

Report No. 22950-BR

Brazil

The New Growth Agenda

(In Two Volumes) Volume I: Policy Briefing

December 31, 2002

Brazil Country Management Unit
Latin America and the Caribbean Region



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January 1 to December 31

ACRONYMS AND ABBREVIATIONS

CPMF	Temporary Tax on Financial Transactions
EMU	European Monetary Union
FDI	Foreign Direct Investment
FIAS	Foreign Investment Advisory Service
GDP	Gross Domestic Product
ICT	Information and Communications Technology
INPI	National Institute of Intellectual Property (Instituto Nacional de Propriedade Intelectual)
IT	Information Technology
OECD	Organization for Economics Cooperation and Development
R&D	Research and Development
RGPS	General Regime for Social Security (Regime Geral da Previdência Social)
RJU	Pension Regime for Government Workers (Regime Jurídico Único)
SOE	State Owned Enterprise
TFP	Total Factor Productivity

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We acknowledge the discussions with and comments from representatives of the Federal Government of Brazil. The findings and views expressed here are exclusively those of the World Bank.

BRAZIL
THE NEW GROWTH AGENDA

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FOREWORD

Brazil: Growth Superstar?

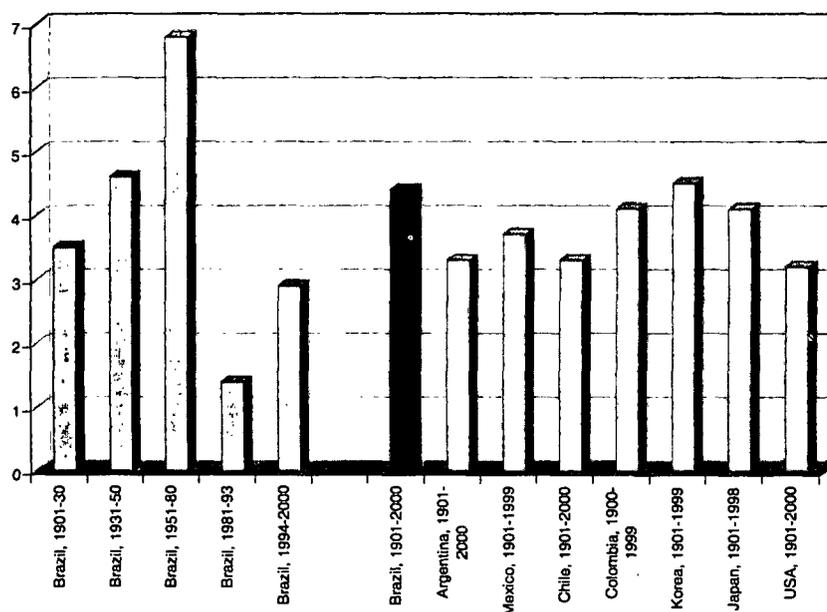
1. During the last century, Brazil was one of the fastest growing economies in the world. Between 1901 and 2000, Brazil's GDP per capita grew at an average annual rate of 4.4 percent. Few countries have done better (see figure, also Abreu and Verner, 1997). The growth rate of Argentina and Chile, for example, was about 3.3 percent. This difference means that if the per capita output in the three countries had been the same in 1900, then by 1966 the average Brazilian would have twice as much income as a Chilean or an Argentine, and almost three times as much by 1999. Brazil's long-run growth has rivaled that of countries such as South Korea, universally praised as a stellar performer. Brazil does not receive the same praise.

2. Perhaps one reason is that more has been expected of Brazil, especially by Brazilians themselves. After all, the country is richly endowed with natural resources and is blessed with an energetic populace. Perhaps Brazilians compare themselves with the US, a similarly endowed country in natural resources that has lived up to its economic promise. Perhaps it is that economic growth in Brazil has been more erratic than in other countries, though this is difficult to establish. Or it may be that this economic growth performance has been accompanied by high inequality, thus diminishing the "quality" of Brazilian growth relative to other fast-growing countries in the eyes of some observers.

3. But the most likely reason is that Brazil's growth during the last two decades—freshest in the memory—has been less than stellar. Compounding this is the fact that even more recently, during the last decade for example, many of Brazil's neighbors have done better (see figure on next page).

***By one
measure,
Brazil was
the world's
fastest
growing
country in
the past
century***

Brazil Was One of the Fastest Growing Countries During the Twentieth Century
(Average Annual Per Capita GDP Growth, Percent, 1901-2000)



Source:
World Bank

Are Brazil's Economic Growth Patterns Unusual?

4. In the 1960s, Brazilian economic growth kept up with that of Latin America and the world, but Brazilians remember better the “miracle years” of the 1970s, when Brazil grew twice as fast as other countries (although today most economists acknowledge that at least a part of Brazil’s “miracle” growth was unsustainable and sowed the seeds of the subsequent collapse). Along with the rest of Latin America, Brazil’s economic engine sputtered during the 1980s, but while growth in the region has picked up since, Brazil’s has been slow and erratic.

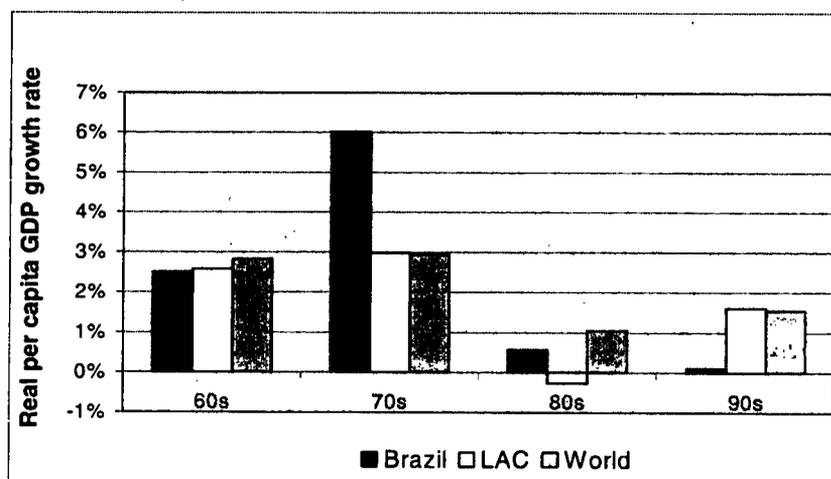
5. This is disappointing. Nevertheless, these comparisons indicate that at least in the matter of economic growth Brazil should not be regarded as unusual. Chile, for example, did poorly in the 1970s and early 1980s when most other countries in Latin America were doing well, and did well later when others stumbled. It is quite common to observe such variations in growth. In fact, based on a careful study of growth across the world for the last half-century, Easterly (2001) has argued convincingly that steady sustained growth over more than a decade is more the exception than the rule—more often than not, economic growth seems to occur in spurts. In other words, viewed through the lens of economic growth analysts, Brazilians are not that different from Koreans or Americans or Mexicans.

6. On the other hand, though, we find that a general framework based on examining Brazil’s experience in a cross-country setting does a poor job of “explaining” variations in Brazilian economic growth. To improve our understanding of Brazil’s growth and to reliably assess its prospects, we have to consider Brazil’s specificities. The framework must be refined and the factors better measured. In a sense, much of this report is an attempt to do precisely this and then, looking ahead, to identify the most important policy measures to rejuvenate economic growth.

7. One factor specific to Brazil is the distribution of Brazil’s growth between poor and rich. Despite spectacular growth over the past century, Brazil is also known for its extreme inequality and the breadth and depth of its poverty. How is it that the country with the fastest growth in the region also has the highest inequality? Are the two facts related, and if so, what can be done to improve the pattern of future income growth across the social classes?

**Brazil was
“typical” in
the 1960s
and 1980s,
“unusual” in
the 1970s
and 1990s**

Growth in Brazil, Latin America, and the World, 1960-2000



Source:
Volume II,
Chapter 2

8. Inequality measures are comparable across countries only with caution, but most analyses conclude that Brazil's income distribution has persisted for decades as one of the most unequal in the world. This suggests that its income growth has not been shared equally. An analysis of the causes of this distribution of growth will add complexity; it will also add to the richness of the findings.

