Enough is not enough: measuring and improving rural public spending in Latin America [1]

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Abstract

For adequate policymaking in Latin America we must go beyond the oversimplification of equalizing rural areas with the "agricultural sector".

With a new dataset, it was estimated that LAC governments channel nearly 6.15 % of their budget directly to rural areas, which represents approximately US$140 per rural inhabitant from 1996 to 2001. The 1990 estimate of public expenditure traceable to rural areas (PETRA) was nearly US$205. The composition of PETRA is also changing, with an increase in social expenditures and a fall in productive promotion subsidies.

We propose a framework for assessing the overall impact of the different rural budgetary allotments, and consider a structural model for analyzing impacts both on intermediate assets and on long-term economic measures. In the future, a complete managerial information system should be put in place, including a set of indicators selected ex ante and carefully embedded in a coherent model of causal relations. This model should be shared by not only by the Budget Office and all executive agencies related to rural areas, but also by the Parliament and the Civil Society, in order to build an evidence-based environment for discussion and policy improvement.

Key Words: Latin America and The Caribbean, Rural development, Public expenditures, Budget Quality

JEL Classification: H83, H5, Q1.

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1. Introduction - Why should governments disclose their expenditures in rural areas?

How much do Latin American governments allocate to rural areas? How do they distribute that investment? How can its impact be improved?

A careful analysis of rural expenditures is paramount for managing economic development. This is because public expenditure is one of the most important governmental tools for impacting rural areas, which are often depicted as the most backward areas both in economic and social terms.

In fact, poverty in Latin America is much higher in rural areas. According to the Economic Commission for Latin America and the Caribbean (ECLAC, 2004) poverty in urban areas is around 31%, while the rural population below the poverty line is 61%. This gap is even greater, in relative terms, when we look at extreme poverty rates: 13% in urban areas versus 37% in rural areas. At the same time, there are large differences in opportunities of access to education, health and public goods. These differences are likely to be at the root of the aforementioned income gaps. Furthermore, high migration rates into cities or other countries also support the hypothesis of the lack of opportunities in rural areas.

Opportunities for rural inhabitants in terms of access to public expenditure must be monitored in order to foster poverty reduction and diminish disparities in productive assets, especially human capital. This framework, as well as the findings in this paper, aims to enrich public discussion through a formal approach for objective measurement, in order to buffer public decisions against lobbying groups, and also to change the paradigm of some budgetary offices that equate the rural world with the agricultural sector.

For determining public expenditure oriented towards rural areas, FAO, in association with LAC governments, developed a study that classifies national budget programs into 31

functional expenditure categories. This study encompasses a panel of 18 Latin American and Caribbean countries[3] over a period from 1985 to 2001.

In the early 80's several studies aimed to quantify, model and benchmark public expenditure in rural areas (FAO, 1984; Elias, 1981). During the subsequent two decades no internationally coordinated effort was directed at this specific issue in developing countries. Consequently, this paper seeks to re-launch the relevance of monitoring rural public expenditures as a tool for democratic accountability and for quality control of public policy. This information is especially useful in cases where public expenditure produces a wide variety of outcomes that normally are difficult to observe. That is the case, for example, when beneficiaries are geographically sparse, or when interest groups are unable to present arguments to finance ministries using "the same language" (e.g. cost benefit analysis), .

The main contributions of this paper are: (i) to show a concrete methodology for monitoring expenditures oriented to rural areas, which goes beyond the traditional view of rural areas only as "the agricultural sector", (ii) to present the main trends in rural expenditures in Latin America (iii) to discuss and partially apply a general framework for assessing the quality of expenditures and (iv) to outline a set of institutional innovations for improving the management of public expenditures in rural areas.

This paper is structured as follows. In section 2 we review the literature related to monitoring public expenditure for rural areas in LAC. In section 3 we present the main descriptive results of our assessment of rural public expenditures. In section 4, we move into a theoretical framework for assessing the quality of public expenditure. In section 5 this theoretical framework is empirically applied for some items of expenditure. In section 6, we suggest some institutional innovations in order to ensure the quality rural public spending. Finally, in section 7, we outline some concluding remarks.

[3] 21 countries were considered in the survey. More details in Annex 9.3 and in the Official Site of the data base http://www.rlc.fao.org/prior/desrural/gasto/presentacion.asp .

2. Rural expenditures comprise much more than just agriculture. However, how should they be recorded?

2.1 Context

Budget planning and execution are complex processes with several principal-agent interactions and a difficult-to-predict equilibrium. In this arena, both rules and players impact the final results. For example, in OECD countries, Perotti and Kontopoulos (2002) show that the number of ministries in the cabinet facing a "tragedy of the commons", the coalition size, and the ideology are determinants of fiscal outcomes. In LAC, Alesina et al (1999) show that institutional quality is extremely important for maintaining fiscal balance. In both cases the idea of "almost privatizing" the budget process in the hands of responsible finance ministers is suggested as a way to preserve the aggregate fiscal balance. However, financial offices are rarely endowed with competitive advantages for managing expenditures for specific areas, something particularly evident in public interventions in rural areas. This weakness impels them to discuss specific budgets in complex negotiations with different interest groups, both within and outside government. Moreover, those groups are unequally endowed with lobbying technology, resulting in a biased budget-making process. (Grossman and Helpman, 2001).

Precisely due to this situation, the introduction of checks and balances as well as a comparable framework for benchmarking practices were recognized as a *must* towards increasing democracy and improving budgetary quality.

In this sense, perhaps one of the most important implicit regulations for these budgetary issues was the standardization in the way countries should "present their figures" through the Government Financial System, led by the IMF since 1986 and upgraded in 2001 in order to match with the System of National Accounts (IMF, 2001). This regulation generated both an objective measurement for improving the quality of discussion and a tool for inter-country comparison. The objective of the present study is to institutionalize a similar mechanism for monitoring expenditures, but focusing on rural areas, with a definition that goes beyond the agricultural sector.

Some decades ago, rural markets were univocally linked to agriculture and the relationship between urban and rural areas was mainly through agricultural products. However, in the final quarter of the twentieth century, LAC rural areas experienced a structural transformation, greatly increasing the relevance of non-agricultural income (Dirven, 2004). This suggests that previous approaches to unveil opportunities for rural areas based only on agriculture activities are no longer valid.

Previous databases of agricultural sector public expenditures which allow comparisons among countries already exist. In fact, the standard IMF matrix required for all countries includes it, but is only detailed in three categories: agriculture, forestry, and fishing and hunting.

A first improvement was developed in an IFPRI study of nine countries from 1950 to 1978 (Elias, 1981 and 1985), which added to standard agricultural accounting (agricultural promotion, agricultural research and extension, irrigation and others) the indirect estimates of expenditures in rural health and education. These estimates were obtained by weighting the overall expenditure in education and health by the proportion of school enrollment and the proportion of social security institutions established in rural areas respectively. While useful for some comparisons, estimating expenditures with this approach prevents the determination of a per capita gap between urban and rural areas.

In 1984, FAO published the first consistent panel of public expenditure in agriculture in 57 developing countries around the world, covering 1978 to 1982. It was based on a survey and used the International Standard Industrial Classification (ISIC) definition of agriculture. However, the Classification of the Functions of Government (COFOG) [4] was recommended for use in extracting the data on public expenditure on agriculture from national budget documents (Table 1). The strength of this analysis is that it separates expenditures by the level of government which delivers the allotment (central government, state/provincial government or local government), and also provides a division by capital or current

[4]

expenditures. This classification allows the building of proxies for capital stock accumulation.

