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PERSONAL AND REGIONAL. REDISTRIBUTION
THROUGH PUBLIC FINANCE. THE CASE OF
PROVINCIAL GOVERNMENTS IN ARGENTINA.

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The case of provincial governments in Argentina.

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Abstract

In a federal system, income distribution is affected by the decision of many public economic agents in at least two dimensions: personal and regional. Through public budgeting, and the interaction of expenditures and taxes, a subnational government typically affects the personal distribution of income, and also the regional distribution of income if the subnational budget is financed with national taxes, through revenue-sharing (coparticipation) regimes -because this regime redistributes tax revenues among provinces.

Most research in this field focuses on the impact of public budget on either personal or regional distribution of income. Very few papers integrate both effects. This paper studies the impact of provincial government budgets (which represent around 50% of total public expenditures, and around 60% of funds to finance them comes from revenue-sharing) on the distribution of income in Argentina using budget information for year 2004.

This paper reveals the importance of considering the impact of fiscal policy on income distribution at the provincial level, because effects are different by province. The aggregation of provinces hides inter-provincial effects because some province may finance or benefit from the revenue-sharing scheme. Taking this effect into consideration, we find that the progressiveness of subnational expenditures and taxes interact with the revenue-sharing regime, reinforcing progressivity in "net-receiving" provinces but creating a trade-off between progressivity and (negative) regional transfer in "net-financing" ones. In the latter provinces, however, the net effect of provincial budget is also progressive.

Resumen

En un sistema federal, la distribución del ingreso es afectada por las decisiones del gobierno (nacional, provincial, municipal) en al menos dos dimensiones: personal y regional. A través del presupuesto público, y de la interacción entre impuestos y gastos, las decisiones de un gobierno provincial impactan sobre la distribución personal del ingreso. Por su parte, la distribución regional del ingreso también se ve afectada si los presupuestos provinciales se financian con regímenes de transferencias desde la nación (por ejemplo, vía coparticipación de impuestos), porque estos regímenes redistribuyen recursos entre provincias.

La mayoría de los trabajos de investigación se concentran en el impacto del presupuesto público sobre la distribución personal o regional del ingreso separadamente, mientras que solo unos pocos integran ambos efectos.

Este paper analiza el impacto del presupuesto público provincial (que representa aproximadamente la mitad del gasto público consolidado, mientras que aproximadamente 60% de los recursos para afrontarlo provienen de regímenes de transferencias) sobre la distribución del ingreso en Argentina utilizando información presupuestaria del año 2004. El mismo revela la importancia de considerar el impacto de la política fiscal sobre la distribución del ingreso a nivel provincial, ya que los efectos difieren por provincia y la agregación de provincias esconde efectos interprovinciales (de provincias financiadoras a provincias receptoras netas). En las provincias receptoras netas la progresividad del presupuesto provincial se refuerza por el efecto (positivo) de las transferencias mientras en las jurisdicciones financiadoras se produce un trade-off entre progresividad y el efecto (negativo) de las transferencias. En este grupo, sin embargo, el efecto neto del presupuesto provincial es progresivo.

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PERSONAL AND REGIONAL REDISTRIBUTION THROUGH PUBLIC FINANCE.
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1. Introduction

In a federal system, income distribution is affected by the decision of many public economic agents in at least two dimensions: personal and regional. Through public budgeting, and the interaction of expenditures and taxes, a subnational government typically affects the personal distribution of income, and also the regional distribution of income if the subnational budget is financed with national taxes through a revenue-sharing (coparticipation) regime, because this regime redistributes tax revenues among provinces.[1]

Most research in this field focuses on the impact of public budget on either personal or regional distribution of income. Very few papers integrate both effects. Also, the approach to measure this impact has been diverse, using national budget, provincial budget (and, to a less extent, municipal budget) or the consolidated public sector budget.

This paper studies the impact of each provincial government budget on the distribution of income using budget information for year 2004.[2] Provincial expenditures represent around 50% of consolidated public expenditure in Argentina. Moreover, around 60% of funds to finance this expenditure come from revenue-sharing schemes, i.e., national taxes collected across the country. Starting from an assumption of balanced budget at the aggregate provincial level (total expenditure equals total collected revenue), each province may finance or benefit from the revenue-sharing scheme. An analysis that assumes regional aggregation necessarily hides inter-provincial effects, biasing conclusions in some direction.

In Porto and Cont (1998), the authors expressed that Kuznets' (1955) thoughts constituted a stimulus for additional research. In that paper, the authors concluded that "…the results are preliminary and ... the paper does not offer enough proved answers. Rather, it should be considered as a challenge and a demand for more and better data gathering, for more theoretical and empirical founded work. Taking into consideration the limitations of the paper, we believe that the qualitative direction of the results is correct and indicative of reality." (p. 285). In this paper, we come back to the issue with similar qualifications, and taking also into account Dalton's words (1929): "Those who are oppressed by a sense of difficulty of this calculus, should console themselves with the saying of the Ancient Greeks that 'it is not the easy things, but the difficult things, that are beautiful'." (p. 15).

The main results of the paper are summarized as follows. The positive distributive impact of subnational expenditures and taxes interact with the revenue-sharing regime, reinforcing progressivity in net-receiving provinces but creating a trade-off between progressivity and (negative) regional transfer in net-financing ones. In the latter provinces, however, the net effect of provincial budget is also progressive.[3] We test the results for different assumptions

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[1] It is assumed that there are no interjurisdictional fiscal externalities. Otherwise, in the cases of tax export or expenditure spillover, a subnational government would also affect the regional distribution of income directly.

[2] We approximate the solution to the impact of provincial fiscal policy on income distribution as the estimation, for each income group, of the income before and after fiscal policy, both at the same existing equilibrium.

[3] Even though this methodology is applied to provincial expenditures and taxes within a federal system, it can also be applied to the national budget. This is the subject of a forthcoming paper.

on tax burden and externalities from expenditures. In order to show these results we proceed as follows. In Section 2, we put the paper in context by reviewing the literature on fiscal policy and income distribution. In Section 3, we provide the basic definitions and the methodological framework. Section 4 and 5 present the main results and extensions. Finally, Section 6 concludes.

2. Brief review of the (large) literature

Income distribution has been, from both a theoretical and historical perspective, one of the most intense research areas in economics. Research has been divided in positive approach, i.e., the study of the laws of income distribution in a capitalist economy, and normative approach, i.e., the study of the instruments to modify such distribution following some value judgment. Rigorous analysis of the first approach dates from the beginning of the XIX Century, with Ricardo (1817) for whom "the principal problem of political economy was the determination of the laws governing the distribution of national income among the classes of society" (p. 5).[4] The Ricardian theory gave birth to two principles of income distribution: the "marginal principle" and the "surplus principle". The first principle is adopted by the Neoclassic School (see Hicks, 1932), and the second is adopted by the Marxist School (see Dobb, 1972).

Under the second and more recent approach, the relevance of income distribution in the research agenda was not as central as in the positive approach. In fact, this relevance depended on the nexus between the fiscal theory and the theory of the state, which evolved along two variants (Musgrave, 1996). The first one is the "service state", which establishes that the main role of the state is to allow the proper function of the market economy by providing a legal system, protection to society from foreign aggressions, public works that –because of size– cannot be provided by the private sector and the basic education to the poor. Since the tax principles according to benefits and ability to pay were assumed to coincide, the distributional impact of fiscal policy would be neutral.[5] The second variant is the "welfare state", aimed to correct the income distribution which results from market forces.[6] Several questions arose throughout the development of this variant.

A first question regarded the level of government that should be responsible for the income distribution task in a federal (multilevel) public sector: national, provincial or local, or all of them, in which case a second question would be how to share this responsibility. The early answer to both questions was clear. Musgrave (1959) and Oates (1972) concluded that the central theme of fiscal federalism is found in the proposition that the provision of services should be assigned among the different levels of government, but the stabilization and distribution branches should be concentrated at the national level.

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[4] Ricardo refers to the distribution among landowners, owners of capital and workers (p.5). The quote corresponds to the Spanish version (1973).

[5] This is Musgrave's (1996) interpretation of A. Smith. Many papers treated both principles separately. For a long time, attention tilted to the distribution of the tax burden according to ability to pay, independently from the benefit principle. Taking into consideration decreasing marginal utility, some papers found that tax rates should equate post-tax income (Edgeworth model of optimal income taxation; see Rosen, 1995).

[6] There is a third approach, that goes back to positive theory and considers a "flawed state" because, among other reasons, pursues the objective of bureaucrats and/or politicians that capture the fiscal apparatus fulfilling own goals rather than general interest (Brennan and Buchanan, 1977, 1978).

A third question regarded the relevant dimension of distribution: Should the aim of the public policy be the regional distribution of income, the personal distribution or both? The answer in this case was that personal distribution of income should be the matter of concern, because the arguments included in the welfare function are individuals' utilities. Moreover, there was 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.

Empirical research followed these guidelines. The leading focus of such research was the impact of national (or consolidated) public budget on personal income distribution, while the regional dimension was relegated to play a supporting role. As a consequence, analysis of the relationship between personal and regional dimensions of income distribution was even less explored.

The early propositions of allocating income distribution policy to the national government and focusing attention on personal distribution of income were both subject to challenges. First, the literature that followed recognized the existence of constraints for decentralized redistributive policies, because of mobility of goods and factors across regions (Oates, 1972, King, 1984, Brown and Oates, 1987). But, on the theoretical side, Pauly (1973) justified the sub-national government interventions with a model in which the utility function of rich households is altruistic (i.e., it depends on both own and poor's disposable income). Wildasin (1992) analyzed the effect of the growing factor mobility as a restraining factor to local redistributive policy, not only among regions within a country but also among countries. As a result, rich households would accept to transfer part of their income to low-income neighbors. Bird (1995) raised another point concerning the functions of the different levels of government by stating that "A government, whether local or central, that is not concerned with distribution is less a government than simply one of the many alternative organizational structures that may be used to deliver certain services". Recently, Tresch (2002) set up a hierarchically nested structure of welfare utilities to argue that "It is no longer true that redistributions among people at the national level are the 'preferred alternative', as Oates claimed. In the alternative model presented here, only the lowest level government redistributes among the people. The higher governments use grant-in-aid to other governments exclusively in their redistributions." (p. 851).

On the empirical side, the evidence points to the existence of a significant impact of sub-national governments' budget on regional distribution of income, especially due to revenue-sharing regimens. Moreover, country Constitutions and legal documents include dispositions that define regional distribution of income as an objective to fulfill.[7]

First efforts to measure the impact of fiscal policy on income distribution concentrated mainly on tax incidence (among others, Musgrave and Thin, 1948, and Musgrave, 1964). However,

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[7] Some examples of Constitutions and legal documents that define the regional distribution of income are Canada ("Parliament and the Government of Canada are committed to the principle of making equalization payments to ensure that provincial governments have sufficient revenues to provide reasonably comparable levels of public services at reasonably comparable levels of taxation", Constitutional Act, 1982) and Argentina ("The distribution between the Nation, the Provinces and the city of Buenos Aires, and among them […], will be fair, solidary and will give priority to the achievement of an equivalent level of development, life standard and equal opportunities throughout the national territory" National Constitution of 1994, Art. 75° inc. 2). The regional cohesion policy, included in the Project of the European Constitution in 1994, is another case.

