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Interdependence among fiscal policy, inequality
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INTERDEPENDENCE AMONG FISCAL POLICY, INEQUALITY AND ECONOMIC GROWTH AT A PROVINCIAL LEVEL IN ARGENTINA. 1995-2010.*

Walter Cont, Alberto Porto and María Minatta**

Abstract

This paper estimates a complete empirical model of the joint determinants of fiscal policy, inequality and economic growth in Argentina. To this end, we construct a balanced panel data of the 24 Argentinian jurisdictions for the period 1995-2010 and estimate two types of equations systems: a simultaneous equation model, which considers the interdependence between the variables considered, and a system of seemingly unrelated regressions, which generates gains in efficiency. The paper is novel in applying this strategy at a subnational level. The main results are the following. There is a *trade-off* between inequality and growth but growth has a slightly positive effect on (reducing) inequality. Distributive expenditures reduce inequality without harming growth if they are financed with direct taxes; other ways of financing introduce distortions on efficiency or equity dimensions that may cancel out (or at least make unclear) the expected effects. Direct taxes are a strong instrument when the government needs to raise funds. Tax reforms that seek to reduce global tax levels could take the opportunity of increasing the share of direct taxes.

Key words: fiscal policy, inequality, economic growth, subnational governments.

Resumen

Este trabajo estima un modelo de determinación conjunta de política fiscal, desigualdad y crecimiento para la Argentina. Se construye un panel balanceado con las 24 jurisdicciones sub-nacionales para 1995-2010. Se estiman dos tipos de sistemas de ecuaciones: un sistema de ecuaciones simultáneas que tiene en cuenta la interdependencia entre las variables y un sistema de regresiones aparentemente no relacionadas que genera ganancias de eficiencia. El trabajo es novedoso ya que a nuestro saber es el primero que aplica esta estrategia a nivel sub-nacional. Los principales resultados son los siguientes. Hay un *trade-off* entre desigualdad y crecimiento, pero el crecimiento tiene efecto levemente positivo sobre la desigualdad. Los gastos distributivos reducen la desigualdad sin afectar negativamente el crecimiento, cuando son financiados con impuestos directos. Otras formas de financiamiento introducen distorsiones en la eficiencia o en la equidad que pueden compensar los efectos positivos. Los impuestos directos son un importante instrumento para aumentar la recaudación. De este modo, una política que busque reducir la presión tributaria global debería, a la vez, incrementar su participación en la presión impositiva global.

Palabras clave: política fiscal, desigualdad, crecimiento económico, gobiernos subnacionales.

JEL: H7, H5, I3

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INTERDEPENDENCE AMONG FISCAL POLICY, INEQUALITY AND ECONOMIC GROWTH AT A PROVINCIAL LEVEL IN ARGENTINA. 1995-2010.

1. Introduction

This paper estimates a complete empirical model of the relationship between fiscal policy, inequality and economic growth in Argentina. In the economic literature there has been a growing concern on the interaction between fiscal policy and economic performance on both efficiency and equity dimensions. A strand of this literature, starting with Benabou (2000), is worried on different performances (or “unequal societies”) arising from common fundamentals. The author began a series of research (2000, 2002, 2005), which was followed by several works of Ramos and Roca-Sagalés (2008), Roca-Sagalés and Sala (2011) and Muínelo-Gallo and Roca-Sagalés (2011, 2013). Specifically, economic policy decisions may be strongly affected by gross (that is, before fiscal policy) income inequality and strongly affect the joint evolution of performance in both economic growth and net (or ex post) distribution of income.

We move in two directions, which make the contribution novel. First, we concentrate on a developing country –Argentina– located in Latin America. Second, we take the analysis to a sub-national level. The first direction is important in itself as there has been little research on specific countries (with the exception of UK and Sweden, studied by Ramos and Roca-Sagalés, 2008, and Roca-Sagalés and Sala, 2011) and no research (as of our knowledge) on a developing country. The second direction is also relevant in itself as we push the idea of different societies with common fundamentals a step further. In a country (for the case, Argentina) the social contract can be understood as set at the national level although differ at a jurisdictional level in terms of output and income distribution. Hence, the questions of the effect of fiscal policy on income distribution and growth and the relationship between outcomes in different dimensions gain relevance.

Section 2 places this research within the literature on growth, inequality and fiscal policy. Section 3 briefly describes the case of Argentina. Section 4 details the econometric strategy. Section 5 presents the main results and Section 6 concludes. Complementary material is relegated to the Appendix.

2. Literature on growth, inequality and fiscal policy

2.1. Main relationships

This section reviews the most relevant papers on growth, income inequality and policy variables linked to our paper. A starting work is Barro (1999), who explores several theories that assess the

macroeconomic relationship between economic growth and inequality, with offsetting effects. Active income redistribution appears to involve a tradeoff between the benefits of equality and a reduction in overall economic growth. The author claims that the Kuznets curve –whereby inequality first increases and later decreases during the process of economic development– emerges as a clear empirical regularity, having found that higher inequality tends to retard growth in poor countries and encourage growth in rich ones.