Table 1. International Standard Industrial Classification (ISIC) definition of agriculture:

I		**Agriculture, hunting, forestry and fishing**
11		Agriculture and hunting
	111	Agriculture and livestock production
	112	Agricultural services
	113	Hunting, trapping and game propagation
12		Forestry and logging
	121	Forestry
	122	Logging
13	130	Fishing

Source: UN Statistical Papers, ST/ESA/STAT/SER, M/70, New York 1980

A step forward was taken in another IFPRI study (Fan et al, 2000), which included the previously mentioned variables, but also quantified infrastructure investments in rural areas. An important contribution was to analyze the impact of expenditures in producing both intermediate assets and final welfare indicators such as GDP growth and poverty reduction, all within an integrated structural system. Nonetheless, this dataset only covers 13 states of one country (India), benefiting from the fact that there was only one authority and a single mechanism for data collection.

2.2 How was the database constructed?

Following the methodology used by FAO in 1984, a system of national correspondents was established. They were selected by FAO on the basis of candidatures submitted by concerned national institutions such as Ministries of Agriculture.

As a mechanism for checking the consistency of the reported data, the sum of all items in the category "agricultural productive promotion" was compared with the component of rural expenditures that is usually reported as "agriculture" in national accounts. No major differences were found, indicating that at least in aggregate terms (Annex 1) our classification of these expenditures in more than eleven categories is consistent with previous national data.

Unfortunately, reliable cross checks for items regarding social investments as well as infrastructure cannot be performed, given restrictions of our proxies. Considering that counterpart selection was slightly biased by "agriculturalist" concerns (e.g. when the correspondent was selected because FAO asked the Ministry of Agriculture for a possible candidate) and considering that national budget systems are not accustomed to go beyond the oversimplified "equation" rural = agriculture, the items classified as social and infrastructure expenditures are likely to be less robust against different national correspondents.

2.3 Using and improving the database

Independent of the heterogeneity in the way each country defines "rural" (World Bank, 2004), given the differences in which countries execute their budget and by the discretion of decentralized levels of government; direct comparisons of PETRA are only imperfect proxies for the real level of public expenditures in rural areas and. While we recognize that this first attempt to monitor rural public spending has limited consistency when used in levels, it could be helpful when econometric analysis allows discriminate idiosyncratic characteristics of

countries. In this sense, some points of this database should be improved prior to allowing more assumption demanding inferences[5]. They are:

(i) Appropriately record expenditures in federalized countries as well as decentralized transfers

(ii) Include a data quality cross-check within each country, specifically with counterparts in national budget offices and congressional budget offices, where available

(iii) Univocally match the classification with specific program entities

(iv) Check overall compatibility when compared with standard IMF classification as "Agriculture"

(v) Provide a better framework for data classification in order to reduce discretion of each country correspondent

(vi) Measure para-fiscal transfers such as specific import tariffs for agricultural products.

3. How much do LAC governments spend in rural areas?

This section describes a preliminary version of this new dataset of public expenditures traceable to rural areas (PETRA) in LAC, for the period 1985 – 2001. The results follow from the compilation of several studies carried out by the FAO Regional Office since 2001[6].

The dataset contains 31 categories that were classified in three groups: direct transfers to the agricultural productive cycle, rural infrastructure, and rural social expenditures[7]. This classification could seem arbitrary, and because of this fact, another plausible classification

[5] Further analysis, such as a direct quantification of the overall impact on poverty or on rural income, normally requires stronger assumptions about the quality of the proxy (PETRA). Assumptions that are not likely to hold. Previous attempts to measure that overall impact, like that preformed by the authors (early version presented at ABCD_LAC Nov 2004) and the other made by Lopez (2004), should be carefully revisited considering the mentioned shortcoming.

[6] Since 2001 and coupling resources from two regional FAO projects, this database was constructed in its first version. Further research will be developed in order to improve and discuss classifications and collection technology for data accuracy.

[7] Detailed in Annex 9.1

based on the focus (productive or social) and type of good produced (private or public) is also presented in Annex 9.1.

In total, data are available from 18 countries. Records from Cuba were not used in this analysis given the different nature of its economic framework.

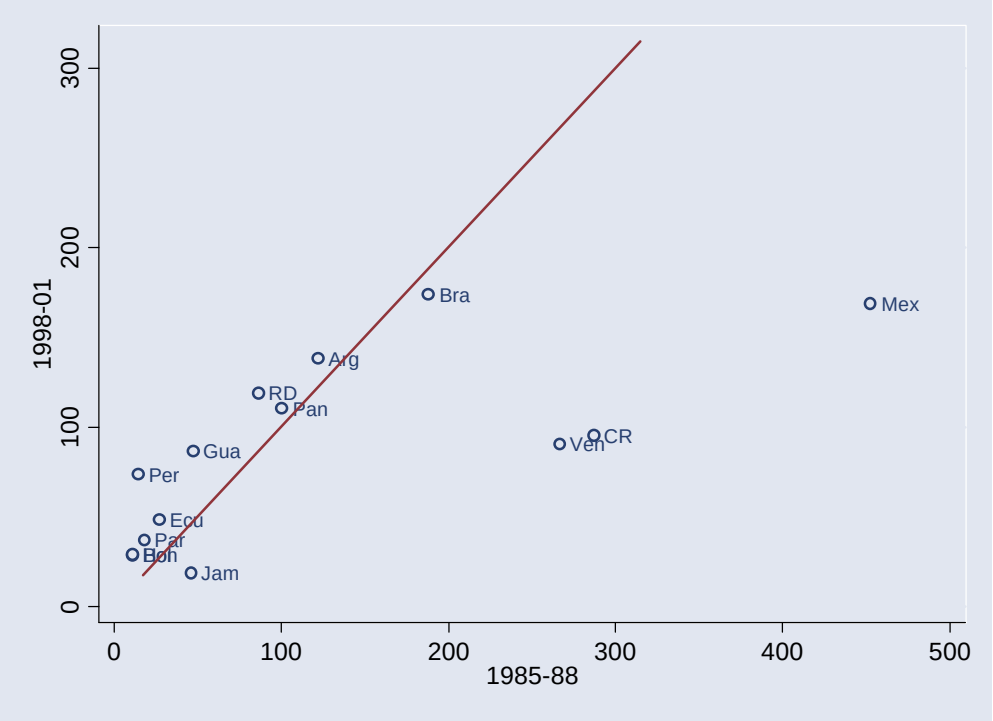
On average, per capita[8] PETRA decreased from US$ 205 in 1985-1990 to US$ 140 in[9] 1996-2001 (see Figure 1 and Annex 1 for more details). In terms of total governmental expenditure these rural expenditures represented respectively 7.05% and 6.15%. However, there are important differences among countries, even within each of the sub-regions. For example, in the Andean sub-region, the expenditure reduction in Venezuela (from US$ 225 to US$ 94 in the same period) is remarkable, but on the other hand there are, paramount increases in Ecuador and Peru. Also in the Andean zone, Bolivia slightly increases its PETRA, while Colombia PETRA practically did not change. In the Caribbean sub-region there is a decrease in the two countries studied.

In the Southern Cone, Uruguay seems to be an astonishing case with an increase from US$872 to US$1,698, but this is due to the fact that it was unfeasible to separate rural pensions from the rest of rural expenditures.

In Argentina and Paraguay a slight increase is noted, whereas in Brazil, spending rose from 1991 to 1995, although it fell in subsequent years. Finally, Mesoamerica presents a contrasting picture, with PETRA reductions in Mexico and Costa Rica, and increases in the other countries.

