Strengthening long-term growth in Brazil

Regis Bonelli
STRENGTHENING LONG-TERM GROWTH IN BRAZIL

Regis Bonelli

RESUMO
Este trabalho analisa alguns dos principais temas identificados como barreiras ao crescimento da economia brasileira no longo prazo. A apresentação tem início com decomposições do crescimento do PIB brasileiro total e per capita para identificar as causas mais próximas da desaceleração do crescimento observada depois da década de 1980 enfatizando fatores que atuam pelo lado da oferta agregada. A razão para esse tipo de abordagem é que, dentro de certos limites, a experiência do passado revela que é relativamente fácil expandir a demanda agregada por meio de estímulos monetários e fiscais.

Cinco temas que têm sido identificados na literatura especializada como limitações à expansão da oferta são analisados em seguida, todos eles associados com uma taxa de poupança menor do que a necessária para sustentar taxas de crescimento da formação de capital fixo capazes de acelerar o crescimento: carga tributária, fatores institucionais, infraestrutura, financiamento e educação. Uma apreciação sumária de linhas de política para lidar com essas limitações é apresentada em seguida. O texto conclui trazendo novamente para primeiro plano a necessidade de aumentar a poupança e o investimento para elevar a taxa de crescimento da economia brasileira e especulando sobre o potencial de crescimento condicionado pelo crescimento da produtividade e do investimento.

ABSTRACT
This paper is devoted to an examination of the main issues identified with Brazil’s barriers to growth in the long term. It begins with a decomposition of per capita and total GDP long term growth to identify the main proximate sources of Brazil’s growth deceleration. Most of the analysis in this part concentrates on factors affecting aggregate supply. The reason for this approach is that, within certain limits past experience reveals that it is easy to stimulate aggregate demand via fiscal and monetary stimuli in Brazil. The risk is on bumping into production capacity barriers, i.e., supply constraints.

Five substantially diversified but interconnected issues have been raised in the literature as supply constraints, many of which associated to a rate of savings lower than deemed necessary for sustaining faster growth: the tax burden, institutional factors, infrastructure, finance and education. Accordingly, the paper also deals with the issues of a high an increasing tax burden, institutional shortcomings and policy settings, insufficient investment in infrastructure, insufficient long term financing, and educational shortcomings, as growth impediments. A survey of policies aimed at removing the barriers to growth thus identified is presented next. The paper concludes by bringing again to the fore the need to increase savings and investment for growth resumption and by speculating on the growth potential of Brazil, conditional on productivity and investment growth.

STRENGTHENING LONG-TERM GROWTH IN BRAZIL

Regis Bonelli

1. Introduction

Brazil has been hailed as one of the fastest growing countries in the world for the five decades from the onset of the Great Depression onwards. As Figure 1 shows, though, fast growth came to a halt and, despite recovering somewhat after 2003 never again displayed average rates similar to those attained before 1980, even after a broad range of reforms were enacted in the 1990s. Growth became not only substantially lower after 1980, on average, but more volatile as well.

Brazil’s growth slowdown began with the balance of payments instability associated with the Latin American debt crisis, when a succession of negative shocks, both foreign- and domestically-originated, hit the country. Figure 1 also shows a five-year moving average line, to highlight the sharp downswing in the country’s GDP average growth rate after 1980 on a medium term measure. Except for the recession 1963-65, medium term growth rates averaged between 6.3% and 9.3% per year in the first two decades shown in the graph. From the late 1960s to 1980 the range was from 5.3% to 11.4%, and included very high average rates until the first oil shock (5-year average growth peaked in 1973). Growth plummeted after 1980, when the 5-year moving average ranged from 0 to 5%.

The 1981-83 recession inaugurated the long slowdown and, despite a brief rebound in the mid-1980s, growth rates continued to fall precipitously until the early 1990s, when the five-year average growth rate recorded a slightly negative figure in 1992. A cyclical recovery took place afterwards, fueled by stabilization (1994). But soon after stabilization the country had to cope with adverse external shocks due to the Mexican, Asian, Russian, and Argentinean crises, as well as domestic ones due to: change in the exchange rate regime (1999), energy shortage (2001) and the temporary interruption of capital inflows to Brazil due to fears of a left-wing government under Pres. Lula (2002). It is not surprising that the uncertainties associated with these events held back capital accumulation and growth.

Beginning in early 1999 a new economic policy model was adopted, based on the tripod represented by: a flexible exchange rate regime; credible inflation targeting managed by a semi-independent Central Bank; and limits on fiscal deficits given by the need to reach minimum primary budget surpluses yearly. Growth resumed (although at a slower pace than before the 1980s, even correcting for population change), supported by reforms such as trade and investment liberalization as well as the productivity gains that they generated,

---


3 GDP growth averaged 4.33% p.a. in the first three decades of the XX century, 6.48% yearly between 1930 and 1980, and only 2.55% p.a. from 1980 to 2010. (source: www.ipeadata.gov.br and author’s estimate for 2010)

4 Note, however, that in terms of per capita GDP the growth difference between the recent past and the pre-1980 periods is much less pronounced due to slower population growth in recent years.

5 “Primary” meaning before interest on public debt. The Fiscal Responsibility Law was enacted in May 2000.
especially after 2003 — just to be interrupted again by the 2008 international crisis. This time the crisis, originated in the financial systems of the advanced countries, spread to the developing nations through a number of channels. Credit tightened as capital inflows to Brazil reversed abruptly and hit economic activity severely\(^6\) and as agents became increasingly cautious over future events and courses of action to be taken by authorities worldwide. (World Bank, 2010) Growth resumption in 2010 has been based on strong domestic demand and recovery in capacity utilization.

Figure 1: Brazil — GDP annual growth rates and five-year moving averages 1947-2010* (%)

![Graph showing Brazil's GDP growth rates and five-year moving averages, 1947-2010.](image)

Source: IPEADATA, National Accounts of Brazil (various issues); * 7.6% growth projected for 2010.

Brazil reacted to the poor macro performance of the 1980s by embarking on reforms, from trade liberalization to changes in fiscal, monetary, exchange rate and social policies, as mentioned. Policies improved, especially after price stabilization and have been better than through most of the pre-1980 period — but, to no avail. What has prevented the country from resuming sustained growth at rates similar to those reached before 1980?

The puzzle behind Brazil’s long slowdown has been the subject of numerous studies. A large number of explanations have been offered, perhaps because the slowdown involves so many aspects.\(^7\) But there is broad agreement on one aspect: the country has

\(^6\) The severity of the recession can be gauged by the fact that seasonally adjusted manufacturing output decreased by 19% between September and December, 2008.

\(^7\) In the present decade, just to mention a few: Pinheiro, Gill, Serven and Thomas (2001), Bugarin, Ellery Jr., Gomes and Teixeira (2003), Gomes, Pessôa and Veloso (2003), Pinheiro (2003), Bacha and Bonelli (2005), Bonelli and Pinheiro (2008), OECD (2009), de Mello (2009), Bonelli (2010), Blyde, Pinheiro, Daude and Fernández-Arias (2010), OECD (2010, Chapter 7), Bacha and Bonelli (2010). A useful analysis focusing on the reforms and their outcomes is provided by Pinheiro, Bonelli and Pessôa (2009).
been growing less than in the past because savings and investment are too low to allow for higher growth rates.

This paper is devoted to an examination of the main issues identified with Brazil’s barriers to growth in the following sequence. The next section decomposes per capita and total GDP long term growth to identify the main proximate sources of growth deceleration. Most of the analysis in this section concentrates on factors affecting aggregate supply. The reason for this approach is that, within certain limits past experience reveals that it is easy to stimulate aggregate demand via fiscal and monetary stimuli in Brazil. The risk is on bumping into production capacity barriers, i.e., supply constraints.

Five substantially diversified but interconnected issues have been raised in the literature as supply constraints, many of which associated to a rate of savings lower than deemed necessary for sustaining faster growth: the tax burden, institutional factors, infrastructure, finance and, as long as human capital is concerned, education. Accordingly, sub-divisions of section 3 deal with the issues of a high an increasing tax burden, institutional shortcomings and policy settings, insufficient investment in infrastructure, insufficient long term financing, and educational shortcomings, as growth impediments. Section 4 is normative; it deals with policies aimed at removing the barriers to growth identified before. Section 5 concludes by bringing again to the fore the need to increase savings and investment for growth resumption and by speculating on the growth potential of Brazil, conditional on productivity and investment growth.

2. Decomposing long term GDP growth

2.1 Per capita GDP: sources of growth deceleration and the role of demographic change

Productivity change is one clearly identifiable major source of long term per capita growth. As aptly summarized by Krugman (1997, p.11) “Productivity isn’t everything, but in the long run it is almost everything…” In addition to productivity, in the transition to more developed levels emerging economies typically face rapid demographic transformations that also contribute to growth due to their effect on the supply of labor and human capital accumulation.

A decomposition exercise is shown next to highlight the changing importance of labor productivity and labor utilization in explaining long term per capita GDP growth in Brazil. The decomposition departs from the identity:

\[ \frac{Y}{N} = \frac{Y}{L} \times \frac{L}{EAP} \times \frac{EAP}{WAP} \times \frac{WAP}{N} \]

Where
- \( Y \) = GDP (at constant prices of 2000)
- \( N \) = population
- \( L \) = employment
- \( EAP \) = economically active population, or labor force
- \( WAP \) = working age population

Thus

\[ \frac{Y}{N} = \frac{Y}{L} \times \frac{L}{EAP} \times \frac{EAP}{WAP} \times \frac{WAP}{N} \]

Of course, this is not supposed to mean that factors affecting aggregate demand are not important in constraining or stimulating growth.
Y/N is per capita GDP
Y/L is labor productivity
L/EAP is the employment rate (complement of the rate of unemployment)
EAP/WAP is the ratio of the labor force to the working age population, also known as the activity rate⁹
WAP/N is the ratio of working age to total population.

The previous expression decomposes per capita GDP into labor productivity and labor utilization (L/N), where this last factor is accounted for by the last three variables in the right hand side of the identity above. The exercise allows for a finer disaggregation of labor utilization into employment rates, activity rates and the working age to total population ratio.

Taking logarithms of both sides in the previous identity and subtracting results from succeeding years (in our case, marked by periods of approximately 10 years)¹⁰ we decompose per capita GDP changes over time into four components. The results are shown in the two panels of Table 1: the upper part (a) shows overall growth rates (in log differences); in the lower part (b) these differences are expressed as percentages of per capita GDP growth. A memo at the bottom of Table 1 shows average compound GDP growth during each period considered in the analysis.

It is transparent from the table that productivity growth accounts for the bulk of per capita GDP growth in the first four decades shown. Labor utilization actually decreased up to 1970, as the sum of its three components became negative. The demographic forces behind the decreases are also displayed in the table: from 1940 to 1960 both the activity (EAP/WAP) and the working age to total population (WAP/N) rates decreased. The working age population began to grow faster than the total population in the 1960s, while in the 1970s the labor force (EAP) began to grow faster that the WAP.¹¹

As a result of these long term trends, labor productivity accounts for more than 100% of per capita GDP growth from 1940 to 1970. In the 1970s productivity shares the explanation with an increased activity rate (ratio between the labor force, EAP, and the working age population), beginning a phase characterized by demographic bonuses that continued into the future, to the present and beyond.

---

⁹ Defined by the population in the age bracket 10-64 years. The official measure for the EAP in Brazil is 10+ years. We prefer to work with a smaller population contingent, even considering the fact that many people aged 65+ are active and continue to work. On the other hand, the lower limit (10 years of age) seems to be too low, as more and more children in the age bracket 10-14 attend school. Thus, they shouldn’t be included in the labor force.

¹⁰ Demographic Census results were used from 1940 to 1980. Census results for 1991 and 2000 have been subject to criticism on the grounds of lack of comparability with the previous ones for some variables. To overcome this problem we used data from Household Surveys (PNAD) conducted yearly by Brazil’s statistical office (IBGE). This procedure has the advantage of allowing the analysis to reach the most recent year available (2008). Data on EAP and WAP from 1940 to 1980 were adjusted to comply with the more recent criterion adopted by IBGE, which defines the economically active population as people with 10+ years of age. National Accounts data were used to measure GDP in constant prices of 2000 (available in www.ipeadata.gov.br). See table with data used in Appendix 1.

¹¹ The measurement of the employment rate, or of its complement, the rate of unemployment, is not accurate before 1980.
A completely different picture characterizes the role of productivity change in the next two periods shown in the table (1981-89 and 1989-98), as productivity actually fell when end-point data are used. This reflects the collapse of GDP growth shown in the memo line at the bottom of the table, coupled with employment increases even during the unstable 1980s. Overall per capita GDP accumulated a meager 7% growth between 1981 and 1989, while productivity fell 2%. Increases in the demographic variables (i.e., labor utilization) accounted for 9% and represented 121% of per capita GDP growth.

Between 1989 and 1998 the results were even worse: accumulated per capita GDP reached only 1%. Labor productivity fell 5%. Except for the employment rate (which fell as well, reflecting weak labor market conditions), the other demographic variables continued to show demographic bonuses: both the labor force and the working age population continued to display fast growth.

A modest growth recovery characterizes the last decade shown above (1998-2008), when per capita GDP log change reached +20% and labor productivity grew 11% — thereby accounting for 57% of total per capita GDP growth. Labor utilization accounted for the remaining 43%. The ratio of the working age (population aged 10-64) to the total population continued to increase markedly, while the activity and the employment rates rose as well.

The speed of demographic change in Brazil is also transparent from the following figure, where decadal average population growth rates from 1950 to the present are shown, as well as projections up to 2050. Average ten-year rates peaked in the early 1960s, declined to 1.25% yearly at present (1.079% in 2010) and are expected to reach 0.2% p.a. in 2050.

