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IS THE ARGENTINE REVENUE EFFORT "TOO" HIGH?

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SUMMARY

1. INTRODUCTION

Argentina has witnessed a large change in the size of government in recent years. After hovering around 30% of GDP during the 1990's, government outlays are likely to reach 43% of the country's GDP in 2010. This is explained by an increase in Primary Expenditures given the relative low interest payments after the debt default of 2001 and the debt restructuring of 2005 that reduced substantially the burden of the debt. Although recently the Federal government had to use some stocks to finance its borrowing needs and to assist sub-national governments, most of the increase in expenditures has been paid out of higher tax revenues, mostly at the Federal government, and from Central Banks profits that reflect seignorage and the inflation tax.

Argentina is a Federal country where expenditure responsibilities are relatively decentralized.[2] However, the Federal government collects a large fraction of taxes and transfers a fraction of its collections to provinces that, in turn, transfer money to their local governments. In any case, in 2009 provinces and municipalities had own sources of revenues for about 6% of GDP, out of total revenues of about 37% of GDP.

As in most countries, tax revenues are the bulk of government revenues. During the 1990's tax revenues averaged about 22% of GDP. In 2009 they were 50% higher. Most of this change was obtained at the Federal level by a combination of new taxes and increases in the effective tax rates. During the 2001-2002 macroeconomic crisis, a tax on financial transactions and export taxes were reintroduced. They were part of the Argentine tax structure during the 1980's and were abolished during the era of market-oriented reforms. In addition to some increases in excises, the absence of indexation in the income tax allowed the government to add more revenues due to bracket creep and the fact that investment is financed mostly with equity.[3] Provinces increased their collections of a turnover tax, but only to offset declining revenues from property taxes.

Argentina was considered a country of relatively low taxation (as most countries in Latina America). Although this conclusion was probably exaggerated because it ignored collections at sub-national levels, it appears not to be valid anymore. In fact, Argentina is second to Brazil in tax effort and both are way above the regional average. Therefore it is interesting to check whether or not the Argentine tax effort is "too" high. In fact, as there are likely to be problems of misclassification of revenues, it is also advisable to check all revenues (excluding grants).

Many observers also criticize the composition of government revenues by saying that the share of indirect taxes is "too high" making the overall tax system regressive.[4] Although what is relevant for income distribution is the overall effect of fiscal policy (i.e. even a regressive tax that funds a very progressive expenditure may help to improve income distribution) it is interesting to analyze if the composition of government revenues in Argentina differs much from what is found in similar countries.

[2] *Provinces and municipalities account for about 55% of total primary expenditures.*
[3] *Bank loans to the private sector are a meager 12% of GDP and only large firms have access to foreign debt.*
[4] *If one accepts that savers are likely to consume their savings in the future, generalized taxes on consumption are proportional.*

Many papers have analyzed why tax or revenue efforts differ across countries using panel regressions or cross-country analysis.[5] However, in constructing large samples most studies rely on databases that exclude sub-national governments and there are some other sources of errors like treating grants as taxes in some African countries. In this paper we tried to correct for some of these sources of errors, but this impeded us to do a panel. Therefore, we have data of better quality for one year (2007 for most of the countries) for a sample of over 100 countries of different levels of development.

The paper is organized as follows. In Section 2 we describe the main characteristics of the Argentine revenue system and its recent evolution. In Section 3 we summarize the literature on the determinants of tax effort across countries. In Section 4 we do an empirical analysis and position Argentina taking into consideration its characteristics (e.g. income per capita, degree of openness, etcetera). Finally we conclude.

[5] *Tax effort is the collection of taxes as a percentage of GDP. Revenue effort adds to tax revenues the collection form all other sources (i.e. social security contributions, non-tax revenues like fees and grants). It is also expressed as a fraction of GDP.*

2. GOVERNMENT REVENUES IN ARGENTINA

Most tax revenues in Argentina are collected by the Federal government. The VAT is of the consumption type[6] at a general rate of 21% although some utilities are taxed at a higher rate of 27% for their sales to firms to piggy bag on their collection effort, and some foods are taxed at 10.5%. Financial services are exempt as is customary in most countries.

There are special excises on the consumption of fuels, tobacco and beverages. Fuel taxes are specific, taxes on beverages are ad-valorem and taxes on cigarettes are almost all ad-valorem.

Labor income is taxed with social contributions that return something to formal workers although most benefits are not a direct function of the tax paid by employers and employees. Therefore, they are a tax on labor income at a proportional rate.[7]

There is a personal income tax on labor and capital income at a progressive rate (the top marginal rate is 35%). The minimum exempt level is about twice the per capita income which, unlike developed countries, takes the medium-income families out of the income tax net. Firms' profits are taxed at a 35% flat rate and dividends are exempt. There is no indexation for inflation. Therefore, equity-financed investment is taxed at a higher effective rate than 35% because depreciation is allowed on the historical cost of the assets, and debt-financed investments are taxed at negative effective rates because firms can deduct all the nominal interest.[8] There is a 1% tax on business assets that is integrated to the business income tax (firms can credit it against their liabilities in the income tax). It acts as a minimum tax on income. There is a similar tax for individuals on their properties and financial assets, but it is a final tax that cannot be credited against the personal income tax. The tax structure for this tax on personal wealth is progressive and the marginal rate is 0,75%. Only mortgages are allowed to be deducted from assets.

There is a tax on financial transactions at a combined rate of 1.2%, but deposits of wages are exempt.[9] This tax is similar to a turnover tax. It distorts relative prices and penalizes domestic producers that cannot shift it to international prices. In the short-term it might help to reduce overall evasion (because the evasion rate of this tax is surely lower than the average) but in the long-term it should discourage formalization by providing incentives to use cash instead of checks.

Imports pay duties according to the common external tariff agreed on Mercosur. All exports pay taxes, but at different rates that go from 5% for manufacturing to 37.5% for soybeans.[10] Exports taxes are a tax on production and a subsidy to local consumption. This is particularly relevant for exports of agricultural products like corn, wheat or meat that are important in the diet of the Argentine population.

[6] *The VAT paid on purchases of capital goods is allowed to be deducted immediately.*
[7] *In a small economy like Argentina with de facto capital mobility, employers' contributions are likely to be shifted backwards to workers.*
[8] *The full deduction of interest more than offsets the cost for the deduction of depreciation based on the historical cost of the asset. For a proof see A. Atkinson and J. Stiglitz, Lectures on Public Economics, Mc Graw Hill. 1980.*
[9] *Both debits and credits into bank accounts are taxed at 0.6%. One third of the rate on bank credits can be used as a tax credit for income tax purposes.*
[10] *The effective rate for manufacturing is somewhat smaller (4.7%) because it is calculated as t/(1+t).*

At the provincial level the most important tax is a cascade tax on sales that has lower rates on primary activities and manufacturing. Each province defines the tax base and the tax rate, although there are some attempts to avoid double taxation of taxpayers that have activities in more than one jurisdiction.

Provinces also tax real estate, cars and other assets and collect royalties from mining and the production of crude oil and natural gas. They also impose a stamp tax on some contracts.

Municipalities are not allowed to collect taxes according to the Argentine Constitution. They can only collect fees, but most "fees" are hidden taxes because they are not related to the services provided. Most revenues are obtained from a tax on sales (that mimics in most cases the provincial tax) and from taxes on real estate (that mimic the provincial one).

The Federal government and the 24 provinces collect fees from different services although it is not clear if they are set on a cost-recovery basis.

Based on economic principles, taxes on income flows or on the capital stock include the income tax, social security contributions, taxes on property and export taxes. Taxing the stock or the income that it generates should have a similar effect on decisions. Moreover, social security contributions have some similarities with the income tax: they are proportional but the benefits received from the social security system are not proportional to the contributions. Export taxes cannot be shifted to foreign buyers given that most (if not all) Argentine exporters are price takers in world markets. Therefore, they are equivalent to a tax on production that in part is used to subsidize domestic consumption. The tax on production falls on labor and capital income (including land as one piece of the capital stock).

Consumption taxes include the VAT, import duties, all excises and the provincial and municipal sales taxes.[11] In the IMF data base the tax on financial transactions appears as a tax on property although it should be classified as a blend of a tax on production and on consumption (like any cascade tax on sales).

Table 1 shows government revenues in Argentina for selected years since the early 1990's. Total Revenues of the three levels of government increased 12% of GDP from 1993 to 2009. Taxes on income and social security contributions account for 40% of the increase in revenues, taxes on goods and services (including the tax on financial transactions) for 37% and taxes on exports for 24%. Therefore, the share of taxes on income and property (defined broadly)[12] increased from about 44% of the total in 1993 to about 52% in 2009.[13]

[11] *The fraction of provincial and municipal sales taxes than cannot be shifted by producers of tradables should be classified as a tax on production and therefore on income of labor and capital. It is not easy to determine which this share is; therefore we opted to treat them as consumption taxes. We adopted a similar assumption for taxes on financial transactions.*

[12] *This assumes that 30% of municipal revenues are obtained from taxing property.*

[13] *Argentina introduced a private pension system in 1994. Employees' contributions to the AFJPs were no included in the government figures from mid 1994 to the end of 2008 when the system was nationalized. Therefore, figures for years 1993 and 2009 include contributions only to the public pay-as-you go system. For years in between we show the contributions to private pension funds in a different line to allow a better comparison of the trend in revenues. Moreover, about half of the provinces have pension systems for their public employees. Contributions to these government agencies are not included in the official figures and, therefore, there is some underestimation of the tax burden.*

The Federal government collects about 70% of all revenues (although it shares them later with the provinces through automatic revenue sharing agreements and discretionary transfers).