In a challenging paper, Welch (1999) says “I believe inequality is an economic ‘good’ and consider that it has received too much bad press”. Focusing on labor markets the author emphasizes that wage inequality is good since it signals labor and skill scarcity, provides incentives for investments in human capital and compensates for different job attributes. But, on the other hand, inequality becomes destructive when society does not view effort as worthwhile and upward mobility is perceived unlikely or even impossible.

Traditional political economy models, under the assumption of perfect capital markets, highlight that a greater degree of inequality motivates redistribution through the political process; higher redistributive transfers and the associated taxes distort economic decisions reducing investment and growth. On the other hand, in models with credit-market imperfection, the limited ability to borrow means that rates of return on investment opportunities are not necessarily equated at the margin because the exploitation of investment opportunities depends, to some extent, on individuals’ levels of assets and incomes. If capital markets and legal institutions tend to improve as economies develop, then this effect may have a positive effect on both equality and growth.

Socio-political arguments stress that the tendency for redistribution to reduce crimes and riots provides a mechanism whereby this redistribution and the resulting greater income equality would enhance economic growth (see also Alesina and Rodrik, 1994). According to Persson and Tabellini (1994, p. 618), inequality is harmful for growth because, through the political-economy process, it leads to the demand of redistribution that do not protect property rights, affecting investment negatively. On another hand, in economies where saving rates increase with the level of income, redistribution of resources from rich to poor tends to lower the aggregate saving rate, and hence a reduction in inequality tends to affect investment negatively (this effects arises if the economy is partially closed, so that domestic investment depends, to some extent, on desired national saving). In this case, more inequality would enhance economic growth (Barro, 1999).

Although there is no agreement on the sign of the relationship, economy models stress that fiscal policy can play a major role in explaining the evolution of both macro aggregates. In this sense, fiscal policy is considered as an endogenous variable that reflects the voters’ preferences for income distribution (Persson and Tabellini, 2000, ch. 14).

Through the empirical model proposed, we test the relationships between fiscal policy, inequality and growth and evaluate the main determinants of different fiscal policy outcomes and their impact on the evolution of economic growth and net income inequality.

2.2. Control variables

When we estimate the effects of inequality and fiscal policy on growth, we use a specification that is commonly accepted in the cross-country growth literature. We consider initial income, population growth (Barro, 1991), human capital and a measure of trade openness (Lundberg and Squire, 2003; Mendoza *et al.*, 1997).

The equation on income inequality is based on the empirical approaches of Castelló and Doménech (2002), Li and Zou (1998), Li *et al.* (1998), and Lundberg and Squire (2003). Controls for the inequality equation should include a measure of educational inequality as a proxy of asset inequality, but given a lack of information at the subnational level, we use a measure of educational level instead.

Control variables for the fiscal policy equations are like those that appear in the theoretical model by Benabou (2000). Institutional, demographic and economic variables have been considered as additional control variables, following Persson and Tabellini (2000, 2003). To capture political economy effects on fiscal policy and inequality we use the number of senators and house representatives, whether the province is governed by a Peronist governor and whether there is alignment between the political parties at the national and provincial levels (official party). In order to take into account the influence of the differences in provincial levels of development, we include each jurisdiction's (lagged) per capita income as an explanatory variable. We also include the percentage of the population aged 65 years old or more to assess the link between demographic composition of the population and government expenditures. In addition, we incorporate public employment to test the bureaucracy theory (Niskanen, 1968). This theory proposes that bureaucrats expand public expenditure beyond the efficient level in order to maximize their power. A measure of the power of bureaucracy used in empirical papers is the relationship between public employees and total employment at the jurisdiction (Borcherding *et al.* 1977).¹ Second generation theories of fiscal federalism (Oates, 2005; Weingast, 2009) study performance of subnational governments in absence of a hard budget constraint due to intergovernmental transfers that allows them to live beyond their means (higher expenditures and subsidies, lower taxes, and so on). Additionally, empirical studies have shown that transfers have a larger effect on the increase of expenditure than income; this finding has been baptized as flypaper effect

¹ We consider provincial public employment to population because we do not have information of total public employment.

(Hines and Thaler, 1995). To consider these effects, we incorporate the ratio of transfers to total income of the jurisdictions as a control variable. Finally, several works have studied the effects of globalization on the level and structure of public expenditure and other variables in the public sector (Azzimonti, de Francisco and Quadrini, 2014; Garrett, 1998; Heinemann, 2000; Rodrik, 1997; Rodrik, 1998). Papers that concentrate specifically on the impact of globalization on the level and structure of public expenditures have distinguished two effects: “efficiency” and “compensation”. The efficiency approach states that the government reduces taxes and social expenditures while preserving the functions of essential public goods such as defense, security and justice in order to promote international trade and attract investments (Breton and Ursprung, 2002, Sinn, 2004). Under this framework, globalization reduces the range and size of welfare programs. The compensation approach proposes the opposite effect. The government faces a role of insurer, compensating –through social welfare programs– individuals and / or regions that may be adversely affected by economic openness and globalization (Cameron, 1978, Rodrik, 1998). In this sense, Porto *et al.* (2016) find that, at a subnational level, economic openness and globalization have a negative impact on the participation of social expenditures. Goode (1984) found that more open economies have larger governments that might reflect the increased demand for social insurance in more open economies or the readily available tax bases resulting from taxes on exports and imports. Both effects may cancel so that the level of openness and globalization may not alter the composition and / or size of the public sector.