We conclude that productivity has recovered in the more recent years the ground it had lost in explaining per capita GDP growth. It was helped by demographic changes that

---

12 This small change is responsible for the very high contributions shown in panel (b) and distorts the analysis.
began to work more forcefully in the 1970s and gained momentum since the 1980s. This demographic bonus is a well-known phenomenon in the development literature and is likely to continue in the medium term as more women enter the labor force (thereby increasing the EAP) and the number of people in the relevant working age group continues to grow faster than total population.

Figure 2: Brazil’s Population — 10-Year Average Growth Rates, 1950-2050 (% p.a.)

Demographic transition is represented by a reduction in fertility rates, increases in life expectancy rates (longevity) and increased female participation. Its intensity varies with countries and over time but it is commonly associated with urbanization — which is clear in Brazil after the 1940s — and increased female participation in the labor force (EAP), which further contributes to decreases in fertility.13

Thus, total fertility rates fell from 4.02 in 1980 to 2.08 in 2010 (projected) and are not expected to fall much more than that in the future. Life expectancy rose from 62.70 years in 1980 to 70.06 in 2010 (projected) and is expected to climb to 73.59 in 2050. Infant mortality fell from 80.1 per thousands born in 1980 to 28.0 in 2010. The rate is expected to fall even further to 15.1 in 2050. Women accounted for 15% of the labor force in Brazil in 1950, 27% in 1980, 35% in 1989, 41% in 1999 and 44% in 2007.14

The previous framework can also be used to make projections for the future. This is done in the next table, which contains projections for 2030. Adopting IBGE’s population projections, assuming no change in the rate of unemployment15 and per capita GDP growth

---

13 Curiously enough, the recently released PNAD results (not included in this version) show a minor increase in fertility in 2009. A survey of the literature on the economic roots of demographic change by Greenwood and Seshadri (2005) examines works that have uncovered a strong empirical nexus between changes in the demographic structure and aggregate macroeconomic variables.

14 Data from the sites [www.ibge.gov.br](http://www.ibge.gov.br) and [www.ipeadata.gov.br](http://www.ipeadata.gov.br). Note that these numbers are likely to change when the 2010 Demographic Census data become available.

15 Unemployment in 2008 reached approximately 7.3% of the labor force according to the National Household Survey (PNAD), a low level in historical perspective.
of 4.5% p.a., labor utilization would account for 40% of total log-average per capita GDP growth, while productivity would be responsible for 60%. The ratio of labor force to the working age population would be the main variable behind increasing labor utilization, as shown in the table.\footnote{Assuming lower per capita GDP growth decreases the labor productivity share and increases the activity rate share in the decomposition. Thus, assuming 3.5% per capita GDP growth reduces labor productivity’s share to 48% and increases the activity rate’s share to 46%, other things equal.}

We conclude that, barring changes in the employment rate — which are not expected to present systematic deviations from present levels in the long run — future growth will depend crucially on the continuation of recent demographic trends, plus productivity change. The former can be taken as exogenous.\footnote{This is a simplification, of course. But linking demographic change and economic growth is beyond the scope of this paper.} Thus, we should search for the sources of productivity growth as a major theme in investigating GDP growth prospects. Demographic change will not be a hindrance to long term growth in Brazil, due to the demographic transition Brazil has been experiencing in the past decades, which is likely to continue to deliver a “demographic bonus” to the pace of development in the years to come.

\begin{table}[h]
\centering
\caption{Decomposition of Log-Average per capita GDP Growth, 2008-2030 (\%)}
\begin{tabular}{lcc}
\hline
Accumulated growth in & Projected 2008-2030 \\
\hline
Per capita GDP (Y/N) & 100\% \\
Labor productivity (Y/L) & 60\% \\
Employment rate (L/EAP) & 0\% \\
Activity rate (EAP/WAP) & 35\% \\
Working age to total population ratio (WAP/N) & 5\% \\
\hline
\end{tabular}
\end{table}

\footnote{The productivity of capital is equal to the output-capital ratio adjusted for capacity utilization.}

2.2 Slower growth is correlated with low levels of capital accumulation

Brazil’s growth deceleration, expressed by the collapse of GDP growth after 1980, is associated with the slowdown of capital accumulation. This suggests that we begin our analysis by a decomposition of capital stock growth ($K’$) into its main components in searching for its major causes. The decomposition proposed next is based on an identity that separates out the effects of: saving rate at current prices ($s$), capacity utilization ($u$), capital productivity ($v$)\footnote{This identity is developed in Bacha and Bonelli (2005).} the inverse of the relative price of investment ($p^{-1}$) and the rate of depreciation ($\delta$) in explaining capital stock growth:\footnote{The analysis begins in 1947 because Brazil’s National Accounts began to be calculated in that year. The depreciation rate $\delta$ is not among the variables in the table because it changed very little between successive periods. The analysis in this and in the next sub-section is based on Bacha and Bonelli (2010).}

$$K’ = s.u.v.(1/p) – \delta$$

The decomposition results shown below follow a division of periods that has become nearly consensual among Brazil’s economic analysts. It divides the long term into phases characterized by (up to a point) similar performance and economic policy regimes.\footnote{The analysis begins in 1947 because Brazil’s National Accounts began to be calculated in that year. The depreciation rate $\delta$ is not among the variables in the table because it changed very little between successive periods. The analysis in this and in the next sub-section is based on Bacha and Bonelli (2010).}

After 1980 growth deceleration characterizes not only GDP but capital stock growth as well, as suggested. During the years of the so-called ‘Brazilian miracle’ of 1968-
73 capital stock growth reached 9.5% p.a., a rate which increased to 9.7% in the succeeding period — just before collapsing after 1980.\footnote{Note that even in the relatively slow-growth quinquennium 1963-1967 it reached a sizeable 6.4% per year.} Slow capital growth, at 2.2-2.3% p.a., prevailed even after stabilization.

As noted by Bacha and Bonelli (2005), it is hard to blame only the saving rate for the collapse after 1980: in fact, it fell approximately only one percentage point of GDP between 1974-80 and 1981-92, from 20.1% to 19.0%. But all the three other components fell much more — in different proportions, though.

Table 3: Decomposition of Capital Stock Growth Rates – Annual Averages in Selected Periods (1948-2009)

<table>
<thead>
<tr>
<th>Periods</th>
<th>K' (% p.a.)</th>
<th>s</th>
<th>u</th>
<th>v</th>
<th>(1/p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948-62</td>
<td>8.1</td>
<td>0.132</td>
<td>0.977</td>
<td>0.625</td>
<td>1.580</td>
</tr>
<tr>
<td>1963-67</td>
<td>6.4</td>
<td>0.141</td>
<td>0.937</td>
<td>0.591</td>
<td>1.396</td>
</tr>
<tr>
<td>1968-73</td>
<td>9.5</td>
<td>0.174</td>
<td>0.970</td>
<td>0.583</td>
<td>1.391</td>
</tr>
<tr>
<td>1974-80</td>
<td>9.7</td>
<td>0.201</td>
<td>0.966</td>
<td>0.542</td>
<td>1.339</td>
</tr>
<tr>
<td>1981-92</td>
<td>3.3</td>
<td>0.190</td>
<td>0.906</td>
<td>0.458</td>
<td>1.023</td>
</tr>
<tr>
<td>1993-99</td>
<td>2.2</td>
<td>0.173</td>
<td>0.931</td>
<td>0.442</td>
<td>1.002</td>
</tr>
<tr>
<td>2000-09</td>
<td>2.3</td>
<td>0.167</td>
<td>0.947</td>
<td>0.454</td>
<td>0.964</td>
</tr>
<tr>
<td>Total</td>
<td>5.8</td>
<td>0.166</td>
<td>0.948</td>
<td>0.528</td>
<td>1.248</td>
</tr>
</tbody>
</table>

Source: Bacha and Bonelli (2010); see text.

From the table results we conclude that the main culprits for slower capital growth after 1980 were reduced capital productivity (v), increased prices of investment (p) and a reduction in capacity utilization (u). This becomes clearer when differences of capital stock growth rates in consecutive periods are analyzed (Table 4).

Thus, for instance, the capital stock growth acceleration from the recession 1963-67 to the ‘miracle’ 1968-73 (+3.1%, from 6.4% to 9.5% p.a.) can be entirely attributable to a 3% absolute change in the saving rate (in fact, fueled by increased foreign savings) plus a 3% absolute change in capacity utilization, given idle capacity in the previous period (as the remaining items actually operated in the opposite direction, restraining capital accumulation).

Table 4: Capital Stock Growth Rates — Differences in Consecutive Periods

<table>
<thead>
<tr>
<th>Differences</th>
<th>K'</th>
<th>s</th>
<th>u</th>
<th>v</th>
<th>(1/p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>63/67 - 48/62</td>
<td>-1.7%</td>
<td>0.01</td>
<td>-0.04</td>
<td>-0.03</td>
<td>-0.18</td>
</tr>
<tr>
<td>68/73 - 63/67</td>
<td>3.1%</td>
<td>0.03</td>
<td>0.03</td>
<td>-0.01</td>
<td>-0.01</td>
</tr>
<tr>
<td>74/80 - 68/73</td>
<td>0.2%</td>
<td>0.03</td>
<td>-0.00</td>
<td>-0.04</td>
<td>-0.05</td>
</tr>
<tr>
<td>81/92 - 74/80</td>
<td>-6.4%</td>
<td>-0.01</td>
<td>-0.06</td>
<td>-0.08</td>
<td>-0.32</td>
</tr>
<tr>
<td>93/99 - 81/92</td>
<td>-1.1%</td>
<td>-0.02</td>
<td>0.02</td>
<td>-0.02</td>
<td>-0.02</td>
</tr>
<tr>
<td>2000/09 - 93/99</td>
<td>0.1%</td>
<td>-0.01</td>
<td>0.02</td>
<td>0.01</td>
<td>-0.04</td>
</tr>
</tbody>
</table>

Source: Table 3.

From the ‘miracle’ period to the next one a slight acceleration in K’ was observed (+0.2%), which was entirely due to increased savings (again, foreign-originated). All other
factors contributed to restrain capital accumulation, especially lower capital productivity. Between this last period and the long lost decade of 1981-92 capital stock growth fell from 9.7% to 3.3% p.a., but only a fraction can be attributable to lower savings. All remaining variables displayed highly negative contributions.

Capital accumulation continued to decrease thereafter during the ‘reforms phase’ (1993-99). Blame for this decrease can be shared between a lower rate of savings, a minor reduction in capital productivity and a slight increase in the relative price of investment goods. Finally, in the last period — characterized by a new policy regime from 1999 on — the modest recovery in capital accumulation is explained by higher capacity utilization and, secondarily, by increased capital productivity. The saving rate, in turn, displayed a minor decrease, restraining capital accumulation.

This approach highlights the role of reduced savings in helping to explain capital accumulation, from 20.1% in the phase just before 1980 to 16.7% in 2000-09 — therefore, in accounting for slower economic growth as well, especially as far as future growth is concerned. And this is so because, at present: capacity utilization has reached relatively high levels (thus, one cannot expect much from this source in contributing to increasing capital accumulation); capital productivity tends to increase with fast output growth, but not much (if at all); the relative price of investment goods has fallen because it benefitted from higher capital goods imports, and is approximately stable at present. Therefore, low investment rates (at about 19% of GDP; 2010 estimate), reflecting low savings rates, is the main constraint from the supply side. To this we should add slow productivity growth, a point to which we now turn to.

2.3 Growth Accounting and Total Factor Productivity (TFP)

Without loss of generality we calculated TFP growth as a residual in an aggregate Cobb-Douglas production function with constant returns to scale with neutral technical change. A log linearization of the function yields

\[ Y' = \alpha (u.K)' + (1 - \alpha) L' + TFP' \]

where, given the usual hypotheses, \( Y' \) is the output growth rate, \( \alpha \) is the income share of capital, \((u.K)’\) is the growth rate of utilized capital stock, \(L'\) is the growth rate of employment and \(TFP'\) is TFP’s growth rate.\(^{22}\) The resulting annual series reveal that: \(^{23}\) (a) TFP growth rates display large volatility; \(^{24}\) (b) negative rates are not found very often from the late 1940s to 1980 (just five occurrences: 1952, 1953, 1963, 1975 and 1977); (c) from then on negative TFP rates are not uncommon (for instance: in the 1981-92 years TFP grew only in 1984-86); (d) after 1992 a TFP recovery is observed: TFP only fell five times (usually during recessions).

It is trivial to deduce from the definition of TFP growth that it can be written as a weighted average of capital and labor productivity growth, the weights being \(\alpha\) and \((1 - \alpha)\). This allows for a decomposition of TFP growth into these two components. Table 5 shows\(^{22}\)

\(^{22}\) The coefficient \(\alpha\) was taken as 0.46, its average value for 2000-2007, as the ratio of labor compensation to total labor compensation plus gross surplus in Brazil’ National Accounts. There is some evidence that this value has been decreasing slightly in recent years.

\(^{23}\) See Appendix 2.

\(^{24}\) In addition, they are not associated with measures of human capital, which is one item included in TFP when it is calculated as a residual in the production function.
the decomposition results in the same time periods shown before, characterized by amply similar origins and consequences of economic policy regimes.

From the table we conclude that Brazil’s productivity performance varied enormously over time. TFP average growth ranged from –1.0% p.a. during the ‘long lost decade’ (1981-92) to 4.0% yearly in the ‘miracle’ years of 1968-73. Note that TFP growth recovered after 1992, but not much. Since 2000 average TFP growth, at 1.0% p.a. until 2009, is more pronounced. Incidentally, the same rate was observed in the long term average.

Table 5: Average TFP Growth Rates Decomposed into Capital and Labor Productivity Contributions, Selected Periods, 1948-2009 (% p.a.)

