%	6%	6%	6%
Production, consumption, transfers	3%	3%	3%	3%	3%	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%
Income, assets	3%	3%	3%	3%	3%	3%	3%	3%	3%	2%	2%	3%	3%	3%	3%	3%
Other	1%	1%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Revenue-sharing regime	5%	6%	6%	6%	6%	6%	6%	5%	5%	6%	6%	6%	7%	7%	7%	7%
Direct taxes	0%	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Indirect taxes	5%	5%	5%	5%	5%	5%	5%	4%	5%	6%	6%	6%	6%	6%	6%	6%
Production, consumption, transfers	4%	5%	4%	4%	4%	4%	4%	3%	3%	4%	4%	4%	4%	4%	4%	5%
Income, assets	1%	1%	1%	2%	2%	2%	2%	1%	2%	2%	2%	2%	2%	2%	2%	3%
Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Discretionary transfers	0%	1%	0%	0%	0%	1%	0%	1%	1%	1%	1%	1%	2%	1%	2%	3%
Provincial Balance	-1%	0%	0%	-1%	-1%	-1%	-2%	-1%	0%	1%	0%	0%	0%	0%	-1%	0%
Consolidate Expenditure	31%	31%	29%	30%	33%	33%	35%	27%	28%	27%	30%	31%	32%	34%	40%	41%
Cash expenditure	9%	9%	9%	9%	9%	10%	10%	9%	9%	9%	9%	9%	10%	10%	12%	12%
In-kind expenditure	20%	19%	18%	18%	20%	19%	19%	15%	16%	16%	18%	19%	20%	22%	26%	27%
Social services	19%	19%	18%	18%	20%	20%	20%	17%	17%	17%	18%	19%	20%	21%	25%	25%
Economic services	3%	2%	2%	2%	2%	2%	2%	1%	2%	2%	3%	4%	4%	5%	5%	6%
Administration, justice, defence	7%	7%	7%	7%	8%	7%	7%	6%	6%	6%	6%	6%	6%	6%	8%	8%
Debt interests	2%	2%	2%	3%	4%	4%	5%	3%	2%	2%	3%	2%	2%	2%	3%	2%
Consolidate Resources	28%	27%	27%	28%	28%	30%	27%	26%	29%	31%	31%	32%	33%	35%	38%	41%
Direct taxes	8%	7%	7%	7%	7%	7%	7%	6%	6%	6%	6%	7%	8%	9%	11%	11%
Indirect taxes	20%	20%	21%	21%	21%	22%	20%	20%	23%	25%	25%	25%	25%	26%	27%	30%
Production, consumption, transfers	13%	13%	13%	14%	13%	13%	13%	13%	15%	17%	17%	17%	18%	19%	19%	20%
Income, assets	11%	10%	10%	11%	11%	11%	11%	9%	10%	11%	12%	12%	13%	13%	15%	16%
Other	4%	4%	4%	4%	5%	5%	4%	4%	4%	3%	3%	3%	3%	3%	5%	5%
Consolidate Balance	-3%	-3%	-2%	-3%	-5%	-3%	-7%	-1%	2%	4%	1%	1%	1%	0%	-2%	0%

Source: own elaboration based of public information on fiscal budgets.

Figure A.1. Reynolds Smolensky (total expenditure, total taxes). RS is defined "positive"
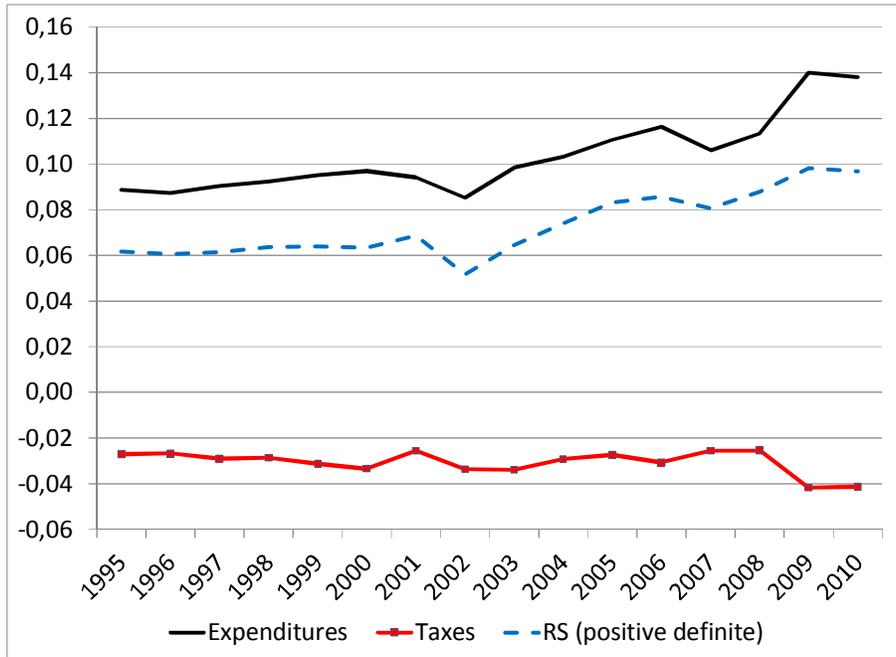
Observation: Expenditure (Taxes) measures the joint effect of size and progressivity g*Kg (t*Kt).