Musgrave (1964) acknowledged that "… any meaningful theory or policy of public finance must ultimately combine the issues posed by the two sides of the budget. This, indeed, is the cardinal principle of the economist's view of public finance. The distributional implications of expenditure policy, therefore, pose an important further problem."

Before starting with the proposed analysis of the impact of provincial budgets on the income distribution in Argentina we want to mention that this country has been a fruitful research field in the area of income distribution and the impact of public policy. Herschel (1963) is the first study that estimates regional and personal distribution of income and the impact of fiscal policy. Dieguez and Petrecolla (1979) study in detail the determinants of income distribution in the Great Buenos Aires. Petrei (1989) analyzes the case of public expenditure in education, health, social security, housing and water and sewerage in five Latin-American countries (Argentina, Costa Rica, Chile, Dominican Republic and Uruguay). Dieguez, Llach and Petrecolla (1991) estimate of the net subsidy associated to the argentine social policy, disaggregating expenditure by the most relevant categories.

Several papers analyze in detail aspects of the impact of social expenditure on personal income distribution taking as a geographical unit Argentina or certain provinces (Ahumada *et al*., 1994, Flood *et al*., 1994, Gasparini and Porto, 1995, Gasparini *et al*., 1998, Porto and Cont, 1998, DNPGS, 1999, DGSC, 2002, Bertranou and Bonari, 2003, CEDLAS-DGSC, 2004, and Feldman and Filc, 2007), or concentrating on specific expenditures (Paqueo and Lee, 2000). Others study the existence of complementarities or trade-offs created by fiscal policy on personal and regional distribution of income in a federal system. For example, Porto (1990) and Porto and Sanguinetti (1993, 2001) find evidence of a strong regional redistribution throughout the revenue sharing regime. Porto (1990) and Artana and Lopez Murphy (1995) suggested opposite effects of government budgets on personal and regional distribution of income in Argentina. Porto and Cont (1998), the antecedent of this paper, find a net complementarity effect at a provincial level.

3. Methodology

We follow the traditional methodology of benefit-incidence analysis from, among others, Musgrave and Thin (1948), Musgrave (1964), and Reynolds-Smolensky (1977). We apply the methodology to provincial public budget in several steps. First, we must provide an ordering of individuals according to a measure of *ex ante* income distribution (that is, income before provincial fiscal budget). Second, we must identify and distribute both expenditures and revenues to each individual or group of income in each province. Third, the *ex post* income is the initial income after adding expenditure benefits and deducting net taxes.[8] The final step is the comparison between the *ex ante* and *ex post* distributions of income, i.e., those before and after fiscal policy, with some methodology. Given that the objective of this paper is to study the impact of provincial fiscal policy on regional and personal distribution of income, we use the Gini index of inequality, the Atkinson index of inequality and the calculation of the welfare level in each province by using the Atkinson index of welfare.

 3.1. Income and distribution of income

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[8] Taxes paid to the provincial government and net taxes paid to the national government, considering the source and the destination of national transfers.

We present income distribution in each province by dividing households into five groups (quintiles) of population. We take the distribution of per capita household income from the Permanent Household Survey (*Encuesta Permanente de Hogares*), or PHS, published by the National Bureau of Statistics (INDEC) for year 2004 (average of for quarterly surveys), and expand the reported incomes by a factor such that the total income from the PHS equals the Gross Domestic Product (GDP, which equals $11,700, or approximately US$ 3,900, per capita).[9] We allocate the GDP by jurisdiction according to Gross Geographical Product (GGP),[10] in order to determine total group income in each province. Finally, we divide the expanded income by group population to determine per capita income by quintiles in each province, which is the starting point to assess income distribution.[11] Table A.1 in the Appendix presents the per capita income in each province and Table A.2 reports the distribution by quintiles. Differently from the mainstream in income distribution analysis, we do not correct this income by equivalent adult. The main reason is the purpose of the study, which adds expenditures and taxes to get an ex post income.[12]

Finally, we calculate the impact of fiscal policy on income distribution including and excluding the city of Buenos Aires (the capital of Argentina) in the analysis. We must warn that the inclusion of the city of Buenos Aires in the analysis raises two issues. On the one hand, the level of activity is so important that a significant fraction of national revenues is collected in the city, while coparticipation to this jurisdiction (and its relative level of expenditure) is very low compared with the national taxes collected there. The exclusion of the city from the analysis implies that the pool of 23 provinces receives a net transfer. On the other hand, the government of the city of Buenos Aires does not spend in some categories (police, justice and some economic services), which are responsibility of the national government. Therefore, the inclusion of this jurisdiction leads us to compare different levels of expenditure among provinces.

3.2. Provincial budget and its distribution

We concentrate on provincial budget, which represents around 50% of consolidated public budget according to data from the Secretariat of Treasury. With the exception of two provinces, the budget ended with a surplus in year 2004, and we made the following changes to make it balance. Since the surplus balance still held even excluding two provincial-revenue lines (revenues from asset sales and property income), we closed the balance, first, by deleting these two revenue lines, and second, by increasing provincial expenditure proportionally by categories. In two provinces, Formosa and Tucumán, we closed the deficit by increasing provincial taxes proportionally to close the gap (in those provinces, asset sales and property

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[9] We report the information in domestic currency (argentine pesos). The exchange rate to the US dollar was around $3/dollar in year 2004.

[10] We use ECLAC statistics of Geographical Gross Product.

[11] Throughout the paper we treat gross product and ex ante income as the same. There is a significant difference between them depending on the subject under study. In this case, we consider it appropriate to use both GDP and GGP as measures of ex ante income because we deduct taxes and add expenditures to obtain ex post income. In others cases, it may be more appropriate to use a definition of household net income (that is, after taxes and subsidies).
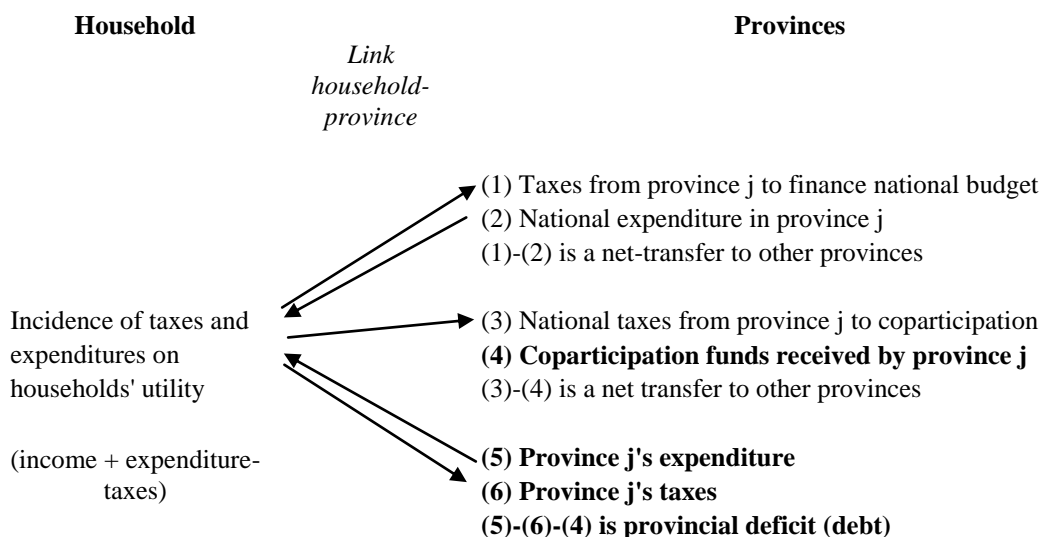
[12] This kind of correction may lead us to take many other factors into consideration, such as, for example, how to convert a peso spent in public administration or education by "equivalent beneficiary", in addition to all the assumptions done to distribute such expenditures following a benefit principle.

income were irrelevant).[13] The statistics for expenditure, and national and revenues are reported in Table A.1 and explained in the Appendix.

Figure 1 may be helpful to understand the flows in provincial budgets. This paper leaves aside national budget (which also affects regional and personal income distribution through expenditures and taxes, see (1) and (2) in the Figure) and concentrates on provincial budgets. Provinces finance their expenditure (5) with local revenues (i.e., (6), own taxes collected within their jurisdiction), (4) transfers from de national government (which come from taxes collected throughout the country) and debt, in case of deficit.

By construction, total national transfers by source (3) equal total national transfers by destination (4), but some provinces are net receivers (that is, they receive in transfers more than they contribute through national taxes collected in their jurisdiction) and others are net financers. Moreover, if the jurisdiction left outside the sample is a net financer (the city of Buenos Aires) the group under analysis is net receiver of national transfers.

Figure 1: Source and destination of funds in provincial budgets.

Household   Provinces

Link household-province

(1) Taxes from province j to finance national budget
(2) National expenditure in province j
(1)-(2) is a net-transfer to other provinces

Incidence of taxes and expenditures on households' utility

(3) National taxes from province j to coparticipation
(4) Coparticipation funds received by province j
(3)-(4) is a net transfer to other provinces

(income + expenditure-taxes)

(5) Province j's expenditure
(6) Province j's taxes
(5)-(6)-(4) is provincial deficit (debt)

As a final step, we calculate an *ex post* income. By following the standard procedure, the allocation of expenditures and taxes among quintiles in a province exhaust the province's budget (that is, we assume neither debt nor surplus). We also discuss alternative effects for expenditures (spillovers) and taxes (export).

3.3. Conceptual framework for measurement[14]

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, where the ex post income is the ex ante income plus provincial expenditure less taxes (by source jurisdiction), for every household in each province.

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[13] The corrections on expenditures and taxes fulfill the condition that current taxes will be spent in the future (distributed by categories as in the year under study) and that current deficits will be closed by future taxes (following the same tax scheme as in the year under study).

[14] Part of this framework is adapted from Ahumada *et al*. (1996).

Formally, consider a province n with i households (labeled n=1, …, N and i=1, …, I, respectively). For simplicity, I=5 and N=24 reflect the case of quintiles in the Argentine provinces (N=23, if we exclude the city of Buenos Aires).