Table 1: Argentina. General Government Revenues (% of GDP)						
	1993	2000	2004	2009 3/	Variation 1993-2009	Contribution to the total
Taxes on Income, Profits, & Capital Gains	2,03%	3,98%	5,26%	5,24%	3,21%	27%
Taxes on Property	1,41%	1,62%	1,46%	1,36%	-0,05%	0%
Taxes on Goods and Services 1/	10,77%	11,16%	13,01%	15,27%	4,50%	37%
Taxes on International Trade	1,07%	0,73%	3,05%	3,68%	2,62%	22%
of which import duties	1,03%	0,70%	0,73%	0,71%	-0,32%	-3%
of which taxes on exports	0,01%	0,01%	2,29%	2,95%	2,94%	24%
of which other taxes on international trade	0,02%	0,03%	0,03%	0,02%	0,00%	0%
Other Taxes	0,78%	0,59%	0,54%	0,48%	-0,30%	-2%
Total Taxes 1/	16,05%	18,08%	23,32%	26,03%	9,98%	83%
Social Contributions to Public System	5,58%	3,40%	3,04%	7,11%	1,54%	13%
Social Contributions to Private pension funds	0,00%	1,48%	0,93%	0,00%	0,00%	0%
Total Taxes and Social Contributions	21,63%	22,97%	27,29%	33,14%	11,51%	96%
Other Revenues 2/	3,92%	4,63%	4,26%	4,45%	0,53%	4%
of which Municipal Revenues	1,36%	1,41%	1,21%	1,45%	0,09%	1%
Total Government Revenues	25,55%	27,59%	31,54%	37,59%	12,05%	100%
Collected by:						
Federal Government	70%	64%	71%	75%	10,40%	86%
Provinces	15%	14%	13%	13%	1,11%	9%
Municipalities	5%	5%	4%	4%	0,09%	1%
Private Pension Funds	0%	5%	3%	0%	0,00%	0%
Other agencies	10%	12%	10%	8%	0,44%	4%
Notes: 1/ Revenues net of tax reimburses to exporters. Includes 100% of tax on financial transactions and provincial turnover tax						
2/ Includes Grants and municipal revenues.						
3/ 2009 Nominal GDP estimated by FIEL						

3. REVIEW OF THE LITERATURE OF THE DETERMINANTS OF TAX EFFORT

The composition of tax revenues differ across countries. Developed economies rely more on taxes on income (see Table 2).[14] As countries get poorer they rely more on taxes on consumption and on taxes on international trade, and less on taxes on income and property (especially when Social Contributions are included). Grants are also more important for the poorer countries averaging about 15% of total government revenues in Low Income Countries and more than 10% in the Lower Middle Income group. Other revenues that include fees, royalties, interest and many others are also important (they represent between 12% and 25% of the total).

Gordon and Li (2009)[15] argued that the tax structure in developed nations is consistent with the theory of optimal taxation: no tariffs, no taxes on capital income, uniform taxes on consumption and low inflation. But developing nations rely more on taxes on corporations, inflation, tariffs and differentiated rates on consumption. The authors argue that informality forces developing countries to adopt different tax structures. Governments need to rely on information from bank records in order to identify taxable entities. When tax rates are high firms may forego the economic benefits of using the financial system in order to avoid taxes. This threat of disintermediation limits the government's ability to raise revenues and may force governments to choose different tax structures. The consequence is that optimal taxation would require taxes on capital income in order to extract money from those firms less willing to abandon the financial system, inflation as an indirect means to tax the informal sector, and tariffs to compensate for tax differences across tradable activities.

Table 2: Composition of Government Revenues in 2007 (% of the total)

	Taxes on Income, Property and Social Security Contributions	Taxes on Consumption	Taxes on International Trade	Other taxes and Non Tax Revenues	Grants	Total Government Revenues	Total Government Revenues % of GDP
High-Income Countries	56%	25%	1%	17%	1%	100%	40,74
Upper Middle Income Countries	38%	29%	8%	23%	3%	100%	33,22
Lower Middle Income Countries	28%	27%	9%	25%	11%	100%	28,68
Low Income Countries	24%	31%	18%	12%	15%	100%	17,65
Argentina	42%	36%	10%	13%	0%	100%	37,52
Latin America Average	36%	36%	5%	21%	2%	100%	25,71
- Only Upper Middle Income in Latam	40%	32%	5%	23%	0%	100%	27,13
- Only Lower Middle Income in Latam	29%	44%	5%	17%	6%	100%	23,36

Source: Own based on IMF GFS and Article IV Reports. Data for Argentina corresponds to 2009.

[14] *In Table 2 taxes on international trade are shown separately because they are easier to collect than other taxes, while in the econometric analysis below export taxes are bundled with taxes on income and import duties with taxes on consumption.*

[15] *R. Gordon and W. Li "Tax Structures in Developing Countries; Many Puzzles and a Possible Explanation". Journal of Public Economics 93 (2009) 855-866.*

Kenny and Winner (2006)[16] argue that governments are forced by competition to continually adjust the structure of the revenue system so as to raise taxes with as little loss of political support as possible. They include seignorage as another potential source of revenues. They found empirical support for the existence of a scale effect (governments rely more on taxes with large tax bases), and also that collection costs matter (i.e. where taxpayers are more educated governments rely more on income and consumption taxes that require widespread literacy).

There is a growing empirical literature on the factors that explain why government revenues differ across countries.[17] There is some consensus that tax revenues will depend on the following variables:

a) Per capita Income because this is a good proxy of the level of development of the economies, the sophistication of their economic structures or because the demand for public goods has an income elasticity higher than one, with citizens more ready to pay for them.

b) The composition of economic activity. As there are some sectors that are more difficult to tax than others (e.g. agriculture) those economies with a larger participation of those activities in the total are likely to have a lower tax burden.

c) The economy's degree of openness (measured by the sum of exports and imports). Taxes are easier to collect at Customs and more open economies might have replaced non-tariff barriers for tariffs and this would produce higher revenues. However, if trade liberalization was achieved through a reduction of tariffs its effect on tax revenues might be the opposite.

d) Better institutions, more transparency and more educated citizens are expected to lead to higher tax revenues.

e) The level of monetization of the economy. More financial deepening is likely to favor tax collections to the extent that more transactions are done through the financial system and they can be monitored more easily by the tax authority.

f) Macroeconomic variables may favor tax revenues. High growth usually creates an environment more prone for taxpayers to comply with their duties without arrears and low inflation improves revenues because the Tanzi effect is minimal.

g) The rate of population growth which is associated to lower tax burden because governments may lag in the ability to capture new taxpayers.[18]

[16] *L. Kenney and S. Winner "Tax Systems in the World: An Empirical Investigation into the Importance of Tax Bases, Collection Costs, and Political Regime". International Tax and Public Finance vol 13. (2006)*

[17] *See for example, M. Keen and A. Simone. "Tax Policy in Developing Countries: Some Lessons from the 1990s and Some Challenges Ahead" in S. Gupta, B. Clements and G. Inchauspe (eds) Helping Countries Develop: The Role of Fiscal Policy. International Monetary Fund. Washington DC 2004. R. Bird, J. Martínez Vazquez and B. Togler "Societal Institutions and Tax Effort in Developing Countries". CREMA Working Paper No. 21 (2004). A. Sen Gupta "Determinants of Tax Revenue Efforts in Developing Countries". IMF Working Paper No. 184 (2007) or studies done for some countries like H. Davoodi and G. Grigorian "Tax Potential vs. Tax Effort: A Cross-Country Analysis of Armenia's Stubbornly Low Tax Collection". IMF Working Paper No. 106 (2007), N. Farjan "Sao Tomé and Príncipe: Domestic Tax System and Tax Revenue Potential". IMF Working Paper No. 215 (2009) and C. Josz "Madagascar-Tax Policy Reform Priorities to Improve Revenue Performance" in IMF "Republic of Madagascar. Selected Issues. IMF Country Report No. 239 (2007). L. Kenney and S. Winner (2006) op cit.*

h) Income distribution where a more equal society is expected to ease tax collections.

Available empirical studies have some limitations. With some exceptions, they focus on tax revenues while governments have other sources of revenues like fees, social security contributions and grants. In some cases there is not a clear distinction between taxes and other sources of revenues. Most studies use Central Government data which is a limitation for federal countries where sub-national governments may have important own-source revenues. There are other errors of classification in some African countries (see below) and an underestimation of revenues in those countries that opted to privatize their mandatory pension systems.

