Aspects of the Fiscal Development

Edited by:
Rogério Boueri and
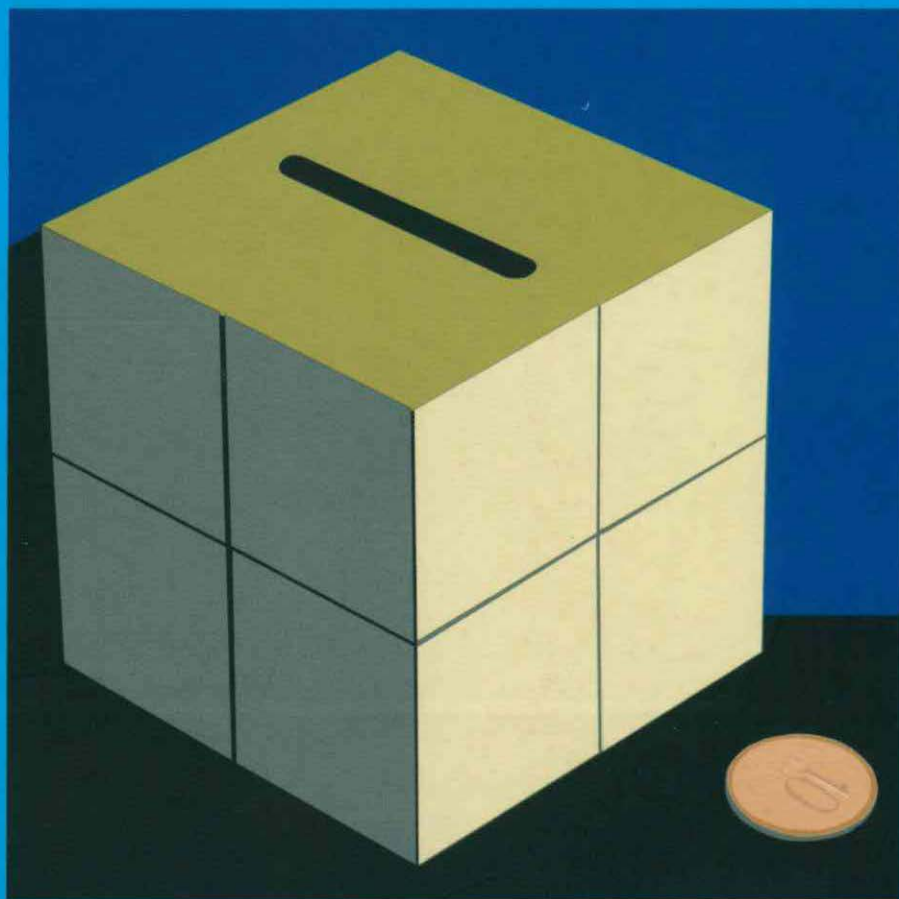Maurício Saboya

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SUMMARY

BRAZIL AND UK TECHNICAL COOPERATION – PUBLIC EXPENDITURE CONTROL

The United Kingdom has not always had effective techniques to control public expenditures. But in the last decades we have taken active steps to address a critical situation for both the treasury and the taxpayers.

This process of change in the treatment of the public budget, and the concern with being more efficient in the allocation, disbursement and control of expenditures was largely motivated by the idea of improving service delivery in three crucial areas for the lives of citizens: education, health and transport. Our greatest challenge, however, was to find mechanisms to develop the efficiency of these sectors without increasing the burden on taxpayers. The pursuit of service improvements gained strength when we learned valuable lessons from the private sector and incorporated the market economy rationale.

However, market solutions are not always the most effective answer to all the needs of the State. One must recognize the limitations and advantages of both the market and the State. Each nation must find its own balance between public and private in order to ensure that each sector's services will be delivered as efficiently as possible.

Another significant aspect of the changes in the British public budget sector was increased transparency and fiscal responsibility. British citizens are better informed about how their taxes are invested. Social scrutiny reinforces the government's concern with the efficiency of its budgetary allocation and the control of public expenditures.

Currently, the benefits of the British macroeconomic and fiscal change are visible. Our services are more efficient than in the past. Nevertheless, we still have much to learn and to improve. The British government understands that a national and transparent policy of sound and efficient public spending can have a major impact on global stability and growth.

On the basis of such guidelines, the British Embassy in Brasilia is pleased to work jointly with Ipea in the launching of this volume, with a view to establishing a permanent agenda of fiscal development incentive among managers and decision-makers in the area of budgetary and fiscal control.

I am certain that this initiative will be a way for us to exchange experiences and move forward together in the development of new practices to improve the efficiency of our services, the balance of our public finances and the transparency of our spending.

Peter Collecott
British Ambassador in Brazil

PRESENTATION

Thinking about Brazil is the essence of Ipea's institutional mission and work goals. In particular, thinking about the Country in the medium and short term, by carrying out economic and social diagnoses, designing public policy proposals in various areas, advising their implementation and evaluating their impacts and benefits at the national level.

Along the past ten years, the country's macroeconomic management has undergone important transformations, which have lead to new and more reliable levels of price stability and control of foreign accounts and public expenditures. However, there is still a lot to do in building a future of steady, sustained and socially inclusive growth. The issues linked to our fiscal policy are the core elements of this scenario.

Ipea has been present and actively participating in the major fiscal policy initiatives and proposals, whether as summoned by the Ministries of the economic area, or on its own initiative and that of its technical staff who have an inclination and aptitude to specialize in the subject. The Institute has been continuously participating in forums and debates on the theme. In line with this continuous presence, the fiscal area is in the centre of the conjuncture analyses produced regularly by Ipea through it newsletters and reports

In 2005, a Public Finances Coordination was created inside the Directorate of Regional and Urban Studies, specifically to conduct research on fiscal issues, with a focus on public expenditures. The motivation for such initiative was to make the most of the great synergy established and consolidated along time between the work developed by Ipea's technical staff and that of several different areas of the federal administration, among which the Federal Budget Secretariat (SOF), the Ministry of Planning, Budget and Management; the Economic Policy Secretariat of (SPE); the Federal Revenue Secretariat (SRF); and the National Treasury Secretariat (STN), of the Ministry of Finance, with which Ipea maintains close ties and exchange of information.

This volume contains articles first published in the three first editions of the *Fiscal Development Bulletin*, which was edited, as well as this book, thanks to a cooperation agreement celebrated between Ipea and the British Embassy.

The main objective of this publication is to understand, improve and develop the fiscal management in Brazil in order to overcome the constraints to the economic and social development of the country.

Needless to say, we have much to profit from this partnership, in view of the British Government's recognized capacity and experience accumulated along several decades in the control of public expenditures.

Luiz Henrique Proença Soares
President of Ipea

Rogério Boueri and Maurício Saboya
Editors

1st PART

MACROECONOMIC AND BUDGETARY ASPECTS OF THE PUBLIC EXPENDITURE

MACROECONOMIC AND BUDGETARY ASPECTS
OF THE PUBLIC EXPENDITURE

Maurício Saboya*

The Brazilian economy is undergoing a transition towards a situation of consolidated macroeconomic stability. As in any successful transition process, elements of a former order (exchange rate and real domestic product instability, and high interests rates) gave way to elements of the new order (low and steady inflation rates, floating exchange, fiscal balance and institutional development). In this period, when conditions are created for sustained economic growth, fiscal adjustment plays a very important role. The maintenance of significant primary surpluses in the public sector through the last eight years, as well as the possible start, as of 2003, of a cycle of sustained reduction of the public debt to Gross Domestic Product (GDP) ratio, are signs of a lasting commitment with long-tem fiscal balance. This attitude of responsibility as regards management of public accounts, supported by a legal-institutional framework, of which the Law of Fiscal Responsibility is a key element, has certainly contributed to Brazil's resumption of the development path.

However, there are reasons to believe that the quality of the Brazilian fiscal adjustment has been inadequate in the last years. The continuous growth of non-financial expenditures of the Federal Government, and increased budgetary rigidity – that is, increase of earmarked revenues and obligatory expenditures – are reflections of the lack of quality in the country's fiscal effort. The increasing primary surpluses are being achieved through revenue increases, mainly from social contributions. The latter, in spite of recent changes in some calculation bases, continue for the most part to "cascade", distorting resource allocation and undermining the productivity and competitiveness of the national industry. The result is an increasing tax burden (37.8% of GDP in 2005, a record level), which moves towards an upper limit bearable to society. Finally, due to the increased budgetary rigidity and obligatory expenditures of the Federal Government (payment of social security benefits, personnel and social burdens, etc.), the fiscal policy is losing room for manoeuvre and its power to act as an effective stabilization instrument. A side effect of this process is the reduction of public investments, with perverse consequences on economic growth.

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For the non-financial current expenditures of the Federal Government, including social expenditures and, among them, the major role of the benefits paid by the National Institute of Social Security (INSS), criteria to increase fiscal flexibility must be established, contemplating three goals: social policy, stabilization and economic growth. Obviously, this is not about conferring less weight to the drivers and specific goals of the social policies (social justice, equity, combating poverty and inequalities), but rather about evaluating social expenditures from a macroeconomic perspective as well, considering not only stabilization and growth but also efficiency and effectiveness. The great challenge is to identify and promote cuts in the social expenditure segments (starting with Social Security) that are inefficient, ineffective and unproductive. To this end, it is crucial to develop instruments for analysis of social expenditures, from this broader point of view.

The main groups of expenses (social expenditure, investments, subsidies, transfers) must be evaluated vis-à-vis their redistributive impacts and their possible production disincentive effects. In short, for every situation there is an optimum combination of various types of expenditure, since each one of them has positive and negative characteristics as regards fiscal development. The role of the analysts, in this case, is to assess whether the combination of budget headings is appropriate for the economic system in question, or if there are imbalances in the division.

Brazilian society needs to discuss the functions, the profile and the size of the desirable State. The challenge is to match the consolidation of macroeconomic stability (which requires fiscal responsibility and sustainability) with social protection and the tackling of poverty and inequality. These issues are at the core of the discussion concerning efficiency and effectiveness of public expenditure in Brazil.

The papers contained in this first part hereby presented is an attempt to encourage discussion concerning the interactions between fiscal policy alternatives and economic development. After eight years of fiscal adjustment, since the Fiscal Stability Program (1998) initiated a phase of achievement of significant primary surpluses in the public sector, it is vital to reflect upon the quality of the Brazilian fiscal adjustment. In this aspect, a consensus has lately emerged among public finance analysts: it is necessary to study the efficiency of government spending, in order to design specific public expenditure policies aimed at optimising their economic and social returns. It is in this spirit that the first part of this volume presents five brief articles addressing the links between public expenditure and economic growth from different perspectives.

The first article, by Professor John Toye, provides an overview of the problems faced by Great Britain in the process of development of its public expenditure control system, and outlines the current system and its links with macroeconomic policy. In this aspect, the British experience can be very useful for the improvement of the public expenditure control system in Brazil.

The second article, entitled "Fiscal Adjustment, Stability and Growth", discusses the conditions under which the expansion of the government's current spending would be harmful to economic growth. In line with what several experts in this area have been saying, the authors conclude that the impacts of public expenditure on economic growth depend crucially on the composition of this expenditure, with the increase of public investments and expenditures that promote income redistribution (i.e. reducing social inequalities) having a significant positive impact on growth.

The third article, entitled "Government Current Account saving: a new fiscal policy proposal", discusses the advantages of "replacing the fiscal target based on primary surplus with a target based on government current account saving" as a means to combine the maintenance of fiscal austerity with the increase of public investments. Using a sophisticated methodology, the authors simulate courses for the public debt to GDP ratio in different scenarios and conclude that replacing the primary surplus target with government current account saving target would not substantially alter the course of the debt to GDP ratio. However, the latter alternative has the advantage of providing a higher rate of economic growth, and is thus preferable.

The fourth article, "Budgetary Rigidity in Brazil and Rules for Increasing Fiscal Flexibility", advocates the adoption of rules to increase fiscal flexibility that restrict the growth of the Federal Government's expenditure and allow for increases of primary surplus and/or public investments. On the assumption that fiscal inflexibility is very high, regarding both revenues and expenditure, and that this causes a kind of "trap" that hinders the consolidation of macroeconomic stability, the author proposes that the obligatory non-financial current expenditure of the Federal Government should be made more flexible by means of rules that impose cuts and/or limits to the expenditure segments considered inefficient, ineffective or unproductive. In particular, this involves an evaluation of social expenditures, especially the payment of social security benefits, that takes into account not only social policy criteria, but also macroeconomic policy criteria (stabilization and growth).

Finally, the fifth article, "Social Security and Efficiency" provides an overview of the criteria of social security expenditure efficiency. Efficiency

is simply the attribute of a process capable of producing "a result with the minimum error, effort, resources, energy and time". In the specific case of public welfare, the discussion on efficiency must take into account the balance between social benefits resulting from government transfers to retirees and pensioners and the social costs of maintaining the social security system, both in the form of dead-weight (reduction of the size of the markets and loss of welfare by the economic agents), and in the form of administrative burden. As regards the dead weight, the possibility of the social security system affecting decisions in the labour market, as well as affecting the savings and investments decisions of the economic agents, poses important questions regarding the impact of Social Security on economic growth.

THE ROLE OF THE FISCAL POLICY FOR ECONOMIC STABILIZATION AND GROWTH: THE EXAMPLE OF THE BRITISH PUBLIC EXPENDITURE CONTROL SYSTEM

John Toye*

Great Britain has had a procedure for the parliamentary control of *government* spending for a very long time. However, in order to meet the goals of economic stabilization and growth, a planning and management mechanism for *public sector* expenditure had to be created. This new phase began during the Second World War. It was driven by two factors. The first was the massive expansion of public expenditure as a proportion of the national economy, which made the behavior of the public sector a much more powerful determinant of economic stability or instability than it had ever previously been.[1] The second was policy makers' adoption of a Keynesian perspective on fiscal policy and their belief that the capacity to vary the size of the public sector deficit would give them the instrument they needed to achieve stabilization and growth.

1 EARLY DIFFICULTIES IN CONTROLLING UK PUBLIC EXPENDITURE

A variety of difficulties stood in the way of using fiscal policy as an instrument of stabilization. The first was that the total and composition of *public* expenditure as an element of national expenditure in the national accounts did not correspond with the *government* spending that was regulated by the existing parliamentary control system of Estimates and Accounts. The economic policy makers needed to control the demand of the entire public sector for real resources. The parliamentary Estimates were the wrong target of control because they did not encompass all of the public sector demand for resources, and because some types of government spending did not directly affect the pressure of government demand on real resources.

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* Oxford University.

1. For the upwards displacement effect during the two World Wars, see Peacock and Wiseman (1967, p. 80-95).

So the initial tasks of building a planning and management system for the function of economic stabilization were (a) to make a comprehensive survey of public expenditure using national accounting definitions and (b) to reconcile this with the expenditures that were subject to the parliamentary control through the normal budget cycle. An annual comprehensive Public Expenditure Survey was pioneered from the late 1950s onwards. In the 1980s, control was exercised by limiting the public sector borrowing requirement (PSBR) as a percentage of GDP.

The existing parliamentary system operated on an annual basis. This gave incumbent politicians the opportunity to use stop-go expenditure policies to gain the political advantage in the electoral cycle. In pursuit of a more rational system, the Public Expenditure Survey at first adopted a five-year time horizon for programming expenditure. This proved to be too long. Departmental administrators could not project their public expenditure realistically in the fourth and fifth years of the survey. When they tried to do so, the result was usually a "false peak": spending rose (realistically) in the second and third year and then the projected increase tapered off (unrealistically) in the fourth and fifth year. Early attempts to use the Public Expenditure Survey figures as the basis for controlling government commitments on public spending over a five year period therefore failed.

Over a five year period, it seemed necessary to make some allowance for inflation. If the aim was to control public pressure on real resources, it seemed mistaken to aim to constrain public expenditure at current prices. Depending on what the rate of inflation turned out to be, totals in current prices might lead to more or less in terms of the use of real resources. So the control figures were set in terms of constant prices, i.e. having made allowance for a forecast future rate of inflation. Unfortunately, this gave the general public the impression that the government was intending to be passive in the face of anticipated inflation, and to concern itself only with the goal of promoting growth at full employment. The use of constant prices held another danger. Controlling expenditure at constant prices tended to insulate the government from the consequences of its own decisions on public sector pay. This was the British experience in the 1970s, and it showed that the constant price method of managing expenditure was unworkable once annual inflation had passed the double-digit level.[2]

Finally, in this catalogue of early difficulties, control was then exercised over the total of public expenditure, to prevent a breach of the maximum

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2. For further details, see Pliatzky (1982, p. 122-175).

permitted PSBR/GDP ratio. However, the government could not control all areas of public expenditure. Some of the government's expenditure (e.g. unemployment benefit) was intended to vary according to the economic cycle, to act as a counter-cyclical stabilizing influence. Moreover, apart from the central government, the public sector contained the local authorities and the nationalized industries. For the local authorities, the government had various instruments to influence to size and composition of their spending, but they could still decide to spend more or less than the government forecast. Also, nationalized industries could exceed their forecast deficits, leaving the central government to fill the resulting gap. Public expenditure was divided into two categories: A meaning controllable and B meaning not subject to control. The combination of fixing the total of public expenditure and not being able to control category B spending had the perverse result of letting the pressure for more current spending to foreclose opportunities for more government investment, even when cost-benefit analysis indicated that it would be socially profitable. The share of public investment to GDP contracted and a crisis of under-investment in public services weakened the impulses of growth.

Describing these early difficulties helps in understanding why the current UK system of public expenditure planning and management has been designed in the form that it has. The current system, i.e. the one that has been developed by New Labour governments since 1997, has the following major features.

2 THE CURRENT UK SYSTEM OF PUBLIC EXPENDITURE PLANNING

Today, the annual springtime Budget is the document that sets the limit of total public expenditure in the years ahead. The planning of public expenditure takes place by projecting the framework of the national accounts. This projection is based on: *i)* forecasts of key parameters; and *ii)* the observance of two self-imposed constraints.

The parameters that are forecast are: the future growth rate of the economy; the likely yield of major direct and indirect taxes; and of the future course of interest rates, which affects the cost of servicing government debt. Additionally, the expenditure totals have to satisfy two constraints, or fiscal rules. One applies to the national accounts category of current spending and the other applies to the national accounts category of investment spending. They are:

On current spending: "the golden rule" is that, over the economic cycle, the government will borrow only to invest, and not to fund current spending. This means that, over the economic cycle, current spending must not exceed current revenue.

On investment spending: "the sustainable investment rule" is that, over the economic cycle, public sector net debt will not exceed 40 per cent of GDP.

Taken together, the Treasury forecasts and the observance of these two fiscal rules as constraints sets the upper limit for the projection of total managed expenditure.

Although the Treasury makes the underlying forecasts, they have to be independently audited by the National Audit Office, which has to judge whether they are well-founded and prudent – and this judgment must be published. This is to prevent the government from making unduly favorable growth, tax yield and interest rate forecasts simply in order to justify excessive public spending. Moreover, the question of whether or not the fiscal rules have been complied with is assessed independently by the Office of National Statistics. The adoption of these safeguards against the manipulation of the planning numbers is a novel feature of the current system of planning public spending.

The delegation of the task of inflation control to the Bank of England in 1997 resulted in a very important simplification of the task of planning public expenditure. This measure made it clear that the government wanted to achieve a low inflation rate, by giving the Bank discretion to use monetary policy to hit the low inflation target. This removed the temptation for the government to add to inflationary pressures in its wage bargaining, because doing so would trigger interest rate rises that would raise the cost of its own borrowing. (It also removed the opposite danger, that the government would use cash limits on public spending in order to achieve a target level of pay settlements in the public sector). The fact that since 1997 the Bank has been able to keep inflation close to 2 per cent has made it easier to forecast future interest rates and made it possible to restore a planning system based on constant prices, by keeping the difference between current and constant prices very small.

3 THE CURRENT UK SYSTEM OF PUBLIC EXPENDITURE MANAGEMENT

For the purpose of managing public expenditure, the total is still divided between two major categories, depending on whether or not the spending is of a type that is amenable to control by setting medium term limits or not. The distinction is similar to the old division into categories A and B, but the labels are new. They are called DEL – which means Departmental Expenditure Limit spending, and AME – which means Annually Managed Expenditure. The share of each is shown in table 1.

TABLE 1
Total UK public spending split by category (2004-2007)

£ billion	2004-2005	2004-2005%	2005-2006	2005-2006%	2006-2007	2006-2007%
Departmental Expenditure Limits (DEL)	279,3	57	301,9	58	321,4	58
Annually Managed Expenditure (AME)	208,3	43	218,9	42	227,8	42
Total Managed Expenditure (TME)	487,6	100	520,8	100	549,2	100

Source: Office for National Statistics, U. K.

TABLE 2
UK public spending aggregates from 1967-1968 to 2007-2008

Year	Current Cash £ bn	Spending % of GDP	Net Cash £ bn	Investment % of GDP	Depreciation Cash £ bn	Total UK Cash £ bn	Spending % of GDP
1967-1968	13,7	33,6	2,9	7,1	1,5	18,2	44,5
1977-1978	58,1	38,4	4,3	2,9	6,8	69,1	45,8
1987-1988	166,4	38,6	2,8	0,7	12,3	181,5	42,1
1997-1998	303,4	36,8	5,3	0,6	12,2	320,9	38,9
2007-2008	534,2	39,5	30,9	2,3	17,7	582,8	43,1

Source: Office for National Statistics, U. K.

DEL spending is controlled on a three year time horizon, by Spending Reviews which take place every second year. For example, DEL spending is currently limited by the the 2004 Spending Review, which set limits for the years 2005-2006, 2006-2007 and 2007-2008. The choice of a three year time horizon evidently responds to problem of the "false peak" already mentioned – although there are some important exceptions to this. Health spending is now operating with a five-year fixed budget, and transport and science are operating with ten year spending plans, because of the long term nature of the investment that they require.

Departments are set separate resource (current) and capital budgets. These are on an accruals basis, reflecting the consumption of resources rather than the timing of cash payments. Departments may now carry forward unspent DEL allocations from on year to the next. This change is designed to remove the incentive, which existed for so many years under the annual Estimates procedure, to spend wastefully at the end of the year to use up their budget. The three year allocation, however, is strictly enforced, and departments have to manage their spending within it as best they can. For truly exceptional circumstances, there is a small, centrally held DEL reserve or contingency fund.

Since the 1970s, various methods had been tried in order to re-orient budgeting away from the regulation of inputs and costs towards the delivery of outputs and benefits. The latest method for achieving this transformation is

the "public service agreements" (PSA). The PSA is an agreement between the Treasury and the spending department which sets specific targets for the delivery of public services, and stipulates the measures to be used to evaluate performance achieved relative to the target. Performance is then reported to Parliament. The current emphasis on the delivery of "front line" services is reinforced by the setting of an administration budget within the DEL allocation, which limits how much departments may spend on running themselves.

Concern about past under-investment in public services has produced a surge in public sector net investment from 0.75 per cent of GDP in 1997, when the first new Labour government was elected, to 2.25 per cent in 2005-2006. To manage their existing assets and planned future changes to their asset stock, each Department is required to produce an Investment Strategy derived from its objectives, with an account of its management systems to ensure that its capital programs are delivered effectively.

Annually Managed Expenditure (AME) consists of spending programs that cannot be subjected to firm multi-year limits. The largest single element of AME is social security transfers, where – once the conditions of eligibility and rates of payment have been set, expenditure depends on the rate of public up-take, which in turn is determined by economic conditions and public knowledge about availability. The problem of nationalized industries' deficits has gradually disappeared in the 1980s and 1990s, as a result of widespread privatization. It has been replaced by a relatively novel form of unpredictable expenditure – spending financed by the proceeds of the National Lottery. This is a residual that varies with the public's demand for lottery tickets, and the size of the prizes needed to induce the public to buy lottery tickets.

Another component of AME is public expenditure that may be influenced by central government actions, but which for constitutional reasons, cannot be absolutely controlled by central government. Examples are where sub-national authorities have been granted their own powers of taxation, as have the Scottish Executive and the local authorities in the whole of the UK. This type of expenditure is of greater significance in federal countries than it is in a relatively centralized country, which the United Kingdom still is, despite recent measures of constitutional decentralization.

For AME, the best that can be done is to forecast its size and composition, review the forecasts regularly when taking budgetary decisions. The government must consider any policy changes that will increase the likely total of AME in conjunction with its plans for DEL expenditure, so that the total does exceed the constraints of the fiscal rules. Since DEL allocations are firm, this implies

a need for great caution in all policy decisions that influence the expansion of AME. Otherwise the objectives of stabilization and growth will be jeopardized.

4 LESSONS FROM UK EXPERIENCE

The building of a system for the planning and management of public expenditure to achieve stability and growth has been a lengthy process in the United Kingdom, stretching over a period of more than forty years. It has been important to sustain the effort of institution building, even through crises and apparent failure. The early difficulties have pointed to the problems to which the present generation of fiscal administrators has had to respond creatively.

It is also clear that some of the solutions to these problems lay outside the domain of fiscal policy as normally defined. British politicians have learned the hard way that, where economic policy is concerned, they can get better results if they limit their own policy discretion, and if they strengthen institutions that act as agencies of restraint. The delegation of inflation control and monetary policy to the Bank of England is the most important example of an agency of restraint that has improved fiscal policy.

In the domain of fiscal policy itself, a self imposed requirement to state government fiscal objectives and rules of operation, and to have compliance independently monitored and reported has been conducive to improved expenditure planning and management. Independent auditing of fiscal forecasts and transparent statistics of public expenditure have also helped to improve the credibility of the system. Technical changes have eased the task of rational planning and management, particularly the introduction of accruals accounting, and end-year carry forward. Insistence that departments commit themselves to service delivery targets, plus greater willingness to trust them to manage within their fixed allocation, has also been helpful in achieving better value for public money. In sum, the management of the controllable portion of public expenditure has definitely been improved.

It is interesting to note that the controllable portion of public spending has not increased, despite privatization. That must imply that some dangers still lurk of fiscal events that could threaten stability and growth. The need for the careful integration of the management of DEL and AME expenditure has been emphasized. The planning and management system in the UK is, however, still evolving. A Comprehensive Spending Review is scheduled for 2007 and will surely produce further refinements.

FISCAL ADJUSTMENT, STABILITY AND GROWTH

Alexandre Manoel Ângelo da Silva*
Manoel Carlos de Castro Pires*

In the period prior to the implementation of the *Real* Plan, marked by high inflation rates, the applied economic literature indicated that seigniorage revenues were essential to maintain the sustainability of the Brazilian public debt. For a brief period, after the implementation of the *Real* Plan and ensuing decline of the inflation rates, the revenues from privatisations compensated the revenues from the high inflation rates.

After the substantial reduction of the privatisation proceeds, and within a context of international crisis, at the beginning of the floating exchange regime that increased the Brazilian public debt by approximately 18 percentile points of GDP, the Brazilian government forcibly initiated its fiscal adjustment, which culminated with the primary surplus target of 4.25% of GDP.

Despite the implementation of this fiscal adjustment, alongside the expansion of the federal government's current expenses (table 1), the debate among economists specialised in public finances has intensified, since there is a concern that this expansion might undermine economic growth.

To what extent is this expansion harmful to economic growth? Even if the answer to this question is not as simple as these specialists claim, there are insights to be obtained. For example: there is empirical evidence that links decreased income inequality to increased economic growth rate.[1] Furthermore, in Brazil, applied literature indicates that the intensification of redistributive policies – other social assistance expenditures, Organic Law of Social Assistance (LOAS) and Lifelong Monthly Income (RMV) – reduces income inequality. Thus, if these redistributive policies actually help reduce income inequality, one can also believe that they have a positive indirect effect on economic growth.

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1. See, for example, the evidence found in Alesina and Rodrik (1994) and in Persson e Tabellini (1994).

In this sense, in the last ten years, the fact that the sum of other social assistance expenditures, the LOAS and the RMV, has risen substantially, i.e. from 0.44 percentile point (p.p) of GDP in 1995, to 0.78 p.p. of GDP in 2005, does not mean damage to economic growth (table 1).

In fact, in the Brazilian conjuncture discussion, the growth of current expenses must be better characterized, inasmuch as it is not the growth of any heading of current expenses that is harmful to economic growth. However, according to table 1, the expenditures with social security benefits and transfers to states and municipalities account for most of the variation of current expenses in the last ten years. Moreover, still according to table 1, it is observed that, in the last three years of the Lula Administration, from 2003 to 2005, the average of expenditures with economic subsidies and subventions, about 0.51 p.p. of GDP, is substantially higher than the average of the last term of the Fernando Henrique Administration, from 1999 to 2002, approximately 0.31 p.p. of GDP.

TABLE 1
Composition of public expenditure of the Federal Government (1995-2005)
(% of GDP)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Personnel and Social Burdens	5.86	5.25	5.11	5.24	5.30	5.29	5.46	5.57	5.07	4.85	4.95
Social Security Benefits	4.84	5.14	5.07	5.69	5.84	5.87	6.23	6.39	6.84	6.67	7.50
LOAS and RMV	0.25	0.24	0.27	0.29	0.29	0.32	0.36	0.39	0.42	0.41	0.49
Other Social Assistance Expenditures	0.19	0.11	0.13	0.15	0.15	0.13	0.17	0.24	0.32	0.40	0.29
Unemployment Insurance and Salary Allowance	0.52	0.51	0.47	0.52	0.48	0.43	0.48	0.53	0.54	0.51	0.60
Health Costing	1.45	1.26	1.43	1.33	1.51	1.48	1.54	1.54	1.45	1.44	1.64
Transfers to States and Municipalities	2.94	2.83	2.88	3.22	3.31	3.61	3.84	4.16	3.97	3.69	4.72
Economic Subsidies and Subventions	0.16	0.03	0.13	0.28	0.44	0.26	0.36	0.20	0.39	0.52	0.62
Other Current Expenses	1.91	1.78	1.90	1.96	1.92	2.05	2.02	2.26	1.83	1.84	2.37
Sum of Current Expenses	18.1	17.2	17.4	18.7	19.2	19.4	20.5	21.3	20.8	20.3	23.2
Investments	0.73	0.73	0.87	0.91	0.71	0.92	1.22	0.75	0.41	0.59	0.91
Financial Investments	0.22	0.98	0.19	0.35	0.07	0.30	0.45	0.10	0.11	0.17	0.17

Source: Ipea/Dirur/CFP.

The economic expenditures with subsidies and subventions are basically discretionary, so it is possible to reduce the rate of concessions, which has been rising in the last three years. These expenditures do not contribute to the reduction of income inequality, and most of them result from political agreements to refinance public financing of the agricultural sector.

As regards the growth of expenditures with transfers to states and municipalities, we do not envisage a reduction in the short term, since these expenditures result from negotiations around the federative pact between the Federal Government, the states and the municipalities. Therefore, even if these

expenditures do not promote economic stability and growth, they might promote democratic stability. In addition to these issues, there are others concerning the Brazilian fiscal federalism that are beyond the scope of this article.

Despite their impact on inequality reduction and the fact that their concession is compulsory, there is a drawback concerning the welfare benefits of the General Regime of Social Security (RGPS). At some point, the substantial growth of expenditures with welfare benefits will require from Brazilian society, by means of the National Congress, the following discussion: is the current social security regime a right or a privilege? When analysing the quality of the current fiscal adjustment and its contribution to economic stability and growth, it is impossible not to focus on the growth of spending on welfare benefits, from approximately 4.84 p.p. of GDP in 1995, to about 7.50 p.p. of GDP in 2005.

The National Congress needs to decide on the situation of the RGPS. If it decides that the current RGPS benefit is a right, it needs to establish changes in health costing and in redistributive expenditures. If it decides that it is a privilege, the concession of RGPS benefits will need urgent reform. Whichever its decision, one thing is clear: the problem of the Brazilian fiscal adjustment is not in the expansion of all the current expenses, but rather, specifically, in the substantial rise of expenditures with welfare benefits, as observed in tablet 1. Moreover, in this environment of fiscal adjustment, another obstacle to economic growth seems to be the low average of public investment. However, we believe that this obstacle can be addressed through the implementation of government current account saving as a fiscal target, as outlined in the next article.

GOVERNMENT CURRENT ACCOUNT SAVING:
A NEW FISCAL POLICY PROPOSAL

Alexandre Manoel Ângelo da Silva*
Manoel Carlos de Castro Pires*

In the last years, even among economists concerned about the sustainability of the Brazilian public debt, there is an increasing dissatisfaction with the fiscal policy of primary surpluses obtained by means of public investment reduction, since this policy represents an obstacle to economic growth. Thus, there is a recurrent view that the maintenance of effective fiscal austerity must be combined with increased public investments.

In this sense, in line with renowned economists such as Blanchard and Giavazzi, we propose an alteration in the current fiscal policy, in order to maintain fiscal austerity and increase the level of public investment, that is, we propose to replace the fiscal target based on primary surplus with a target based on government current account saving. Since it does not undermine the rise of capital supply, one of the determinants of economic growth, the concept of government current account saving is economically more appropriate than that of primary surplus.

However, a question related to this replacement is whether the use of government current account saving is not more of a fiscal slackening than a policy change justified by economic theory. Thus, we evaluate this proposal from the point of view of fiscal sustainability, that is, we analyse whether the change from the primary surplus target to government current account saving leads to an alteration in the course of the public debt/GDP ratio.

In order to establish relations for the construction of scenarios, we estimated self-regressive vector models, in which the results confirm the intuition that the increase of public investment can contribute to the increase of economic growth. Given this relation, we studied possible courses for the Brazilian public debt to GDP ratio both in an environment of fiscal target based on primary surplus and in an environment of fiscal target based on government current account saving.

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The simulations of the scenarios are based on a primary surplus target of 4.25% of the GDP and on a target of government current account saving of 7.65% of GDP, which corresponds to a similar target of a primary surplus of 4.25% of GDP, since in the 1999-2005 period the average of public investment is of 3.40% of GDP. According to our simulations, as public investment increases, the rate of economic growth rises.

Regarding the real interest rate, we made projections according to three states of nature, based on real interest rates of 12%, 11% and 10%. In the first state of nature (real interest rate of 12%), in the environment of fiscal target based on primary surplus, in a ten-year horizon, the public debt /GDP ratio grows about 5.5 percentile points (p.p.) of GDP (table 1); in the environment of fiscal target based on government current account saving, the public debt/GDP ratio grows approximately 6.3 p.p. of GDP (table 2).

TABLE 1
Simulations for the public debt (primary surplus)
(In%)

	T+1	T+3	T+6	T+10
r=12%; n=2.5	51.59	52.78	54.57	56.95
r=11%; n=2.7	50.98	50.94	50.89	50.83
r=10%; n=3.0	50.32	48.96	46.92	44.20

Source: Brazilian Central Bank.
Prepared by the authors.

TABLE 2
Simulations for the public debt in a scenario of implementation of fiscal target based on government current account saving

	T+1	T+3	T+6	T+10
r=12%; n=2.5%	51.70	53.11	55.22	58.04
r=11%; n=2.7%	51.11	51.35	51.70	52.17
r=10%; n=3.0%	50.47	49.42	47.85	45.75

Source: Brazilian Central Bank.
Prepared by the authors.

In the second state of nature (real interest rate of 11%), in the environment of fiscal target based on primary surplus (table 1), in the next ten years, the public debt is stable and in the environment of government current account saving it is virtually stable, since there is an addition of about 1 p.p. of GDP (table 2). In the third state of nature (real interest rate of 10%), along the next ten years, in the environment of fiscal target based on primary surplus (table 1), the public debt drops approximately 6 p.p. of GDP and, in an environment of fiscal target based on government current account saving (table 2), the public debt drops about 4 p.p. of GDP

Therefore, the results show that the adoption of the concept of government current account saving does not result in any substantial alteration in the course of the public debt/GDP ratio. In the scenarios where the public debt/GDP ratio is unsustainable, it is both with the primary surplus target and the government current account saving target. It should be noted that, although the course of the public debt/GDP ratio is practically the same in the primary surplus and government current account saving environments, in the latter, since public investment is not discouraged, our estimates suggest a higher growth rate, increasing general welfare.

A second issue regarding the adoption of the government current account saving is related to its implementation, since there is a strong incentive for public managers to account for current expenses as public investments. Nevertheless, we understand that this window of opportunity can be exhausted relatively easily. In the first place, in the federal government, in the Ministry of Finance, the National Treasury Secretariat (MF/STN) has a General Coordination of Economic-Fiscal Analysis of Public Investment Projects that, among others functions, evaluates and monitors investments made through Public-Private Partnerships. With this function, attention is drawn to the fact that this Coordination is fully capable of evaluating or distinguishing current expenses from expenditure that should be labelled as investment.

Since this institutional framework is located within the federal government itself, another possible argument is that this might suffer "political" pressures. Therefore, the process of deciding what investment is might not be transparent enough, and based on exclusively economic criteria. Two simple solutions are presented for this possibility: *i)* to include in the Law of Fiscal Responsibility (LRF) severe penalties for the manager who intentionally indicates current expense as investment; and *ii)* in the LRF, regarding the monitoring and control of the implementation of the government current account saving, including recommendations to the Federal Court of Accounts (TCU), an agency outside the Executive Branch responsible for the auditing of federal expenditure.

As regards the state and municipal governments, similar structures to the General Coordination instituted in the MF/STN can be implemented. Moreover, external audits should be carried out by courts of accounts responsible for the state and municipal expenditures, respectively. Obviously, the inclusion of penalties in the LRF is valid for all the Federation entities.

Thus, there are no practical or theoretical obstacles that might undermine the adoption of the government current account saving target as a fiscal policy instrument. Furthermore, it should be noted that, beyond the possible gains in economic growth, the implementation of this concept does not suggest a slackening of the fiscal austerity pursued by the Brazilian Federation entities in recent times.