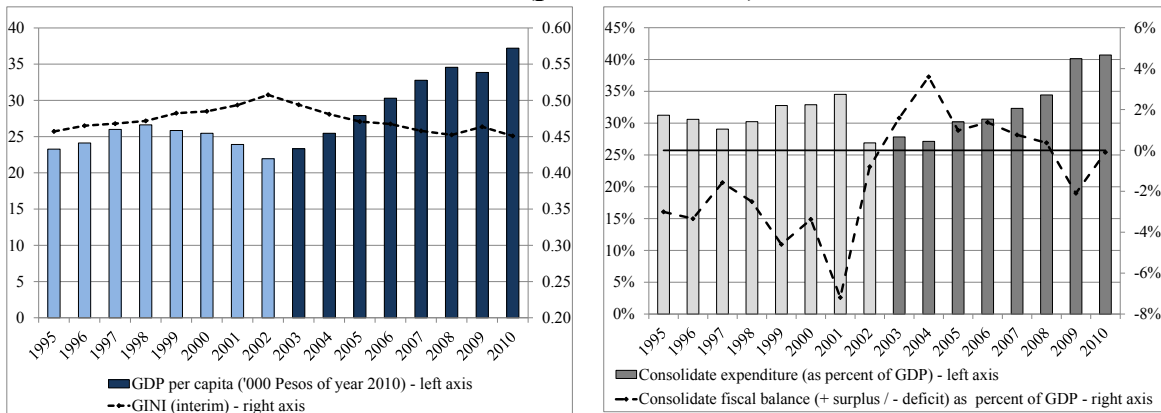
3. The case of Argentina

Argentina is a country located in South America. Average per capita income ascended to US\$9,000 in 2010. This average, however, hides large regional disparities, with provincial incomes ranging from US\$ 27,508 in the city of Buenos Aires to US\$ 3,781 in the province of Santiago del Estero. Such disparities also hold for other social indicators (Unsatisfied Basic Needs, for example), although other indicators may indicate less provincial heterogeneity (Human Development Index). Table A1 in the Appendix contains detailed information on these indicators.

During the period under study (1995-2010) Argentina underwent different socioeconomic stages. A first sub-period is part of the so-called Convertibility, which was a socio-economic regime characterized by fixed exchange rate, macroeconomic stability and tight fiscal accounts. During this period, the economy moved from growth and increasing inequality (1995-1998) to recession and increasing inequality (1999-2002), to an economic crisis in 2002. A second sub-period is known as “post-Convertibility”, and is characterized by high real exchange rate, high inflation and slack fiscal accounts. During this period the economy engaged in steady growth accompanied

by decreasing inequality (2003-2010). The left panel of Figure 1 shows the evolution of GDP and of income inequality.

Figure 1. Evolution of per capita GDP (in thousands of constant Pesos of 2010), income inequality (Gini index), and consolidated –national and provincial– fiscal expenditure and balance (percent of GDP)



The consolidated nation-provinces expenditure oscillated between 29 percent and 35 percent of GDP during 1995-2001, to later plummet to around 27 percent of GDP during a three-year period.² Since then, it grew constantly to peak 40 percent in the last year of the sample (and 45 percent in 2014). Tax pressure kept it up to a higher pace, from 28 percent of GDP in 1995-2001 to 34 percent of GDP in 2003-2010, turning the fiscal balance from an average 4-percent deficit to an average 1-percent surplus (see right panel of Figure 1).

Table 1 summarizes the evolution of expenditures and taxes through several decompositions (as shares of expenditures or taxes, respectively), comparing averages for the total sample and the two selected sub-periods.³ Some interesting observations emerge from this table. First, the sum of social spending on education and health remained stable (about 26 percent) between periods. Social security, which is mostly direct expenditure, lost 2 points of share from between 1995-2001 and 2003-2010, which were gained by direct transfers in social promotion and assistance, and work plans. Subsidies on the consumption of energy (natural gas and electricity) and transport are the main component of economic services, which increased 5 points of share in total

² Municipal budgets are excluded because detailed information is unavailable. They represent 8 percent of total expenditure in Argentina. Nonetheless, they are indirectly considered in the analysis through the transfers from provinces to municipalities (which represent about half of municipal expenditures).