In the empirical analysis below we opted to use the revenues of the General Government as shown in the GFS (Government Finance Statistics of the IMF) complemented with IMF Article IV reports. We also analyzed total revenues and their composition.[19] To group revenues we follow economic principles as follows:

a) Taxes on income, profits and capital gains include taxes on the flows of labor and capital income and are grouped together with taxes on property (on the capital stock).[20] Social Security contributions belong to this category unless each worker receives a compensation that matches his contribution to the system.[21] As we do not have enough information on the characteristics of the social security system of all countries we opted to try both alternatives (include them in this category or exclude them). We also added taxes on exports because in small economies that use them they reduce labor or capital income.

b) General taxes on consumption are grouped together with excises and import duties. Taxes on import are a tax on consumption that is used in part to subsidize local production.

c) Other Revenues include minor taxes and non tax revenues as classified in the GFS.

However, this gain in terms of the precision in how revenues are measured has a cost: we have to rely on a cross-section and not on a panel, and we have to leave aside other sources of revenue like seignorage and inflation tax and the use of public debt.[22]

[18] *See Bahl, R. "Reaching the Hardest to Tax: Consequences and Possibilities". 2003 (mimeo)*

[19] *In some low-income African countries we used data for Central Government that is likely to cover most (if not all) General Government revenues.*

[20] *There are some problems with taxes on property. The GFS classification includes in this category taxes on financial transactions that should better be included as turnover sales taxes.*

[21] *Some countries (many in Latin America) have privatized their pension systems. To make a comparison with other countries that maintain their pay-as-you go public systems it is necessary to estimate the contributions to the AFPs. There is no public information for all countries so we had to estimate them based on the number of contributors, the average tax rate and their annual income based on information in the FIAP web page.*

[22] *There is information about the use of debt but we could not ensure that it was comprehensive of all levels of government.*

4. EMPIRICAL EVIDENCE OF GOVERNMENT REVENUES

Table 3 summarizes the composition of government revenues grouping countries according to its income level and Table 4 summarizes the information for the explanatory variables.

Table 3: General Government Revenues (% of GDP). Year 2007.

	Taxes on Income, Profits, & Capital Gains	Taxes on PayRoll and Work Force	Taxes on Property	Taxes on Goods and Services	Taxes on International Trade	Other Taxes	Total Taxes	Social Contributions	Grants	Other	Total Revenues	Total with Contributions to private pension funds
Argentina	5,24	0,08	3,29	13,34	3,68	0,48	26,11	7,11	0,00	4,30	37,52	37,52
Bolivia	3,08	0,00	2,89	16,68	1,08	0,79	24,52	1,83	2,65	7,81	36,81	40,43
Brazil	5,70	0,00	1,30	9,10	0,50	1,10	17,70	14,70	0,00	5,80	38,20	38,20
Chile	10,99	0,00	0,57	10,12	0,35	0,68	22,71	1,34	0,00	5,38	29,43	31,94
Costa Rica	3,90	0,00	0,70	9,20	1,20	0,00	15,00	6,30	0,03	1,30	22,63	23,26
Dominican Republic	4,00	0,00	0,80	9,40	1,70	0,00	15,90	0,10	0,20	4,00	20,20	21,52
El Salvador	4,60	0,00	0,10	7,30	1,00	0,40	13,40	0,10	0,30	3,40	17,20	19,25
Guatemala	2,50	0,00	0,00	7,60	1,00	0,90	12,00	0,00	0,00	0,80	12,80	12,80
Honduras	5,09	0,00	0,46	9,91	1,24	0,00	16,70	2,59	1,60	3,19	24,08	24,08
Mexico	5,00	0,00	0,50	3,70	0,30	0,20	9,70	1,30	0,00	11,60	22,60	23,22
Nicaragua	5,50	0,00	0,00	11,50	1,00	0,00	18,00	5,40	3,70	0,00	27,10	27,10
Panama	5,10	0,00	0,70	3,20	1,90	0,00	10,90	5,70	0,00	11,70	28,30	28,30
Paraguay	2,03	0,00	0,37	8,25	1,39	0,23	12,27	3,44	0,37	6,06	22,14	22,14
Peru	6,81	0,00	0,20	7,22	0,48	1,18	15,89	1,55	0,08	3,37	20,89	24,64
Uruguay	3,45	0,65	1,45	13,49	1,40	-1,77	18,67	5,59	0,00	2,62	26,88	27,85
Venezuela	3,75	0,00	1,07	6,89	1,16	0,05	12,92	0,63	0,00	11,09	24,64	24,64
Latin America Average	4,80	0,05	0,90	9,18	1,21	0,27	16,40	3,61	0,56	5,15	25,71	26,68
- Only Upper Middle Income in Latam	5,39	0,07	1,06	8,57	1,27	0,19	16,55	4,43	0,03	6,12	27,13	28,11
- Only Lower Middle Income in Latam	3,80	0,00	0,64	10,21	1,12	0,39	16,15	2,23	1,44	3,54	23,36	24,30
High-Income Countries	12,05	0,40	1,52	10,30	0,52	0,31	25,11	8,67	0,36	6,62	40,74	n.d.
Upper Middle Income Countries	6,42	0,52	0,97	9,54	2,68	0,80	20,95	4,55	0,89	6,85	33,17	n.d.
Lower Middle Income Countries	5,24	0,06	0,57	7,79	2,65	0,61	17,32	2,08	3,15	6,53	28,68	n.d.
Low Income Countries	3,35	0,27	0,49	5,50	3,19	0,18	12,98	0,08	2,71	1,88	17,65	n.d.

Source: Own based on the IMF GFS and Article IV reports for some countries. Data for Argentina are our own and correspond to 2009.
Estimates of contributions to private pension funds were done using information on the number of workers making contributions, the tax rate and the annual salary for 2007 based on information in the FIAP web page.

Table 4. Different Variables that can influence Revenue Effort

Countries	Number of countries in each group	Per Capita National Income (US$)	Share of Agriculture in total Value Added	M2 % of GDP	Trade (% of GDP)	Transparency Index	Literacy (% of population)	Exports of mining and fuels (% of total exports)	Gini Coefficient	Share in total income of the top decile	Share in total income of the lowest decile	Population growth (% per year)	Total Revenues (% of GDP)
High-Income Countries	44	> 11455	2,37	96,64	92,64	6,72	97,62	19,95	32,53	25,96	2,85	0,85	40,74
Upper Middle Income Countries	31	3706-11455	7,01	60,70	70,07	3,96	93,02	32,14	44,81	36,40	2,01	0,87	33,22
Lower Middle Income Countries	31	936-3705	14,84	46,69	81,69	3,02	80,34	22,09	42,77	33,88	2,33	1,35	28,68
Low Income Countries	12	< 936	31,86	31,18	69,06	2,39	67,39	16,57	40,75	33,39	2,92	2,23	17,65
Argentina	Upper Middle Income	7200	9,39	27,74	38,29	2,90	97,64	14,74	50,00	36,11	1,17	0,99	37,52
Bolivia	Lower Middle Income	1460	12,88	51,46	60,33	2,90	90,74	74,84	58,20	45,29	0,72	1,81	36,81
Brazil	Upper Middle Income	5910	5,98	28,60	21,54	3,50	91,00	20,03	55,00	43,03	1,06	1,04	38,20
Chile	Upper Middle Income	9400	4,24	51,87	70,03	7,00	96,54	64,21	52,00	41,71	1,59	1,02	29,43
Costa Rica	Upper Middle Income	6060	8,71	24,96	84,86	5,00	96,00	1,94	47,20	38,58	1,62	1,42	22,63
Dominican Republic	Upper Middle Income	4390	6,57	22,22	50,24	3,00	89,14	5,50	50,00	37,75	1,58	1,44	20,20
El Salvador	Lower Middle Income	3480	12,13	39,98	62,32	4,00	82,03	4,83	49,70	36,11	1,34	0,41	17,20
Guatemala	Lower Middle Income	2680	10,58	42,04	60,16	2,80	73,20	9,05	53,70	42,41	1,25	2,47	12,80
Honduras	Lower Middle Income	1800	13,38	39,40	115,66	2,50	83,60	5,45	55,30	42,19	0,71	2,00	24,08
Mexico	Upper Middle Income	9980	3,73	24,84	55,44	3,50	92,80	18,34	48,10	37,93	1,81	1,01	22,60
Nicaragua	Lower Middle Income	1080	19,37	37,40	84,15	2,60	78,00	2,94	52,30	41,82	1,35	1,27	27,10
Panama	Upper Middle Income	6180	6,66	81,73	41,24	3,20	93,39	4,35	54,90	41,43	0,83	1,68	28,30
Paraguay	Lower Middle Income	2180	22,00	23,25	81,86	2,40	94,56	0,85	53,20	42,32	1,09	1,83	22,14
Peru	Upper Middle Income	3990	6,64	28,03	45,09	3,50	89,59	57,60	49,60	38,38	1,27	1,17	20,89
Uruguay	Upper Middle Income	8260	10,00	37,10	41,82	6,70	97,86	4,94	46,20	35,50	1,61	0,28	26,88
Venezuela	Upper Middle Income	9230	4,02	28,11	50,54	2,00	95,15	92,15	43,40	35,69	1,09	1,75	24,64
Latin America Average	16	5205	9,77	36,80	60,22	3,59	90,08	23,86	51,18	39,77	1,26	1,35	25,71
- Only Upper Middle Income in Latam	10	7060	6,59	35,52	49,91	4,03	93,91	28,38	49,64	38,61	1,36	1,18	27,13
- Only Lower Middle Income in Latam	6	2113	15,06	38,92	77,41	2,87	83,69	16,33	53,73	41,69	1,08	1,63	23,36

Definition of variables in Appendix 1.