Let m_{in} be the individual income before provincial fiscal policy, g_{in} the benefits of provincial (n) expenditure and t_{in} the total taxes paid to finance the provincial expenditure. The ex post individual income is

$$c_{in} = m_{in} + g_{in} - t_{in} \qquad (1)$$

Expenditure in province n is $g_n = \Sigma_k\ g_{kn}$, i.e., the sum of expenditures in k categories (education, health, administration, etc.). Each expenditure k is distributed among households according to weights γ_{ik}, so that $g_{in} = \Sigma_k\ \gamma_{ik}.g_{kn}$. An individual i in province n pays s different provincial taxes (turnover, stamps, property, vehicles, etc., labeled t_{sn}), according to weights τ_{is}, and r national taxes (VAT, consumption, income, etc., labeled t_r), according to weights $\tau_{ir,n}$. Therefore, $t_{in} = \Sigma_s\ \tau_{is}.t_{sn} + \Sigma_r\ \tau_{ir,n}.t_r$. We also define $a_n = \Sigma_{i \in n}\ (\Sigma_r\ \tau_{ir,n}.t_r)$, which stands for the contribution of province n to national taxes that fund the aggregate provincial budget system. The h×k matrix labeled B_n summarizes the expenditure weights; the h×s (h×r) matrix T_n (X_n) summarizes the provincial (national) tax weights. Each column in B_n, T_n and X_n adds up to unity. Using these definitions, equation (1) can be rewritten as

$$c_{in} = m_{in} + \Sigma_k\ \gamma_{ik}.g_{kn} - \Sigma_s\ \tau_{is}.t_{sn} - \Sigma_r\ \tau_{ir,n}.t_r \qquad (2)$$

The budget constraint for a government in province n is

$$\Sigma_k\ g_{kn} = \Sigma_s\ t_{sn} + d_n \qquad (3)$$

where d_n is the national transfer according to the tax sharing regime (this assumes zero debt or surplus). Comparing (2) and (3) there is a transfer among provinces depending on the difference between a_n and d_n.

At a provincial level the term $d_n - a_n$ may be positive or negative. A positive residual means that the province receives a net transfer from the other provinces (that is, it is a "net receiver"), while a negative residual means that the province finances the other provinces (that is, it is a "net financer" or "net contributor"). At an aggregate level, if the city of Buenos Aires is included the following condition is met: $\Sigma_n\ d_n = \Sigma_n\ a_n$. But if the city is excluded from analysis, there is a net contribution (NC) to the group of provinces summarized as (labeling the city of Buenos Aires with 1):

$$NC = \sum_{n=2}^{24} \left(d_n - a_n \right)$$

When analyzing income distribution, we will use taxes and expenditures from equations (2) and (3) to calculate Gini coefficients of income inequality. For a given jurisdiction, this coefficient is calculated as

$$G = 1 + \frac{1}{I} - 2 \sum_{i=1}^{I} \frac{\left(I + 1 - i \right) y_i}{I^2 y^P} \qquad (4)$$

where income groups are ranked from lowest (i=1) to highest (i=5), I=5, given that we work with quintiles, y = m, c (that is, ex ante or ex post income), and y^P is the average income of the group under analysis. To assess the impact of fiscal policy on income distribution we use the

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Reynolds and Smolensky (1977) indicator (RSp). The application of this indicator to the aggregate of N jurisdictions is

$$RSp = -\,t\,(Kt + Kg)$$

where t is the relative size of taxes (taxes / GGP), which equals the relative size of expenditures (expenditure / GGP), labebed g. Kt and Kg are the Kakwani (1977) progressivity indexes of taxes (equal to the difference between the concentration of taxes and (4)) and expenditures (equal to the difference between (4) and the concentration of expenditures). For a particular province, the RSp is

$$RSp = -\left(\frac{t}{1-t+g}\,Kt + \frac{g}{1-t+g}\,Kg\right) \qquad (5)$$

where t may differ from g because the province is a net financer or a net receiver. If we exclude the city of Buenos Aires, the indicator for the aggregate of provinces is also given by (5) because NC may be (and actually is) different from zero.

We are also interested in the distinction between the regional and personal distribution of income. For that reason, we also calculate the (ex ante and ex post) Atkinson index and evaluate significant differences with the Gini coefficient. The Atkinson index is defined as

$$D(\alpha) = 1 - \frac{y^*}{y^P}, \quad \text{where} \quad y^* = \frac{1}{I}\left(\sum_{i=1}^{I} y_i^{\alpha}\right)^{1/\alpha} \qquad (6)$$

where α is the inequality aversion coefficient, which takes values less than or equal to 1 (with a corresponding transformation if α=0). To focus on the welfare effect of fiscal policy, we calculate the net effect using a per-capita Atkinson-like welfare function.

$$W(y_i \ldots) = \left(\sum_{i=1}^{I} y_i^{\alpha}\right)^{1/\alpha} = (1 - D(\alpha))\,y^P \qquad (7)$$

where y=c,m, and the addition of weighted incomes corresponds to households in a province or in a country.

Many issues arise from a comparison of equations (2) and (3) and their application to (4)-(7). First, they reveal the importance of considering the regional factor in an analysis of impact of public budgets on income distribution, not only because each region may have different ex ante income, but also because they may have their own incidence patterns for provincial taxes (T_n) and expenditures (B_n), in addition to different level and mix of expenditures (g_n), taxes (t_n), contribution to national taxes (a_n), and reception of transfers from the upper level of government (d_n).[15]

Second, a full analysis of equation (2) must include all expenditures and taxes to assess the impact of provincial budget on income distribution. After the rupture of the principle of coincidence between benefit and ability to pay, both theoretical and empirical studies engaged in a first stage of partial analysis (biased to taxes), but later it was recognized that the tax and

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[15] This issue is not only relevant when analyzing provincial budgets but also for national budget. In this case, d_n is a "fiscal residual" in each province, calculated as the difference between the benefits from national expenditure accrued in such province and the national taxes paid by its residents.

expenditure problems could not be treated separately. From the distributional standpoint, it is of little worth to count with a progressive expenditure if it is financed with very regressive taxes. Along the same lines, a social expenditure (the focus of many research papers on public policy and income distribution) may be progressive but total expenditure may be regressive, turning the partial analysis incomplete and misleading. In fact, the theory of state failure visualizes that expenditures, or a share of them, are tilted towards groups that take over the fiscal apparatus. Although it is difficult to quantify this effect beyond ad hoc assumptions on leakages, the inclusion of all expenditures –with their own distribution pattern– may help to understand the problem in a more complete way. For the same reasons it is necessary to include all taxes (legislated and non-legislated) since the tax structure (tax base, deductions, exemptions, and tax rates) are the result of a political-economics equilibrium.

Following Musgrave (1964) in the consideration of both sides of the budget (that is, the inclusion of all expenditures and taxes that enter equations (2) and (3)), we must identify first the taxes and expenditures for the *level of government* under research (consolidate, national, a provincial government, the set of provincial governments, etc.). Then we must consider the *regional dimension*, because personal income, taxes and expenditures are not uniformly distributed across regions. When assessing taxes, one must consider the *direct cost* and the *excess burden*; when calculating expenditures, one must take care of *efficiency differentials* between private and public sectors, *leakages* in certain expenditures to non targeted beneficiaries, and possible *externalities* due to benefits that are spilled over to other groups.

Third, we take an additional step in estimating the tax incidence. Taxes in equation (3) are measured by their direct collection cost, i.e., the direct transfer from private sector to the government. Raising taxes also imply indirect costs, or excess burden (Pigou, 1947, Atkinson and Stern, 1974), which may have an own incidence pattern. Although it is well known that the quantification of this effect is a difficult task, it should be taken into consideration when evaluating impacts of fiscal policy on income distribution. For example, the bigger the size of the public sector, the larger the excess burden (Harberger, 1974), and c_n could be higher than m_n after fiscal policy, but lower after taking into account the excess burden accrued to the household.[16]

Fourth, we also analyze alternative scenarios for expenditure incidence. In the beginning of the 1970s, Aaron and McGuire (1970) presented a method to estimate the distribution of the public component of the expenditure among different groups of households, considering the need to distinguish between public expenditure in goods that are appropriated fully by privates (publicly provided private goods) and public expenditures that benefit all society (public goods). The fundamental problem with public goods –or the public component of the publicly provided goods– is how to allocate them to every population group. Aaron and McGuire show that the value of these goods for different groups depends on shape of the households' utility

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[16] The magnitude of excess burden may be significant. For example, Ballard, Shoven y Whalley (1985) estimated, in a general equilibrium model, that the excess burden may vary from 15 to 33 cents per dollar of tax raised, depending on the tax and the assumptions made on the elasticities of supply of labor and savings. Feldstein (1997) used a method that divide goods in an appropriate way for tax purposes and found a marginal excess burden per dollar of revenue of 1.65 in the United States. That is, the marginal cost of raising an extra dollar increasing all marginal tax rates proportionally is 2.65 dollar. He concludes that "The central public finance question facing any country is the appropriate level of public spending and, therefore, of taxes. As specialists in public finance, we have a particular responsibility to help the public and the politically responsible officials to deal with this question…".

function. In many papers the public component of publicly provided goods is distributed equally among groups. According to Aaron and McGuire, this allocation could be sustained under the assumption of a constant marginal utility of income. But, if the utility function displays diminishing marginal returns, the resulting allocation is larger for individuals who belong to quintiles of higher income, and each group receives an allocation that comes from multiplying the total value of the good and the inverse of the marginal utility of income.

The alternative scenario allocates the public good share of publicly provided goods based on ad hoc assumptions regarding the magnitude, and implicit assumptions on the value of the externality for every receptor of the benefits. As Aaron and McGuire show "…the selection of a utility function critically influences one's results…". In particular, we will assume (ad hoc) that the external benefit is proportional to income within each group. That is, the value of the expenditure allocated to group i equals $g.(y_i/\Sigma_H y_i)$ where g is the expenditure to be distribute among quintiles, y_i is the i-quintil's income. The indirect utility function which is compatible with this assumption is

$$V_i = f(y_i) + g \times \frac{y_i}{\sum_{j=1}^{H} y_j} \tag{8}$$

In sum, this paper estimates the impact of provincial budgets on income distribution following the standard literature, calculating some of the typical progressivity indexes for expenditures, taxes and distributional impact. Then, it advances in four directions, usually omitted by the standard literature: (i) the consideration of both sides of the budget for the level of government considered –provincial, in this case–, revenues and expenditure; (ii) the consideration of the regional impact of provincial budgets, given the interregional transfers and different designs of provincial budgets; (iii) the consideration of the excess burden of taxes; and (iv) the consideration of the externality, or public component of publicly provided private goods (either in the form of direct externality or of leakage). These dimensions, although treated in an ad hoc fashion, provide results that must be considered once again "…as a collection of hunches calling for further investigation……" (Kuznets, 1955).

4. Results I: the standard methodology

4.1. Preliminaries

Table A.1 in the Appendix summarizes the average values of income, provincial expenditures and taxes and national revenues raised to finance provincial budgets. Provinces in Argentina are different in many dimensions. For an average per capita income of $11,710, the richest province's per capita income (Santa Cruz, with $34,743) is almost eight times the poorest one (Formosa, with $4,377). These differences are also present in expenditures and revenues. Provincial expenditure ranges from 45%-50% of the income (in La Rioja and Formosa, respectively) to 5%-10% (in the city of Buenos Aires and the province of Buenos Aires, although in the first case some local public expenditures are provided by the national government). Taxes range from 17%-18% of income (in Tucumán and Neuquén) to 7%-9% (in San Luis and Catamarca). Some additional differences are revealed in the comparison: for example, even though La Rioja Catamarca and San Luis are net receivers of funds and display a low level of revenues, provincial public expenditure in La Rioja is significantly higher than expenditure in Catamarca, which is also higher than expenditure in San Luis.