<table>
<thead>
<tr>
<th>Period</th>
<th>TFP</th>
<th>Due to capital productivity</th>
<th>Due to labor productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948-62</td>
<td>2.3%</td>
<td>-0.4%</td>
<td>2.7%</td>
</tr>
<tr>
<td>1963-67</td>
<td>0.3%</td>
<td>-0.7%</td>
<td>1.0%</td>
</tr>
<tr>
<td>1968-73</td>
<td>4.0%</td>
<td>0.4%</td>
<td>3.6%</td>
</tr>
<tr>
<td>1974-80</td>
<td>1.0%</td>
<td>-1.1%</td>
<td>2.0%</td>
</tr>
<tr>
<td>1981-92</td>
<td>-1.0%</td>
<td>-0.6%</td>
<td>-0.4%</td>
</tr>
<tr>
<td>1993-99</td>
<td>0.2%</td>
<td>-0.1%</td>
<td>0.3%</td>
</tr>
<tr>
<td>2000-09</td>
<td>1.0%</td>
<td>0.5%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Total (1948-2009)</td>
<td>1.0%</td>
<td>-0.3%</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

Source: author’s calculations; see text.

The annual TFP results shown in Table A.2 (Appendix) reveal two interesting aspects. First, the capital productivity contribution to TFP growth is positive only in approximately 1/3 of the years. Usually, years and periods of very fast GDP growth. This also appears in the averages shown in Table 5: the contribution of capital productivity to TFP is positive in two periods, only (1968-73 and 2000-09). Labor productivity growth, on the other hand is negative only rarely: of the 62 rates shown in Table A.2 it is negative in 12 years, all of them characterized by economic recession and loss of output. In terms of period averages, as shown in Table 5, it is negative only during the ‘lost decade’ (1981-92). These findings suggest that productivity is pro-cyclical.

Second, the contribution of labor productivity is always much larger than capital’s, the exception being the average 2000-09, when they are equal. This suggests that labor productivity “sustained” TFP growth in the long term. Considering the 60-odd years average TFP growth of 1.0% (1948-2009), the contribution of labor productivity was 1.3% p.a., while that of capital reached –0.3% per year.

A traditional sources of growth approach is shown next (Table 6), where it is found that capital stock growth accounts for most of GDP growth in most periods — the exception being the most recent phase (2000-09).

The long term average in the last line indicates that average GDP growth of 5.1% was due to 1.0% TFP growth (or 20% of the average rate), 2.7% capital stock growth (or 52% of total GDP average growth) and 1.4% labor growth (28% of total growth). The averages hide significant inter-period changes, the most noticeable of which refer to productivity, where rates vary from –1.0% p.a. to 4.0% p.a., as told. Labor, on the other hand presents the least variation: 0.9% yearly in 1963-67 to 2.4% p.a. in 1968-73.
Table 6: Sources of Output Growth, Selected Periods, 1948-2009 (%)

<table>
<thead>
<tr>
<th>Period</th>
<th>GDP</th>
<th>TFP</th>
<th>% GDP</th>
<th>Capital</th>
<th>% GDP</th>
<th>Labor</th>
<th>% GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948-62</td>
<td>7.6%</td>
<td>2.3%</td>
<td>30%</td>
<td>3.9%</td>
<td>51%</td>
<td>1.4%</td>
<td>19%</td>
</tr>
<tr>
<td>1963-67</td>
<td>3.5%</td>
<td>0.3%</td>
<td>8%</td>
<td>2.3%</td>
<td>67%</td>
<td>0.9%</td>
<td>25%</td>
</tr>
<tr>
<td>1968-73</td>
<td>11.2%</td>
<td>4.0%</td>
<td>36%</td>
<td>4.7%</td>
<td>42%</td>
<td>2.4%</td>
<td>22%</td>
</tr>
<tr>
<td>1974-80</td>
<td>7.1%</td>
<td>1.0%</td>
<td>13%</td>
<td>4.3%</td>
<td>61%</td>
<td>1.8%</td>
<td>25%</td>
</tr>
<tr>
<td>1981-92</td>
<td>1.4%</td>
<td>-1.0%</td>
<td>-70%</td>
<td>1.3%</td>
<td>88%</td>
<td>1.2%</td>
<td>82%</td>
</tr>
<tr>
<td>1993-99</td>
<td>2.9%</td>
<td>0.2%</td>
<td>6%</td>
<td>1.5%</td>
<td>51%</td>
<td>1.2%</td>
<td>43%</td>
</tr>
<tr>
<td>2000-09</td>
<td>3.3%</td>
<td>1.0%</td>
<td>30%</td>
<td>1.0%</td>
<td>32%</td>
<td>1.2%</td>
<td>38%</td>
</tr>
<tr>
<td>Total 1948-2009</td>
<td>5.1%</td>
<td>1.0%</td>
<td>20%</td>
<td>2.7%</td>
<td>52%</td>
<td>1.4%</td>
<td>28%</td>
</tr>
</tbody>
</table>

Source: author’s calculations; see text.

The main findings from this section can be summarized as follows: (i) per capita GDP changed mostly in response to productivity growth in the long term; (ii) but the contribution of demographic bonuses in the form of increasing labor utilization has been growing and is likely to continue in the foreseeable future; (iii) slow growth after 1980 followed slower capital accumulation, but savings were only part of the picture; (iv) despite this last conclusion, from now on savings and investment rates must increase for growth to resume; (v) productivity change has recovered, but it needs boosting as well; the record suggests that productivity is pro-cyclical.

In fact, more than one study has identified lack of savings as a major growth constraint in Brazil. According to Hausman, Rodrik and Velasco,25 the poor growth performance can be explained by low saving and too little emphasis on education. The plausibility of the hypothesis rests on observed high returns on capital and education: “If domestic savings are scarce, high foreign debt or a large current account deficit would signal that the country is making extensive use of foreign savings… There would also be a strong willingness to remunerate domestic savings through high interest rates… The challenge for Brazil is to explain why domestic savings do not rise to exploit large returns to investment (Hausman, Rodrik and Velasco, 2005).”

The answer, as suggested by the authors, lies in issues to be explored in the next section: “Brazil … suffers from an inadequate business environment, a low supply of infrastructure, high taxes, high prices for public services, weak contract enforcement and property rights, and inadequate education… Investment is … constrained by the country’s inability to mobilize enough domestic and foreign savings (not anymore, apparently; our addition) to finance investment at reasonable rates… A more sustained relaxation of the constraint on growth would therefore involve increasing the domestic savings rate… Brazil’s share of public revenue, at 34 percent of GDP, is by far the highest in Latin America and one of the highest in the developing world. Yet public savings have been negative … High taxes and low savings reflect high spending and social transfers and

---

25 The growth diagnostics approach created by Hausman, Rodrik and Velasco (2005) has been used to analyze growth barriers in Brazil in, for instance, Bonelli and Pinheiro (2008) and Blyde et al. (2010).

26 But it should be noticed that the returns to education have been decreasing in recent years.
reduce the disposable income available to the formal private sector...” (Hausman, Rodrik and Velasco, 2005, *passim*).

One of the main conclusions from their analysis is that a lower tax burden resulting from lower public expenditures would contribute both directly to increased savings (because it would allow the public sector to save) and indirectly (by increasing funds available to the private sector).

The list of issues just cited suggests the approach to be adopted next in order to deepen the analysis on growth barriers, when we turn to factors that have inhibited savings, investment and productivity. The analysis focuses on five main issues: high tax burden, weak institutional pillars, insufficient infrastructure, inadequate finance, and low educational levels. Thus growth-enhancing reforms should focus on improving: (i) the fiscal stance; (ii) institutions and related policies (especially through regulatory reform); (iii) infrastructure (implying increased public expenditures, which require shifts in the structure of expenditures); (iv) financial development (which presumes a larger role for private agents, opposing the recent trend towards increasing the state presence in granting long and short term loans); and (v) human capital.

3. Obstacles to Growth Acceleration

The list of factors deemed responsible for the country’s less-than-expected growth is large and covers a broad array of subjects, as noted. In what follows a reasonably common set of explanatory factors is analysed, following the suggestions at the end of the previous section. The next section takes up the theme of reform proposals and discusses policy alternatives.

3.1 The obstacle represented by a high tax burden

The obstacle to growth represented by a high tax burden has been clearly recognized in the literature. In Brazil, the rise in public current spending that underlies increases in the tax burden has among its roots the new obligations in the 1988 Constitution (or immediately thereafter), when a phase of 20 years of fiscal centralism ended and a large share of tax revenues was transferred to sub-national governments (state and municipalities), but without a corresponding reallocation of responsibilities. While state and municipal governments used revenue windfalls to increase consumption and hire civil servants, the federal government contracted non-discretionary spending (mostly investment) and attempted to decentralize responsibilities. Eventually, the federal government transferred most activities in health, education and public transportation to the states and municipalities, but remained responsible for financing some of them (in health, for instance). The 1988 Constitution and other reforms also expanded social security expenditures and created more generous retirement rules for civil servants and private sector workers, notably in the rural sector.

In the initial years after its enactment, the central government financed its growing current expenditures counting on an inverse Tanzi effect (since revenues were better indexed to inflation than expenditures) and on augmented *seignorage* revenues. When

---

27 Note, however, that foreign savings (current account deficits) have been increasing since 2008. This trend is expected to continue in the near future, in which case it may soften the domestic savings constraint. Even so, domestic savings must increase for growth to resume at faster rates than those reached recently. See below.
inflation was tamed (after 1994), the government relied on expanding the public debt. High interest rates on government bonds have kept their attractiveness, but are costly as far as GDP growth is concerned, for they set a floor to all other interest rates in the economy. They also contribute to increase overall government’s expenditures.\textsuperscript{28}

Increased borrowing was accompanied by raising taxes. The federal government, in particular, boosted its tax proceeds by creating new taxes and raising rates on social contributions,\textsuperscript{29} with three important effects: (i) they counterbalanced decentralization promoted by the Constitution and, indeed, brought about some re-centralization; (ii) the quality of the tax system worsened; and (iii) as no compensating tax reduction occurred in states and municipalities, the total tax burden increased.\textsuperscript{30}

The surge in public consumption (primary expenditures, which include retirement, pensions, etc.) was so large that, notwithstanding the rise in debt and taxes, it could only be accommodated due to a significant decline in public investment: summing the public administration and federal SOEs, public investment dropped from 7.9\% of GDP in 1968-78 to 2.7\% of GDP in 2003-05.\textsuperscript{31}

Infrastructure was especially hit, with public investment in this area (including SOEs) declining by about 4\% of GDP between 1971-80 and 2001-03, a contraction that was not at all compensated by a rise in private infrastructure spending. One of the consequences has been the deterioration in physical infrastructure, with negative effects on productivity growth. As a late recognition of this fact, investment in infrastructure has recently been elected a top priority in the government agenda, as witnessed by the launching of PAC — \textit{Programa de Aceleração do Crescimento} (Growth Acceleration Program) in early 2007. Infrastructure spending accelerated since then, but: results are slow to appear; and the level of spending is still below what is needed.

To evaluate the impact of taxation increases and simultaneous infrastructure investment reductions on Brazil’s long-term growth Pinheiro, Bonelli and Pessôa (2009) developed a counterfactual exercise that simulated what would have happened to Brazil’s long-term growth had taxation and infrastructure investment stayed at levels similar to those observed before the 1988 Constitution was enacted. They found that the adoption of this course of action led to a 2006 GDP level 18\% smaller when compared to the counterfactual scenario. Such accumulated GDP reduction, spread through nearly 20 years, amounts to an annual average decrease of almost 1 percentage point in the growth rate of GDP. The increase in the tax burden was identified by the authors as a ‘reform’ that took

\textsuperscript{28} Public consumption increased from an average of 10.9\% of GDP in 1951-80 to 20.0\% in 1995-2005, while both public savings and investment fell substantially. (Pinheiro, Bonelli and Pessôa, 2009) The share of public consumption on GDP has been kept after approximately at 20\% since 2005 (includes investment and current expenditures on goods and services; source - Quarterly GDP database, IBGE).

\textsuperscript{29} A ‘contribution’ is a kind of tax that is not shared with sub national governments.

\textsuperscript{30} The number of tributes increased as well. Some of them are applied cumulatively, some share the same tax base and others have rates that vary with time and region of the country. The final result is a complex, unstable and costly tax system. Among other things, this complex system has increased investment risk and fostered informality, with negative consequences for human capital investment and productivity growth (Pinheiro, Bonelli and Pessôa, 2009).

\textsuperscript{31} Reclassifications resulting from privatization account for about 1\% of GDP only (ibid).
the economy away from the kind of market-based economic model aimed at when adopting privatization, trade and financial liberalization and de-regulation.\(^{32}\)

Thus, the importance of a disproportionately high tax burden is a crucial factor in explaining low savings and investment rates. In addition, the next table shows that Brazil’s tax burden is not only high compared to developing countries such as Mexico and Turkey, but has been increasing substantially as well.\(^{33}\) In 2008 it was only slightly lower than OECD’s average (34.4\% compared to 35.1\%) and much higher than the average in Latin America.\(^{34}\)

Note that the temporary fall observed in 2009 was due to the fiscal policies adopted to deal with the domestic recession after the 2008 world crisis — mainly, reduction of taxes on consumer durables (cars, furniture, and electric and electronic appliances, mostly), capital goods and construction material — and to the recession itself. Parts of these incentives to boost spending were discontinued in the second quarter of 2010.