³ In this paper we define expenditures into two categories: distributive (social protection, health, housing and education) and non-distributive (general services, defense, public order and safety and economic affairs). Revenues are classified into three categories: direct taxes (taxes on income, profits and capital gains, payroll taxes and property taxes), indirect taxes (taxes on goods and services, taxes on international trade and transactions), and other revenues (other taxes, grants and other revenues).

expenditure. Finally, provincial expenditure gained 1 point of share between 1995-2001 and 2003-2010 (concentrated on social services).

Table 1. Argentina. Composition of consolidated (nation-provinces) expenditures and taxes. Selected periods 1995-2001 and 2003-2010

	1995-2010	1995-2001	2003-2010		1995-2010	1995-2001	2003-2010
Percent of Total Expenditure				Percent of Total Revenues			
Administration, defense, safety	21%	22%	20%	Production, consumption, trade	50%	47%	52%
Social services	61%	60%	61%	- VAT	21%	23%	20%
- Education and health	26%	26%	25%	- Export taxes	5%	0%	8%
- Social security	26%	27%	25%	- Other domestic taxes	22%	21%	22%
- Promotion, assistance, work	7%	6%	8%	- Other trade taxes	3%	3%	2%
- Other social services	3%	2%	3%	Income and assets	38%	38%	37%
Economic services	9%	7%	12%	- Income + asset taxes	15%	13%	17%
- Energy	2%	0%	3%	- Social security contributions	20%	21%	18%
- Other economic services	8%	6%	9%	- Other taxes on income	3%	4%	2%
Debt services	8%	10%	7%	Other taxes	12%	15%	10%
National expenditure	54%	54%	53%	National taxes	76%	74%	77%
Provincial expenditure	46%	46%	47%	Provincial taxes	24%	26%	23%

Source: own elaboration based on public national and provincial accounts.

On the revenue side, there has been an increase in the share of taxes on production, consumption and transactions, from 47 percent of total taxes in 1995-2001 to 52 percent in 2003-2010, and a slight reduction of taxes on income and assets (from 38 percent to 37 percent) and other taxes. Within production and transaction taxes, there was a shift from VAT (from 23 percent to 20 percent) to export taxes (from 0 to 8 percent). On the other hand, within direct income taxes there was a shift of social security contributions (from 21 percent to 18 percent), to –mostly personal– income and asset taxes (from 13 percent to 17 percent). Finally, taxation shifted away from provincial resources to national resources (from 74 percent to 77 percent).

4. The empirical model

We construct a system of three equations that describes the relationship among endogenous variables: (I) economic growth, (II) net income inequality and (III) fiscal policy outcomes, closely following Muinelo-Gallo and Roca-Sagalés (2013). Then we estimate the system of equations for a balanced panel of the 24 Argentinean jurisdictions during the period 1995-2010.

4.1. Econometric model

Growth equation

Regional growth in per capita GDP (Δy) is related to net inequality (NI , as in Barro, 1990, and Barro and Sala-i-Martin, 1992), fiscal policy (FP , as in Kneller *et al.*, 1999, to avoid biases that an incomplete specification of the government budget constraint could imply) and other non-fiscal control variables (X vector):

$$\Delta y_{it} = \alpha + \kappa NI_{it} + \beta \sum_{k=1}^K X_{it}^k + \sum_{j=1}^{m-1} (\gamma_j - \gamma_m) FP_{it}^j + u_{it} \quad (1)$$

where sub-index it refers to province i in period t . To avoid collinearity, we use a vector FP of fiscal variables that includes all but one element. The omitted variable within FP_{it} is assumed to be the compensating instrument in the government's budget constraint. This way the interpretation of the estimated coefficient of each fiscal variable is the net effect of a unit change in the relevant fiscal variable compensated by a unit change in the omitted variable.

Economic inequality

In line with Li and Zou (1998), Li *et al.* (1998), Castelló and Doménech (2002), and Lundberg and Squire (2003), net inequality depends on growth, fiscal policy and non-fiscal control variables (Z vector):

$$NI_{it} = \delta + \omega \Delta y_{it} + \psi \sum_{l=1}^L Z_{it}^l + \sum_{j=1}^{m-1} (\zeta_j - \zeta_m) FP_{it}^j + \varepsilon_{it} \quad (2)$$

Fiscal policy

The fiscal policy outcome j -th (which is the excluded one in the previous equations) depends on lagged gross inequality (GI , i.e., income before taxes and government transfers) and a set of control variables (vector W). This configuration is based on the empirical approaches of Persson and Tabellini (2000, 2003), and

$$FP_{it}^j = \chi + \lambda GI_{i(t-1)} + \phi \sum_{g=1}^G W_{it}^g + \eta_{it} \quad (3)$$

To carry out the estimation we consider two types of equation systems. The first one is the Simultaneous Equation Model (SEM) on (1)-(3), which makes it possible to analyze the joint interdependence between growth, inequality and fiscal policy variables. The second approach is the Seemingly Unrelated Regressions Model (SUR) which assumes that the explicit relationship between endogenous variables is null ($\kappa=0$ in equation (1) and $\omega=0$ in equation (2)), and that disturbances from the different equations at a given point in time are correlated because of common unobservable factors. This way, the SUR system exploits the efficiency gains derived from the assumed interdependence of the error terms of the three equations but at the cost of omitting the interactions among the relevant variables.

