**Cont, Walter, Porto, Alberto, and Juarros, Pedro (2016). "Regional Income Redistribution and Risk-sharing: Lessons from Argentina"**

This Online Appendix contains the following information:

- Appendix A. Allocation rules. Income, taxes and expenditures
- Appendix B. Summary of taxes, expenditure and transfers by provinces: 1995-2010.
- Appendix C. Redistribution and stabilization effects. Analysis by sub-periods: 1995-2001 and 2003-2010

**Appendix A. Allocation rules. Income, taxes and expenditures**

Given that we will use the criterion of the benefit incidence of expenditures and tax collection by the Federal Government in order to evaluate the Stabilizer and Redistributive role of the National Budget on the Argentinian provinces, it is necessary to make certain assumptions.

Our measure of economic activity is the Gross Geographic Product (GGP)[1] in the constant local currency, and using the population data published by the INDEC, we obtain the GGP per capita (corresponding to $X_{it}$ in the equations, where i refers to jurisdiction and t to year). We construct the variable Ex Post GGP ($Y_{it}$) adding to the Ex Ante GGP, $X_{it}$, the expenditures of the national government ($G_{it}$) and the Transfers ($T_{it}$) that made in province i and time t, and the resources collected in it ($R_{Git}$ y $R_{Tit}$), all in per capita terms:

$$Y_{it} = X_{it} + G_{it} + T_{it} - R_{Git} - R_{Tit}$$

This same allocation for the total country is $Y_{Pt} = X_{Pt} + G_{Pt} + T_{Pt} - R_{GPt} - R_{TPt}$. Thus, $G_{Pt}$ is Total Expenditure of the national government, $T_{Pt}$ is the transfers to the provinces (and the City of Buenos Aires), and $R_{GPt} + R_{TPt}$ are the total collection of taxes by the national administration, which can be divided into incomes that hold on to national expenditures ($R_{GPt}$) and national resources that transfer to the provinces ($R_{TPt}$)[2]. On the other side, the design of the tax system is such that $T_{Pt} = R_{TPt}$, which means that taxes with destination to transfers must be distributed to the provinces, but $G_{Pt}$ can be higher or lower than $T_{Pt}$, and if so the government incurs in deficit or surplus.

As is usual in the literature, we study the national budget uncorrected for deficits or surpluses. Regarding the components of the budget, we consider all the national expenditures with exception of the interest on the public debt paid for the national government, given its complex mechanism of provincial allocation. To balance and not affect the final and original deficit/surplus of the national administration, taxes whose destination is the national expenditure were adjusted thereby leaving unchanged the overall budget balance (either deficit or surplus). This means that $G_{Pt}$, excludes the total debt interest paid, and $R_{GPt}$ was adjusted (decrease) proportionally to maintain the overall budget balance. In this setting, $R_{TPt}$ remains unchanged due to its specific destination.

In what follows, we detail the territorial criteria and assumptions to allocate national expenditures, transfers and taxes between provinces.

**Allocation of National Expenditures**

Information on national expenditures is taken from the Argentinian Association of Public Budgeting and Financial Management (ASAP), based on the Ministry of Finance, MEFP.

Within national expenditures, 4 big items are distinguished, allocating the values based in different sources and assumptions:

1. Social Services: they basically consist of retirement pensions, divided into the following functions:

- Non-Contributory Pensions and Contributory Pensions: they are aimed at promoting the access to people's rights in social vulnerability conditions and rules of the Ministry of Social Development of the Nation, we allocate these expenditures to provinces using information from the National Administration of Social Security (ANSES).

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[1] Source: up to 2006, Federal Investment Council, and then updated by regional drivers.

[2] These two concepts include several commons taxes (shared taxes and others with specific assignation, as VAT, income, personal property and internal taxes), while others taxes are only in $R_{GPt}$ (basically, taxes on foreign trade).

- Former Military Program of Pensions: 50% as contributory pensions and 50% per population.

- Federal Police Program: 50% to CABA and 50% per population.

- Universal Child Allowance: it is based on information from "Gasto Público Social y su distribución a las Provincias en el Presupuesto Nacional 2012".