### Table 7: Tax Burden—Brazil (2000-10) and selected OECD countries (2008)

<table>
<thead>
<tr>
<th>Year</th>
<th>Brazil (% of GDP)</th>
<th>Japan</th>
<th>Mexico</th>
<th>United States</th>
<th>Ireland</th>
<th>Switzerland</th>
<th>Canada</th>
<th>Spain</th>
<th>New Zealand</th>
<th>United Kingdom</th>
<th>Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>29.98</td>
<td>17.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>30.89</td>
<td></td>
<td>20.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>32.01</td>
<td></td>
<td>23.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>31.5</td>
<td></td>
<td></td>
<td>26.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>32.31</td>
<td></td>
<td></td>
<td>28.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>33.38</td>
<td></td>
<td>29.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>33.35</td>
<td></td>
<td>32.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>33.95</td>
<td></td>
<td>33</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>34.41</td>
<td></td>
<td>34.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>33.58</td>
<td></td>
<td>35.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>34.6</td>
<td></td>
<td>35.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Brazil’s increase 2000-10 in p.p. 4.6 OECD average (all countries) 35.1

Sources: Receita Federal do Brasil and OECD; Brazil’s estimate for 2010 is preliminary.

Pres. Lula’s second term (2007-10) has been characterized by increased government expenditures. The trend was reinforced after the 2008 crisis, as the federal government augmented spending as an action to counterbalance the crisis effects. In addition to that, a strong fiscal impulse has also been based on large real minimum wage increases.\(^{35}\)

This state of affairs has continued even after it became clear that Brazil had experienced only a short recession in late 2008-early 2009. The government has resorted to the justification that policies of increased expenditures have been adopted nearly

\(^{32}\) Three additional problems associated with Brazil’s high tax burden are: (i) the uncertainty brought about by a high public debt to GDP ratio, which contributes to high interest rates; (ii) the rigidity of the main budget expenditure items, which include many earmarking provisions that allow the authorities very little discretion and make fiscal policy pro-cyclical; and (iii) the complexity of the tax structure, which imposes a further burden on economic agents. (Pinheiro, Bonelli and Pessoa, 2009, passim)

\(^{33}\) The increase from the pre-Constitution years to the late 2000s amounts to nearly 12\% p.p. of GDP. In 2005-09 approximately 70\% of the tax burden was due to federal taxes and ‘contributions’, 26\% to states’ and 4\% to municipalities’.\(^{34}\)

\(^{34}\) 18.4\% of regional GDP, according to ECLAC (2010).

\(^{35}\) National Accounts results recently released show that the tax burden is slightly higher than presented in the table above. In 2008, for instance, it amounted to 34.9\% of GDP.
everywhere. As a result, the presence of the State in the economic sphere has been greatly enhanced. This aspect has implications for the process of institutional development as well.

In addition, in 2010 a worsening of the fiscal position is expected. At the same time ‘creative’ use of Treasury lending to the National Development Bank (BNDES) has succeeded in keeping the net public debt approximately constant, while the gross debt increases.

3.2 Institutional or policy settings that could explain past performance

The quality of institutions has been recognized as a key factor in economic development. But institutional development takes place slowly, its impact on growth is not easy to gauge when time series information for individual countries are used to evaluate it, and there is no clear answer as to which institutions are more important to enhance growth. A related controversial issue is causality, because institutions are simultaneously cause and consequence of growth.

Therefore, analyses and conclusions from individual countries over short time spans should be viewed with a grain of salt, or as merely indicative. The least that can be said is that the creation and working of clear and respected regulatory frameworks and strict observance of the rule of law are important as sources of growth due to their allocative effects on factor use and aggregate supply. This is one of the instances in which it seems safe to say that institutional reform antecedes growth.

In what follows we use a World Bank database — namely, the World Governance Indicators (WGI)38 — to evaluate Brazil’s institutional development according to the six dimensions covered by the WGI survey: (i) Voice and Accountability; (ii) Political Stability and Absence of violence; (iii) Government Effectiveness; (iv) Regulatory Quality; (v) Rule of Law; (vi) Control of Corruption. We compiled series of 3-year moving averages for these indicators, which are shown in the next figure.

The main conclusion from the figure is straightforward: over the decade analyzed Brazil has improved its position relative to the world average in one dimension only: Voice and Accountability.40 This is one of the two dimensions in which Brazil has displayed above world average grades during the whole period for which the indicator is available.

---

36 The accounting procedure is such that the lending is backed by assets (loans extended by the by BNDES) that presumably will be paid out in due time.
37 Besides, if, on the one hand, institutional reform can be facilitated during a growth phase, on the other existing growth may imply that reforms are not necessary, because growth has been occurring without their help.
38 See Kaufmann, Kraay and Mastruzzi (2009), or KKM, for short. The governance indicators are measured in normalized units ranging from -2.5 to +2.5 (the world average is zero), with higher values corresponding to better governance outcomes. They cover 212 countries and territories and include hundreds of variables from 35 different data sources to capture the views of tens of thousands of survey respondents worldwide, as well as thousands of experts in the institutes, think tanks, NGOs and international organizations both in the private and public sectors on the quality of governance.
39 The indicators are available for the years 1996, 1998, 2000 and from 2002 to 2008 on a yearly basis. We added averages for 1997, 1999 and 2001 to fill the gaps and allow for the construction of 3-year averages for the decade beginning in 1998 and ending in 2008. The 2009 dataset is not available yet.
40 Defined by KKM as “the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, association, and the press.”
Indeed, the country has been steadily improving its position over time, at least until 2008 (average 2006-08).

The other dimension in which Brazil has been performing above world average is regulatory quality: “the ability of the government to provide sound policies and regulations that enable and promote private sector development.” (KKM, 2009) In this case, however, the record shows a peak in 2000 and a gradual worsening over time up to 2007, with a recovery in 2008. With few exceptions, the capture of regulatory agencies in the more recent years by specific interest groups (with close links with the sector ministries they are expected to regulate) has implied a worsening in this dimension, as future research will probably show. In a sense, this is also reflected in the “control of corruption” dimension (next).

![Figure 3: Governance Indicators, 1998-2008](image)

Source: Kaufmann, Kraay and Mastruzzi; see text

The control of corruption dimension — “the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as elite ‘capture’ of the state” (KKM, 2009) — represents a case in which progress in the initial years, up to 2000, was compromised afterwards. After remaining at world average levels until 2005, the indicator drops until 2007 and recovers a little in 2008.

Brazil’s record in all other three dimensions has been, and still is, poor relative to the world average. Furthermore, the trends over time not always point to positive achievements: (i) government effectiveness (“the quality of public services, the capacity of the civil service and its independence from political pressures; the quality of policy formulation”) improved until 2005 — only to drop afterwards; (ii) political stability and absence of violence (“the likelihood that the government will be destabilized by unconstitutional or violent means, including terrorism”) improved until the early 2000s, but fell a little afterwards;41 (iii) and the rule of law dimension (“the extent to which agents

41 In all likelihood the decrease can be explained by the surge of public violence in recent years, which state governments are trying to curb. With positive results, in some cases (e.g., in Rio de Janeiro).
have confidence in and abide by the rules of society, including the quality of property rights, the police, and the courts, as well as the risk of crime”) has always been the dimension characterized by the lowest record — and one in which the curve in the figure above shows a constant decline until 2007.

The conclusion is that Brazil’s record in terms of institutional quality has not been brilliant relative to the world average. The average for all six indicators is exactly the same in 1996 and in 2007. There was improvement in 2008, though. But there is a long way to go before governance levels and institutional quality become similar to those found in most advanced economies. And it is feared that the process of ‘capture’ of regulatory agencies by interest groups and politicians that has been going on since Pres. Lula’s first term will hardly be reflected in institutional improvements.\(^\text{42}\)

In a previous work (Bonelli, 2009) the analysis of the WGI dataset for 2006 allowed for the following conclusions: (i) all six dimensions are highly correlated, the highest correlation coefficient being the one between regulatory quality and government effectiveness (R = 0.95); (ii) cross country regression equations (including 175 countries) for each dimension against per capita national income result in positive associations and show that Brazil was below the average — meaning that its record was that of a country with a higher income — in only one dimension: political stability and freedom of expression. In all the other ones the Brazilian indicator was characteristic of a country with lower per capita income than the actual one.

Repeating the exercise with the WGI 2008 dataset yields essentially the same results, but now: (i) the highest correlation occurs between “corruption” and the “rule of law” dimensions (R=0.947), followed by the one between “government effectiveness” and “rule of law” (R=0.934); (ii) “government effectiveness” and “regulatory quality” are also closely related (R=0.932).

More recent data from the Global Competitiveness Report (GCR) 2010-2011 (World Economic Forum, 2010) shows that Brazil lost in 2010 little of the ground it had acquired in the previous years: the Report’s latest issue shows that Brazil went from the 56\(^{\text{th}}\) to the 58\(^{\text{th}}\) position among 139 countries between 2009 and 2010. It ranks especially low in the pillars related to “Goods Market Efficiency” (114\(^{\text{th}}\)), “Macroeconomic Environment” (111\(^{\text{st}}\)), “Labor Market Efficiency” (94\(^{\text{th}}\)), “Institutions” (93\(^{\text{rd}}\)), and “Health and Primary Education” (87\(^{\text{th}}\));\(^{43}\) and less so in “Financial Market Development” (50\(^{\text{th}}\)), “Technological Readiness” (54\(^{\text{th}}\)) and “Infrastructure” (62\(^{\text{nd}}\)).\(^{44}\) In particular, the Report estimates that investment in infrastructure should reach (at least) 5 percent of GDP to keep infrastructure from becoming a bottleneck to achieving sustained (high) growth rates in the future.

Thus, the institutional environment remains relatively weak in areas related to legal and regulatory issues, a situation that tends to deteriorate with the on-going process of

\(^{42}\) Few agencies are truly independent at present. Most have either become inoperative or subject to the ministries whose activities they are supposed to regulate.

\(^{43}\) Note that the median is 69.5.

\(^{44}\) On the positive side the GCR 2010-2011 also notes that “Brazil displays one of the most developed and sophisticated financial sectors in the region (50th), coupled with fairly efficient infrastructure by regional standards (ranked 62nd, up 12 places from 2009) and a relatively well functioning higher education system (58th), notably in its on-the-job training component (38th).” (ibid.)
capture of firms and agencies by particular interests, and contract enforcement. The country’s business environment is also dragged down by a high cost of doing business, and less-developed human capital. On the other hand, a high degree of IPO activity contributes to the country’s relatively high scores in non-banking financial services, according to the GCR 2010-11.

The high cost of doing business in Brazil has also been measured by the country’s position in international comparisons. The latest World Bank Doing Business 2010 report has ranked Brazil in the 129th position among 183 countries. What is worse, Brazil lost two positions from the previous report, indicating that excessive regulation and bureaucratic procedures have not been solved or, at least, dealt with.\textsuperscript{45}

From the report we conclude that private investment presently faces three key challenges to improving business environment conditions: (i) regulatory bottlenecks and political uncertainties; (ii) excessive renegotiations of concessions; and (iii) the lack of efficiency of regulatory agencies, a process which has been worsening in the recent past. The coincidence of analyses in the GCR and the Doing Business reports with the WGI indicators is suggestive of the weakest institutional aspects, or dimensions. It is also fitting to bring attention to the fact that juridical uncertainty is associated with fragile legal and regulatory frameworks. All these dimensions tend to constrain investment and growth.

3.3 Impediments to investment in infrastructure

It has long been established that the availability and quality of infrastructure services of telecommunications, road and railroad transportation, ports, transmission and distribution of energy, and water and sanitation lead to higher productivity and lower costs for the private sector, thereby facilitating growth and increasing its prospects. Accordingly, many empirical studies that have examined the relationship between infrastructure investment and economic growth have found a positive and significant association between the two (Rozas, 2010).\textsuperscript{46} Studies have also found a correlation between infrastructure investment and overall investment.\textsuperscript{47}

To what extent is infrastructure a binding constraint to growth in Brazil? It is a known fact that the growth slowdown in Brazil occurred simultaneously with the reduction of expenditures in infrastructure. The reduction in infrastructure investment reflected the retrenchment in public investment, including both central and local governments and state enterprises. Privatization and regulatory reform have not been able to reverse this decline (Blyde et al., 2010). But a recent study has found that central government infrastructure investment has recovered steadily since 2003: having reached only 0.31% of GDP in that

\textsuperscript{45} Thus, for instance, the Brazil time spent on paying taxes is the highest in the world: 2,600 hours per year (World Bank, 2009, p. 58). Reforms in 2008-09 have been more effective in the procedures related to starting businesses (ibid, p.98).

\textsuperscript{46} A pioneering work for Brazil has found that the causation runs from infrastructure investment to growth (Ferreira and Maliagros, 1998).

\textsuperscript{47} In the case of Brazil the following conclusion holds, as shown by Ferreira and Araujo (2007): “Having established a firm relationship between investment flows and infrastructure capital variation, the next step is to assess relationships between public capital and GDP (and per capita GDP). The cumulative impact of changes in public capital on private capital and output per capita is relatively sizeable, especially if we consider the long run response.”
year, the ratio went to 1.02% in 2009 and is estimated to reach 1.14% in 2010. During Pres. Cardoso’s term this ratio had averaged 0.83% of GDP.48

In fact, the issue is common to many countries. Part of the growth slowdown in Latin America, for instance, has been attributed to lower infrastructure investment.49 The reduction of capital expenditures, a general phenomenon in the region, is characteristic of the times of fiscal restrictions, when public investments were curtailed. A good part of the burden of fiscal adjustment was felt first and with more intensity in infrastructure. Many studies also found that there is a correlation between increased public sector deficits and reduced public investment infrastructure expenditures made by the public sector, a situation that began in the early 1980s as the foreign debt crisis erupted. Not coincidentally, at that time Brazil (and other countries) started its growth collapse. The need to have fiscal adjustment together with servicing an increasingly costly external debt led countries to restrain public expenditures, mostly on capital investment. The same continued to occur in the 1990s, as the fiscal crises in many states forced them to postpone infrastructure expenditures before sacrificing consumption and debt service expenditures.50

Thus, the annual average of infrastructure investment in the main economies in Latin America during 1980-1985, 1996-2001 and 2002-2006 went from 3.7% of GDP to 2.2% and to 1.5% (Rozas, 2010). Ferreira and Gonçalves do Nascimento (2005) estimate that the decline in public investment since the early 1980s, largely concentrated on infrastructure, lowered Brazil’s annual GDP growth by about 0.4 percentage points.