BUDGETARY RIGIDITY AND RULES FOR INCREASING FISCAL FLEXIBILITY

Maurício Saboya*

The importance of discussing the theme of budgetary rigidity[1] in Brazil becomes clear in the context of the recent history of the Brazilian economy, marked by a transition towards consolidated macroeconomic stability and by the creation of conditions for sustained growth. One of these conditions is the structural fiscal adjustment of the public sector, a process strongly driven by the 1998 Fiscal Stability Program, with which significant and increasing primary surpluses are being achieved in the scope of the Federal Government. This movement was consolidated after the enactment of the Law of Fiscal Responsibility in 2000.

However, the Brazilian fiscal adjustment process also presents problems, mainly on the side of expenditure. For several years, a growth of non-financial current expenses of the Federal Government has been observed, particularly of obligatory items, i.e. those not subject to restrictions or cuts.

The continuous growth of obligatory expenses reflects the increased degree of rigidity of the Brazilian budgetary structure, where an increasing share of obligatory expenditures is covered with an increasing share of earmarked revenues. Consequently, the degrees of freedom of the fiscal policy as regards cuts in public spending are reduced (graph 1). This causes, among other consequences, loss of capacity of the fiscal policy to play its role as an instrument of macroeconomic stabilization. The results of this loss of degrees of freedom of the fiscal policy should be investigated, considering the pros and cons of the different policy strategies and options.

Graph 1 shows that the discretionary expenditures, which allow room for manoeuvre to the fiscal policy on the side of expenditure, are increasingly compressed by the obligatory expenditures and the primary surplus.

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1. Budgetary rigidity (or fiscal rigidity) is understood as an attribute of the public budget characterized by the existence of earmarked revenue and obligatory expenditures. A budget can be rigid to different degrees, while in practice there is no completely rigid or completely flexible budget, i.e. without any earmarked revenue or obligatory expenditure.

This means that the government's capacity to increase its primary surplus beyond the current levels is quite reduced, because the discretionary expenditures are already at a low level and, in practice, cannot be totally eliminated – this would cause paralysis of the public apparatus. Moreover, public revenues have been growing – for example, the tax burden has just beat a new record in 2005, reaching about 37.8% of GDP, and it is not reasonable to expect them to grow indefinitely.

GRAPH 1
Brazil: budgetary rigidity in % of non-financial federal revenue (2000-2005)
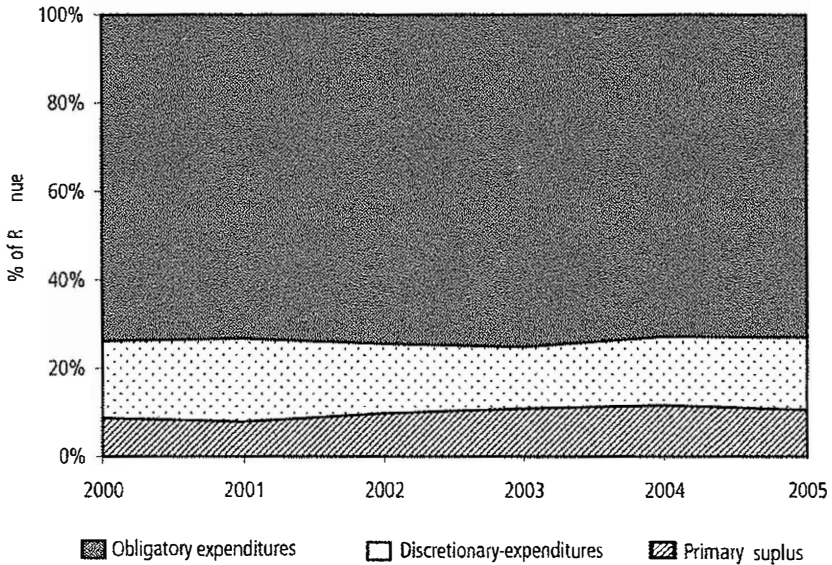
Source: Ministry of Planning – Federal Budget Secretariat.
Prepared by Ipea/Dirur/CFP.

When emphasizing the effect of budgetary rigidity over the stabilizing role of the fiscal policy, it is claimed that, in the presence of economic shocks, fiscal rigidity can promote the growth of the public debt to GDP ratio. Although there are no empirical studies that associate budgetary rigidity with growth of the public debt, this relationship is justified in the light of current intuition concerning the behaviour of economic agents, because their perception concerning fiscal rigidity provides the bases for the belief that the government, sooner or later, will not be able to achieve a primary surplus – at least not the necessary amount or with the necessary speed – sufficient to maintain the debt/GDP ratio on a sustainable course. The result is that economic agents frequently take on a "defensive attitude" towards government bonds, preferring

short-term papers, with high risk premiums and/or indexed to the basic interest rate (over-selic).[2] In turn, this post-fixed nature of the public debt stimulates the growth of its supply, whenever the Central Bank, faced with inflationary pressures caused by shocks that are transmitted to foreign exchange, has to raise the target of the over-selic rate. Consequently, the net debt of the public sector remains highly sensitive to interest rate variations, which becomes a kind of vicious circle, particularly in the presence of the said economic shocks.

Considering only expenditure, the main burden of the fiscal adjustment befell a small share of discretionary expenditures (other financing and capital expenditures), including investments. In the 1995-2005 period, Federal Government investment was kept at a minimum level (table 1). Regardless of public investment not playing the crucial role it had in the past in Brazilian economic growth (e.g. 1970's), and regardless of the creation of alternative mechanisms to increase private participation in the provision of public services (e.g. public-private partnerships), it is hard to imagine how to achieve the standards of economic and social development yearned for by society, without the support of public investment.

TABLE 1
Brazil: execution of non-financial expenditure of the Federal Government

Period	1995-1998	1999-2005	1995-2005
Personnel and Social Burdens	5.37	5.22	5.27
Social Security Benefits	5.18	6.48	6.01
LOAS and RMV	0.26	0.38	0.34
Other Social Assistance Expenditures	0.15	0.24	0.21
Unemployment Insurance and Salary Allowance	0.51	0.51	0.51
Other Health Costing	1.37	1.51	1.46
Investments	0.81	0.79	0.79
Transfers	2.97	3.90	3.56
Other Current Expenses	1.89	2.13	2.04
Others	0.61	0.60	0.60
Total	**19.11**	**21.55**	**20.66**

Source: Chamber of Representatives – Federal Government's Budgetary Execution.
Prepared by Ipea/Dirur/CFP.

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2. It is undeniable that in the last two years the prospects of placing prefixed papers have been improving constantly, as demonstrated by the rising weight of these papers in the total federal bond debt. Another remarkable fact, as of 2003, is the reduction of the participation of foreign exchange bonds in the total federal bond debt in the market (including swaps), causing a reduction of the foreign exchange risk of the Brazilian public debt. What is not known is whether the change in course is sustainable, since there are reasons to believe that the reduction of the foreign exchange exposure of the Brazilian public debt has been determined by an abundance of dollars in the domestic and foreign markets, motivated, among others things, by a cycle of growth of world trade and of the prices of commodities that make up an important share of the Brazilian exportation portfolio.

Table 1 shows the evolution of the non-financial expenses of the Federal Government, in the 1995-2005 period. A significant growth of the total expenditure in percentage of the GDP is observed. The data also show that the period of effective fiscal adjustment (1999 onwards) presented an average annual expenditure above that of the 1995-1998 period, which was characterized by a relatively slack fiscal policy. This is one more indication that the Brazilian fiscal adjustment has concentrated on revenue increase, because both the primary surplus and the primary expenditures grow. Nevertheless, this is not a good sign, in view of the fact that a large share of these revenues corresponds to accrued contributions, i.e. "cascading" incidents, in each phase of the productive process, which distort the decisions of the agents and undermine the productivity and competitiveness of the economy as a whole.

Table 1 shows very clearly the contribution of the INSS social security benefits to the dynamics of the non-financial expenditures of the Federal Government along the last ten years. Whether the analysis is done on the basis of levels or on variation rates, the data seem to indicate that any attempt to restrict the growth of non-financial expenditures of the Federal Government will necessarily require a mechanism to control expenses with social security benefits.

With a view to analysing the effect of budgetary rigidity on the structure of public expenditure, the evolution of the rigid expenditures of the Federal Government's Budget in the 2006-2008 period is simulated.[3] The simulation mechanics follow the following guidelines: on the basis of the expected course of primary surplus of the Government (2.5% of GDP, compatible with the 4.25% of GDP relative to the consolidated public sector established as a target), the series of total non-financial expenditure is deducted, given the hypothesis that the non-financial revenue remains constant in relation to GDP throughout the projection period (based on the fact that it is no longer acceptable to increase the tax burden/GDP ratio). Then, the obligatory expenditures (personnel, social security, health and social assistance etc.) are projected, assuming that their behaviour will follow the model. In this scenario, the maintenance of recent trends for obligatory expenditures implies a reduction of the investment to GDP ratio.

Table 2 presents the results of the simulations and shows that, given the hypothesis adopted, there is a trend of relative reduction along time for public investments, given the fact that the expenses considered rigid grow more than

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3. To obtain a detailed description of the Federal Government's public spending simulation model that provides the basis for the results of the exercise presented see Pinheiro (2006).

the non-rigid expenses, in general, and more than investments, in particular.[4] Soon, in a context of high tax burden and the need to maintain the primary surplus, in addition to the strong growth trend of rigid public expenses, public investments tend to undergo a reduction in their relative participations in total expenditure and in GDP.

TABLE 2
Brazil: simulation for investments and rigid expenditures of the Federal Government – basic scenario (2005-2008)
(R$ billions)

Year	Expenditure cap (a)[1]	Rigid expenditures (b)	Non-rigid expenditures (c)	Investments (d)[2]	(d)/(a) (%)	(d)/(GDP) (%)
2005*	418.3	293.6	101.4	23.2	5.5	1.2
2006	443.3	328.3	90.8	27.2	6.1	1.4
2007	469.9	370.4	73.4	22.0	4.7	1.0
2008	498.1	416.7	53.5	16.1	3.2	0.7

Prepared by Ipea/Dirur/CFP.
Notes: [1]Expenditure cap = total of non-financial expenditure of the Federal Government required to keep the primary surplus of the Federal Government at 2.6% of the GDP (compatible with 4.25% for the consolidated public sector), assuming that the non-financial revenue of the Federal Government remains constant in percentage of the GDP
[2]Includes financial inversions.
Obs. * Realized values.

In order to prevent the materialization of this somewhat sombre scenario, this article argues in favour of the need to create mechanisms to increase budgetary flexibility, particularly on the side of public spending. It is necessary to create mechanisms to restrict the growth of obligatory expenditures, in order to generate additional resource savings. These savings could be used to increase the primary surplus, in the cases where this is necessary, for example, due to a severe international financial crisis, or could be directly allocated to increased public investments. The basic idea of the rules for increased fiscal flexibility is to provide to the economic agents safe signals that the primary surplus can be raised quickly and significantly, strengthening the "fiscal shield" against internal or external shocks. It is reasonable to assume that the mere existence of rules to increase fiscal flexibility, duly regulated in Law, will have a favourable effect on the expectations of the market, and will thus help to lower interest rates and the debt even more quickly, even if these rules are not actually enforced.

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4. The growth of investments in 2006 results from the hypothesis that the relative participation of investments in the total of non-rigid expenditures will return, in the 2006-2008 period, to its historical average (about 30%). In 2005, this participation was approximately 23%. This hypothesis is justified for 2006, because this is a general elections year and, as such, presents a typical pattern of increased investments.

The great challenge is the design of specific rules to increase fiscal flexibility – applicable, say, to certain segments of social expenditure – that simultaneously contemplate the goals of the social policies (social security, reduction of poverty, inequality and informality) and the economic stabilization and growth targets. The goal is to promote cuts or systematic reduction of those segments of expenditure that, by reasonable criteria, are considered inefficient, ineffective and/or unproductive.[5] This has nothing to do with conferring less importance to the effect of social expenditures as poverty, inequality and informality reduction instruments. Rather, it is about improving the evaluation of the social expenditures, introducing broader criteria, such as the effect of these expenditures on economic stabilization and growth. It is clear that a huge analytical effort must be undertaken, particularly by government agencies responsible for public policy design, evaluation and control.

In the centre of the Brazilian fiscal problem, there is a certain "choice of priorities" (materialized or institutionalised in the 1988 Constitution) determining a budget that is extremely rigid to social expenditure cuts and that causes serious restrictions to the increase of public investment in infrastructure and other important areas for economic development (examples: C&T, public security, Justice enforcement etc.). In face of this problem, one assumes that Brazilian society will hope for a State whose size and functions are compatible with the consolidation of macroeconomic stability – which entails fiscal responsibility and sustainability – and with the improvement of a social protection network that provides, efficiently and effectively, a minimum standard of welfare for the most vulnerable social segments. The position defended in this text is that, in the current circumstances, both principles – fiscal responsibility and universal social protection – are in conflict in Brazil. Fiscal rigidity and the historical drop of public investments are indicators or reflections of this conflict. It is impossible to maintain fiscal sustainability without increasing the flexibility of expenditure; it is impossible to increase the flexibility of expenditure without social costs. In turn, with the current public expenditure structure, it is impossible to increase social protection without undermining fiscal sustainability.

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5. Systematic analysis of the efficiency of social public expenditure can reveal some segments that could be cut. For example: between 2001 and 2005, the evolution of the number of sick pay benefits increased from 574 thousand to 1.5 million, a fact generally attributed to increase of the number of frauds, resulting from a disastrous policy of outsourcing of INSS medical examinations. If this number had matched population growth in the period (which would be a reasonable expectation, if there had not been a failure in the management of the medical examinations), the resource saving with the payment of those benefits would have been of approximately R$ 14.6 billion, in accrued terms.

Therefore, Brazilian society needs to discuss thoroughly the State profile that it wants. For this, the dilemmas involved in the pursuit of the consolidation of macroeconomic stability, reduction of poverty and social inequality, and, finally, the pursuit of sustained growth, have to be addressed directly. The discussion around the rules to increase fiscal flexibility takes up these dilemmas only partially.

SOCIAL SECURITY AND EFFICIENCY

Marcelo Abi-Ramia Caetano*

Efficiency is defined as the capacity to achieve a result with minimum errors, efforts, resources, energy and time. For the particular case of a public policy, its efficiency would be measured by comparing the results achieved and the efforts and distortions generated for the achievement of its objectives.

The purpose of a social security regime is to guarantee that the insured will receive income after they fulfil the necessary requirements to have the right to the social security benefits. As is the norm in any governmental action, the social benefits are obtained with social costs. In the case of Social Security, the benefits enjoyed by society as a result of the amounts paid by the government to retirees and pensioners must be compared to the social costs imposed by a social security regime. Within a more macro line, the social costs or, alternatively, the loss of efficiency generated by social security, are divided into two natures: dead weight and administrative burden.

Dead weight is understood as reduction of the size of the markets and consequent loss of welfare caused to various social agents, namely, firms, workers, consumers, producers, savers and borrowers, as a result of the alterations of incentives under social security rules. In turn, administrative burden refers to the time spent by the insured to pay their contributions and receive their benefits, to the ease in obtaining and keeping the documents required by social security as well as their recovery if they are lost, to the simplicity of the rules for collection of contributions and application for benefits in view of the fact that the complexity of the rules increases the administrative burden because it involves the hiring of lawyers, accountants and specialized staff or greater time spent to comply with the obligations and to receive the social security benefits. The last factor to measure the administrative burden would be the size of the administrative apparatus needed for the operation of social security.

Social Security can change the allocation of resources and generate dead weight in three different spheres: labour market, savings decision, and allocation of investment portfolio.

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Regarding the labour market, it should be noted that most of the Brazilian Social Security collection is payroll-based. Taxes or contributions reduce the size of the market by differentiating the price that the applicant pays from the price that the provider receives, generating the dead weight. The salary cost for the firms exceeds the salaries received by the workers. There are two disincentives: firms employ less and, in principle, depending on the behaviour of manpower supply, workers would supply less work. However, most of the time it is hard to claim that the substitution of the payroll-based contribution by a value-added tax, for example, would be a desirable option. This is because public policy goals are not limited to efficiency, but are also related to equity. From the distributive point of view, replacing payroll-based contributions with value-added taxes, for example, tends to increase the regressive character of the taxes or contributions. Payroll-based contributions are generally proportional or progressive in relation to income, while indirect taxes befall lower-income people more strongly. Moreover, with simultaneous effects on distribution and allocation aspects, the difficult discussion ensues regarding which productive sector or type of firm should be burdened and which should benefit from the tax structure. Incentives given to sectors based on cheap labour and disincentives given to firms that innovate technologically deserve careful consideration. Finally, doubts emerge as to whether the dead weight generated in the goods market will not exceed that of the labour market. Finally, from the point of view of stabilization, the extent to which the substitution of incidence bases will affect total collection should be verified.

The second argument to consider in the relation between social security efficiency and the labour market would be the Laffer curve. Smaller payroll-based contribution aliquots might stimulate formalization, besides encouraging firms to employ more and the workers to work more. As a result, even if the government loses in the collection from each payer, it would gain from stimulating the expansion of the contribution base. The counter-argument is quite pragmatic: fiscal conservativeness. In principle, there is no guarantee that a reduction of the contribution aliquot will encourage individuals to produce more in a way that will compensate the smaller aliquot.

The last aspect that associates social security with the labour market refers to the incentives that a social security regime could have over an insured person's decision to abandon the labour market prematurely. An efficient economy makes the most of its production factors. Social security plans that allow early retirement discourage the full use of labour, as the insured will no longer produce to enjoy their retirement because they will have the benefit of an income without the *disutility* caused by labour.

The second aspect where Social Security could alter individuals' decisions and promote resource allocation different from that of the free market would be the savings decision. Economic theory does not offer a final conclusion concerning the impacts of Social Security on accumulation of capital. Social security can encourage an individual to save less because social security would provide the resources that the individual was previously forced to obtain by means of saving. There would be no need to save as much for retirement, since the government will pay the benefit. However, national saving can be increased if individuals believe that the government will not pay the benefits promised or if there are other reasons to save apart from forming a reserve for the purpose of retirement, such as precautionary saving. In the latter case, the increased public collection could exceed a possible drop in private saving and therefore increase national saving. For not trusting the government or for saving for reasons other than retirement, the private sector would not promote substantial alterations in its saving. Nor is there, from the empirical point of view, enough evidence to determine the impact of Social Security on saving.

The last aspect referring to Social Security and allocation is related to the composition of the investment portfolio. There are two different approaches. In the first place, it is possible to investigate whether the existence of a social security regime would alter the way people invest financially, e.g., if Social Security influences the composition of the portfolio among real estate, fixed income and variable income. Another example: tax incentives combined with long-term saving can alter the way agents make their financial investments. Regarding the former aspect, there is no empirical evidence or theoretical facts that allows drawing an unambiguous conclusion. A second approach would consider countries such as Brazil, which regulates the applications of institutional investors such as retirement and pension funds. For this situation, since there is direct imposition of quantitative limits, regulation changes the composition of the portfolio, except in cases of very flexible regulatory structures.

The other side of the loss of efficiency caused by Social Security is related to the administrative burden. As a positive aspect of the Brazilian case, it should be noted that the costing and personnel expenditure of the General Regime of Social Security (RGPS) is around 3% a year of the total collection and expenditure of the National Institute of Social Security (INSS). For the purpose of comparison, there are private social security plans managed by large national banks whose administration fee reaches 5% a year on the investment value. It is clear that a thorough analysis would require comparison between the costs of the administration fee and the benefits gained by it. However, when taking into account the complexity, the geographic distribution and the catering to various social groups, the 3% fee of the RGPS is not high.

A second positive aspect referring to the administrative burden is related to the payment of benefits after they are granted. Very few benefits are deposited inaccurately or not corrected as determined in legislation. This saves time and confusion, and reduces the need for staff to ensure the operation of the administrative apparatus.

The downside of the administrative burden is related to the complexity of the legislation on social security collection and granting of benefits, which imposes several costs particularly on small companies, as well as time spent in queues for INSS services.

In conclusion, it should be noted that, given society's choice for the existence of a social security regime, its design must minimize the loss of efficiency caused by distortion of incentives, the so-called dead weight, as well as the administrative burden. However, two comments should be made to balance this point of view. In the first place, public policies are not based only on efficiency principles. In societies marked by inequality, as in the case of Brazil, issues related to equity must be taken into account. Secondly, a shortsighted behaviour regarding the formation of saving on the part of individuals may lead to negative externality and more poverty in the absence of an appropriate social security system. In this way, poverty reduction as a consequence of Social Security actions could generate a positive externality for society as a whole. In other words, the existence of social security regimes is justified by market imperfections, to the extent that Social Security does not only generate dead weight, but it also serves as a potential reducer of inefficiencies generated by the market itself and by individual decisions.

2nd PART

THE MANAGEMENT OF THE FEDERAL GOVERNMENT'S REVENUES

THE MANAGEMENT OF THE FEDERAL GOVERNMENT'S REVENUES

Maurício Saboya*

The second part of this volume focuses on the links between the Brazilian fiscal policy and development from a special viewpoint, namely that of the role of the Federal Union's public revenues in the process of fiscal adjustment in Brazil. In particular, attention is drawn to the importance of the revenue forecast systems as elements of responsible fiscal management. They are important because, under a fiscal responsibility regime, public spending cannot be appropriately planned, executed and evaluated unless the forecast of collected revenues is precise and accurate. The reason for this is that only budgetary expenditures covered by budgetary revenues in the corresponding fiscal year will be programmed.

In Brazil, the agency legally in charge of preparing forecasts of the Federal Union's budgetary revenues is the Federal Revenue Secretariat (SRF), of the Ministry of Finance. However, in the last years, the SRF's forecasts (estimated collection in budgetary programming) have not infrequently been lower than actual collection; this difference would be growing year after year and serving to increase the Federal Union's primary surplus, without the possibility of the surplus resources being used in important programmes, such as in infrastructure. In turn, the SRF argues that the over-collection is due, on the one hand, to unexpected factors, such as the effects of atypical and extraordinary revenues – resulting from changes in the tax legislation and/or improved efficiency in the collection and inspection activities – and, on the other hand, to the growth of public spending. As claimed by the Deputy Secretary of the Federal Revenue Secretariat, in a recent interview to G1 (Globo News Portal), "one has to take expenditures into account when talking about tax burden. The collection needs are defined by the expenditure needs. It is like a government rule: collect what you need to spend".

However, in this discussion, there is one aspect that has not been fully explored: the revenue forecast methods. Traditionally based on accounting models, almost without the use of econometric techniques, these methods have undergone significant improvements in the past years. The contributions

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in this area come from several sources, including universities and public applied research agencies, such as Ipea. We need to take stock of these recent advances in Brazil, and compare the revenue forecast methods used in the country with those used in other countries. In the international benchmarking aspect, the support of the Embassy of the United Kingdom in Brasilia has, one again, been essential, since it enabled the British Treasury technicians to contribute with their critical and comprehensive view concerning the way this matter is addressed in the United Kingdom.

In the general terms described in the previous paragraph, Graham Parker and Jon Riley, both from the Public Sector Finances Team of HM Treasury (British Treasure), outline the system used to forecast the main taxes in the United Kingdom. They highlight the role of the legal-institutional framework – the Fiscal Stability Code, the fiscal rules, the Treasury and Her Majesty's Revenues and Customs (HMRC) – in the design and operation of this system. The authors show that the revenue forecasts in the United Kingdom follow various models, ranging from the ones that forecast macroeconomic and fiscal aggregates, to those intended to predict collection in particular segments, such as collection per type of tax or company. Parker and Riley's article shows the complexity of the British system to forecast revenues, as regards institutions, norms and methods. However, it is based on a few normative principles, which should also steer the improvement of the Brazilian system, namely the principles of fiscal responsibility, transparency and accountability towards society.

The next article, "Recent Behaviour of Public Revenues in Brazil", based on the work of the technical staff of the Public Finances Coordination of Ipea, describes the evolution of the Federal Union's public revenues. After a brief background of some of the problems faced in the fiscal adjustment process in Brazil – notably the significant increase of the tax burden based on contributions that generally distort the decisions of the economic agents – the text analyses separately the recent behaviour of the main taxes and contributions. Special attention is given to the Income Tax (IRPF, IRPJ and IRRF), the Tax on Industrialized Products (IPI) – which has been going through historical drops in collection, partly due to tax evasion and smuggling of goods – and to the main social contributions (Cofins, CPMF and CSLL). It should be noted that, in the 2000-2005 period, the irregular evolution of the taxes contrasts markedly with the vigorous and consistent growth of the contributions. In this context, two major challenges are underscored. Firstly, to promote a tax reform that, among other things, can reduce the economically perverse effects of the increase

of contributions on the agents, mainly the companies. Secondly, the expected change in the Brazilian tax structure will require the improvement of the current revenues forecast system.

The text "How to Forecast or Explain the Behaviour of Public Revenues in Brazil: Old and New Alternatives", written by Cláudio Hamilton Matos dos Santos and Márcio Bruno Ribeiro, takes a step towards tackling the second challenge mentioned above. The text presents a mapping of literature on the specification of models intended to explain or forecast the behaviour of public revenues in Brazil. Initially, the approaches currently used are presented: the so-called "calibrated" models that focus on the description of the inter-relations between the public sector variables (debt, nominal and primary deficits, revenues and expenditures); and the econometric models, that seek to adjust specifications for the collection of revenues at the aggregate level or by specific tax. In order to facilitate understanding, the description of each approach contains a proposed subdivision for the various existing works. At the end of the text, some preliminary results of the current revenue modelling effort being developed by Ipea's Public Finances Coordination are presented.

Finally, the text "Fiscal Progressivity in Brazil" throws light on a characteristic of the Brazilian tax system that needs to be addressed in the reform agenda: regressivity. The authors, Rodrigo Mendes Pereira and José Oswaldo Cândido Júnior maintain that Brazil has a tax structure that focuses on collection of consumption taxes and other indirect taxes. The high dependence on consumption taxes as compared to income tax is not an exclusive characteristic of this country, but can be observed in several developing countries, as a result of their socio-economic structure. Consumption taxation is notably regressive, since the tendency to consume decreases with the income. The aim of the article is to measure the degree of progressivity of the Brazilian tax structure and compare it with the indicators of thirteen other economies, using the method of relative volatilities. This method consists of calculating the proportional standard deviation of the aggregated tax collection and income. Among the fourteen economies, Brazil is the third country with the lowest degree of progressivity. These results suggest that the progressivity of the federal taxes is not used in Brazil as mechanism to address the country's huge social and economic inequalities. Possibly this absence of a stronger progressivity is a reflection of the Brazilian collection structure, which is overburdened by indirect taxes of a regressive nature.

TAX FORECASTING BY THE UNITED KINGDOM GOVERNMENT

Graham Parker*
Jon Riley*

Tax forecasting has a long history in the UK. Some estimates of government receipts for the year ahead have been published in annual Budget Red Books since the nineteenth century. More systematic forecasts of the UK economy and public finances have been published since 1968 and the Industry Act of 1975 required the Treasury to publish two forecasts a year. To start with these forecasts only looked two years ahead, but from 1980 medium term projections have been published each year.

The current publication requirements are set in *The Code for Fiscal Stability*, published in 1998. The Code stipulates that there should be at least two economic and fiscal projections published each year, that these projections should include projections of all the main fiscal aggregates, including total government revenues, and have a projection horizon of not less than two full financial years from the date of publication. It also says that where possible the projections should include a breakdown of revenue by sector and by economic and functional category.

Economic and fiscal projections are now included in each year's Pre Budget Report (normally in November or December) and in the Budget itself (March or April). In practice the projection horizon for tax revenues extends further than the minimum set out in the Code. The Budget 2006 projections published in March 2006 looked forward for five full years to 2010-2011. A limited breakdown, showing receipts of larger taxes as a percentage of GDP, is published for the full period but more detailed breakdowns by type of tax and economy category are given for one year ahead.

The public finance projections in general and tax forecasts in particular are of critical importance to the Government and attract a lot of public attention, largely because of the Government's strict fiscal rules. These are:

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- the golden rule: over the economic cycle the Government will borrow only to invest and not to finance current spending; and

- the sustainable investment rule: public sector net debt will he held at a stable and prudent level. Other things being equal, net debt will be maintained below 40 per cent of GDP over the economic cycle.

Section 2 sets out the main features of the tax forecasting process and how it is organised, section 3 briefly describes some of the methods used and section 4 looks at aspects of the monitoring process.

1 THE TAX FORECASTING PROCESS

Tax forecasting is a joint exercise involving the Treasury and HM Revenue & Customs (HMRC), which is responsible for almost all of the tax revenue collected by central government. A small team of analysts in the Tax forecasting section of the Public Sector Finances (PSF) team in Treasury are responsible for putting the overall tax forecasts together and work very closely with their colleagues in HMRC and with Treasury colleagues responsible for the economic projections.

The Treasury produces economic forecasts using a macroeconomic model, usually known as the Treasury model. This can also produce estimates of tax receipts using published outturn data and a set of econometric equations, and this approach could be used to produce the medium term tax projections. However there were problems with this method, and since the 1970s the tax projections have been produced on a tax by tax basis, using tax specific models. The Treasury model tax equations are still maintained for policy simulations and related purposes.

The individual tax forecasting models used by HMRC all rely to some extent on economic determinants (e.g. forecasts of wage and salary growth, profits, consumer spending etc) supplied by Treasury. A lot of care is taken to ensure consistency between the economic and tax projections. As required by the *Code for Fiscal Stability* the major assumptions underlying the public finance projections are set out in the Budget and Pre Budget Report, and some of these assumptions are audited by the independent National Audit Office (see Box 1). The economic projections are presented in terms of ranges, with annual GDP growth varying by ¼ of a percentage point either side of the neutral view. However the lower end of this range is assumed for the public finance projections in order to incorporate caution into the forecast. All the GDP components and other economic determinants associated with this assumption are taken from the Treasury model and supplied to analysts in HMRC who then feed the data into their models.

The HMRC analysts producing the tax forecasts are experts on their particular taxes and work closely with their operational and technical colleagues in HMRC to gather up to date intelligence on the impact of special factors or new legislation on tax receipts. They will also have access to the latest receipts and tax assessment data, including where necessary access to data on individual taxpayers.[1] The information content of receipts outturns will vary from tax to tax. Sometimes, for example in corporation tax where large companies start making instalment payments part way through the year and need to base these payments on their estimated liability for the whole year, this will be a much better indication of future receipts than outturns of economic determinants. Hence short term forecasts for the current year for taxes will often be based primarily on recent outturns and HMRC judgements.

BOX 1
National Audit Office (NAO) Audited Assumptions

- In 1997, the Government invited the NAO to perform the first ever audit of the key assumptions and conventions underpinning the fiscal projections. Their role has developed since 1997 and the NAO currently audit 11 key assumptions. Since 2000, the NAO have been invited to conduct a rolling review to ensure those it audited three years previously remain reasonable and cautious. This cautious approach to fiscal policy builds a 'safety margin' into the public finance projections to guard against unexpected events. The main assumptions which have an impact on the tax forecasts are:

- Trend growth: Assuming 2½ per cent growth up to 2006 and 2¼ per cent in subsequent years, ¼ percentage points below the Government's neutral view.

- Composition of GDP: Shares of labour income and profits in National Income are broadly constant in the medium term.

- Equity prices: Rise from their current starting point in line with money GDP.

- Oil prices: Based on the average of independent forecasts for one year ahead.

- VAT: The VAT gap will rise by 0.5% points a year from a level that is at least as high as the estimated outturn for the current year.

- Tobacco: In projections, the underlying market share of smuggled cigarettes will be set at least at the latest published outturn.

Prepared by the authors.

The HMRC analysts return their forecasts to the Public Sector Finances (PSF) in Treasury and also provide a lot of diagnostic material on changes relative to previous forecasts and from year to year. PSF, who are responsible for putting these forecasts together and for presenting, explaining, and justifying the resulting projections for receipts, and for the main fiscal aggregates, to Ministers and senior officials, critically examine the HMRC work.

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1. Under UK legislation nobody in Treasury is allowed access to tax data on identifiable taxpayers.

Any unexpected changes will be discussed in detail with HMRC, and PSF will also look at top down comparisons, ensuring for example that there is a sensible, and comprehensible, pattern for the overall tax to GDP ratio.

Each Budget or Pre Budget Report forecasting exercise will stretch over several weeks and involve a series of forecasting rounds. This is partly because some of the economic determinants do depend on tax projections so a degree of iteration is required, and partly because more outturn data will become available during the exercise.

As set out in the *Code for Fiscal Stability*, the projections also have to take into account government decisions on changes to the tax regime. The importance of the fiscal rules is such that the Government will wait until the public finance projections have been finalised before confirming decisions on tax and spending policy. PSF work closely with their tax and spending policy colleagues, and with HMRC, to ensure that these policy changes are properly taken into account.

PSF are also responsible for producing the public finances documentation published at each Budget or Pre Budget Report. All the tax numbers included, and the associated text are agreed with HMRC colleagues.

2 FORECASTING METHODS

As the methods used are highly tax specific and reflect the particular types of tax existing in the UK, only a summary of the very different methods used for some of the major taxes is given here. The table below, as published in Budget 2006, shows the relative importance of the major taxes.
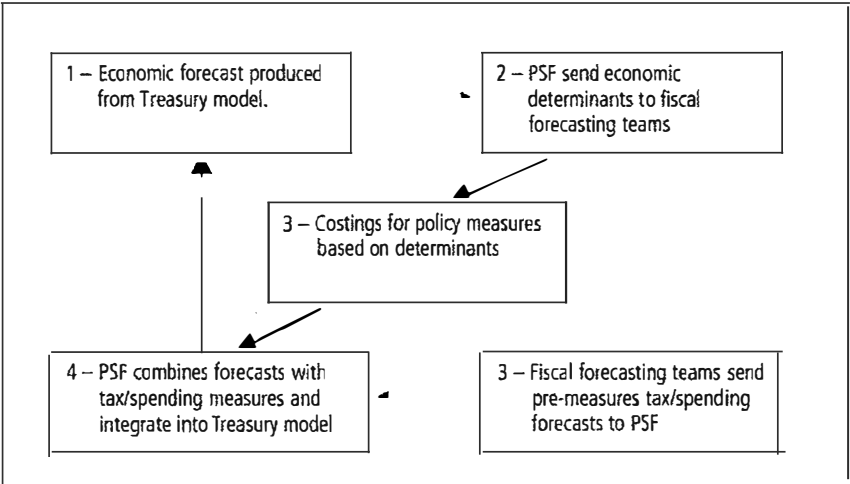
Income tax in the UK is collected in a variety of different ways and most of these are forecast separately.

The largest component is known as Pay As You Earn (PAYE), which accounts for over 85 per cent of total income tax (around £130bn). It is deducted at source from wages and salaries, and some pension income, and paid over to HMRC by employers/pension fund managers, usually on a monthly basis. The forecasting model uses Treasury determinants on wages and salaries to project forward tax liabilities. Increases in wages and salaries are split into those due to changes in numbers employed and those due to changes in earnings. The progressive nature of the income tax system means there is a large difference between the average marginal tax rate, which is applied to changes stemming from higher earnings, than the average tax rate, which is applied to changes from higher employment numbers. The tax rate projections are primarily derived from HMRC's personal tax model, a microsimulation model based on the tax records of a sample of around 400,000 individuals. The PAYE model has generally performed well. The main problems in recent years have been connected with forecasting the amount of tax collected from bonus payments, especially those paid in the financial sector, as the level of these payments has changed considerably from year to year. It is therefore necessary to adjust the modelled tax rates to allow for the assumed level of bonuses in the light of forecasts of financial sector profits.

TABLE 1
Current receipts: a proportion of GDP

	Per cent of GDP						
	Outturn 2004-2005	Projections 2005-2006	2006-2007	2007-2008	Estimate 2008-2009	2009-2010	2010-2011
Income tax (gross of tax credits)	10.8	11.1	11.2	11.4	11.5	11.7	11.8
National insurance contributions	6.6	7.0	7.0	7.0	7.0	7.1	7.1
Non-North Sea corporation tax[1]	2.6	2.9	3.2	3.4	3.4	3.4	3.4
Tax credits[2]	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3
North Sea revenues[3]	0.4	0.8	0.8	1.0	1.0	0.9	0.8
Value added tax	6.2	6.0	6.0	6.0	5.9	5.9	5.8
Excise duties[4]	3.3	3.2	3.1	3.1	3.0	3.0	2.9
Other taxes and royalties[5]	6.6	6.9	7.1	7.1	7.1	7.1	7.2
Net taxes and national insurance contributions[6]	**36.2**	**37.5**	**38.0**	**38.5**	**38.7**	**38.7**	**38.7**
Accruals adjustments on taxes	0.1	0.2	0.2	0.2	0.2	0.2	0.1
Less EU transfers	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Other receipts[7]	2.3	2.4	2.5	2.5	2.5	2.5	2.5
Current receipts	38.3	39.7	40.3	40.9	41.0	41.0	41.0

Source: Office for National Statistics, U. K.

Notes: [1] National accounts measure, gross of enhanced and payable tax credits.

[2] Tax credits scored as negative tax in net taxes and national insurance contributions.

[3] Includes oil royalties, petroleum revenue tax and North Sea corporation tax.

[4] Fuel, alcohol and tobacco duties.

[5] Includes council tax and money paid into the National Lottery Distribution Fund, as well as other central government taxes.

[6] Includes VAT and 'own resources' contributions to EU budget. Cash basis.

[7] Mainly gross operating surplus and rent, excluding oil royalties.