[8] If no other explanations are provided, in this paper per capita refers only to rural inhabitants.
[9] Real US$ year 1995, using each country's implicit GDP deflator

Figure 1. Comparison of rural public expenditure per rural inhabitant in 1985-88 and 1998-2001. (Constant US$, 1995). The straight line represents a 1 to 1 relation (i.e. no change)



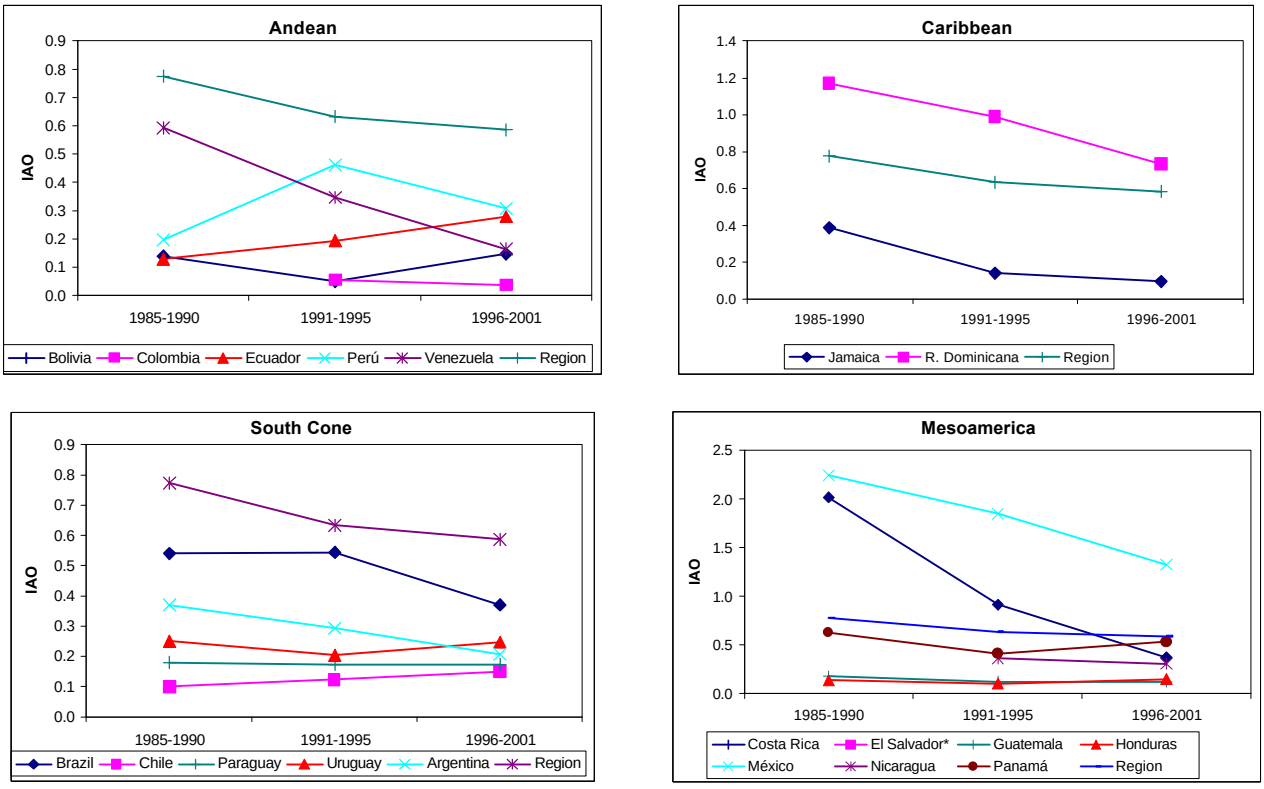
In Figure 2, we present an Agricultural Orientation Index (AOI), which quantifies the relative relevance of the sector in total governmental expenditures.[10] An AOI equal to one would mean that government spending in the sector equals agricultural share of GDP. Nonetheless, it must be kept in mind that Agricultural GDP may underestimate the contributions of this sector to the economy and welfare, given some positive externalities and multipliers (World Bank, 2004). With the exception of Mexico, Nicaragua and Costa Rica (the latter two only in 1985-90), this indicator is consistently below one, and the average is relatively stable, consistent with PETRA decreases and the reduction in the share of agricultural in GDP. In all countries, except Bolivia, Ecuador and Uruguay, this indicator is decreasing. Other

[10] AOI = (Expenditure in rural direct incentives / total governmental expenditures) / (Agricultural GDP / Total GDP).
AOI was used by FAO in the presentation made for the World Food Summit - Five Years Later:
COMMITTEE ON WORLD FOOD SECURITY. 2001. MOBILIZING RESOURCES TO FIGHT HUNGER. Twenty-seventh Session, Rome, 28 May - 1 June 2001.

interesting evidence is the relative convergence of Central America to around 0.5 or less, with the exception of Mexico where, although slightly reduced, it continues to be greater than one.

In Mexico, direct incentives from 1996 to 2001 represent 72 %, which in per capita terms is slightly higher than other Central American countries. On the other hand, 22% correspond to social expenditure.

Figure 2. Index of Agricultural Orientation



There is coincidence between the decrease in rural expenditure per capita and the reduction of the Agricultural Orientation Index. However, there are differences not shown by these indicators, such as the decreasing share of agriculture in rural income (De Janvry and Sadoulet, 2001), rural migration and also changes is rural expenditure's composition, which in general increases its share of social expenditures (Table 2 and Figure 3).

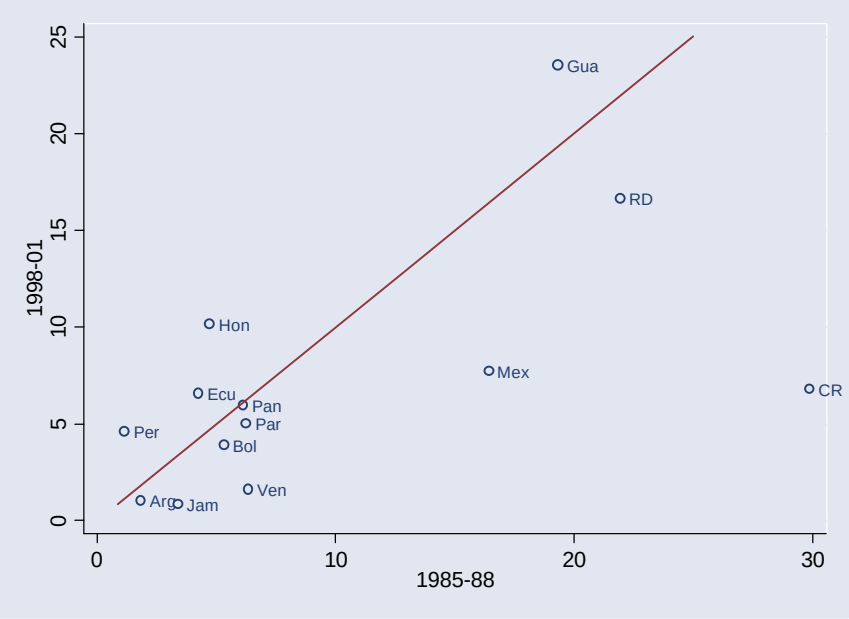
Considering the mentioned changes in rural economies in Latin America, agricultural GDP is not reliable enough as a proxy of economic activity in rural areas (see for example OECD, 2005). For this reason, a new indicator should be taken into account: Rural Orientation Index (ROI = % of public expenditures to rural areas / Rural % of GDP). However, the denominator, namely Rural GDP, is not yet available for feasibly estimating such an index.