9. An initial look at recent evidence confirms that Brazilian growth has been unequally shared, although some qualifications are necessary to this general statement. Brazil's poorest states in the Northeast, for example, have struggled to close the gap with the richer states in the South and Southeast of the country, despite various policies at the federal level to redistribute income towards the poorer states. But in fact experience has been mixed. In the 1980s and 1990s, income growth was on average somewhat higher in the Northeast. But a closer look reveals that growth was only really higher than average in four of the nine Northeastern states, with considerable variation between the nine. This variation, then, is one source of detail within Brazil that the report will try to understand from a policy perspective.

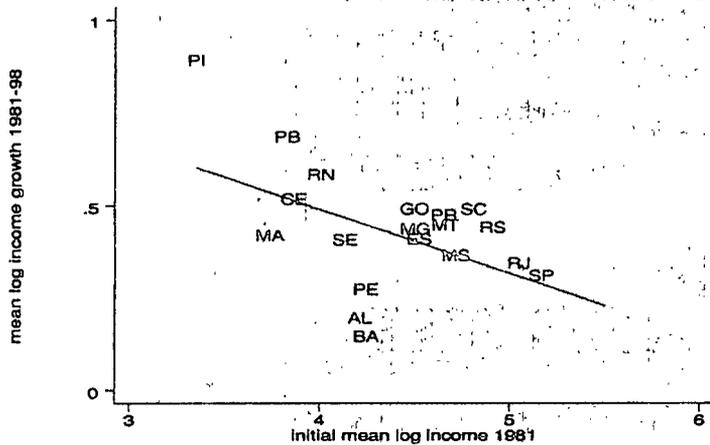
10. When discussing income distribution, it is important to dismiss a common fallacy. High inequality in Brazil leads some to posit that growth is essentially irrelevant to the problem of poverty, and that the latter should be viewed solely as an issue of "cutting the pie," rather than the "size of the pie." But even allowing that Brazil's growth has been unequally shared, and allowing that poverty has proved hard to reduce (though by no means impossible), there is no doubt that growth has led to poverty reduction (see second figure, below). Indeed, probably the greatest obstacle to further gains in Brazil's war on poverty has been the absence of sustained growth since the 1970s.

11. This is not to deny that Brazil's inequality reduces the effectiveness of growth as an instrument of poverty-reduction (either relative to other countries or relative to a counterfactual, more equal, Brazil). It is also not to deny that Brazil's efforts to reduce inequality, which have increased in recent years, may not in time prove to have important payoffs, by in terms not only of inequality, but also of poverty and of economic growth. Nonetheless, thus far, income inequality in Brazil has proven stubbornly resistant to social policy and economic growth alike (a separate World Bank report, "Inequality and Economic Development in Brazil," March 2003, treats this important subject in depth). To define our terrain: this report will focus on economic growth and its endogenous distribution between poor and non-poor (that is, before taxes and transfers) rather than inequality, per se.

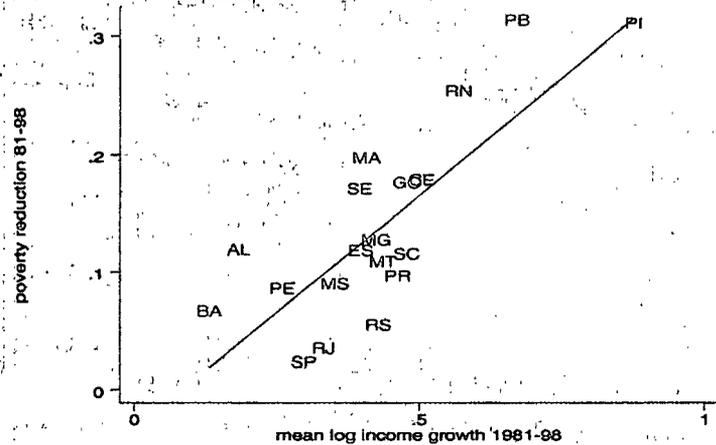
Although high inequality has persisted for decades, there is no doubt that growth has led to poverty reduction

Brazilian Economic Growth Has Been Unequal, but Has Still Led to Poverty Reduction...

1. Patchy Convergence between Rich and Poor States



2. A Strong Relation between Growth and Poverty Reduction



The “Three Legs of Economic Growth” and New Growth Theory

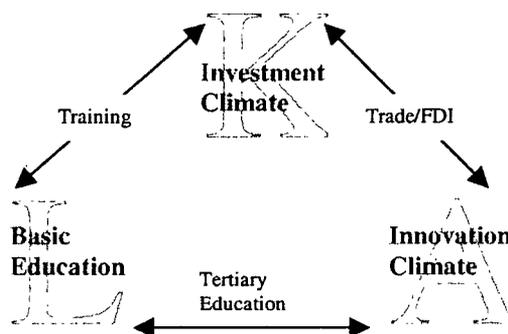
12. Robert Solow of the Massachusetts Institute of Technology, who created modern growth theory with the publication of his Nobel prize-winning 1956 article, has characterized growth as a stool standing on three legs: labor, capital, and technology (broadly defined). The quality of labor and capital matters as much as their quantity, but what may matter more are advancements in management and technology that determine the efficiency with which labor and capital are combined to produce goods and services (and the pace at which new, improved, products appear).

13. The New Growth theory of the 1980s and 1990s, led by researchers such as Romer and Lucas, changed the emphasis, while leaving the essence of the Solow model intact, by suggesting a heightened role for government policy in influencing the technological progress discussed in the previous paragraph. Policies that alter incentives to adopt cutting-edge foreign technology, that reduce knowledge flows through trade, that decrease competition, or that divert resources towards less productive sectors, may dilute simple measures of labor, capital, and even human capital as determinants of growth rates. Moreover, in the newer models, the effects of these policies may be highly persistent. Indeed, empirical evidence across countries suggests that simple factor accumulation explains only a small part of the differences between countries’ growth rates.

14. In Brazil, all three legs of economic growth can be strengthened through public policy, but how quickly this leads to growth will vary and we should condition expectations accordingly. This report aims to determine how policy can best be improved. It proposes that measures to increase investment in physical capital will have relatively prompt payoffs; improving the quality of labor takes time and will yield benefits only over the long term; and efforts to speed up technological progress fall somewhere in between. In examining each of these areas in light of the New Growth theory, and in light of Brazil’s economic history and endowments, the report constructs a list of well-grounded measures appropriate for the modern circumstances the country now faces: Brazil’s New Growth Agenda.

**Setting the
New Growth
Agenda
means finding
the most
potent mix of
measures for
investment,
innovation
and skill
formation**

Solow’s Three Legged Stool, Revised



See Volume II, Chapter 1, of this report for more details.

15. **Investment.** Physical investment is undertaken in the presence of macroeconomic, social, and bureaucratic risks. In Brazil, public debts and deficits make credit for the private sector scarce, and credit is the lifeblood of business. Brazil's social and political history has spawned institutions such as labor regulations whose impact is costly and uncertain. And entrepreneurial risks are magnified by bureaucratic requirements such as those relating to starting a new business or dealing with municipal, state, and federal tax authorities. The report attempts to understand the primary constraints to investment.

16. **Innovation.** International evidence suggests that increasing investment will not be enough to increase growth. In the medium term, investment that fosters or is accompanied by technical progress raises the productivity of labor and capital, and hence creates the largest, most sustainable benefits. A common measure of the joint productivity of labor and capital is "total factor productivity" or TFP. The report examines the correlates of TFP in Brazilian industry, and assesses how to harness global knowledge flows through technology policy.

17. **Skills.** Increasing investment rates and flows of knowledge is useless (or impossible) without a workforce capable of absorbing the knowledge and using it productively. Improvements in workforce quality take time, and efforts in this area should not be expected to quicken economic growth immediately. But for the same reason—long gestation lags—these measures should not be postponed either. The report attempts to provide Brazilian policymakers with guidance on the investments in human capital that will yield the highest long-term payoff.