Three jurisdictions (the city of Buenos Aires, the province of Buenos Aires and, to a little extent, Mendoza) are identified as net financers. That is, a_n, the difference between transfers by destination and transfers by source, is negative. Córdoba and Santa Fe, which used to be net financer provinces in 1991, as shown in Porto and Cont (1998), benefit from regional redistribution according to the 2004 budget, although the comparison in 1991 excluded the city of Buenos Aires. Among the net receiving provinces, Neuquén, Chubut, Santa Cruz and Tierra del Fuego raise an important amount of provincial taxes to support their high per capita expenditure. The amount of the NC (net contribution) from the city of Buenos Aires to the group of provinces is significant: $1,814 per capita of the city (or 6% of its income), which turns out to be $155 per capita of the group of provinces (or 1.6% of their income).

Finally, the provincial expenditure creates a new ranking of provinces comparing ex ante and ex post per capita income. Some of them benefit from the mix provincial expenditure / redistribution (such is the case of Chaco, Formosa, Jujuy, La Rioja and Santiago del Estero, with an important expenditure and an even more important regional subsidy) while others are affected negatively (for example, Buenos Aires, Corrientes, Entre Ríos, Mendoza, Salta, San Juan and Tucumán, either because of a low expenditure, and negative or little positive redistribution effect). Other provinces do not improve significantly albeit a high expenditure and redistribution (Chaco or Jujuy).

4.2. The effect of provincial fiscal policy on income distribution

Table 1 reports ex ante and ex post values for income distribution and per capita income. The net effect of provincial budgets on income distribution is a clear shift of income-value from high-income quintiles (4 and 5) to low-income quintiles (1 to 3), either including or excluding the city of Buenos Aires in the analysis.

Table 1: Ex ante and ex post income distribution and per capita income (quintiles), year 2004. Including and excluding the city of Buenos Aires. Values in pesos.

Income distribution (quintiles)	Quintil 1	Quintil 2	Quintil 3	Quintil 4	Quintil 5	Total
Income distribution (quintiles)						
Argentina						
. ex ante	3.7%	8.5%	14.0%	22.2%	51.6%	100%
. ex post	5.6%	10.0%	14.6%	22.0%	47.8%	100%
Argentina w/o city Bs As						
. ex ante	3.8%	8.6%	14.1%	22.3%	51.2%	100%
. ex post	5.9%	10.3%	14.8%	22.0%	47.0%	100%
Per capita income (pesos per quintil)						
Argentina						
. ex ante	2,187	4,986	8,190	12,989	30,178	11,710
. ex post	3,298	5,853	8,541	12,864	27,976	11,710
Argentina w/o city Bs As						
. ex ante	1,887	4,318	7,056	11,126	25,547	9,991
. ex post	2,989	5,220	7,510	11,186	23,806	10,146

Source: own elaboration. The ex ante income distribution aggregates households from the [n]th quintil in each province to constitute the [n]th quintil in Argentina. The ex post income distribution is calculated based on household income after having added expenditures and subtracted revenues from the jurisdiction in which the household lives.

Table A.2 in the Appendix summarizes the ex ante and ex post income distribution. Table A.3 reports the corresponding per capita income, and Table A.4 presents the change of per capita income due to provincial budget, all of them at the provincial level. The first clear result is a decrease in income for net financing jurisdictions. Second, in seven provinces (Chaco, Formosa, Jujuy, La Rioja, Misiones, Santa Cruz and Santiago del Estero) the richest quintil benefits from provincial expenditure and redistribution. Third, income of the fourth quintil decreases in net financing provinces and Neuquén. Lastly, quintiles 1 to 3 are net beneficiaries from the provincial budget (with the exception of the 3rd quintil in the city of Buenos Aires).

4.3. The effect of provincial budget on inequality and welfare

In this section we follow the standard methodology to assess the effect of provincial budget on income distribution. Table 2 summarizes the inequality coefficients for Argentina. Tables A.5 and A.6 in the Appendix show the details at the jurisdiction level.

Table 2: Inequality, progressivity and income redistribution. Argentina 2004.

Inequality indexes: Gini and Atkinson				
	Argentina		Argentina w/o city of Bs As	
	ex ante	ex post	ex ante	ex post
Gini	0.438	0.385	0.434	0.376
Atkinson ($\alpha=0,5$)	0.161	0.122	0.158	0.116
Atkinson ($\alpha=-1$)	0.520	0.394	0.515	0.377
Atkinson ($\alpha=-10$)	0.780	0.669	0.778	0.654

Reynolds-Smolensky coefficient, and Kawani coefficients for expenditures and taxes		
Kg	0.481	0.463
g/(1-t+g)	0.127	0.145
Kt	-0.071	-0.069
t/(1-t+g)	0.127	0.129
RSp	-0.052	-0.058

The ex ante income distribution aggregates households from the nth quintil in each province to constitute the nth quintil in Argentina. The ex post income distribution is calculated based on household income after having added expenditures and subtracted revenues from the jurisdiction in which the household lives.

At the aggregate level, provincial budgets worked as a progressive redistributive tool, under all coefficients of measurement considered (Gini or Atkinson) and both including or excluding the city of Buenos Aires. For example, the Gini coefficient indicates a reduction of 0.05 points out of an inequality value of 0.438. The most important changes are observed in Catamarca, Chaco, Formosa, Jujuy, La Rioja, Santiago del Estero and Tucumán. The lowest changes are observed in the city and province of Buenos Aires and Mendoza (which are net financing jurisdictions), but also in Santa Fe, Córdoba, Chubut, Neuquén and Santa Cruz.

The change in inequality measured by the Reynolds-Smolensky coefficient, is due to a strong effect from the expenditure side (high Kg), which more than overcomes the regressive effect of taxes collected to finance it. If the city of Buenos Aires is excluded an additional effect is given by NC, that is, the net contribution from this jurisdiction to the pool of provinces.

At the provincial level, the change in RSp is the result of an individual factor or a combination of factors. For example, in Mendoza it is the progressivity in expenditure but in Chaco, Formosa and La Rioja it is the significant size of expenditure. In Jujuy it is the combination of a high size in expenditure and a relatively neutral effect of taxes. The little change in the Gini of the city and province of Buenos is mainly due to a size effect (low expenditure vs. high revenues), while in Santa Cruz is mainly due to a redistribution effect (little progressive expenditure vs. regressive taxes). Finally, the little effect in San Luis is due to a low size in both expenditure and revenue.

Given the relevance of progressivity in expenditures in the results, Table A.7 in the Appendix reports the concentration index for several categories of expenditure. The aggregate level of expenditure is relatively proportional with significant differences among provinces and categories. Health, welfare and education categories are more progressive programs than justice, defense and economic services.

A final result is in order. In the case of net financing jurisdictions, there is a trade-off between the positive impact of fiscal budget on inequality and the negative "level effect" in average income. Table 3 assesses the net effect of fiscal budget using the Atkinson index of welfare for several assumptions on inequality-aversion for selected jurisdictions (we add the calculation for Argentina, with and without the city of Buenos Aires), and Table A.8 presents the results for all jurisdictions.

Table 3: Welfare assessment for selected jurisdictions.

Jurisdiction	Atkinson (α=0.5)		Atkinson (α=-1)		Atkinson (α=-10)	
	ex ante	ex post	ex ante	ex post	ex ante	ex post
City Bs As (CABA)	26,370	25,538	14,659	15,992	6,685	8,108
Buenos Aires	8,776	8,779	4,970	5,813	2,221	2,939
Mendoza	10,187	10,626	5,919	7,489	2,734	4,280
Argentina	9,823	10,283	5,618	7,096	2,569	3,873
Argentina w/o CABA	8,408	8,974	4,844	6,324	2,217	3,510

Source: own elaboration.

With the exception of the city of Buenos Aires, welfare increases in all provinces for the assumed values of α. Given that the exercise of provincial budget takes significant resources from the city of Buenos Aires, the level-effect loss in welfare is reverted under the assumption of significant inequality aversion. An easy calculation shows that the breakpoint value of α is 0.06. For the provinces of Buenos Aires and Mendoza, given the difference in ex ante and ex post average incomes, this will be the case for almost all values of α (the breakpoint value of α is 0.51 and 0.97, respectively). For the remaining provinces, the increase in welfare is the combination of net revenue received through coparticipation and progressiveness of the provincial budget. See, for example, the high increase in welfare in Formosa and Chaco (the two effects are in place) and the modest increase in welfare in Santa Fe and Córdoba (only the second effect is in place).

5. Results II: extensions

As discussed in Section 3, besides the standard analysis of considering the interconnection between revenues and expenditures, interlinked with a regional distributive effect of the provincial budget, we considered four alternative exercises.

The first one (scenario 1) assumes a tax cost through an excess burden applied to different taxes. Using the results from Ballard *et al.* (1985), the burden ranges from 21% (production taxes) to 32% (property and consumption taxes). Scenario 2 considers that a fraction of expenditure on education and health spills over to the non-direct beneficiary households. We assume that 70% (60%) of expenditure in education (health) is allocated as in the standard case, that is, it goes to direct beneficiaries, and the remaining is allocated to households according to their initial income.[17] Scenario 3 considers the case of a leakage in expenditure. In this case we assume that 90% of total expenditure is distributed as in Section 4 and the remaining 10% is allocated to households according to their initial income. Finally, Scenario 4 includes the three effects together. Table 4 presents the results and Table A.9 in the Appendix reports the Gini coefficient for all simulations.

Table 4: Inequality, progressivity and income redistribution under selected scenarios.

Inequality indexes, Gini and Atkinson						
	Ex ante	**Ex post**				
		base	scenario 1	scenario 2	scenario 3	scenario 4
Gini	0.438	0.385	0.386	0.395	0.392	0.402
Atkinson (alfa=0,5)	0.161	0.122	0.122	0.129	0.126	0.133
Atkinson (alfa=-1)	0.520	0.394	0.397	0.416	0.408	0.432
Atkinson (alfa=-10)	0.781	0.669	0.673	0.691	0.683	0.707

Reynolds-Smolensky coefficient, and Kawani coefficients for expenditures and taxes					
Kg	0.481	0.481	0.406	0.433	0.365
g/(1-t+g)	0.127	0.131	0.126	0.127	0.130
Kt	-0.071	-0.071	-0.071	-0.071	-0.071
t/(1-t+g)	0.127	0.167	0.127	0.127	0.167
RSp	-0.052	-0.051	-0.042	-0.046	-0.036

Scenario 1: differential excess burden across taxes. Scenario 2: 70% of expenditure in education and 60% of expenditure in health is allocated as in the base case, and the remaining expenditure is allocated to households according to their initial income. Scenario 3: 90% of total expenditure is allocated as in the base case, and the remaining 10% is allocated to households according to their initial income. Scenario 4: Aggregation of Scenarios 1 to 3.