In both approaches, in order to avoid endogeneity problems, fiscal policy and net inequality (the latter only appears on the SEM growth equation) are lagged one period in the growth equation and gross inequality is lagged one period in the fiscal policy equation. This control is not necessary in the net inequality equation as the explained variable is ex post.

4.2. Description of the data

The data panel consists of 24 provincial jurisdictions in Argentina (23 provinces and the city of Buenos Aires) covered from 1995 to 2010. Table 2 shows the relevant variables.

Table 2. Description of the variables

VARIABLES	Description; unit of measure
GDP	Real GDP per capita, in logs
Growth	Annual GDP growth
Initial GDP	1995 per capita GDP, in logs
Gross income inequality	Gini index of gross income
Net income inequality	Gini index of net –extended– income
Population growth	Annual growth rate of population
Education level	Alphabetized population as a percentage of total population
Trade – KOFA Index	Proxy that measures globalization from different angles
Distributive expenditure	Expenditures on social protection, health, housing and education, as a share of GDP.
Non-distributive expenditure	Expenditures on general public services, defense, public order and safety, and economic affairs as a share of GDP
Direct taxes	Revenues of general government due to direct taxes as a share of GDP
Indirect taxes	Revenues of general government due to indirect taxes as a share of GDP
Deficit	Total revenues minus total outlays of general government as a share of GDP
Peronist party	Dummy that takes the value of 1 if the ruling party is Peronist and zero otherwise
Population >65 years	Population ages 65 and above as a percentage of the total population
Senators	Senators per million of habitants
House representatives	House representatives per million of habitants
Official party	Dummy that takes the value of 1 if the ruling party at the jurisdictional level is the same as at the national one and zero otherwise
Provincial employment	Provincial public employment to total population
Transfers effect	Transfers to total income

Data on economic, political and social variables is obtained from several sources such as *Ministerio de Hacienda y Finanzas Públicas*, INDEC, CFI, ASAP, INDEC and ECLAC.⁴

As it is standard in the literature, the growth variable Δy_{it} is calculated on the per capita GDP, net inequality NI is measured by the Gini index of inequality after considering the effects of fiscal

⁴ This data is included in Cont and Porto (2017). Interested readers are referred to this source.

policy, gross inequality GI is measured by the Gini index of inequality before disentangling the effects of fiscal policy.

We use three-year averages for all the variables for two main reasons. First, because year-to-year changes in fiscal policy variables and several control variables are not expected to have effect on changes in economic growth and inequality. Second, because taking three-year averages reduces the short run fluctuations and therefore the influence of the economic cycle allowing us to focus on the structural relationships. After calculating the averages we are left with 5 observations for each jurisdiction, totaling 120 observations. This strategy is also followed by Muínelo-Gallo and Roca-Sagalés (2013).

5. Results

Table 3 presents the results obtained from the SEM model. Table A2 in the Appendix compares these results with those of the SUR model

In the first equation, we find a positive significant impact of inequality on economic growth. This result points out the fact that reducing inequality comes at the cost of harming growth and is in line with the arguments that indicate that inequality is good for incentives and therefore good for growth. On the other hand, the relationship between growth to net inequality is not statistically significant. However, in three out of four equations, the sign is negative, which may suggest that provinces with higher growth rate may experience some spillovers on income distribution. This combination of results is in line with those obtained by Muínelo-Gallo and Roca-Sagalés (2013) for OECD countries. Also, Cont and Porto (2016) find similar results when analyzing the relationship between inequality and the level of GDP (rather than growth). Therefore, the result of provinces being on the negative-sloped side of the Kuznetz's inverted-U relationship seems to be strong, both at the GDP level and at its growth.

In the first equation, we obtain that levels of per capita GDP have no significant effect on GDP growth, in line with papers that find no convergence in Argentinian provinces (Elías, 1995; Porto, 1995; Wellington, 1998; and Llach and Grotz, 2013). Also, population growth has no significant effect on growth.

Provinces with higher level of education show higher levels of growth rates (in line with Barro, 1991) and lower levels of inequality, so that improvements in education achievements are an important tool to jointly improve growth and income distribution. Higher exposure to international trade is associated with higher levels of growth rates; this result is also found by Frankel and Romer (1999), Rodríguez and Rodrik (2000), and Greenaway *et al.* (2000). The effects of other institutional variables on inequality are not found to be significant.