*The report
analyzes
Brazilian Total
Factor
Productivity
and assesses
how Brazil
can harness
global
knowledge
flows*

Policy as a Determinant of TFP

While "policy as a determinant of TFP" has not explicitly been the message of much of the economic growth literature, it is easy to adapt modern growth theory to this end. First, policy may affect TFP through its effects on innovation. Second, policy may affect the returns to factors in the economy, affecting the investment decisions of agents and thereby TFP. Third, policy may be thought of as directly creating certain factors, such as public education.

Kienow (1998) has argued that the evidence of within country growth experience favors the view that ideas and thus innovation are behind TFP growth. It is worth emphasizing that such innovation need not necessarily be "technological" but may for instance be embodied in managerial techniques. McKinsey Global Institute (1999) recently completed an analysis of Brazilian productivity based on case studies of selected industries, and came to the conclusion that the major inefficiencies reside in the lack of penetration of international best practice in management methods, partly owing to a lack of competition in certain sectors, whether domestic (suggesting changes to competition policy) or foreign (suggesting further trade opening).

Some models give a critical role for policy in determining the location of activities and subsequent agglomeration effects. In Romer's words, policy can be "hypercritical":

"... small changes in [choices] can now imply much bigger changes in equilibrium outcomes... You could have, in the aggregate, increasing returns and positive feedback which make policy much more effective."

Concluding that policy has a critical role is not the same as detecting its effects. Indeed, in cross-country studies causal inferences are almost impossible. This leads Solow and others to recommend the study of country-specific episodes and experiences, included throughout this report.

What this Volume Contains

18. Based on work commissioned for this report and the contributions of other researchers in Brazil and elsewhere, this volume attempts to prioritize policies to make the three legs of Brazilian economic growth sturdier. Volume II contains seven background papers, organized in three sections: Analytical Overview, Empirical Assessments, and Policy Discussions (see table).

19. **History.** A question often raised in discussions of economic growth is whether Brazil can recreate the circumstances that led to stratospheric growth rates of 8 percent or more during the 1970s and early 1980s. Was this growth episode a fluke, and is Brazil's destiny in fact a low and variable economic growth rate? We have organized this report around this question. In Section 1, *Brazil: Then and Now*, we find that several factors relevant for economic growth have deteriorated, but there have also been improvements in others.

20. **Public debt.** One factor is clearly worse now—Brazil has entered the 2000s with a much larger debt than before. Section 2, *Sine Qua Non: Reducing Brazil's Debt Service Burden* discusses steps that Brazil must take to address this weakness.

21. **Investment climate.** A factor that has both deteriorated and become more relevant now is the business environment. This is the subject of Section 3. Public enterprises have relinquished the role of leader to the private sector, but the tax burden is higher now, policy uncertainty is at least as great, and regulatory obstacles for new firms are daunting.

22. **Innovation system.** On facilitating and making use of knowledge flows, Brazil has improved since the 1970s. But in the hyper-competitive “new economy” it is not enough just to improve—Brazil must at least keep pace in ICT and innovation systems with other countries, and there are signs that it has not. Section 4 of this report identifies the top priorities for the knowledge economy.

23. **Human capital.** Health, longevity and education levels have clearly improved since the 1970s. These investments will pay off over the longer term, for such is their nature. Section 5 of the report identifies where—given Brazil's historical underperformance in this area and the heightened importance of human capital in today's economy—its policy efforts could be concentrated.

**The report
does not
recommend
that Brazil “do
everything all
at once,” but
identifies
policy
priorities for
economic
growth**

Contents of Volume II

Chapter	Title	Nature
1	Concepts, Framework and Road Map	Analytical overview
2	Aggregate Growth in Brazil	Cross-country data analysis
3	Productivity Growth in Brazilian Industry	Firm-level data analysis
4	Household Income Growth and its Distribution in Brazil	Household-level data analysis
5	Brazil and the Knowledge Economy	International experience and Brazil's policies
6	Human Capital Policies for Growth	International experience and Brazil's policies
7	Investment Climate in International Perspective	International experience and Brazil's policies

Note: These background papers can be downloaded from the website:
<http://lnweb18.worldbank.org/external/lac/lac.nsf/>.

The Main Messages of the Report

24. **Public debt.** Currently, Brazil spends almost two-thirds of its tax revenues on servicing its public debt and pension obligations, leaving little room for public investments. The messages of the report are familiar: paying down the public debt will lead to better debt service terms and considerably more fiscal space, but successful fiscal adjustment also requires the deficits in federal and sub-national systems of pensions for government workers to be reduced. The experience of countries that have grown out of debt indicates little else will work.

25. **Investment climate.** The report identifies two aspects for special attention: the regulatory burden for new firms and the effects of public policy on foreign direct investment (FDI). Although financial costs of starting a business are not great, Brazil imposes long time delays on its entrepreneurs, and these increase investment risk. And despite large FDI flows into telecom and financial services, there are large untapped efficiency gains in sectors such as food and retailing, which FDI could help to capture.

26. **Innovation system.** Brazil's ability to take advantage of the knowledge economy depends on economic management, innovation systems, human capital, and information infrastructure. International benchmarks show that Brazil fares badly with respect to its innovation system, due to low business R&D, few patents, and low revealed comparative advantage in technology. This is despite high spending on tertiary education, a high index of entrepreneurship, and good information infrastructure. To utilize international knowledge flows and encourage innovation, priorities for Brazil are the protection of intellectual property rights and stronger R&D links between firms and universities.

27. **Human capital.** Increased public funding for the tertiary education sector does not follow from this, however. Analysis illustrates that at current rates of graduation from high school, public initiatives to expand higher education would not qualify as "non-elitist," and experience indicates that "leapfrogging" in human capital investment is not a viable strategy. Brazil completed the "epidemiological transition" to middle-income country health status during the 1980s. Brazil could build on its recent success in primary schooling and complete an analogous "pedagogical transition" to middle-income status in education within the next decade. The report thus recommends a heightened focus on upper primary school completion and secondary school enrollment.

**The priorities
are: reduce
implicit and
explicit public
debt, lower
barriers to new
firms and
export-oriented
FDI, improve
intellectual
property rights
and strengthen
R&D linkages,
and rapidly
expand
secondary
education**

Principal Message and Limitations of this Report

The main message of this report is that to resume economic growth Brazil needs to create an environment that is more conducive to productivity growth, and that the *Plano Real* and other reforms in the 1990s have been necessary but insufficient steps in that direction. Brazil's New Growth Agenda entails reducing macroeconomic uncertainty by lowering public debt, improving the quality of regulation for firms, encouraging R&D and innovation, making the labor force better prepared to exploit the opportunities presented by the new economy, and increasing social and political stability by improving education and reducing poverty.

There are many dimensions to economic growth (see World Bank, 2000, for a rich treatment): too many to treat all aspects comprehensively for Brazil in one report. The subject matter of this report has been circumscribed as follows. A deliberate omission is of policy questions related to the sustainability of natural resource use: this was to keep the task manageable. Second, the report contains a relatively cursory coverage of international trade policy, since this will be the subject of follow-up research. Third, the report's treatment of income inequality is restricted to one dimension: analyzing the extent to which income growth has accrued to the poor. A concurrent report analyzes longer-term structural and comparative questions surrounding Brazilian income inequality.

I. THEN AND NOW: BRAZIL IN THE 1970S AND 2000S

Introduction

28. A study of economic growth for a country that has not enjoyed high and sustained growth in recent memory can begin almost anywhere. In Brazil, where the economic success of the 1960s and 1970s was both exceptional and recent, such a report should arrive at its recommendations in the context of past successes, both from an analytical perspective and for it to convince a broad cross-section of Brazilians. So we should start by asking what were Brazil's circumstances and policies then, and how matters are different today.