As mentioned, the public investment decline in Brazil has also been due to the effort to generate budget surpluses, as in the other countries of Latin America. One political explanation for the myopic behavior of policy makers, who restrain infrastructure investment in order to solve fiscal constraints, is that “with short-term tenures (e.g., four or six years) they have little incentive to consider the future gains of infrastructure expenditures.” (Ferreira and Araujo, 2005)

Another explanation lies in one crucial characteristic of Brazil’s recently adopted policy mix: its reliance on private and public consumption as growth-enhancing variables, even before the 2008 crisis.

Thus, infrastructure spending in Brazil declined from the 1970s to the early 2000s. It averaged 5.4% of GDP during the 1970s, 3.6% in the 1980s, 2.3% in the 1990s, and 2.1% in the 2000s, and has been identified as one of the binding constraints in the near future, despite recent efforts by the central government: “Although part of the decline in SOE investment stems from changes in classification, as a result of privatization, the bulk of it had already happened by 1990-94, before the peak of privatization in 1996-98. Indeed, the decline in public investment is underestimated, for it does not take into account the contraction in investment by state and municipal SOEs. The main consequence of this fall in public investment has been the deterioration in the quantity and quality of infrastructure.” (Blyde et al., 2010)

49 Calderon and Serven (2003) estimated that one third of the growth difference between Latin America and East Asia is due to underinvestment in infrastructure.
50 “In most Latin American countries, public investment, particularly in infrastructure, bore the brunt of fiscal adjustment” (Fay and Morrison, 2005).
Macroeconomic instability contributed to the observed decline until recently, as it increased the cost of capital and implied uncertainty towards the future. According to the World Bank (2007, p. 25), however, although “evidence shows that higher infrastructure investments may lead to higher growth rates and better social indicators … it is not possible to claim that infrastructure is a binding constraint to higher sustainable growth rates in Brazil — especially when compared to high current expenditures and high levels and incidence of taxation”. This is not to say, of course, that it may not become a binding constraint, if infrastructure investment stays at their current low levels.

Frischtak (2007) estimates that public and private investment in infrastructure has averaged only 2.21% of GDP in 2001-2006 (water and sanitation, electric energy, communications and road construction account for 93% of the total, railroads, airports, ports, hydro ways for 7%). He notes the central role played by BNDES, the National Development Bank, in accounting for these results: “In 2007 investment in infrastructure reached R$ 57.3 billion (2.15% of GDP), of which 12.4 by the central government and 44.9 by private and public enterprises. Of these, BNDES disbursements came to represent 53.5%.” (Frischtak, 2007)

A recent mapping of infrastructure projects at the sector level, planned for the present and for the next three years put infrastructure investment at R$274 billion in 2010–13, or 37% higher than the R$199 billion disbursed in 2005–08. The estimate for 2010–13 corresponds to only 2.2% of GDP — in line with the average 2.1% of GDP spent in recent years (Borça and Quaresma, 2010).

Over the past 10 years, the private sector has accounted for almost 90% of total investment (not only infrastructure) in Brazil, while the public sector was responsible for the remaining 10% (ibid). In infrastructure investment, however, the private and public sectors have shared the burden. The bulk of total projected infrastructure investment in 2010-13 is concentrated in the electricity sector, which is expected to account for about one-third of total infrastructure investments during the next four years. Telecommunications come second, with a share of 24.5% of the total, followed by water and sewage with a share of 14.2%.

Thus, public sector investment in infrastructure, albeit increasing, has been low. It could grow even more over time if authorities manage to create enough fiscal space. A crucial challenge to increasing public sector investment in infrastructure without reducing consumption expenditures is that the tax burden is already high. In addition, most of the budget is earmarked for hard-to-curb expenditures like payroll and social security. As to challenges to the private sector, the main ones are the legal and regulatory frameworks, as mentioned above.

3.4 Financial Development

Financial development is usually measured by factors such as size, depth, access, efficiency and stability of a given financial system. Evidence suggests that both the level of banking sector development and stock market development exert a causal impact on economic growth (and are highly correlated with subsequent GDP per capita growth as

51 Despite the scheduled projects associated with the 2014 World Cup, 2016 Olympics, pre-salt oil reserves, and government-backed Growth Acceleration Programs (PAC 1 and PAC 2).
well; Levine, Loayza and Beck, 1999). A World Bank report also notes that: “Deep and efficient financial markets promote investment and TFP growth through their role in selecting and monitoring projects, diversifying risks, reducing asymmetries of information, improving resource allocation, and encouraging the optimization of scale, time frame and technology”. (World Bank 2004, p.2)

Financial market development, especially concerning long term financing mechanisms, has been one area in which reform progressed less than expected in Brazil, despite recent huge increases in lending to the private sector by both private and public agents. The adoption of a ‘growth diagnostics’ approach advocated by Hausmann, Rodrik and Velasco (2005) indicates that financing constraints are a main impediment to growth in Brazil, as mentioned. As advanced by Rodrik (2005, p. 11):

“All the indications are that this (Brazil) is an economy that is bumping against a financing constraint. Real interest (rates) are extremely high …. and the current account balance is driven by the willingness of foreign creditors to lend. (…) Brazil, therefore, is a high-return country where the domestic financial system and external capital markets constrain the equilibrium level of investment. The solution therefore lies in improving financial intermediation and in increasing Brazil’s external creditworthiness (in part by tight fiscal policies).”

The situation has partially changed since then, due to: the deepening of the financial sector since the mid-2000s; the increasing role attributed to the public sector since the 2008 crisis; and improved external creditworthiness conditions.

Results from the latest Financial Development Report (FDR) 2009 help us in putting Brazil on a comparative perspective with respect to other countries, especially because of its performance during and immediately after the 2008 world crisis. Thus, Brazil is 15th in the world (among 55 countries), with a score of 5.13 (maximum of 7) within the financial stability pillar, a key contributor to Brazil’s ranking of 34th in the overall index. In overall financial development it ranks 34th in 2009, against 40th in 2008, indicating improvement in this dimension: “Of the relatively few countries that experienced an increase, Brazil experienced the largest (+0.18) and Australia the second largest (+0.15), which would seem consistent with the relatively robust performance of their financial systems in the face of the extreme instability of the past year.” (FDR 2009)

The country has exhibited stability across its banking system (25th) through the crisis and shows currency stability (3rd) as a particular advantage. Although it possesses the index’s highest official supervisory power (1st), Brazil’s institutional environment remains relatively weak in areas related to legal and regulatory issues (49th) and contract enforcement (42nd). Brazil lowest ranking in the latest FDR (47th) lies in the business environment indicator. (FDR, 2009, p. 35)

Brazil has a well-developed financial infrastructure but relatively shallow credit and capital markets, which have historically contributed only modestly to spurring long-term growth (Pinheiro and Bonelli, 2007). The volume of credit, however, has increased substantially in recent years, and a considerable improvement has been taking place since the mid-2000s (Table 8). In fact, however, fears have recently been expressed on the

extremely fast growth of credit because it has been fueling domestic demand to unsustainable levels.\footnote{Quarterly GDP data show data domestic demand (consumption plus investment) has been growing at the pace of nearly 8\% per year in 2010.}

Table 8: Public and Private Sources of Credit to the Private Sector, Selected Years (% of GDP)

<table>
<thead>
<tr>
<th>Time periods</th>
<th>Public</th>
<th>Private</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average 2000-04</td>
<td>9.3%</td>
<td>15.7%</td>
<td>25.0%</td>
</tr>
<tr>
<td>December 2005</td>
<td>9.6%</td>
<td>17.7%</td>
<td>27.3%</td>
</tr>
<tr>
<td>December 2006</td>
<td>10.7%</td>
<td>19.4%</td>
<td>30.1%</td>
</tr>
<tr>
<td>December 2007</td>
<td>11.4%</td>
<td>23.0%</td>
<td>34.5%</td>
</tr>
<tr>
<td>December 2008</td>
<td>14.0%</td>
<td>25.9%</td>
<td>39.9%</td>
</tr>
<tr>
<td>December 2009</td>
<td>16.9%</td>
<td>26.2%</td>
<td>43.1%</td>
</tr>
<tr>
<td>June 2010</td>
<td>17.7%</td>
<td>26.5%</td>
<td>44.2%</td>
</tr>
<tr>
<td>Growth rate Dec. 2004-June 2010*</td>
<td>239%</td>
<td>190%</td>
<td>206%</td>
</tr>
</tbody>
</table>

Source: Central Bank and National Accounts, elaborated by the author; * in current prices.

These results on credit extended by both public and private agencies to the private sector witness the speed of change.\footnote{The latest available results show that total credit to GDP increased from 43.9\% in September 2009 to 46.7\% in September 2010, a very large expansion of nearly three percentage points of GDP in the short time span of one year, but in line with what has been occurring in the past five years.} Still, most credit is of short maturity, not long term, as instruments to provide long term credit from private sources are still to be developed in Brazil. An increasing role attributed to the official development bank (BNDES) has not contributed to the development of long term credit because the official bank supplies credit at subsidized rates, counting on sources of low cost funds. This practice, coupled with high interest rates, crowds out private competitors that potentially could extend long term market loans.

This is one reason why credit from public sources has grown slightly higher than from private sources (Table 8): it accumulated 239\% from December 2004 to June 2010, against 190\% for credit from private financial agents (yearly nominal GDP grew 71\% between 2004 and mid-2010). After the 2008 financial crisis, credit from public sources grew even faster than before, as opposed to credit from private agents. The yearly average since December 2003 has been of nearly 22\%.

Finance is still scarce, notably for small firms and households, and expensive when compared to the basic interest rate fixed by the central bank — which implies high premia in financial intermediation.\footnote{In September 2010 the average interest rate for consumer credit, at 39.4\% per year, was hailed as the lowest since the data began to be compiled (1994). The basic interest rate in the economy (SELIC rate) is presently at 10.75\%.} Besides, the incentives faced by financial institutions to select and monitor projects are distorted by norms, institutional weaknesses, and high taxes, so that jurisprudence and patterns of judicial behavior play at least as important a role as the law itself in regulating credit disputes. With the country’s high marginal productivity of capital, more and less expensive credit for investment would help to spur growth, a conclusion in line with Hausmand, Rodrik and Velasco (2005).
Partly as a result of that, “around 75% of investments made by Brazilian firms are funded by their own budgets. In other words, the majority of investments made by Brazilian firms do not use its financial system. Therefore, credit constraint is considered one of the most important market failures in the Brazilian economy as they hamper entrepreneurial efforts of local firms.” (Ottaviano and Lage de Souza, 2010, p. 2)

There are at least two complementary explanations for the shallowness of financial markets in most of Latin America, and particularly in Brazil. One hinges on the region’s traditionally high levels of macroeconomic instability and the crowding out effect of large public deficits. Some evidence in this regard is presented in Padilla and Requejo (2000) and Galindo and Micco (2001). The other attributes the underdevelopment of financial markets to a poor institutional environment, with weak creditor and minority shareholders rights, and a low respect for contracts and the rule of law in general.

It was expected that with the lowering of inflation, the privatization of public banks, increased market share of foreign financial institutions, improved prudential regulation, the enactment of a new bankruptcy law and other macro, structural and institutional reforms adopted since the mid-1990s, financial markets would experience a large expansion. This did not happen at first, in part because of the adjustment processes associated to the end of high inflation: “High inflation prior to the Real plan … provided incentives for banks to compete for deposits because of the profits banks earned by investing the resources in inflation-protected government securities. The inflation profits … induced banks to expand, open new branches, offer ‘free’ bank services and develop a high degree of technological progress, especially aimed at enhancing the speed of processing financial transactions… The end of high inflation induced a rapid revamp of the system… Consolidation was the order of the day, as offering deposits was less profitable. …The end of the inflation tax and implicit government guarantee led also to the restructuring and privatization of banks owned by Brazil’s state governments.” (Goldfajn et alii, 2003, p. 5-6) But, as shown, major changes were observed more recently.

The evaluation of indicators of financial performance reveals that Brazil has gone a long way in improving its past state of financial repression. The next figure illustrates this point by showing the evolution of six indicators that measure the size, activity, and efficiency of financial intermediaries and markets: stock market capitalization, private bond market capitalization, public bond market capitalization, net interest margin, international debt issues to GDP ratio and the ratio of offshore to domestic bank deposits.

From the figure we observe that stock market capitalization has proceeded fastly since 2003, as the pace of economic growth increased. The same can be said, but with less emphasis, with respect to private bond market capitalization and even less so with respect to public bond market capitalization, in which case the increase from a higher base was lower than in the case of the (lower initial year data) private bonds. As shown in the previous table, after 2008 financial deepening has continued to occur at a high rate. Even so, the low and diminishing ratios of offshore to domestic bank deposits (at 2.3% in 2008, down from 9.1% in 2002) and of international debt issues to GDP (since 2003) are suggestive of a country still closed to external financial transactions. Net interest margins,

---
56 Foreign entry started essentially in 1996, peaked in 2001 and has since been followed by the exit of some of the financial institutions that had entered previously.
in turn, have remained roughly constant at around 14% — a rate much higher than found in most countries.

**Figure 4: Brazil- Indicators of Financial Performance, 1998-2008 (% of GDP)**

![Figure 4: Brazil- Indicators of Financial Performance, 1998-2008 (% of GDP)](image)

Source: Beck, Demirgüç-Kunt and Levine database (2010 update)

A comparison with a group of developing economies, to which we added the USA and Korea, is shown in the next three figures. It reveals that Brazil’s position occupies an intermediate place among the nations selected, with noticeable exceptions. Thus, its bank deposits to GDP ratio was in the same proportion as those of India, China and Korea, but much less in the USA.