Table 2. Public Expenditure Traceable to Rural Areas (PETRA) and its composition

Subregion	Country	Years	PETRA per capita (US$1995)	Total PETRA (MM US$ 1995)	Agric. Prod. Promot. (% of PETRA)	Rural infraestructure (% of PETRA)	Rural social expenditure (% PETRA)	Petra as % of total gov. Expenditure	Agricultural value added (% GDP)	Index of Agricultural Orientation
Andean	Bol	1991-95	12	35	30	18	52	2.43	15.25	0.05
		1996-01	26	83	57	9	34	3.75	14.43	0.15
	Col	1991-95	37	403	28	33	40	3.43	17.32	0.05
		1996-01	29	306	28	22	50	1.77	13.52	0.04
	Ecu	1991-95	27	130	79	4	16	4.75	19.73	0.19
		1996-01	49	239	77	1	22	6.79	18.88	0.28
	Per	1991-95	65	447	68	16	16	5.35	7.92	0.46
		1996-01	73	513	55	28	16	4.72	8.48	0.31
	Ven	1991-95	166	522	49	22	29	3.61	5.15	0.35
		1996-01	94	298	48	16	36	1.79	5.26	0.16
Caribbean	Jam	1991-95	25	30	81	-	5	1.49	8.42	0.14
		1996-01	19	23	92	-	1	0.85	8.05	0.10
	RD	1991-95	84	274	72	13	15	18.05	13.15	0.99
		1996-01	105	362	54	10	36	15.87	11.69	0.73
Mesoamerica	CR	1991-95	159	234	78	5	17	14.72	12.58	0.91
		1996-01	104	161	58	9	33	7.72	11.91	0.38
	Gua	1991-95	40	220	17	49	34	17.69	24.87	0.12
		1996-01	82	499	12	55	33	24.81	23.24	0.12
	Hon	1991-95	18	56	27	56	17	6.74	18.40	0.10
		1996-01	25	88	29	58	13	9.17	17.47	0.15
	Mex	1991-95	227	5,379	74	13	13	12.43	4.99	1.84
		1996-01	181	4,454	72	6	21	8.53	4.68	1.32
	Nic	1991-95	67	129	43	23	35	26.53	30.78	0.37
		1996-01	77	167	37	29	35	25.23	30.51	0.30
	Pan	1991-95	52	60	97	2	1	3.26	7.74	0.41
		1996-01	90	111	76	23	1	5.02	7.20	0.53
South Cone	Arg	1991-95	125	508	99	-	2	1.49	5.07	0.29
		1996-01	135	519	96	1	3	1.08	5.04	0.21
	Bra	1991-95	240	8,704	95	5	-	4.39	7.70	0.54
		1996-01	194	6,437	87	12	1	3.36	7.87	0.37
	Chi	1991-95	218	483	27	26	47	4.18	9.31	0.12
		1996-01	301	651	29	33	38	3.82	7.35	0.15
	Par	1991-95	30	65	74	13	12	5.80	24.75	0.17
		1996-01	36	85	86	7	7	5.12	25.49	0.17
	Uru	1991-95	1,245	398	22	13	65	7.59	8.20	0.20
		1996-01	1,698	476	27	12	61	7.21	7.88	0.25
LAC (surveyed countries)		1985-90	205	1,268	90	5	10	7.05	0.08	0.77
		1991-95	162	1,004	80	11	11	6.17	0.08	0.63
		1996-01	139	860	72	14	16	6.15	0.08	0.59

Note: Refer to Annex 9.3 for viewing each country's status in terms of formal governmental acceptance of the data.

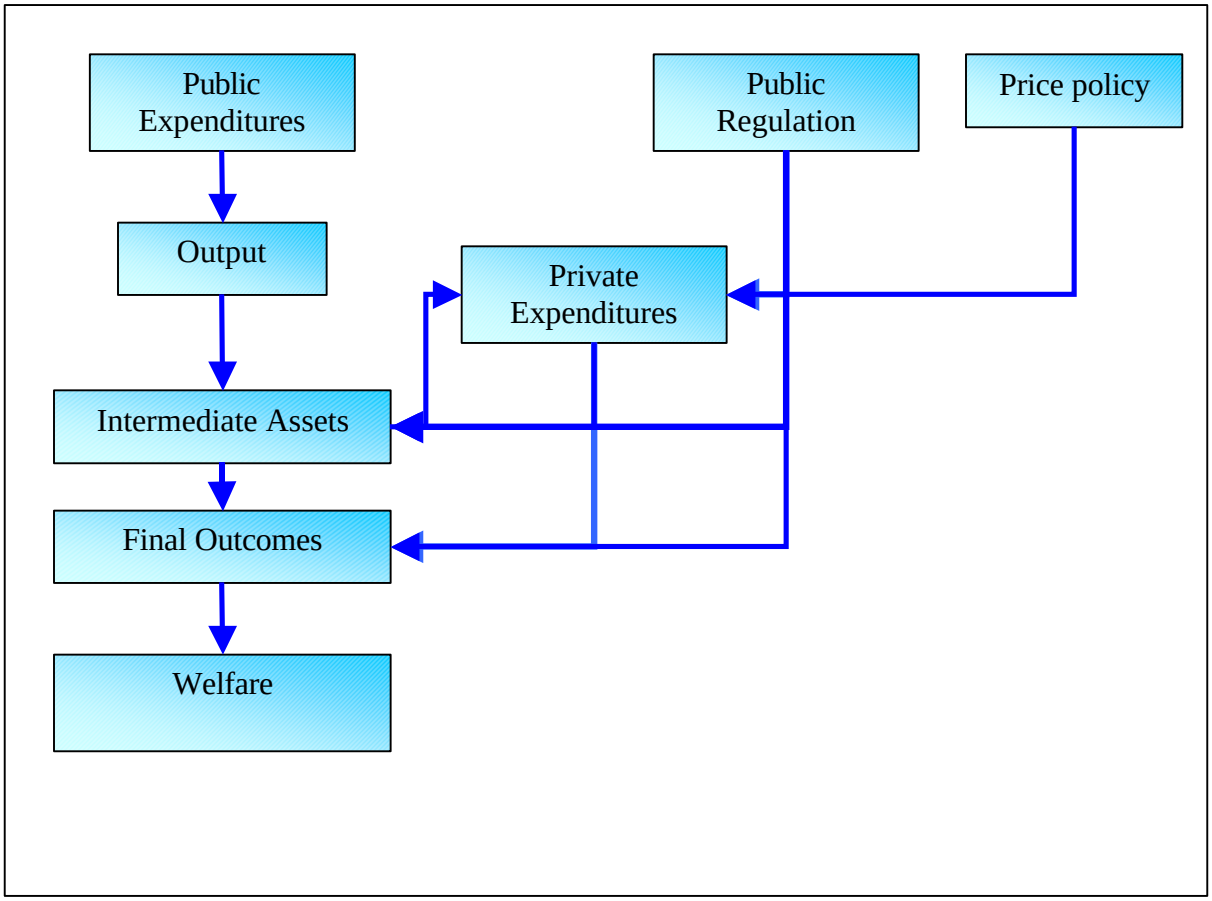
Figure 3. Proportion of total governmental expenditures that are directly assignable to rural areas. Comparison at the start and at the end of the studied period.



4. Beyond currency allotments: exploring the quality of public expenditures

Figure 4 presents a schematic view of the process that transforms public decisions (top) into welfare results (bottom). As it can be seen, one of the major challenges is to determine the extent to which a given result is attributed to a given public decision.

Figure 4. General framework of hypothetical causal relations between public interventions and welfare results.