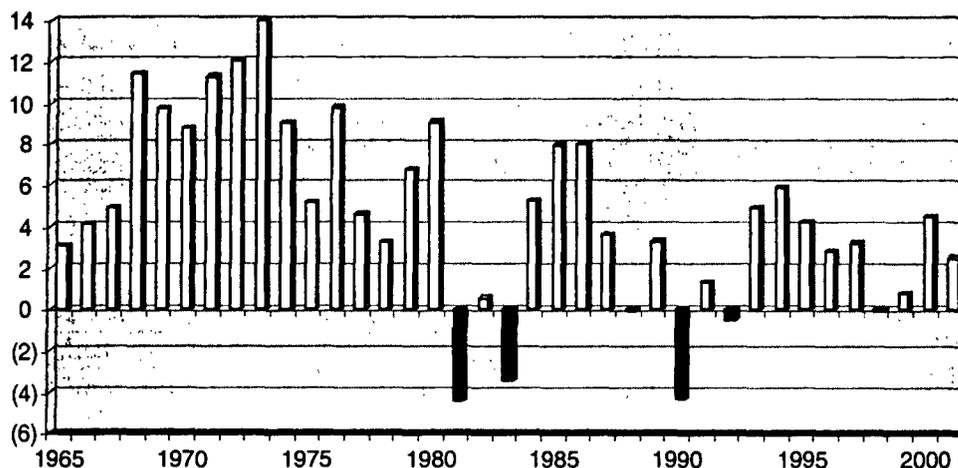
29. When we do so, it becomes clearer that a return to the policies of 1970s Brazil is neither possible nor appropriate. Today, Brazil is more dependent on the world economy than it was then, and its public sector is no longer in a position to take the lead in the country's investment program. Some of the drop in Brazil's performance can also be traced to changed economic conditions in the world, and some of it to an increase in Brazil's own income and changed structure of its economy. Third, some of Brazil's 1970s performance was unsustainable and built up macroeconomic imbalance (such as external debt), which later manifested themselves as lower growth. This last point is important to qualify too simplistic a comparison between the Brazil of the 1990s and that of the 1970s. Fourth, some of the macroeconomic foundations that Brazil has laid (such as improved fiscal management and low inflation), have yet to bear fruit. Despite the newfound economic stability, Brazil pays a price for the remaining policy uncertainty. Fifth and finally, in a new international economy, Brazil may have to emphasize human capital far more than it did during the 1960s and 1970s. These statements are treated at greater length in this section.

30. This section of the report is divided into eight short subsections, each outlining a relevant development. This will set the context for later, more detailed, explorations taken up in the rest of the report. The specific areas are:

1. Public Debt
2. Inflation, Expectations, and Uncertainty
3. Infrastructure Investment
4. Taxation and Regulation
5. Trade Policy
6. Integration
7. Migration, Industrialization, and Urbanization
8. Human Capital.

A cross-country model of economic growth can explain only a third of the decline in Brazil's growth rate since the 1970s

Brazilian GDP Growth (percent)



Source:
World Bank

Public Debt

31. Brazil has entered the 2000s with a higher debt overhang than it carried into the 1970s. In 1970, servicing public debt cost the Brazilian government less than 2 percent of national income. In 2000 this figure was greater than 9 percent. Yet despite low levels of debt through the 1970s, Brazil's present public debt can be traced to that period.

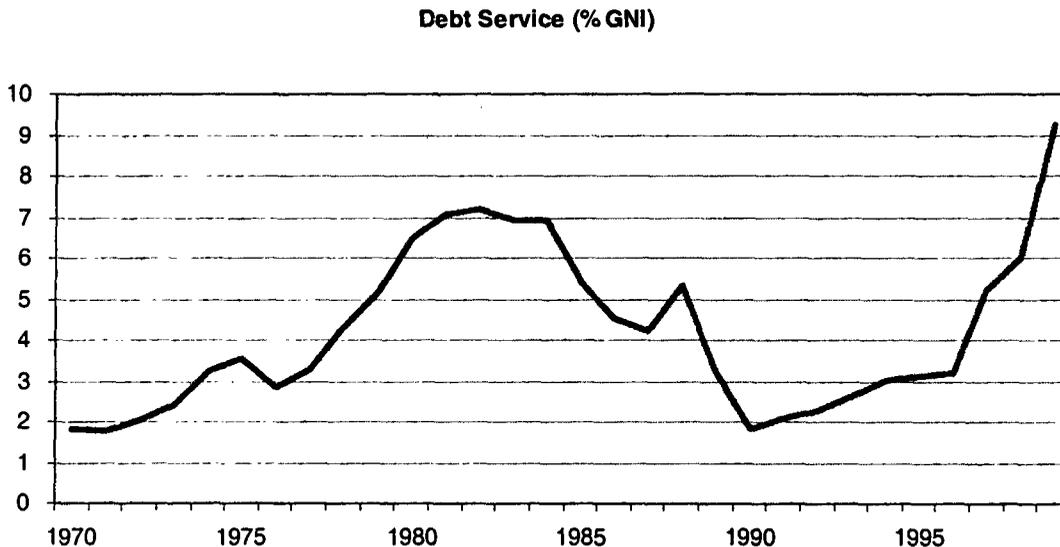
32. Brazil's debt first rose significantly through the 1970s in response to the oil crisis of 1973. Facing higher energy costs, the country ran current account deficits and racked up external debt to finance its investment program. This strategy entailed high levels of fixed capital formation in the public sector—investment in state-owned enterprises was more than 7.5 percent of GDP in some years. The intention was to repay external accounts through the growth that these investments generated. The second oil shock of 1979 led to the subsequent debt default and periods of uncontrolled inflation throughout the 1980s and early 1990s. Only in 1995 was inflation reined in, but at a price: interest rates remained high to maintain the *real*, and recession was avoided in part by fiscal deficits.

33. It is important to record that much of Brazil's present public debt predates the Real Plan. The debt of the states and state owned enterprises, assumed in a variety of ways since 1994 by the Federal Government, cannot be blamed on the elimination of inflation. One analysis (Bevilaqua and Garcia) estimates that over half the public debt accumulation between 1994 and 2000 is traceable to the refinancing of the states and to fiscal "skeletons." It is also necessary to record successive governments' efforts to ensure that such events do not repeat themselves: the Fiscal Responsibility Law and the system of budget surplus targets are two advances in this regard.

34. Nonetheless, for the purpose of the present discussion, it is sufficient to observe that the Real Plan in effect partly traded high inflationary expectations for a greater debt overhang. This has had two effects. First, the obvious cost is a loss of fiscal space owing to the cost of servicing the debt. A second—perhaps more pernicious—effect is reflected in the country's cost of capital, which is raised as markets face uncertainty about how the authorities will manage the economy to meet future liabilities. In the next section we shall turn to Brazil's debt stock and its implications for the country's economic prospects and policies.

**The Real
Plan has in
part traded
inflation for
a debt
overhang**

Brazil Has Entered the 2000s with a High Debt Overhang...



Source:
World Bank

Inflation, Expectations, and Uncertainty

35. In 2001, there is ample evidence that Brazil has eliminated inflation and inflationary expectations. This creates an apparent paradox: the higher growth of the 1960s and 1970s was accompanied by higher inflation than at present. The resolution of the paradox lies in distinguishing between inflation *per se* and the more fundamental concept of investor's uncertainty relative to their expectations. It is the latter concept that is germane to discussions of economic growth.