Net interest margin, at 14% was highest than in any other country, as mentioned.\(^{57}\) Indeed, the average for all countries in the figure was only 6%. This may represent the market power of banks in Brazil, but it may also reflect juridical uncertainty. Thus, bank concentration, at 83% (measured as the assets of the three largest banks as a share of assets of all commercial banks), is also very high in Brazil. It is comparable in magnitude to Peru’s and South Africa’s only, and considerably higher than the average for all countries (56%). Bank ROE (Average Return on Assets, equal to Net Income/Total Equity), in turn, is not as high as in other developing countries (India, China, South Africa, Turkey), which indicates that interest margins may be high because of high real interest rates in Brazil.

\(^{57}\) The net interest margin equals the accounting value of a bank’s net interest revenue as a share of its total earning assets.
The main highlights from Figure 6 are: insurance volumes, despite recent increases,\textsuperscript{58} are still low in Brazil, revealing underdevelopment of insurance instruments when compared to most countries selected for comparison. Stock market capitalization is still below some developing countries (Chile, Russia, India and, especially, South Africa). Private, and especially public bond market capitalization as a share of GDP are higher than in any other developing country in the graph. In the case of public bonds, the share is similar to the ones found in the USA and in Korea.

A final group of indicators relates more directly to foreign transactions and is shown below (Figure 7). This last set of data reveals that Brazil, together with Chile, India, China and Turkey, is still reasonably closed as far as international debt issues are concerned. A similar conclusion applies to the indicator related to the ratio of offshore bank deposits to domestic bank deposits: at 2.2%, Brazil’s is only slightly larger than India’s (2.1%) — revealing, again, a low degree of capital account liberalization. The remittance inflows to GDP ratio is also small, and much less than in other Latin American countries such as Colombia, Mexico and Peru. And also much lower than India’s and China’s. Offshore bank loans relative to GDP (amount outstanding) is on the same order of magnitude as other countries in Latin America, but considerably less than in Chile, South Africa and Turkey, not to speak of the USA and Korea. This last indicator is also suggestive of a slow degree of financial integration with the outside world — or, in other words, low degree of capital account liberalization.

\textsuperscript{58} Life insurance premium volume as a share of GDP went from 0.4% in 1998 to 1.5% in 2008, but non-life insurance went slightly down, from 1.7% to 1.6% of GDP. The sum, therefore, increased from 2.1% to 3.1% of GDP from 1998 to 2008.
Financial globalization has proceeded at a high pace during the period covered by the indicators just analyzed. A deepening of both financial markets and institutions has been observed nearly everywhere — but especially in the developed world —, and has led to the dire outcomes of the world recession that began in 2008. The fact that Brazil has a still closed capital account helps to explain why the credit crisis, which affected mainly
export financing and the manufacturing sector, left only temporary marks in Brazil’s recent
growth. In a sense, one of the country’s weaknesses (low integration into the world
economy, both in terms of goods and services and finance) has partially insulated the
economy from being more severely hit than it did. But it should also be noted that Central
Bank supervision of the banking system, scarred by years of high inflation, also had a say.

3.5 Deficient education and training policies as barriers to growth

Three features of the Brazilian labor market stand out in cross-country comparisons,
even with countries at similar development levels: high inequality of wages, high
informality and low average levels of schooling. This last aspect is made worse by the fact
that central and local government inefficiency in education is a well known phenomenon in
Brazil despite the large increase in enrolment rates at the primary and lower secondary
levels observed in the past decade and a half, beginning with Pres. Cardoso’s first term
(1995). However, this large increase in enrollment in basic (and higher) education has had
one important outcome: the lowering of the skill premia that fostered inequality in the past.
As to informality, its importance has been decreasing somewhat with higher growth, but
not fast enough.

Central and local government inefficiency is not related to an eventual under-
funding, as government expenditures on education and health account for almost 10% of
GDP — a relatively high ratio of publicly financed spending to GDP and the second largest
item of spending following social security.59 Yet, the performance of Brazilian students has
remained mediocre when judged on the basis of standardised international tests, such as
PISA.

The average educational attainment of the population aged 15 and over has
improved substantially since the 1980s, after remaining nearly unchanged in the preceding
ten years. The next figure highlights this aspect and compares Brazil with other selected
developing countries. Despite having progressed at very high rates since the 1980s, Brazil
still ranks second to last among the countries selected (the last one being India). It only
recently reached Colombia, just below China’s figures.

---

59 Brazil is also characterized by extensive earmarking of government revenue to be used in education, as all
levels of government are required by the constitution to allocate at least 25% of their tax revenue to education.
Another way of looking at recent achievements is to compare Brazil and a standard represented by a developed country. We chose the USA as the standard of measure upon which to gauge Brazil and the previous sample of countries, to which we now added South Korea as a country representative of fast educational change. The results are shown in the next figure.

Source: Barro and Lee (2010 database)
Brazil’s record is remarkable when cast against the USA record: from 0.18 in 1950 to 0.62 in 2010, a performance that improved mainly after 1980. Still, other countries have performed at least as well: China (from 0.18 to 0.67) and Mexico (0.29 to 0.75).

In recent years several reforms have sought to accelerate the rise in average educational attainment.60 On the supply side, the FUNDEF (Fundão Nacional para o Desenvolvimento do Ensino Fundamental e Valorização do Magistério) was established to increase the resources allocated to primary education, especially in the country’s poorest areas, with noticeably positive effects.61 Demand, meanwhile, was fostered through the Bolsa Escola program, created in 2001, which pays poor families a stipend to send up to three children aged 6 to 15 years to school.62

Also during this period, several mechanisms were implemented to measure educational performance and supply valuable information for future planning and other focused initiatives. In the first term of the current presidency, the policy emphasis shifted from basic to higher education. Leading initiatives included the PRO-UNI Programa Universidade para Todos (University for All), which aims at facilitating college entry conditions for poor students, and a proposed reform that, among other provisions, would have reserved 50 percent of vacancies in federal universities to students who attended public secondary schools. In December 2006 the government also created the Fundão de Manutenção e Desenvolvimento da Educação Básica (FUNDEB), which extended the FUNDEF program to pre-primary and secondary education.

These reforms have yielded significant gains, but the education system still faces important challenges, in particular the need to raise equity and efficiency and improve learning. The quality of schooling varies considerably across the country, as expected. Children attending some public schools in poor regions lack the basic educational opportunities available in other parts of the country, or even in better-endowed schools within their own jurisdictions. Almost everywhere, repetition and dropout rates remain high. Standardized test results have shown that mathematics proficiency levels are low and have not increased much. In this context, the recent shift in focus from basic to higher education is an unwelcome development.

Recent developments also include efforts by schools at the state and municipal levels to improve quality and the new wave of interest in the creation of Escolas Técnicas, public entities that provide technical education and training in 2-3 year applied courses and disciplines, sponsored by federal and state governments. Shortage of workers possessing specific training and skills is behind the surge of these Escolas Técnicas in recent years.

---

60 The remainder of this subsection is based on Pinheiro, Bonelli and Pessóa (2009).
61 FUNDEF is a fund for financing sub-national spending on primary and lower-secondary education. It was created in 1996 and implemented in 1997-98. Through FUNDEF, a national floor was set on a per student basis for government spending on primary and lower-secondary education at all levels of government. The federal government is required to top up spending in those states/municipalities that cannot afford the national spending floor.
62 Each child must achieve at least an 85 percent attendance record. The Bolsa Escola was extended and unified other social transfers programs to become the Bolsa Família, a program of huge success in the present administration due to its effective distributive character and low cost.
4. Policies to remove barriers to growth

Having identified five areas of growth-constraining factors, this section is devoted to an examination of policy proposals to overcome these barriers.

Fiscal and tax reform are needed to deal with the high tax burden

High (and inefficient) taxation has been identified as a severe constraint to growth, for it significantly reduces savings and returns on investment, thus holding back growth. Accordingly, fiscal reform should aim at reducing current expenditures relative to GDP, while creating the fiscal space needed to increase public infrastructure investment and simultaneously reducing the overall government deficit. In addition, interest rates are high because of a high tax burden: the uncertainty brought about by a high public debt to GDP ratio which results from an expensive tax burden is a contributor to high interest rates. Two issues stand out in looking for candidates for expenditure reduction: pension and retirement reform; and current government expenditures on goods and services. With the inauguration of a new administration in January 2011 there are hopes that both of these issues be tackled. However, it would be too optimistic to expect radical changes (and results) in the short and medium terms.

Lowering the country’s basic interest rate would help in building long term credit and stimulating fixed investment. Tax and expenditure reform should create the conditions for a reduction in interest rates, unlocking a virtuous cycle of lower interest payments on the public debt and higher growth. One way to implement this process of expenditure reduction and switching would be through current expenditures and social security reform, as mentioned. Fiscal reform should combine a relative reduction in public consumption (i.e., with respect to GDP), including pension/social security reform. It should also induce increases in public investment in infrastructure. High taxes and high interest rates account for a part of bank spreads as well. Therefore, lowering taxes and interest rates would decrease the cost of credit for investment.

Fiscal reform should be accompanied by tax reform. Besides reducing the tax burden (with expenditure switching), two goals of tax reform should be: (a) reduce earmarking of revenues (vinculação das receitas) to give flexibility for expenditure switching (many earmarking provisions allow the authorities little discretion and make fiscal policy pro-cyclical); (b) simplify the present tax structure and reduce its administrative complexity, because they impose a further burden on economic agents.

Tax reform is an ‘almost permanent’ item in Brazil’s reform agenda because of the difficulties in accommodating conflicting political interests (mainly from sub-national governments and constituencies). And despite the fact that complaints are often expressed by the business community, the complexity of the tax system has not received proper attention from the authorities.

In fact, even relying on a strong political coalition, the present administration has not deemed it necessary to deal with the difficult issues involved in tax reform. In part because fast growth since 2003 has implied rising revenues, which in turn (seems to) make reform less necessary. The myopic behavior of policy makers in this respect should not be

---

63 See Pinheiro, Bonelli and Pessôa (2009) for further analysis.
minimized. The high cost of doing business in Brazil in part follows from the complexity of the tax system and has not been properly dealt with, as seen.

In addition to that, the preference for a large state and for an increased presence of the state in economic sphere is an important characteristic of the present administration. This does not mean that the government’s efficacy has improved, though, as shown by the survey results in the previous section.

Institutional reform

Institutional reform deals with measures that are often part of other reform areas. One of such measures is strengthening contract enforcement, which is critical to fostering long-term credit, but in which institutional and financial sector reform are just part of a larger effort to improve juridical security and regulation. Likewise, high taxes account for a significant part of bank spreads and financial risk, but changes in this area can also be dealt with as part of tax reform. Other areas of reform, such as capital market regulation, access to information in credit bureaus, and better mechanisms for foreclosing on collateral in case of default can be implemented with relatively less political resistance, as shown by experience in recent years. (Pinheiro, Bonelli and Pessôa, 2009)

Among the aspects that need be improved, strengthening the rights of creditors and minority shareholders occupies an important position. Currently, few types of guarantees operate well, in the sense of allowing for a quick and low-cost recovery of the loan. For loans extended with these guarantees as collateral, interest rate spreads are well below the average, which shows the potential for measures in this direction to lower the cost of and expand access to credit, in particular for small firms and poor families. Here, too, cooperation of the judiciary is central, particularly so that collateral offered by the poor may actually be accepted as such by financial institutions. (ibid)

Following international practice, regulatory reform in the area of infrastructure involved the separation of commercial, regulatory, and policy activities. The state-owned enterprises continued to respond for commercial activities but were restructured, often through privatization. As the new regulatory model stressed the introduction of competition, privatization was often accompanied by the vertical or horizontal breakup of the enterprise and the dismantling of barriers to new private entry. To reduce the risk of expropriation, new regulatory agencies, with relative financial and administrative independence from the government, were entrusted with the responsibility of fixing rates, subject to rules set out in the concession contracts and the general principle of “financial and economic equilibrium” established in the Concessions Law. Policy responsibilities were ascribed to the appropriate sector ministry. More recently these agencies have been the object of concern due to the ‘politization’ in fulfilling the positions. (ibidem)

This process has been coupled with the recent practice of mixing together public (state) and private affairs. In particular, not separating government from political parties’ interests. The identification of government and party reveals a critical aspect of the present administration and helps to explain the charges of corruption that have been leveled recently. Mechanisms that may result in control of the means of communication by the state is another area in which attempts have been made — fortunately with no success so far. All these trends have been accompanied by an increased presence of the state in the economic sphere, as noted.
**Infrastructure**

It has been established that well-functioning and extensive infrastructure plays a fundamental role in enhancing the growth prospects. Both the level and quality of infrastructure are important in raising private-sector productivity and investment rates, particularly the adequate functioning of roads, railroads, ports, and air transport, as well as a good quality electricity supply and an adequate telecommunications network.

Low public investment in infrastructure has been in part due to budget rigidities and control. Public sector adjustment is harder on investment expenditures, which are not earmarked, than on current expenditures. In addition to that, the state has not been able even to execute approved expenditures due to management problems within the state bureaucracy. In fact, limited planning capacity is due, among other factors to bureaucratic ‘politization’ of public agencies. Given the existing complementarity between public and private investment in infrastructure it is not difficult to understand why private investment has been slow to respond to market stimuli. Even so, the recognition of past failures in the area has led the central government to act more forcefully in the last few years.

Investment recovery in this area necessarily implies: (a) increased central and local government direct expenditures; (b) more intense use of concessions as a mechanism of inducing private investment in infrastructure; (c) increased investment finance by public banks (as has been occurring more recently) and private agents; (d) more independence and improved quality in the actions of regulatory agencies.