Both tables show some characteristics of government revenues and of the countries of different income levels.

Both groups of countries in Latin America (Upper Middle Income and Lower Middle Income) collect less than their peers, about 6% of GDP less for the two groups. However, most of the difference is explained by lower tax revenues in the first group and by lower Grants and Other Revenues in the second group.

At first sight many variables in Table 4 confirm the a priori expectation of their impact on government revenues: the share of agriculture and population growth decline with income, while financial deepening, transparency, and literacy increase with income. Trade is much higher in developed countries than in the poorest but there is no clear variation in the Middle Income Groups. Income distribution is more equal only for High Income Countries and the share of fuels and mining in total exports has no clear trend reflecting the availability of those goods in each country and the diversification of exports.

For Latin-American countries there are notorious differences with their peers in financial deepening, which is much lower in Latin America probably as a consequence of higher inflation in the past, economies are less open to trade (especially for the High-Middle Income), income distribution is more unequal and population growth is higher. In the other variables the differences are less notorious compared with their peers. This should help to explain lower government revenues in the region according to what is the expected sign for each variable.

Argentina, with the exception of the literacy rate, has values in all variables that suggest that it should collect less than its peers, but in fact obtains almost 4.5% of GDP more.

We perform and econometric analysis to test whether or not Argentina has "excess" tax burden compared to its characteristics. Although any country can choose to have a larger state participation in the economy (and be ready to pay for it), it is interesting to take a look at the cross-country information to determine if Argentina is a sort of outlier in the collection effort.

The econometric evaluation of the tax effort is done for Total Revenues without Grants as a fraction of GDP and its different components.

And the explanatory variables are[23]:

a) Agric: Agriculture and Farming share in total GDP
b) M2: Money and Quasi Money as % of GDP
c) Trade: Exports plus imports of goods (% of GDP)
d) Transpa: Transparency Index as measured by Transparency International
e) XFuels: Share of exports of fuels and mining in total exports
f) GNI: Per Capita Gross National Income (Athlas method)
g) Alfabet: Literacy index.
h) Inflat: Average inflation rate of the year
i) Growth: Average growth rate of 5 years
j) Pop_gr: rate of population growth
k) Gini: Gini coefficient
l) High_ten: the share of the highest decile in total income
m) Informality: the share of the informal economy estimated by Schneider (last available data is 2003 for most countries)
n) Latam: Dummy variable that takes a value of 1 for Latin-American countries
o) Const: Constant intercept.

The sample is a cross section for 118 countries with information on revenues and on the explanatory variables.[24] On the econometric analysis there are two initial problems we have to

[23] *For a detail of the sources of information see Annex 1.*

deal with. First, some countries in the sample can be considered as outliers. Second, there are two explanatory variables (transparency and informality) that might be endogeneous.

To address the second problem, we run Instrumental Variables regression (IV), with the fractionalization indexes from Alessina et al. (2002)[25] and legal origin indexes from La Porta et al. (1998)[26] as instruments. These indexes try to capture the quality of institution and growth rates conditioned to languages, religious and ethnics, and historical and political inheritance.

After modeling the great aggregates (Total Revenues with and without grants, with and without AFP's, and Tax revenues) and some of it components (Consumption taxes, income taxes, etc.) the variables with endogeneity suspicions appears to be well instrumented, but they are not significant. In order to account for the presence of outliers we run a robust IV regression.[27]

Therefore we can exclude the possible endogenous variables from the explanatory variables and run Ordinary Least Squares. However, given the presence of some atypical observations the regressions were done using MM regression (robust) with the algorithm developed by Verardy and Croux[28]. Robust regression – generally talking – uses location and dispersion statistics less sensitive to outliers, which are employed in the optimization of losses functions to obtain reliable parameters estimations and its related hypothesis tests[29].

By working with a fraction of total revenues we get closer to zero values for some countries. To ensure that the forecasted values stay in a range between 0 and 1, we used the classic Generalized Linear Models (GLM)[30] estimations. The GLM method with a logistic function allows us to avoid getting forecasts with negative values.[31] Even though robust theory applied to GLM methods is already developed, its application to Stata is not, so that and taking the results as a "proxy" of the robust methods we decided to delete the observations marked as outliers in the first stage.

As our interest is in forecasting what the revenue effort should be we ran again the regressions only for the variables with significant level between 0 and 0.30 to reduce the forecasting interval. The regressions with all variables (significant or not) are shown in Appendix 2

[24] *For SACU countries there is an implicit grant in the distribution of revenues obtained from import duties and excises from South Africa to Bostwana, Lesotho, Namibia and Swaziland. Taxpayers clear customs and pay their duties in the first port of entry into the SACU region (usually South Africa) and the money goes to a pool that is allocated among the five countries with formulas that favor the smallest countries. This hides a grant from South Africa to the other members that ranges from 2.4% of the GDP in Bostwana to 27.4% of GDP in Lesotho. We estimated what actual revenues would have been absent that redistribution, using as a proxy each country's share in total imports of the region (as of 2005).*

[25] *Alessina et al., Fractionalization. NBER, Working paper 9411, 2002*

[26] *La Porta et al., The quality of government. NBER. Working paper 6727, 1998*

[27] *We run the IV regression taking into consideration the presence of outliers using a modified Stata routine (that uses Hadi's distances instead of the original MCD distance) developed by Professor Verardi. We also run the process without correcting for outliers. In both cases we arrived to same conclusions, where the instrumented endogeneuos variables were non-significant.*

[28] *Verardi and Croux. Robust Regression in Stata. The Stata Journal Volume 9 No.3. 2009.*

[29] *A complete overview of the robust methodology can be found in Maronna R., Martin, R. D., Yohai, V. Robust Statistc. Theory and Method. John Wiley & Sons (2006)*

[30] *In the estimates for the different components of revenues we excluded five countries because the available data on their composition is only for Central Government, and there is an important difference between the total collection of General and Central Government.*

[31] *The coefficients estimated by GLM need to be modified to approximate the marginal effect given that a logistic function was used. In Table 5 we show the adjusted values.*

The results in Table 5 are in line with what is expected in theory. The variable Agriculture has the expected negative sign in all regressions. M2 has the expected positive sign but a negative coefficient for the square of M2 suggests that the positive effect of financial deepening on revenues diminishes as M2 grows. The dummy variable for Latin-America has also the expected negative sign which reveals problems to raise revenues in this region beyond those reflected in its characteristics. Population growth has the expected negative sign (except in the regression for Other Revenues where the sign is positive). Income per capita is significant and with the expected positive sign in all regressions (with the exception of Other Revenues). The literacy rate has the expected positive sign when it is significant. The share of Fuels and Mining in Exports improves tax revenues and the collection of Other Revenues (as expected, given that royalties are included here). The variables related to income distribution are not significant for almost all regressions, with the exception of the share of the richest decile that has a positive coefficient in the regression for Taxes on Consumption. Trade has a positive effect on revenues obtained from Taxes on Consumption.

The next step is to forecast what the revenues would be according to values of the dependent variables and compared them with actual revenues. The results are shown in Figure 1 for Latin American Countries Total Revenues and in Figure 3 for Total Revenues for all countries in the sample. According to this, Argentina is collecting much more than what its characteristics suggest. For example, in Total Revenues (excluding grants) Argentina collects 37.5% of GDP, 13% of GDP more that the point forecast and way above the forecasting range of 21.5 to 27.6% of GDP. The same happens with Taxes (including Social Security Contributions – Figure 2): the country collects 33.2% of GDP, about 10 points more than suggested by its characteristics and above the interval of 17.8 to 25.7% of GDP. In Taxes on Consumption (including import duties) the observed collection was 14.1% of GDP and the range was from 8.30% to 10.5% of GDP (point estimate 9.4%) and in Taxes on Income and Property (including all Social Contributions and Taxes on Exports) collections are also "excessive": 18.7% compared with a range of 11% to 14.8% and a point estimate of 12.8% of GDP.