As a starting point, we can consider a model in which welfare indicators (GDP, poverty…) grouped in a vector W, depend in a given functional form on a vector of assets available in rural areas, X (roads, safe drinking water, literacy rate), and other determinants Z.

$$\mathbf{W} = f(\mathbf{X}, \mathbf{Z}) \qquad \text{(Eq 1).}$$

Those assets (X) need to be constructed and maintained, i.e. investments are needed for each respective asset. Without losing generality, those investments comprise both a stock of public investments (G) and a stock of private investments (P). Consequently,

$$\mathbf{X} = F(\mathbf{G}, P) \qquad \text{(Eq 2).}$$

If we consider the (strong) assumption that the effects are functionally separable into G and P, we can describe the impact of the stock of public expenditures $\mathbf{G_{it}}$ on the mentioned assets X as

$$\frac{\partial \mathbf{X}}{\partial \mathbf{G}} = \begin{bmatrix} \frac{\partial X_1}{\partial G_1} & \cdots & \frac{\partial X_n}{\partial G_1} \\ \vdots & \vdots & \vdots \\ \frac{\partial X_1}{\partial G_n} & \cdots & \frac{\partial X_n}{\partial G_n} \end{bmatrix} \qquad \text{(Eq 3).}$$

In this paper we are going to explore the direct impacts of public expenditure in producing those assets X. This means that we only explore the relationship of a given asset x_k (e.g. rural roads) and the respective stock of publicly provided assets that could be clearly assigned to it, G_k (e.g. public spending on rural roads). With this focus, we are discarding any effect of G_j (for example spending in research and development) on G_k

Mathematically, that means that we are going to explore only the vectorized diagonal of d**X**/d**G**

$$vec\,(\,diag\,(\frac{\partial \mathbf{X}}{\partial \mathbf{G}})) = \begin{bmatrix} \frac{\partial X_1}{\partial G_1} \\ \vdots \\ \frac{\partial X_n}{\partial G_n} \end{bmatrix} \qquad \text{(Eq 4).}$$

While it is true that "unintended" effects could occur (i.e. an effect of road investments in improving efficiency of rural education expenditures), in order to keep things simple we are going to explore only "mainstream" effects.

Perhaps one of the major contributions of the new database of Latin American Public Expenditures is the level of detail reached in the budget items, which allows not only to ability to assess the impact of expenditures from a structural point of view, but also to determine which item shows low levels of performance.

Finally, assuming that the effects are functionally separable, we can explore the overall impact of a given public expenditure in social welfare, either defined as GDP, rural income or people above the poverty line; by using the chain rule:

$$\frac{\partial W}{\partial g_k} = \frac{\partial X_k}{\partial g_k}\frac{\partial W}{\partial X_k} \qquad \text{(Eq 5)}$$

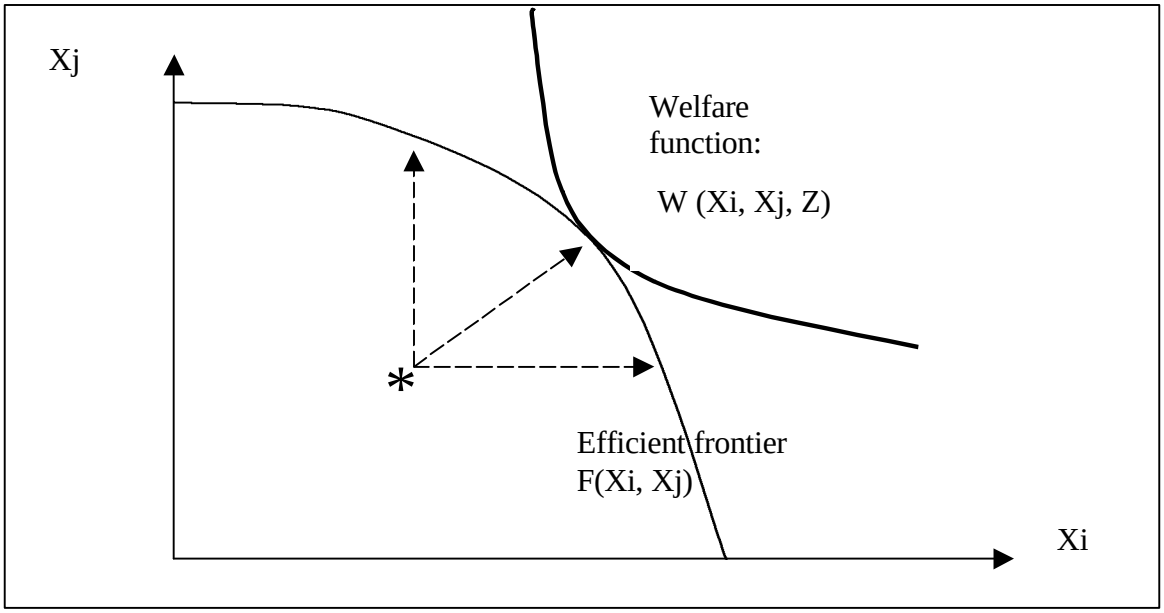
Considering efficiency, we can partially decompose the right hand side of equation 5 into two mechanisms (IMF, 1995)

- The first is the efficiency in producing, at minimum cost, a given asset X of standardized quality through public investment (technical efficiency), and

- The second is the efficiency in selecting the adequate mix of assets that maximize overall welfare, (allocative efficiency)

In graphical terms, it could be shown as:

Figure 5. Maximizing welfare through public expenditures: technical efficiency and "right" allocation efficiency.



While it is practically impossible to exactly determine the optimum level of public expenditure, we understand that improving the performance of public investment in rural areas requires a whole system. It should continuously monitor and manage budget based on *ex ante* stated results, and more specifically on outcomes rather that outputs. In concrete terms, it is complex to determine $\frac{\partial W}{\partial X}$, because of the problems when constructing a counterfactual, as well as by the uncertainty about "the" welfare function, which is a purely theoretical concept. Nonetheless, a successful democratic system should not allow more discretion than that granted by stakeholders to the managers of a corporation: "do as you want, but show me objective proofs that the results you planned are being implemented."

As we previously argued, the impact of public expenditures on welfare has two components. On the one hand there is $\frac{\partial W}{\partial X}$, which is intrinsically determined by the economic and political system. With this, we can only expect that the authority discovers and implements "the best mix". On the other hand, $\frac{\partial X}{\partial g}$ is a matter of technical or "business" efficiency, which could be monitored with the classic MBA-like tools applied to the public sector. However, one needs to look at both budget and political capital restrictions, so there is the need to seek approval or answers from the Minister of Finance (Chief Finance Officer) as well as the Chief Political Officer.

5. Trying to make definitions work –Preliminary estimates of expenditure impacts

Measurement of firm efficiency, including public efficiency, cannot be oversimplified with partial productivity ratios because of the differences in the level of any other determinant in the production function (Farrell, 1957). Consequently, and driven by the ideas of a global benchmarking in the context of budgeting for results, many cross-country comparisons for assessing the quality of public expenditures (e.g. education spending impact on literacy or health spending impact on life expectancy), were performed by frontier methods. A new work on public spending' s efficiency in 140 Developing Countries was made by Herrera and Pang (2005), estimating the efficiency frontier for several health and education output indicators by means of the Free Disposable Hull (FDH) and Data Envelopment Analysis (DEA) techniques. Results show that countries that score lower in efficiency have, on average: higher expenditure levels, larger share of the government's budget spent in wage bill, higher ratios of public to private financing of the service provision, higher HIV/AIDS levels, higher income inequality and higher aid-dependency ratios.