**Financial sector reform**

Despite recent developments, bank intermediation in Brazil is still far from expected in terms of investment financing. Part of the blame is on the potential threat to macroeconomic stability represented by a high public debt. This has been identified as one cause of high real interest rates, which prevents (together with other factors) the development of long term capital markets. Accordingly, financial sector reform should include measures along four lines, some of which also related to institutional reform:

(a) Reduce taxes on financial operations and avoid frequent tax changes. Implementing this reform would require only political will, but attempts at reducing these taxes will likely be resisted by the Executive, as it would force a decline in expenditure and may seem to favor the banks. Moreover, taxes on financial transactions are easy to collect and supervise, and this makes them popular with the tax authorities.

(b) Improve the quality of information available to lenders and shareholders, so that they can better evaluate the risks they face. This will require a revamping of accounting practices (a process started in early 2008), better registration of assets, and more stringent disclosure rules. Also important is enlarging credit information registries, which have a relatively wide coverage in Brazil, to include positive information about borrowers as well as the negative information they currently carry. Also needed are better auditing, a strengthening of supervision by the central bank and the securities commission, and more stringent and faster sanctions for those who fail to comply. This may require changes in privacy laws and discussions with judges so that they uphold these changes.

---

64 See Pinheiro, Bonelli and Pessôa (2009), *passim.*
(c) Promote competition among financial institutions, and between them and the capital market, not least because the current consolidation of the banking sector through concentration among the largest banks is likely to further reduce competition among banks, which also hold a dominant position in the capital markets. The competition tribunal and the central bank should receive a clear mandate to improve competition in the banking sector. This should include a more rigorous analysis of mergers and acquisitions as well as pro-active policies of information dissemination and strengthening of guarantees. Another recommended measure is to facilitate the migration of bank clients across institutions, lowering taxes and facilitating access of banks to information on potential clients.

(d) Reduce and restructure the role of the public sector banks and of directed credit in the financial system, except for infrastructure investment. These banks are still responsible for a large share of finance, including many transactions that private institutions or the capital markets could take care of, but for which they cannot compete because of the subsidies received by the public sector banks. Directed credit, in addition, operates as a means of cross-subsidizing certain borrowers, but at the cost of higher interest rate spreads. Both instruments have become inefficient and largely unnecessary with the growing sophistication of private financial institutions, the opening of the capital account, and the expansion of capital markets. The main measures called for in this regard are to significantly lower the subsidies transferred through public banks and to increase the transparency with which they are allocated.

Education

The proposals in the area of education follow from the diagnosis that there is the urgent need to expand the coverage at the secondary level and, especially, improve the quality of basic education, as witnessed by the poor results achieved by Brazilian students in international tests. Public spending on education in Brazil is biased towards tertiary education, despite the fact that private returns are likely to far outweigh social returns in the case of post-secondary education. Enhancing human capital through the education system would also contribute to raising formality in labor relations, as empirical evidence reported shows that educational attainment is a powerful predictor of employability.

Therefore, the main reform objective should be to enhance the coverage and quality of basic education, while reducing subsidies to higher education by shifting from universal free tuition at public universities to a combination of paid tuition and student loans.

More specifically, reform should aim at:

(a) Achieving universal coverage from pre-school through upper secondary school by fully implementing the FUNDEF and including families with students aged 16 through 19 in the Bolsa Família program. Particularly important is expanding coverage and improving the quality of early childhood care;

(b) Improving the quality of primary education through periodic evaluation of schools and teachers, possibly with the introduction of an accreditation system, and increased competition among schools;

---

65 This area is likely to be one of strong resistance to reform because of the financial subsidy mechanisms embedded in directed credit regulations and the workings of the public sector banks.

66 The PROUNI represents a step in this direction, as noted.

67 See Pinheiro, Bonelli and Pessôa (2009), passim.
(c) Increasing efficiency and equity in university education via competition among universities;

(d) Allowing public universities to charge tuition and fees and at the same time expand the federal program of scholarships (PROUNI) for poor students.

The major problem with improving primary education is that its current low quality appears to result mainly from administrative problems, so that merely allocating more resources is unlikely by itself to produce significant improvement. In fact, although salaries in the public schools are not very high, they are higher than the average salary paid by the private sector and are not low by international standards when per capita GDP is used as the standard of measure.

Fortunately, the public school system is highly decentralized — in the sense that each state and municipality has its own system — which reduces the central government’s power and creates scope for piecewise, incremental change: reform in one jurisdiction can create a constituency for reform in others. Alternative management practices are also possible, including public-private partnerships and the hiring of private firms to provide services.

The federal government should strengthen incentives for efficiency enhancement by making more extensive use of conditionality in voluntary transfers, by introducing rewards for performance and by restructurings of expenditures towards lower levels (and away from tertiary education, which should be partially privately financed, as suggested).

5. Conclusion: Potential and Limits to Future Growth

Our main conclusion is that Brazil’s domestic savings are low to sustain higher growth rates and may choke investment if access to international financial markets deteriorates. During 2000-2003, for instance, access to international financial markets was limited due to market concerns regarding the sustainability of debt and, therefore, investment was limited by domestic savings. In late 2008 a foreign-originated credit crunch resulted in a strong, but short-lived recession.

Savings have been low, indeed lower than in the past and than in most of Latin America, because of the high tax burden and negative public savings. The rise in national savings observed in the late 1960s, which was sustained in the 1970s, was due to higher public savings. Savings declined substantially in the early 1980s; recovered somewhat with the acceleration of inflation, notably in the early 1990s; fell again in 1995-98; and recovered again since 2003.

As repeatedly stated, slow growth in Brazil is due to low investment (and savings) rates: the country does not invest enough to increase its capital stock at the pace necessary for GDP to grow faster. This can also be illustrated in the next figure, constructed with information from recently released quarterly GDP figures.68

68 Domestic plus foreign savings equal capital formation (Gross fixed investment plus inventory change). One should expect inventory change as a percentage of GDP to be near zero in the long term, but not necessarily in the short and medium terms.
Gross fixed investment in the recent cycle began to grow from early 2004 onwards. Indeed, the yearly average for the year ending in the first quarter of 2004 was a mere 15.2% of GDP. Domestic savings, at 17% of GDP, partly financed foreigners, as foreign savings (current account surplus) reached -0.4% of GDP and increasing inventories amounted to 1.3% of GDP. Gross investment peaked in late 2008, as the external crisis hit Brazil, and began to recover in late 2009. It is presently (mid-2010) at 18.7% of GDP and is expected to increase to 19% by year end.

Foreign savings were negative from the beginning of 2003 to the end of 2007, and only recently have come to represent a relevant source of funds (2.6% of GDP in the year ending in June 2010). A negative relationship between current account deficits (foreign savings) and the investment rate implies a rising deficit in the near future.

Domestic savings, in turn, have recently been on the order of 15-16% of GDP, but it is not unreasonable to expect them to increase as growth proceeds. Given the need to sustain investment rates in the range of 22-23% of GDP to keep growth in the neighborhood of 5% per year, this means that foreign savings have to rise to 4% of GDP. In principle, this is not a difficult achievement, if authorities pursue prudent courses of action on fiscal and monetary policies. Fiscal (expenditure switching, towards increased infrastructure spending) and institutional reform would provide a substantial push in both

---

69 One additional point in the investment to GDP ratio increases (negatively) the net exports of goods and services to GDP ratio — to which foreign savings are closely associated — by almost 2% (the estimated coefficient confidence level ranges from -1.7% do -2.1%). We thank Prof. Samuel Pessôa for having provided his estimates on the relationship between net exports and investment rates.
increasing domestic savings and reducing the need to rely on perhaps too large foreign savings.

Another way to approach this issue of growth prospects departs from the growth accounting expression:

\[ Y' = \alpha.(u.K)' + (1 - \alpha).L' + PTF' \]  

(1)

Recalling that

\[ K' = (I/K) - \delta \]

where I is gross fixed investment (at constant prices) and \( \delta \) is the rate of depreciation.

A simple algebraic transformation leads to

\[ Y' = PTF' + \alpha.u.v.(I/Y) + T \]

(2)

where \( v \) is the productivity of capital, \( (I/Y) \) is the investment to GDP ratio and

\[ T = (1-\alpha).L' - \alpha.\delta / (1 + [u.K]') \]

Therefore, GDP growth, in (2) can be written as a linear combination of (unobserved) productivity growth, the rate of fixed investment to GDP (modified by the function \( \alpha.u.v \)) and a term \( T \).

It seems reasonable to assume \( \alpha \) and \( u \) constant (at 0.46 and 0.97, respectively), but the constancy hypothesis does not apply to \( v \). Between 1999 and 2009, for instance, it grew at nearly 1% p.a., on average. We assume that this trend may continue into the medium term, as growth continues.

Given these hypotheses, it is possible to arrive at trajectories for Brazil’s GDP growth in the future conditional on the investment rate \( (I/Y) \), provided we assume that productivity is pro-cyclical (as repeatedly suggested) and follows the pattern observed in the past in terms of its association with GDP growth (see Table 6).

The next figure presents a set of growth alternatives. The figure also shows the contribution of TFP, measured as the difference between the top and bottom lines. TFP accounts for an increasing share of GDP growth: from only 2% to 24% in the figure, as GDP ranges from 2.8% to 6.1% per year.

---

70 Where, as before: \( Y' \) is the GDP growth rate; \( \alpha \) is the elasticity of output with respect to capital; \( u \) is the rate of capacity utilization; \( K' \) is the capital stock growth rate; \( L' \) is employment growth; \( PTF' \) is the growth rate of total factor productivity (residual).

71 Assuming \( \alpha \) and \( \delta \) constant, \( T \) is a positive function of employment growth and negative of utilized capital growth. A reasonable value for \( T \) in the medium term is ~0.007. Due to the additive character of (2), this means that \( T \) subtracts 0.7 percentage points from TFP growth.
Investment rates on the order of 19% of GDP, as observed in 2010, result in GDP growth in the range of 3.9 to 4.2% p.a. on a sustained basis (depending on the rate of increase of capital productivity).\textsuperscript{72} To accelerate growth to the neighborhood of 5% it is necessary to invest approximately 21% of GDP on a sustained basis. Given present low levels of domestic savings, this would require sizeable foreign savings.

Thus, reforms are needed to increase domestic savings that, at present, are on the order of magnitude of 16% of GDP (Figure 10). The trade off between domestic and foreign savings will have to be softened by economic reform if the country is to succeed in reaching per capita growth of 4% or more in the long term. Fiscal reform and expenditure switching towards infrastructure investment are on top of the list. From the fiscal stance we learned that Brazil has an overspending state. Thus, reform should aim at containing current spending growth and rethinking priorities.

The list here is long and includes: (a) addressing budget rigidities; (b) reducing mandatory earmarking in the budget (the public budget has become increasingly rigid in the recent past, with mandatory expenditures in education and health, for instance, and mounting expenses in payroll, social security, various social programs and interest); and (c) revisiting structural entitlements (i.e., social security reform), because social security is probably the most important challenge facing Brazil’s fiscal accounts over the long run. Brazil needs to lay out a clear medium-term fiscal framework to restore transparency to its fiscal accounts and targets. There is also need to address directly the quasi-fiscal transactions among public sector financial entities (i.e., Treasury and BNDES).

\textsuperscript{72} Growth in 2010 will exceed the 3.9 to 4.2% range because it is based on a strong recovery from the 2009 recession, when GDP decreased 0.2%.
To sum up, fiscal reform should combine a reduction in public consumption, especially through pension and social security reform, with an increase in public investment in infrastructure, along with tax reform. But one should note that political resistance to reform in these areas is likely to be strong.

Paradoxically, one of the most noticeable trends in contemporary policy making in Brazil over the past few years is an increasing role of the state in economic affairs. The fact that Keynesian policies have been adopted in many countries to deal with the effects of the Great Recession that began in 2007-2008 has been used to support measures to boost spending in Brazil. Past experience suggests that direct government interventions in Brazil (and perhaps elsewhere) have not been as successful as one would imagine. For this reason, many people fear that needed reforms and economic policy changes that reduce state interventions will hardly take place. For the time being, the need to change present courses of action does not seem to be strong. But pressures on capacity utilization will have to be dealt with through increased investment, part of which financed by foreign savings. The use of foreign savings will be constrained by liquidity conditions worldwide and by the quality of domestic policies. If, as it seems likely, the government insists on pursuing the same course of action it has been following in the past years — with strong stimuli from the fiscal and credit sides — demand expansion will imply an increased tax burden and inflationary pressures, and domestic savings will not resume.
Bibliography


Ottaviano, G. I. P. and Lage de Souza, F. (2010) “Productivity and Credit Constraints: Where is the link?”. September (processed)


Appendix Table A.1: Demographic and economic data used in the decomposition exercise.