- Protection and Social Assistance: 2/3 on the basis of proportion of population under the poverty line and 1/3 per population.

- Education and Culture: college education allocated, 50% based in the location of the university and 50% per population. The rest of education and culture per population.

- Health: it consists of hospitals, research centers, insurance program and coverage to poor sectors. Allocated per population.

- Work, Housing and Water and Sewerage: 50% per population and 50% on the basis of proportion of population under the poverty line.

2. Economic Services: they are classified into the following functions:

- Energy, Mining and Fuel: it includes basically transfers to the electrical service, expenditures in infrastructure of generation and transmission and subsidies to YCF. Since 2002, it includes the subsidies to the private sector associated with the deficit in electrical generation, the deficit in the import of natural gas and others. Transfers to the private sector were allocated in terms of the contribution of each consumer-province to the deficit, in some cases based on the total provincial consumption or when available by official reports.

- Transport: up to 2003, the function included expenditures in vial infrastructure and subsidies to operators in the metropolitan area. Since 2004, it has deepened subsidies, especially in railways and subways and added the national airline. These expenditures were allocated according to the transfers of the national government to the respective location of the different operators, which correspond with between 80-100% to City of Buenos Aires and Province of Buenos Aires (or Greater Buenos Aires, and the distribution between these two jurisdictions were based on the number of passengers). On the other hand, expenditures on Aerolineas Argentinas, the national airline, were allocated according to the participation of each province in the higher quintile of the income distribution of the country.

- Communications: they are basically represented by the Public Media, and, insomuch as they are service of open access, we allocated it by population.

- Ecology and Environment: expenditures to control and conserve natural resources and the human environment. They were distributed by province per population.

- Agriculture, Industry, Trade, Tourism, Insurance and Finance: we assumed that these activities affect the consumption of the population, and then we allocated them by provincial consumption (see below).

3. Defense and Security: 50% per population and 50% per GGP, under the assumption that these expenditures protect the population and property.

4. General Administration: it is proportional to the resulting provincial distribution of the rest of the expenditures considered (Defense and Security, Social Services and Economic Services).

**Allocation of National Taxes**

Information on tax collection is taken from the Argentinian Association of Public Budgeting and Financial Management (ASAP), based on the Ministry of Finance, MEFP.

- Value Added Tax (VAT): it is a consumption tax. Given the lack of annual data of consumption at the provincial level, we estimated a cross section regression with data from the 2004/2005 National Survey of Household Expenditure (ENGH), which contains income and expenditure estimations at the jurisdiction level. We used as a dependent variable the per capita consumption expenditures from ENGH and we took as independent variables (proxies at the provincial level) the energy consumption from residential users (Secretariat of Energy), supermarket expenditures (INDEC: National Institute of Statistics and Census) and the number of patented cars (DNRPA), all in

per capita terms. These coefficients estimated were used to estimate the per capita provincial consumption to 1995-2010.

- Income Tax: we considered jointly the Personal and Corporation Income Tax, because we didn't have shareholders data by provinces. We allocated them territorially according to the total household income that we took from the Household Permanent Survey (EPH) between 1995 and 2010.

Personal Property Taxes, Monotributo and Capital Resource Tax were distributed in the same way as the Income Tax.

- Contributions to Social Security: we adopted a criteria based on the employment rate adjusted by the economically active population (EAP) at the provincial level (data from EPH)[3].

- Bank Credits and Debits: 80% as VAT and 20% as the Income Tax.

- Liquid Fuels: according to the consumption of liquid fuels (Secretary of Energy).

- Internal Taxes: they were allocated in terms of the average of the "Domestic Taxes", which includes VAT, Income Taxes, Liquid Fuels, Contributions to Social Security, Personal Property, Montributo and Bank Credits and Debits, excluding the Foreign Trade Taxes.

Others tax resources, No Tax Income and Sale of Goods and Service were also distributed geographically as "Domestic taxes".