Nonetheless, a recent analysis (Ravallion, 2005) shows that, with the current parametric approaches, it is very difficult to really assess inefficiencies in such cross-country comparisons, due to both econometric and theoretical issues. For example, it is not clear if

some relevant variables are part of the "inefficient" production function or if they are determinants of the described inefficiency. Other problems relate to the functional assumptions as well as the distributional assumptions made in such cross-country comparisons. Furthermore, the final responses of the socio-economic system are mediated by complex interactions, so any unobservable factor not corrected may be mistakenly attributed to this aggregated inefficiency.

For reliably estimating some policy relevant results about public expenditures' impact on rural areas, we need a structural approach similar to that used by Fan (2000), which relates expenditures to intermediate variables and then indirectly to rural welfare indicators. In this way, it is possible to gain statistical efficiency, but also partial effects through more than a single mechanism can be identified, generating more information for managerial decision making

Unfortunately, given data constraints about such intermediate rural assets in Latin America, we are unable to provide full benchmarks. We are restricted to report average values for Latin American countries. In addition, we can only report a selected group of indicators for which simple causal relationswere identified (e.g. simple production functions of public expenditures to irrigated land or schooling).

Expenditure proxy comes from the mentioned FAO study. Social and Economic Indicators were constructed from World Development Indicators (WB) and BADEINSO (ECLAC). The FAO Statistical Database (FAOSTAT) was used as a source of intermediate assets for agriculture. In the case of assets in R&D we used the Agricultural Science and Technology Indicators (ASTI) of the Consultative Group on International Agricultural Research (CGIAR).

(a) Direct production of outputs

A first set of equations were estimated for quantifying the quasi production function between a given item of expenditures to rural areas and their respective expected outputs, as shown in Table 3.

Table 3. Evaluating individual allotments. Summary of the estimated effects of rural public expenditures on intermediate assets.

Type of rural public expenditure	Type of asset	Selected estimation method	Control variables	Elasticity	R^2	Observations
ln (public expenditure in irrigation, US$ MM 1995)	ln(change in irrigation land, hectares)	Fixed effects	-	-0.1145 n.s.	0.40	Random and fixed effects are differents (Hasuman test P-value = 0.0). The most variation is between (R^2 = 0.74)
		Regression with robust standard errors	ln(arable use land, hectares), time effects.	0.1476 **	0.60	
ln(public expenditure in agricultural research per hectare, US$ 1995)	ln(public agricultural researchers full equivalent per 100 MM hectares)	Random effects - GLS regression	-	0.1216 ***	0.73	Random and fixed effects are similar (Hausman test P-value = 0.25)
		Fixed effects	-	0.1065 ***	0.73	
ln(public expenditure per capita in urban education, PPP 1995)	ln (school enrollment primary net, %)	Regression with robust standard errors	ln(total population)	0.0492 ***	0.551	Random and fixed effects aren´t differents (Hasuman test P-value = 0.08), but the most variation is between (R^2 = 0.72)
ln(public expenditure per capita in rural education, PPP 1995)				-0.0329 **		
ln(public expenditure per capita in urban health, PPP 1995)	Immunization, DPT (% of children ages 12-23 months)	Random effects - GLS regression	-	0.0777 *	0.01	Random and fixed effects are similar (Hausman test P-value = 0.83).
ln(public expenditure per capita in rural health, PPP 1995)			-	0.0214 n.s.		

* significant at 10%; ** at 5%; *** at 1%; n.s. non significant.

Regarding irrigation expenditures, we can see that the simplest fixed effects estimates are unable to find an impact on irrigated land. This could be due to the fact that many public efforts in irrigation during the 90's were directed to increase quality of irrigation (e.g. drip). We are unable to correct for private investments in irrigation given the absence of a reliable proxy.

When estimating public costs of R&D for rural sector, we find that a 10% increase in expenditures in R&D may increase the number of agricultural researchers by 1%. This should not be interpreted as evidence of inefficiency, given that quality (and consequent expected impact of research) normally depends also on: (i) non permanent researchers who normally are not recorded in public databases, (ii) resources for equipment and fungible resources for experimentation (iii) higher levels of human capital accumulated by each researcher. Perhaps the consideration of not only researchers, but also relevant scientific papers (e.g. ISI) could be the next step.

Education and health outputs were not available yet in disaggregate terms, but total (rural + non rural) governmental expenditures in such items were available. Consequently, a different approach was used in estimating the impact of both rural and non rural expenditure on the output variable. This is consistent with the findings of Calderon et al (2003) who estimated the impact of public and private investments on infrastructure.

With this methodology, there is no statistical evidence of the response of school enrollment to rural investment in education when corrected by unobservable country effects constant in time. This is likely to rely on the low quality of schooling data for rural areas, which should be improved to monitor the "equal-opportunities-to-rural-areas" objective.

When applied to one indicator of health services (DPT immunization), rural investments in health were significantly related to this output, and almost equal[11] when compared to non rural investments.

(b) Impact of expenditures' outputs, and their respective stock, on some rural outcomes

[11] This is true if the proper transformation on per capita basis is performed. That means dividing the rural elasticity times the ratio of urban to rural population, which on average for Latin America is nearly 1/4.

A second set of equations were run for quantifying the contribution of some rural public investments outputs on rural outcomes. As an example, we selected two relationships: impact of irrigated land on exports diversification and impact of agricultural researchers on agricultural production.

Regarding exports diversification, fixed and random effects estimates show positive impact of irrigation, even when correcting per year effects (like an international crises effect) and R&D efforts.

Regarding the other example, not surprisingly, full time equivalent researchers have proved to be significant for improving productivity in Latin America's agriculture. These results are consistent with previous evaluations.[12]

Table 4. Summary of the effects of assets on some rural final outcomes of production and diversification

Type of assest	Type of output	Selected estimation method	Control variables	Elasticity	R^2	Observations
ln(irrigated land, %)	ln(index of export diversification)	Random effects - GLS regression	Time effects	-0.0155 n.s.	0.25	Random and fixed effects are similar (Hausman test P-value = 1.00)
		Regression with robust standard errors	ln(arable use land, hectares) and time effects	0.0464 **	0.31	
ln(public agricultural researchers full equivalent per 100 MM hectares)	ln(Agricultural product value per hectare)	Fixed effects	Agricultural inputs and time effects	0.0721 n.s.	0.82	Random and fixed effects are differents (Hausman test P-value = 0.0)
		Regression with robust standard errors	Agricultural inputs, time effects and ln(arable land use, hectares)	0.1301 **	0.99	

(c) Searching for inefficiencies

Finally, we wanted to report another application of this database, which is searching for inefficiencies in the previous estimates of regional average effects. Considering the limitations previously mentioned by Ravallion (2005), we only estimate effects of

[12] See for example the analysis of several evaluations made by Rosenboom (2003). See also Thirtle,et al. 2003

intermediate variables (expenditures → output → intermediate outcomes), but not on final welfare indicators such as poverty or rural income.

Results [13] shown in Table 3 indicate that both impact of exports diversification and researchers' impact on productivity present significant heterogeneity among countries. These results are consistent with the fact that efforts in international marketing (for example the Chilean experience) and incentives for researchers have been previously mentioned as important determinants for those two results.

Table 5. Panel data estimates of frontier analysis and inefficiencies.