Table 3. Regression results – SEM model

VARIABLES	Growth			
Net inequality (lagged)	0.475***	0.569***	0.371***	0.510***
Initial GDP	-0.025	-0.069	-0.083	-0.035
Population growth	-0.009	-0.013	-0.015	-0.010
Education level (human capital)	1.351**	1.664***	1.026*	1.629***
Trade	0.559***	0.622***	0.551***	0.754***
Distributive expenditure (lagged)		-0.944**	-0.158	-0.274
Non-distributive expenditure (lagged)	-0.726		-0.837*	-0.029
Direct taxes (lagged)	0.591*	1.530***		1.204**
Indirect taxes (lagged)	0.747**	0.911***	1.205***	
Constant	-1.557***	-1.717***	-0.907	-1.773***
Observations	120	120	120	120
R-squared	0.466	0.477	0.455	0.453
VARIABLES	Net Inequality			
Education level	-2.443***	-2.326***	-2.436***	-2.396***
Growth	-0.064	0.028	-0.117	-0.048
Distributive expenditure		0.311	-0.472***	0.096
Non-distributive expenditure	-0.774***		-0.883***	-0.721***
Direct taxes	-0.678***	-1.096***		-0.767**
Indirect taxes	0.126	-0.728***	0.395	
Peronist party	0.009	0.007	0.007	0.010
Constant	3.118***	3.003***	3.122***	3.072***
Observations	120	120	120	120
R-squared	0.667	0.632	0.657	0.666
VARIABLES	Distributive expenditure	Non-distributive expenditure	Direct taxes	Indirect taxes
Trade	0.197*	0.113	0.199***	0.522***
Gross inequality (lagged)	0.003	-0.0734*	0.006	0.011
Population >65 years	1.285**	0.521	0.197	0.267
GDP (lagged)	-0.349***	-0.157***	-0.117***	-0.096***
Senators	-0.413	0.170	-0.334	1.137*
Representatives	0.447	-0.011	0.176	-0.645*
Official party	0.009	0.013	0.013*	0.014**
Provincial employment	2.991***	2.433***	0.661***	0.374
Transfers effect	0.198***	0.168***	0.059	-0.071**
Constant	1.224***	0.564***	0.463***	0.489***
Observations	120	120	120	120
R-squared	0.727	0.739	0.569	0.663

Notes: see full table in Appendix – Table A2. Statistical significance: * 10%; ** 5%; *** 1%.

The effect of fiscal policy from the expenditure side on growth is quite limited. We find that provinces that contribute more to both direct and indirect taxation (independently of the financing instrument) display higher growth rates. However, the effect on income distribution depends on the combination of fiscal instruments. Non-distributive expenditures and direct taxes are found to

decrease inequality, independently of how they are financed. Distributive expenditures reduce inequality only when financed with direct taxes. And indirect taxes reduce inequality only when financed with non-distributive expenditure.

These results are interesting when re-designing fiscal systems. First, they suggest that distributive expenditures (being education and health the most important ones) reduce income inequality without harming growth if they are financed with direct taxes. Other ways of financing distributive expenditures introduce distortions on efficiency or equity dimensions that may cancel out the expected effects. Second, a unique characteristic emerges with direct taxes, in that they are a source of contribution to growth and income distribution (even more in the latter dimension if complemented with distributive expenditure). In any case, tax reforms that seek to reduce global levels could, at the same time, increase the share of direct taxes.⁵ Finally, it is striking that non-distributive expenditures look like a redistributive tool, but they have a clear negative effect on growth when replacing distributive expenditures or being financed by direct taxes. We consider that further research should be in order, given that we only considered the level of expenditure, while a full analysis on redistribution should ponder both level and the progressive effect.⁶

The lower panel of the table shows the regression of economic and institutional variables on fiscal policy. First, the level of GDP is negatively related to the four fiscal instruments. Provinces with higher initial GDP have lower expenditure and lower taxes, which is reasonable in Argentina. The way that fiscal policy works is that the city of Buenos Aires, and the provinces of Buenos Aires, Córdoba, Mendoza and Santa Fe finance the other provinces. Some of the beneficiaries of regional redistribution are provinces with lower per capita GDP (poor provinces like Chaco) but also provinces with higher per capita GDP (low density provinces, like Santa Cruz). Second, there is a negative relationship between ex-ante inequality and non-distributive expenditure, which is a reasonable result. Third, the relationship between openness and size of fiscal policy is positive (in the case of non-distributive expenditures the effect is not significant). This evidence is consistent with Porto et al. (2016) for provincial expenditures and Garbero (2016) for consolidated expenditures: the relationship between openness and the size of total expenditures is positive. Fourth, provinces with a higher share of population in retirement age demand more expenditure (both distributive and non-distributive), which is reasonable.

⁵ Of course, this assessment is based on the growth and inequality effect. Usually, taxes that are easy collect are also distortionary and less transparent.

⁶ First, this effect was already identified in Cont and Porto (2016). The authors find a stronger effect of economic services than social services on ex post inequality. Second, Cont and Porto (2015) analyze the distributive impact of consolidated budgets and show that social expenditure is more progressive than expenditure on economics services and administration (which, together, constitute the non-distributive expenditure in this paper). Also, the size of social expenditure doubles the size of non-distributive expenditure.