Compared to the base case from section 4, the assumed excess burden has little effect on income distribution but it has a negative level-effect in households' utility. When analyzing the composition of the inequality change, there is an increase in the tax size relative to the expenditure size, which has little effect due to the almost neutral (albeit regressive) tax system. If revenues were highly progressive or regressive a significant effect should arise. In fact, this is the case of the provinces of Santa Cruz, Neuquén and Chubut (compare columns II and III in Table A.9), in which the impact on inequality of the provincial budget is reduced under the assumption of an excess burden because of a combination of higher tax size and highly regressive tax system.[18] Table A.9 also reports the Atkinson index of welfare for this scenario. Columns VII to IX reveal that the interaction of a positive impact of fiscal policy, the redistribution of revenues and the tax burden effect increases welfare less (or reduces welfare

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[17] The assumption for education was taken from McMahon (2002) and the assumption for health was taken from Aaron and McGuire (1970).

[18] This effect magnifies for higher excess burden.

more) than under the no-tax burden scenario. In the case of the Buenos Aires province and Neuquén, welfare would be reduced for α=0.5.

The second scenario considers an externality in education and health expenditure that spreads over the households. This externality changes the impact of the provincial budget on inequality, depending on two main factors: the size and the composition of expenditure. At an aggregate level, there is a reduction in the positive effect on inequality and welfare from the previous section (base case in Table A.9), which is expected when part of expenditure is distributed in a less progressive way. At the level of jurisdictions, the lower positive effect is more noticeable in Chaco (high level of expenditure with average share of education and health), Santiago del Estero (high level of a highly progressive expenditure) and La Rioja (high expenditure level). The externality effect is very low in the city of Buenos Aires, the province of Buenos Aires, Santa Fe (all with a relatively low level of expenditure) and Santa Cruz (less progressive expenditure).

The third scenario is, in nature similar to the second one (see column V in Table A.9). The main difference is that the allocation (according to income) of a 10% of provincial expenditure, which is less progressive than education and health, implies a lower redistributive effect. In fact, at the country level the change in the Gini index is –0.046 (compared with the change of –0.042 in Scenario 2).

The fourth scenario is a compound of the previous three, and the result (a reduction of 0.036 in the Gini index) is straightforward once we know that the redistribution according to income of both total expenditure and the share of expenditure on education and health means a lower progressiveness of expenditure (the Kg coefficient decreases from 0.481 down to 0.365, a compound reduction of that in Scenarios 2 and 3) and that the excess burden assumption implies a stronger weight on regressive taxes.

6. Conclusions

This paper studies the impact of provincial public budget on income distribution. The relevant two dimensions of income distribution, personal and regional, are captured in the analysis at the provincial level.

The redistributive effect of sub-national expenditures and taxes interact with the revenue-sharing regime. This interaction creates a trade-off between the positive effect on income distribution and (negative) regional net transfer in financing jurisdictions (the city of Buenos Aires, and the provinces of Buenos Aires and Mendoza), and reinforces the positive effect on income distribution in net-receiving provinces.

The size, progressivity, and distributive indicators, as well as the Atkinson's welfare indicator, show important differences among provinces. Provincial fiscal budget increases welfare in all provinces for the assumed inequality-aversion assumptions. However, there are significant differences in the provinces. For example, there is a significant increase in welfare in Chaco, Formosa, La Rioja and Santiago del Estero (they receive significant amounts of revenue through coparticipation and other transfers and their expenditure is very progressive), but a modest increase in welfare in Santa Fe and Córdoba (where the little benefit from coparticipation is the dominant effect). Two interesting cases are the city of Buenos Aires and the province of Buenos Aires: welfare is reduced if utility functions put little weight on inequality aversion. Neuquén enters this list when including excess burden on taxes.

We suggest taking into account several aspects widely discussed in theoretical papers, but less covered in empirical papers: externalities of some categories of expenditures, leakages in expenditures, and tax burden. The simulations run in this paper suggest that the first two effects weaken any positive impact of provincial fiscal budgets (if the leakage or externality is appropriated by medium to high income households). Tax burden creates more level effects than distributive effects (in particular, if the tax system is mildly regressive).

Finally, the methodology used in this paper can be extended to the national or consolidate budget. This is the subject of future research.

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Appendix.

The dataset consist of gross domestic product (taken from National Accounts), gross geographical product (taken from ECLAC) and public budget for the year 2004, from the National Bureau of Fiscal Coordination with Provinces, Secretariat of Treasury at the Ministry of Economics. The ex ante distribution of income is taken from CEDLAS-UNLP.

In order to determine the impact of taxes on different groups of households (classified into five income categories, according to provincial per capita household income), we use the following assumptions:

- Turnover, property and automobiles tax. We use the criteria presented in FIEL (1999), p. 361.
- Stamp taxes: 75% as property tax and 25% by population and income.
- Royalties: by population.

The taxes collected by the national government, which go back to provinces according to coparticipation or other transfer schemes, are distributed among the provinces in order to reflect the source of revenues. We use the assumptions made in FIEL (1999), p. 530. Then we assign taxes by quintiles using the criteria proposed by FIEL (1999), p. 361.

The source of information for expenditures is the 2004 budget execution by the provinces, taken from the National Bureau of Fiscal Coordination with Provinces, Secretariat of Treasury, at the Ministry of Economics.

For each category of provincial expenditure we allocate expenditure based on different sources of information and assumptions:

- General administration: per total expenditure.
- Justice: 50% per income and 50% per population.
- Transfers to local governments (municipalities): 35% according to use of urban services, 18% per users of the Public Health System, 8% by the distribution of welfare and the remainder is distributed evenly between population and the result of the previous allocation.
- Defense and Safety: 50% per income and 50% per population.
- Education: based on the number of students attending public schools.
- Culture, Science and Technology: per population.
- Health: based on the number of individuals who are not beneficiaries of a private health insurance program.
- Social security: per number of individuals that belong to the provincial social security system.
- Water and sewerage: 75% by users of the service and 25% by population.
- Housing: according to beneficiaries of loans for housing construction.
- Welfare: according to the number of beneficiaries of different welfare programs (nutrition, clothing, etc.).
- Work: per number of individuals unemployed.
- Other urban services: based on the use of urban services (paved roads, sewerage, public lighting and refuse collection).
- Primary production: among land owners.
- Energy, fuel and mining: according to consumption of energy and fuels.
- Industry: according to consumption of industrial products.
- Transport and communication services: 1/3 according to total consumption of goods, 1/3 according to expenditure on automobile and 1/3 according to tourism expenditures.
- Public Debt services: according to distribution of income.

The weight matrices B_n, T_n and X_n are available upon request.

Finally, as explained in the text, in most provinces the balance was a surplus even after deducting revenues from asset sales and property income. In these cases, we closed the balance, first, by deleting both revenue lines, and second, by increasing provincial expenditure proportionally by categories. In two provinces with provincial deficit (Formosa and Tucumán), we balanced the budget by increasing provincial taxes proportionally (in those provinces, asset sales and property income were irrelevant).

Table A.1: Gross geographical product, provincial public expenditure, and provincial and national (by province of source and destination) fiscal resources, per province. Year 2004.

	Jurisdiction	GGP ex ante $ per capita	Rkg	Provincial expenditure $ per capita	Rkg	Provincial expenditure % of GGP	Rkg	Total revenues (source) $ per capita	Rkg	Total revenues (source) % of GGP	Rkg	GGP ex post $ per capita	Rkg
1	City Bs As (CABA)	31,817	2	1,693.2	14	5.3%	24	3,507.0	4	11.0%	19	30,003	2
2	Buenos Aires	10,434	12	1,058.3	24	10.1%	23	1,448.9	9	13.9%	10	10,043	13
3	Catamarca	15,852	6	2,844.5	5	17.9%	18	1,183.0	12	7.5%	24	17,514	6
4	Córdoba	11,263	11	1,282.5	22	11.4%	22	1,215.2	11	10.8%	21	11,331	11
5	Corrientes	5,237	22	1,298.3	21	24.8%	9	585.5	22	11.2%	17	5,949	24
6	Chaco	5,251	21	1,678.9	15	32.0%	4	665.5	20	12.7%	13	6,264	19
7	Chubut	19,966	5	3,267.1	4	16.4%	19	3,199.7	5	16.0%	3	20,033	5
8	Entre Ríos	7,502	14	1,651.0	16	22.0%	11	1,075.3	13	14.3%	8	8,077	15
9	Formosa	4,377	24	2,195.5	9	50.2%	1	581.3	23	13.3%	12	5,991	23
10	Jujuy	5,725	18	1,709.3	12	29.9%	6	631.8	21	11.0%	18	6,802	16
11	La Pampa	13,083	7	2,590.2	7	19.8%	15	1,647.6	6	12.6%	14	14,025	7
12	La Rioja	6,353	15	2,843.3	6	44.8%	2	851.7	17	13.4%	11	8,344	14
13	Mendoza	12,089	8	1,427.1	18	11.8%	21	1,455.5	8	12.0%	15	12,060	9
14	Misiones	5,426	20	1,402.1	20	25.8%	8	775.6	18	14.3%	9	6,053	20
15	Neuquén	23,469	4	4,292.1	3	18.3%	17	4,110.1	3	17.5%	2	23,651	4
16	Río Negro	10,150	13	2,041.7	10	20.1%	14	1,620.0	7	16.0%	4	10,571	12
17	Salta	6,257	16	1,265.2	23	20.2%	13	724.3	19	11.6%	16	6,797	17
18	San Juan	5,756	17	1,720.7	11	29.9%	5	865.9	16	15.0%	6	6,610	18
19	San Luis	11,656	9	2,249.9	8	19.3%	16	1,063.9	14	9.1%	23	12,842	8
20	Santa Cruz	34,743	1	7,189.1	1	20.7%	12	5,206.8	1	15.0%	7	36,726	1
21	Santa Fe	11,616	10	1,424.9	19	12.3%	20	1,261.6	10	10.9%	20	11,779	10
22	Santiago del Estero	4,816	23	1,704.8	13	35.4%	3	478.6	24	9.9%	22	6,042	22
23	Tucumán	5,555	19	1,492.3	17	26.9%	7	1,004.2	15	18.1%	1	6,043	21
24	Tierra del Fuego	27,024	3	6,098.7	2	22.6%	10	4,110.8	2	15.2%	5	29,012	3
	Argentina	11,710		1,486.4		12.7%		1,486.4		12.7%		11,710	
	Argentina w/o CABA	9,991		1,468.7		14.7%		1,313.6		13.1%		10,146	
	Std. Dev.	8,847		1,529.2		10.5%		1,332.8		2.6%		8,761	
	Max/Min	7.9		6.8		9.4		10.9		2.4		6.2	

Source: Own estimates based on INDEC and Secretary of Treasury, Ministry of Economics. Rkg: ranking of provinces. 3 pesos=1 US$.