Table 5

	Robust Reggresion (MM.estimators)			Classic Generalized Linear Model (Logistic)								
	Coefficients			Marginal Effects at average								
	TR w/o grants	TR w/o grants + afp	Tax Revenues	Tax Revenues + SS	Tax Revenues + SS + AFP	Income Tax + SS	Income Tax + SS + AFP	Income Tax + SS + Exports	Income Tax + SS + Exports + AFP	Consumption Taxes	Consumption Taxes + Imports	Other Revenues
	Rob	Rob	Rob	Glm	Glm	Glm	Glm	Glm	Glm	Glm	Glm	
agric	-0,422 ***	-0,432 ***	-0,177 ***	-0,2655 ***	-0,274 **	-0,2567 **	-0,2578 **	-0,2478 **	-0,253 **			-0,165 ***
	(0.09)	(0.088)	(0.067)	(0.102)	(0.123)	(0.106)	(0.107)	(0.109)	(0.108)			(0.065)
m2	0,174 ***	0,167 ***	0,135 **	0,2094 ***	0,144 *					0,100 ***	0,111 ***	0,063
	(0.055)	(0.054)	(0.065)	(0.07)	(0.084)					(0.037)	(0.033)	(0.04)
m22	-0,0009 ***	-0,0009 ***	-0,0006 **	-0,0012 ***	-0,0005					-0,001	-0,001 ***	-0,0002
	(0)	(0)	(0)	(0)	(0)					(0) ***	(0)	(0)
trade_merc				0,0212						0,032	0,031 ***	
				(0.016)						(0.011) ***	(0.011)	
alfab						0,0956	0,0878	0,0897	0,095			
						(0.081)	(0.077)	(0.08)	(0.079)			
X_fuels			0,0699 **			-0,041	-0,0339	-0,037	-0,033			0,061 ***
			(0.029)			(0.027)	(0.028)	(0.028)	(0.028)			(0.021)
gni	0,0003 ***	0,0003 ***	0,0001 *	0,0002 ***	0,0002 **	0,0002 ***	0,0002 ***	0,0002 ***	0,0002 ***			-0,0001 *
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)			(0)
high_ten				0,1086						0,126	0,129 **	-0,065
				(0.101)						(0.058) **	(0.056)	(0.064)
pop_gr	-2,007 **	-1,994 **	-1,280 **	-4,8028 ***	-5,100 ***	-2,6145 ***	-2,8221 ***	-2,9233 ***	-2,875 ***	-1,891	-1,816 ***	
	(0.941)	(0.929)	(0.591)	(0.8)	(0.943)	(0.832)	(0.751)	(0.775)	(0.771)	(0.484) ***	(0.47)	
latam	-5,091 **	-4,343 **	-2,842 *	-2,7731		-1,8977						
	(2.374)	(2.067)	(1.656)	(2.064)		(1.644)						
_cons	28,7 ***	29,02 ***	16,94 ***	***	***	***	***	***	***	***	***	***
	(3.485)	(3.519)	(2.56)									
R^2 aj	0,517	0,513	0,3185									
R^2*				0,72	0,54	0,67	0,66	0,66	0,66	0,35	0,37	0,26
N	117	117	110	95	109	101	101	101	101	94	94	90

* significance level of 0.1 ** significance level of 0.05 () standar error

R^2*: Predictive Power Index of Agresti - Zheng (2000).

Figure 1. Forecasted total revenues and their confidence interval and observed revenues

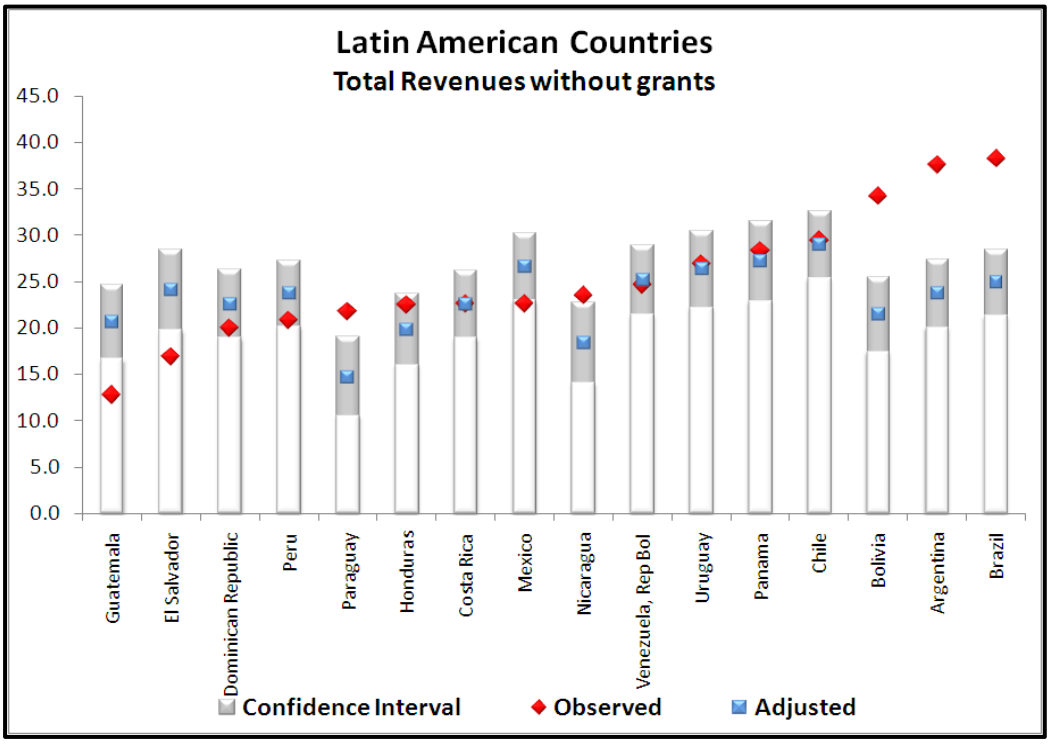


Figure 2. Forecasted Tax revenues plus Social Contributions and their confidence interval and observed revenues