Regarding the political control variables, we find weak evidence that redistributive expenditure is lower but contribution to indirect taxes is higher in provinces with more representation in the Senate, and the opposite result for provinces with more representatives in the House.⁷ Also, provinces which are aligned with the Governing Party spend slightly more, but contribute more taxes.

As expected from the theory of bureaucracy, provinces with higher public employment to total population (our measure of its power) present higher expenditures (distributive and non-distributive) and higher taxes. Finally, in line with the second-generation theory of fiscal federalism, provinces with higher share of transfers to total revenues have higher expenditures and also contribute more taxes (in particular, direct taxes).⁸

6. Conclusions

This paper estimates a complete empirical model of the relationship between fiscal policy, inequality and economic growth in Argentina. It takes the analysis to a sub-national level for 1995-2010 and follows the econometric strategy of Simultaneous Equation Model, which makes it possible to analyze the joint interdependence between growth, inequality and fiscal policy variables.

We find, on the one hand, a trade-off between two “luxuries”: equality and growth. But, on the other hand, provinces with higher growth rates may have a leverage on reducing inequality.

Some results are interesting for re-designing fiscal systems. Distributive expenditures (being education and health the most important ones) reduce inequality without affecting growth significantly if they are financed with direct taxes, but other ways of financing introduce distortions on efficiency or equity dimensions that may reduce or cancel out the expected effect. Non-distributive expenditures have an effect in reducing inequality although this striking result deserves a deeper analysis. Finally, direct taxes seem to be a strong instrument when the

⁷ This result does not enter into conflict with those obtained by Bercoff and Meloni (2009) and Porto, Cont and Juarros (2014). These authors estimate economic and political economy determinants of the geographic allocation of the national expenditure, transfers and/or national budget, and find a negative relationship between Senators and expenditure-taxes and a positive relationship between Representatives and expenditure-taxes. In this paper we proceed in two different directions. First, we consolidate national and provincial expenditures, which may introduce another effect, that low density and poorer provinces (with more representation in the Senate and in the House) have higher per capita provincial expenditure. Second, we decompose expenditure into redistributive and non-redistributive, which may be differently affected by the political economy variables. We do not perform a full comparison with the cited papers, but an interesting research line is whether and to what extent the national and provincial expenditures, on the one hand, and redistributive and non-redistributive expenditures, on the other hand, complement or substitute each other when interacting with political dimensions.

⁸ This last result is difficult to rationalize, as governments with soft budget constraints may engage in expenditures and taxes that are hard to explain.

government needs to raise funds so that tax reforms that seek to reduce global tax levels could, at the same time, take the opportunity of increasing the share of direct taxes.

Control variables have the expected signs and are in line with the empirical literature. Education improves distribution, there is no convergence among provinces, more open provinces have higher growth rates, and bureaucracy and the financing with transfers increase expenditures and taxes.

As it is always the case in empirical research, results should be taken with caution. However, there are many interesting research questions to pursue. One has to do with the robustness of results in a larger time span. Another interesting question could be the decomposition of national and provincial budgets in the interaction with inequality and growth. Some results found in this paper hide different effects from national and provincial budgets that may complement or substitute each other.

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Appendix.

Table A1. Regional indicators, 2010

Jurisdiction	Surface (sq km)	Population ('000)	Population density	GGP (million dollars)	Per capita GGP ('000 dollars)	Human Development Index (2011)	Unsatisfied basic needs
Buenos Aires	307,571	15,316	49.8	130,332	8,510	0.84	8%
City Bs As (CABA)	200	3,058	15291.5	84,128	27,508	0.89	6%
Catamarca	102,602	404	3.9	3,253	8,047	0.84	11%
Chaco	99,633	1,071	10.8	4,117	3,844	0.81	18%
Chubut	224,686	471	2.1	5,854	12,436	0.85	8%
Córdoba	165,321	3,397	20.5	26,671	7,852	0.86	6%
Corrientes	88,199	1,036	11.7	4,259	4,112	0.83	15%
Entre Ríos	78,781	1,282	16.3	7,861	6,132	0.84	8%
Formosa	72,066	556	7.7	1,919	3,453	0.81	20%
Jujuy	53,219	698	13.1	3,089	4,422	0.83	15%
La Pampa	143,440	341	2.4	1,823	5,338	0.86	4%
La Rioja	89,680	355	4.0	1,526	4,294	0.83	12%
Mendoza	148,827	1,766	11.9	12,282	6,956	0.85	8%
Misiones	29,801	1,111	37.3	7,402	6,660	0.82	16%
Neuquén	94,078	565	6.0	7,780	13,764	0.86	10%
Río Negro	203,013	604	3.0	4,790	7,933	0.85	9%
Salta	155,488	1,267	8.2	5,006	3,950	0.83	19%
San Juan	89,651	715	8.0	3,293	4,605	0.83	10%
San Luis	76,748	457	6.0	3,020	6,611	0.83	8%
Santa Cruz	243,943	234	1.0	3,767	16,092	0.87	8%
Santa Fe	133,007	3,285	24.7	32,966	10,035	0.85	6%
Santiago del Estero	136,351	884	6.5	3,340	3,781	0.81	18%
Tierra del Fuego	21,571	134	6.2	2,551	19,081	0.88	14%
Tucumán	22,524	1,512	67.1	6,615	4,377	0.84	13%
Argentina	2,780,400	40,519	14.6	367,643	9,073	0.85	9%
(std. deviation)					0.64	0.03	0.51