<table>
<thead>
<tr>
<th>Year</th>
<th>GDP (Y)</th>
<th>Employment (L)</th>
<th>Economically Active Pop. (EAP 10-64)</th>
<th>Working age population (WAP 10-64)</th>
<th>Total Population (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reais million, 2000 prices</td>
<td>Million</td>
<td>Million</td>
<td>Million</td>
<td>Million</td>
</tr>
<tr>
<td>1940</td>
<td>52424</td>
<td>14.7</td>
<td>28.5</td>
<td>41.17</td>
<td></td>
</tr>
<tr>
<td>1950</td>
<td>92961</td>
<td>17.1</td>
<td>35.2</td>
<td>51.94</td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>189522</td>
<td>22.4</td>
<td>46.7</td>
<td>70.07</td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>344892</td>
<td>28.9</td>
<td>62.8</td>
<td>93.14</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>788964</td>
<td>42.0</td>
<td>80.3</td>
<td>118.56</td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>755433</td>
<td>43.3</td>
<td>84.8</td>
<td>121.38</td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td>964310</td>
<td>56.2</td>
<td>102.2</td>
<td>144.00</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>1127922</td>
<td>69.1</td>
<td>124.0</td>
<td>166.25</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>1568999</td>
<td>85.8</td>
<td>147.3</td>
<td>189.61</td>
<td></td>
</tr>
</tbody>
</table>

Appendix Table A.2: Growth Accounting, 1948-2009 (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>Y'</th>
<th>(u.K)'</th>
<th>L'</th>
<th>TFP'</th>
<th>K contribution to TFP'</th>
<th>L contribution to TFP'</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948</td>
<td>9.7%</td>
<td>10.9%</td>
<td>2.8%</td>
<td>3.2%</td>
<td>-0.5%</td>
<td>3.7%</td>
</tr>
<tr>
<td>1949</td>
<td>7.7%</td>
<td>9.3%</td>
<td>1.8%</td>
<td>2.4%</td>
<td>-0.8%</td>
<td>3.1%</td>
</tr>
<tr>
<td>1950</td>
<td>6.8%</td>
<td>8.4%</td>
<td>0.8%</td>
<td>2.5%</td>
<td>-0.7%</td>
<td>3.2%</td>
</tr>
<tr>
<td>1951</td>
<td>5.0%</td>
<td>7.7%</td>
<td>0.9%</td>
<td>0.9%</td>
<td>-1.3%</td>
<td>2.2%</td>
</tr>
<tr>
<td>1952</td>
<td>7.3%</td>
<td>11.1%</td>
<td>3.3%</td>
<td>0.4%</td>
<td>-1.8%</td>
<td>2.2%</td>
</tr>
<tr>
<td>1953</td>
<td>4.7%</td>
<td>8.4%</td>
<td>2.0%</td>
<td>-0.2%</td>
<td>-1.7%</td>
<td>1.5%</td>
</tr>
<tr>
<td>1954</td>
<td>7.8%</td>
<td>9.1%</td>
<td>3.8%</td>
<td>1.5%</td>
<td>-0.6%</td>
<td>2.1%</td>
</tr>
<tr>
<td>1955</td>
<td>8.8%</td>
<td>8.7%</td>
<td>4.1%</td>
<td>2.6%</td>
<td>0.1%</td>
<td>2.5%</td>
</tr>
<tr>
<td>1956</td>
<td>2.9%</td>
<td>4.4%</td>
<td>0.5%</td>
<td>0.6%</td>
<td>-0.7%</td>
<td>1.3%</td>
</tr>
<tr>
<td>1957</td>
<td>7.7%</td>
<td>8.0%</td>
<td>3.2%</td>
<td>2.3%</td>
<td>-0.1%</td>
<td>2.5%</td>
</tr>
<tr>
<td>1958</td>
<td>10.8%</td>
<td>10.0%</td>
<td>4.4%</td>
<td>3.8%</td>
<td>0.4%</td>
<td>3.4%</td>
</tr>
<tr>
<td>1959</td>
<td>9.8%</td>
<td>9.7%</td>
<td>3.8%</td>
<td>3.3%</td>
<td>0.0%</td>
<td>3.3%</td>
</tr>
<tr>
<td>1960</td>
<td>9.4%</td>
<td>8.6%</td>
<td>3.0%</td>
<td>3.8%</td>
<td>0.3%</td>
<td>3.5%</td>
</tr>
<tr>
<td>1961</td>
<td>8.6%</td>
<td>7.3%</td>
<td>3.5%</td>
<td>3.3%</td>
<td>0.6%</td>
<td>2.7%</td>
</tr>
<tr>
<td>1962</td>
<td>6.6%</td>
<td>4.6%</td>
<td>1.7%</td>
<td>3.6%</td>
<td>0.9%</td>
<td>2.7%</td>
</tr>
<tr>
<td>1963</td>
<td>0.6%</td>
<td>3.2%</td>
<td>-0.2%</td>
<td>-0.8%</td>
<td>-1.2%</td>
<td>0.4%</td>
</tr>
<tr>
<td>1964</td>
<td>3.4%</td>
<td>4.8%</td>
<td>1.6%</td>
<td>0.3%</td>
<td>-0.6%</td>
<td>1.0%</td>
</tr>
<tr>
<td>1965</td>
<td>2.4%</td>
<td>3.8%</td>
<td>1.0%</td>
<td>0.1%</td>
<td>-0.7%</td>
<td>0.8%</td>
</tr>
<tr>
<td>1966</td>
<td>6.7%</td>
<td>7.5%</td>
<td>3.6%</td>
<td>1.3%</td>
<td>-0.4%</td>
<td>1.7%</td>
</tr>
<tr>
<td>1967</td>
<td>4.2%</td>
<td>6.0%</td>
<td>1.9%</td>
<td>0.4%</td>
<td>-0.8%</td>
<td>1.2%</td>
</tr>
<tr>
<td>1968</td>
<td>9.8%</td>
<td>9.9%</td>
<td>4.9%</td>
<td>2.6%</td>
<td>0.0%</td>
<td>2.6%</td>
</tr>
<tr>
<td>1969</td>
<td>9.5%</td>
<td>10.1%</td>
<td>4.2%</td>
<td>2.6%</td>
<td>-0.3%</td>
<td>2.9%</td>
</tr>
<tr>
<td>1970</td>
<td>10.4%</td>
<td>9.5%</td>
<td>3.7%</td>
<td>4.1%</td>
<td>0.4%</td>
<td>3.6%</td>
</tr>
<tr>
<td>1971</td>
<td>11.4%</td>
<td>10.1%</td>
<td>5.1%</td>
<td>4.0%</td>
<td>0.6%</td>
<td>3.4%</td>
</tr>
<tr>
<td>1972</td>
<td>11.9%</td>
<td>10.1%</td>
<td>4.2%</td>
<td>5.0%</td>
<td>0.8%</td>
<td>4.2%</td>
</tr>
<tr>
<td>1973</td>
<td>14.0%</td>
<td>12.1%</td>
<td>4.9%</td>
<td>5.8%</td>
<td>0.9%</td>
<td>4.9%</td>
</tr>
<tr>
<td>1974</td>
<td>8.2%</td>
<td>10.6%</td>
<td>2.7%</td>
<td>1.9%</td>
<td>-1.1%</td>
<td>3.0%</td>
</tr>
<tr>
<td>1975</td>
<td>5.2%</td>
<td>10.7%</td>
<td>2.9%</td>
<td>-1.4%</td>
<td>-2.6%</td>
<td>1.2%</td>
</tr>
<tr>
<td>1976</td>
<td>10.3%</td>
<td>11.9%</td>
<td>4.5%</td>
<td>2.3%</td>
<td>-0.8%</td>
<td>3.1%</td>
</tr>
<tr>
<td>1977</td>
<td>4.9%</td>
<td>8.5%</td>
<td>2.5%</td>
<td>-0.3%</td>
<td>-1.6%</td>
<td>1.3%</td>
</tr>
<tr>
<td>1978</td>
<td>5.0%</td>
<td>6.8%</td>
<td>2.0%</td>
<td>0.8%</td>
<td>-0.8%</td>
<td>1.6%</td>
</tr>
<tr>
<td>1979</td>
<td>6.7%</td>
<td>7.8%</td>
<td>3.5%</td>
<td>1.3%</td>
<td>-0.5%</td>
<td>1.8%</td>
</tr>
<tr>
<td>1980</td>
<td>9.2%</td>
<td>9.5%</td>
<td>5.0%</td>
<td>2.1%</td>
<td>-0.2%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Year</td>
<td>%Change1</td>
<td>%Change2</td>
<td>%Change3</td>
<td>%Change4</td>
<td>%Change5</td>
<td>%Change6</td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>1981</td>
<td>-4.2%</td>
<td>2.7%</td>
<td>-1.1%</td>
<td>-4.9%</td>
<td>-3.2%</td>
<td>-1.7%</td>
</tr>
<tr>
<td>1982</td>
<td>0.8%</td>
<td>3.6%</td>
<td>1.5%</td>
<td>-1.7%</td>
<td>-1.3%</td>
<td>-0.4%</td>
</tr>
<tr>
<td>1983</td>
<td>-2.9%</td>
<td>1.2%</td>
<td>0.7%</td>
<td>-3.9%</td>
<td>-1.9%</td>
<td>-2.0%</td>
</tr>
<tr>
<td>1984</td>
<td>5.4%</td>
<td>3.4%</td>
<td>3.9%</td>
<td>1.7%</td>
<td>0.9%</td>
<td>0.8%</td>
</tr>
<tr>
<td>1985</td>
<td>7.5%</td>
<td>6.4%</td>
<td>6.7%</td>
<td>1.3%</td>
<td>0.7%</td>
<td>0.6%</td>
</tr>
<tr>
<td>1986</td>
<td>7.5%</td>
<td>6.4%</td>
<td>5.7%</td>
<td>1.5%</td>
<td>0.5%</td>
<td>1.0%</td>
</tr>
<tr>
<td>1987</td>
<td>3.6%</td>
<td>4.1%</td>
<td>2.9%</td>
<td>0.1%</td>
<td>-0.2%</td>
<td>0.3%</td>
</tr>
<tr>
<td>1988</td>
<td>-0.1%</td>
<td>2.5%</td>
<td>2.0%</td>
<td>-2.3%</td>
<td>-1.2%</td>
<td>-1.1%</td>
</tr>
<tr>
<td>1989</td>
<td>3.2%</td>
<td>4.2%</td>
<td>4.2%</td>
<td>-1.0%</td>
<td>-0.5%</td>
<td>-0.5%</td>
</tr>
<tr>
<td>1990</td>
<td>-4.3%</td>
<td>-3.1%</td>
<td>-2.5%</td>
<td>-1.6%</td>
<td>-0.6%</td>
<td>-1.0%</td>
</tr>
<tr>
<td>1991</td>
<td>1.0%</td>
<td>2.1%</td>
<td>3.5%</td>
<td>-1.8%</td>
<td>-0.5%</td>
<td>-1.3%</td>
</tr>
<tr>
<td>1992</td>
<td>-0.5%</td>
<td>-0.5%</td>
<td>-1.4%</td>
<td>0.5%</td>
<td>0.0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>1993</td>
<td>4.7%</td>
<td>4.9%</td>
<td>3.9%</td>
<td>0.3%</td>
<td>-0.1%</td>
<td>0.4%</td>
</tr>
<tr>
<td>1994</td>
<td>5.3%</td>
<td>4.4%</td>
<td>3.5%</td>
<td>1.4%</td>
<td>0.4%</td>
<td>1.0%</td>
</tr>
<tr>
<td>1995</td>
<td>4.4%</td>
<td>5.2%</td>
<td>4.2%</td>
<td>-0.3%</td>
<td>-0.3%</td>
<td>0.1%</td>
</tr>
<tr>
<td>1996</td>
<td>2.2%</td>
<td>1.3%</td>
<td>0.4%</td>
<td>1.4%</td>
<td>0.4%</td>
<td>1.0%</td>
</tr>
<tr>
<td>1997</td>
<td>3.4%</td>
<td>3.8%</td>
<td>2.8%</td>
<td>0.1%</td>
<td>-0.2%</td>
<td>0.3%</td>
</tr>
<tr>
<td>1998</td>
<td>0.0%</td>
<td>1.5%</td>
<td>0.6%</td>
<td>-0.9%</td>
<td>-0.7%</td>
<td>-0.3%</td>
</tr>
<tr>
<td>1999</td>
<td>0.3%</td>
<td>1.5%</td>
<td>0.6%</td>
<td>-0.8%</td>
<td>-0.6%</td>
<td>-0.2%</td>
</tr>
<tr>
<td>2000</td>
<td>4.3%</td>
<td>3.6%</td>
<td>2.7%</td>
<td>1.2%</td>
<td>0.3%</td>
<td>0.8%</td>
</tr>
<tr>
<td>2001</td>
<td>1.3%</td>
<td>1.3%</td>
<td>0.7%</td>
<td>0.3%</td>
<td>0.0%</td>
<td>0.3%</td>
</tr>
<tr>
<td>2002</td>
<td>2.7%</td>
<td>0.4%</td>
<td>3.9%</td>
<td>0.4%</td>
<td>1.0%</td>
<td>-0.7%</td>
</tr>
<tr>
<td>2003</td>
<td>1.1%</td>
<td>2.6%</td>
<td>1.7%</td>
<td>-0.9%</td>
<td>-0.6%</td>
<td>-0.3%</td>
</tr>
<tr>
<td>2004</td>
<td>5.7%</td>
<td>3.7%</td>
<td>2.9%</td>
<td>2.5%</td>
<td>0.9%</td>
<td>1.5%</td>
</tr>
<tr>
<td>2005</td>
<td>3.2%</td>
<td>2.5%</td>
<td>2.6%</td>
<td>0.6%</td>
<td>0.3%</td>
<td>0.3%</td>
</tr>
<tr>
<td>2006</td>
<td>4.0%</td>
<td>1.4%</td>
<td>1.9%</td>
<td>2.3%</td>
<td>1.2%</td>
<td>1.1%</td>
</tr>
<tr>
<td>2007</td>
<td>5.7%</td>
<td>4.3%</td>
<td>2.6%</td>
<td>2.3%</td>
<td>0.6%</td>
<td>1.7%</td>
</tr>
<tr>
<td>2008</td>
<td>5.1%</td>
<td>3.8%</td>
<td>3.4%</td>
<td>1.5%</td>
<td>0.6%</td>
<td>0.9%</td>
</tr>
<tr>
<td>2009</td>
<td>-0.2%</td>
<td>-1.0%</td>
<td>0.7%</td>
<td>-0.2%</td>
<td>0.4%</td>
<td>-0.5%</td>
</tr>
</tbody>
</table>