Dependent variable	Estimation method	Time-invariant of technical efficiency (μ)	Decay parameter (ç)	Share of technical efficiency variance (gamma)	General P-value	Observations
ln(change in irrigation land, hectares)	Time-invariant inefficiency model	3.1848 n.s.	--	0.67	0.6156	No evidence of inefficiency
	Time-varying decay inefficiency model	--	--	--	--	
ln(public agricultural researchers full equivalent per 100 MM hectares)	Time-invariant inefficiency model	1.4178 ***	--	0.99	0.0000	Evidence of time-invariant inefficiency
	Time-varying decay inefficiency model	--	--	--	--	
ln(immunization DPT, % of children ages 12-23 months)	Time-invariant inefficiency model	0.1422 n.s.		0.50	0.1047	No evidence of inefficiency
	Time-varying decay inefficiency model	1.0420 n.s.	0.0209 n.s.	0.23	0.3448	
ln(index of export diversification)	Time-invariant inefficiency model	0.3066 **	--	0.65	0.0001	Some evidence of time-decreasing inefficiency
	Time-varying decay inefficiency model	0.2261 n.s.	0.0362 **	0.48	0.0101	

* significant at 10%; ** at 5%; *** at 1%.

As a conclusion of the empirical analysis, it is important to remark that current preliminary results could be useful for international benchmarking only if we can collect reliable estimates of the mentioned outputs and assets. Recording expenditures is only the first step for monitoring public efficiency. In fact, with this approach, rather than suggesting direct policy measures about public expenditures themselves, we generated a broader set of hypotheses that should be tested after data constraints are removed.

[13] Using the same respective specifications used in the analysis of table 2 and table 3.

6. Filling institutional niches for improving the quality of expenditures.

As mentioned in section 2, priority setting and execution of public budget is a complex process that should be managed properly in order to avoid resource dispersion and dissipation. In this section, we present some institutional innovations that could be considered for improving the quality of the process that designs, executes, and evaluates the performance of public expenditures in rural areas.

6.1. Public organism decoupled from partisan activities - *Public Non-Governmental Organizations*[14]

One important lesson from the previous cycles of structural reforms is that weak or incomplete markets call *for public interventions but not necessarily governmental agencies*. Noting this crucial lesson, the term Public Non Governmental Organizations (PNGO) [15] seeks to express the provision of certain public goods such as policies, norms and regulations through private actors and citizens. These organizations are de-linked from a particular political regime and subject to different rules on their composition, their duration and their enforcement procedures. Examples of these types of organizations can be found in Human Rights commissions, Electoral Boards, Central Banks or private certification agencies.

The increase in decision-making effectiveness regarding monetary policy, after independent central banks were institutionalized (Alesina and Summers, 1988 ; Cukierman *et al* 1993) is well known. These improvements are a result of its non partisan nature in that: (i) a set of clear indicators and goals, such as an inflation targeting is kept; (ii) there is a whole group of experts that is continually improving its understanding of their specific business; (iii) there is

[14] Gordillo(1999)
[15] Gordillo (1999) differentiates this term from a similar used by Bresser y Cunill (1998) in that these are public organizations but not government agencies

a relatively standardized language and background that allows the international community of experts to discuss, and consequently conceptually advance in parallel and network form rather than sequentially; and finally (iv) there is a strong relationship with markets and with a technical supervisory group, that allows a pertinent performance control. One can argue that the variables managed by a central bank (money) are related in a straightforward manner with the objective (inflation, unemployment) as compared to the complex nature of national and regional development. However, the underlying principles could be adapted and effectively applied in favoring impact evaluation and spillover from public expenditures.

Another analogy that also sheds light on the role of these PNGOs comes from the modern role of Supreme Audit Offices [16] which in addition to controlling the legality of processes also fosters efficiency and potential coordination, namely on how to improve governments.

6.2. Quality of parliamentary discussion

The weaknesses of voice institutions in LAC have been identified as one of the most important restrictions for development (Rodrik, 1999). In this sense, parliaments are a major challenge.

Even considering their limitations, parliamentary deliberations represent some level of territorial and partisan diversity in preferences, but they are mostly preferences on final outcomes of policies (income, redistribution, externalities...) and not directly on policy measures (discussion outputs) that should be taken in order to receive from the system a given outcome (reforms, taxes, subsidies, regulations...). In general, they do not have competitive advantages for modeling and, in LAC, internal arrangements that organize technical assistance and advice are rarely developed.

[16] See for example GAO Government Accountability Office (formerly General Accounting Office), in the United States. www.gao.gov

In our region, parliamentary decision making has too little of argumentative discussion, too much of doctrine and, as a paradoxical result, too much of a piecemeal approach. Acceptance of a doctrine may be articles of faith, but for good policymaking it does not exempt presentation of objective proof or discussion of the suppositions that hold an argument (Norman and Gregory, 2003).

Public intervention in this *decision making market* is reasonable precisely because there is public interest in increasing the quality of arena in which ideas are discussed, given that Coase's theorem is not feasible in the political economy[17]. Thus, following the experience collected in more than 40 years of Quality Management[18], attention should be paid not only to the quality of laws--parliamentary discussion products--but also in the process that generates those products. This is in order to avoid excessive delays, casuistry reasoning and costly problems of quality[19]. For example, secondary and unexpected effects may be an indicator of quality failure.

For addressing some of the quality problems, an expansion of the "decision making market" is needed in order to enhance the elective and decision processes as follows:

- An independent advisory body that develops proposes laws and regulations, similar to the advisory structure of the US Congress.
- A Government Accountability agency. Following the example of GAO in US, congresspersons not only need to review the legality of some procedures followed by the Executive (such as what some common Comptroller Offices in Latin America perform), or about complex modeling (as discussed above), but also need to make managerial decisions based on facts[20]. Indicators on levels of efficiency and effectiveness in governmental offices are needed to reduce mission fragmentation and program overlapping. Currently, there is clear informational asymmetry among the performances of bureaucracies between executive and legislative branches.

[17] See Acemoglu 2003.
[18] Now formally a branch of operations management
[19] See also Grasso, 2003
[20] See again Chapter 5 in ISO 9001:2000.

- A vector of indicators to be maximized by parliament: this is helpful considering the non-contractable (i.e. non enforceable on courts) nature of congressmen work. This vector should contain variables (or proxies) regarding both quality control of products (laws analyzed ex post) and quality of processes. [21]

These changes are feasible because of a context characterized by: (i) recent surveys that reflect low levels of voters' trust in their institutions, especially the low perceived value of democracy[22] (ii) a credible menace of populism and (iii) the need of national internal and external signals of accountability.

Adequate timing and sequence for reform (Hausmann et al, 2005) as well as a change management approach should be considered for really implementing some of the mentioned innovations.[23]

6.4 Coordination of public policies (and private investments) at micro-regional level.

Briefly stated, we observed that centralized power has problems regarding local preferences and capacities. On the other hand, local governments have competitive advantages regarding those issues, but lack enough economy of scale for technical capacity and linkages (which cannot be contracted in completely divisible units). Also, the extremely reduced size of some municipalities produces a bias against projects with externalities that significantly impact beyond the boundaries of a given municipality (Duret and Ventelou, 2004).

Consequently, we propose a complementary institution: an Alliance for (micro) regional development which operates as an agency to coordinate public policies at micro regional

[21] Regarding the latter, a system for monitoring managerial decision making is good for increasing transparency. However if one records only "easy indicators ", such as session attendance or project acceptation rate, you are biasing the incentives against good quality of discussion. Some alternatives could be (i) a group of argumentation professionals that record the depth of discussion and arguments presented by each representative.

[22] See for example Latinobarometro surveys.

[23] Following one of the Kotter's 8 steps for managing change

levels—a group of municipalities. Its purpose is to maximize the potential spillovers of projects without by-passing but, instead, coordinating permanent local institutions.