Income tax collected via self assessment amounted to around £18bn in 2005-2006. This covers tax due on the profits from self employment and other unincorporated businesses and other tax which cannot be collected during the tax year itself. The forecasting model follows the same principles as the PAYE model but the data on the main determinants is not nearly as good or timely as for PAYE and it has been more difficult to identify the main drivers of changes to these receipts.

Almost all National Insurance Contributions (around £86bn) are collected alongside income tax, with the bulk being paid by employers and employees. This is forecast using a similar process to PAYE. Payments by the self employed are part of the self assessment system and are forecast by the same model used for self assessment income tax.

Corporation tax raised around £42bn in 2005-2006. About £7½ bn of this was from North Sea oil companies, which have a different tax regime. The remainder is forecast mainly using a microsimulation model based on the tax records of all large companies and a sample of smaller ones.[2] This approach allows for changes in profits, losses and allowances to be modelled at the company level, although group relief (which involves interactions between companies) is modelled at an aggregate level using regression techniques. The major challenges in forecasting corporation tax in recent years have been associated with the tax paid by financial companies. The financial sector is very important in the UK and accounts for, on average, about 30% of the non-oil corporation tax yield but the tax liabilities of these companies have been very volatile, growing by around 20% in some years and falling by up to around 15% in others. Moreover, unlike profits of non-financial companies where there is a fairly close relationship between profits as measured in the National Accounts and taxable profits, there is no external data available to use as a good indicator of financial company taxable profits.

Value Added Tax receipts amounted to £73 bn in 2005-2006. The methods used to forecast VAT have changed several times in recent years. Before the mid 1990s a model based on a projection of the underlying tax base was used. This was split into individual components (durable and non-durable consumers expenditure, government procurement and investment). Different VAT factors were applied to each sector reflecting the different proportion of spending subject to VAT. The equation seemed to break down in the mid 1990s when the effective

2. Total sample size is about 15,000 companies. Further details on the corporation tax model can be found in Eason (2000).

tax rate declined each year, resulting in large over-forecasts of VAT. As a result the equation was replaced by a much simpler one which just assumed that VAT would be determined by consumers expenditure, as projected by the Treasury model, and a deliberately cautious assumption that the effective tax rate would decline each year by 0.05 percentage points was introduced in the November 1997 Pre Budget Report.

This simplified model worked well until 2000, but the effective tax rate then started to fall by more than 0.05 percentage points a year. HMRC were then doing much more work on compliance strategies for indirect taxes and had developed methods for measuring the "VAT gap", the difference between the VAT theoretical tax liability (VTTL) and actual VAT receipts. Since Budget 2004, the VAT projections have been based on this approach.[3] Each component of the VTTL is projected separately in line with Treasury economic forecasts using data on both the tax base and on the trends in the proportion theoretically subject to VAT. The forecast for receipts in the current year is based on recent outturns and judgements about the effects of changes to the economy, and this forecast is used to construct an estimate of the VAT gap. The VAT gap is then projected in line with the NAO-audited assumption to increase by 0.5 percentage points each year, before the effects of legislative changes and other special factors.

Receipts from **excise duties** on fuel, alcohol and tobacco raised £39bn in 2005-2006. Econometric models[4] are used to forecast receipts from excise duties on fuel (£23 bn in 2005-2006) and on alcoholic drink (£8bn in 2005-2006). Demand models have been estimated for petrol, diesel, beer off-sales, beer on-sales, wine and spirits. Demand is assumed to be a function of own prices, prices of close substitutes and complements and broader economic variables. The fuel models also use a variable to capture changes in fuel efficiency. The equations are carefully monitored and re-estimated on a regular basis.

Other central government taxes are forecast individually using a variety of different methods. A different approach is used for council tax, the main tax raised by local government. As council tax rates are determined annually by individual local authorities, not by central government, a stylised assumption that rates will increase in line with the historical average is used. Since changes to council tax are broadly balanced by changes to locally financed expenditure, they have little material impact on the fiscal aggregates.

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3. Further details on the VAT model are available in UK Treassury.

4. Further details on the alcohol demand equations are available in Huang (2003).

The UK attaches considerable importance to detailed monitoring of the public finances. This enables emerging trends or possible deviations from forecast pattern to be observed as quickly as possible. HMRC provide regular reports on a monthly basis, and more specific information at particular times of the year, around the important due dates for the major taxes.

The amount of information available, and its timeliness, varies considerably from tax to tax. The usual pattern is that a limited amount of information is available quickly but more detailed analysis, which requires access to tax assessment data has to wait until much later. For example information on PAYE receipts in a day is available during the next working day. However the amount of information is limited to the total amount paid over by the employer. Hence, some information on the tax paid by different industries is available promptly, but nothing on the number of employees paying tax or on the distribution of their earnings is available until much later. As the amount paid over comprises income tax and national insurance (compulsory social) contributions the split between these has to be estimated using algorithms. The employers will send details of the amount of tax and NIC deducted from each employee but not until well after the end of the tax year.

Whenever the monitoring reveals significant, unexpected deviations from the expected pattern of receipts, HMRC will be asked to investigate further. This will involve HMRC analysts contacting operational experts within HMRC, who might then contact the companies involved directly.

The Government also attaches considerable importance to transparency, which is one of the key principles set out in the *Code for Fiscal Stability*. Figures showing provisional outturns for the public finances are published monthly, jointly by the Office for National Statistics and the Treasury. This publication includes some series for the major taxes, and more detail is published at the same time by HMRC.

The monitoring exercise also feeds directly into the important work done on short term forecasting. These are done on a regular basis, mainly for the purposes of cash flow management. The UK Debt Management Office (DMO) is responsible for carrying out the Government's debt management policy of minimising financing costs over the long term and for managing the aggregate cash needs in the most cost-effective way. As receipts for individual taxes tend to be concentrated over particular time periods, the level of receipts will vary considerably, both from month to month and within each month. The profile of receipts will also be very different from that of expenditure. This means

that on certain days the DMO will need to borrow substantial amounts from the money markets while on others the flow will be in the other direction. The DMO needs good projections of likely cashflow for several months ahead so it can plan its major operations, but it also needs forecasts on a daily basis in order to plan its day to day money market operations effectively.

Government cash flow is monitored by Treasury intra-day as part of the cash management operation. Whilst it is not generally possible to identify individual taxes, deviations from expectations of cash receipts over specific days in the month can give an early indication of the likely outturn for particular taxes.

THE RECENT BEHAVIOUR OF PUBLIC REVENUES IN BRAZIL

Public Finances Coordination (Dirur/Ipea)

The importance of discussing the theme of public revenues in Brazil becomes clear in the context of the recent history of Brazilian economy, marked by a transition to a situation of consolidated macroeconomic stability and the creation of conditions for sustained growth. One of these conditions is the structural fiscal adjustment of the public sector, a process that advanced considerably after the implementation of the Fiscal Stability Programme (1998), through which significant and increasing primary surpluses are being achieved in the scope of the Federal Union. This movement was consolidated after the passing of the Law of Fiscal Responsibility in 2000.

However, the process of Brazilian fiscal adjustment presents problems. One of them is related to the fact that this process has depended too much on the growth of public revenues – for example, the tax burden has just beaten a record in 2005, reaching about 37.37% of GDP, equivalent to a growth of 1.49 percentile point in relation to the previous year.[1] However, since it is not reasonable to assume that public revenues will grow indefinitely, since economic theory sets a limit on collection,[2] one may conclude that the public sector's capacity to maintain high primary surpluses will end sooner or later, as can also be surmised from the continuous growth of current expenditures and the increased budgetary rigidity.[3]

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1. See Secretaria da Receita Federal (2006). In this document, the main reason indicated for the increase of the Union's tax burden in 2005 is the increased efficiency of tax administration, and the adoption of legal measures to improve collection, control and inspection was underscored.

2. This is related to the so-called "Laffer curve", that establishes a relation between the sum of the collection and the tax rate. Representing the sum in a vertical Cartesian axis and the tax rate in the horizontal axis, this relation is described by means of a concave downward parabola, in such a way that, as the tax rate increases, the collection initially rises, later reaching a maximum level and finally decreasing.

3. Budgetary rigidity (or fiscal rigidity) is understood as a feature of the public budget characterized by the existence of earmarked revenues and obligatory expenditures. A budget can be rigid to different degrees. In practice, there is no such thing as a totally rigid or totally flexible budget – that is, without any earmarked revenue or obligatory expenditure.

The data show that the period of effective fiscal adjustment (1999 onwards) presented average annual spending above that of the 1995-1998 period, which was characterized by a relatively slack fiscal policy. This is an indication that the Brazilian fiscal adjustment has focused on increasing revenues, because both the primary surplus and the primary spending have grown.[4] However, this is not a good sign, in view of the fact that a large share of these revenues corresponds to accrued contributions, i.e. "cascading" on each phase of the productive process, which distorts the decisions of the agents and undermines the productivity and competitiveness of the economy as a whole.

TABLE 1
Brazil: Union revenues of the 2000-2005 GDP
(in %)

Year	Taxes	Rates	Contributions	Patrimonial	Services	Other current revenues	Other revenues	Total
2000	7.02	0.12	12.69	0.92	1.30	0.84	0.03	22.93
2001	7.52	0.12	13.44	0.89	1.34	0.78	0.04	24.14
2002	7.89	0.13	14.38	0.73	1.27	1.05	0.04	25.49
2003	7.27	0.13	14.53	0.80	1.27	0.66	0.04	24.70
2004	6.82	0.14	14.82	0.80	1.14	0.62	0.03	24.37
2005	7.83	0.17	15.97	0.77	1.20	1.21	0.03	27.18

Source: Ministry of Finance/STN. Integrated Financial Administration System.
Prepared by Ipea/Dirur/CFP.

Table 1 presents the collection performance for the main revenue categories of the Union, as proportion of GDP, in the 2000-2005 period. It shows the significant growth of total revenues, as well as the importance of the contributions for the performance of this total. Taxes, in turn, had a less regular evolution than that of contributions, although the latter have also grown in the period under analysis.

Graph 1 shows the behaviour of the total tax burden as proportion of GDP and the real growth of the product along the 1995-2003 period. Overall, there is a possibility that the rise of the tax burden has contributed to the low growth of the product in recent years. In the 1995-1997 period, when the total of taxes was around 28.6% of GDP, the average rate of growth of the product was 3.4% a year. As of 1999, with the beginning of the fiscal adjustment period, the total taxes exceeded 30% of GDP. For the 2001-2003 sub-period, the average burden was 34.1% and average growth was 1.3%. Thus, the only

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4. In the 1995-1998 period, the annual average non-financial spending of the Union reached about 19.1% of GIP, while in the 1999-2005 period, it increased to approximately 21,6% of GIP. In the same periods, the average annual primary surplus went from 0.69% of GIP to 3.77% of GIP respectively.

exception regarding the negative effect of a high tax burden is in 2000 when, for a 31% burden, the product grew 4.4%.

1 INDIVIDUAL INCOME TAX (IRPF)

According to current legislation, IRPF tax payers are natural persons living or residing in the country, with economic or legal availability of income or earnings of any nature, including capital earnings or profits; as well as natural persons who receive incomes from goods that they own.

According to Federal Revenue Secretariat, the number of individual income tax payers is relatively small when compared to that of other countries, so the participation of this tax in the total revenues collected by the Union is relatively low. High exemption limits and reduced maximum rate account for the low relative participation of the Brazilian income tax.

In 2000-2005 period, the total IRPF tax collection presented a real growth of 34.8%. Its participation in the total tax revenues of the Union went from 4.3% to 4.5%. However, the increase of collection did not occur in uniformly along the period, but was concentrated between 2003 and 2005 (growth of 26.6% in real terms – see table 2).

TABLE 2
Individual Income Tax (IRPF): collection revenue in the 2000-2005 period

Year	IRPF (R$ million of 2005)*	Δ (%)
2000	5,037	
2001	5,158	2.4
2002	5,026	-2.6
2003	5,365	6.7
2004	6,076	13.3
2005	6,791	11.8

Source: National Treasury Secretariat/Government Accounts.
Obs.: * Values updated by the Expanded Consumer Price Index (IPCA).

The behaviour of the IRPF tax collection between 2000 and 2003 can partly be explained by the evolution of the number of taxpayers. Table 3 presents the number of declarants who submitted income tax statements and the number of income tax payers each year. An increase of approximately 30% can be observed in the number of statements submitted during the period, which can be attributed to the increased ease in filling out and submitting the information, electronically, to the Federal Revenue Secretariat. However, in every year of the series, the number of people who effectively paid this tax – the taxpayers – is equivalent to less than half of the total statements submitted (34,82%, on average, for the 2000-2003 period).

Evolution of the number of IRPF declarants and taxpayers in the 2000-2003 period

Reference year of the statement	Number of declarants	Number of taxpayers	Taxpayers/declarants (%)
2000	13,906,143	5,189,242	37.3
2001	15,180,447	5,506,075	36.3
2002	15,967,859	4,953,121	31.0
2003	18,047,676	6,261,601	34.7

Source: Federal Revenue Secretariat/General Coordination of Tax Policy.

The total number of taxpayers, which constitutes the taxable base of the IRPF, presented a growth of 21% between 2000 and 2003, in spite of a reduction of approximately 10% in this base in 2001-2002. The annual evolution of the number of taxpayers presents a similar path to that of the IRPF collection in the 2000-2003 period. In both cases, the figures resulted from alterations in the tax legislation and changes in the country's employment and income levels.

Table 4 presents the description of the IRPF annual progressive table for the period under analysis. The incomes that determine the limits for each one of the rates (exemption, 15 and 27.5%) correspond to twelve times the amounts of the monthly incomes.

The 27.5% rate was established in 1999, replacing the previous rate of 25%. As of 2002, Law n. 10.451 determined a 17.5% correction of the limit values of each income bracket, as well as in the deductions of expenditures with education and per dependent. Thus, the reduction of the number of taxpayers and, consequently, of the total IRPF collection in 2001-2002 period seems to have been caused mainly by the change in the current law. The rise in the limits of exemption and taxation of incomes, as well as the increase in the deduction of some personal expenditures, contributed to a real decrease in the collection of the tax.

TABLE 4
Description of the IRPF annual progressive table between 1999 and 2005

1999 to 2001		2002 to 2004 (Law n. 10.451, of 2002)		2005 (Law n. 11.119, of 2005)	
Calculation base for annual income in R$	Rate (%)	Calculation base for annual income in R$	Rate (%)	Calculation base for annual income in R$	Rate (%)
Up to 10,800.00	0	Up to 12,696.00	0	Up to 13,968.00	0
From 10,800.00 to 21.600,00	15	From 12,696.00 to 25,380.00	15	From 13,968.00 to 27,912.00	15
Above 21,600.00	27.5	Above 25,380.00	27.5	Above 27,912.00	27.5

Source: Laws n. 9.250/1995, 10.451/2002 and 11.119/2005.
Prepared by Ipea/Dirur/CFP.

A new correction of the progressive table was determined for 2005. Law n. 11.119 corrected by 10% the limits of each income bracket and the deductions of expenditures with education and per dependent. However, this correction does not seem to have resulted in loss of collection, since the IRPF revenue increased in real terms in the 2003-2005 period (see table 2). This increase could therefore be explained by the increase of the taxpayers' average income in the last three years.

Table 5 presents the annual averages of the occupied population and the real income in some of the major metropolitan regions of the country, from 2002 to 2005. The figures in the table should be considered only as a reference, since they do not take into account the employment and income levels in Brazil as a whole, and they exclude the possible variations in the income of retirees and include information on informal workers.

TABLE 5
Occupied population and effective real average income between 2002 and 2005*

Year	Occupied population (%)	Δ (%)	Effective monthly average income (R$) – occupied people	Δ (%)
2002	48.68		1,134.00	
2003	50.05	2.81	995.55	-12.21
2004	50.59	1.08	997.95	0.24
2005	50.97	0.75	1,020.58	2.27

Source: Brazilian Institute of Geography and Statistics/Monthly Employment Survey (includes only the metropolitan regions of Recife, Salvador, Belo Horizonte, Rio de Janeiro, São Paulo and Porto Alegre).
Note: *The figures for each year correspond to the arithmetic averages of the months when the statisticians are available.

The figures presented in table 5 indicate an increase of the occupied population between 2002 and 2005 and an increase of real average income between 2003 and 2005. Such figures suggest that the growth of IRPF collection, as of 2003, may have been caused, among other factors, by the increase in the employment and income levels.

1.1 Corporate Income Tax (IRPJ)

The IRPJ's generating fact is the profit obtained by the legal entity. The tax rates, in force since 1996, are basically the following:

1) 15% (fifteen percent) on real profit, presumed or certain, obtained by legal entities in general.

2) The share of the annual real profit that exceeds the amount of R$ 240.000,00 (two hundred and forty thousand Reals) is subject to the incidence of an additional rate of 10%, being the same for all legal entities, including financial institutions, insurance societies and similar entities.

The taxpayers, by choice or by legal determination, are taxed through one of the following forms:

1) Within the Simple System, for micro and small companies.

2) Presumed profit, being a percentile value on the invoicing of the company that varies according to activity branch, which is prsumed to represent the average rate of profit of the activity.

3) Real profit, which basically represents the accounting profit of the company, with some additions and exclusions.

Table 6 shows the behaviour of the real variation rates of the IRPJ collection in the 1996-2005 period.

TABLE 6
Evolution of the growth rate of IRPJ collection in the 1996-2005 period

(In R$ billions of Mar. 2006, updated by the IGP-DI)									
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Collection	32.9	30.1	28.3	28.1	31.7	27.6	49.3	39.4	41.7	51.2
Variation (%)		-8.4	-5.9	-0.97	12.95	-13.0	78.8	-20.1	5.8	22.9

Source: Brazil. Ministry of Finance. Result of the National Treasure. Brasilia, several numbers.
Prepared by Ipea/Dirur/CFP.

In 2000, there was a real increase of about 13% in the IRPJ collection, on account of the extra collection from overdue payments through the Fiscal Recovery Programme (Refis) instituted in that year. In 2001, due to reduction of these atypical revenues and to economic stagnation, the IRPJ collection fell 13%. In 2002, there was a sharp increase (78.8%) in the collection of the tax, due to several factors, such as the collection of overdue debts and changes in the legislation, which resulted in a high increase of the IRPJ taxation on financial corporations. In 2002, there were also extra collections – especially because of legal measures to charge overdue debts – without counterpart in the previous year. Moreover, the profits of companies and banks with assets in foreign currency, due to currency exchange variation in 2002, increased hugely, consequently raising the tax calculation base.

The legal measures referred to are established in Provisional Measure (PM) n. 38, which also re-established deadlines for payment of overdue tax debts – including the Income Tax on inflationary profit that was very high in 2002 – and in PM n. 75, later rejected by the Congress, which established the programme for refinancing of debts for companies that agreed to stop legal actions. The most important change, however, came from PM n. 2.222/2001, later revoked by Law n. 11.053/2004, that established collection, as of January 1, 2002, of the Income

Tax on pension funds and private welfare entities. Just the taxing of pension funds alone generated an increase of R$ 9.60 billion in collection, in nominal terms. In spite of the considerable increase in the collection of this tax, the structure of the tax's rates was not altered; the growth was only in the tax base. This·is positive, considering aspects related to isonomy and income distribution.

In 2003 the collection of the IRPJ dropped 20.1%. This happened because of economic stagnation, particularly of industrial activity. Moreover, the increase of extraordinary revenues did not take place to the same extent as in the previous year, when the behaviour of the revenue from this tax results, to a large extent, from the effects of the above-mentioned MPs. Is estimated that these extraordinary revenues increased the Union's tax collection in R$ 18.5 billion in 2002 and R$ 7.9 billion in 2003. In 2004, there was a small real growth of 5.8% in the collection of the tax. In addition to the macroeconomic improvement, administrative measures collaborated towards this growth. In 2005, the real increase of 22.9% occurred due to the increased profit of the companies, mainly in the mining sectors (360%), telecommunications (111%), fuels (61%) and electricity (38%), thus increasing the tax base. Attention should also be drawn to the increased efficiency in recovery of public credits by the Office of the Attorney General of the Union, with a 50% increase in relation to the previous year.

An important legal measure occurred on December 30, 2004, when the federal government, by editing Provisional Measure n. 232 (the same one that readjusted the IRPF Table), increased the IRPJ calculation base and the Social Contribution on Net Profit (CSLL) from 32% to 40%, for service providers (except transporters and hospitals) that chose the presumed profit system. This corresponded to an average increase of 25% in the said taxes, because while previously it was considered that the average profit of the service provider corresponded to 32% of its invoicing, now the average profit is considered as 40%.

1.2 Withholding Income Tax (IRRF)

The IRRF is divided into four major categories, according to the nature of the generating fact, in compliance with the classification of the data disclosed by the National Treasury: IRRF-Labour (on labour earnings), IRRF-Capital (on capital earnings), IRRF-Remittances Abroad and IRRF-Other Earnings. Decree n. 3.000, of 26/03/1999, regulates the IRRF. Known as RIR/99, this decree establishes all the possibilities of taxation at the source, as well as the applicable rates, the tax responsibilities, the penalties and general provisions.

Graph 1 shoes that the IRRF participation in the total federal collection increased from 2000 to 2002 and, in the two following years, dropped in relation to 2002. In 2004, the said participation reached the lowest level of the series, with a slight improvement in 2005. Despite the atypical year of 2002, it can be claimed that that the IRRF is one of the federal taxes that has been contributing to the fall of the relative participation of tax revenues in the federal collection in recent years.

GRAPH 1
Participation of the IRRF in the total of federal collection
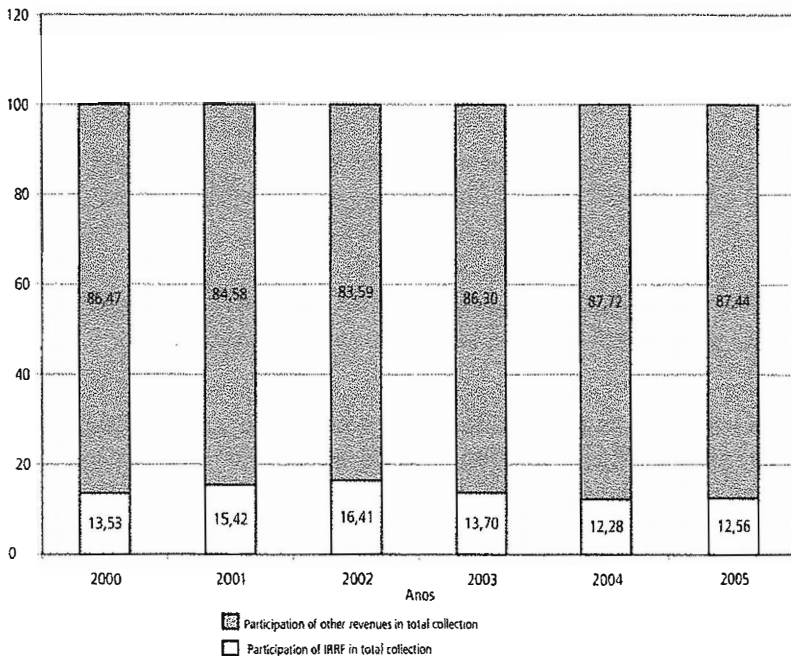
Source: National Treasury Secretariat.
Prepared by Ipea/Dirur/CFP.

Graph 2 presents the evolution of the IRRF, in real terms, broken down to its basic categories. In the 2000-2005 period, this tax had a 30% increase in collection in real terms, while the per capita GDP, at 2005 prices, varied only 3.62% in the same period. The 2000-2002 period was of growth derived, among other things, from the currency depreciation of the period, that positively affected the collection of IRRF-Capital and IRRF-Remittances Abroad. Moreover, 2002 was marked by the effect of several changes in the tax legislation, described below, that affected in particular the collection of overdue debts.

GRAPH 2
Collection of the IRRF

(In R$ billions updated by the average IPCA of 2005)
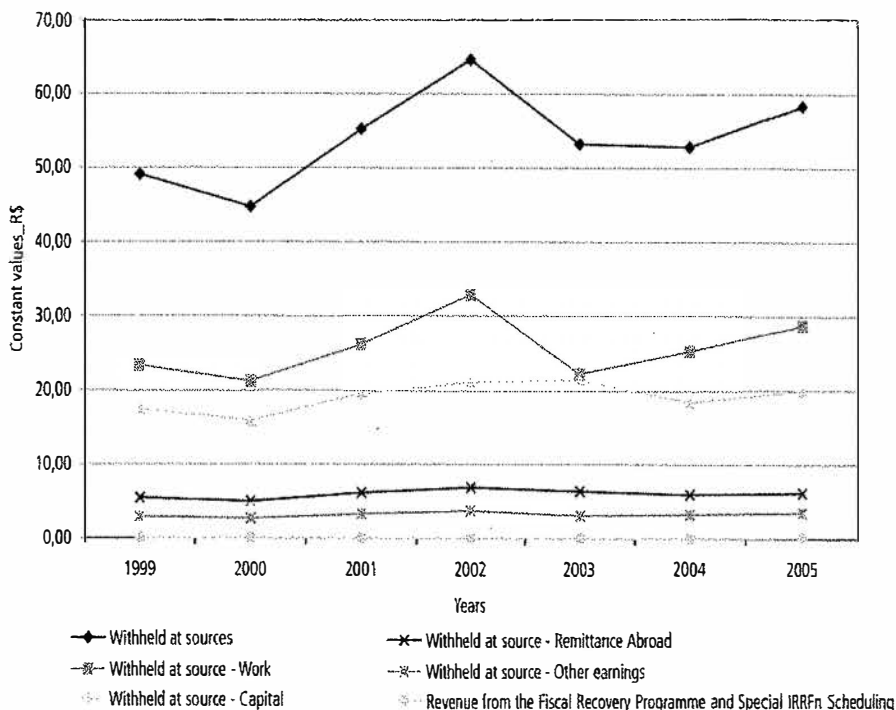
Source: National Treasury Secretariat.
Prepared by Ipea/Dirur/CFP.

1) PM n. 2.222, of 04/09/2001: established new rules for the taxation of earnings and profits from investments of resources by complementary welfare funds; allowed entities that chose the special regime to pay overdue taxes in up to six installments, in compliance with Law n. 9.779/ 1999, as of January 2002. This year, these measures provided a collection of the order of R$ 7.7 billion.

2) PM n. 38: exempted from payment of fines and moratoriums the debtors with lawsuits that paid, by the last working day of July, the total overdue tax and welfare debts, in compliance with conditions established in Law n. 9.779/1999 and in PM n. 2,158-35/2001. The collection gain with this measure was of R$ 2.2 billion.

3) PM. 66, of 29/08/2002: extended until September the deadline for payment of overdue tax and welfare debts, with or without filed lawsuit, and of the complementary welfare entities that opted for the special regime. The revenues derived from this provision totalled R$ 3.5 billion.

4) PM n. 75: reopened until the last working day of November the deadlines established in PM n. 66, providing textra revenues of the order of R$ 1.3 billion.

The fall of the real collection of the IRRF in 2003 is explained mainly by the extraordinary character of the collection in the previous year (mainly as a result of the changes in the legislation and the impact of currency depreciation) and by the low economic growth, high rates of unemployment and fall of average real incomes. These adverse macroeconomic factors caused a significant drop of the revenue from IRRF-Labour.

In 2004-2005, there was a very slow recovery of the collection of this tax. This reflects, on the one hand, the increase of labour earnings – mainly in the sectors of insurance and private welfare, manufacture of chemicals and manufacture and assembly of automotive vehicles. On the other hand, this increase in the IRRF-Labour revenue was compensated by the decrease of IRRF-Capital collection (in 2004), resulting from the fall of interest rate and currency stability, which reduced the earnings from financial applications.

1.3 Tax on Industrialized Products (IPI)

The IPI is a modality of tax on the physical production or sale of goods produced by industrial or similar establishments. Regulated by Law n. 10.934, of August 11, 2004, this tax is traditionally divided into five categories: IPI-Automobiles (rate incident on sale of automotive vehicles), IPI-Beverages (based on the physical production of beverages, mainly beer, soft-drinks and mineral water), IPI-Tobacco (collection base in cigarette sales in the domestic market), IPI-Importation (generating fact in the customs clearance of foreign products) and IPI-Others. Except in the case of IPI-Importation, the generating fact of this tax occurs when the product leaves the industrial establishment (or similar establishment).

The calculation base of the IPI is identified in two ways: in the internal operation (the total amount of the operation in which the product leaves the industrial establishment); and in the importation (the amount that serves or would serve as calculation base for the customs taxes, upon importation
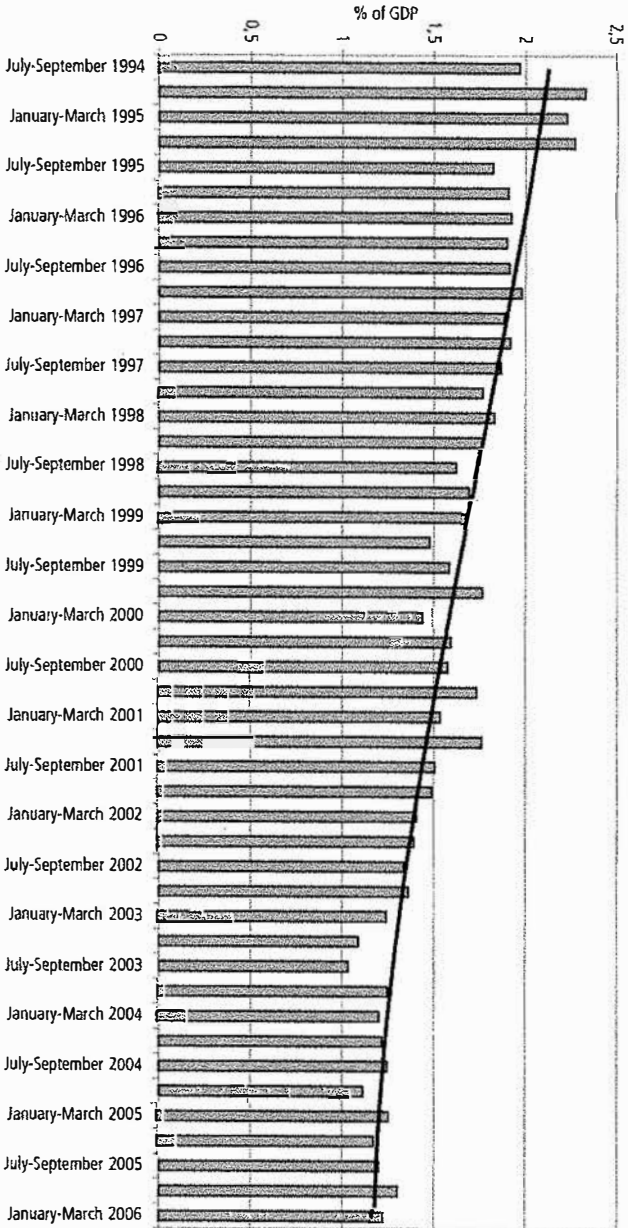
clearance, added to the total of taxes and currency charges paid or owed by the importer). The IPI incidence is very complex. The table of incidence of tax on industrialized products contains ninety-seven chapters, each one related to a category of products.

At least along the last ten years, the IPI has been presenting a trend of reduction of collection, both in real terms and in terms of participation of GDP (see graph 3, with a clearly decreasing trend line). This is reflects, obviously, in the fall of the relative participation of this tax in the total revenue of the Union.

In general, the drop in IPI collection occurred in all its categories. However, this reduction had specific causes in each one of the categories. In the case of IPI-Automobiles and IPI-Others, the effect of Law n. 10.276, of September 10, 2001, was important. This law increased IPI presumed credits on raw materials used in products intended for exportation. Moreover, as of 2003, there was a reduction of the rates of this tax for some products, including automobiles, chemical products and products related to basic metallurgy. In addition, that was a year of zero growth in the industrial sector. In turn, in the last six years, the relative stagnation of IPI-Importation seems to be associated with the relative stagnation of the added value of the importations, particularly in the most important segment of importation – intermediate goods.

Finally, IPI-Beverages and IPI-Tobacco also experienced significant drops in the period under analysis, but for a different reason than in the reduction in the other categories, namely, smuggling and the tax evasion. According to the Federal Revenue Secretariat (http://www.receita.fazenda.gov.br), in 2005 alone, there was a loss of collection of approximately R$1.6 billion, of which R$1.35 billion from cigarettes and R$ 255 million from tax evasion in the manufacture of soft-drinks. In face of these problems, the federal government has been making huge efforts to fight smuggling and tax evasion on several fronts. The efforts include the use of a mechanism to track cigarette production by means of a special stamp that will be placed on the packs and will allow the inspectors to know where, when and for whom the goods have been produced. There is also a project being implemented to use electronic bills of sale, which should speed up the services of inspection of production and sale of beverages and cigarettes. In the case of beverages, outflow gauges – devices used since 2004 that monitor the production of beverages and transmit the data to the Federal Revenue Secretariat in real time – have already proved to be efficient in reducing tax evasion in the beer sector.

GRAPH 3
Quarterly collection of IPI (1994-2006) % of GDP

% of GDP

July-September 1994	
January-March 1995	
July-September 1995	
January-March 1996	
July-September 1996	
January-March 1997	
July-September 1997	
January-March 1998	
July-September 1998	
January-March 1999	
July-September 1999	
January-March 2000	
July-September 2000	
January-March 2001	
July-September 2001	
January-March 2002	
July-September 2002	
January-March 2003	
July-September 2003	
January-March 2004	
July-September 2004	
January-March 2005	
July-September 2005	
January-March 2006	

0   0,5   1   1,5   2   2,5

2 THE SOCIAL CONTRIBUTIONS

2.1 Contribution for the Financing of Social Security (Cofins)

The Cofins was instituted by Complementary Law n. 70, of December 30, 1991, with the purpose of meeting exclusively "the expenditures with the end activities of the areas of health, welfare and social assistance". This contribution is levied on legal entities, except micro and small companies ruled by the Integrated System of Payment of Taxes and Contributions of the Micro and Small Companies (Simple). As a general rule, its rate is of two percent on monthly invoicing, considering the gross revenue from the sale of goods and services of any nature. Nevertheless, there are different rules for the various sectors, as well as special provisions that regulate exclusion from the calculation base and exemption from this contribution. Since it has a fixed rate regardless of the company's invoicing, the Cofins can be considered a regressive contribution.

Currently, the Cofins is ruled by Law n. 9.178/1998, which raised the percentage of contribution to three percent of the invoicing. It can be compensated with the Social Contribution on Net Profit (CSLL) by up to one third of the paid Cofins, in compliance with the requirements of this law. Since February 1, 2004, the Cofins has two rates. The first one is three percent and the second is 7.6% for the non-cumulative modality, specified in Law n. 10.833/2003. In some operations, the rates can be different.

The evolution of the Cofins in the period from January 1995 to February 2006 (graph 4) shows a substantial alteration of the series as of 1999, as a result of the rate increase from 2% to 3% in the that year. Moreover, more volatility of the series is observed after 1999, a period that was also marked by a rising trend of the collection of this contribution.

GRAPH 4
Evolution of the Cofins-GDP ratio
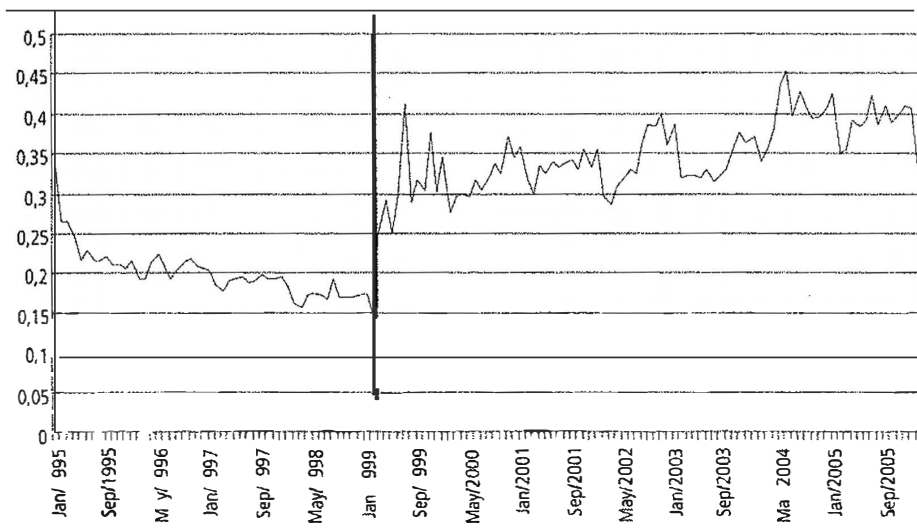
Source: National Treasury Secretariat.
Prepared by Ipea/Dirut/CFP.

2.2 Temporary Contribution on Financial Activities (CPMF) or transmission of values and credits and rights of a financial nature

The CPMF was instituted by Law n. 9.311, of October 24, 1996, and entered into force on January 23, 1997. Its incidence base refers to any operation or movement carried out by financial institutions, that entails contractual or physical circulation of currency, whether it results or not in the transfer of ownership of the same values, credits and rights. Currently, the CPMF is charged at the rate of 0.38%. It is planned to last until 2007. However, it will likely be renewed or even made permanent.

The evolution of CPMF collection between 2000 and 2005 can be divided into two sub-periods. In the first, between 2000-2002, there was a significant expansion of collection in real terms and in terms of share of GDP. In 2001, the real growth of the CPMF reached 11.5% and in 2002, 8.9%. This expansion is explained by three factors: increased rate, real growth of the economy and recovery of resources through legal sentences. In 2000, for about six months, the CPMF was in force with a rate of 0.30%. In 2001, the 0.30% rate was in force for only two and a half months, with an increase to 0.38% through the rest of 2001. However, in 2002, in addition to the twelve complete months with a rate of 0.38%, there was an acceleration of economic growth in relation to 2001 and an addition of R$ 300 million from judicial deposits and conversion

of deposits, in compliance with PM n. 66/2002 (except article 24) and PM n. 75/2002 (article 14). This behaviour is reflected in terms of increase of CPMF collection as share of GDP: in 2000, the CPMF reached 1,31% of GDP, increasing to 1.43% and 1.51% of GDP, in 2001 and 2002, respectively.