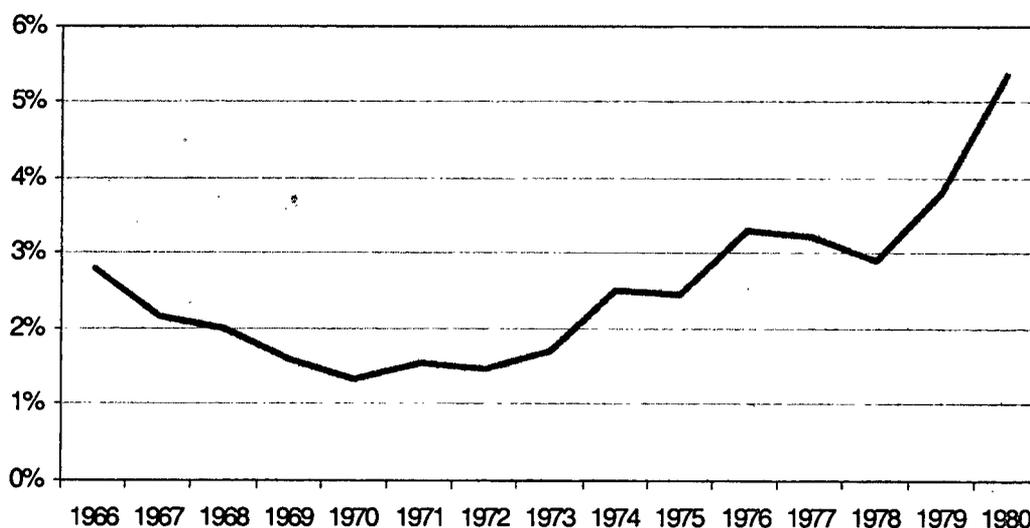
36. While inflation was higher during the 1970s than now, it has been well documented that Brazil had developed mechanisms to cope, and in particular that these mechanisms led to inflation during the period that was relatively predictable. The figure below shows this, charting average monthly inflation for the years 1966–80: inflation during the period did not equate to uncertainty. Further, inflation is not the only source of uncertainty faced by investors: a second, discussed above, is unsustainable projected paths of public liabilities. Where investors perceive the latter, this creates policy uncertainty as to the way out that will be chosen: renegotiated pension plans, greater fiscal austerity, higher future inflation, all are potential means of cutting future liabilities.

37. It is thus worth putting today's stability into perspective. Viewed in this light, the central role for public policy, beyond eliminating inflation, should therefore be to create the maximum policy certainty feasible given the constraints, political and economic. Paying off debt, and recognizing and reducing contingent public liabilities, are the most important components in this process. But there are many other possible elements: judicial transparency, central bank autonomy, rules rather than discretion in public policy (a good example being the new *Lei da Responsabilidade Fiscal*), improved budgetary planning (e.g., the multiyear budgeting mechanism). These are all factors that reduce macroeconomic uncertainty and can be viewed as central in this regard.

38. Recent government policy reflects this recognition. The refinancing of federal banks, the privatization of state banks, and improvements to the planning and budget process (such as multiyear planning and the budget law – *Lei de Diretrizes Orcamentarias* – should all be viewed in this light).

**Brazil's cost
of capital now
partly reflects
uncertainty
about
government
policy rather
than inflation**

Monthly Inflation



Source:
World Bank

Infrastructure Investment

39. In the 1980s, faced with tightening fiscal circumstances, Brazil's public enterprises cut investments. The effect was a downgrading of infrastructure relative to world levels. The locus of infrastructure investment has now shifted to the private sector, implying a pivotal role for regulation of once public industries. The 2001 energy crisis illustrates the perils of under-investment. Although accounts of the energy shortage vary, and granting that its proximate cause was low rainfall (more than 90 percent of Brazil's power is hydroelectric), it seems certain that price controls and regulation have discouraged energy investments.

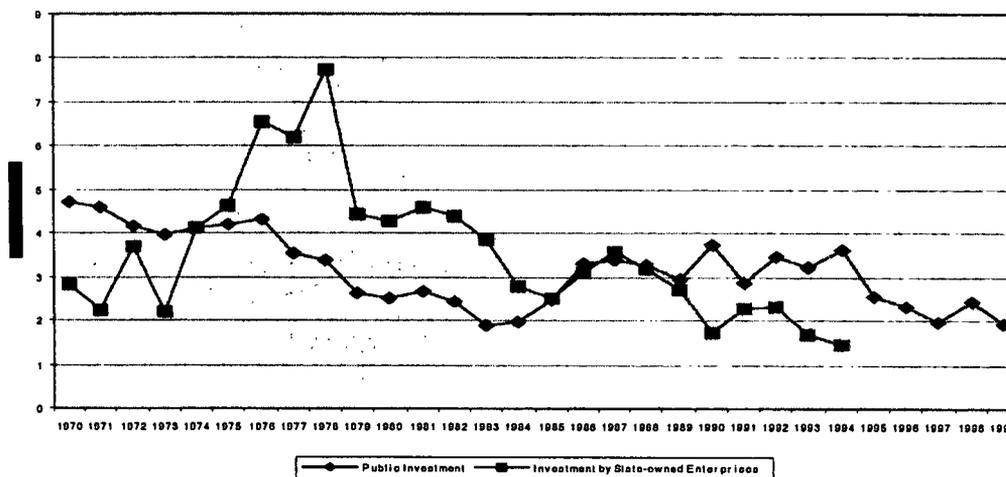
40. Brazil's investment backlog is serious. For transport alone, the government estimates that \$32 billion of infrastructure investment is needed (public investment in transport in 2001 was \$3.1 billion). It is necessary to distinguish between sub-sectors. The condition of roads has worsened since the 1970s—by 1995, two-thirds of roads were in poor condition—resulting in freight costs about twice those of international leaders. But freight rail privatization has been viewed as a success and—given the poor performance of the system historically—rail performance has probably improved since the 1970s. For ports the story is mixed: although they have improved, other countries have improved facilities faster and Brazil's ports are now among the most expensive in the world. A similar pattern—slow improvement relative to other countries—can be discerned in civil aviation.

41. The progress in urban public services such as water and sanitation is similar to the progress in ports and airports. In 1968, urban access to safe water stood at only 50 percent; by 1997 this proportion had risen to 91 percent. Access to sanitation improved from 25 to 43 percent over the same period. Nonetheless, international comparisons again raise concerns: coverage of urban sewerage in Brazil is lower than in poorer neighbors like Bolivia, Colombia, and Peru.

42. Overall, the evidence suggests that deterioration in infrastructure, especially relative to other countries, is an important factor behind the decline of Brazilian economic growth. Public-private partnerships and regulation are central issues. Key policies will be clear operating rules to minimize regulatory risk and incentives to providers to minimize costs.

The locus of infrastructure investment has shifted from state-owned enterprises to the private sector

**Infrastructure Investment Fell after the 1970s...
Public Investment (percent of GDP)**



Source:
World Bank

Taxation

43. Brazil's tax revenues amounted to about 33 percent of GDP in 2001, a level more typical of developed than of middle-income countries, which as a rule collect a smaller proportion of national income. Comparing Brazil's taxation rates across time is complicated by the role of state-owned enterprises in public finance. It is quite possible that the revenues of the SOEs in the 1960s through to the 1980s contained supernormal profits, although we do not have the detailed evidence necessary to make this assertion. A further complication is the question of how to treat government revenues from inflation; though not a factor today, these were a major source of finance in the past. But the best guess seems to be that the overall tax burden has increased since the 1970s.

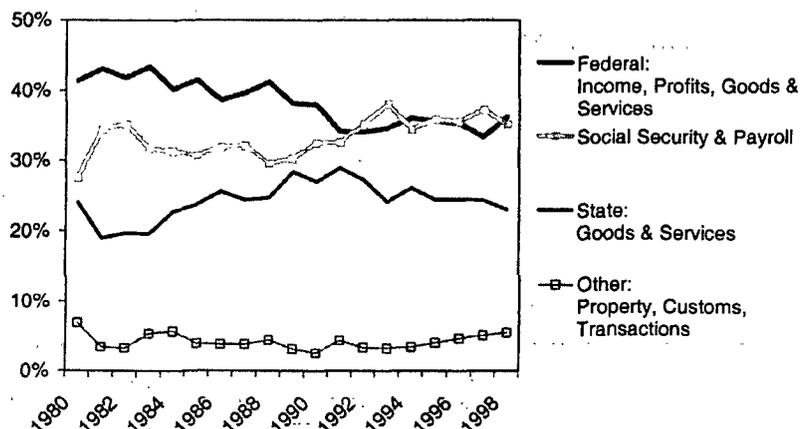
44. What is certain is that Brazil's taxes distort economic incentives more than in most countries. In 2000, of federal, state, and municipal government revenues, less than one-sixth came from direct income tax and over a third from various payroll taxes, especially social security. Brazil also has sales and financial transactions taxes that are inefficiently designed. Since some of these taxes are relatively new (such as the *Cofins* and CPMF), it is possible that the distortions have increased since the 1970s. However, it is not clear that these distortions are worse than those from hidden sources of public finance in the past.