In practical terms, based on an in-built feedback loop for learning and following some best practices in an effective operative framework, these alliances would unveil areas for interventions and to channel them into the pipelines of the ministries, financing agencies or private investor initiatives. These alliances can assist in solving tradeoffs between sufficient economy of scale for enhancing capabilities and sufficient local knowledge. Also, they might reduce capture problems. (Gordillo and Wagner, 2004)[24]

In conclusion, the three arrangements presented in this section are likely to reduce capture by elite, increase checks and balances and help coordination, through improvements in the quality and informational attributes on which the efficiency of public expenditures in rural areas depends.

[24] Paper presented in 8th Annual Conference of the International Society for New Institutional Economics (ISNIE) September 30 - October 3, 2004 in Tucson, Arizona USA and also in the Tenth Annual World Bank Conference on Development in Latin America and the Caribbean (ABCD-LAC 10), November 3, 2004, in San Jose, Costa Rica.

7. Concluding remarks

Exploring how much and in what manner public spending reaches rural areas is a key tool for monitoring the equality of opportunities and the efficiency of investments, especially considering that the rural world is much more than the agricultural sector typically considered in official statistics[25].

Previous cross-country databases of agricultural sector public expenditures as well as databases of rural public expenditures within a country already exist. Although a previous study (Elias, 1981 and 1985) also showed health and education expenditures, this paper is the first to monitor all rural public expenditures (i.e. "agriculture promotion" + social inv. + infrastructure) in a panel of countries, applied in this case applied to Latin America.

Given the disaggregated nature of the analysis, it enables comparative analyses within and between countries for the amount of resources allocated in each area. Even if more consistency should be provided, some preliminary trends can be remarked.

First, considering the collected results, per capita public expenditures directly traceable to rural areas decreased; this trend seems very constant in almost all the countries studied. No clear conclusions should be drawn about the causes of this reduction, which could be either a difference in the way Latin American governments tend to classify or combine such expenditures (e.g. in a way that makes it difficult to separate urban from rural investments), or a real reduction of opportunities for rural areas.

Second, considering the composition of rural spending, almost all countries reduced in relative terms the component of agricultural promotion in the overall rural public expenditure, while siphoning more resources to social expenditures and infrastructure.

[25] See Chomitz, Buys and Thomas (2004) and Chapter 2 in Beyond the city (World Bank, 2005).

On the other hand, resource allocation itself does imply neither results nor efficiency. Then, the "figures" of public spending would provide much more relevant information for decision making if they were linked to a specific set of rural assets which such expenditures aim to improve (e.g. rural schooling rate, rural health coverage, etc). Unfortunately, a limited amount of variables regarding such assets are available in a consistent manner for selected countries.

While it is true that the definition of what is rural in Latin America varies among countries and is not equivalent to the OECD definition (World Bank, 2004), the key challenge is that each country should be able to measure both public inputs, outputs and outcomes in the same rural definition within a given country.

Even though this first attempt to measure rural spending allows some analytical results, further improvements are needed in order to (i) appropriately record the expenditures in federal countries; (ii) include a data quality cross-check within each country, specifically with counterparts in national budget offices and congressional budget offices; (iii) match univocally the classification with specific program entities; and (iii) check overall compatibility when compared with standard IMF classification as "Agriculture".

In conclusion what is needed is a complete managerial information system, able to assess not only public spending but also private investments. In the long run, this system should also include a whole set of indicators selected ex ante and carefully embedded in a coherent model of causal relationships, following, to some extent, the model of Balanced Scorecard used in some profit making businesses or the Growth Diagnostics framework[26]. The Budget Office, the Parliament and the Civil Society should share this model, in order to build an evidence-based environment for discussion and policy improvement.

[26] See Hausmann et al, 2005

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9. Annex

9.1 Classification of rural expenditures used in this survey

A. Productive promotion
1. Administration and others
2.- Internal and external marketing (Market promotion and development)
2.1.- Forest, Agricultural, Animal and Fishing exports promotion.
2.2.- Internal marketing promotion agricultural and animal production
3.- Infrastructure for irrigation
4.- Scientific and Technological Research and Extension
5.- Soil, natural resources and environmental conservation focused on agricultural producers
6.- Forest incentives
7.- Phyto / Zoo sanitary capital
8.- Information and communication services
9.- Targeted rural productive incentives; targeted territorial or special programs
10.- Integrated rural development programs
11.- Productive incentives for aquaculture and fishing
B. Rural Infrastructure
12.- Roads and related
13.- Rural electric infrastructure
14.- Rural sanitary investments
15.- Rural water infrastructure (human uses)
16.- Land titling, agrarian regularization
17.- Water rights regularization and titling
18.- Social infrastructure for rural communities
19.- Land bought and expropriations
C. Rural social expenditures
20.-Social services in rural areas (Administrative and others)
21.- Housing
22.- Health
23.- Education
24.- Justice
25.- Sports and recreation
26.- Promotion of native ethnic groups
27.- Age groups promotion
28.- Women promotion
29.- Family promotion
30.- Promotion of associations and other administrative expenses
31.- Training

9.2. Alternative Multi-Classification

ITEM	Asset, Context or Transf (De Janvry)	Public good or Institutio	Private Good	Socially Oriented	Productively Oriented	Mainly Administrative	Public Good Or Social Subsidy (Lopez)?
A. Direct productive incentives							
1. Administration and others	C	1				1	
2.- Internal and external marketing (Market promotion and development)	C	1		1			
2.1.- Forest, Agricultural, Animal and Fishing exports promotion.	C	1		1			
2.2.- Internal marketing promotion agricultural and animal production	C		1		1		
3.- Infrastructure for irrigation	C/A		1		1		
4.- Scientific and Technological Research and Extension	C/A	1			1		1
5.- Soil, natural resources and environmental conservation focused on agr. producers	A		1		1		1
6.- Forest incentives	A		1		1		1
7.- Phyto / Zoo sanitary capital	C	1			1		1
8.- Information and communication services	C	1			1		1
9.- Targeted rural productive incentives; targeted territorial or special programs	A		1		1		
10.- Integrated rural development programs	C		1		1		1
11.- Productive incentives for aquaculture and fishing	A		1		1		
B. Rural Infrastructure			1		1		
1.- Roads and related	C	1		1			1
2.- Rural electric infrastructure	C/A	1		1			1
3.- Rural sanitary investments	C/A	1		1			1
4.- Rural water infrastructure (human uses)	C/A	1		1			1
5.- Land titling, agrarian regularization	A	1			1		1
6.- Water rights regularization and titling	A	1			1		1
7.- Social infrastructure for rural communities	C	1		1			1
8.- Land brought and expropriations	A		1	1			1
C. Rural social expenditures							
1.-Social services in rural areas (Administrative and others)	C		1	1		1	1
2.- Housing	A/T		1	1			1
3.- Health	A/T		1	1			1
4.- Education	A		1	1			1
5.- Justice	C/A		1	1			1
6.- Sports and recreation	C		1	1			1
7.- Promotion of native ethnic groups	T		1	1			1
8.- Age groups promotion	T		1	1			1
8.- Women promotion	T		1	1			1
9.- Family promotion	T		1	1			1
10.- Promotion of associations and other administrative expenses	C		1	1			1
11.- Training	A		1	1			1

9.3. List of surveyed countries

Countries with data accepted by government	Countries with data not yet accepted by government	Surveyed countries having serious problems in data or without data
n = 14	n = 4	n = 3
Argentina*	Bolivia	Chile
Brazil*	Costa Rica	El Salvador
Colombia	Guatemala	
Cuba	Mexico*	
Ecuador	Peru	
Honduras	Dominican Republic	
Jamaica		
Nicaragua		
Panama		
Paraguay		
Uruguay		
Venezuela*		

(*) Countries with an additional underestimation of PETRA due to the large amount of decentralized expenditures that could not be traced to rural areas