- Export Taxes: they were assigned according to the provincial origin of the exported products (primary products, Agricultural and Industrial Manufactures) as published by INDEC (http://www.opex.sig.indec.gov.ar/comex/) and subject to taxes under the existing taxes in Argentina published by the Ministry of Finance, available in http://www.mecon.gov.ar/sip/dniaf/tributos_vigentes.pdf.

- Import Duties and Statistic Rate: they were allocated on the basis of the Gross Geographic Product (GGP).

- Property Rents and Current Transfer: per population.

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[3] We used a lineal trend to estimate annual economically active population because we only have information for 2001, 2005, 2010 and 2015.

**Appendix B. Summary of taxes, expenditure and transfers by provinces: 1995-2010**

Table B.1 summarizes regional information on GGP per capita, expenditures (which are classified into three categories: social services, economic services, and defense plus safety plus public administration), together with national transfers to the provinces. This table also summarizes national resources (which include VAT, income tax, tax on personal assets, *monotributo*, trade taxes, social security and others). "Residuum Expenditure" is the difference between Expenditures and taxes that finance expenditures ("Taxes for expenditure"); Residuum Transfer" is the difference between Transfers and taxes that finance them. Finally, "Residuum" is the sum of Expenditure and Transfer Residua.

**Table B.1. Average per capita national expenditures, transfers and revenues**

| Jurisdiction | GGP per capita | | Expenditure + Transfer | | Expenditure | | Transfer | | Taxes for Expenditure | | Taxes for Transfer | | Residuum Expenditure | Residuum Transfer | Residuum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mean | s.d | mean | s.d | mean | s.d | mean | s.d | mean | s.d | mean | s.d | mean | mean | mean |
| City Bs As | 77,476 | 15,465 | 7,636 | 2,421 | 7,305 | 2,278 | 331 | 176 | 6,162 | 1,716 | 3,186 | 702 | 1,143 | -2,854 | -1,712 |
| Buenos Aires | 24,646 | 4,297 | 4,694 | 1,449 | 3,786 | 1,286 | 908 | 173 | 3,798 | 1,423 | 1,674 | 455 | -12 | -765 | -777 |
| Catamarca | 20,192 | 8,662 | 8,852 | 3,211 | 4,627 | 1,902 | 4,224 | 1,342 | 3,869 | 2,392 | 1,145 | 373 | 759 | 3,079 | 3,838 |
| Córdoba | 24,668 | 3,060 | 5,338 | 1,528 | 3,638 | 1,104 | 1,699 | 451 | 4,095 | 1,615 | 1,565 | 375 | -456 | 135 | -322 |
| Corrientes | 13,467 | 1,425 | 5,582 | 1,796 | 3,159 | 1,187 | 2,423 | 635 | 2,530 | 1,001 | 1,011 | 306 | 629 | 1,412 | 2,041 |
| Chaco | 12,565 | 1,193 | 6,278 | 1,883 | 3,282 | 1,074 | 2,995 | 869 | 2,551 | 924 | 1,022 | 278 | 731 | 1,973 | 2,705 |
| Chubut | 38,983 | 5,398 | 8,526 | 1,820 | 5,522 | 1,352 | 3,003 | 625 | 6,447 | 2,455 | 2,485 | 472 | -924 | 519 | -406 |
| Entre Ríos | 18,354 | 3,117 | 6,070 | 1,719 | 3,539 | 1,085 | 2,531 | 668 | 3,232 | 1,340 | 1,253 | 367 | 307 | 1,278 | 1,585 |
| Formosa | 11,690 | 1,034 | 7,443 | 2,231 | 3,036 | 1,172 | 4,408 | 1,116 | 2,332 | 835 | 946 | 265 | 704 | 3,461 | 4,165 |
| Jujuy | 14,374 | 1,622 | 6,795 | 1,465 | 3,882 | 949 | 2,914 | 555 | 2,695 | 999 | 1,071 | 281 | 1,187 | 1,843 | 3,030 |