45. Finally, since government revenues in the past came from a variety of opaque sources—inflation, parastatal profits, customs duties—it is possible that for the businesses operating in Brazil the *administrative* burden of complying with tax requirements has increased, as the taxes are now collected transparently. Firm surveys consistently reveal the level of taxes and their administration as major obstacles to investment. Tax reform has been a consistent item on the legislative agenda in recent years. However, a wish to avoid jeopardizing fiscal balance has combined with the complexity of discussions of fiscal federalism to impede root-and-branch reform. Today's issue seems less to be the overall level of taxation, then, than its administration and incidence. Recent initiatives to simplify this burden (particularly on small enterprises) reflect this recognition.

**Today's issue
is less the
level of
taxation than
its incidence:
how taxes are
raised and
administered**

Brazil's Tax Structure has Evolved away from Direct Taxation...

Percentage Share of Total Taxation by Tax Type



Source:
IMF Government
Financial Statistics

Trade Policy

46. After inflation, international trade is the policy area where Brazil has reformed most radically since the 1970s. Yet current account deficits persist and export growth has been lower than world levels. What can explain this?

47. First, Brazil's trade openness must be put in context. The creation of Mercosul is certainly an event of great regional moment, but Mercosul's common external tariffs remain among the highest in the world, and Brazil's trade with its Mercosul partners represents only about a tenth of its total trade. Moreover, non-tariff barriers are an important part of the trade story, and evidence suggests that these remain significant in Brazil. And Brazil's trade opening has taken place at a time when other countries have also opened up, many faster than Brazil.

48. Second, Brazil's exports are dominated by flows to the European Union and the USA, trading partners that have remained implacably protectionist in many of the markets where Brazil has the greatest comparative advantage, such as agricultural products and iron and steel. This is neither Brazil's fault nor markedly different today than 30 years ago, but it helps explain why Brazil's economy has responded less than most to trade opening.

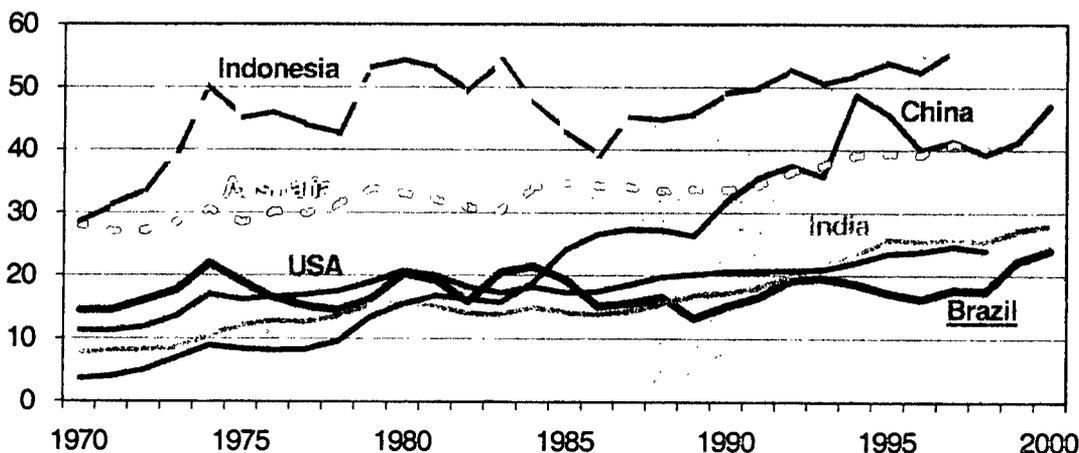
49. Third, opening to trade takes place in the broader context of other economic policies, and herein may lie the final piece of the puzzle. International evidence suggests that the two most important complementary policies to trade opening are investment in human capital and labor market policies. In these areas, Brazil has started with a lag in relation to many other countries.

50. To conclude, Brazil's trading conditions have improved markedly on the 1970s, and confounding factors should not obscure the fact that the country's future lies in greater integration in world markets for its goods (however this integration is negotiated in practice: another World Bank report, "Brazil: Trade Policies to Improve Efficiency, Increase Growth and Reduce Poverty" treats Brazil's gains from different trade blocs). But Brazil has reformed partially while its competitors in the developing world have reformed more deeply. And Brazil's principal markets overseas remain highly protectionist even today.

**While Brazil
has opened, its
competitors
have opened
up more, and
its export
markets have
remained
protected**

Brazil has opened up less than others...

Trade Volumes of Continental Countries (% GDP)



Source:
World Bank

Global Integration

51. Related to the trade policy just discussed is global integration more broadly. In particular, international flows of knowledge and capital have increased beyond recognition since the 1970s. Have these flows not represented greater growth opportunities for Brazil?

52. Brazil's knowledge economy is best viewed in international perspective. The country has not been most strategically positioned to benefit from the knowledge revolution for two reasons. First, until recently Brazil's information and communications technology base lagged those of higher growth economies in East Asia, for example. This is changing, but the benefits have probably not yet been felt (Section 4 will discuss this in greater depth). Second, despite recent "new economy" rhetoric, in the USA in particular, there is little evidence of a sustained worldwide effect on productivity *growth* from high technology sectors. (Indeed, much of US out-performance of Europe often attributed to technology can be explained by increases in labor-force participation and working hours.)

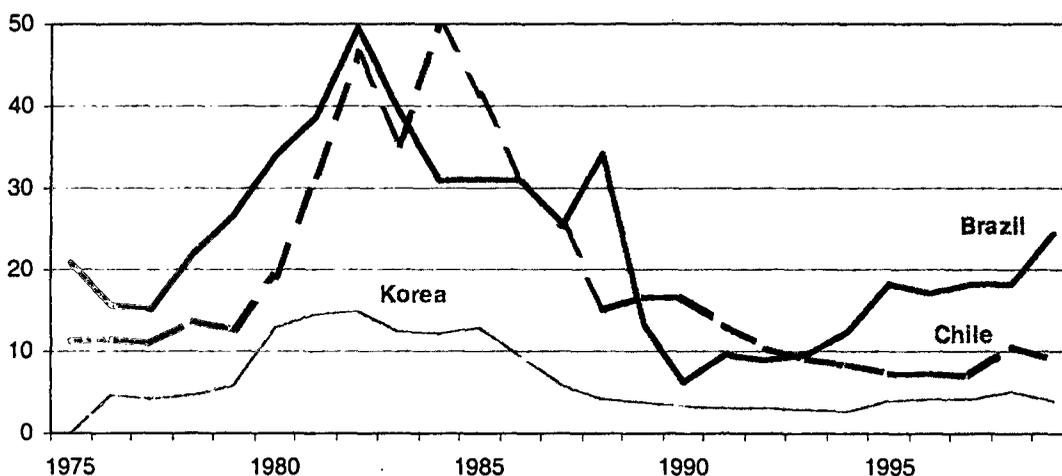
53. Brazil has been a well-advertised recipient of global capital flows, with equally well-advertised mixed results. Reliance on short-term external capital flows creates vulnerability to changes in world financial conditions, and places a higher premium on solid economic management. Macroeconomic management has of course improved greatly, but there remain issues that the markets remain sensitive to, particularly related to uncertainty over the sustainability of the national debt. It should be noted, on this subject, that since the *Real Plan*, Brazil has covered most of its external financing needs through FDI, and also that debt sustainability analysis suggests Brazil's public debt is sustainable under most reasonable scenarios. Suffice it to say that a reduced debt would certainly enable Brazil to face economic shocks with greater equanimity.

54. Another way of looking at global integration is therefore that it has "raised the stakes" with respect to macroeconomic imbalances. In the absence of large short-term international capital flows in the 1960s and 70s, Brazil was able to pursue looser monetary and fiscal policies without these affecting interest rates, and therefore growth, as immediately or as strongly.

In the absence of large short-term capital flows in the 1970s, Brazil could pursue looser monetary and fiscal policies without affecting interest rates

Integration has not Reduced Brazil's External Vulnerability...