The second analysis sub-period goes from 2003 to 2005. This period is characterised by the stability of the CPMF rate at 0.38% and reduction of the effects of atypical collection of the judicial deposits in 2002. As a consequence, the CPMF collection was basically influenced by the behaviour of the real growth of GDP. With this, the CPMF collection stabilised at around 1.49% of GDP between 2003-2005 (graph 5). In terms of real growth, the CPMF followed the evolution of the real growth of GDP

GRAPH 5
Evolution of CPMF collection
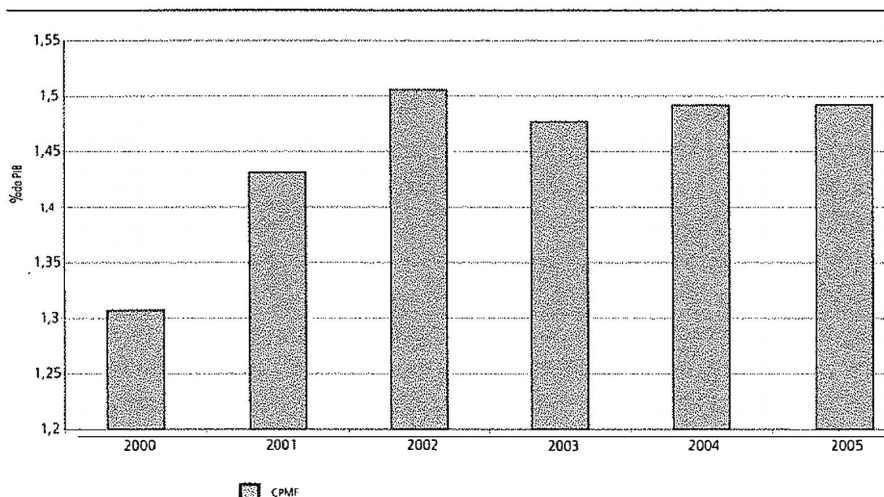
Source: Treasury National Secretariat MF.
Prepared by Ipea/Dirur/CFP.

The CPMF has been an important source of collection for the federal government, especially because, as a contribution – and differently from taxes – it does not need to be shared with the states and municipalities. In 2005, the collection reached R$29 billion, representing 6.28% in the total collection of taxes and contributions by the National Treasury. In the 2000-2005 period, this participation presented a slight decrease as of 2001, with the average of the period reaching 6.6% of the total. In the total of contributions, this decline was more important, given that the CPMF in 2001 represented 10.6% of the total and in 2005 this percentage fell

to 9.4%, with the average for the 2000-2005 period at 10.1%. This drop can be explained by the collection gains obtained with the other contributions (Cofins, PIS/Pasep, CSLL), which in the last years have become more important in relation to taxes. The CPMF itself has continuously increased its participation in relation to taxes between 2000-2004, decreasing only in 2005. In the average of the 2000-2005 period, the CPMF's share in the total of taxes was 19.5%.

The CPMF has been successively extended for two reasons: allocation of the resources in areas considered a priority and due to the policy of generation of primary surpluses, implemented as of 1999. Initially, the CPMF resources were only intended to finance health expenditures, particularly through the National Health Fund. Currently, part of the collection is also applied in the Fund to Fight Poverty. In the case of Health, Constitutional Amendment n. 29/2001 determines that the resources cannot drop as a ratio of GDP from one year to the next. On the other hand, the Fund to Fight Poverty, created by article 79 of the Act of Transitory Constitutional Provisions, in force until 2010, encompasses, to a large extent, the resources of the cash transfer programmes aimed at poor families, such as the *Bolsa Família*. Moreover, the CPMF is an important source of resources that helps generate primary surpluses. In the 2000-2005 period, if all the CPMF resources had been used to finance the primary surpluses of this period, the average financing would be of the order of 62.3% of the total. On the other hand, even if all the CPMF resources are not used to compose the primary surplus, they are allocated to the social funds mentioned above, which represent rigid expenditures. In the absence of the CPMF, they would have to be financed with other revenue sources.

2.3 Social Contribution on Net Profits (CSLL)

The CSLL was instituted by Law n. 7.689, of 1988, with a view to assisting the financing of Brazilian social welfare. Its calculation base is the value of the companies' yearly profit, before the Income Tax provision. Currently, the rate of this contribution is 9%, but this rate has undergone several changes. For example, when the Law was promulgated the rate was 8%, and it reached 12% in 1999.

The analysis of the behaviour of the series shows a change of trend in the evolution of the CSLL collection as of 2002. The series shows a stationary behaviour, in spite of some oscillation, in the years before 2002. From then on, an uninterrupted growth in collection took place. Numerically speaking, the average growth rate between 1994 and 2001 was 2.7% in real value, while from 2002 onwards, the average rate rose to 13.9%. Moreover, there have

been no decreases in collection in any year since 2002. It should also be noted that, as of 2002, the CSLL as a ratio of GDP never stopped growing, rising from 0.75% in 2001 to 1.27% in 2005 (graph 6).

GRAPH 6
CSLL as ratio of GDP between 1994 and 2005
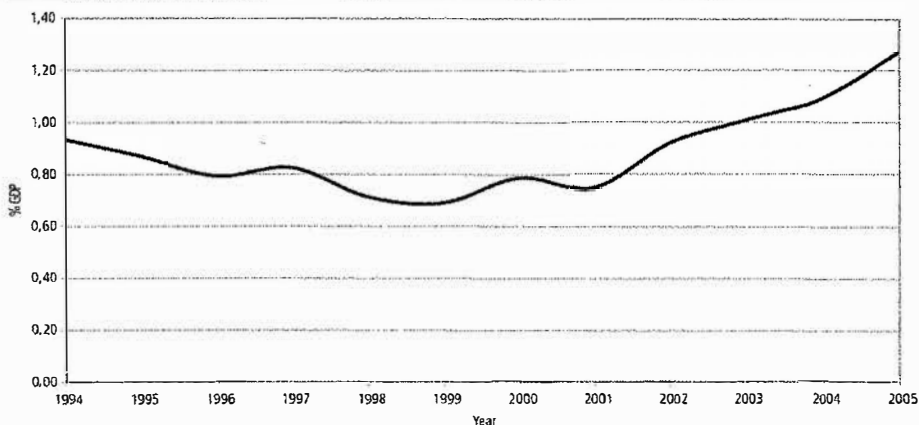
Source: National Revenue Secretariat.
Prepared by Ipea/Dirur/CFP.

Therefore, as of 2002, there has been an unmistakable growth of CSLL participation in GDP, in the current revenue of the federal government and in the total of federal contributions. This is the result of alteration of the tax rules that regulate the CSLL.

This article analysed the factors responsible for the behaviour of the main taxes and contributions of the Union in the recent period. Along the last years, there has been an increase of the relative participation of social contributions in the total revenues collected by the Union. The three contributions analysed here (Cofins, CPMF and CSLL) underwent significant increases in collection in the period, which can be attributed mainly to the alterations of their rates or in taxation rules. Taxes, in turn, had a less regular evolution in the period. The IRPF grew 20% more than in real terms between 2003 and 2005, while the IPI has presented a downward trend in the ten last years. The IRPJ and the IRRF collections resumed growth in 2004 and 2005, after a drop in 2003.

HOW TO FORECAST OR EXPLAIN THE BEHAVIOUR OF PUBLIC REVENUES IN BRAZIL? OLD AND NEW ALTERNATIVES

Cláudio Hamilton Matos dos Santos*
Márcio Bruno Ribeiro*

Even a superficial search will show that there is no lack of recent texts on the dynamics of the Brazilian public accounts. Indeed, if we consider the main public finances and tax policy themes (dynamics and composition of the Brazilian public debt, evolution of the Brazilian taxation structure and/or tax reform proposals in Brazil, as well as "sustainability tests of the Brazilian public debt"), we can easily find around 40 texts and 1.600 pages – not taking into account articles in situation journals published by the various research and government agencies. There is no doubt that this number would increase significantly in a broader search on the subject. This abundance of texts is certainly an indication of the importance that the themes related to the Brazilian public finances have taken on in the last years.

However, there is much less literature aimed strictly at adjusting econometric specifications to the data on public sector revenues in Brazil. Indeed, after a reasonably careful search, one finds only eight texts with explicit specifications on the subject, namely: Hernández (1998), Reis *et al.* (1999), Issler and Lima (2000), Portugal and Portugal (2001), Melo (2001), Siqueira (2002), Guaranga and Mello (2002) and Muinhos and Alves (2003). This number includes partially redundant texts and that work with very different definitions, frequencies and aggregation levels. The situation improves a little if we use a broader definition of econometrics, so as to also include the "calibrated" models based on various systems of national accounting. Even so, the number of texts found does not reach one third of the forty mentioned above.

The aim of this text is to offer two contributions. Initially, we present a preliminary effort to map the broad econometric literature on the Brazilian public revenues published in the last decade (in the first two parts). Secondly, we present (in the third part) some strictly new specifications that we have been using at the Public Finances Coordination of Ipea.

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Attention should be drawn to the importance of the theme in at least two aspects. In the first place, a better understanding of the historical and future behaviour of public revenues allows the identification of the relationship between its determinants (tax rates, sectoral or macroeconomic variables etc.) and government collection, as well as preventing possible imbalances in the public budget. Secondly, there is a close link between the collection of revenues and the public policy process, since the tax and contribution revenues are earmarked to the various federal government programmes.

1 "ACCOUNTING" MODELS AND THE EXISTING DATA

"Accounting" models are those less focused on the adjustment of "good" econometric specifications for some specific variables and more focused on "systemic" understanding of the inter-relations between a relatively large set of variables. Such models can work with disaggregated "classic" variables (such as, for example, the various types of current revenues and public expenditures) and/or with variables logically related to the latter (such as stock variables or "fund flow" variables"), possibly of several sectors and/or interconnected institutions. Given that such models presuppose a lot of historical-institutional knowledge of the object under study and of how the various parts of it interrelate, it is no surprise that the main recent models of accounting consistency that include the Brazilian public finances came from public agencies. These agencies were in one way or another concerned with applied research, such as Ipea (for example, Carvalho, 2001, and Silva *et al.*, 2004) and the BNDES (Giambiagi and Pastoriza, 1997).

Carvalho's model (2001) systemizes much of the existing data on the Brazilian federal public revenues and seems highly representative of the Brazilian "calibrated" fiscal models. Thus, it seemed convenient to describe it briefly in sub-section 1.1. Very brief notes on the availability of data on the revenues of other government spheres and on the important work of Silva *et al.* (2004), *inter alia,* with multi-sectoral models are presented in sub-section 1.2.

1.1 The models of Carvalho (2001) and Giambiagi and Pastoriza (1997), the "method of the indicators" and the data on federal government revenues

One of the main objectives of Carvalho's model (2001) is to enable the construction of scenarios for the dynamics of the public sector net debt – understood as the sum of the external and internal net debts of the federal, state and municipal governments, as well as of the state-owned companies of these three government spheres – on the basis of hypotheses on the various components of the latter. Thus, the starting point of the model is the following accounting identities:

(I.1) $DLSP_j$ a" $DLSP^{ext}j + DLSP^{int}j$;

(I.2) $DLSP^ij$ a" $DLSP^ij(-1) + DN^ij + AP^ij$;

(I.3) DN^ij a" $NFSP^ij$ a" $DP^ij + Jur^ij$; e

(I.4) DP^ij a" $DC^ij - RC^ij$ [with i = external or internal and j = federal, state, municipal, federal state-owned, state state-owned or municipal state-owned].

Or, in words, *i)* the net debt of a government sphere j is given by the sum of its external and internal net debts; *ii)* the value of each one of these debts at the end of an accounting period is given by its value in the beginning of the period plus the nominal deficit (external or internal) of this government sphere in the period plus the relevant patrimonial adjustments; *iii)* the nominal deficit or nominal financing needs [internal or external] of a given government sphere j is given by its respective primary deficit plus the expenditures with the nominal interests of the respective debt; e *iv)* primary deficit (external or internal) of a given government sphere j is obtained by subtracting the respective revenues from the non-financial current expenditures of this government sphere.

The fact that the Brazilian Central Bank publishes monthly data on the internal and external net debts, financing needs, patrimonial adjustments and primary deficits and the expenditures with interests of the six government spheres mentioned above can lead the less informed analyst to thinking that there are detailed monthly series on the current revenues and expenditures of each one of those spheres. However, this is only true in the case of the federal government,[1] and the primary deficits of the other government spheres are only estimated by the Central Bank (CARVALHO, 2001, p. 7).[2] We will have a little more to say on the availability of state and municipal data in sub-section 1.2. For now, it should be noted that identity *(I.5)* below presents a disaggregation of net current revenues of the federal government compatible with the monthly data effectively made available by the Central Bank and the National Treasury Secretariat (STN) of the Ministry of Finance.

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1. Both in the SGS-Bacen and in the website of the National Treasury (in government statistics-accounting). However, the data provided by these institutions are, in many cases, significantly different.

2. More precisely, the Central Bank estimates these primary results indirectly, based on the variation of the stocks of the debts of these government spheres and the data on payment of interests on these debts. Unfortunately, this procedure, known as "below-the-line method", generates significantly different

(I.5) Federal "Net" Current Revenues *(RCF)* a" Current Revenues under the Control of the Federal Revenue Secretariat *(RCRF)* + Welfare Revenues *(RC)* + Other Current Revenues-Fiscal Incentives-Transfers *(TR)*.[3]

Identity (I.5) makes it clear that there are several possible concepts of "public revenues", even when limited to federal current revenues. Indeed, most of the studies that we will discuss in section 3.2 are concerned only about disaggregations of the current revenues under the control of the Federal Revenue Secretariat (SRF). Carvalho's text (2001) has the advantage of presenting the "full picture" of federal current revenues, so to speak.

In fact, Carvalho's model (2001) is worthy of note because of its explicit concern in working always with the highest degree of possible disaggregation among the variables mentioned in the (I.5) expression.[4] Carvalho *(ibid* p. 34) even argues that the diversity of Brazilian taxes and contributions is such, and their structural breaks so many and so large, that the "sticking to reality" of highly disaggregated models "(...), is, in general, much more appropriate than what occurs most of the time when simplified models, whose main determinant is the gross domestic product, are adopted." Even if one is not discussing the usefulness and clarifying power of disaggregated analyses, such as the ones allowed by Carvalho's model (2001),[5] it is interesting to note that the latter point is controversial. We will return to this matter in section 3.2, but for now it suffices to say that Carvalho uses the so-called " method of the indicators", that:

> consists of [forecasting the collection of some tax in the present period by the result of] multiplication of the collection of the previous period by (...) [*i*) a price index] that represents the inflationary variation to which the economic fact that generates the collection is subject; (...) [*ii*) an index of] quantity that represents the real variation

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3. However, it should be noted that the STN data are much more detailed, disaggregating federal current revenues into tax, contribution, patrimonial, agriculture and livestock, industrial, service revenues, and other revenues. It should also be noted that while the Central Bank includes non-welfare contributions among "tax revenues", the STN calls "tax revenues" the aggregate of revenues obtained with taxes and rates, and calls "contribution revenues" the revenues obtained with welfare and non-welfare contributions. That is, the term " revenues under control of the Federal Revenue Secretariat" – used by Carvalho (2001) – is perhaps more appropriate to describe the "tax revenues" of the Central Bank.

4. For example, Carvalho (2001) disaggregates the revenues obtained from Income Tax on "natural persons", " legal entities" and " withholding at source", in addition to "fines paid for delays or mistakes in the payment of the various types of Income Tax". The revenue with Withholding Income Tax, in turn, is divided into "labour earnings", "capital earnings", "profit remittances abroad" and "other earnings". Finally, the revenues from Withholding Income Tax levied on labour earnings are disaggregated into "levied on the wages of public civil servants" and on "the wages of private sector employees".

5. Which are essentially the raw materials of texts such as, for example, Giambiagi (2006).

of this generating fact; (...) [*iii)* an index that] represents the effect caused in the collection by modifications in the tax legislation; (...) [and *iv)* indices that] represent any [other] influences in the tax collection. (MELO, 2002, p. 35)

For example, Carvalho (2001) calculates the total revenue from collection of the importation tax with the importations of oil (a sub-component of the Importation Tax) in the following way:

Imp_oil = *Imp_oil* $_{-1}$ * (1 + percentile change of the total oil importations measured in dollars)*(1 + variation of the percentage rate of the tax on oil importation)*(1 + percentile change in the value of the nominal exchange rate).

Therefore, it is clear that a forecast according to this formula will be as good as the forecasts of the total oil importations, the nominal exchange rate and the rate of the oil tax. Since Carvalho's model works literally with dozens of disaggregations of the variables in the table above and with a similar number of exogenous variables, it is intuitively clear that the necessary information requirements for a good forecast performance of the model are certainly very high, and its use as an instrument of instrument of elaboration of "scenarios" (obtained by means of combinations of exogenous variables) is potentially more fertile.[6]

We conclude this part of the text remembering that Giambiagi and Pastoriza's model (1997) should be mentioned in any good summary of "accounting" models on the Brazilian economy. For our purposes, however, it should be noted only that the "fiscal part" of the model assumes that GDP growth is the only determinant of the growth of current revenues, both of the central government and of states and municipalities. Other endogenous variables of the model are also calculated by the "method of the indicators".

1.2 Brief notes on the national accounts of Brazil and multi-sectoral models

Aggregated annual data on the Brazilian public sector revenues excluding the state-owned companies (which are treated as private companies), as well as their disaggregation into central government, states and municipalities, are also available in the national accounts published by the IBGE. The last data currently available, related to 2003, indicate that the central government revenues account for little more than two thirds of the total revenue. The states are left with something around 27% and the municipalities with close to 5% of these revenues. The IBGE also publishes every quarter an aggregated

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6. Even so some care should be taken in the analysis of how robust the conclusions of the model are to small variations in the combinations of the exogenous variables adopted.

series of "taxes on products"[7] that is necessary for the calculation of the GDP at market prices, also published quarterly by the Institute.

It should also be noted that the fact that the GDP calculation requires the calculation of the value added by each "productive sector" of the economy – and, therefore, measures of incidence of taxes (on products and production)[8] at the sectoral level – enables the construction of so-called "multi-sectoral" models of accounting consistency. Indeed, based on data on the incidence of these taxes to the level of "39 productive sectors that are identified, with few exceptions, with the sectors of the product input matrix [published by IBGE]" – in addition to specific hypotheses on the demands for products from these sectors, among other variables – Silva *et al.* (2004) calculated estimates of the impact in the Brazilian tax collection of several changes in the calculation and incidence of the Cofins and the PIS contribution.[9] Even though multi-sectoral models are known to be complex, depending on a high number of questionable theoretical hypotheses, it is certain that they offer an important contribution to the literature that aims to explain the behaviour of public revenues in a given economy.

2 ECONOMETRIC SPECIFICATIONS PER SE

As mentioned previously, there seem to be few "tax collection functions" econometrically estimated for Brazil. Indeed, the sample found of texts published in the last decade and immediately relevant for our purposes has only seven elements, which, even though there might be other relevant specifications in texts that we are not aware of, at least makes the relative fragmentation of literature clear. Nevertheless, it seems useful to divide the eight texts mentioned in the introduction of this paper into three groups, namely, "conventional Keynesian", "atheoretical" and "intertemporal". The following discussion at the same time is based on this typology and tries to explain it in more detail.

We understand "Keynesian conventional" as models that are concerned with adjusting econometric equations for government revenues – generally tax revenues – as functions of the sum of their "generating fact" (generally

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7. Which include IPI, ICMS, IImp, ISS revenues, among others. The joint revenue from IPI, IImp and ICMS accounts for more than 90% of this total in several years.

8. The IBGE lists as "other taxes linked to production", for example, the Cofins and the contributions for the PIS-Pasep and the education wage, among others. These must be distinguished from the "taxes on products" (such as the IPI or the ICMS).

9. Other recent examples of use of multi-sectoral models to clarify the dynamics of certain types of tax revenues in Brazil are Siqueira *et al.* (2001) and Kume (2004).

approximated by the GDP, or some component of the latter) and often also of the inflation rate. The expected effect of the GDP is positive,[10] while that of inflation is ambiguous because it will depend on the precise form of indexation both of taxes (Tanzi, 1977) and of levels of incidence of higher or lower rates (such as in recent discussions on whether the Brazilian income tax exemption cap should be adjusted and to what percentile). Thus, it is to be expected that inflation will affect public revenues in different ways in different contexts, so models of "variable coefficients" are commonly used for the elasticity-inflation of current revenues of the government (Hernandez, 1998; Portugal; Portugal, 2001). And since recurring "fiscal packages" can also change the elasticity – income of tax revenues along time, the hypothesis of variable coefficients is also justified by the latter variable (Portugal; Portugal, 2001).

The texts of Portugal and Portugal (2001) and Hernández (1998) used the same econometric instruments, that is, estimation by means of estimators of maximum probability of variable coefficient models by means of the so-called "Kalman filter". Such similarity was not, obviously, mere coincidence. On the one hand, the econometric technique used was to a large extent determined by the specificities of the theoretical diagnosis, that is, by the hypothesis that the relations in question would be subject to repeated structural breaks. On the other hand, it is symptomatic that both studies were carried out in the period immediately after the Real Plan. Actually, and in spite of all the "modernizing" rhetoric of the time, that period was marked by acute worsening of public accounts (Giambiagi, 2006) and the two texts present evidence that one of the causes of this worsening was the fact that the government stopped being a "partner of inflation", so to speak. Table 1 presents a summary of the two texts, allowing a comparison between the revenues analysed and models used.

The differences between the two texts are considerable. More obviously, Hernández (*ibid*) – whose work was aimed at providing inputs for the construction of the annual model of Reis *et al.* (1999) – uses annual data between 1951 and 1995 (thus 45 observations), while Portugal and Portugal (*ibid*) worked with quarterly data for the 1980:1-1997:3 period (thus 71 observations), which entails the inclusion of a treatment for the seasonality observed in the series in question. Moreover, Hernández assumes that the

income elasticities of the various types of current revenues of the public sector remain constant and attempts to analyse a complete disaggregation of the latter, while Portugal and Portugal work only with the most important taxes and assume that both the income elasticities and inflation of the latter can vary along time.

Naturally, the hypothesis of variable coefficients is not obligatory in Keynesian models. Muinhos and Alves (2003), for example, work with the hypothesis of constant coefficients because they adopt a small sample (the data used are quarterly between 1996:1 and 2002:2, i.e., 22 observations) and, therefore, with few structural breaks – so they can be treated with the use of conventional dummy variables of level and impulse. The text also stands out in the literature for estimating "conventional Keynesian" functions with data from the national accounts and without using inflation as an explanatory variable (given that the entire sample is from after the Real Plan). In fact, Muinhos and Alves estimate both the total taxes (T^T) and the direct taxes (T^d)[11] as a function of the GDP, of a autoregressive term and of dummies – both the seasonal β_j on account of the quarterly data, and pulse/level, that is:

$$T^i_t = á_0 + á_1 T^i_{T-1} + Ó_{(i=1..3)} â_j Y_{t-j} + á_2 D_{99} + á_3 D_{97:4} + å_t \text{ [with i = T (total)}$$
and d(direct)][12]

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11. Unfortunately, Muinhos and Alves do not make the source of the variables they use clear. As we saw above, the only "tax" variable directly available in the quarterly national accounts is the value of the "taxes on products". Thus, one may speculate that Muinhos and Alves calculated the "total taxes" applying the annual tax burden of the national accounts to the quarterly GIP data (such as Cavalcanti *et al.* 2002, a text quoted by Muinhos and Alves). In this case, one could calculate the "direct taxes" by subtracting the taxes on products from the total taxes. However, it should be noted that the concept of "tax burden" of the national accounts includes the contributions, so that very likely the "direct taxes" of Muinhos and Alves include the revenue from contributions (including welfare) and taxes on income and assets.

12. That is, Muinhos and Alves identify a structural break in 1999 and an "outlier" in the fourth quarter of 1997.

Summary of the texts of Portugal and Portugal (2001) and Hernández (1998)

Portugal and Portugal (2001). 1980:1-1997:3 Quarterly data	Hernández (1998). 1951-1995 Annual data
Variables studied	
Total current revenues	Total net current revenues $(1) = (2) + (3) + (4) + (5) + (6)$
Income Tax (IR)	IR (2)
Tax on Industrialized Products (IPI)	IPI (3)
Tax on Circulation of Goods and Services (ICMS)	ICMS (4)
-	"Other taxes" (5)
-	"Other net current revenues"[13](6)
Models used	
$ln(T/P)=i_t+\ddot{a}_t+\acute{a}_t lny_t+(\acute{,}ln(P/P_{t-1})+\ddot{a}_3 ln(P)+\ddot{a}_t$ in which μ is the stochastic trend, γ is the seasonality and T is the relevant revenue. That is, the model above differs from Hernández's model on the side because it *i)* assumes that $\acute{a}_t$ is variable; *ii)* includes the level of prices beyond inflation as an explanatory variable; and *iii)* has to address seasonal issues (since it is quarterly). The trend and the seasonality have the following functional specifications: $i_t = i_{t-1} + \hat{a}_{t-1} + i_t$ $\hat{a}_t = \hat{a}_{t-1} + \ddot{a}_t$ e $\tilde{a}_t = - O^{(j=1...4)}\tilde{a}_{t-j} + \dot{u}_t$ in which i_t, $\ddot{a}_t$ and $\dot{v}_t$ are all white noises.	$Z_t = F(Y_t, II_t) = A_t Y_t^{3t} II_t^{4t}$ or, applying logs of the two sides: $ln(Z_t)=ln(A_t)+\alpha' ln(y_t)+\beta' ln(II_t)$ which would be a basic log-linear model (in which Z_t is the relevant tax measured in real terms) if it were not for the fact that both the term contained above [log(A)] and the inflation coefficient (β) are modelled as variables, along time, i.e., as order (1) autoregressive models with errors that are not self-correlated and that are not correlated with one another. Model MA (6) for the "Other net current revenues"

Prepared by the authors.

Regarding the "atheoretical" models, it should be noted that we designate in this way those models that use strictly statistical approaches – notably the one proposed by Box and Jenkins (1970) – in order to forecast the future path of a certain variable (some type of tax or contribution or aggregation of the two) based on data on its recent past path. Note that the application of these methods dispenses with theoretical considerations on other variables that might affect both the past and future dynamics of the variable that one wishes to forecast. Thus, the "atheoretical" models do not seem relevant in terms of policy implications. Examples of models of this type appear in Melo (2001), Siqueira (2002), Guaranga and Mello (2002).

Starting with Guaranga and Mello's text (2002), we notice that the core of the study is the presentation of a method to estimate ICMS revenue for the state of Rio Grande do Sul. In the second part of the work, however, the authors

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13. That is, the "Other gross current revenues" minus the "Other transfer expenditures".

also present forecasts for eleven other states of the federation and for Brazil as a whole. What makes the text peculiar is the fact that it adopts statistical procedures (descriptive, that is, without any stochastic component) that are dominated by the proposals of Box and Jenkins (SIQUEIRA, 2002). In this sense, Melo's text (2001) is more "modern", so to speak. Indeed, in the first two parts of the text, Melo presents a competent and useful summary of the basic techniques associated with the use of Box and Jenkins's approach (1970) and of the "method of the indicators" historically used by the Federal Revenue Secretariat to forecast the total revenue from a series of taxes and contributions. In the third part, Melo criticizes the "method of the indicators", for being a particular case of a non-estimated one order autoregressive model [or AR(1)], discusses several measures of "accuracy" in forecasts and shows that the use of Box and Jenkins's approach, separately or combined with other statistical methods, leads to much better results than the "method of the indicators" in the case of a particular tax, the Income Tax.

Siqueira's text (2002) is perhaps the most important of this literature. The author initiates the text by noting that Box and Jenkins's approach (1970) not only evolves from a long succession of simpler deterministic and/or stochastic forecast methods, but can be significantly improved with the introduction of the technique of "calendar variations". In the second part of the text, Siqueira (2002) uses Box and Jenkins's approach with and without calendar variations, depending on the case, with a view to presenting forecasts for a long list of taxes, contributions and their respective disaggregations "under the control of the Federal Revenue Secretariat", in addition to the ICMS. As one would expect, the results obtained by Siqueira proved to be superior than those of Guaranga and Melo, in the case of the ICMS, and of Melo, in the case of the Income Tax.

Albeit useful as forecast instruments, atheoretical models are not very promising to explain, in economic terms, the behaviour of the different revenue items. On the other hand, neither are conventional Keynesian models such as the ones discussed above – with their two or three basic explanatory variables – completely satisfactory as explanations of public sector revenues (even though they are useful in the identification of structural breaks) and, consequently, to measure policy implications. A third family of models that help "assemble the puzzle", so to speak, is composed of "intertemporal" models.

By "intertemporal" models we mean models that seek to explain the dynamics of the flows of current expenditures and revenues of the government on the basis of considerations on the dynamic implications of these flows – notably on the indebtedness or accumulation of net assets by the public sector – in longer time frames. Issler and Lima's text (2000) presents a good

example of this type of model. The starting point of the text is the so-called condition of sustainability of the public debt, understood as the condition that the public debt today is equal to the present value of the sum of future primary surpluses. This condition of sustainability, in turn, is understood as a condition of long-term balance (or, in the statistical version of the expression, as a "co-integration equation"), that is, as a condition that "joins" along the time the series of current revenues and expenditures. This fact makes any shocks in any of these variables, say, in government expenditures, for example, lead to other shocks in the future, whether in government revenue or expenditure, in order to correct the initial shock (or "error"), thus ensuring the intertemporal balance of public accounts. This story, with some variations, is told in the first part of the work. Moreover, the authors notice that: i the seigniorage revenue is usually not computed in accounting definitions of public sector current revenues; and $ii)$ the nominal interests of the public accounts have to undergo some ad-hoc adjustments in order to become the "real interests" of the theory.

The results of Issler and Lima (with data on the national accounts, annually from 1947 to 1992) indicate that there was, in fact, co-integration between the revenues and the current expenditures of the government in the period in question, a resulted corroborated by the "debt sustainability" literature.

What makes the work more interesting than other texts of this literature is the fact that it estimates the error correction model associated with the co-integration equation obtained. This procedure allows the authors to conclude that:

> (...) [the] results for budgetary balance depend on the generating source of the deficit (surplus). When the imbalance of the public accounts is generated by changes in the taxes, what is adjusted is always the present value of the taxes (...). When the imbalance factor is public expenditure, the adjustment is made by increasing the present value of the taxes and decreasing the present value of expenditures by 60% and 40%, respectively. (...) A possible interpretation for the reversion of 40% of the initial expenses is that the Treasury is unable to get the Central Bank to accomodates 100% of the increases of expenditures, being that 40% of the increases, on average, are not accomodated. This set of evidences places Brazilian public finances in the spend-and-tax model, and rejects the tax-and-spend model. Finally, it should be noted that, in Brazil, seigniorage was very important in the attainment of intertemporal budgetary balance, since, if we exclude seigniorage revenues from the total government revenue, the public debt will no longer be sustainable in econometric tests (ISSLER LIMA: 2000, p. 3-4).

In an analysis also based on the government's intertemporal budgetary restriction, Mello (2005) estimated a fiscal reaction function using monthly data from the 1995-2004 period. The results indicated a significant reaction of the primary surplus to indebtedness, especially as of 1999. Moreover, in relation

to the central government's revenues and expenditures, Mello used a similar procedure to the one used by Issler and Lima (2000) to infer the tax policy model. The evidences were in favour of the spend-and-tax model with two thirds of the changes in the expenditures being covered by an increase of revenues in the long run.

3 SOME NEW RESULTS

Although still in a preliminary stage, our effort to model current revenues under the control of the Federal Revenue Secretariat seems to corroborate the conventional econometric wisdom on their behaviour. As suggested by the examples below, our results indicate that *i)* the precise composition of federal current revenues presents varied structural breaks and its study is, in fact, crucial to understand the aggregated dynamics; despite this, *ii)* atheoretical models are useful in efforts towards short-term forecasting of these revenues; and *iii)* the behaviour of the real GDP, in fact, seems to explain to a large extent the behaviour of those revenues (when, for example, they are deflated by the Expanded Consumer Price Index – IPCA).

3.1 Structural breaks and the composition of current revenues under the control of the Federal Revenue Secretariat

Graphs 1 to 8, showing a disaggregation of federal current revenues (such as measured by the Central Bank, in billions of R$, with monthly data after the Real Plan – July/1994 to December/2005), give an idea of the extension of the structural shocks and breaks that affect the aggregated series.

GRAPHS 1 TO 8

— CIDE

------ Cofins

— CPMF

— CSLL

— Import taxes

— IOF

—— IR and IPI

—— Other taxes and contributions
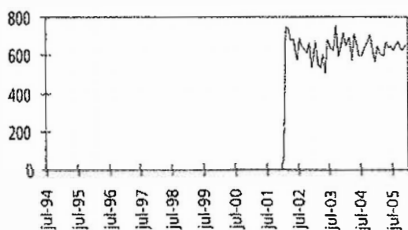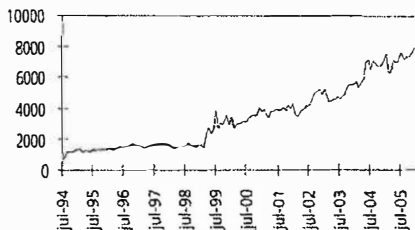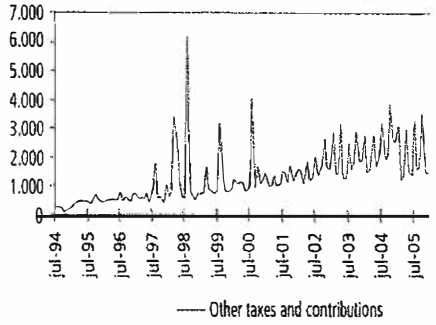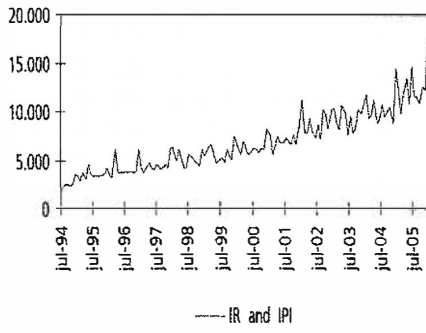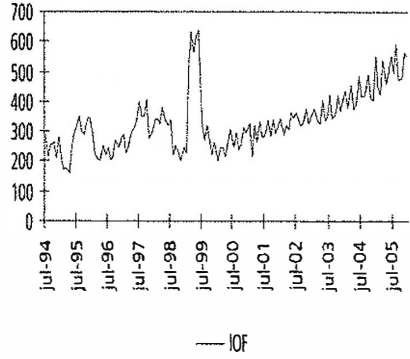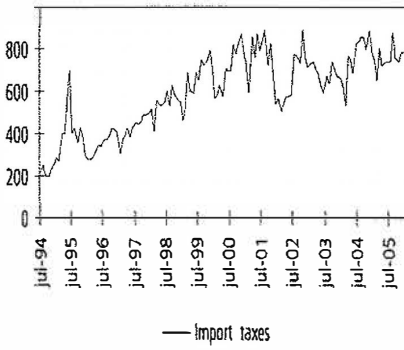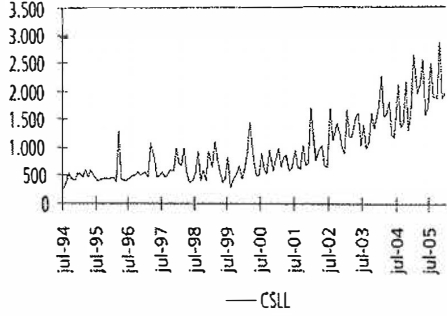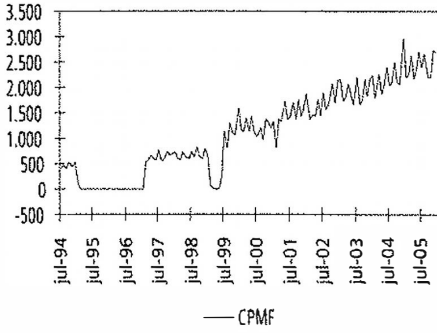
Source: Brazilian Central Bank.
Prepared by Ipea/Dirur/CFP.

Taken together, the graphs above tell us a simple story. About two thirds
of the federal revenues collected were obtained through the Income Tax, the
IPI (about 42%) and Cofins (about 24%). Moreover, the years that mark
the beginning of government (1999 and 2003) show clear (positive) inflections
in the inclination of the series. Finally, discrepant observations (or "outliers" in

the econometric jargon) were endemic in the period. Not only were contributions created (the Contribution for Intervention in the Economic Domain (CIDE), in January 2002), cancelled (such as the CPMF in January 1995 and February 1999) and recreated (as the CPMF itself in February 1997 and June 1999), but in a given month – August 1998, for example – there were extraordinary revenues of the order of 60% of the normal revenues.[14]

3.2 A simple exercise of forecast of current revenues under the control of the Federal Revenue Secretariat measured as percentage of the GDP

Graph 9 describes quarterly data of the total of federal revenues collected (as measured by the Central Bank) as percentage of the GDP in the period beginning with the Real Plan. In exercises involving the construction of scenarios, one often wishes to formulate hypotheses on the future behaviour of this variable. Table 2 presents the results of the estimate of an atheoretical model that has been useful in forecast exercises of this type.