| La Pampa | 18,151 | 1,414 | 6,975 | 3,346 | 3,928 | 2,200 | 3,046 | 1,163 | 3,275 | 1,682 | 1,355 | 565 | 653 | 1,692 | 2,345 |
| La Rioja | 14,106 | 1,770 | 8,880 | 2,846 | 5,045 | 1,882 | 3,835 | 1,083 | 2,780 | 1,290 | 1,155 | 420 | 2,265 | 2,680 | 4,945 |
| Mendoza | 20,729 | 4,005 | 5,082 | 1,865 | 3,648 | 1,427 | 1,434 | 457 | 3,248 | 1,367 | 1,371 | 460 | 400 | 63 | 463 |
| Misiones | 19,360 | 3,518 | 5,406 | 1,273 | 3,110 | 906 | 2,296 | 409 | 2,883 | 832 | 1,156 | 222 | 228 | 1,139 | 1,367 |
| Neuquén | 61,305 | 6,812 | 7,985 | 2,403 | 4,866 | 1,479 | 3,118 | 1,036 | 4,923 | 783 | 1,797 | 384 | -56 | 1,321 | 1,265 |
| Río Negro | 25,087 | 3,049 | 7,837 | 2,391 | 4,897 | 1,782 | 2,941 | 651 | 3,992 | 1,292 | 1,663 | 405 | 905 | 1,278 | 2,182 |
| Salta | 13,146 | 1,268 | 6,597 | 1,234 | 4,160 | 894 | 2,437 | 389 | 3,362 | 1,012 | 1,311 | 269 | 798 | 1,126 | 1,924 |
| San Juan | 13,438 | 2,498 | 7,382 | 2,219 | 4,370 | 1,448 | 3,012 | 810 | 3,075 | 1,628 | 1,148 | 336 | 1,294 | 1,864 | 3,158 |
| San Luis | 25,044 | 1,997 | 7,264 | 2,434 | 4,028 | 1,525 | 3,235 | 944 | 3,005 | 1,259 | 1,201 | 378 | 1,023 | 2,035 | 3,058 |
| Santa Cruz | 58,797 | 3,239 | 10,379 | 2,290 | 4,725 | 1,521 | 5,654 | 899 | 7,282 | 3,503 | 2,547 | 799 | -2,557 | 3,107 | 549 |
| Santa Fe | 31,410 | 3,986 | 6,465 | 1,370 | 4,469 | 1,003 | 1,996 | 410 | 5,347 | 2,163 | 1,891 | 354 | -878 | 104 | -773 |
| S. del Estero | 11,470 | 1,873 | 7,231 | 1,983 | 4,125 | 1,211 | 3,106 | 820 | 2,565 | 1,012 | 999 | 275 | 1,560 | 2,108 | 3,667 |
| Tucumán | 13,918 | 1,738 | 6,095 | 1,837 | 3,962 | 1,335 | 2,133 | 537 | 3,102 | 1,025 | 1,261 | 270 | 860 | 872 | 1,732 |
| T. del Fuego | 69,908 | 4,907 | 12,232 | 2,593 | 4,668 | 2,302 | 7,564 | 1,220 | 6,657 | 2,313 | 2,828 | 747 | -1,989 | 4,737 | 2,748 |
| Argentina | 27,392 | 4,164 | 5,802 | 1,666 | 4,134 | 1,290 | 1,668 | 399 | 3,921 | 1,433 | 1,655 | 407 | 213 | 13 | 226 |
| C.A.B.A.+ PBA | 33,783 | 5,976 | 5,232 | 1,601 | 4,413 | 1,440 | 819 | 172 | 4,232 | 1,467 | 1,944 | 493 | 182 | -1,125 | -944 |

Note: Period 1995-2010 in constant 2010 values.

**Appendix C. Redistribution and stabilization effects. Analysis by sub-periods: 1995-2001 and 2003-2010**

In the main body of the paper it was mentioned that, considering the possibility that institutional frameworks and macroeconomic regime may play an important part in these effects, we performed the redistribution and stabilization tests for two different sub-periods.

The period covered in this paper can be divided into two important sub-periods in the Argentinean history: the *90s* and the first decade of the *2000s*. From a macroeconomic perspective, the period between 1991 and 2001, known as the *90s* decade, was characterized by an economy with low inflation, 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 a growing economy and increasing inflation 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. Therefore, the whole period is characterized by two business cycles, both with pronounced peaks and recessions with two completely different behaviors of fiscal balances (deficit during 1995-2001 and surplus in 2003-2010).