External Debt Service as a Fraction of Exports



Source: World Bank

Migration, Industrialization, and Urbanization

55. The three decades after 1950 were a period of rapid industrialization, with accompanying urbanization and migration. Urban-rural wage differentials attracted large flows of low-skilled workers, and many of today's urban problems of congestion and insecurity were yet to take their toll. These migratory flows have now declined and in some cases reversed.

56. The 1991 census revealed net positive outflows in the previous five years from the South and Southeast of Brazil to the North and Center-West regions. Emigration from the Northeast declined between 1986 and 1996, though only slightly. Nonetheless, net migration from the Northeast to the Southeast is now about 100,000 people per year, a fraction of the flows recorded during the 1960s and 1970s. Moreover, the urbanization that took place in Brazil from the 1960s to the 1980s came at a cost. As in other countries, crime in many cities and traffic congestion in the larger metropolises increased, imposing new costs. Related, the proportion of households living in urban areas has begun to stabilize and small urban centers are gaining in importance relative to the largest metropolitan areas.

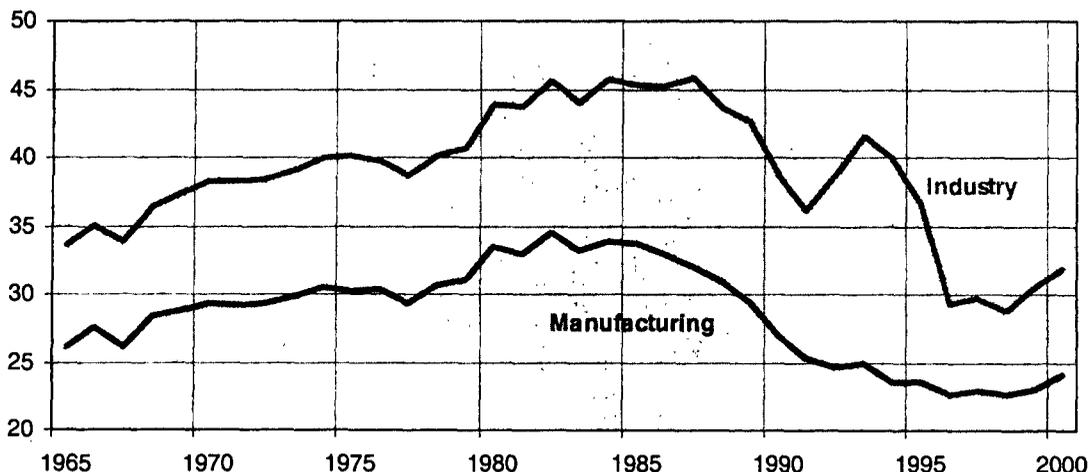
57. As the graph below shows, the industrialization that took place through the 1960s and 1970s came to a halt in the recession of 1981–82, and Brazilian manufacturing declined continuously through the late 1980s and early 1990s. The same trends were observed in all developed economies and much of Latin America. In Italy, for example, manufacturing value added fell from about 30 percent of GDP in the 1970s to 19 percent in 2000. Even in Mexico, where the North American Free Trade Agreement created an impetus for industry, the share of manufacturing employment has fallen since the 1980s.

58. To conclude, much of the reversal of early industrialization that Brazil has undergone is common in middle-income economies. But the urban transformation that took place in the 1960s and later was essentially once-and-for-all and irreversible. Its growth effects will not be reproduced. While cities may still remain the “engines of growth”, they will now have to rely more on productivity increases than on an influx of workers from the countryside.

Migration from the countryside will not fuel growth as it did before—there is now net emigration from the Southeast to Center-West and North

Industrialization has Reversed...

Industry and Manufacturing (% GDP)



Source: World Bank

Human Capital

59. By human capital measures, today's Brazil is another country than that of 1970, where one in three children finished primary school and one in seven babies died before they were five years old. Today, two in three children finish primary school, and under-five mortality has fallen to one in 25. Life expectancy has increased, again, to a greater degree in Brazil than in most of Latin America.

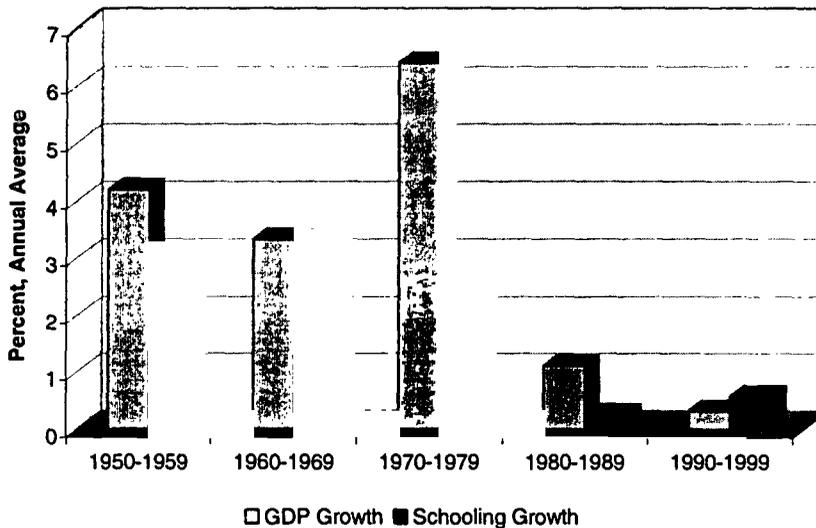
60. Despite the increased supply of education, earnings patterns suggest that demand for educated workers in Brazil has matched supply. Returns to primary and secondary education have remained high and returns to tertiary education have increased. Human capital may be a limiting factor today on growth, even if Brazil attained high growth rates in the past with lower investment in its workforce. Training and adult education are less common in Brazil than in its competitors, even if their occurrence has increased. For training, there is the question of the quality of programs, in many cases delivered by the public sector.

61. Perhaps most important in analyzing the role of human capital *levels* in explaining Brazil's growth slowdown is skill-biased technical change. But when considering *changes in levels*, there is evidence that, although the industrializing Brazil of the 1960s and 1970s had lower education levels than Brazil today, *percentage improvements* in the decades preceding this growth were greater even than those in the 1980s and 1990s (see figure).

62. In this report, we limit the discussion of human capital to its effects on economic growth. Of course, the gains from improvements in education and health should not be seen only in this light. Income is only one factor in public welfare and social indicators are ends in themselves.

**Skill-biased
technical
change may
reconcile past
"growth without
education" with
today's key role
for human
capital**

**Education levels have increased less in the last two decades than
in the 1950s and 1960s...
Increases in per capita GDP and Education Levels, 1951-1999**



Source:
World Bank, PNAD

The Historical Evidence: A Synopsis

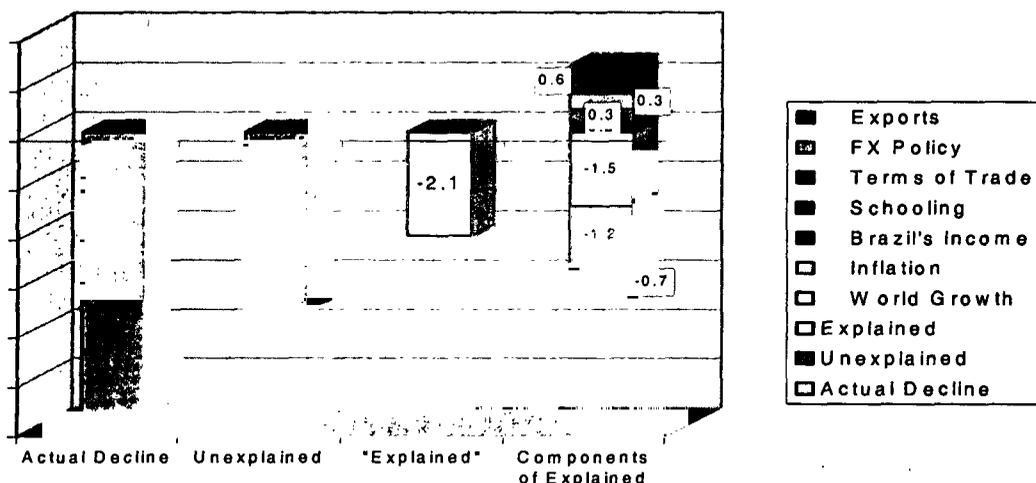
63. Greater global integration leading to greater access to credit, higher education levels, and trade-related improvements all point towards higher growth rates in the 1990s as compared with the 1970s (see figure). Countering these changes were the effects of lower world economic growth in the 1990s, Brazil's own higher income (*ceteris paribus*, richer countries grow slower), and higher inflation until mid 1995. Since then, Brazil's legacy of debt (despite eradication of inflation expectations), falling infrastructure investment (particularly in transport), the exhaustion of the benefits of transformation to urban industrial status, and work-force quality shortfalls (perhaps owing to skill biased technical change) have all contributed. Considerably more analysis is still necessary to account for the 6-percentage point decline in Brazilian economic growth in the 1990s from the 1970s: relying on cross-country regressions (in a sense neglecting "Brazil-specific" factors) leaves two-thirds of the variation in economic growth unaccounted for.