GRAPH 9
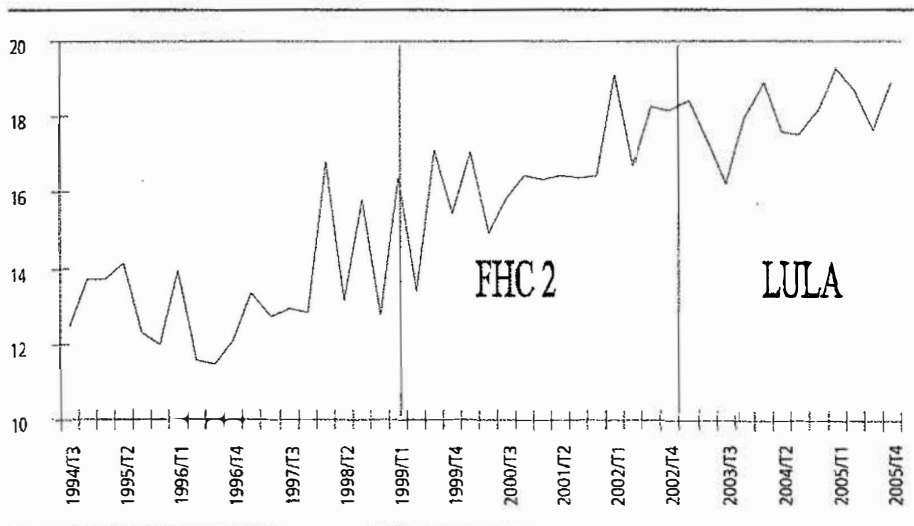
Prepared by the authors.

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14. In this case, "revenues of concession of telecommunication services".

TABLE 1
Results of the estimate of an atheoretical model for the total of federal revenues collected

Dependant variable measured as percentage of GDP. Sample adjusted for 1996:3-2005:4 period (38 observations) [15] AR = autoregressive and MA = moving averages.				
Variable	Coefficient	Standard deviation	Statistic-t	Prob.
C	20,336	1,0445	1,946	0,0000
D_{3uin}	-1,445	0,233	-6,194	0,0000
$D_{1999:3}$	1,923	0,714	2,701	0,0111
$D_{1998:1}$	1,265	0,733	1,726	0,0943
AR(4)	-0,268	0,162	-1,654	0,1082
AR(2)	1,201	0,172	6,996	0,0000
MA(2)	-0,995	0,0000186	-53418,90	0,0000

Prepared by the authors.

Even though it lacks economic content, the estimated model is well adjusted to the data, stable (when re-estimated for smaller samples, for example) and useful in forecast exercises. Indeed, the performance of the model is significantly higher than that achieved through "pocket rules" (generally adaptive) usually used in models based on the "method of the indicators". This point is obvious in table 3, which shows the forecast errors that would have been made by the model if it had been estimated in the last four quarters (with different results, on account of different samples, on each one of the occasions). The dynamic forecasts of the model proved to be much more efficient than those obtained, for example, with the (adaptive) hypothesis that the amount of federal revenues collected as percentage of GDP in a given quarter would be equal to that of the previous quarter. Of course, this result is even clearer in the case of static forecasts.

TABLE 2
Forecast errors for 2005: model A – theoretical *versus* adaptive expectations
(As % of GDP)

	2005:1	2005: 2	2005: 3	2005: 4
2004:4 (mod)	-.163	-.092	.298	-.13
2004:4 (adap)	-.4	-1.1	-.14	-.737
2004:1 (mod)	-	.12	.69	.13
2004:1 (adap)	-	1.1	.14	.737
2004:2 (mod)	-	-	.63	.177
2004:2 (adap)	-	-	.14	.737
2004:3 (mod)	-	-	-	.066
2004:3 (adap)	-	-	-	.737

Prepared by the authors.

15. The adjusted R2 of this equation is 0,91. The errors are stationary, normal and homoscedastic. Some evidence – not definitive – of self-correlation was found.

3.3 GDP as determining factor in the dynamics of current revenues under the control of the Federal Revenue Secretariat

As mentioned previously, atheoretical models have the disadvantage of not helping in the task of explaining "why things happen". Historical analyses on the basis of disaggregated data, such as Giambiagi's (2006), seem much better for this end, besides having the advantage of being fully compatible with the econometric method (or providing hypotheses to be tested by econometricians or being based on these tests).

In particular, the main underlying hypothesis to these studies – namely, the Keynesian hypothesis that the dynamics of current revenues is to a large extent determined by GDP dynamics, albeit with precise specifications that are variable and dependant on the historical context – seems perfectly compatible with the data. The results of the estimate of a conventional Keynesian model for the total of federal revenues collected, with which we have been working and that seem to corroborate this view, are presented in graph 10.

GRAPH 10
Degree of adjustment of the Keynesian model
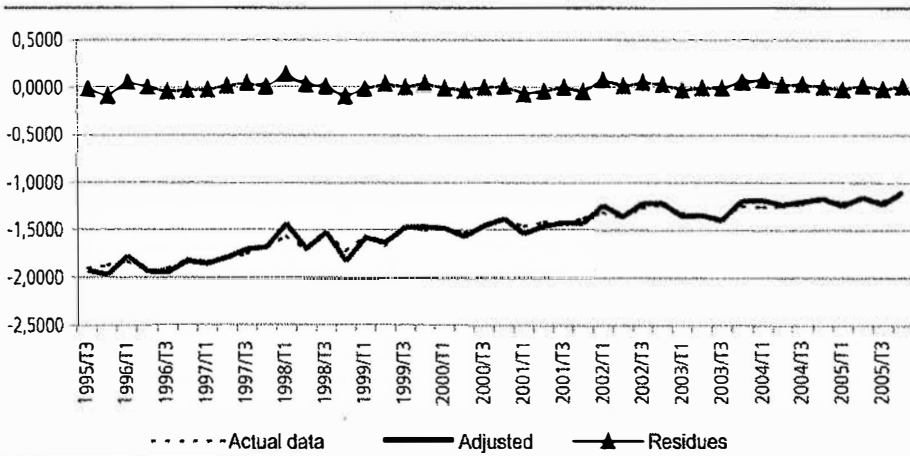
Prepared by the authors.

Besides corroborating the intuitions that federal current revenues "follow" the GDP and that there was a qualitative change in Fernando Henrique Cardoso's second administration, the model ("autoregressive of distributed imbalances") above – obtained with the use of the "general to specific" methodology (Hendry, 1995) – is reasonably well adjusted to the data (see

graph 10) and stable (when re-estimated for smaller samples, for example). The fact that some evidence of heteroscedasticity was found makes it impossible for us to eliminate the hypothesis of parametric variability - a topic currently under study in the CFP/Dirur/Ipea.

4 FINAL NOTES

The present text had two objectives. Initially, it described the main types of models and databases used by Brazilian economists concerned with studying the dynamic behaviour of public revenues in Brazil. Secondly, new empirical evidences were presented that corroborate some of the main qualitative conclusions of the literature.

Even though our results reflect a preliminary stage of the modelling effort currently undertaken by CFP-Dirur-Ipea, they seem compatible with conventional wisdom that no model is capable of explaining and forecasting the behaviour of public revenues in a modern economy. The informed and careful use of the various types of models outlined above seem to us the best way to move forward, given the current state of the arts.

FISCAL PROGRESSIVITY IN BRAZIL

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Brazil is an extremely unequal country. Income distribution in the country is one of the most concentrated in the world. One of the alternatives to try to correct the enormous injustice of income distribution in Brazil would be a tax policy with a distributive bias, that would penalise the very rich and helped the poor (even, in some cases, with negative taxes). In other words, the huge income inequality in Brazil could be minimized by means of a highly progressive tax structure. The question that should be asked is, therefore, how progressive is the current Brazilian tax structure? Is there a number that can measure this degree of progressivity, and compare it with that of other countries?

TABLE 1
Effective tax burden on salary income
(In %)

N. of minimum wages	Consumption	Income*	Total
Up to 2	13.13	7.82	20.95
2 ——| 3	12.80	7.82	20.62
3 ——| 5	12.38	7.82	20.20
5 ——| 6	12.15	9.00	21.15
6 ——| 8	12.03	11.00	23.03
8 ——| 10	11.17	11.10	22.27
10 ——| 15	10.69	11.73	22.42
15 ——| 20	9.91	12.55	22.46
20 ——| 30	9.13	15.86	24.99
More than 30	6.94	20.46	27.41

Source: Brazilian Federal Revenue.
Note: * Income Tax + employee's social contribution.

There are methodologies to arrive at this number. However, it has never been calculated for Brazil. It is only known that in Brazil the tax structure is not very progressive. The reason for this informal wisdom is that the Brazilian tax structure focuses heavily on consumption taxes. Consumption taxes are notable regressive, since the propensity to consume decreases with the income.

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That is, the poor end up paying more taxes because they spend all their income. The rich pay proportionally less because they save a large share of their income. In Brazil, approximately half of the total of taxes collected in all government spheres comes from goods and services. For the purpose of comparison, this proportion is of 17.6% in the United States, 20.1% in Japan, 25.4% in France, 29.2% in Germany, 30.3% in Australia and 32.7% in the United Kingdom.[1] The average for the thirty OECD member countries is 31.9%. Table 1 shows the regressive effect of consumption taxation in Brazil. Clearly, the regressivity of the consumption taxation has the effect of reducing the progressivity of the taxation on income. In Brazil, this regressive effect of taxation on consumption is particularly significant due to the strong concentration of tax collection on consumption taxes.

It should be noted that the great dependence on consumption taxes as compared to income tax is not peculiar to Brazil, but can be observed in several developing countries. This can be observed in table 2 (Tanzi; Zee, 2000), which compares the relation between collection derived from income taxes and from consumption taxes among groups of developed and developing countries in the 1985-1987 and 1995-1997 periods. This relation did not change in the period, showing that in the developed countries of the OECD this relation is 2.4 times higher than in developing countries.

TABLE 2
Collection of income taxes/consumption taxes

	1985-1987	1995-1997
OECD countries[1]	1.2	1.2
America	1.8	2.2
Pacific	2.3	1.9
Europe	1.1	1.1
Developing countries[2]	0.5	0.5
Africa	0.5	0.6
Asia	0.6	0.6
Middle East	0.5	0.5
Western Hemisphere	0.4	0.4

Source: Tanze and Zee (2000).
Notes: [1] Excludes Czech Republic, Hungary, Korea, Mexico and Poland.
[2] Sample includes African 8 countries, 9 Asian countries, 7 Middle East countries and 14 Western-Hemisphere countries
Obs.: Primary data: Revenue Statistics (OECD) and Government Finance Statistics (IMF).

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1. Source: OECD Revenue Statistics. Taxes on goods and services as a percentile of the total collected in the country. Data for 2002.

The reasons for this high dependence on consumption taxation vis-à-vis income taxes derives from the following two-fold factors that are common to the non-developed economies:

1) Economic structure of these countries, resulting in low participation of salaries in the national income and in a high degree of informality in economic activities and occupation of man power.

2) Policy restrictions resulting from the high degree of income inequality of these countries, mainly in cases, such as Brazil, where the Gini coefficient exceeds 0.50. These restrictions are of two types.

    a) in order to reach a high tax revenue, the richest should be taxed at a much higher proportion than the poor;

    b) the economic and political power of the richest prevents tax reforms with a greater degree of progressivity, particularly in personal Income Tax and property tax.

How then can one calculate a number for the degree of tax progressivity in Brazil? What methodology should be used to infer this level of progressivity? When we know the distribution of income and the tax burden, it is enough to calculate a Gini coefficient, with a Lorenz curve on a graph where the accumulated percentage of the income is drawn according to the accumulated percentage of the tax burden. The resulting curve forms an area with the shape of a half-moon, with the straight 45-egree line (picture 1). The bigger this area, the more progressive the tax structure. A Lorenz curve coinciding with the straight 45-degree line, for example, would represent a neutral tax structure (that is, the 10% poorest pay exactly 10% of the burden, the 20% poorest pay 20%, and so).

Percent accumulation of
the tributa ry burden

45°

100

Percent accumulation of
the income
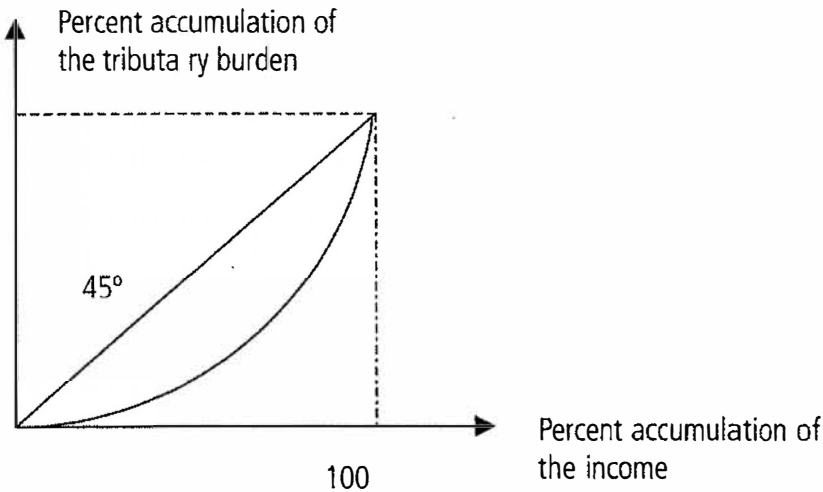
The problem of this methodology is that it requires knowledge of the tax burden distribution by income bracket. This data is difficult to obtain and subject to errors. Here we will use an alternative approach, developed by the Public Finances Coordination (Ipea's Directorate of Regional and Urban Policy). Our attempt to measure the degree of fiscal progressivity in Brazil is based on fluctuations of two aggregated variables: tax revenue and income.

The intuition is quite simple. Imagine, for instance, an economy with a progressive tax burden. The total revenue collected could be represented by $T = t(Y)$. Y, where T is the tax collection, t is the tax rate and Y is the income level. If the tax is progressive, then t increases with the increase in Y. If the tax is neutral, then t is constant in Y and therefore variations in T only reflect variations in Y. If the tax is regressive, t decreases with the increase in Y and therefore an increase in Y enerates a less than proportional increase in T.

Then, in a situation of economic growth, income grows fast, and everyone gets richer. If the tax is progressive, collection increases more than proportionally to income. In the real world, where there are discontinuities in $t(Y)$ function, the economic growth would have the effect of pushing larger shares of the income into heavier tax brackets. In any case, T increases more than proportionally to Y when taxation is progressive. The more progressive the tax structure, the greater the increase in T proportionally to the increase in Y. Analogously, progressivity makes T drop more to in relation to Y in the event

of a recession. Therefore, the relative volatility of tax collection and income contains a relevant piece of information on the degree of tax progressivity – regressivity of the system. The more volatile the collection proportionally to the volatility of the income, the greater the degree of progressivity.

The method consists of calculating the proportional standard deviation of the aggregated tax collection and income. The progressivity index is the ratio of the standard deviation of the collection to the standard deviation of the income.[2] The database used is the *International Financial Statistics,* of the International Monetary Fund. For the collection series we take the revenues of central governments, excluding transfers, as well as revenues of local governments. For the income series, we take the Gross Domestic Product. Both series were deflated by the implicit deflator of the GDP. The data have annual frequency and the values considered are for the period from 1965 to today, depending on the availability of data for each country.

TABLE 3
Tax progressivity index based on relative volatilities

Country	Index
France	5.324
South Korea	4.452
Italy	4.297
Denmark	3.497
Germany	3.429
Japan	2.881
Canada	2.606
United States	2.567
Australia	2.451
New Zealand	2.178
Spain	2.163
Brazil	1.842
Belgium	1.833
United Kingdom	1.715

Source: IMF, International Financial Statistics.

The results are presented in Table 3. The progressivity index of the federal taxes is calculated for Brazil, as well as thirteen other economies. In all of them the index suggests progressive taxation structures. That is, in no country the index was below one, which would indicate volatility of lesser collection

2. The proportional standard deviations were calculated on the basis of data filtered with the Hodrick-Prescott filter, which eliminates very low frequencies, which can be treated as trends, from the total fluctuations.

lower than the volatility of the aggregated income. Among these fifteen economies, Brazil is the third country with the lowest degree of progressivity. These results suggest that the progressivity of the federal taxes is not used in Brazil as a mechanism to address the huge social and economic inequalities. This lack of stronger progressivity could be a reflection of the Brazilian tax collection structure, overburdened by indirect regressive taxes.

With more than half of the fiscal collection in Brazil coming from consumption taxation, and only 16% from income taxation, an increase of the progressivity of the Income Tax (for example, introduction of a rate of 35) would not be a very efficient instrument to increase of the progressivity of the total collection. Perhaps a better strategy would be a gradual change of the tax structure, in which collection would depend less and less on indirect taxes and increasingly on direct taxes.

The method of relative volatility is no doubt less complete than the traditional method of the Lorenz curves and Gini coefficients. Looking only at the aggregated data, one cannot, for example, compute the effects of income distribution changes over the collection. A precise panorama of the degree of tax progressivity can only be obtained with the traditional method. However, the computational ease and the ease of comparing different economies make the volatility index an extremely useful instrument, particularly for economies that do not have microdata available to build the traditional index. The progressivity index based on relative volatilities requires only aggregated income and taxation series, which are usually widely available, even for developing economies.

Moreover, it is also important to observe the differences of composition of Income Tax collection between developed and non-developed countries. In developed countries, the personal Income Tax is about 3.5 the 4 times higher than the corporate Income Tax. In developing countries, more revenue is collected with the corporate Income Tax. Again the factors that explain this difference are related to the economic structure of these countries and to policy restrictions, such as the differences in the participation of salaries in the national income, sophistication of the tax administration and political power of richest. The fact that developing countries explore personal income proportionally as a collecting source generates other distortions in the tax structure, such as the need to collect taxes on foreign trade transactions. From 1985 to 1987, foreign trade taxes of a group of developing countries reached 4.2% of GDP, compared to 0.7% of

GDP for OECD countries. From 1995 to 1997, there was a drop in the collection of these taxes to 3.5% of GDP and 0.3% of GDP, respectively. However, for the developing countries this collection exceeds the total collected with the personal Income Tax in the two periods, as shown in tables 4 and 5.

Therefore, taking into account the international experience, one can observe a positive correlation between the income level of the countries and their tax structure. Thus, countries with higher income levels tend to concentrate their tax collection on direct taxes, such as Income Tax. In turn, countries with low and average income levels tend to have tax structures more concentrated on indirect taxes, particularly on consumption taxes. However, the progressivity gains obtained with this change of composition in taxation should be carefully evaluated. An optimum mix of taxation should also take into consideration the incentives for labour supply and capital accumulation. In this case, compensatory measures by means of public expenditures focused on the poor also represent effective fiscal instruments to increase fiscal progressivity in Brazil.

TABLE 4
Composition of the tax revenue per group of countries (1985-1987)
(As ratio of GDP)

	Income Tax			Consumption Tax				Social Security
	Total	Companies	Personal	Total	General	Excise[5]	Foreign Trade	
OECD countries[1]	**13.9**	**2.8**	**11.3**	**11.3**	**6,0**	**3.8**	**0.7**	**8.8**
America	14.0	2.5	11.4	7.6	3.4	2.2	0.6	5.8
Pacific	17.1	3.9	13.2	7.5	2.3	3.7	0.8	2.8
Europe	13.3	2.7	11.0	12.4	6.8	4.0	0.7	10.1
Developing countries[2]	**4.9**	**2.8**	**1.7**	**10.3**	**2.3**	**2.6**	**4.2**	**1.2**
Africa	6.3	2.9	3.1	11.7	3.2	2.3	5.7	0.4
Asia	5.7	3.5	2.1	9.5	1.9	2.5	3.6	0.1
Middle East	4.7	4.3	1,0	9.1	1.5	2.4	4.4	1.2
Western Hemisphere	3.7	1.8	1.0	10.6	2.6	3.0	3.7	2.4

Source: Tanzi and Zee (2000).
Primary data: Revenue Statistics (OECD) and Government Finance Statistics (IMF).
Notes: [1] Excludes Czech Republic, Hungary, Korea, Mexico and Poland.
[2] Sample includes African 8 countries, 9 Asian countries, 7 Middle East countries and 14 Western-Hemisphere countries.

TABLE 5

Composition of the tax revenue per group of countries – 1995-97

(As proportion of the GDP)

	Income Tax			Consumption Tax				Social Security
	Total	Companies	Personal	Total	General	Excises	Foreign Trade	
OECD countries[1]	**14.2**	**3.1**	**10.8**	**11.4**	**6.6**	**3.6**	**0.3**	**9.5**
America	15.4	3.0	12.3	7.0	3.7	2.0	0.3	6.1
Pacific	16.3	4.3	11.4	8.4	4.3	2.6	0.6	3.5
Europe	13.7	2.9	10.6	12.4	7.3	4.0	0.3	10.8
Developing countries[2]	**5.2**	**2.6**	**2.2**	**10.5**	**3.6**	**2.4**	**3.5**	**1.3**
Africa	6.9	2.4	3.9	11.6	3.8	2.3	5.1	0.5
Asia	6.2	3.0	3.0	9.7	3.1	2.2	2.7	0.3
Middle East	5.0	3.2	1.3	10.3	1.5	3.0	4.3	1.1
Western Hemisphere	3.7	2.3	1.0	10.6	4.8	2.3	2.6	2.5

Source: Tanzi and Zee (2000).

Primary data: Revenue Statistics (OECD) and Government Finance Statistics (IMF).

Notes: [1] Excludes Czech Republic, Hungary, Korea, Mexico and Poland.

[2] Sample includes African 8 countries, 9 Asian countries, 7 Middle East countries and 14 Western-Hemisphere countries.

3rd PART

EVALUATING THE EFFICIENCY OF THE PUBLIC EXPENDITURE

EVALUATING THE EFFICIENCY OF THE PUBLIC EXPENDITURE

Rogério Boueri*

Brazil has been going through a strict fiscal regime in these last years. The generation of successive fiscal surpluses is aimed at reducing the debt-GDP ratio, which would create conditions for sustained reduction of the domestic interest rates and resumption of economic growth.

The problem with this strategy is that it is reaching the limit of its effectiveness. This occurs, on the one hand, because the policy of obtaining fiscal surpluses has been strongly based on the increase of the tax burden, which in the view of many analysts has already reached its top limit. On the other hand, the meeting of social demands has been achieved through considerable increases in government transfers.

A third obstacle for the continued use of the surplus generation policy is the increasingly less sustainable compression of the government's investment expenditures. In order to resume sound growth, Brazil needs high investment in infrastructure and much of it will have to be made by the federal government, since most of the economic infrastructure of the country depends on public investment. The need for this type of investment made the government launch a coordinated action, the Growth Acceleration Plan (CAP) in order to reverse this obstacle to growth.

One of the means for the government to maintain fiscal surpluses and still play an effective role in the promotion of economic development is the improvement of the quality of public spending. This alternative would allow the social demands for public services to be met, at least partially, at decreasing costs, that is, without added tax burden. Thus, it would be possible to reconcile the pressure for more services with the restriction imposed by the limit to taxation.

However, the path towards an overall improvement in the efficiency of public expenditure in Brazil is long. The first step is to try to assess and measure the magnitude of the waste of public resources. Without the notion of how much more is spent than necessary, it is hardly possible to establish reasonable goals for the reduction of such waste.

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The third part of this volume addresses the theme of assessment and measurement of the inefficiency of government action at its various levels. The purpose is to indicate paths for more efficient government action, in its various modalities, assisting in the identification of waste-generating points in the government's actions, in the measuring of the magnitude of this waste and in the formulation of public policies capable of containing such waste. This third part contains five articles that address this theme.

The first, written by Antonio Afonso, begins with an overview of methodologies currently used in economic literature with a view to measuring the level of efficiency of the public sector, developing the criterion of *relative State efficiency*. From then on, it draws international comparisons of the performance of the governments of various countries. Such comparisons are based on the goals to be reached and the means available to reach them.

In the second article, Marcos Mendes, in a more specific text on the Brazilian case, attempts to explain some of the causes of the inefficiency of public spending in our country, and suggests public policies that would attenuate the problem. With this aim, the author focused on the analysis of the institutional and political factors, as well as historical traits of Brazilian society, such as high degree of inequality, which play a role in the low efficiency of public expenditure. This approach highlights that, as necessary as the identification of the problem of inefficiency of public spending per se, is the political engineering for the design of reforms to minimize or suppress this problem.

After that, in the third article, Rogério Boueri evaluates the sum of resources that could be saved if the Brazilian municipalities spent budgetary resources for health, education and urban infrastructure more efficiently. Efficiency is defined as the action of the best-performing municipalities. The inefficiency's geographic distribution and distribution by population bracket is also analyzed, as well as the existence of scale gains in the municipal public production. The importance of this analysis lies in the fact that municipal expenditures have grown along the last years, reaching approximately 66 billion dollars in 2005 (or 15% of the total public expenditure). In addition, there is a perception, not proven empirically, that in the municipalities the waste of resources would be proportionally more serious than in the other federative spheres.

The fourth article, authored by Márcio Bruno Ribeiro and Waldery Rodrigues Júnior, compares the efficiency of public expenditure among Latin American governments. The main motivation for this study comes from the fact that some of the largest countries of the region (such as Argentina, Brazil, Chile, Colombia and Mexico) adopted, along the eighties and nineties, structural reforms

that encompassed both the public sector and other sectors and institutions, aimed at achieving fiscal balance and improving economic activity. Such reforms were market-oriented and, after some years, it is claimed that continuous economic growth and increased social equity have not been reached in most of the countries in the region. Thus, a quantitative/comparative survey can help in a more precise assessment of the differences with regard to efficiency of public expenditure among Latin American countries. Particularly, in the comparison with those countries that led the adoption of reforms in the region and where the reforms went deeper, as seems to be the case of Chile and Mexico.

Finally, the fifth article, "International Comparative for Social Security", written by Marcelo Abi-Ramia and Rogério Boueri, compares social security expenditures in various countries, considering the social, demographic and economic conditions of each one of them. Thus, the article attempts to evaluate such expenditure in relation to the structural possibilities of each country.

With this set of articles, this volume seeks to collaborate towards the improvement of the quality of public spending, a factor that is considered a necessary condition for economic development, as well as a crucial factor in overcoming social inequalities in Brazil.

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THE EFFICIENCY OF THE STATE

Antônio Afonso*

As referred to by Feldstein (2002), one of the main changes in the public finance literature of the last three decades is the inclusion of public expenditures alongside the study of taxes as a major research topic. On the other hand, the simple use of measures for the size of the State, such as the weight of public expenditures in the GDP, does not render much information on the quality of the results that those expenditures provide. The relevant issue is not so much the size of the expenditure, but the results obtained from this expenditure.

Public expenditure is considered in generic terms an important factor for the promotion of economic growth and social well being. For example, a low level of public expenditure means that less public revenues will be needed, which also means less taxes and a bigger contribution to stimulate growth and employment.

For example, Lucas (1988) argues that public investment in education increases the level of human capital and that this may be seen as the main source of long-term economic growth. In turn, Barro (1990) defends the importance of public expenditures in infrastructure for economic growth, while Romer (1990) draws attention to the relevance of expenditures in research and development. That is, the composition of the public expenditure is also a relevant aspect; thus it is important that the economic decision-makers earmark public resources to the most productive expenditures.

On the other hand, public expenditure is equally a key variable in the sustainability of public finances. In this sense, strict control and reductions in public expenditures, when possible, are important to establish the appropriate balance between smaller public debt, less taxes and the financing of public investment in key areas of the economy. Thus, and in generic terms, it would be pertinent to redirect public expenditure to increase physical and human capital accumulation, while still supporting research, development and innovation.

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This paper is organized as follows: in section two, the most usual methodology for the analysis of the efficiency of State public expenditure is referred to. Section three presents some of the existing evidence on international comparisons of overall State performance and efficiency, both for OECD countries and emerging economies. In section four, the same review is done on efficiency in the education and health sectors of OECD countries. Section five concludes the paper.

1 HOW TO EVALUATE EFFICIENCY OF PUBLIC EXPENDITURE

In order to evaluate the efficiency of public expenditure, most studies turn to the so-called non-parametric methods, where a group of inputs (not only physical, but also monetary) and of outputs are used to build a frontier of production possibilities. This type of analysis allows one to determine, for example, the level of performance that a certain amount of public expenditure should reach in a given country, by comparison with other countries. Put differently, what would be the possible reduction in terms of costs, without reducing the level of performance, if these resources were used in the most efficient way.

This strategy of relative efficiency analysis, which draws on the evaluation of efficiency of entrepreneurial units, can be applied to various entities and/or sub-sectors of public administration. For example, a relative efficiency analysis of secondary education can be done with several countries, or the relative efficiency of a group of secondary schools in a certain country can be evaluated.

Some of the methods used most often in efficiency analysis in the public sector have been the *Free Disposable Hull* (FDH) and the *Data Envelopment Analysis* (DEA).[1] The terminology "envelopment" results from the fact that the efficient frontier takes the form of an "envelope" that embraces all the observations, as seen in the examples of pictures 2 and 4. Therefore, non-parametric methods are used that do not require the use of econometric estimates of coefficients and are based on the resolution of math programming problems.

On the other hand, after determining the degree of efficiency/inefficiency, the literature also seeks to explain the reasons for the inefficiency by resorting to a two-step analysis. In the second moment of the analysis, conducted through the use of Tobit models or bootstrap techniques, non-discretionary or

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1. Possible references on these methodologies, are for example, Thanassoulis (2001) and Coelli, Rao and Battese (2002).

exogenous variables are usually used to explain in part the degree of inefficiency detected in the first step.[2]

Besides the non-parametric methods, other approaches are equally possible, namely the parametric, deterministic or stochastic methods. Normally, and in the absence of market prices for the outputs of the public goods or services, what is calculated in practice is the so-called efficiency technique. A summary of some of these methodologies is presented in picture 1.

PICTURE 1
Analysis of efficiency: methodologies
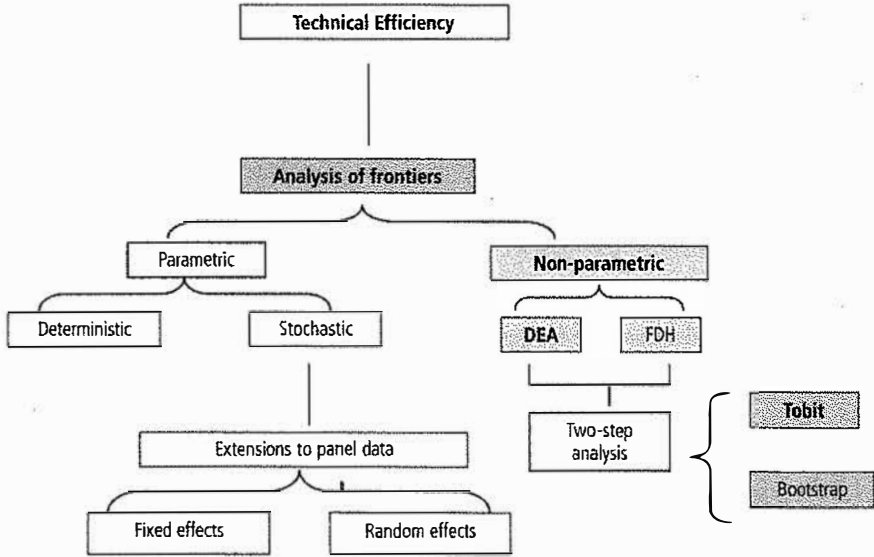
Prepared by the author.

Technical efficiency is one of the two components of economic efficiency, also denominated X-efficiency. The second component is allocation efficiency and both are combined as follows: *economic efficiency* = *technical efficiency* × *allocation efficiency*. The unit of decision (country, agency, school, sector, company, etc.) is technically efficient if it is capable of obtaining maximum output based on a certain group of inputs (output orientation) or if it is capable of minimizing the inputs used in the production of the same level of output (input orientation). On the other hand, allocation efficiency reflects the capacity of the decision unit to use the various inputs in optimal proportions.

2. The reader interested in these methods may consult, for example, Simar and Wilson (2007) for further technical details.

The following example illustrates in a simple manner the construction and use of a frontier of production possibilities, or efficient frontier, using the FDH non-parametric method. Supposing that the followings values for a performance indicator in the public sector, output, as well as the respective levels of public expenditure, input, are observed in three countries:

TABLE 1
Performance and public expenditures in countries A, B and C

Country	performance Index	Public expenditure (thousand euros)
A	65	800
B	75	1.000
C	70	1.300

Prepared by the author.

Public expenditure is smaller in the country A, but the level of performance is also the lowest. Country C has the highest value of expenditure, but country B is the one that obtains the most value in terms of performance. The example referred to allows one to build the frontier of production possibilities (or efficient frontier) represented in picture 2.

PICTURE 2
Frontier of Production Possibilities (FPP)
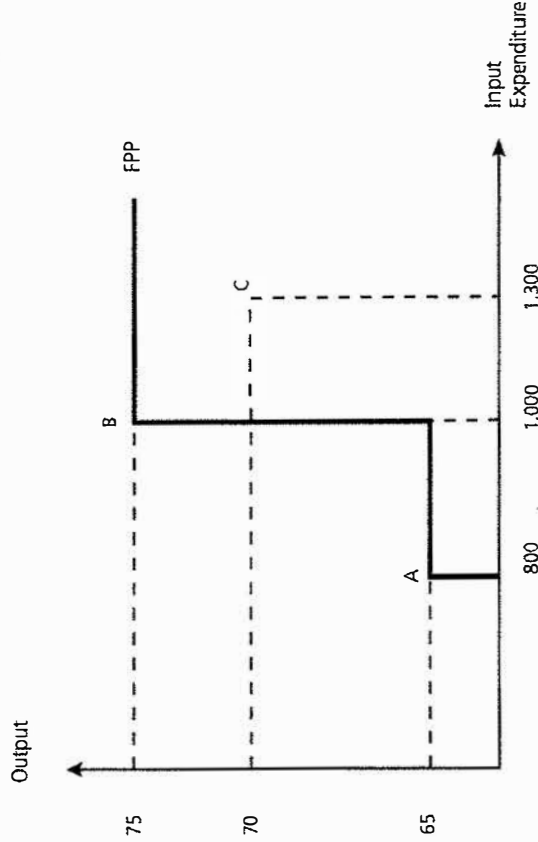
Prepared by the author.
Obs.: Input – expenditure in thousand euros;
Output – performance index.

Country C may be considered inefficient given that its performance is lower than that of country B, which obtains better performance with a lower level of expenditure. On the other hand, neither country A nor country B can be considered inefficient according to the above criterion. Countries A and B are supposedly located on the frontier of production possibilities.

The inefficiency of country C can be measured in two alternative forms:

a) Through the vertical distance between point C and the efficient frontier, the difference between the level of output that would be obtained in case all the expenditure was done in an efficient way and the level effective of output are evaluated. In the current example, the loss in terms of efficiency is of five units, i.e., in efficiency conditions country C should obtain, at least, the same level of performance as country B. That is, the loss in terms of efficiency in country C is of around 6.7% (=5/75). Here, efficiency is evaluated in terms of output.

b) Through the horizontal distance between point C and the efficient frontier. In this case, the difference between the level of input that should be necessary and that effectively used is evaluated, being the loss in terms of expenditure of 300 thousand euros. That is, the loss in terms of efficiency in country C is of around 23.1% (=300/1.300) of the expenditure done. To reach the level of performance of 70, it should not be necessary to spend more than 1000 thousand euros, as may be seen in the case of country B. In this case, efficiency is evaluated in terms of input.

It should be noted that instead of using the FDH method, such as in Picture 2, which does not impose restriction on convexity, if the DEA method is used, the efficient frontier would link in a straight line points A and B, which implies that the degree of inefficiency in country C would be even larger in terms of input. Indeed, the DEA method is more demanding than the FDH method – the country that is efficient in a FDH analysis isn't always efficient in a DEA analysis, but the country that is efficient in a DEA analysis will also be efficient in the FDH approach. In more generic terms, the coefficients of efficiency of input and of output in the FDH will be smaller than or equal to the coefficients in the DEA.

2 RELATIVE EFFICIENCY OF THE STATE

Usually the empirical studies on efficiency consider financial measures as the most relevant variables. Actually, one may assume that the public expenditure in percentage of the GDP may reflect the costs of opportunity to reach a certain

level of performance in the public sector. Therefore, it is possible to observe that in the OECD the ratio of public expenditure to GDP has dropped moderately since the 1993 peak, remaining at a little over 40 percent in 2002. However, the public expenditure ratio varies considerably among OECD member countries. For example, the average public expenditure in 1990 ranged from around 35 percent of GDP in the to 64 percent in Sweden. These differences are essentially related to the larger or smaller extension of the State social security programs in each country, being that significant differences are also found in terms of public expenditure in education and health in several countries.[3]

As seen before, it is important·to know to what extent public expenditures are done in an efficient manner. Therefore, one needs to try to measure appropriately the efficiency of the State, particularly with respect to the rendering of public goods and services. It is a difficult issue to address, since studies on performance and efficiency in the public sector are not common, in particular when one intends to do international comparisons.[4]

Even though admitting the possibility that in some cases the costs of rendering public goods and services may grow more than in the private sector, the increase of public expenditure must be seen as a cause for concern in several countries. In this context, the existence of performance indicators in the public sector that allow the establishment international comparisons is very useful. These indicators may be used to determine the relative efficiency of each country or sector of activity in the State.

In order to obtain a composite indicator to evaluate the performance of public administrations, Afonso, Schuknecht and Tanzi (2005) used several performance sub-indicators of the public sector that take into consideration, for example, the performance of the areas of administration, education, health and public infrastructure. The use of a larger group of indicators also allows the use of information on the functions of the State enunciated by Musgrave: macroeconomic stabilization, redistribution of returns and efficient resource allocation. Therefore, it is possible to obtain performance indicators compiled

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3. See, for example, EC (2002) and OECD (2003).