**Figure A.2. Progressivity of national and provincial expenditure, national and provincial taxes.**
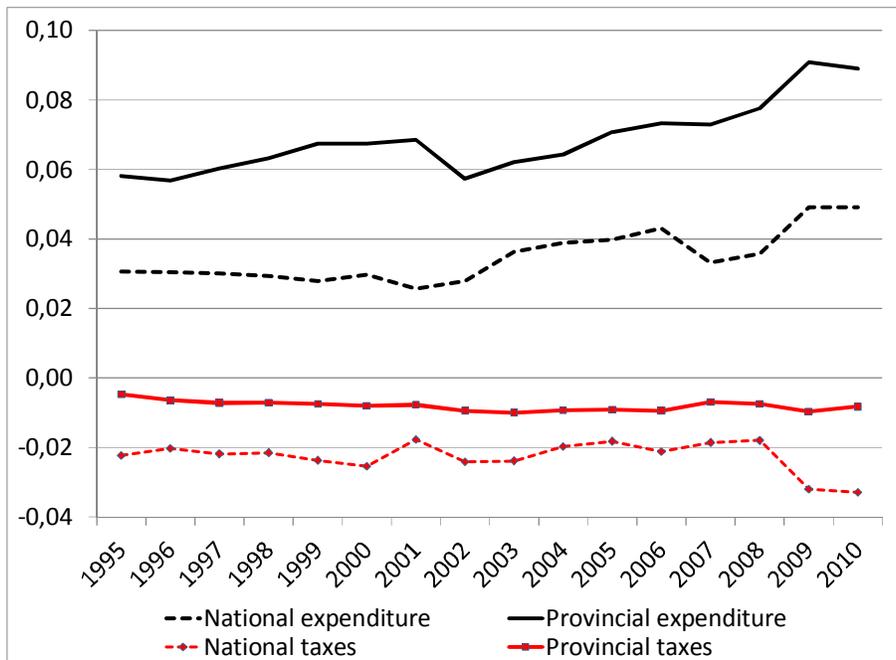
Observation: Expenditure (Taxes) measures the joint effect of size and progressivity g*Kg (t*Kt).

Table A.3. Progressivity of expenditures (social services, economic services and administration) and taxes (production-consumption-transactions, income-assets, others)

Ex ante vs Ex post	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Kg_(SS)	0,338	0,337	0,375	0,371	0,364	0,371	0,364	0,368	0,423	0,429	0,452	0,463	0,403	0,412	0,442	0,419
g_(SS)	0,186	0,184	0,175	0,179	0,187	0,190	0,188	0,171	0,174	0,175	0,181	0,189	0,197	0,207	0,240	0,246
Kg_(ES)	0,095	0,110	0,092	0,107	0,123	0,122	0,105	0,123	0,080	0,115	0,095	0,088	0,067	0,070	0,085	0,079
g_(ES)	0,025	0,024	0,022	0,022	0,020	0,018	0,017	0,013	0,024	0,025	0,034	0,036	0,042	0,051	0,050	0,060
Kg_(A)	0,321	0,330	0,351	0,354	0,345	0,354	0,357	0,359	0,377	0,392	0,397	0,402	0,378	0,379	0,383	0,369
g_(A)	0,073	0,068	0,065	0,066	0,072	0,068	0,067	0,057	0,061	0,064	0,065	0,064	0,063	0,065	0,077	0,082
Kt_(PCT)	-0,102	-0,111	-0,117	-0,122	-0,129	-0,127	-0,131	-0,120	-0,109	-0,102	-0,103	-0,109	-0,086	-0,075	-0,110	-0,094
t_(PCT)	0,117	0,122	0,122	0,120	0,110	0,110	0,099	0,119	0,145	0,168	0,157	0,162	0,165	0,177	0,170	0,193
Kt_(IA)	-0,035	-0,027	-0,030	-0,027	-0,033	-0,028	-0,034	-0,054	-0,034	-0,025	-0,018	-0,023	-0,022	-0,019	-0,044	-0,035
t_(IA)	0,100	0,091	0,088	0,092	0,088	0,092	0,080	0,080	0,095	0,109	0,107	0,113	0,121	0,121	0,134	0,148
Kt_(R)	-0,308	-0,346	-0,336	-0,366	-0,386	-0,405	-0,385	-0,438	-0,433	-0,375	-0,366	-0,376	-0,353	-0,358	-0,405	-0,392
t_(R)	0,038	0,031	0,036	0,031	0,037	0,042	0,026	0,034	0,034	0,025	0,025	0,028	0,024	0,028	0,043	0,046
RSp	-0,062	-0,060	-0,061	-0,064	-0,064	-0,064	-0,069	-0,052	-0,065	-0,074	-0,083	-0,086	-0,081	-0,088	-0,098	-0,097

Figure A.3. Progressivity of expenditures (social services, economic services and administration) and taxes (production-consumption-transactions, income-assets, others)

Observation: Expenditure (Taxes) measures the joint effect of size and progressivity g*Kg (t*Kt).