Table A.1 (cont.): Gross geographical product, provincial public expenditure, and provincial and national (by province of source and destination) fiscal resources, per province. Year 2004.

	Jurisdiction	Provincial revenues $ per capita	Rkg	Provincial revenues % of GGP	Rkg	National transfers (source) $ per capita	Rkg	National transfers (source) % of GGP	Rkg	National transfers (destination) $ per capita	Rkg	National transfers (destination) % of GGP	Rkg
1	City Bs As (CABA)	1,470.3	5	4.6%	17	2,036.7	1	6.4%	17	222.9	24	0.7%	24
2	Buenos Aires	588.6	10	5.6%	9	860.3	8	8.2%	7	469.6	23	4.5%	23
3	Catamarca	714.2	7	4.5%	18	468.8	17	3.0%	24	2,130.3	4	13.4%	14
4	Córdoba	412.9	15	3.7%	23	802.2	9	7.1%	12	869.5	21	7.7%	19
5	Corrientes	181.2	24	3.5%	24	404.3	20	7.7%	9	1,117.0	15	21.3%	7
6	Chaco	272.7	20	5.2%	13	392.9	21	7.5%	10	1,406.2	11	26.8%	4
7	Chubut	2,074.8	4	10.4%	3	1,124.9	3	5.6%	19	1,192.2	14	6.0%	21
8	Entre Ríos	424.3	14	5.7%	8	651.0	12	8.7%	3	1,226.7	13	16.4%	10
9	Formosa	214.6	22	4.9%	14	366.7	23	8.4%	6	1,980.9	5	45.3%	1
10	Jujuy	249.0	21	4.4%	20	382.7	22	6.7%	14	1,460.3	9	25.5%	5
11	La Pampa	695.3	8	5.3%	11	952.3	5	7.3%	11	1,894.8	6	14.5%	13
12	La Rioja	305.9	17	4.8%	15	545.7	15	8.6%	5	2,537.3	3	39.9%	2
13	Mendoza	664.0	9	5.5%	10	791.4	10	6.5%	16	763.0	22	6.3%	20
14	Misiones	331.6	16	6.1%	7	443.9	18	8.2%	8	1,070.4	17	19.7%	8
15	Neuquén	3,206.6	2	13.7%	1	903.5	6	3.8%	22	1,085.5	16	4.6%	22
16	Río Negro	744.0	6	7.3%	6	875.9	7	8.6%	4	1,297.6	12	12.8%	15
17	Salta	299.0	19	4.8%	16	425.2	19	6.8%	13	966.2	19	15.4%	11
18	San Juan	303.4	18	5.3%	12	562.5	13	9.8%	1	1,417.3	10	24.6%	6
19	San Luis	515.4	11	4.4%	19	548.5	14	4.7%	21	1,734.5	7	14.9%	12
20	Santa Cruz	4,083.2	1	11.8%	2	1,123.6	4	3.2%	23	3,106.0	2	8.9%	17
21	Santa Fe	499.3	13	4.3%	21	762.3	11	6.6%	15	925.7	20	8.0%	18
22	Santiago del Estero	192.7	23	4.0%	22	285.9	24	5.9%	18	1,512.1	8	31.4%	3
23	Tucumán	502.3	12	9.0%	5	501.9	16	9.0%	2	990.0	18	17.8%	9
24	Tierra del Fuego	2,695.8	3	10.0%	4	1,415.0	2	5.2%	20	3,403.0	1	12.6%	16
	Argentina	651.3		5.6%		835.1		7.1%		835.1		7.1%	
	Argentina w/o CABA	581.2		5.8%		732.4		7.3%		887.5		8.9%	
	Std. Dev.	1,048.1		2.7%		400.0		1.8%		760.2		11.2%	
	Max/Min	22.5		3.9		7.1		3.3		15.3		64.6	

Source: Own estimates based on INDEC and Secretary of Treasury, Ministry of Economics. Rkg: ranking of provinces. 3 pesos = 1US$.

Table A.2: Income distribution by quintiles, pre and post provincial budget. Year 2004

(%)

	Jurisdiction	Quintil 1				Quintil 2				Quintil 3				Quintil 4				Quintil 5			
		Inc. ea	Rev.	Exp.	Inc. ep	Inc. ea	Rev.	Exp.	Inc. ep	Inc. ea	Rev.	Exp.	Inc. ep	Inc. ea	Rev.	Exp.	Inc. ep	Inc. ea	Rev.	Exp.	Inc. ep
1	City Bs As (CABA)	3.6	6.8	28.3	4.6	8.0	10.3	26.7	8.8	13.5	14.5	19.9	13.7	21.9	19.4	13.2	21.7	53.0	49.1	11.9	51.2
2	Buenos Aires	3.6	6.4	20.3	5.0	8.7	9.8	23.7	10.1	14.3	13.9	19.6	14.9	22.3	18.6	17.3	22.4	51.0	51.3	19.1	47.6
3	Catamarca	3.6	7.2	21.3	6.3	7.8	10.4	19.7	9.6	13.0	14.3	21.0	14.2	20.4	19.0	18.3	20.2	55.1	49.2	19.6	49.7
4	Córdoba	3.9	6.8	20.8	5.5	8.5	10.2	21.4	9.8	14.0	14.2	19.3	14.6	22.6	18.9	20.1	22.7	51.0	49.8	18.3	47.4
5	Corrientes	3.7	6.2	20.0	7.0	7.7	9.6	20.2	10.2	12.3	13.5	18.4	13.6	21.4	18.6	18.0	21.0	54.9	52.0	23.3	48.3
6	Chaco	4.2	6.8	20.7	8.4	8.2	10.2	21.9	11.6	12.6	14.4	19.6	14.3	20.5	19.3	17.2	19.8	54.4	49.4	20.5	45.9
7	Chubut	4.0	12.3	21.6	5.6	9.3	14.3	20.6	10.3	14.3	16.6	18.1	14.6	22.2	19.2	18.9	22.1	50.2	37.5	20.8	47.5
8	Entre Ríos	3.7	6.1	20.7	6.8	8.7	9.5	22.4	11.4	14.4	13.5	17.8	15.2	22.4	18.3	15.3	21.5	50.8	52.5	23.7	45.1
9	Formosa	3.6	7.5	16.7	8.0	8.0	10.7	17.9	11.4	13.4	14.7	20.2	15.7	19.9	18.9	19.9	20.0	55.0	48.1	25.3	44.8
10	Jujuy	4.4	6.4	21.7	8.5	8.5	9.8	20.3	11.3	13.3	13.9	19.4	14.8	21.3	18.8	18.7	20.9	52.5	51.1	19.9	44.4
11	La Pampa	3.5	7.1	22.5	6.6	9.0	10.4	21.5	11.2	15.2	14.5	21.2	16.4	23.2	19.1	18.7	22.9	49.0	48.9	16.0	42.9
12	La Rioja	5.0	6.1	23.9	11.3	9.1	9.5	21.9	13.4	13.5	13.6	19.4	15.5	21.5	18.6	17.3	20.4	51.0	52.1	17.6	39.5
13	Mendoza	3.9	8.5	27.1	6.0	8.7	11.3	21.7	9.9	14.1	14.8	17.4	14.4	22.3	18.8	16.4	22.1	51.1	46.5	17.4	47.7
14	Misiones	4.7	6.7	18.8	7.7	8.7	10.1	17.7	10.6	14.4	14.2	17.4	15.2	21.6	19.2	18.0	21.1	50.5	49.9	28.0	45.4
15	Neuquén	3.3	14.3	21.9	4.8	7.9	15.8	22.0	9.1	13.3	17.5	19.0	13.6	22.7	19.5	17.5	22.3	52.7	33.0	19.6	50.1
16	Río Negro	4.2	8.7	24.7	7.5	8.2	11.6	20.1	9.9	12.6	15.1	19.4	13.6	20.5	19.1	17.1	20.1	54.4	45.5	18.7	48.9
17	Salta	3.2	7.1	21.5	6.2	6.5	10.4	21.4	8.8	10.9	14.3	18.7	12.0	19.8	18.8	17.1	19.4	59.6	49.4	21.4	53.6
18	San Juan	4.1	6.3	23.2	8.8	8.6	9.7	20.6	11.6	13.9	13.8	18.6	15.1	20.4	18.6	17.8	20.0	53.0	51.6	19.8	44.5
19	San Luis	5.1	6.5	28.9	9.2	9.4	10.0	18.5	10.9	15.2	14.3	21.1	16.3	23.1	19.3	13.9	21.8	47.2	50.0	17.7	41.8
20	Santa Cruz	4.2	12.8	20.3	6.1	9.3	14.7	17.3	10.1	15.9	16.9	16.0	15.7	22.8	19.5	19.2	22.6	47.8	36.1	27.2	45.4
21	Santa Fe	3.9	6.7	22.5	5.8	9.3	10.2	22.4	10.7	15.1	14.1	18.4	15.6	23.5	18.8	17.5	23.3	48.3	50.2	19.2	44.6
22	Santiago del Estero	3.0	6.5	21.3	7.9	7.0	9.9	21.0	10.7	12.5	14.0	19.3	14.3	21.1	18.8	18.3	20.5	56.5	50.7	20.0	46.6
23	Tucumán	3.9	6.1	23.5	8.4	8.5	9.7	21.7	11.5	13.2	13.9	19.3	14.6	21.1	19.2	16.7	20.4	53.3	51.2	18.9	45.2
24	Tierra del Fuego	4.1	10.4	26.6	7.9	9.3	13.0	19.3	10.9	14.3	15.9	18.9	15.0	21.9	19.4	17.1	21.3	50.4	41.3	18.2	44.9
	Argentina	3.7	7.3	22.2	5.6	8.5	10.5	22.2	10.0	14.0	14.4	19.1	14.6	22.2	18.9	17.2	22.0	51.6	48.9	19.3	47.8
	Argentina w/o CABA	3.8	7.4	21.6	5.9	8.6	10.6	21.7	10.3	14.1	14.4	19.0	14.8	22.3	18.8	17.6	22.0	51.2	48.9	20.0	47.0

Source: own elaboration. ea: ex ante; ep: ex post; Inc: Income; Rev: Provincial revenues; Exp:Provincial expenditures.

Table A.3: Per capita income, before and after provincial budget. In Argentine pesos. Year 2004.