4. Some recent examples of evaluation of the efficiency in public expenditures may be referred to: Clements (2002), eduction in Europea; Gupta and Verhoeven (2001), education and health in Africa; Afonso, Schuknecht and Tanzi (2005, 2006), performanece and efficiency of the public expenditure in OECD and the new Member States of the EU; Afonso and St. Aubyn (2005, 2006), health and education in OECD; Afonso and Santos (2005), University tuition in Portugal; Afonso and Scaglioni (2005), regions in Italy; Afonso and Fernandes (2006), expenditures of the municipalities of the Lisbon region; Boueri and Gaparini (2006), expenditures of the municipalities in Brazil; Afonso and St. Aubyn (2006a, b), respectivelly for educaçtion and health in OECD controlling the existence of exogenous factors.

from the several indexes. For example, in the construction of the performance index of the public sector in the administrative area, Afonso, Schuknecht and Tanzi (2005) ascribe the weight of 25% to each sub-indicator related with bureaucracy, efficiency in the judicial system, corruption and size of the underground economy.

PICTURE 3
Performance and efficiency (2000)
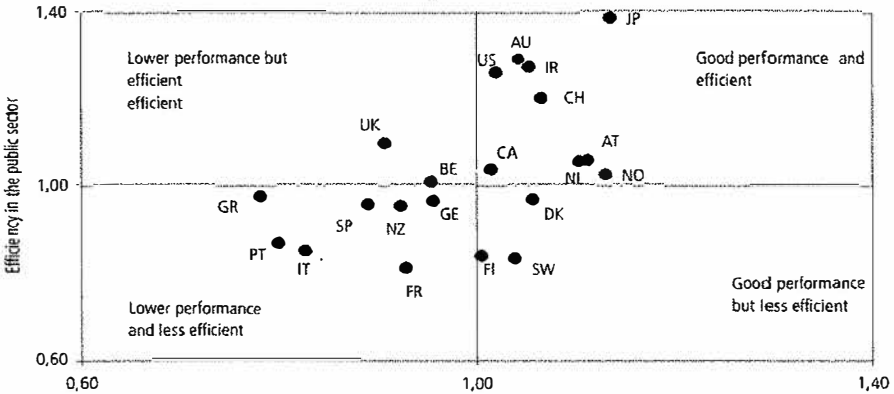
Picture 3 shows the ranking of the OECD countries in terms of performance-efficiency in the State in 2000.[5] It is interesting to observe the existence of countries with a good level of performance (in the two quadrants on the right side), not only with low level of efficiency (Finland, Sweden and Denmark), but also with high level of efficiency (Austria, Japan, Ireland and USA). Overall, it is possible to conclude that similar levels of outputs in the public sector, and above average, can be reached with different levels of resources allocated to public expenditure. In practice, such economic policy decisions should be seen as specific for each country.

Based on a similar methodology, Afonso, Schuknecht and Tanzi (2006) evaluate equally the efficiency of the State expenditure for a group of emerging economies and for the new European Union Member States. The efficient frontier resulting from the use of the input (public expenditure) and the output (composite performance indicator) is presented in picture 4.

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5. More detailed data are presented in the Appendix.

Frontier of production possibilities (2001-03)
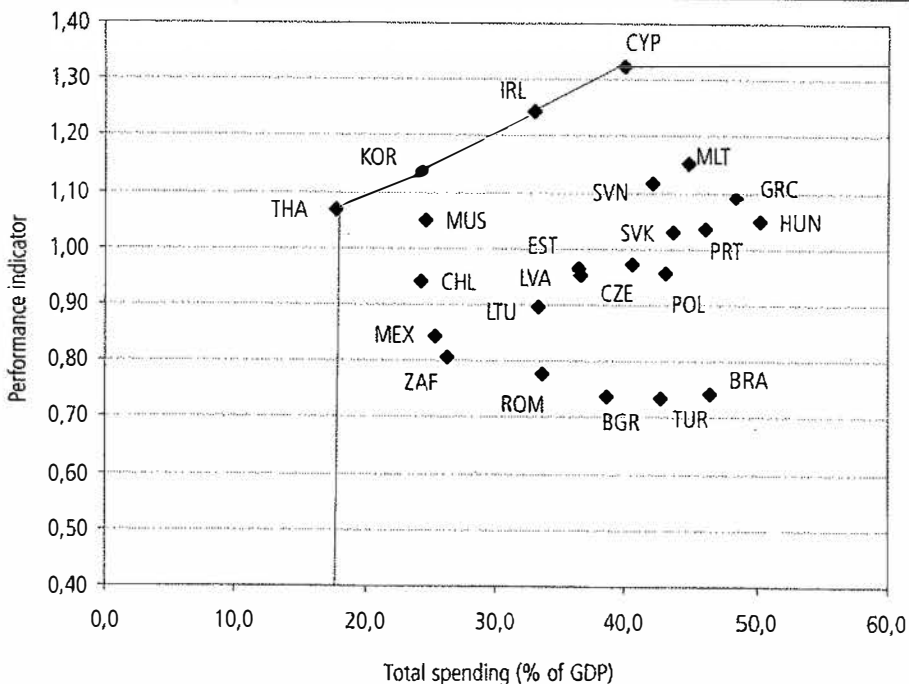
Source: Afonso, Schuknecht and Tanzi (2006).
BGR – Bulgaria; BRA – Brazil; CHL – Chile; CYP – Cyprus; CZE – Czech Republic; EST – Estonia; GRC – Greece; HUN – Hungry; IRL – Ireland; KOR – Korea; LTU – Lithuania; LVA – Latonia; MEX – Mexico; MLT – Malta; MUS – Mauritius; POL – Poland PRT – Portugal; ROM – Romania; SVK - Slovakia; SVN – Slovenia; THA – Thailand; TUR – Turkey; ZAF – South Africa.

In the case of the new member states of the European Union, a different behavior is observed, with some of these countries being quite distant from the efficient frontier. Four countries, some of which obtained in the sample the highest performance composite index, are located either on the efficient frontier or very near it: Thailand, Korea, Ireland and Cyprus. Brazil, Bulgaria, Turkey and Romania are the farthest from the frontier, indicating that there is some room for improvement of the efficient rendering of public goods and services in these cases.[6]

3 EFFICIENCY IN EDUCATION AND IN HEALTH

The expenditures done in the sectors of education and health are the expenditure programs that in principle contribute most to improve the redistribution of resources, and that seek to address the issue of rendering goods and services

6. See Appendix.

to correct some of the weaknesses of the market mechanisms. On the other hand, the expenditure in education, whether public or private, is normally considered one of the sources of long-term economic growth.

For example, Afonso and St. Aubyn (2005) evaluate the efficiency of education in secondary education of the OECD countries in 2003 using quantitative and financial measures (public expenditure in education at the secondary education level) as inputs. As performance indicator in the secondary education an index calculated by the OECD (the PISA indicator) is used, being the input indicators the followings: number of hours a year spent in the school by the students and number of teachers per students. The results of the analysis of efficiency in education in secondary education are partially reproduced in table 2.[7]

In the first sentence it seems that expenditures with education are included. In the second, it seems that the inputs are only for number of hours a year spent at school by the students and number of teachers per students and that the output is the PISA indicator.

TABLE 2
Efficiency in education, secondary education (2003)

Country	Efficiency of the inputs	Ranking	Most efficient country
Germany	0.961	5	Korea
Australia	0.850	12	Korea
Belgium	0.689	17	Sweden
Korea	1	1	
Denmark	0.912	9	Sweden
Spain	0.876	11	Sweden
Finland	1	1	
France	0.832	13	Korea
Greece	0.758	15	Sweden
Hungry	0.801	14	Sweden
Italy	0.730	16	Sweden
Japan	1	1	
New Zealand	0.914	8	Korea
Portugal	0.879	10	Sweden
United Kingdom	0.922	7	Korea
Republic Czech	0.931	6	Sweden
Sweden	1	1	
Average	0.886		

Source: Afonso and St. Aubyn (2005).
FDH analysis: inputs (hours a year in school, teachers by 100 students), output (PISA indicator of the OECD for the performance of the students in secondary education), assuming a variable scale of returns.

7. According to the authors, the expenditures with education at the secondary education level are essentially public, mainly in Europe (in 2000, 92.4% of the total expenditures in education of the European Union was public). The public expenditures in health are usually more than half the total expenditure, being on average around 72.2% of the total in the OECD in 2000.

In table 2, the countries with the efficiency index of one (the maximum value) are positioned on the frontier of production possibilities. This is to say that for the sample of countries analyzed, no other country can obtain a higher performance using the same or a lower level of resources. In other words, the efficiency index of the inputs of the country indicates in this case the least inputs the country could use to obtain the same level of output. For example, on average, the sample of OECD countries would reach the same level of output in terms of secondary education with a 11.4% reduction of resources (1-0,886).[8]

According to the results presented by the authors, for example, Hungry is less efficient than Sweden, since the former presents a smaller number of hours spent in school by the students and the highest student-teacher ratio. On the other hand, Sweden has the best performance in terms of output in the PISA indicator of the OECD on the quality of the results in secondary education.[9]

It's not clear to me why in table 2 the reference efficient country is sometimes Sweden, sometimes Korea and why Japan and Finland, which also obtained index 1, are not used as references.

Afonso and St. Aubyn (2006b) also analyze efficiency in the rendering of public health services for the group of OECD countries, using namely quantitative inputs: number of doctors, nurses, hospital beds and medical equipment. As performance measures for each country, infant mortality, life expectancy and the number of years of life not lost are used. Table 3 presents a partial summary of some of the results obtained.

For this sample of OECD countries, and according to the results presented in table 3, efficiency gains would be possible on average, since the countries can obtain the same level of performance in terms of results in the health sector with 28.9% less resources (1-0,711).

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8. These calculations may be seen as an approximation of the potential direct cost due to inefficiency in the rendering of public services. However, the indirect costs, which imply a greater loss in terms of consumer well being, should also be taken into account. Afonso and Gaspar (2006) analyze this issue.

9. It should be noted that these results are somewhat different, as the authors refer to, when a monetary measure of public expenditure is used directly as input, such as, for example, public expenditure by student in secondary education. Indeed, the fact that salaries are naturally higher in the more developed countries has to be taken into consideration.

TABLE 3
Efficiency in health (2003)

Country	Efficiency of the inputs	Ranking	Most efficient Country
Germany	0.780	14	Sweden, Japan
Australia	0.908	10	Canada, Sweden, Korea, Finland
Austria	0.767	15	Sweden, Japan
Canada	1	1	
Korea	1	1	
Denmark	0.731	16	Korea, Japan, Sweden, Finland
Slovakia	0.375	20	Korea, Sweden, Japan
Spain	1	1	
USA	1	1	
Finland	1	1	
France	0.904	11	Sweden, Spain
Hungry	0.228	21	Korea, Sweden, Japan
Italy	0.875	12	Sweden, Japan
Japan	1	1	
Luxemburg	0.729	17	Korea, Sweden, Japan
Poland	0.533	19	Spain, Korea
Portugal	0.923	9	Spain, Korea
United Kingdom	0.935	8	Canada, Sweden, Korea, Finland
Czeck Republic	0.628	18	Sweden, Japan
Sweden	1	1	
Switzerland	0.858	13	Sweden, Japan
Average	0.711		

Source: Afonso and St. Aubyn (2006b). DEA analysis: inputs (doctors, nurses, hospital beds, medical equipment); outputs (infant mortality, life expectancy and the number of years of life not lost), assuming variable returns of scale.

Seven countries are located on the efficient frontier: Canada, Korea, Spain, USA, Finland, Japan and Sweden. Canada, Finland, Japan, Spain and Sweden are on the efficient frontier for having good performance in terms of the composite output indicator, with above-average results. On the other hand, the Korea and the USA are normally below the average in terms of resources used. The other group of countries is located on the opposite side – Hungry, Slovakia and Poland. The DEA approach indicates that the output of these countries would increase significantly if they were located on the efficient frontier.

4 CONCLUSION

Adequate evaluation of efficiency in the public sector and of the services rendered by the State is not always a simple theme to deal with empirically. On the other hand, there are few empiric studies that enable international comparisons in aggregate terms. Yet, most of the studies seam to conclude that the level of public expenditure may be reduced and more efficient. Additionally, it is always

necessary to consider the options of economic policy available to policy makers, which is difficult to include in any quantitative analysis.

Taking into account the existing results in the literature, countries with smaller public sectors seam to have a degree of efficiency above average. Nevertheless, the interpretation of the results has to take into consideration that correct measurement may have an important role when making comparisons between countries. Another aspect that requires some care in this type of comparison is, for example, the fact that countries differ in terms of the weight of public and private expenditure in relation to the total expenditure. For example, in sectors such as education and health, a possible source of inefficiencies may result from the interaction between those two types of financing of expenditure.

Be as it may, and even though the evaluation of quality and efficiency of public expenditure is extremely important, some care is needed in reading the results of the empirical studies. Indeed, more important than identifying the relative differences in the efficiency of specific sectors between countries, the major challenge is to reduce such differences. This issue is particularly relevant for countries with high public deficits, since their budget re-equilibrium necessarily requires public expenditure contention.

In this sense, decision makers may evaluate what is done differently in other countries, with a higher degree of efficiency, and see at which point modifications of economic policy are possible and/or desirable internally, to improve the efficiency of the respective public expenditure, whether totally or in sector terms. That is, the evaluation of the quality of every euro spent by the State is clearly becoming a more pertinent and current issue.

APPENDIX

TABLE A1
Efficiency index in the public sector (2000)

Country	Efficiency of the inputs	Ranking	Efficiency of the outputs	Ranking
Germany	0.72	16	0.79	17
Australia	0.99	4	0.92	7
Austria	0.67	17	0.92	8
Belgium	0.66	19	0.79	18
Canada	0.75	12	0.84	13
Denmark	0.62	21	0.87	11
Spain	0.8	10	0.78	19
USA	1	1	1	1
Finland	0.61	22	0.83	14
France	0.64	20	0.77	20
Greece	0.73	14	0.65	23
Holland	0.72	15	0.91	9
Ireland	0.96	5	0.93	6
Iceland	0.87	7	0.9	10
Italy	0.66	18	0.68	22
Japan	1	1	1	1
Luxemburg	1	1	1	1
Norway	0.73	13	0.93	5
New Zealand	0.83	9	0.81	15
Portugal	0.79	11	0.7	21
United Kingdom	0.84	8	0.8	16
Sweden	0.57	23	0.86	12
Switzerland	0.95	6	0.94	4
Average	0.79		0.85	

Source: Afonso, Schuknecht and Tanzi (2005). FDH, Assuming variable returns of scale.

TABLE A2
Efficiency index in the public sector (2001-03)

Country	Efficiency of the inputs	Ranking	Efficiency of the outputs	Ranking
South Africa	0.68	8	0.69	19
Brazil	0.38	22	0.56	22
Bulgaria	0.46	15	0.56	21
Chile	0.73	5	0.82	8
Cyprus	1	1	1	1
Korea	0.98	4	0.99	4
Slovakia	0.41	20	0.78	12
Slovenia	0.53	12	0.84	7
Estonia	0.49	13	0.75	13
Greece	0.41	19	0.82	9
Hungry	0.36	23	0.79	10
Ireland	1	1	1	1
Latvia	0.49	14	0.74	14
Lithuania	0.54	10	0.72	18
Malta	0.56	9	0.87	6
Mauritius	0.72	6	0.91	5
Mexico	0.70	7	0.73	16
Poland	0.41	18	0.72	17
Portugal	0.39	21	0.78	11
Republic Czech	0.44	16	0.74	15
Romania	0.53	11	0.62	20
Thailand	1	1	1	1
Turkey	0.42	17	0.56	23
Average	0.59		0.78	

Source: Afonso, Schuknecht and Tanzi (2006). DEA, Assuming variable returns of scale.

INEFFICIENCY OF PUBLIC EXPENDITURE IN BRAZIL*

Marcos Mendes**

The aim of this article is to show that the pattern of public expenditure generation in Brazil is far from efficient. Some of the causes of this problem are indicated. In the first place, the 1988 Constitution, which represented an option for state intervention in the economy, assistentialism and protection of specific interests. Secondly, the dispersion and weak coordination of political power in the democratic system instituted in 1984, which weakened fiscal control. Thirdly, the weakness of the institutions and organizations responsible for control, coordination and planning of public programs, as well as for the enforcement of budgetary restriction.

Here, a government is considered efficient if it manages to fulfil the main functions that belong to it in a capitalist economy within a democratic political regime and, at the same time, is capable of minimizing the problems and distortions that result from its actions.

The literature[1] indicates that the main function of the public sector is to compensate for so-called "market failures", that is, to provide goods and services that the private market is unable to provide in a satisfactory manner, which I will call, throughout the article, "the six functions of an efficient government":

1) guaranteed right to property and other individual rights and freedoms: judicial, police and prison systems;

2) macroeconomic stability: control of inflation, economic growth, easing of economic cycles, equilibrium in the balance of payments;

3) reduction of inequality and poverty: access to minimum conditions of basic sanitation, health, education, housing, social assistance, etc;

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1. See Arvate and Biderman (2006).

4) supply or subsidy to production of public goods and goods that generate positive externalities: technological innovation, universal access to education, environmental protection and recovery, national security, roads, etc;

5) regulation of natural monopolies and free market defence;

6) solution of imperfect information problems: availability of information on credit risk, education financing, regulation of health plans and insurances.

A necessary condition for the efficiency of a government is, therefore, to fulfil these six functions in a satisfactory way. However, it should be noted that when taking on the function of correcting the "market failures", the public sector incurs in "government failures". Firstly, the public sector has less incentive than the private sector to minimize costs and pursue increased quality. Secondly, the politicians and bureaucrats who operate the state apparatus can use their power in rent seeking for themselves or on behalf of certain social groups. This increases the costs and reduces the quality of the public services.

Thirdly, the political process of collective decision-making on the actions of the State can result in high public expenses, demanding high public taxation and indebtedness, leading to the crowding out of private investment and undermining the balance of prices and economic growth. Fourth, the public actions depend on laws that determine their execution. Given that the approval of laws is a slow process, the public sector tends to be less agile than the private sector in making course corrections and adjusting targets, and is also subject to the continuation of privileges provided for in law

An efficient state, which maximizes results in the overcoming of market failures and minimizes the adverse impacts of its intervention, is a necessary condition for a country to develop, not only achieving an increase of its per capita income but also offering equal opportunities for all its citizens, by means of competition by merit, to compete for the allocation of public and private resources to innovative projects that have a high social return. On the other hand, an inefficient state is that with artificial creation of income (market reserves, perpetuation of monopolies, compulsory allocations of public resources, use of State apparatus in favour of the bureaucracy), with no concern with the effective reduction of income inequality and equal opportunities, or with the final quality of the public service rendered.[2]

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2. North, Wallis and Weingast (2006) offer a detailed analysis on how societies based on equal opportunities and access manage to consolidate economic development, while those based on income creation through the State tend to fall back.

The argument here is that in the Brazilian State model, created with the re-democratisation process of 1984 and the 1988 Constitution, the quality of the services is low and the costs generated by the "government failures" are significant. Therefore, it is necessary to raise the efficiency of public spending as an instrument of economic and social development.

1 RE-DEMOCRATISATION AND THE NEW CONSTITUTION

Some circumstances of the historical moment when the re-democratisation took place were determining for the model of State created in the 1988 Constitution. It was enacted on the 5th of November 1988, one year before the fall of the Berlin Wall, a historical episode that marked the end of the socialist utopia and that was followed, almost throughout the planet, by the age of privatisation, trade liberalization and concentration of state activity in the "six functions of an efficient government" described above, with emphasis on pro-market reforms, strengthening of property rights and increased access to education.

If the new Constitution had been written in the early nineties, possibly its text would have been less influenced by the ideal of a large, assistentialist and nationalistic State. Such principles, in general, make room for organized segments to introduce in the legislation restrictions to competition, reserves of public resource allocations and obligatory expenses that generate or perpetuate privileges. The result is high expenditure and low efficiency.

Added to this, there is the historical accident of the death of Tancredo Neves before taking office as the first civilian President. The emerging, recently-installed democracy did not have solid institutions and depended on the strength and political capacity of the President to form majority coalitions and to implement a government program.[3]

Throughout the campaign for direct elections, Tancredo managed to establish a support network to rule the Country. However, his vice-president, José Sarney, took office in March 1985 without enjoying the same prestige. His political weakness prevented the Executive from influencing decisively the drafting of the Constitution. The Constitution began to be designed on the basis of a collage of interests of the various lobby groups represented in the parliament, without any concern for costs and means of funding of public expenditures that the new Constitution rendered obligatory.

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3. On the political model instituted with the re-democratisation, see Cintra (2004).

The aim of earmarking funds for each interest group became more important than the organization of an efficient service-rendering State. The Executive, which should have ensured a balance, demanding that expenditures resulting from constitutional determination should fit within the budgetary restriction, did not have the political strength to do so.[4]

That is, the "social contract" established in the new Constitution, which rules the action of the State, was old from the day it was born, and was drafted at a time of weak coordination and dispersion of political power. Once this inadequate contract is established, it is difficult to change it, both because institutions are not easily changed, and because the winners of the competition for allocation of resources form coalitions to veto constitutional reforms.

But the organization of the Brazilian State in the last years cannot be attributed only to historical accidents. Behind the dispersion of political power, and a Constitution concerned with establishing privileges, there seems to be an important trait of Brazilian history: the huge social inequality, which generates dispersion of interests. As suggested by Rajan and Zingales (2006), the coexistence of a small educated middle class with a great mass of uneducated poor, in a closed and very regulated economy, constitutes a scenario of little changes and rent seeking through the State ("rent-oriented society"). The opposition to market liberalizing reforms was conducted not only by segments of the industry. The poor would not be interested in such reforms either, not having enough human capital to make the most of the new opportunities that were emerging in a free-competition economy, preferring to guarantee incomes through state assistance programs. The middle class, more educated, would have been the main beneficiary of economic liberalization, but opposed the expansion of education (of interest to the poor), because this would allow the poor to compete in equal conditions.

The result was the blocking of reforms aimed at an efficient state that would generate an increased level of income for all. Simultaneously, there was pressure for poverty reduction measures through public spending, which coexisted with the political capacity of middle and high income segments to maintain the public programs that favour them. In this model of "public spending for all", expenditure took a path of accelerated growth: the non-financial current expenditure of the Union, for example, rose from 18% to 22.4% of the GDP between 1995 and 2005. This corresponds to a real growth of per capita expenditure of 4.5% a year.[5]

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4. As to influencing the decisions of the Constitutional Assembly, the fact that Sarney concentrated efforts on approving a transitory provision of the Constitution that ensured an extra year in office is emblematic.

5. Source: National Treasure Secretariat and IBGE.

Attention should be drawn to five characteristics of the State model defined by the 1988 Constitution that lead to the growth and low efficiency of public expenditure:

1) rigidity of spending through the determination of obligatory expenditures in the text of the Constitution and of the complementary law;

2) electoral bias of the social programs with no concern with cost-benefit evaluation and without eliminating privileges;

3) fiscal decentralization model that stimulates inefficiency;

4) distortion in the principle of the autonomy of the three powers;

5) weakness of the organizations and institutions responsible for enforcing budgetary restriction and control, coordination and planning of public administration

Each one of these points is analysed below.

2 RIGIDITY OF SPENDING[6]

The various segments interested in absorbing federal resources sought, during the drafting of the Constitution and the complementary legislation, to ensure captive sources of resources in their favour. The best way to do this was to establish, in the Constitution or the legislation, a certain amount or obligatory minimum spending parameters in the area that was to be privileged.

The great winners of the dispute for resources during the drafting of the Constitution were the states and municipalities. Emerging from a dictatorship, when revenue was strongly concentrated in the Union, the cause of decentralization of resources was identified and confused with the cause of re-democratisation. Thus, the percentages of federal taxes transferred to the sub-national governments were very high.[7]

Also included in the Constitution, with a wealth of detail, were benevolent criteria for the concession of retirements and pensions, as well as full indexation of the benefits to the minimum wage. With this, any rearrangement of the social security model would have to face the high quorum and the two turns of voting required for constitutional reforms. Two social security reforms have

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6. See Velloso (2006).
7. There is a synthesis of this process in Mendes (2005).

entered the Congress big and come out small, without managing to reduce the huge and increasing weight of social security in the total expenditure.

Equal treatment was given to the labour benefits, such as wage allowance and unemployment insurance; explicitly defined in the Constitution as nonnegotiable rights in the private scope and that have a significant impact on public spending because they are funded by obligatory contributions imposed on employers and workers (besides demanding a heavy labour justice structure that consumes more than R$ 6 billion a year).

After that, the approval of the Organic Law of Social Assistance[8] and of the Statute of the Elderly[9] introduced and/or expanded social benefits to the elderly and the physically disabled. The health sector got its "permanent share" by inscribing in the Constitution the obligatory rise of expenditures in that area at the same pace of the nominal variation of the GDP.[10]

The incapacity to establish a personnel policy based on objective criteria for the basic public administration careers, adequate remuneration structure, criteria for reallocation and dismissal of staff, etc. resulted in an ad-hoc policy of contracting and remuneration, executed on the basis of political pressure from the careers, unions and agencies. It no exaggeration to say that the personnel policy meets, first, the needs of the corporations and only secondarily the public interest. A legislation based on the tenure of civil servants and with little incentive to productivity completes the picture of rigid and unproductive personnel expenditure.[11]

Adding to this list other obligatory expenditures (investments and activities initiated in previous years), the result is that more than 90% of the federal budget expenditures are pre-defined.[12] It is important to note that these expenditures are not only rigid. A significant share of them is also "superindexed". That is, most of them are readjusted at a higher rate than inflation (in the case of health, by the variation of the GDP; in the case of social security, social and labour benefits, by the variation of the minimum wage).

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8. Law n. 8.742, of 1993.
9. Law n. 10.741, of 2003.
10. Constitutional Amendment n. 29, of 2000.
11. See Guerzoni (2006).
12. See Lima and Miranda (2006).

Thus, the trend is that, every year, they will represent a bigger percentage of the total expenditure. To have an idea of this growth, in 1987, according to Velloso (2006), the obligatory expenditure represented only 47% of the total expenditure.

The rigidity of the expenditure has several negative effects on the efficiency of public spending. In the first place, those who rely on previously defined appropriations do not need to make an effort or demonstrate efficiency in the administration of the resources as a means to apply for more. Secondly, the priorities of a country are not unchanging; so establishing in law rigid and invariable shares of resources for each area prevents the distribution of resources according to changing priorities. Third, because the obligatory expenditures established in law may contain a bias contrary to equity or the development needs of the Country (a typical example is the bias against children, commented further ahead). Fourth, because the accelerated growth rate of this expenditure demands increasing extraction of resources from the private sector in favour of the public sector, transferring resources to a less efficient sector and undermining economic growth.

3 ELECTORAL AND SHORT-TERM BIAS OF THE SOCIAL PROGRAMS AND PERPETUATION OF PRIVILEGES

With the re-democratisation and resulting introduction of direct elections for the offices of President of the Republic and State Governors, the huge constituency of low income voters became crucial in deciding elections. The politicians could please this constituency by offering efficient poverty and inequality reduction programs (for example, education). However, given the difficulty in achieving consensuses in an unequal society, the lack of interest of the richer classes in the education of the poor (commented above), and the high rate of discount that the poor have in relation to the future (since they are worried about immediate survival); have lead to the choice of second best in the search for support from the poorer electorate: the expansion of assistentialist programs (distribution of goods and money) and regulation of prices and incomes (minimum wage, retirements).

This choice has a high cost in terms of efficiency of public spending. In the first place, because the poor, once they have an income artificially guaranteed by the State, regardless of the macroeconomic situation, stop worrying about (and demanding) fiscal sustainability of the public programs: it matters little if the expenditures that benefit them are creating a fiscal imbalance that will reduce the potential growth of the economy; since their income is already (artificially) guaranteed *a priori*.

Secondly, the social expenditures tend to focus on the programs that benefit the people who vote more directly. The big losers, in this case, are the children, who do not have the right to vote. Thus, the search for votes tends to be done through programs that benefit adults (increasing the value of the retirements, adult literacy courses, payment of social benefits to the elderly, real readjustments of the minimum wage). The result is that there is not enough investment in the education of the citizen of the future, creating conditions for people to overcome poverty through education and the protection of children against degrading situations.

The impact of this bias in favour of the elderly in overcoming poverty (one of the "six functions of an efficient government") is small. As demonstrated by Paes and Barros and Carvalho (2006), only 5.9% of poor families and 2.5% of extremely poor families have elderly members. On the other hand, children and adolescents under the age of 15 are present in 79% of poor families and 82% of extremely poor families. Likewise, the insistence on real readjustments of the minimum wage as a social policy instrument does not seem to be an appropriate path. The same authors note that only 14.5% of the poor families have at least one member receiving remuneration close to one minimum wage.

This small capacity to reduce poverty and inequality contrasts with the high fiscal cost of these politics. The real increases of the minimum wage between 1999 and 2006, for example, represented an additional expenditure of R$ 62.6 billion in social security benefits, in comparison with a situation where the readjustments of the minimum wage were equivalent to the variation of the National Consumer Price Index -INPC.[13]

Even the social policies that manage to reach the poorest, which is the case of the *Bolsa Família* Program, have not yet shown signs that they are capable of creating conditions for consistent reduction of poverty. Since the major interest is in winning votes in the next election, there is no effort on the part of the managers to demand the fulfilment of the conditionalities for participation in the Program, in particular, the children's school attendance; or to improve the conditionalities and the monitoring of their fulfilment.

On the other hand, while the social programs expanded, the mechanisms of privileges for the middle and high classes, built along the military government and expanded or consolidated by the 1988 Constitution, were not eliminated.

13. Value in average Reais of 2006, accumulated in the 1999-2006 period. Sources: Ministry of Social Security and IpeaData. Calculated by the author.

The main example is the free-of-charge provision of university courses in public institutions, attended mostly by high-income students. This expenditure is carried out to the loss of basic and secondary public education, attended by the lower-income families. The social security regimes of the public sector and the private sector, in turn, maintain eligibility criteria for retirements and pensions that can be classified among the most benevolent in the world.[14]

Other typical cases of privilege can be mentioned, such as the fact that the wages paid by the public sector are higher than those paid in the private sector.[15] The public funds used for protection of workers (FGTS, FAT, PIS/Pasep), in turn, benefit only the workers employed in the formal sector, excluding the mass of poor people with precarious employment links. Furthermore, the tax resources that compose these funds are used to finance public institutions such as the Brazilian Development Bank (BNDES) and the Federal Savings Bank (Caixa), and a large share is consumed by low administrative efficiency and captured by the corporations.[16]

In short, with the inclusion of the poor voter in the decision–making process on public expense, an expansion of the social programs is to be expected. This, however, could have been partly funded by the reduction of privileges, since this type of benefit does not fit in any one of the "six functions of an efficient government". And the social programs, in turn, could be less biased and more efficient in the reduction of poverty.

4 FISCAL DECENTRALIZATION MODEL[17]

The fiscal decentralization model designed in the 1988 Constitution was based on transfers: the Union and the states collect the main taxes and transfer to the municipalities a significant share of these revenues. As seen above, the states and municipalities constitute one of the successful groups in the rent seeking that took place during the drafting of the Constitution. While in most federations the transfers represent approximately 30% of the local revenue, in Brazil this participation exceeds 60%, and in 73% of the municipalities such participation exceeds 85%.[18]

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14. See Caetano (2006).

15.See Bender and Fernandes (2006) and Moriconi *et al.* (2006).

16. Kohler (2006), for example, shows that the remuneration rules of the Federal Savings Bank for the position of operating agent of the FGTS are extremely eneficial to the Bank, and such remuneration is a relevant part of the results of the institution. Such incomes account for almost half of the institution's expenditures with the payroll.

17. See *Gasto público eficiente, chapter 7,* by Fernando Blanco and Carlos Eduardo Gasparini.

18. Source: National Treasury Secretariat.

Economic literature has already shown that the excessive use of transfers induces growth and deterioration of the quality of the local governments' spending.[19] In fact, as shown by Blanco (2005), in Brazil, the response of municipal public spending to an increase in transfers is 65% greater than that derived from an equivalent increase in the income of the average voter. As regards the quality of the expenditure, Blanco (2005) found that as the importance of transfers in the municipal revenue increases, the overhead (expenditure with the bureaucracy in the central administration, planning and the legislative) increases and the expenditures in infrastructure and social policy drop, possibly indicating a picture of increased capturing of incomes as the importance of the transfers in the local revenue increases.

An additional distortion occurs in the Brazilian case, where the transfers are biased in favour of the small municipalities (less than ten thousand inhabitants), which stimulates the fragmentation of large municipalities into smaller entities, multiplying the administrative apparatuses and reducing operation scales.

The sudden rise of available resources in the hands of municipal administrations with low technical qualification, in communities with weak mechanisms to control public action, left room for a lot of inefficiency, corruption and capturing of public resources. Gasparini and Melo (2004), for example, evaluated the management of the municipalities of the States of Pernambuco and Rio Grande do Sul and showed that in 2000 the municipalities of the two states wasted 24% of the resources used in the State of Pernambuco and 28% in the Rio Grande do Sul.

5 DISTORTION IN THE PRINCIPLES OF AUTONOMY OF POWERS[20]

A striking trait of the 1988 Constitution was the recovery of the autonomy of the legislative and the judiciary, which had been controlled by the Executive during the military government. Thus, the Constitution granted to those powers administrative and financial autonomy[21] that basically consists of freedom to determine their own budget. The constitutional construction that, correctly, was created to hinder any manipulations and pressures on the part of the Executive,

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19. For a synthesis of this literature, see *Gasto público eficiente, chapter,* by Fernando Blanco and Carlos Eduardo Gasparini.

20. See *Gasto público eficiente, chapter* 6, by Marcos Mendes.

21. The Public Prosecutor's Office (agency of the Executive) and the Court of Accounts of the Union (linked to the Legislative) received the same autonomy, to be able to exercise its inspection and oversight actions fully.

ended up generating opportunities for the bureaucracies of the other powers to grow and appropriate even bigger shares of the public budget.

The real expenditure of the Judiciary increased tenfold between 1984 and 2004, going from 0.11% to 0.84% of the GDP. In the same period, the expenditure of the Legislative rose from 0.13% to 0.28% of the GDP and of the Public Prosecutor's Office from 0.03% to 0.09%.[22] The wages paid in these powers far exceed those in the Executive: in 2006 the average monthly expenditure with staff in the Executive was of R$ 3.7 thousand, against more than R$ 10 thousand in the Legislative, Judiciary and the Public Prosecutor's Office.[23]

This type of privilege is repeated at the state and municipal levels. The most recent aggregated data available, referring to 2003, allow one to estimate a total cost of the Judiciary, Legislative, Courts of Accounts and Public Prosecutor's Offices, at the three levels of government, of the order of R$ 41.3 billion.[24] This amount, corrected by the inflation up to 2006, would exceed R$ 50 billion.

6 WEAKNESS OF THE ORGANIZATIONS AND INSTITUTIONS THAT ENFORCE BUDGETARY RESTRICTION AND CARRY OUT CONTROL, COORDINATION AND PLANNING OF THE PUBLIC ADMINISTRATION.

Since the beginning of the re-democratisation there were significant advances in the quality of the organizations and institutions intended to promote fiscal balance. Attention should be drawn to the creation of the National Treasury Secretariat, the Central Bank's moving away from the financing of fiscal expenditures, the programs of extinction/privatisation of public companies and state banks, the program of fiscal adjustment of states and municipalities, the approval of the Law of Fiscal Responsibility (LRF). However, this impulse lost force in the last years, and new stages were not pursued and even experienced setbacks. In this section, I address the following points: the weakening of the LRF, the weaknesses of the federal budget, the lack of effectiveness of the courts of accounts and the biased process of election of politicians.

The LRF is running the risk of becoming dead letter due to a combination of factors such as: its provisions are not fully regulated, intense use of casuistry to dodge the limits of expenditures imposed by the Law and non-enforcement of the envisaged penalties on the offenders (loss of credibility).

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22. Sources: Court of Accounts of the Union and Central Bank. Calculated by the author.

23. Source: Personnel Statistical Bulletin. Ministry of Planning.

24. Sources: Court of Accounts of the Union and National Treasury Secretariat. Calculated by the author.

The main regulation omission in the Law is the non-installation of the Fiscal Management Council (FMC). The FMC would have the main function of verifying the practical problems in the enforcement of the Law and issuing standards and guidelines with a view to tackling them. This would allow the limits of expenditure and indebtedness, provided for in the LRF, to be detailed and complied uniformly by all the federate units. Since the FMC was not installed, each federate units interprets the concepts of personnel expenditure, net debt, etc. in the most convenient way so that, at least on paper, the requirements of the LRF are complied with. There is a huge number of cases of non-inclusion of retirees and pensioners in the personnel expenditure, discounting of credits without liquidity in the calculation of the net debt, among others distortions.

The Congress and the Executive (as well as their state and municipal counterparts) have also already found ways to dodge the determination that a new continuous expenditure (lasting more than two years) cannot be created without a clear indication of its funding source. The cases of impunity of public authorities that disrespect the LRF are increasingly common, but they do not suffer the penalties provided for, taking shielding behind their political influence and the sluggishness of justice. At every end of term of mayors and governors, cases of expenditures contracted without the corresponding cash availability emerge, with no consequences for the offenders.