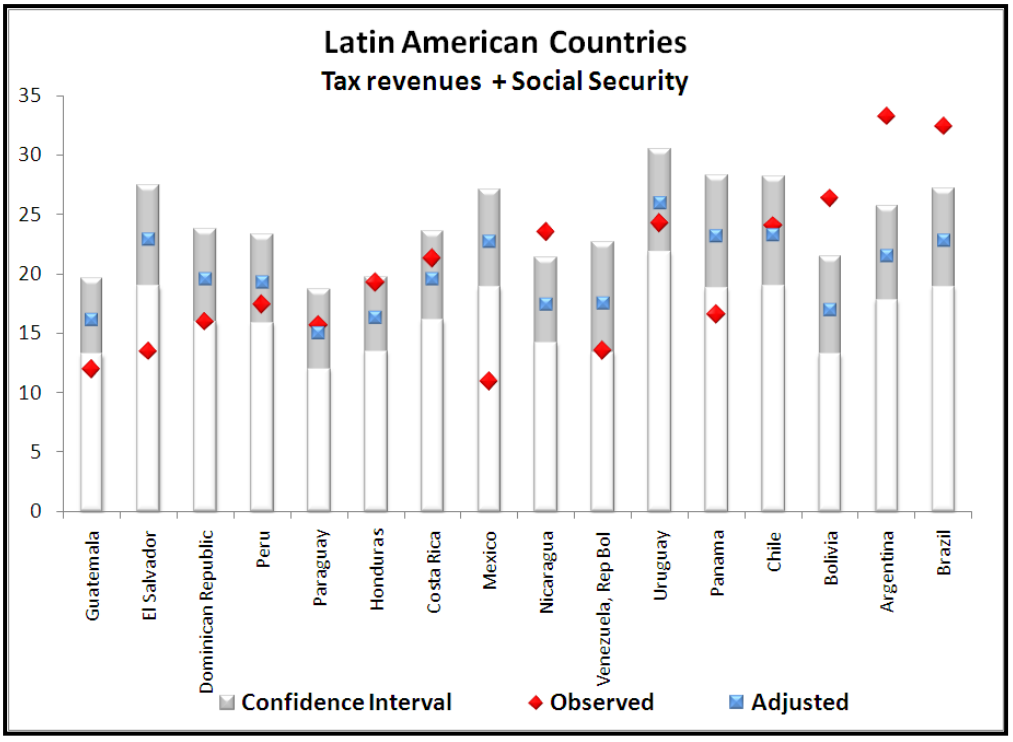
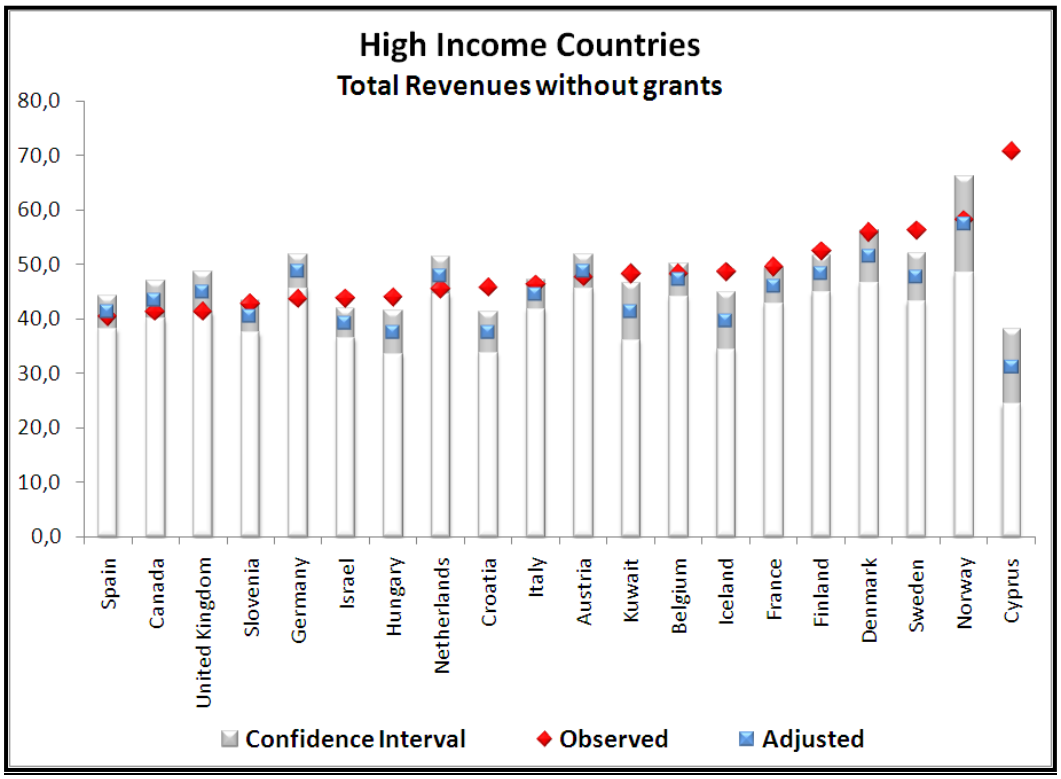
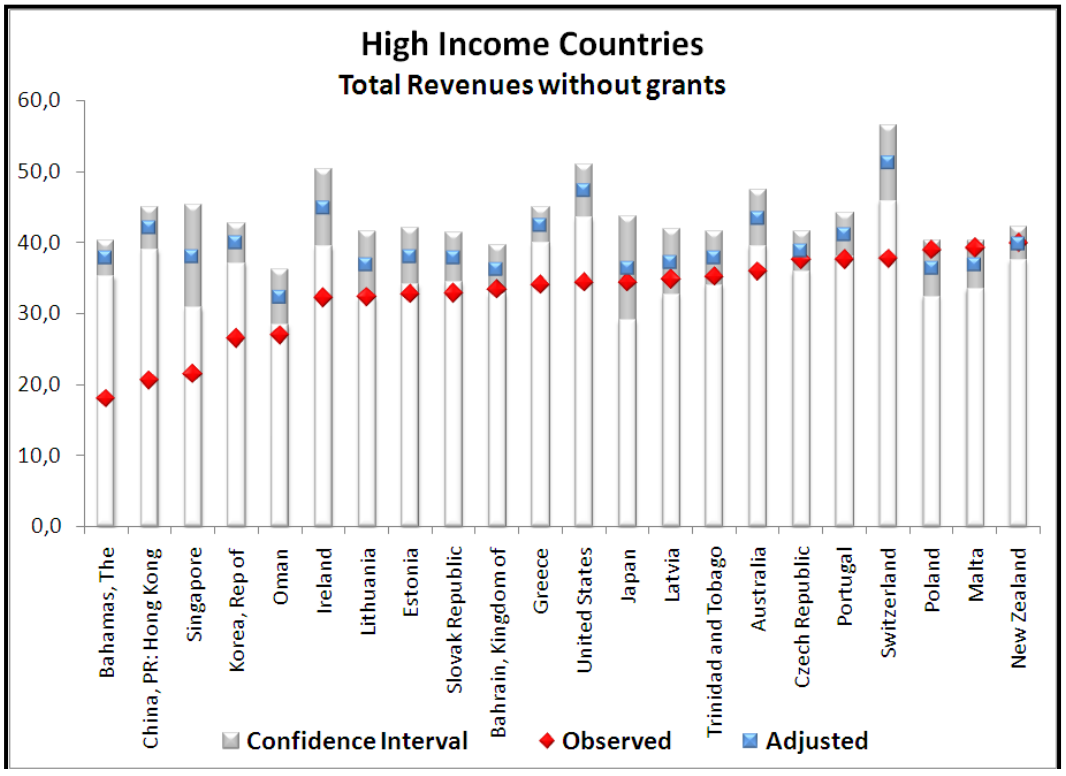
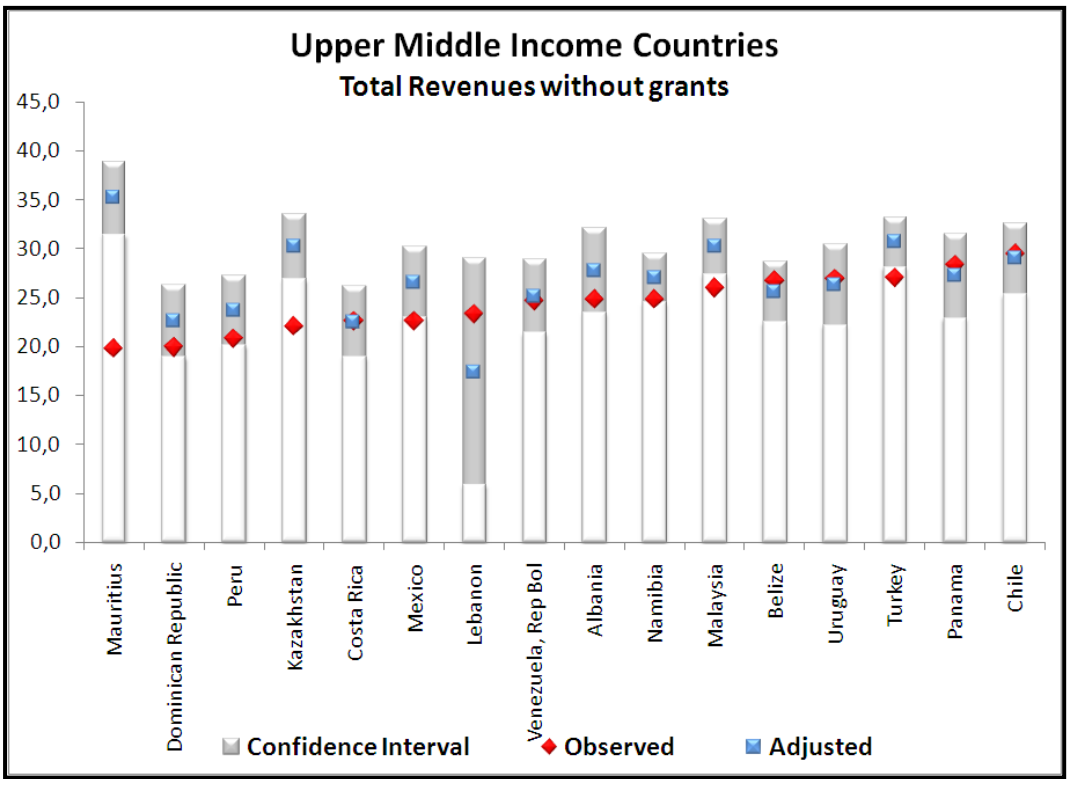
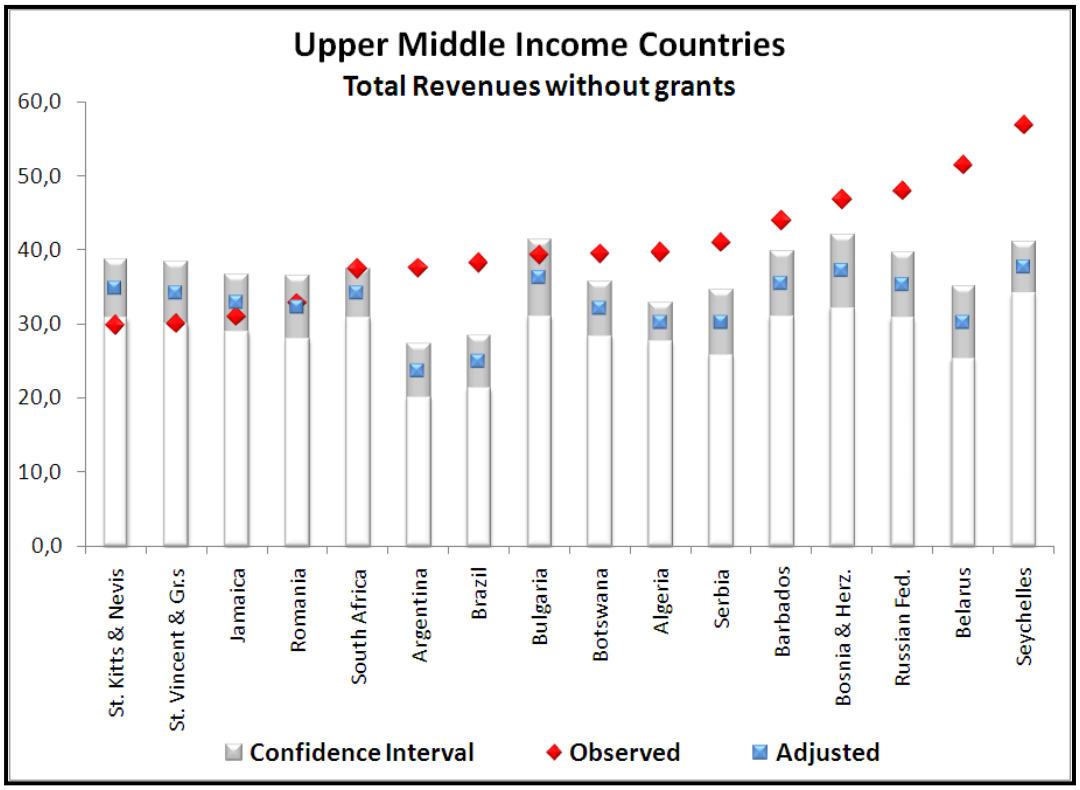