**Table C.1. Redistribution and stabilization effects of national fiscal policy on GGP.**
**Sub-periods 1995-2001 and 2003-2010.**

| Measure | | Redistribution | | Stabilization | | |
|---|---|---|---|---|---|---|
| | | Eq. (6) | Eq. (7) | Eq. (8) | Eq. (9) | Eq. (10) |
| **Time period 1995-2001** | | | | | | |
| 1. National Expenditure + Transfers | Coefficient | 0.970 | 0.970** | 0.863 | 0.885* | 0.937 |
| | s.e. | (0.032) | (0.012) | (0.093) | (0.059) | (0.075) |
| | N | 24 | 168 | 144 | 168 | 168 |
| | adj. $R^2$ | 0.990 | 0.990 | 0.610 | 0.727 | 0.556 |
| 2. National Expenditure | Coefficient | 0.973** | 0.972*** | 0.900 | 0.872* | 0.962 |
| | s.e. | (0.007) | (0.005) | (0.086) | (0.074) | (0.072) |
| | N | 24 | 168 | 144 | 168 | 168 |
| | adj. $R^2$ | 0.999 | 0.998 | 0.627 | 0.68 | 0.57 |
| 3. Transfers | coef. | 0.997 | 0.998 | 0.973 | 1.017 | 0.982 |
| | s.e. | (0.0359) | (0.0133) | (0.0251) | (0.0324) | (0.0258) |
| | N | 24 | 168 | 144 | 168 | 168 |
| | adj. $R^2$ | 0.993 | 0.993 | 0.954 | 0.960 | 0.947 |
| **Time period 2003-2010** | | | | | | |
| 1. National Expenditure + Transfers | Coefficient | 0.934*** | 0.935*** | 0.981 | 0.985 | 0.987 |
| | s.e. | (0.014) | (0.005) | (0.035) | (0.023) | (0.030) |
| | N | 24 | 192 | 192 | 192 | 192 |
| | adj. $R^2$ | 0.985 | 0.985 | 0.932 | 0.963 | 0.921 |
| 2. National Expenditure | Coefficient | 0.955 | 0.956*** | 0.968 | 0.966* | 0.973 |
| | s.e. | (0.034) | (0.012) | (0.028) | (0.019) | (0.022) |
| | N | 24 | 192 | 192 | 192 | 192 |
| | adj. $R^2$ | 0.993 | 0.993 | 0.945 | 0.975 | 0.936 |
| 3. Transfers | Coefficient | 0.979 | 0.979* | 1.012 | 1.016* | 1.013 |
| | s.e. | (0.036) | (0.012) | (0.009) | (0.009) | (0.010) |
| | N | 24 | 192 | 192 | 192 | 192 |
| | adj. $R^2$ | 0.991 | 0.991 | 0.993 | 0.993 | 0.991 |

Notes: all panel data cases (stabilization equations) include fixed effect by province, which controls for local heterogeneities. Asterisks accompanying coefficients correspond to the significance of the test β or γ ≠ 1: *** significant at 1%, ** significant at 5%, * significant at 10%. Robust standard errors (s.e.) in parenthesis.

Table C.1 presents the regression results for both sub-periods. The top panel (period 1995-2001) shows that the stabilization effect of national fiscal policy is approximately 7%-14% while the redistribution effect is weak (about

3%). The bottom panel (period 2003-2010) shows that the redistribution effect is approximately 6%, mainly explained by government spending, while the stabilization effect is practically nil. The assessment of the effect of national fiscal policy in different macroeconomic regimes suggests that the redistribution goal is facilitated in times of fiscal leeway. On the contrary, the stabilization effect was more relevant during the hard-budget sub-period but disappeared when the fiscal restraints became more flexible.[4]

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[4] Results from equation (9) are similar to those in equations (8) and (10) because the time sub-division is done in the period of crisis (year 2002). Trends in provincial per capita GGPs are less marked within each sub-period.