Just as the LRF, the General Budget of the Union (OGU) has significant flaws both in its role of imposing strict budgetary restriction and in the rationalization of the expenditures. The National Congress, even though constitutionally forbidden to raise the estimate of revenues prepared by the Executive, habitually uses a distorted interpretation of the Constitution to increase the forecast of available resources. This results in increased expenditure to a level incompatible with fiscal balance. The Executive ends up restoring such balance by "contingencing" the expenditures. If, on the one hand, such mechanism prevents the worse evil of successive generation of deficits, on the other it paves the way for corruption and political bargaining in the decision regarding which expenditures will be made and introduces a bias contrary to public investment (easier to cut than-current expenses).

The proceduring of the OGU in the Congress also suffers distortions: the rules for proceduring of budget amendments leaves room for the scattering of the resources into small projects of a parochial and/or suspect interest (as in the case of the so-called mafias of the ambulances and medicines). Neither is there any cost evaluation that indicates that the amount provided for is appropriate for the intended goals of the projects and programs.

As for the Courts of Accounts (TC), it should be mentioned that these organizations are far from playing the important role of promoting quality and effectiveness of public spending. Historically, these entities have focused on verification of the *legality* of the public acts, rather than focusing on verification of the *quality* of the rendered service. Thus, activities such as checking balance sheets and certifying accounts are prioritised over on-the-ground audits of public programs, to verify any failures, wastes and need for course corrections.

Another cause of the inefficacy of the courts of accounts is their supposedly judicial organization, focused on imposing penalties on the managers who fail to comply with the rules. Given the constitutional right to appeal to the judiciary, a large number of managers "convicted" by the TC are later acquitted by the judiciary.

Their organization in the form of a board of justices or councillors, with high turnover in the command offices, prevents the TC from conducting medium-term projects for audit and control of public agencies. Furthermore, in the case of many state and municipal TC, agencies have been captured by bureaucratic and political interests, resulting in an abundance of privileges, high wages, excess staff, nepotism and co-opting of the board by the managers who should be inspected by the TC. Taking into account that the TC are among the main enforcers of the LRF, their inefficacy reinforces the phenomenon of loss of credibility of the LRF described above.

The electoral legislation can be an important ally in good public administration by removing from office individuals with a background of corruption and administrative improbity. The Constitution foresees the ineligibility of individuals involved in improbity and immorality in the past.[25] However, the regulation of this provision only prevents the candidacy of individuals convicted after appeal. Given the sluggishness of justice and the countless appeals that penal legislation makes available to the defendant, it is possible for a person widely known as corrupt to be re-elected for several years before final conviction.

Other factors contribute to turning Brazilian elections into a true "adverse selection mechanism". A high-cost electoral system stimulates the politician in office to become corrupt in order to raise funds for re-election. The privileged forum for judgment of office holders and former office holders makes the judgment of the processes even slower, pushing them prescription. This also encourages individuals who become rich illegally to guarantee, by means of millionaire campaigns, an office that will keep them safe from common justice.

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25. Federal Constitution, art. 14, paragraph 9.

7 CONCLUSIONS

This paper focused on the analysis of the institutional and political factors, as well as historical traits of the Brazilian society, such as high inequality, that resulted in low-efficiency of public spending. The roots of the problem reveal the great challenge of overcoming it. There is ample literature on the persistence of institutions along time, even though they are harmful to the whole population and their elimination could places the whole of society on a higher level of well being. It is equally complex to overcome the uncertainty of the agents on their post-reform situation[26] or to break majority coalitions formed by groups that prefer the status quo rather than partial reforms that might cause losses to them.[27]

Thus, as important as studying what to do to make expenditure more efficient,[28] is to study how to implement the necessary reforms. It is in this direction that literature has moved, as shown in a recent summary by Zettelmeyer (2006).

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26. Wei (1997).

27. Rajan and Zingales (2006).

28. A challenge that we seek to address in the book Gasto público eficiente: 91 propostas para o desenvolvimento do Brasil.

AN EVALUATION OF THE EFFICIENCY OF BRAZILIAN MUNICIPALITIES IN THE PROVISION OF PUBLIC GOODS USING DATA ENVELOPMENT ANALYSIS

Rogério Boueri*

Brazil has had quite a tough fiscal regime in place in the last years. The attempt to generate successive fiscal surpluses is aimed at reducing the debt-GDP ratio, to create conditions for sustained decrease of internal interest rates and the resumption of economic growth.

The problem with this strategy is that it is reaching the limit of its effectiveness. This is happening, first, because the policy of achieving fiscal surpluses has been strongly based on increasing the tax burden, which in the last years has been breaking successive records and is bordering 40% of the Brazilian gross domestic product. Therefore, it would not be surprising if, in the near future, tax burden increases cease to occur.

On the other hand, social demands have been driving considerable increases in government transfers. Coupled with the growth of personnel expenditures, the average growth cost expenditures a year is of 6%.

A third obstacle to the continued use of the fiscal surplus generation policy is the increasingly unsustainable compression of government investment expenditures. In order to resume growth soundly, Brazil needs high investments in infrastructure and much of it will have to be done by the federal government, since most of the country's economic infrastructure depends on public investment.

The current path of the Brazilian economic policy has benefited from a favourable international scenario, with external demand raising the prices of commodities and other primary inputs that Brazil exports. This has led to an appreciation of the Real and helps control inflation. However, it should not be expected that this favourable world economic environment will last forever. When the world economy begins to decelerate, internal pressures in Brazil will increase.

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One of the means for the government to maintain fiscal surpluses and still be effective in the promotion of economic development is the improvement of public expenditure. This alternative would allow the social demands for public services to be met at decreasing costs, that is, without additional tax burden. Thus, it would be possible to combine the pressure for more services with the restriction imposed by the taxation limit.

However, there is a long path ahead to achieve overall improvement in the efficiency of public expenditure in Brazil. The first step is to try to size and measure the magnitude of the waste. Without a notion of how much more is spent than necessary, one can hardly establish reasonable goals to reduce waste.

Recent studies on efficiency of public expenditure have been using techniques that are commonly used in the analysis of efficiency of productive units in general. According to this approach, the government is a producer of goods and services and can have its productivity evaluated and compared to that of other producing units.

The techniques used for the evaluation of government performance can vary according to the goals of the measurement. In general, when the aim is to measure the impact of government action (outcome) econometric methods are more appropriate, since they allow incorporating into the analysis the effect of external factors that, although influencing the evaluated variables, are not under the control of the government action (see Coelli *et al.* 2005).

However, this analysis is restricted to the cases where a single impact variable is analysed. Nevertheless, in most cases, the government action occurs simultaneously across sectors. Thus, a government needs to meet educational, health, national defence needs, etc., at the same time. Furthermore, given that resources are scarce, increase of government action in one sector entails reduction in another, or increased tax burden or indebtedness.

The method of *Data Envelopment Analysis* (DEA) can be appropriate in situations where the provision of multiple outputs has to be evaluated. This non-parametric method is quite flexible and does not impose standards to the evaluated units; the evaluation criteria are based on the performance of the units within the sample.

Recent literature provides examples of application of the DEA method for evaluation of government performance in the delivery of public services. Afonso, Schuknecht and Tanzi (2006) use the method to evaluate the performance of national governments, using public expenditure as a proportion of gross domestic product as input variable and indicators such as level of corruption, level of unemployment, growth of GDP, among others, as representative of public output.

Other studies have focused on sectoral inefficiency in the delivery of public services. For example, Anderson, Walberg and Weinstein (1998), Caballero *et al.* (2004) and Chakraborty, Biswas and Lewis (2001) studied education spending, while other authors, such as Sola and Prior (2001) and Butler and Li (2005) studied efficiency in the public provision of health services.

The DEA instrument has also been used for comparison of efficiency among sub-national governments. For example, Afonso and Fernandes (2006) compare the performance of local governments in Portugal (more specifically, in the Lisbon region), while Gasparini and Melo (2004) investigate the optimum level of transfers to Brazilian municipalities based on the difference between how much such governments would need to bridge their respective fiscal gaps if they used the available resources efficiently.

This paper proposes to evaluate the amount of resources that could be saved if Brazilian municipalities spent budgetary resources efficiently, efficiency being defined here as corresponding to the municipalities with the best performance. Analyses will also be carried out on the geographic distribution and population bracket of the inefficiency, as well as on the scale efficiency of the municipal public production.

1 METHODOLOGY

1.1 Data Envelopment Analysis (DEA)

The principle of the DEA methodology is based on the physical definition of efficiency, according to which efficiency is given by the relation between inputs used and outputs generated. Thus, the bigger the production of a unit for a given amount of inputs, or alternatively, the lower the amount of inputs used for a certain amount of output, the greater the efficiency of this unit will be. The problem is that this definition cannot be applied directly in the case of multiple inputs and/or outputs. In this case, it is necessary to attribute weights to the amounts produced and the inputs used. When both inputs and outputs can be clearly priced, this limitation is easily overcome by the use of prices as weights and evaluation.

However, this pricing is often difficult or impossible to be done. In this case, the attribution of weights to outputs and inputs would have to be based on some arbitrary criterion established by the evaluator. The great merit of the DEA methodology is that it spares the evaluator from the establishment of arbitrary criteria: the weights will be established by the available data set. The idea is for such weights to be chosen in the most favourable way for each unit, according to certain consistency rules.

In this paper, the *Data Envelopment Analysis* (DEA) methodology will be used to evaluate the efficiency of the Brazilian municipalities in the delivery of public services. The DEA method was first proposed by Farrel (1957), but only became popular in literature after Charnes, Cooper and Rhodes (1978) used it for evaluations of concrete problems. These first models used, known today as CCR models, adopt the hypothesis of constant returns to scale. This limitation, however, was overcome by the work of Banker, Charnes and Cooper (1984), which extends the original model to the case of variable returns to scale (BCC model).

An interesting result that can be obtained from the comparison of the solutions provided by the BCC and CCR models is the verification of inefficiency due to production scale. It is possible to show that the relative efficiency index obtained with the CCR model will always be lower than the one obtained through the BCC model [see Cooper, Seiford and Tone (2006), page 88]. With this, the ratio between the two indices will show the proportion of inefficiency derived from the unit's production scale. This analysis allows, on the one hand, to distinguish how much of a unit's inefficiency is due to the size of the unit and how much is due to management and administrative weaknesses. It also allows drawing inferences on the optimum size of the units.

1.2 Application of the DEA Method to measure the inefficiency of Brazilian municipalities

The main areas of action of the Brazilian municipalities are, by order of importance, education, health and housing and urban planning. In 2005, activities linked to these areas took up about 64% of the Brazilian municipal budget, according to the National Treasury Secretariat. These expenditures correspond to about 92% of the municipal expenditure on core activities.[1]

Thus, to evaluate the relative efficiency of the Brazilian municipalities, one must consider the outputs and services offered by the municipalities in these three areas, as well as the total spent by them.

In education, the Constitution attributes to the municipalities the responsibility for basic education. Based on this fact, this paper uses the number of school enrolments in the municipal network of basic education as municipal output in the education area. Naturally, this number is not perfectly correlated with the efficiency of the municipality in the education area. For

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1. Administrative activities are responsible for 30.7% of the municipal expenditures.

example, a municipality that spends more than average on cultural activities, or that has a lower pupil-teacher ratio, will not necessarily be less efficient, in spite of some loss in the DEA evaluation.

On this point, it is worth noting that the evaluation through the DEA methodology applied here is incapable of evaluating efficiency in terms of results (outcomes), and is limited to investigating efficiency in terms of services delivered (outputs).

As health indicator, the number of hospital admissions in the municipal network will be considered. Once again, it is necessary to acknowledge the limitations of the indicator. According to the methodology used, two short admissions would have twice the weight as a single admission for twice the time, which could result from the severity of the patient's problem rather than the efficiency of the hospital unit.

The last area to be considered is that of urban planning. There is a large number of candidate indicators for this one. Kilometres of paved avenues and streets, addition of street signs, etc. The great problem of most of these indicators is that the expenditures with urban planning generally reflect permanent investments, which, once done, need only maintenance to continue providing services to the population. Perhaps an example will help clarify the nature of the problem. Let us assume that a municipality has not carried out any road works in a certain year. In this case, the efficient expenditure of this municipality for this year would be zero, since if there were no improvements all the money spent would be a complete waste. However, if the amount of paved streets were used as an indicator, this municipality would have the expenditures justified by the works carried out in previous periods.

The variation of the indicators could be used as a measure of efficiency. However, at municipal level, such indicators are collected every ten years, so it is impossible to use them in annual analyses.

The attempt to overcome these difficulties has led to the use of the number of municipalities with garbage collection as the only indicator in the urban planning area. This indicator does present the problems described above, since the expenditure with the service takes place at the same time as its delivery.

Once the outputs to be considered are described, the choice of input should be discussed. In this evaluation, the budgetary expenditure of each municipality in 2000 will be considered as input. This choice is based on the principle that, in economic terms, the municipalities exist to deliver services to their populations.

As seen above, most of the services delivered can be categorized in the areas[2] of education, health and urban planning. Therefore, the total cost of such services is given not only by the direct expenditures of the municipalities in these areas, but also by the expenditures carried out in the administrative activities, without which it would be impossible for the municipalities to offer the services. The total budgetary expenditure of the municipalities takes into account all these expenditures taken together.

Once again, this choice entails some measurement imprecision. For example, municipalities that have expenditures with public security will have their efficiency underestimated, since these expenditures will not have effects on the output indicators. However, such imprecision is the price if to pay for such an aggregated analysis.

1.3 Databases

The information on number of children enrolled in basic education in municipal schools, the number of admissions in hospitals of the municipal network and number of households served with garbage collection, were obtained from the Municipal Information Base (BIM) produced by the Brazilian Institute of Geography and Statistics (IBGE). The data on budgetary expenditures of the municipalities were obtained from the Finbra data of the National Treasury Secretariat. All the information refers to 2000, which is the last census year in Brazil.

Only the data of the municipalities that contained information on all the variables were used, that is, those municipalities on which any information was missing were not included. This lack of information can have two causes: either the municipality does not deliver some of the services, for example, some of the municipalities do not have hospitals, or there was some failure in obtaining the data. After the application of this criterion, 3.215 of the 5.506 municipalities remained in the sample.

It was also necessary to carry out a critical filtering of the data, so as to eliminate from the sample municipalities that presented strong evidence of incorrectness in their data. Such refining was done as follows: the per capita expenditures of each one of the 3.215 remaining municipalities were calculated

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2. The use of the term "area" rather than the budgetary term "function" is due to the fact that the "area" of health includes expenditures belonging to the health function as well as expenditures related to other functions, such as sanitation, for example. The same occurs with the area of education and the area of urban planning.

and those that presented a value under R$ 50,00 or over R$ 5,000.00 were excluded. After this filtering, the sample was left with 3,206 municipalities. In table 1 some of the characteristics of the sample used are described, while table 2 presents descriptive statistics of the sample. It should be noted that, in population terms, this sample of municipalities shelters 146.82 million inhabitants, corresponding to 86.46% of the Brazilian population in 2000.

TABLE 1
Representativeness of the sample

Region	Population in the sample	Number of municipalities in the sample	% of the sample	% Representativeness of the sample
North	10,288,506	222	6.92	49.44
Northeast	39,592,259	1,033	32.22	57.81
Southeast	65,607,588	868	.27.07	52.10
South	22,680,373	759	23.67	65.49
Mid-West	8,647,265	324	10.11	72.81
Total	146,815,991	3,206	100.00	58.23

Prepared by the author.

TABLE 2
Aggregated results of the CCR and BCC Models

Expenditure	71,816,545,042
Waste CCR	50,596,171,025
% Waste CCR	70.45
Waste BCC	34,026,128,790
% Waste BCC	47.38
Scale Waste	16,570,042,234
% Scale Waste	32.75

Prepared by the author.

2 ANALYSIS OF THE RESULTS

2.1 Comparisons between the aggregated results of the CCR and BCC Models and scale efficiency

The information on the 3.206 municipalities was used in the construction of two models using DEA methodology.[3] In the first, the hypothesis of constant returns to scale was established (CCR model) and in the second, the hypothesis of variable returns to scale (BCC). The aggregated results of each model are presented in table 3.

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3. The SAS software was used for the implementation of the models, since the large number of units to be considered exceeds the capacity of most existing DEA methodology implementation programs.

TABLE 3
Regional distribution of municipal inefficiency

Region	Budgetary expenditure R$ million	Waste CCR R$ million	Waste R$ million	Waste BCC CCR %	Waste BCC %	Per capita expenditure R$
North	3,434	2,333	67.95	1,507	43.87	333.78
Northeast	13,249	8,685	65.55	5,431	40.99	334.63
Southeast	38,856	28,071	72.24	17,485	45.00	592.25
South	12,236	8,675	70.89	7,281	59.51	539.51
Mid-west	4,041	2,832	70.09	2,322	57.46	467.34
Total	71,817	50,596	70.45	34,026	47.38	489.16

Prepared by the author.

The first line of table 3 shows the aggregated total of the budgetary expenditure of the 3.206 municipalities in the sample, totalling 72 billion Reals almost (in current values). The second line shows the total of waste detected by the CCR model in the sample. This total reaches 70.45% or 50.5 billion Reals. This number, however, should be interpreted carefully. Its meaning is that, if all municipalities managed their resources in the way the most efficient municipalities (only 3 in the CCR model) do, the same amount of services could be delivered with little less than 30% of the resources effectively spent. It should be noted that the CCR model does not take into account the scale gains and losses that might occur in the provision of the public services considered.

As already mentioned in section 2, the BCC model is more flexible in this aspect and allows the data to adapt to the existing scale variations. The use of this second model indicated a waste of 34 billion, which represents 47.38% of the total expenditure (lines 4 and 5 of table 3). This means that, even deducting the scale effects, the public services could have been delivered with about half of the resources that were used by the municipalities in 2000, if all the municipalities managed their budgetary resources with maximum relative efficiency.

The fact that the municipalities in general do not present the optimum scale is reflected in the difference between the waste calculated by the CCR model and the one resulting from the application of the BCC model. This difference, which aggregately reaches 16.5 billion Reals, is the waste of resources due to scale problems and represents approximately 1/3 of the total lost.

Another interesting result appears when we examine the individual values of the efficiency coefficients of the municipalities in relation to the scale. The BCC model reveals the existence of 23 efficient municipalities when the scale effects are taken into consideration. As seen in section 2, the result of the division

of coefficient BCC by coefficient CCR indicates the scale efficiency of a given unit. In graph 1 such scale efficiency coefficients are plotted against the budgetary expenditure of the 23 efficient municipalities under the BCC criterion.

GRAPH 1
Aggregated results of the CCR and BCC Models
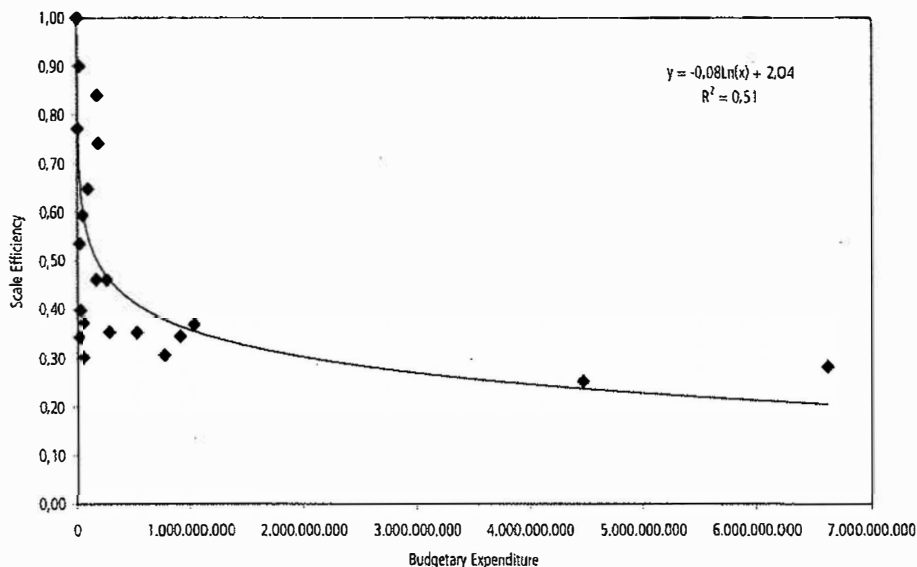
Prepared by the author.

Contrary to what might be expected, a pattern of negative returns to scale was detected, that is, larger municipalities tend to present a greater degree of inefficiency in the CCR criterion, given their efficiency in the BCC criterion. This result might be derived from the fact that larger municipalities have more expenditures in indicators not considered in this paper. Since the efficiency criterion here is based only on the three indicators chosen, the larger municipalities would turn up as less efficient, since they "waste" budgetary resources in the generation of other outputs and services for their populations. The logarithmic regression shown in graph 1 only serves to illustrate the trend of decreasing returns to scale observed in the data.

2.2 Distribution of waste according to regions and size of the budgets

The regional distribution of waste of budgetary resources is shown in table 4. One aspect that should be noted is that the inefficiency has a strong correlation with the per capita spending. When the correlation of the latter variable with the level

of waste in the CCR criterion is measured, a value of 0.9405 is found, which indicates the strong link between inefficiency and per capita spending. When the experiment is done replacing the CRR inefficiency criterion with the BCC criterion, the positive correlation remains, although less high, reaching 0.5094.

The regional patterns of waste, however, present little variation, especially when the CCR criterion is considered, with differences of approximately 10% between the regions of maximum waste (Southeast) and minimum waste (Northeast).

When the distribution of waste by population brackets is analysed, a much clearer pattern is detected. As observed in table 5, the municipalities with less population have a level of waste (BCC criterion) of almost 75%. This coefficient drops as the population brackets grow, reaching its minimum level in the bracket that contains municipalities with a population of more than one million inhabitants. In this bracket, waste is reduced to less than 10% of the expenditure.

In terms of percentage of total waste, the smaller municipalities participate basically with 30% of the totality, although their budgetary expenditures reach only 19% of the total of the sample. On the other hand, the municipalities with more than one million inhabitants (12 in the sample) carry out 28.5% of the total of the expenditures of the sample and participate with 5.9% of the waste. It is important to highlight that such figures are obtained when the scale losses of the BCC model are considered.

TABLE 4
Distribution of inefficiency according to size of the municipalities – BCC Model

Population bracket	Number of municipalities	Population sample %	Total expenditures R$ million	Waste R$ million	Waste %	Participation waste total %
<30.000	2,360	21.29	13,635	10,198	74.79	29.97
<100.000	632	22.25	12,735	7,979	62.66	23.45
<250.000	132	13.90	10,061	6,102	60.64	17.93
<1.000.000	70	20.56	14,951	7,753	51.86	22.79
>1.000.000	12	21.99	20,434	1,994	9.76	5.86

Prepared by the author.

Such results for waste are probably underestimated, since there is no reason to expect that the municipalities outside the sample will present a better performance than those included in it. On the contrary, the fact that some of them were not included due to unavailability of information is already good evidence of their administrative deficiencies, which can be reflected in their efficiency. Furthermore, many of the municipalities excluded from the sample have a small population, which is another indication that their inclusion

would tend to increase the numbers on waste, since, according to the analysis carried out here, the less populous municipalities are the ones that waste the most resources.

3 CONCLUSIONS

This paper used the DEA method to evaluate waste in the Brazilian municipal budgetary execution. This method allows a comparison of the relative efficiency of the decision units, municipalities in this case. Waste is calculated as being the difference between what one municipality spent and how much the more efficient units of the sample would have spent to deliver the same level of services as the evaluated unit.

To this end, two different DEA models were used. The first is the CCR model, which considers constant returns to scale, or analogously, disregards any scale losses or gains among the evaluated units. The BCC model incorporates variable returns to scale, which allows a more flexible analysis. The comparison of the results of the two models allows inferences on scale performance in the delivery of municipal services in Brazil.

A sample of 3,206 municipalities, representative of all geographic regions of the country, was used. The results refer to 2000. As municipal outputs, the following variables were used: number of children enrolled in the municipal network of basic education, number of admissions in the municipal hospital network and number of households with garbage collection in the municipality. As input, the total municipal budgetary expenditure was used.

For this group, a waste of 50.6 billion Reals was detected with the use of the CCR model. This figure corresponds to 70.5% of the budgetary expenditure of the municipalities studied. Waste drops to 34 billion Reals when the scale effects are considered (BCC model).

It was also detected that a lot of waste occurs in the municipalities with less population, even though the data indicates decreasing returns to scale in the provision of municipal services.

EFFICIENCY OF PUBLIC EXPENDITURE IN LATIN AMERICA

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Traditionally characterized by discussions involving the size of public expenditure and the degree of intervention in productive activity, the debate on the role of the government in the economy is being addressed from new angles by the more recent academic literature. One of these lines of research is related to the evaluation of the efficiency of public spending, both as regards the quality of the services delivered (administration, health, education and infrastructure) and in relation to the results achieved in terms of social equity, stabilization and growth. The most recent references in the area are the empirical studies of Afonso, Schuknecht and Tanzi (2005; 2006) who, in comparisons involving, respectively, industrialized countries and a set of emerging countries, built and evaluated indicators for performance of the services and efficiency of public expenditure. In spite of being subject to some limitations, the indicators built and the techniques used in the evaluation of relative efficiency revealed that the marginal returns of public expenditures are decreasing regardless of the group of countries considered. In short, spending is more efficient in nations where the public sector is comparatively smaller.

In the present analysis, we will extend the type of investigation proposed by Afonso, Schuknecht and Tanzi (2005; 2006), henceforth referred to as AST, with a view to evaluating the efficiency of public spending in a comparison involving Latin America countries in the recent period (1998-2003). The main motivation for the study comes from the fact that some of the larger countries of the region (such as Argentina, Brazil, Chile, Colombia and Mexico) adopted, along the eighties and nineties, structural reforms encompassing both the public sector and other sectors and institutions related to fiscal balance and improvement of economic activity. Such reforms were market-oriented and were characterized,

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among others, by the following aspects: greater decentralization in the provision of public services (local government level); privatisation of state-owned companies; liberalization of international trade and of the financial system. After some years, it is argued that continuous economic growth and greater social equity are goals that remain to be reached in most of the countries in the region. Thus, a quantitative/comparative research can help provide a more precise assessment of the differences among Latin American countries regarding the efficiency of public expenditure. In particular, in the comparison with the countries that led the adoption of reforms in the region, and where the reforms went deeper, as appears to be the case of Chile and Mexico.

The text is divided into six more sections. The next one describes the methodology used. Section 3 lists a set of criticisms to one of the methods used for efficiency evaluation, the Data Envelopment Analysis (DEA). The fourth section briefly discusses the profile of public expenditure in Latin America during the period evaluated. Sections 5 and 6 present the empirical results and the last section presents the final considerations.

1 METHODOLOGY AND MODEL

The present analysis follows the same approach proposed in the AST studies. The reasons for such choice were: i) the fact that the results presented by AST are quite direct and have a strong intuitive appeal; ii) there are few methods in literature that carry out quantitative/comparative analysis of spending efficiency between countries. First of all, the way the terms performance and efficiency are understood in the text should be noted. Performance is associated with results achieved (or outcomes, in the technical jargon) in the various areas where the public sector is present. Efficiency, in turn, is a measurement of the relation between the performance achieved and the resources employed in a certain government area.

Initially, based on economic and social indicators and indicators referring to the size of government expenditure, composite indicators for the performance and efficiency of the public sector in each country were built. After that, and also based on performance in certain areas and the expenditures of the public sector, the technique of Data Envelopment Analysis (DEA) was applied in the calculation of the public expenditure relative efficiency scores. The latter technique is a non-parametric method and, therefore, it does not require knowledge of the distributions of objective or subjective probabilities of the variables under consideration. Finally, with the computation of the composite indicators and the scores obtained through the DEA method, surveys were done to rank the 21 Latin American countries that make up the sample.

In the construction of composite indicators, it is assumed that the performance of the public sector depends on a set of economic and social indicators. Using a notation very similar to that adopted by AST (making some alterations as appropriate), we have it that for a country i that has j government areas, the performance of the public sector will be measured by:

$$
\left|
\begin{array}{l}
DSP_i = \sum_{j=1}^{n} DSP_{ij} \\
DSP_{ij} = \Im(I_k) \\
dDSP_{ij} = \sum_{k}^{n_1} \frac{\partial \Im}{\partial I_k} dI_k
\end{array}
\right.
\qquad (1)
$$

Where:

$DSPi$ = global performance of the public sector in country i (composite performance indicator);

$DSPij$ = performance of the public sector in area j of country i (performance sub-indicator);

I_k = relevant economic or social indicator;

$\Im(.)$ = well behaved function that links the indicator to the performance of the public sector;

$d(.)$ = total differential;

$\partial(.)$ = partial differential;

n = number of government areas (in our analysis, $n = 5$);

n_1 = number of relevant indicators for the government area under consideration;

It should be noted that the performance in each one of the government areas ($DSPij$ depends on one or more economic or social indicators (I_k). Thus, an improvement of the overall performance of a country's public sector ($DSPi$) will depend on better levels for those indicators.

Following the same approach as AST, we built performance sub-indicators that can be grouped in two classes:

a) The opportunity sub-indicators reflect the influence of the fiscal policies on individual opportunities and the good functioning of the

markets. This group includes the sub-indicator for the areas of Administration, Education, Health and Infrastructure.

b) The "Musgravean" sub-indicators are related to the three primary functions provided by the public sector according to economist Richard A. Musgrave. They are: Social equity, Stability and Economic growth.

In this paper, the sub-indicators related to infrastructure and social equity were not considered due to lack of information, until now, on the public expenditures in these two areas for some of the countries of the sample. Thus, the composite performance indicator of the public sector *(DSPi)* will be computed by simple arithmetic average of five sub-indicators: Administration, Education, Health, Stability and Economic performance. Picture 1 summarizes the structure of the composite indicator. In the Annex, the primary data used in the construction of each sub-indicator and their respective sources are tabulated.

FIGURE 1

Structure of the composite performance indicator of the public sector. Opportunity Sub-indicators of "Musgravean" Sub-indicators
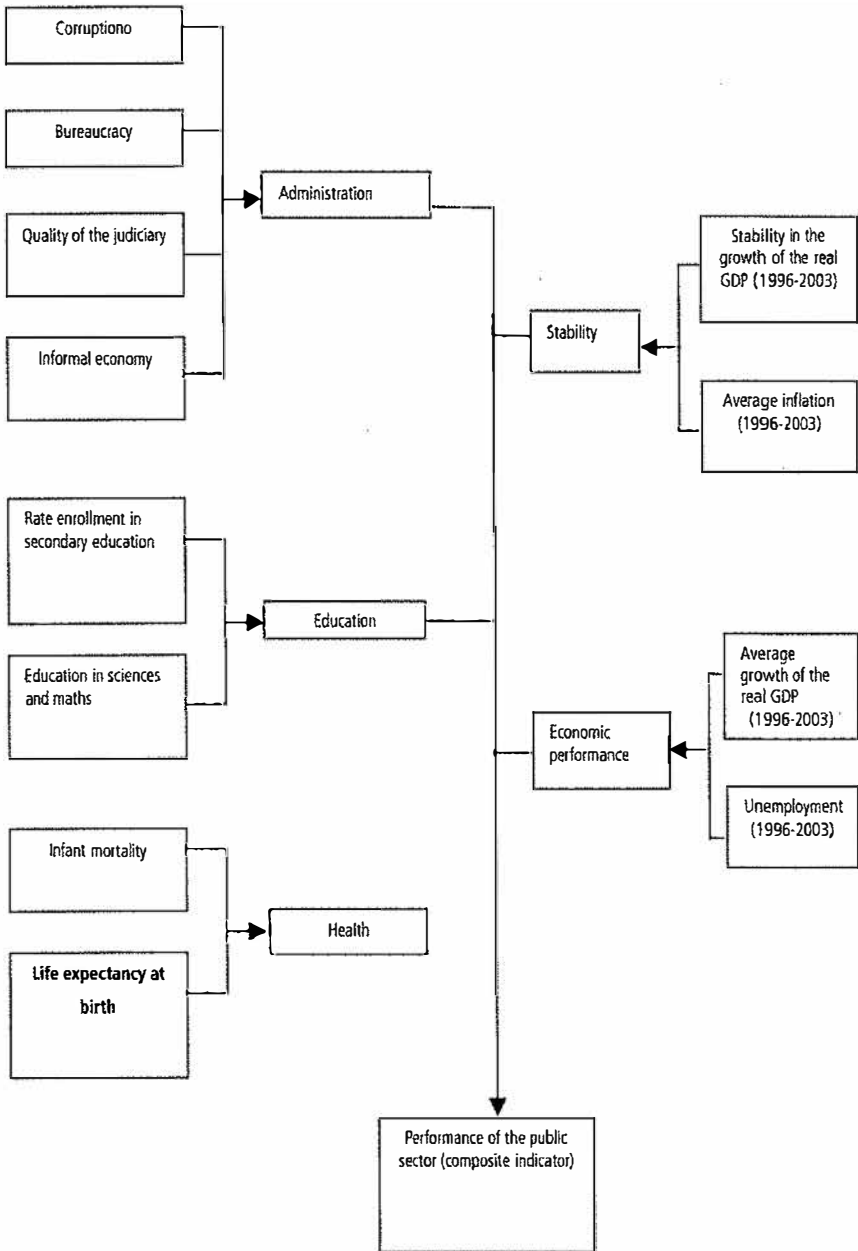
The efficiency sub-indicators were obtained from the performance measurements, taking into account the category of the public expenditure related to the government area in question. Thus, we have it that efficiency in the j-th government area of country i will be measured as follows:

$$ESP_{ij} = \frac{DSP_{ij}}{GSP_{ij}} \tag{2}$$

And the composite efficiency indicator will be given by:

$$ESP_i = \sum_{j=1}^{n} ESP_{ij} = \sum_{j=1}^{n} \frac{DSP_{ij}}{GSP_{ij}} \tag{3}$$

Where:

GSP_{ij} = public expenditure in area j of country i

As regards the data envelopment analysis (DEA) technique, its application consists of obtaining a convex production frontier from the set of observations on: i) the government's consumption (input) and ii) the performance sub-indicators (outputs). The frontier is built from the resolution of a linear programming problem. There are two types of choice or orientation in setting up this problem:

Input-oriented, where one determines how much of each input can be proportionally reduced without changing the output obtained.

Output-oriented, one calculates how much output can be proportionally increased without changing the inputs used.

The two approaches result in the same response when there are constant returns to scale, but they have different results when variable returns to scale are used. AST (2006) claim that, although there are variable returns to scale for the analysis of efficiency of the public sector, linear programming will identify the same sets of efficient or inefficient units (countries).

The problem in using input-oriented linear programming and variable returns to scale is described below:

$$\min_{\theta,\lambda} \theta$$

$$s.a. \begin{vmatrix} -y_j + Y\lambda \geq 0 \\ \theta x_j - X\lambda \geq 0 \\ n1'\lambda = 1 \\ \lambda \geq 0 \end{vmatrix} \qquad (4)$$

Where:

y_j is a vector of outputs (mx1) where m is the number of outputs

x_j is a vector of inputs (pxn) where p is the number of inputs

Y is a matrix of outputs (mxn), where n is the number of sectors;

X is a matrix of inputs (pxn), where n is the number of sectors;

q is a scale that measures technical efficiency (efficiency score);

ë is a vector (nx1) of constants that measures the weights used to calculate which countries are inefficient;

n'1 is a vector of ones. Restriction $n1'\lambda = 1$ guarantees the convexity of the frontier and is related to the hypothesis of variable returns to scale.

Note that q measures the distance between the country and efficient border, being that:

If q = 1, the country will be at the frontier and will be efficient

If q < 1, the country will be below the frontier and will be inefficient.

It should be noted that, since the DEA uses linear programming techniques, it has the benefits and limitations of these methods. In the next section, the DEA is briefly criticised.

2 CRITICISM TO THE DEA METHOD[1]

The method used by AST (2006) is not free from criticisms, including the important ones listed below.

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1. Co-author Waldery Rodrigues Júnior is responsible for this section.

2.1 Indifference with regard to orientation

AST (2006, page 21) claim that

> since the computation uses linear programming not subject to statistical problems such as simultaneous equation bias and specification errors, both output and input-oriented models will identify the same set of efficient/inefficient producers or DMUs... In fact, and as mentioned namely by Coelli et al. (1998), the choice between input and output orientations is not crucial since only the two measures associated with the inefficient units may be different between the two methodologies.

The linear programming method does not necessarily result in the same results when the type of orientation is changed. The set of countries that will be considered inefficient may the same, but the calculation of the distance in relation to the frontier changes completely and therefore so do the considerations made on efficiency.

2.2 Distance to the efficient frontier taken as isometric

AST (2006), as well as a significant part of the relevant literature for our study, assume that the distance to the frontier is a *linear and isometric concept:* the country that is one unit away from the frontier is 10 times less inefficient than the country that is ten units away from the frontier. This hypothesis disregards the non-proportionality inherent in these economic concepts. That is, it does not consider that it is increasingly more difficult for the addition of a unit in the input to generate the same amount of output (formally, decreasing gains or negative second order derivatives).

2.3 Specification errors eliminated *ad gloriam* by the linearization of the optimisation problem

The fact that the program is linear does not guarantee that the model is badly specified, that the chosen sectors are the ones that really explain the efficiency or inefficiency of the public sector.

2.4 Time lag of the same size

There is also the hypothesis that the expenditures in the various sectors have a lag in relation to performance in similar periods. But this hypothesis is not reasonable for some countries. The effect of investment on education and health can be felt in different time periods in the future.

2.5 Weights λ

Finally, different balances can lead to (very) different results, being that the correlations between different country rankings generated might not be substantially far from 1.