	Jurisdiction	Quintil 1		Quintil 2		Quintil 3		Quintil 4		Quintil 5		Total			
		ea	ep	ea	Ep	ea	ep	ea	ep	ea	ep	ea		ep	
1	City Bs As (CABA)	5,691	6,904	12,798	13,253	21,453	20,598	34,761	32,475	84,369	76,773	31,817	2	30,003	2
2	Buenos Aires	1,891	2,503	4,550	5,094	7,473	7,502	11,656	11,223	26,585	23,881	10,434	12	10,043	13
3	Catamarca	2,880	5,493	6,218	8,409	10,305	12,446	16,193	17,674	43,611	43,496	15,852	6	17,514	6
4	Córdoba	2,195	3,118	4,788	5,541	7,875	8,249	12,730	12,870	28,721	26,869	11,263	11	11,331	11
5	Corrientes	959	2,077	2,016	3,045	3,225	4,026	5,609	6,234	14,369	14,360	5,237	22	5,949	24
6	Chaco	1,117	2,632	2,142	3,645	3,314	4,481	5,397	6,204	14,259	14,337	5,251	21	6,264	19
7	Chubut	4,040	5,595	9,235	10,305	14,296	14,609	22,300	22,306	49,659	47,080	19,966	5	20,033	5
8	Entre Ríos	1,384	2,769	3,264	4,601	5,391	6,132	8,394	8,677	19,057	18,192	7,502	14	8,077	15
9	Formosa	799	2,411	1,761	3,417	2,924	4,711	4,362	6,001	12,022	13,398	4,377	24	5,991	23
10	Jujuy	1,262	2,913	2,424	3,844	3,821	5,044	6,095	7,099	15,014	15,105	5,725	18	6,802	16
11	La Pampa	2,303	4,639	5,908	7,834	9,972	11,527	15,203	16,054	31,977	30,029	13,083	7	14,025	7
12	La Rioja	1,582	4,721	2,878	5,583	4,271	6,444	6,845	8,514	16,169	16,445	6,353	15	8,344	14
13	Mendoza	2,328	3,646	5,235	5,955	8,497	8,658	13,511	13,310	30,853	28,715	12,089	8	12,060	9
14	Misiones	1,273	2,332	2,364	3,213	3,918	4,591	5,866	6,386	13,708	13,740	5,426	20	6,053	20
15	Neuquén	3,925	5,689	9,299	10,775	15,616	16,103	26,718	26,469	61,675	59,115	23,469	4	23,651	4
16	Río Negro	2,164	3,983	4,131	5,241	6,401	7,158	10,412	10,611	27,627	25,854	10,150	13	10,571	12
17	Salta	1,008	2,110	2,023	2,999	3,414	4,078	6,189	6,588	18,634	18,199	6,257	16	6,797	17
18	San Juan	1,184	2,913	2,487	3,839	3,986	4,988	5,889	6,612	15,205	14,676	5,756	17	6,610	18
19	San Luis	2,987	5,890	5,475	7,023	8,853	10,472	13,467	14,002	27,486	26,813	11,656	9	12,842	8
20	Santa Cruz	7,302	11,267	16,232	18,614	27,559	28,902	39,624	41,446	82,918	83,322	34,743	1	36,726	1
21	Santa Fe	2,243	3,423	5,376	6,328	8,740	9,160	13,642	13,707	28,066	26,268	11,616	10	11,779	10
22	Santiago del Estero	723	2,388	1,681	3,238	3,003	4,313	5,083	6,196	13,555	14,043	4,816	23	6,042	22
23	Tucumán	1,089	2,536	2,351	3,484	3,662	4,403	5,869	6,156	14,776	13,614	5,555	19	6,043	21
24	Tierra del Fuego	5,570	11,549	12,617	15,833	19,235	21,712	29,629	30,866	67,995	65,040	27,024	3	29,012	3

Source: own elaboration. ea: ex ante; ep: ex post. 3 pesos = 1 US$.

Table A.4: Change in per capita income. In Argentine pesos. Year 2004

	Jurisdiction	Quintil 1	Rkg	Quintil 2	Rkg	Quintil 3	Rkg	Quintil 4	Rkg	Quintil 5	Rkg	Total	Rkg
1	City Bs As (CABA)	1,213	18	456	24	-854	24	-2,286	24	-7,596	24	-1,814	24
2	Buenos Aires	612	24	544	23	29	23	-432	23	-2,704	22	-391	23
3	Catamarca	2,613	5	2,191	4	2,141	3	1,481	4	-115	9	1,662	4
4	Córdoba	922	23	753	21	374	20	140	18	-1,852	17	67	21
5	Corrientes	1,119	20	1,029	17	801	12	625	11	-9	8	713	12
6	Chaco	1,515	14	1,503	9	1,167	10	807	9	78	6	1,013	9
7	Chubut	1,555	13	1,069	16	313	21	6	20	-2,579	21	67	20
8	Entre Ríos	1,385	16	1,337	13	741	14	283	16	-865	13	576	14
9	Formosa	1,612	12	1,657	6	1,787	4	1,639	3	1,376	1	1,614	5
10	Jujuy	1,651	11	1,420	11	1,223	9	1,004	7	90	5	1,078	8
11	La Pampa	2,335	6	1,926	5	1,555	6	851	8	-1,948	18	943	10
12	La Rioja	3,139	3	2,705	2	2,173	2	1,669	2	276	4	1,992	1
13	Mendoza	1,318	17	720	22	161	22	-200	21	-2,139	19	-28	22
14	Misiones	1,059	22	849	20	673	16	520	13	32	7	626	13
15	Neuquén	1,764	8	1,476	10	487	18	-250	22	-2,560	20	182	18
16	Río Negro	1,820	7	1,109	15	756	13	199	17	-1,773	15	422	17
17	Salta	1,102	21	976	18	664	17	399	14	-435	10	541	15
18	San Juan	1,729	9	1,352	12	1,002	11	723	10	-528	11	855	11
19	San Luis	2,903	4	1,548	8	1,619	5	534	12	-673	12	1,186	7
20	Santa Cruz	3,965	2	2,383	3	1,342	7	1,823	1	404	3	1,982	3
21	Santa Fe	1,180	19	951	19	420	19	65	19	-1,798	16	163	19
22	Santiago del Estero	1,665	10	1,557	7	1,310	8	1,113	6	489	2	1,226	6
23	Tucumán	1,447	15	1,133	14	741	15	287	15	-1,162	14	488	16
24	Tierra del Fuego	5,979	1	3,216	1	2,477	1	1,238	5	-2,955	23	1,988	2

Source: own elaboration. Rkg: ranking of provinces. 3 pesos = 1 US$.

Table A.5: Gini and Atkinson coefficients of inequality. Year 2004

	Jurisdiction	Gini				Atkinson (α = 0.5)				Atkinson (α = -1)				Atkinson (α = -10)			
		ex ante	Rkg	ex post	Rkg	ex ante	Rkg	ex post	Rkg	ex ante	Rkg	ex post	Rkg	ex ante	Rkg	ex post	Rkg
1	City Bs As (CABA)	0.451	9	0.424	1	0.171	7	0.149	1	0.539	6	0.467	1	0.790	5	0.730	1
2	Buenos Aires	0.434	13	0.390	5	0.159	12	0.126	4	0.524	8	0.421	3	0.787	6	0.707	3
3	Catamarca	0.462	4	0.390	4	0.180	4	0.125	5	0.543	5	0.381	7	0.787	7	0.632	10
4	Córdoba	0.433	14	0.387	6	0.157	15	0.123	6	0.509	13	0.402	5	0.771	13	0.677	4
5	Corrientes	0.465	3	0.373	9	0.181	3	0.114	9	0.545	4	0.348	11	0.785	9	0.591	13
6	Chaco	0.451	7	0.333	18	0.170	8	0.092	18	0.504	14	0.280	19	0.750	19	0.509	20
7	Chubut	0.421	17	0.382	7	0.150	18	0.121	7	0.490	18	0.392	6	0.762	15	0.672	5
8	Entre Ríos	0.432	16	0.346	14	0.158	14	0.098	14	0.519	10	0.321	14	0.783	10	0.598	12
9	Formosa	0.459	5	0.329	20	0.178	5	0.089	20	0.538	7	0.281	18	0.786	8	0.529	18
10	Jujuy	0.436	12	0.325	21	0.158	13	0.086	21	0.485	19	0.271	21	0.741	21	0.500	21
11	La Pampa	0.421	18	0.337	16	0.151	17	0.093	16	0.523	9	0.322	13	0.793	4	0.612	11
12	La Rioja	0.418	21	0.253	24	0.144	22	0.054	24	0.446	23	0.173	24	0.708	23	0.349	24
13	Mendoza	0.433	15	0.382	8	0.157	16	0.119	8	0.510	12	0.379	8	0.774	11	0.645	7
14	Misiones	0.418	20	0.344	15	0.145	20	0.096	15	0.460	22	0.304	16	0.725	22	0.549	15
15	Neuquén	0.454	6	0.416	3	0.175	6	0.143	3	0.556	3	0.451	2	0.804	3	0.718	2
16	Río Negro	0.451	8	0.372	10	0.170	9	0.114	10	0.504	15	0.338	12	0.750	20	0.560	14
17	Salta	0.505	1	0.421	2	0.215	1	0.147	2	0.599	1	0.416	4	0.811	2	0.636	9
18	San Juan	0.438	11	0.319	22	0.161	11	0.084	22	0.499	16	0.261	22	0.758	16	0.486	22
19	San Luis	0.391	24	0.304	23	0.126	24	0.075	23	0.421	24	0.246	23	0.699	24	0.470	23
20	Santa Cruz	0.403	23	0.364	11	0.137	23	0.108	11	0.471	21	0.361	10	0.753	18	0.640	8
21	Santa Fe	0.413	22	0.361	12	0.144	21	0.107	12	0.497	17	0.367	9	0.773	12	0.659	6
22	Santiago del Estero	0.484	2	0.349	13	0.200	2	0.100	13	0.598	2	0.306	15	0.824	1	0.538	16
23	Tucumán	0.446	10	0.330	19	0.167	10	0.090	19	0.515	11	0.277	20	0.770	14	0.509	19
24	Tierra del Fuego	0.421	19	0.337	17	0.148	19	0.092	17	0.485	20	0.292	17	0.758	17	0.534	17

Source: own elaboration. Rkg: ranking of provinces.

Table A.6: Reynolds-Smolensky (RSp), Kakwani for expenditure (Kg) and revenues (Kt). Year 2004.