Source: own elaboration based on INDEC Argentina (surface, population, and Unsatisfied Basic Needs), and United Nations (Human Development Index). GGP published by Council of Federal Investment (CFI) until 2006 and then updated by regional drivers, and expanded to the GPD using national accounts, with base 1993 Note: A: Advanced; I: Intermediate; LD: Low Density; L: Lagged. The exchange rate was 3.93 Argentine pesos per dollar in year 2010.

Table A2. Regression results - SEM and SUR models.

VARIABLES	SEM				SUR			
	Growth				Growth			
Net inequality	0.475***	0.569***	0.371***	0.510***				
Initial GDP	-0.025	-0.069	-0.083	-0.035	0.002	-0.061	-0.141**	-0.081
Population growth	-0.009	-0.013	-0.015	-0.010	-0.016	-0.017	-0.015	-0.012
Education level (human capital)	1.351**	1.664***	1.026*	1.629***	0.258	0.438	0.266	0.454
Trade	0.559***	0.622***	0.551***	0.754***	0.520***	0.570***	0.565***	0.905***
Distributive expenditure		-0.944**	-0.158	-0.274		-0.860*	-0.661**	-0.558
Non distributive expenditure	-0.726		-0.837*	-0.029	-1.267**		-1.533***	-0.820**
Direct taxes	0.591*	1.530***		1.204**	0.386	1.034*		0.925
Indirect taxes	0.747**	0.911***	1.205***		0.902**	0.768*	1.627***	
Constant	-1.557***	-1.717***	-0.907	-1.773***	-0.267	-0.154	0.372	-0.019
Observations	120	120	120	120	120	120	120	120
R-squared	0.466	0.477	0.455	0.453	0.388	0.360	0.410	0.362
VARIABLES	Net Inequality				Net Inequality			
Education level	-2.443***	-2.326***	-2.436***	-2.396***	-2.402***	-2.313***	-2.256***	-2.365***
Growth	-0.064	0.028	-0.117	-0.048				
Distributive expenditure		0.311	-0.472***	0.096		0.479	-0.357**	0.192
Non distributive expenditure	-0.774***		-0.883***	-0.721***	-0.745***		-0.819***	-0.690***
Direct taxes	-0.678***	-1.096***		-0.767**	-0.684***	-1.343***		-0.854***
Indirect taxes	0.126	-0.728***	0.395		0.087	-0.816***	0.209	
Peronist party	0.009	0.007	0.007	0.010	0.009	0.007	0.007	0.009
Constant	3.118***	3.003***	3.122***	3.072***	3.079***	2.994***	2.934***	3.023***
Observations	120	120	120	120	120	120	120	120
R-squared	0.667	0.632	0.657	0.666	0.666	0.630	0.651	0.663
VARIABLES	Distributive expenditure	Non-distrib expenditure	Direct taxes	Indirect taxes	Distributive expenditure	Non distrib expenditure	Direct taxes	Indirect taxes
Trade	0.197*	0.113	0.199***	0.522***	0.177*	0.105*	0.205***	0.528***
Lagged gross inequality	0.003	-0.0734*	0.006	0.011	0.047	-0.057	0.018	0.018
Population >65 years	1.285**	0.521	0.197	0.267	1.296***	0.506*	0.214	0.272
Lagged GDP	-0.349***	-0.157***	-0.117***	-0.096***	-0.313***	-0.140***	-0.138***	-0.119***
Senators	-0.413	0.170	-0.334	1.137*	-0.435	-0.087	-0.141	1.343***
House representatives	0.447	-0.011	0.176	-0.645*	0.432	0.146	0.084	-0.748***
Official party	0.009	0.013	0.013*	0.014**	0.013	0.014	0.011	0.0111*
Provincial employment	2.991***	2.433***	0.661***	0.374	2.953***	2.471***	0.684***	0.343
Transfers effect	0.198***	0.168***	0.059	-0.071**	0.231***	0.192***	0.028	-0.105***
Constant	1.224***	0.564***	0.463***	0.489***	1.031***	0.465**	0.554***	0.596***
Observations	120	120	120	120	120	120	120	120
R-squared	0.727	0.739	0.569	0.663	0.725	0.738	0.565	0.658

Statistical significance: * 10%; ** 5%; *** 1%.