3 DATA: PROFILE OF THE EXPENDITURES

Table 1 presents some components of public expenditure for the countries considered in the sample. Some differences between the nations of the region are found:

TABLE 1

Public expenditure in the 21 countries of the sample: government consumption, health and education (in % of the GDP). Average in the 1998-2003 period

Country	Government consumption[1]	Education[2]	Health[3]
Argentina	12.97	4.28	4.76
Bolivia	15.29	5.94	3.77
Brazil	19.42	4.23	3.32
Chile	12.37	4.00	2.86
Colombia	20.44	4.64	6.46
Costa Rica	13.73	4.84	5.21
Ecuador	11.21	1.37	1.72
El Salvador	10.11	2.60	3.52
Guatemala	6.82	1.65	2.11
Haiti	7.13	1.50	2.66
Honduras	12.53	4.20	3.46
Jamaica	15.85	6.10	2.83
Mexico	11.48	5.12	2.67
Nicaragua	11.17	3.56	3.64
Panama	13.61	4.58	5.06
Paraguay	11.73	4.64	2.93
Peru	10.49	3.10	2.34
Dominican Rep.	7.84	2.30	2.12
Trinidad e Tobago	13.38	4.00	1.58
Uruguay	12.78	2.72	3.46
Venezuela	13.06	4.60	2.70
Average	12.54	3.81	3.29
Standard deviation	3.40	1.36	1.23
Maximum	20.44	6.10	6.46
Minimum	6.82	1.37	1.58

Prepared by the author.

Notes: [1] Final consumption of the general government. Average in 1998-2003 period. Sources: IMF, International Financial Statistics 2006; ECLAC, Statistical Yearbook for Latin America and the Caribbean 2005.

[2] Current and capital expenditures of the general government in education. Average in 1999-2003 period. Sources: UNESCO Institute for Statistics (UIS); ECLAC, Statistical Yearbook for Latin America and the Caribbean 2005.

[3] Expenditure of the general government in health. Average in 1998-2003 period. Source: WHO, 2006 World Health Organization Report.

a) Regarding government consumption, Colombia and Brazil present the highest figures (around 20% of the GDP), above the average of 12.5% in the period. On the other end, Guatemala and Dominican

Republic present the lowest figures of consumption, averaging less than 10% in the period.

b) Public expenditure on education presents slightly more variability (standard deviation) that the health expenditure. Countries such as Equator, Haiti and Guatemala spend less than 2% of the GDP in education.

4 RESULTS: COMPOSITE INDICATORS OF PERFORMANCE AND EFFICIENCY

Table 2 presents the values obtained for each one of the sub-indicators, as well as the calculation of the composite performance indicator for each country. One can see some difference in relation to the countries that obtained the highest values for the opportunity and "Musgravean" sub-indicators.

a) In the first class, the best performance results (higher values for the opportunity sub-indicators) were reached by Chile, Costa Rica and Uruguay, with above- average values for the areas of Administration, Education and Health.

b) Regarding the "Musgravean" sub-indicators for the areas of Stability and Economic Performance, the highest results were obtained by Panama (due to the lowest average rate of inflation in the last years among the countries of the sample) and Guatemala (lowest average unemployment rate) respectively.

Two composite performance indicators were calculated.

a) The first (DSP1) is an arithmetic average of the five sub-indicators and shows Panama as the best-performing country due to the high value obtained for the stability sub-indicator and above-average values in the other areas.

b) Indicator DSP2 consists of the arithmetic average of the three opportunity sub-indicators and indicates Chile as the best-performing country.

TABLE 2
Performance indicators for the 21 countries of the sample

Country	Administration	Education	Health	Stability	Economic performance	DSP1[1]	DSP2[2]
Argentina	0.81	1.27	1.03	0.78	0.39	**0.85**	**1.03**
Bolivia	0.73	1.04	0.93	1.30	1.32	**1.06**	**0.90**
Brazil	1.20	1.18	0.99	1.08	0.77	**1.04**	**1.12**
Chile	1.39	1.23	1.06	1.11	1.23	**1.20**	**1.23**
Colombia	1.10	1.02	1.02	0.67	0.52	**0.86**	**1.04**
Costa Rica	1.21	1.12	1.06	0.60	1.45	**1.09**	**1.13**
Ecuador	0.80	0.92	1.03	0.39	0.77	**0.78**	**0.91**
El Salvador	1.16	0.85	1.00	1.96	1.02	**1.20**	**1.00**
Guatemala	0.79	0.62	0.97	1.42	2.27	**1.21**	**0.79**
Haiti	0.67	0.68	0.84	0.82	0.58	**0.72**	**0.73**
Honduras	0.84	0.74	0.98	0.71	1.48	**0.95**	**0.85**
Jamaica	1.08	1.15	1.01	1.08	0.31	**0.93**	**1.08**
Mexico	1.04	0.95	1.03	0.62	1.80	**1.09**	**1.01**
Nicaragua	1.00	0.80	0.99	0.88	1.04	**0.94**	**0.93**
Panama	1.05	1.05	1.03	3.43	1.09	**1.53**	**1.04**
Paraguay	0.84	0.81	1.00	0.74	0.55	**0.79**	**0.89**
Peru	0.87	1.01	0.99	1.06	0.98	**0.98**	**0.96**
Dominican Rep.	1.15	0.76	0.97	0.63	1.32	**0.97**	**0.96**
Trin. and Tobago	1.29	1.31	1.00	1.03	1.60	**1.25**	**1.20**
Uruguay	1.27	1.24	1.04	0.41	0.24	**0.84**	**1.18**
Venezuela	0.72	0.94	1.03	0.27	0.06	**0.60**	**0.89**
Average	1.00	0.99	1.00	1.00	0.99	**1.00**	**1.00**
Maximum	1.39	1.31	1.06	3.43	2.27	**1.53**	**1.23**
Minimum	0.67	0.62	0.84	0.27	0.06	**0.60**	**0.73**

Prepared by the author.
Notes: [1] DSP1 corresponds to the arithmetic average of the five sub-indicators.
[2] DSP2 corresponds to the arithmetic average of the sub-indicators for Administration, Education and Health.

Table 3 presents the results referring to the computation of the sub-indicators and the composite efficiency indicator. Similarly to that was done for the performance indicators, two composite efficiency indicators were calculated. In general, it is observed that the countries that reached the highest values for indicators ESP1 and ESP2, and are therefore the most efficient, present the lowest values for government expenditures. It is the case of Guatemala (highest value for ESP1) and Ecuador (highest ESP2), which present average-below values for some performance sub-indicators (see table 2), but also have a profile of public expenditure below the regional average (see table 1). Such results suggest that public expenditure has little return vis-à-vis performance in Latin American countries, which is consistent with the evidence found in AST both for developed countries and emerging countries in Europe.

TABLE 3
Efficiency Indicators for the 21 countries of the sample

| Country	Administration	Education	Health	Stability	Economic performance	DSP1[1]	DSP2[2]
Argentina	0.78	1.13	0.71	0.75	0.38	**0.75**	**0.87**
Bolivia	0.60	0.67	0.82	1.06	1.08	**0.84**	**0.69**
Brazil	0.77	1.06	0.99	0.70	0.50	**0.80**	**0.94**
Chile	1.41	1.17	1.22	1.12	1.24	**1.23**	**1.27**
Colombia	0.67	0.84	0.52	0.41	0.32	**0.55**	**0.68**
Costa Rica	1.11	0.88	0.67	0.55	1.32	**0.91**	**0.89**
Ecuador	0.90	2.55	1.97	0.43	0.86	**1.34**	**1.81**
El Salvador	1.43	1.25	0.93	2.43	1.27	**1.46**	**1.21**
Guatemala	1.45	1.43	1.51	2.61	4.17	**2.23**	**1.46**
Haiti	1.18	1.73	1.04	1.45	1.02	**1.28**	**1.32**
Honduras	0.84	0.67	0.93	0.71	1.48	**0.93**	**0.82**
Jamaica	0.85	0.72	1.17	0.85	0.25	**0.77**	**0.92**
Mexico	1.14	0.71	1.27	0.67	1.97	**1.15**	**1.04**
Nicaragua	1.13	0.86	0.89	0.99	1.17	**1.01**	**0.96**
Panama	0.97	0.87	0.67	3.17	1.01	**1.34**	**0.84**
Paraguay	0.90	0.67	1.13	0.80	0.59	**0.82**	**0.90**
Peru	1.04	1.24	1.39	1.26	1.17	**1.22**	**1.22**
Dominican Rep.	1.85	1.26	1.51	1.02	2.11	**1.55**	**1.54**
Trin. and Tobago	1.21	1.25	2.08	0.96	1.50	**1.40**	**1.51**
Uruguay	1.24	1.74	0.99	0.41	0.24	**0.92**	**1.33**
Venezuela	0.69	0.78	1.25	0.26	0.06	**0.61**	**0.91**
Average	1.06	1.12	1.13	1.08	1.13	**1.10**	**1.10**
Maximum	1.85	2.55	2.08	3.17	4.17	**2.23**	**1.81**
Minimum	0.60	0.67	0.52	0.26	0.06	**0.55**	**0.68**

Prepared by the author.
Notes: [1] ESP 1 corresponds to the arithmetic average of the five sub-indicators.
[2] ESP 2 corresponds to the arithmetic average of the sub-indicators for Administration, Education and Health.

A graph helps illustrate the combined performance and efficiency indicators (picture 2). According to the graph:

a) Efficient countries and with good performance are: Guatemala (Gua), El Salvador (Esv), Panama (Pan), Trinidad and Tobago (TrT), Chile (Chi) and Mexico (Mex).

b) Efficient countries, but with bad performance are: Dominican Republic (RDm), Ecuador (Ecu), Haiti (Hai), Peru (Per) and Nicaragua (NIC).

c) Inefficient countries, but with good performance are: Costa Rica (Cri), Bolivia (Bol) and Brazil (Bra).

d) Inefficient countries and with bad performance are: Venezuela (Ven), Colombia (Col), Uruguay (Uru), Paraguay (Pair), Argentina (Arg), Honduras (Hon) and Jamaica (Jam).

FIGURE 2
Performance versus efficiency
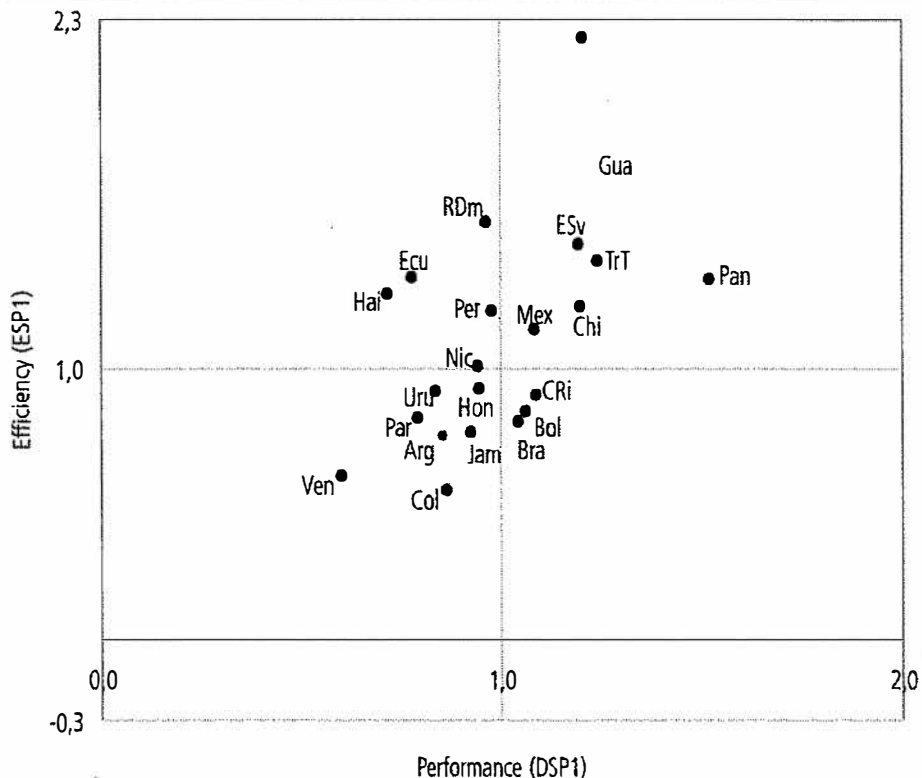
Performance (DSP1)

5 RESULTS OF THE DEA ANALYSIS

Table 4 presents the results for the input-oriented efficiency coefficients obtained considering the performance sub-indicators as measurements of output, and government consumption as measurement of input. The results are presented in two cases according to the number of sub-indicators considered.

TABLE 4
Results of the data envelopment analysis (DEA)

Country	Output= all five performance sub-indicators. Input=government consumption. Variable returns to scale		Output=sub-indicators for Administration, Education and ealth.Input= government consumption. Variable returns to scale	
	Efficiency score (θ)	Ranking	Efficiency score (θ)	Ranking
Argentina	0.988	10	0.988	6
Bolivia	0.706	18	0.688	18
Brazil	0.613	20	0.613	20
Chile	1.000	1	1.000	1
Colombia	0.505	21	0.505	21
Costa Rica	1.000	1	1.000	1
Ecuador	0.916	13	0.916	10
El Salvador	1.000	1	0.895	12
Guatemala	1.000	1	1.000	1
Haiti	0.997	9	0.984	7
Honduras	0.621	19	0.621	19
Jamaica	0.735	17	0.734	17
Mexico	1.000	1	0.917	11
Nicaragua	0.751	16	0.751	16
Panama	1.000	1	0.790	14
Paraguay	0.762	15	0.762	15
Peru	0.982	12	0.976	9
Dominican Rep.	1.000	1	1.000	1
Trin. and Tobago	1.000	1	1.000	1
Uruguai	0.984	11	0.984	8
Venezuela	0.792	14	0.792	13
Average	0.874		0.853	

Prepared by the author.

In case 1, where the 5 performance sub-indicators were considered, the following are on the efficiency frontier (score of 1): Chile, Costa Rica, El Salvador, Guatemala, Mexico, Panama, Dominican Republic and Trinidad and Tobago. Colombia presented the lowest relative efficiency score (0.505), which means that it could reduce by about 50% its government resources without altering the performance of the public services. Brazil ranks second-last (twentieth among the 21 countries considered, with a score of 0.613) and could save around 40% of its resources without altering the results of the indicators. The mean score of 0.874 indicates that, on average, the governments of Latin American countries could be more efficient, using around 13% less resources. In comparison with the results obtained in the computation of the composite efficiency indicator ESP1, the main difference seems to be in relation to Costa Rica, the country that presented a score of 0.91 for that indicator (therefore, below the average of 1.10 for efficiency, see table 3) but is on the efficiency frontier according to the DEA analysis.

In the second case, considering only the opportunity sub-indicators, five countries are on the frontier (Chile, Costa Rica, Guatemala, Dominican Republic and Trinidad and Tobago), suggesting that the efficiency criterion becomes stricter when considering only the areas of Administration, Health and Education. Of the eight countries previously considered as efficient in case 1, three dropped below the frontier: El Salvador (could save around 10% of its inputs), Mexico (around 8%) and Panama (21%). Colombia and Brazil maintained the last positions, with the same scores as in case 1. On average, the countries could use around 15% less public resources. That is, in case 2 the set of countries was relatively more inefficient.

6 FINAL CONSIDERATIONS

Performance measurements of public services and efficiency of government expenditure are unquestionably useful in determining how good the macroeconomic measures adopted in a certain country are in the comparison with other countries of a specific group or of the same region. In this study, we carried out a quantitative analysis of performance and efficiency concepts for a set of 21 countries in Latin America. Although the results can be questioned to some extent, in particular because of the great difficulty in separating the impact of public expenditure from other influences that can affect some of the performance sub-indicators, a precise (not necessarily exact)[2] quantification of those concepts is achieved regarding the public sector. While some results obtained match intuition (Chile and Mexico, the most advanced countries in the region, are on the efficient frontier in at least one of the cases), others defy common sense (several countries in Central America have performance and efficiency above the regional average) and should be interpreted with caution. In any case, this is an analysis still in progress in the Coordination of Public Finances of IPEA, and it can provide bases for other empirical studies where the methodological corrections/suggestions made here are described.

In the case of Brazil, a direct result is achieved. The country could save around 40% of its inputs to produce the same output (using DSP1 or DSP2). It is a very bad performance, particularly when one takes into account that it is relative to the set of countries in the region. However, it should be noted that the study did not take into account performance in relation to social equity. Perhaps this is one of the areas where the country has advanced more in the last years due to the achievement of economic stability in the late nineties and the increase of social programs considered as low cost and high impact.

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2. Exactness + Precision = Accuracy.

TABLE A.1
Primary data used in the construction of the performance sub-indicators

Country	Corruption		Bureaucracy	Qual. Judiciary		Informality	Education		Health	
	1	2	3	4	5	6	7	8	9	10
Argentina	3.1	3.3	1.7	1.6	1.8	4.4	3.8	81.3	74.3	17.2
Bolivia	2.5	2.4	2.0	1.8	2.3	6.0	2.9	71.2	63.8	63.0
Brazil	4.7	4.8	2.7	4.2	3.7	4.7	3.6	74.9	70.3	35.0
Chile	5.2	3.6	3.2	4.2	4.2	2.1	3.7	78.6	77.7	8.9
Colombia	4.4	4.0	2.3	3.4	3.4	4.2	3.6	55.3	72.2	20.0
Costa Rica	4.8	3.9	2.2	4.5	4.3	3.7	4.4	52.7	78.6	12.5
Ecuador	2.7	3.3	1.8	1.6	1.8	4.4	3.2	50.4	74.2	27.0
El Salvador	3.6	4.8	3.4	3.0	3.4	4.9	2.9	48.6	70.6	29.0
Guatemala	3.1	2.0	2.1	2.0	2.1	5.2	2.4	29.7	67.0	39.0
Haiti	2.5	2.8	2.5	1.3	1.5	7.2	2.2		51.4	81.0
Honduras	3.0	3.5	1.9	2.0	2.2	4.8	2.4		67.6	33.0
Jamaica	5.4	3.3	2.3	4.4	4.0	5.9	3.4	75.4	70.7	17.0
Mexico	3.8	4.8	2.3	2.8	3.1	4.6	2.8	62.6	74.5	25.0
Nicaragua	4.0	3.0	2.4	1.9	2.3	3.2	3.1	39.0	69.5	34.0
Panama	3.7	2.6	2.5	2.5	2.9	3.1	3.4	63.0	74.7	20.0
Paraguay	2.6	3.0	2.7	2.0	2.2	5.7	2.5	51.1	70.8	23.0
Peru	2.7	3.7	2.3	2.3	2.8	5.7	2.8	69.2	69.8	33.0
Dominican Rep.	4.1	4.0	3.1	3.3	3.0	4.1	3.0	35.5	67.2	33.0
Trin. and Tobago	5.3	3.1	2.7	5.2	4.6	3.8	4.6	72.0	69.9	20.0
Uruguai	5.9	4.3	2.1	5.2	4.1	3.8	4.1	73.2	74.8	14.1
Venezuela	2.9	2.1	1.7	1.3	1.5	4.7	2.9	59.2	73.6	17.0

Country	Stability	Economic Perform.		
	11	12	13	14
Argentina	6.9	4.7	0.9	15.8
Bolivia	1.6	4.7	3.1	5.0
Brazil	1.5	8.5	1.9	8.8
Chile	2.6	4.3	3.8	7.3
Colombia	2.5	12.4	1.5	15.5
Costa Rica	3.1	11.7	4.4	6.0
Ecuador	3.6	35.2	2.3	10.7
El Salvador	0.9	3.7	2.7	7.1
Guatemala	1.1	7.4	3.3	2.2
Haiti	1.7	16.8	1.5	
Honduras	2.3	13.2	3.0	4.0
Jamaica	1.4	9.7	0.4	14.9
Mexico	2.7	14.1	3.7	3.3
Nicaragua	2.0	8.7	3.9	12.2
Panama	2.5	1.0	4.3	13.6
Paraguay	2.5	9.5	0.4	7.7
Peru	2.6	4.7	2.7	7.9
Dominican Rep.	3.5	9.3	5.7	15.4
Trin. and Tobago	3.5	4.1	7.0	13.1
Uruguai	5.7	13.4	-0.2	13.4
Venezuela	5.7	36.4	-1.1	13.2

Sources: WorldEconomic Forum, Global The Competitiveness Report 2002-2003.
ECLAC, Statistical Yearbook for America Latin and the Caribbean 2005.
World Bank, World Development Indicators (WDI).
IMF, World Economic Outlook 2004 and 2006.
LABORSTA, ILO Bureau Statistics.

Notes: [1] Irregular payments related to favourable sentences. 1=common; 7=never occur.
[2] Frequency of additional payments or bribes in the last 3 years. 1= increased significantly; 7=decreased significantly.

(it continues)

[3] Administrative regulations. 1=many; 7=few.

[4] Independence of the judiciary in relation to the government. 1=highly influenced; 7=totally independent.

[5] Efficiency of the set of laws. 1=inefficient (subject to manipulation); 7=efficient (neutrality).

[6] Percentage non-official business. 1=less than 5%; 2= from 6 to 10%; 3= from 11 to 20%; 9=more than 70%. In the calculation of the indicator, index I was used, such that I = 9 – percentage of non-official business.

[7] Quality of education in sciences and mathematics. 1=below and far from other countries; 7=among the best of the world.

[8] Net rate of enrolments in secondary education. Values referring to 2002.

[9] Life expectancy at birth (years). Values referring to 2002.

[10] Infant mortality rate (per 1000 births). Values referring to 2002. In the calculation of the indicator, infant survival rate = 1000 – infant mortality rate was used.

[11] Standard deviation of the real GDP growth rate in the 1996-2003 period. In the calculation of the indicator, the reverse of the standard deviation was used.

[12] Average inflation rate in the 1996-2003 period. In the calculation of the indicator, the reverse was used.

[13] Average growth rate of the real GDP in the 1996-2003 period.

[14] Average unemployment rate in the 1996-2003 period. In the calculation of the indicator, the reverse was used.

INTERNATIONAL COMPARATIVE FOR SOCIAL SECURITY

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The several reflexes of the Brazilian social security on the national economic context are already well known. The payment of retirements and pensions to the public and private sector reach 12% of the Country's GDP. In other words, for every R$ 10.00 produced in Brazil more than R$ 1,00 is allocated to the payment of social security benefits. If, on the one hand, this statistic represents the national advance in issues of social security coverage and potential reduction of poverty specially for the elderly, there are, from another perspective, opportunity costs in not applying these resources in areas with potential to sustain bigger growth rates such as, for example, public investment, or even, in the reduction of the tax burden that would support the development and opening of new enterprises. This opportunity cost is particularly significant for a country that in the last years has been presenting growth rates that are well below the international average.

In absolute terms, the Brazilian expenditures with social security, as a proportion of all that's produced by the nation, are undoubtedly high, as presented in graph 1. Comparing 113 countries, Brazil ranks 14th, together with European countries with older populations and known for their extensive social protection networks, such as Italy, Germany, France, Switzerland, Belgium and Sweden.

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GRAPH 1
Expenditures with social security as a percentage of the GDP
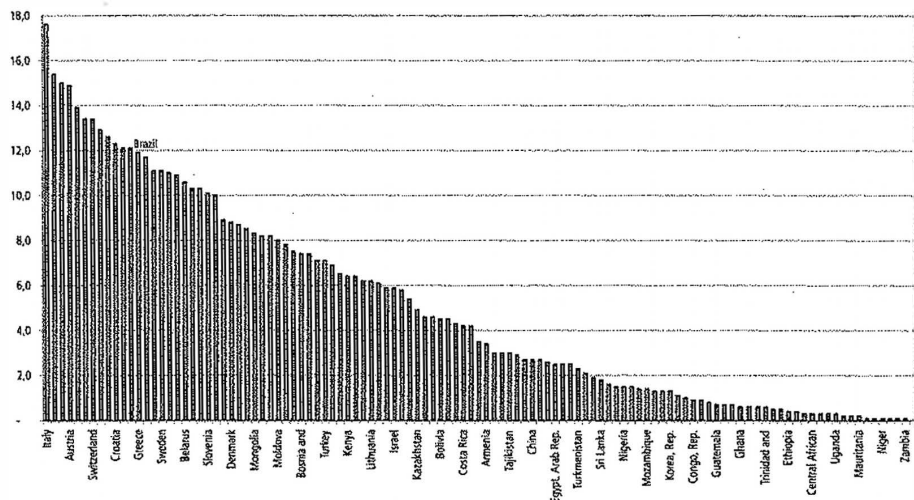
Source: World Development Indicators 2006.

In spite of providing a good overview, graph 1 presents absolute values and merits some analysis. For example, Brazil may spend a lot with social security in absolute terms due to the lack of a minimum age limit to retire, or for charging high contribution rates that allow increased expenditure with social security.

Contemplating in the study the other variables may have reduced the universe of comparable countries from 113 to 49, but it has allowed a more thorough analysis of the results as one considers, in addition to social security expenditures, the population demographic structure, the relationship between retirement benefits and per capita income, the participation of the contributors in the work force, the contribution quotas and, lastly, the minimum age required for retirement.

The source of data for the demographic dependency ratio, which is the ratio of retirement benefits and per capita income to contributors as a percentage of the work force, was the World Development Indicators published by the World Bank in 2006. On the other hand, the data referring to the contributions quotas and minimum ages for retirement were obtained from the Social Security Programs Throughout the World published by the Social Security Administration.[1]

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1. These publications are freely available on the internet at the following web sites: <http://www.ssa.gov/policy/docs/progdesc/ssptw/> and <http://devdata.worldbank.org/wdi2006/contents/home.htm>.

To construct an order that takes into account several factors that influence the expenditure with social security, the method *Data Envelopment Analysis* (DEA) was used. The technique applied is purely empirical and not parametric. The highest position in the ranking indicates only that the country spends a lot given the several variables used in the analysis. In other words, the aim was not to determine the optimum value of the relationship between the expenditure in social security and the GDP of a country, but only indicate for the nations under analysis if their social security expenditures are high after being controlled by the other variables that summarize the demographic characteristics and social security plan design.

In the first place, the demographic dependency ratio that represents the quotient between the populations over the age of 65 years was selected, considered as elderly, and the population aged 15 to 64 years. The greater dependency ratio would imply more potential expenditure with social security due to the greater numbers of elderly people that represent the target population of the social security programs. As observed in graph 2, the demographic composition of Brazil does not justify its high social security expenditures. The dependency ratio of 9.1% indicates a young population by world standards.

GRAPH 2
Demographic dependency ratio
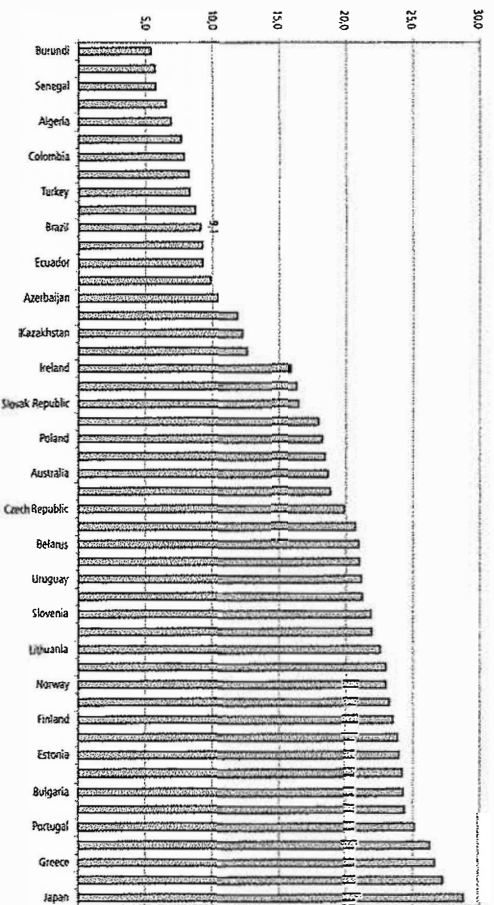
The second variable, the relationship between retirement benefits and per capita income, is used as proxy calculation formula of the social security benefits. The higher proportion of retirement benefits in relationship to average income means that the social security regime returns to the retirees and pensioners a large share of the income they used to earn when active in the work market. In this sense, it is expected that the increase in the average amounts of the benefits will increase the expenditure in social security. Therefore, the participation of the social security expenditure in the product of a country is a growing function of the second variable. In Brazil, the relationship between retirement benefits and per capita wages is of 59.4%, a little more than 10 points over the international average of 48.5%. In other words, the formulas for calculating the Brazilian social security benefits allow a re-composition of income in inactivity that partially explains the high participation of social security expenditure in relation to the product.

GRAPH 3
Retirement benefits as a percentage of the per capita income
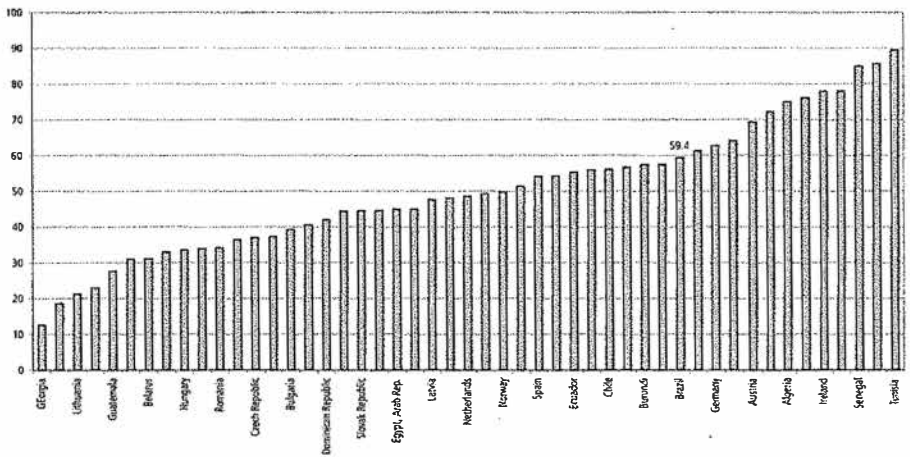
The third explaining factor would be the number of contributors to the social security regime. In principle, social security systems with broad coverage of their workers in the active phase will naturally end up paying benefits for a larger number of people, which implies a higher amount of social security expenditures as a proportion of the GDP. A little more than half of the Brazilian work force, around 56%, has some type of coverage by the social security regime. Even though this number is lower than the average of 67.5% of the 49 countries studied, Brazil has the second highest percentage among

the Latin American nations included in the sample, which points towards three considerations: in the first place, the Brazilian coverage, even though small by world standards, is high for Latin America; second, in considering similar countries there is little scope for the feasibility of policies to increase social security coverage in Brazil and, lastly, the number of people covered in the contributing phase does not justify such a significant amount of social security expenditure found in Brazil.

GRAPH 4
Contributors as a percentage of the work force
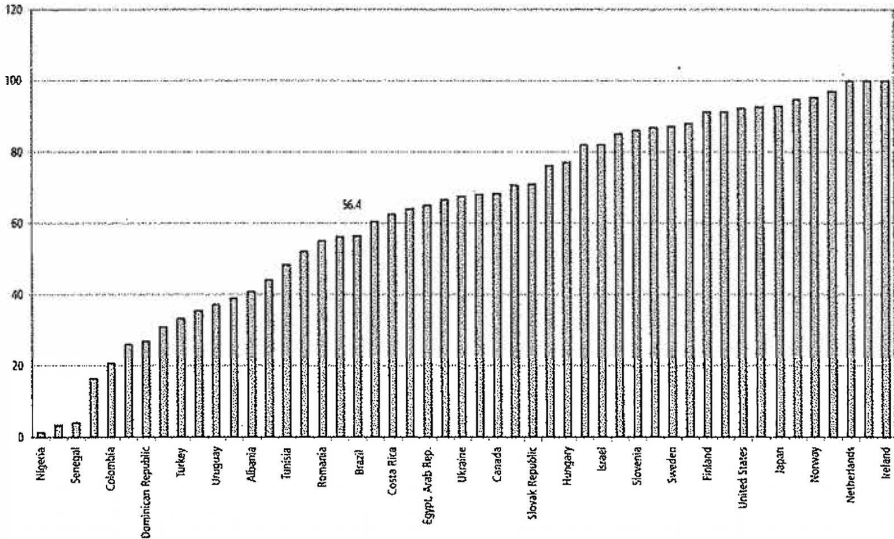
The quotas for social security contributions would be a fourth determining factor of the expenditure with retirement benefits and pensions. Charging high rates allows receiving higher benefits. Therefore, one expects that countries with high taxation related to their social security regimes will spend more. Great shares of income directed to the financing of social security indicate, a priori, great promises of future income in the phase when the benefits are received. Brazil is a leader in this respect, with the seventh highest quota for social security contributions among the countries studied.

GRAPH 5
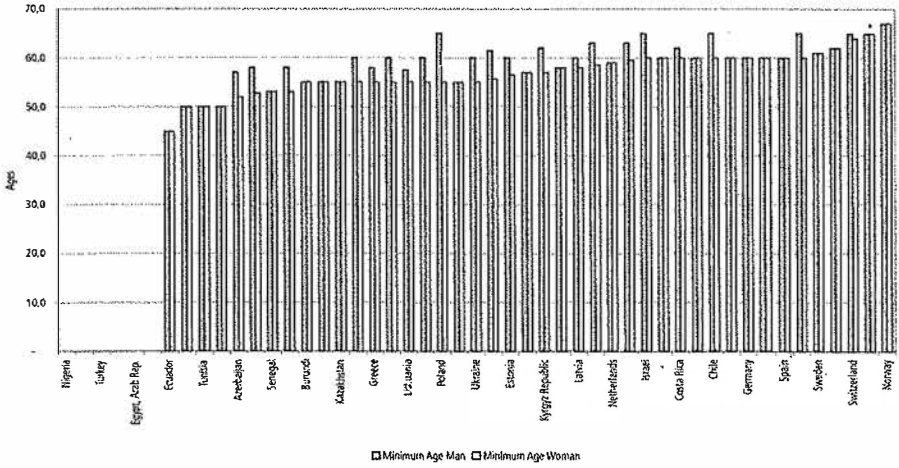**Total Contribution Quotas for Employees and Empoloyers**
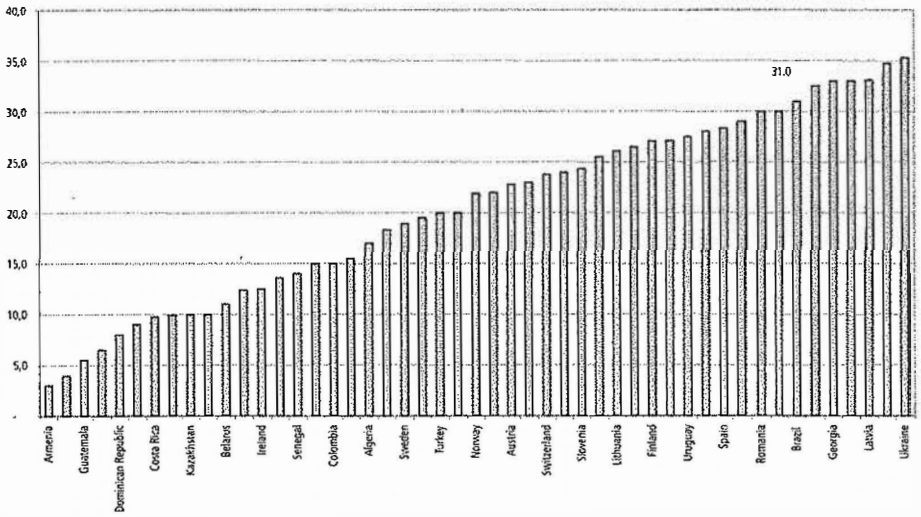
The fifth and last variable, minimum age for retirement, is the only one that presents a negative relationship with the social security expenditures as a proportion of GDP. The higher the age required to retire, the shorter the time available to receive retirement benefits and, therefore, less expenditures are needed to fund social security. Due to the still widespread differentiated treatment for men and women, the minimum ages for retirement used in this study have been disaggregated by gender. As seen in graph 6, Brazil is one of the six countries that still allows retirement without an age limit, just with contribution or service time. Naturally, this is one of the factors that explain the high social security expenditure in Brazil.

GRAPH 6
Minimum age required for programmed retirement, by gender

The results synthesized in graph 7 place Brazil in the leading group of the ranking of social security expenditure after considering the amounts of the five variables described above.

GRAPH 7
Social security expenditure indicator

Prepared by the authors.

The interpretation of the mathematical results indicates that a value equal to 1 places the Country at the top of the list of those that spend a lot with social security given the variables used as determinants of its expenditure. Sharing the position with Brazil are countries such as Austria and Uruguay, known for the high fiscal burden imposed by social security.

A second group is composed by nations also known for the high participation of social security in their GDP and that face challenges in adjusting their social security regimes. Several OECD members such as Germany, USA, Turkey and Sweden are in this group.

The third group includes several Latin American and Central and East European Countries that have been through processes of capitalization of their social security regimes. Chile, an example of structural reforms in the financing of its social security, occupies the 41st position in a ranking of 49 national States. Such result indicates that, in spite of the transition costs from a partition regime to a capitalization regime, the structural reforms have managed to reduce the fiscal drainage of social security.

Brazil's high position in the ranking generates contradictory positive as well as negative interpretations. Regarding the extension of the social protection network, Brazilian social security is quite evolved, with a higher position, in relative terms, than OECD Countries. A by-product of these gains is fiscal costs. In short, even in an international comparison that takes into account rich countries with an old population and broad social security coverage, Brazil allocates a lot of resources to its social protection, in proportional terms.

Therefore, this explains that the ranking may motivate a favorable position regarding the *status quo* of social security due to its social aspect or, on the contrary, a pessimist position due to its high fiscal cost even after several demographic and social security plan structure variables have been controlled.

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