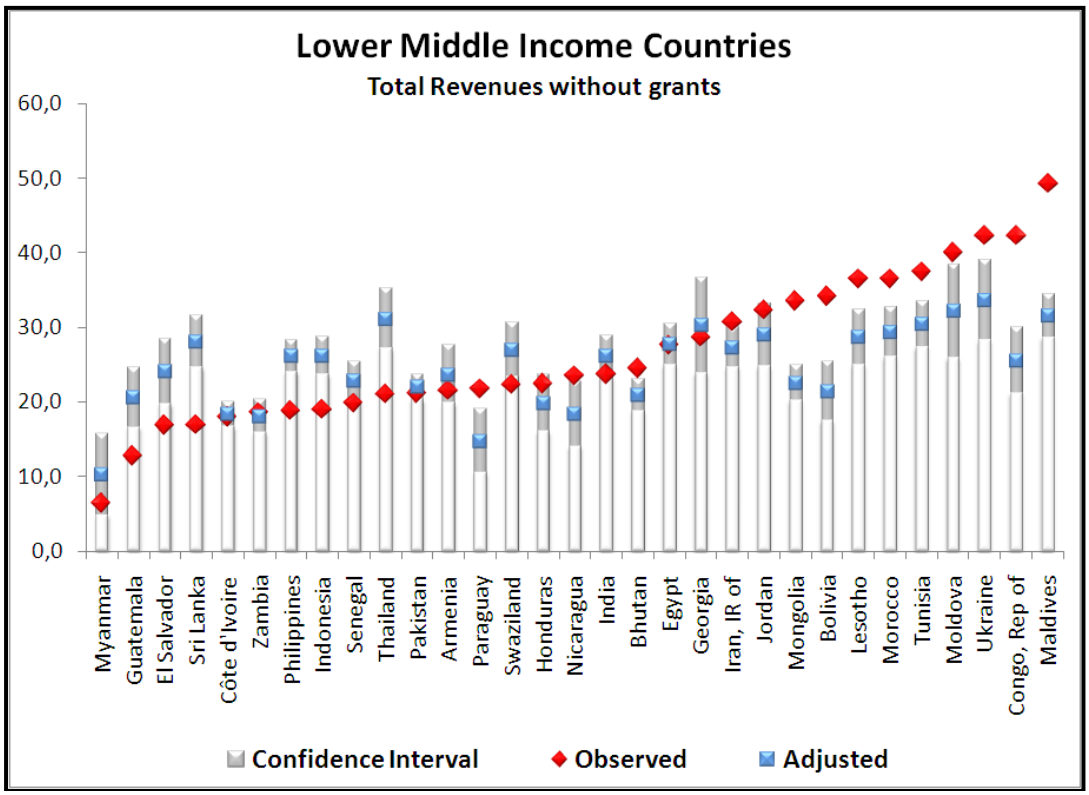
Figure 3 Forecasted total revenues and their confidence interval and observed revenues

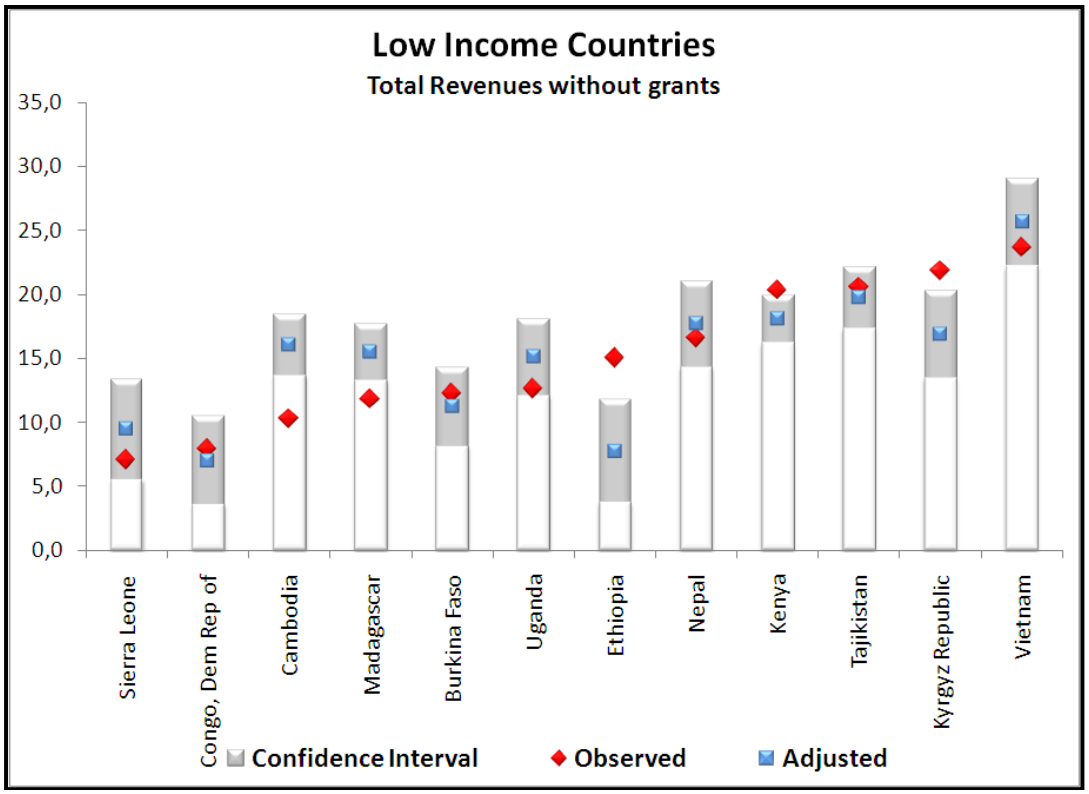





Upper Middle Income Countries
Total Revenues without grants
45,0
40,0
35,0
30,0
25,0
20,0
15,0
10,0
5,0
0,0
Mauritius
Dominican Republic
Peru
Kazakhstan
Costa Rica
Mexico
Lebanon
Venezuela, Rep Bol
Albania
Namibia
Malaysia
Belize
Uruguay
Turkey
Panama
Chile
Confidence Interval
Observed
Adjusted


Upper Middle Income Countries
Total Revenues without grants
60,0
50,0
40,0
30,0
20,0
10,0
0,0
St. Kitts & Nevis
St. Vincent & Gr.s
Jamaica
Romania
South Africa
Argentina
Brazil
Bulgaria
Botswana
Algeria
Serbia
Barbados
Bosnia & Herz.
Russian Fed.
Belarus
Seychelles
Confidence Interval
Observed
Adjusted


Lower Middle Income Countries
Total Revenues without grants
60,0
50,0
40,0
30,0
20,0
10,0
0,0
Myanmar
Guatemala
El Salvador
Sri Lanka
Côte d'Ivoire
Zambia
Philippines
Indonesia
Senegal
Thailand
Pakistan
Armenia
Paraguay
Swaziland
Honduras
Nicaragua
India
Bhutan
Egypt
Georgia
Iran, IR of
Jordan
Mongolia
Bolivia
Lesotho
Morocco
Tunisia
Moldova
Ukraine
Congo, Rep of
Maldives
Confidence Interval
Observed
Adjusted


Low Income Countries
Total Revenues without grants
35,0
30,0
25,0
20,0
15,0
10,0
5,0
0,0
Sierra Leone
Congo, Dem Rep of
Cambodia
Madagascar
Burkina Faso
Uganda
Ethiopia
Nepal
Kenya
Tajikistan
Kyrgyz Republic
Vietnam
Confidence Interval
Observed
Adjusted

In a comparison with other Latin-Countries the "excess" taxation in Argentina is the highest (although similar "excesses" are shown for Brazil and Bolivia in Total Revenues excluding grants). When taxes on exports are added to taxes on income and property and social contributions Argentina's "excess" is somewhat smaller than Brazil's. In Taxes on Consumption Argentina is second to Bolivia in collecting much more than what its economic and social characteristics suggest.