	Jurisdiction	Kg	Rkg	g/(1-t+g)	Rkg	Kt	Rkg	t/(1-t+g)	Rkg	RSp	Rkg
1	City Bs As (CABA)	0.636	1	0.056	24	-0.076	14	0.117	13	-0.027	24
2	Buenos Aires	0.469	15	0.105	23	-0.039	6	0.144	5	-0.044	20
3	Catamarca	0.482	12	0.162	19	-0.092	15	0.068	24	-0.072	16
4	Córdoba	0.459	17	0.113	22	-0.055	11	0.107	14	-0.046	19
5	Corrientes	0.447	19	0.218	9	-0.063	12	0.098	19	-0.091	8
6	Chaco	0.472	14	0.268	4	-0.074	13	0.106	17	-0.119	5
7	Chubut	0.436	21	0.163	18	-0.201	23	0.160	3	-0.039	21
8	Entre Ríos	0.437	20	0.204	11	-0.026	3	0.133	8	-0.086	10
9	Formosa	0.382	22	0.366	1	-0.101	18	0.097	20	-0.130	3
10	Jujuy	0.456	18	0.251	6	-0.043	8	0.093	21	-0.111	7
11	La Pampa	0.484	11	0.185	15	-0.052	10	0.117	12	-0.083	12
12	La Rioja	0.487	10	0.341	2	-0.013	2	0.102	18	-0.165	1
13	Mendoza	0.532	2	0.118	21	-0.099	17	0.121	11	-0.051	18
14	Misiones	0.343	23	0.232	8	-0.037	5	0.128	10	-0.075	15
15	Neuquén	0.490	9	0.181	16	-0.290	24	0.174	1	-0.039	22
16	Río Negro	0.511	4	0.193	13	-0.127	19	0.153	4	-0.079	14
17	Salta	0.523	3	0.186	14	-0.133	20	0.107	16	-0.083	13
18	San Juan	0.477	13	0.260	5	-0.039	7	0.131	9	-0.119	4
19	San Luis	0.500	7	0.175	17	-0.006	1	0.083	22	-0.087	9
20	Santa Cruz	0.340	24	0.196	12	-0.198	22	0.142	6	-0.038	23
21	Santa Fe	0.459	16	0.121	20	-0.031	4	0.107	15	-0.052	17
22	Santiago del Estero	0.507	5	0.282	3	-0.095	16	0.079	23	-0.135	2
23	Tucumán	0.503	6	0.247	7	-0.046	9	0.166	2	-0.116	6
24	Tierra del Fuego	0.498	8	0.210	10	-0.148	21	0.142	7	-0.084	11

Source: own elaboration. Rkg: ranking of provinces.

Table A.7: Concentration indexes, by category of expenditure. Year 2004.

Jurisdiction	Total expenditure	General administration	Justice	Defense and safety	Culture y education	Health	Economic services	Welfare programs	Others*
1 City Bs As (CABA)	-0.185	-0.230	0.226		-0.253	-0.289	0.309	-0.468	0.064
2 Buenos Aires	-0.035	-0.066	0.217	0.217	-0.158	-0.239	0.281	-0.332	0.044
3 Catamarca	-0.019	-0.059	0.231	0.231	-0.096	-0.313	0.252	-0.180	0.062
4 Córdoba	-0.026	-0.049	0.217	0.217	-0.198	-0.269	0.047	-0.332	0.110
5 Corrientes	0.018	-0.027	0.232	0.232	-0.121	-0.228	0.238	-0.344	0.120
6 Chaco	-0.020	-0.051	0.226	0.226	-0.120	-0.235	0.010	-0.344	0.132
7 Chubut	-0.013	-0.084	0.211	0.211	-0.081	-0.322	0.214	-0.530	-0.001
8 Entre Ríos	-0.004	-0.044	0.216	0.216	-0.187	-0.308	0.197	-0.354	0.198
9 Formosa	0.077	0.019	0.230	0.230	-0.046	-0.139	0.274	-0.040	0.110
10 Jujuy	-0.020	-0.063	0.218	0.218	-0.117	-0.266	0.088	-0.295	0.079
11 La Pampa	-0.063	-0.086	0.210	0.210	-0.137	-0.286	0.009	-0.407	0.000
12 La Rioja	-0.069	-0.113	0.209	0.209	-0.172	-0.276	0.246	-0.301	0.001
13 Mendoza	-0.099	-0.149	0.216	0.216	-0.252	-0.323	0.064	-0.529	0.036
14 Misiones	0.075	-0.009	0.209	0.209	-0.114	-0.221	0.250	-0.377	0.145
15 Neuquén	-0.036	-0.088	0.227	0.227	-0.058	-0.245	0.113	-0.361	-0.055
16 Río Negro	-0.059	-0.108	0.226	0.226	-0.128	-0.257	0.185	-0.518	0.022
17 Salta	-0.018	-0.065	0.252	0.252	-0.152	-0.249	0.174	-0.337	0.100
18 San Juan	-0.038	-0.094	0.219	0.219	-0.206	-0.279	0.253	-0.386	0.174
19 San Luis	-0.108	-0.149	0.196	0.196	-0.069	-0.274	0.303	-0.394	-0.210
20 Santa Cruz	0.063	-0.062	0.201	0.201	-0.108	-0.290	0.335	-0.484	0.053
21 Santa Fe	-0.046	-0.097	0.206	0.206	-0.168	-0.318	0.406	-0.354	0.022
22 Santiago del Estero	-0.022	-0.082	0.242	0.242	-0.142	-0.293	0.269	-0.390	0.092
23 Tucumán	-0.056	-0.092	0.223	0.223	-0.167	-0.327	0.170	-0.223	-0.013
24 Tierra del Fuego	-0.076	-0.111	0.210	0.210	-0.168	-0.316	0.188	-0.495	-0.039
Argentina	-0.043	-0.090	0.219	0.218	-0.163	-0.272	0.218	-0.366	0.053
Argentina w/o CABA	-0.029	-0.073	0.219	0.218	-0.154	-0.268	0.214	-0.349	0.053

Source: own elaboration. * Others pool expenditures on social security, water and sewerage, housing, work, other urban services, services of public debt and transfers to local governments (municipalities).

Table A.8: Welfare assessment for Argentine jurisdictions. In Argentine pesos. Year 2004

	Jurisdiction	Atkinson (α=0.5)		Atkinson (α=-1)		Atkinson (α=-10)	
		ex ante	ex post	ex ante	Ex post	ex ante	ex post
1	City Bs As (CABA)	26,370	25,538	14,659	15,992	6,685	8,108
2	Buenos Aires	8,776	8,779	4,970	5,813	2,221	2,939
3	Catamarca	13,001	15,320	7,249	10,849	3,383	6,443
4	Córdoba	9,490	9,938	5,526	6,781	2,579	3,661
5	Corrientes	4,288	5,271	2,384	3,881	1,126	2,434
6	Chaco	4,360	5,689	2,605	4,511	1,311	3,078
7	Chubut	16,973	17,610	10,189	12,187	4,746	6,571
8	Entre Ríos	6,318	7,286	3,608	5,484	1,626	3,251
9	Formosa	3,600	5,459	2,021	4,307	938	2,823
10	Jujuy	4,821	6,214	2,946	4,957	1,482	3,400
11	La Pampa	11,102	12,723	6,244	9,514	2,706	5,446
12	La Rioja	5,437	7,893	3,517	6,902	1,858	5,430
13	Mendoza	10,187	10,626	5,919	7,489	2,734	4,280
14	Misiones	4,639	5,472	2,929	4,211	1,495	2,728
15	Neuquén	19,368	20,275	10,417	12,974	4,610	6,681
16	Río Negro	8,429	9,367	5,037	6,998	2,541	4,649
17	Salta	4,909	5,795	2,507	3,971	1,184	2,471
18	San Juan	4,829	6,054	2,885	4,885	1,390	3,399
19	San Luis	10,184	11,879	6,748	9,683	3,508	6,808
20	Santa Cruz	29,990	32,748	18,373	23,452	8,577	13,226
21	Santa Fe	9,940	10,523	5,847	7,459	2,635	4,020
22	Santiago del Estero	3,854	5,437	1,937	4,195	850	2,791
23	Tucumán	4,629	5,502	2,696	4,369	1,279	2,965
24	Tierra del Fuego	23,015	26,332	13,918	20,527	6,542	13,507
	Argentina	9,823	10,283	5,618	7,096	2,569	3,873
	Argentina w/o CABA	8,408	8,974	4,844	6,324	2,217	3,510

Source: own elaboration. 3 pesos = 1 US$.

Table A.9: Change in Gini coefficient of inequality and Atkinson index of welfare under several alternative scenarios.

Jurisdiction	Gini (ex ante)	Gini (ex post)					Atkinson index of welfare (α=0.5)		
		Base	scenario 1	scenario 2	scenario 3	scenario 4	ex ante	Base	scenario 1
1 City Bs As (CABA)	0.451	0.424	0.426	0.431	0.428	0.437	26,370	25,538	24,679
2 Buenos Aires	0.434	0.390	0.390	0.398	0.395	0.403	8,776	8,779	8,438
3 Catamarca	0.462	0.390	0.390	0.400	0.398	0.407	13,001	15,320	15,040
4 Córdoba	0.433	0.387	0.388	0.395	0.392	0.400	9,490	9,938	9,639
5 Corrientes	0.465	0.373	0.373	0.388	0.383	0.397	4,288	5,271	5,130
6 Chaco	0.451	0.333	0.331	0.350	0.345	0.361	4,360	5,689	5,526
7 Chubut	0.421	0.382	0.388	0.393	0.390	0.406	16,973	17,610	16,850
8 Entre Ríos	0.432	0.346	0.344	0.363	0.355	0.369	6,318	7,286	7,030
9 Formosa	0.459	0.329	0.328	0.346	0.343	0.358	3,600	5,459	5,318
10 Jujuy	0.436	0.325	0.324	0.343	0.337	0.352	4,821	6,214	6,062
11 La Pampa	0.421	0.337	0.336	0.349	0.346	0.357	11,102	12,723	12,323
12 La Rioja	0.418	0.253	0.249	0.274	0.270	0.286	5,437	7,893	7,688
13 Mendoza	0.433	0.382	0.383	0.392	0.388	0.399	10,187	10,626	10,281
14 Misiones	0.418	0.344	0.342	0.355	0.352	0.361	4,639	5,472	5,284
15 Neuquén	0.454	0.416	0.426	0.427	0.424	0.446	19,368	20,275	19,284
16 Río Negro	0.451	0.372	0.374	0.386	0.382	0.397	8,429	9,367	8,978
17 Salta	0.505	0.421	0.423	0.437	0.431	0.447	4,909	5,795	5,626
18 San Juan	0.438	0.319	0.316	0.341	0.332	0.350	4,829	6,054	5,847
19 San Luis	0.391	0.304	0.303	0.314	0.313	0.321	10,184	11,879	11,624
20 Santa Cruz	0.403	0.364	0.369	0.373	0.371	0.384	29,990	32,748	31,533
21 Santa Fe	0.413	0.361	0.360	0.370	0.366	0.375	9,940	10,523	10,221
22 Santiago del Estero	0.484	0.349	0.348	0.374	0.363	0.386	3,854	5,437	5,324
23 Tucumán	0.446	0.330	0.326	0.345	0.342	0.354	4,629	5,502	5,258
24 Tierra del Fuego	0.421	0.337	0.339	0.352	0.347	0.363	23,015	26,332	25,382
Argentina	0.438	0.385	0.386	0.395	0.392	0.402	9,823	10,283	9,928
Argentina w/o CABA	0.434	0.376	0.376	0.386	0.382	0.393	8,408	8,974	8,662

Source: own elaboration. Scenario 1: differential excess burden across taxes. Scenario 2: 70% of expenditure in education and 60% of expenditure in health is allocated as in the base case, and the remaining expenditure is allocated to households according to their initial income. Scenario 3: 90% of total expenditure is allocated as in the base case, and the remaining 10% is allocated to households according to their initial income. Scenario 4: Aggregation of Scenarios 1 to 3.