Comparing with all countries in the sample Argentina's "excess" revenue collection is among the highest in the world (although part of the excess is explained by the Latin America dummy). If one excludes island economies due to their particular characteristics, only Argentina, Bolivia and Brazil have a ratio of observed revenues collections to forecasted revenues over 1.5.[32]

[32] *Natural Gas production is an important source of revenues for Bolivia.*

5. CONCLUSIONS

Argentina's tax system has changed dramatically in recent years and collections soared. When the three levels of government are included total revenues (i.e. tax and non-tax) reached 37.5% of GDP in 2009 about 50% higher than in the 1990's. Most of the increase in revenues is explained by new taxes introduced during the macroeconomic crisis of 2001-2002 (e.g. taxes on exports and on financial transactions) and by increases in effective tax rates (e.g. the lack of indexation of the income tax in an economy with annual inflation of 20%, or rate hikes in sub-national taxes).

Several authors have estimated the determinants of tax effort, but they have some problems in their datasets (like ignoring sub-national government collections or misclassifying different sources of revenues or ignoring the decision to privatize mandatory pension systems). We were able to improve the quality of the database for a cross-section of about 120 countries of different levels of development.

Different characteristics of an economy may ease or difficult the collection of revenues. We estimated regressions for different revenue variables and forecasted what revenues should be according to each country's characteristics. In the case of Argentina, collections in 2009 were much higher than our forecasts either in total revenues or in taxes on consumption and on income and property.

How can Argentina collect more when it has an adverse scenario to achieve those relatively high-revenues? The answer for this question is simple: Argentina uses a poor tax mix but that is easy to collect as shown by taxes on exports (3% of GDP) and a very high tax on financial transactions (2% of GDP). Also, the income tax rate is relatively high for companies (35%), the labor tax wedge at 48% is also high, and the equivalent-VAT tax rate on consumption of adding the VAT and the turnover provincial and municipal taxes is about 30%, also very high.

This "excessive" taxation financed a boom in primary expenditures. Although it is beyond the scope of this paper to assess the efficacy of these expenditures, social indicators suggest that a record-high state participation in the economy was not able to achieve lower poverty of less inequality compared with the achievements of other developing countries.

A large jump in government revenues had no evident effect in growth rates. In fact, Argentina was able to recover at high rates after 2003 and this allowed the country to regain the trend achieved during the first part of the nineties that was much better than what happened in the lost decades of the 1970's and 1980's.[33] However, important gains in terms of trade and a booming region (especially in Brazil, Argentina's most important partner) may have provided the country with extra trade inflows that more than offset the negative impact of higher taxes on companies´ profits and the standard of living of the population given that government outlays were not very efficient. At some point this additional impulse would vanish and the negative effects of a large and inefficient state may impose a toll on the country's efforts to develop.

[33] *With a longer perspective Argentina's growth rate is worse than others in the region. If we take 1997 as a base year, when the data was not influenced by the effects of the Asean and Russian crisis, and the consensus forecasts for 2010 (to allow for the recovery after the slowdown in 2009), Peru has grown more than 70% in real terms, Chile more than 50%, Brazil and Colombia about 45% and Argentina and Uruguay about 40%.*

Annex 1: Data Sources

- Agriculture (value added % GDP) – agric -: World Development Indicators World Bank Database
- Money and quasi money M2 (% GDP) - M2 -: World Development Indicators World Bank Database
- Merchandise trade (% GDP) – merc_trade -: World Development Indicators World Bank Database
- Corruption perception Index (1 (less transparency) to 10 (high transparency)– Transpa -: Transparency international
- Adult literacy rate (0 to 100) –alfab-: World Development Indicators World Bank Database
- Inflation (average of the last 3 years): World Bank Database
- Year Inflation (corresponding to the TR sample year): World Bank Database
- GDP growth (average of the 5 last years): World Bank Database
- Shadow Economy Index. From *Shadow Economies of 145 Countries all over the World: Estimation Results over the Period 1999 to 2003.* Friedrich Schneider, 2005
- Fuels and Mining Products Exports (% total merchandise trade): World Bank Database
- Gini Index: World Development Indicators World Bank Database
- Income share held by highest 10% (High_ten): World Bank Inequality Database
- Income share held by lowest 10% (Low ten): World Bank Inequality Database
- Population Growth: World Bank Database

Annex 2

Annex 2

	Robust Reggresion (MM.estimators)			Classic Generalized Linear Model (Logistic)								
	Coefficients			Marginal Effects at average								
	TR w/o grants	TR w/o grants + afp	Tax Revenues	Tax Revenues + SS	Tax Revenues + SS + AFP	Income Tax + SS	Income Tax + SS + AFP	Income Tax + SS + Exports	Income Tax + SS + Exports + AFP	Consumption Taxes	Consumption Taxes + Imports Duties	Other Revenues
Method	Rob	Rob	Rob	Glm	Glm	Glm	Glm	Glm	Glm	Glm	Glm	Glm
agric	-0,2869 *	-0,3400 **	-0,1154	-0,2779 **	-0,2766	-0,3212 ***	-0,3217 ***	-0,3237 ***	-0,3241 ***	-0,0411	-0,0377	-0,1833 **
	(0.164)	(0.162)	(0.171)	(0.109)	(0.11)	(0.095)	(0.095)	(0.096)	(0.096)	(0.067)	(0.067)	(0.083)
m2	0,2545 ***	0,2291 ***	0,2365 **	0,1652 **	0,1714	0,0858 **	0,0932 **	0,0736	0,0810 *	0,0914 **	0,1040 ***	0,0555
	(0.079)	(0.063)	(0.109)	(0.072)	(0.073)	(0.042)	(0.043)	(0.046)	(0.046)	(0.044)	(0.039)	(0.04)
m22	-0,0014 ***	-0,0013 ***	-0,0012 ***	-0,0010 ***	-0,0010	-0,0005 ***	-0,0005 ***	-0,0005 **	-0,0005 **	-0,0005 **	-0,0006 ***	-0,0002
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
trade_merc	-0,0152	0,0084	-0,0314	0,0224	0,0229	-0,0071	-0,0065	-0,0060	-0,0055	0,0306 ***	0,0294 ***	-0,0112
	(0.047)	(0.022)	(0.023)	(0.017)	(0.017)	(0.012)	(0.012)	(0.013)	(0.013)	(0.01)	(0.01)	(0.011)
alfab	-0,0238	-0,0149	0,0375	0,0406	0,0380	0,0563	0,0532	0,0620	0,0589	-0,0186	-0,0216	0,0359
	(0.127)	(0.087)	(0.072)	(0.07)	(0.069)	(0.068)	(0.067)	(0.071)	(0.07)	(0.04)	(0.04)	(0.044)
X_fuels	0,0254	0,0183	0,0579	-0,0340	-0,0264	-0,0154	-0,0077	-0,0143	-0,0066	-0,0188	-0,0200	0,0546 **
	(0.046)	(0.045)	(0.046)	(0.034)	(0.035)	(0.023)	(0.024)	(0.023)	(0.024)	(0.019)	(0.019)	(0.021)
gni	0,0003 ***	0,0003 ***	0,0001	0,0002 ***	0,0002	0,0002 ***	0,0002 ***	0,0002 ***	0,0002 ***	0,0000	0,0000	-0,0001 **
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
high_ten	-0,0146	-0,0460	0,1316	0,1227	0,1244	0,0028	0,0033	-0,0054	-0,0049	0,1202	0,1274 *	-0,0784
	(0.193)	(0.145)	(0.321)	(0.111)	(0.11)	(0.057)	(0.057)	(0.06)	(0.06)	(0.073)	(0.07)	(0.078)
pop_gr	-3,9218 **	-2,7686 **	-1,4821	-4,0662 ***	-4,1582	-2,5785 ***	-2,6934 ***	-2,5792 ***	-2,6952 ***	-1,6443 ***	-1,6191 ***	0,5961
	(1.958)	(1.381)	(1.819)	(0.806)	(0.797)	(0.781)	(0.776)	(0.797)	(0.791)	(0.596)	(0.584)	(0.631)
latam	-4,0102	-3,5794	-3,9270	-4,2128 *	-3,1317	-2,3406	-1,1425	-2,2411	-1,0449	-0,8704	-0,9620	-0,6371
	(3.144)	(2.312)	(2.465)	(2.086)	(2.127)	(1.454)	(1.46)	(1.525)	(1.523)	(1.18)	(1.135)	(1.178)
_cons	30,0 ***	28,70 ***	8,69	***		***	***	***	***	***	***	***
	(7.685)	(7.555)	(12.378)									
R^2 aj	0,58	0,55	0,43									
R^2*				0,68	0,80	0,80	0,80	0,79	0,79	0,34	0,37	0,13
N	98	98	98	93	89	89	89	89	89	89	89	78

* significance level of 0.1 ** significance level of 0.05 *** signifance level of 0.001 () standar error

R^2*: Predictive Power Index of Agresti - Zheng (2000).

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