64. Trade and macroeconomic policy improvements may have mitigated these effects, but cross-country analysis reveals that reforms have some way to go before their effects are fully felt. Regional trade integration cannot be expected to deliver spectacular results, since Brazil makes up more than two-thirds of the economic heft of its trading bloc, and Brazil's own openness must be viewed against the backdrop of similar reforms in developing countries and the continued protection by OECD countries in markets for Brazil's exports. Inflation eradication, while necessary and successful, has not yet reduced economic uncertainty, partly owing to Brazil's debt levels. And fiscal constraints in combination with regulatory obstacles continue to hamper infrastructure investments. The world has also changed in other ways. Technological innovation has increased. Knowledge flows have become faster and more global. International capital flows have grown exponentially.

65. Accompanying these changes is the need for policy reform. This report examines factors that we assess as central to the New Growth Agenda: the burden of public debt, a less-than-favorable climate for investment, the requirements of a knowledge economy, and shortfalls in human capital. These are taken up in turn in Sections 2-5.

A cross-country model of economic growth can explain only a third of the decline in Brazil's growth since the 1970s

World Growth and Inflation Explain Some of Brazil's Lower Growth in the 1990s...



Source:
Vol. II, Ch. 2

2. THE SINE QUA NON: CUTTING THE DEBT SERVICE BURDEN

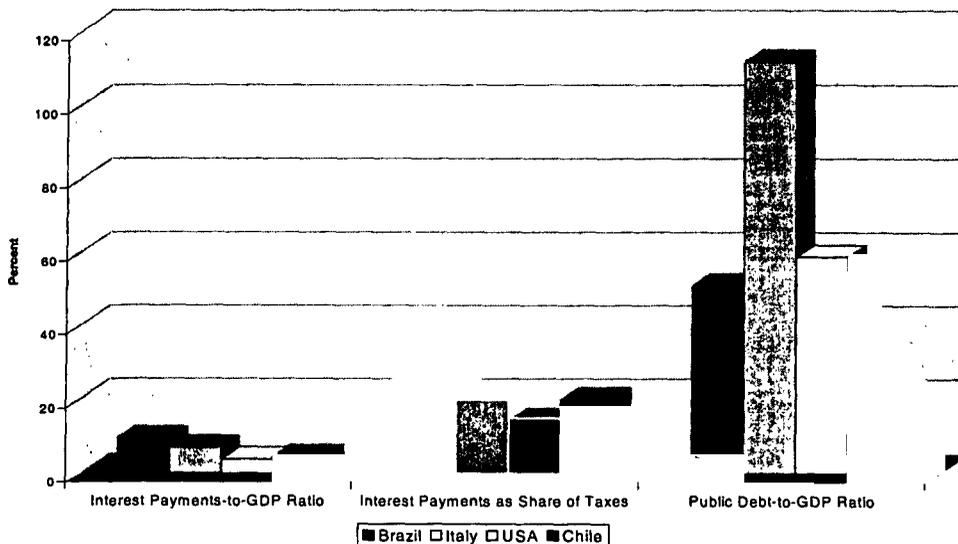
66. Brazil's federal government debt has grown over the last two decades, especially since 1995. The ratio of public debt to GDP was between 4 and 8 percent in the 1970s, 4 and 16 percent in the 1980s, 8 to 13 percent in the first half of the 1990s, but rose to between 20 to 45 percent in the second half of the 1990s (Bevilaqua et al., 2001). By 2002 it was above 50 percent.

67. In fact, the debt of most high and middle income countries has risen over this time: US public debt, for example, doubled from 26 percent of GDP in 1980 to 51 percent in 1998. Some OECD countries have debts that exceed 100 percent and it is instructive that the European Monetary Union has set 60 percent of GDP as the debt-to-GDP ceiling required of members. Putting Brazil's debt alongside these countries may not make the Brazilian government look frugal, but it does not make it look extravagant either. Compared with other middle-income countries, Brazil's debt-to-GDP ratio is high, but not the highest in the world—countries such as the Hungary, Turkey, Ukraine, and Argentina have higher indebtedness indices.

68. Brazil's problem is not simply high debt *per se*—the problem is a high *debt-servicing* burden. Interest payments (harmonized) on public debt were 7.3 percent of GDP in 2001 and about 8 percent in 2002, exceeding spending on health and education combined. Italy, with a debt-to-GDP ratio of about 110 percent in 2001, had lower interest payments to GDP (about 7 percent – see figure). The terms at which Brazil can borrow—from foreigners or from its own citizens—are much worse than those for “investment grade” countries. In any case, this interest burden severely limits public investment in human and physical infrastructure, and the high interest rates also discourage private investment. Brazil's challenge is to improve the debt service terms: in the short term, it appears that this can be done mainly by reducing debt levels. This is difficult: raising primary budget surpluses much above their present levels requires changing the rules that govern public spending, to introduce the flexibility to allow cuts that do not harm equity or growth.

**Brazil's
problem is at
least as much
its high debt
servicing
burden as its
high debt**

Brazil Has Less Public Debt than Italy and the US, But a Higher Debt Financing Burden



Source: World Bank

Amortizing Debt with Inflation: False Gold

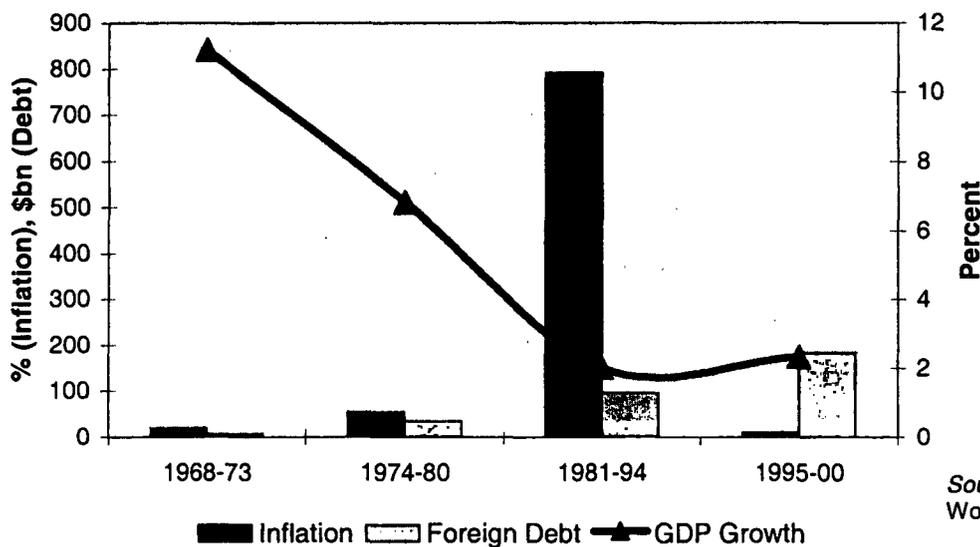
69. Annual inflation was 6.8 percent in 2001, 8.0 percent in 2002, but is now expected to fall. This is a great achievement. One way for the Brazilian government to deal with debt—tried before but which needs to be resisted—is to inflate it away. A large part of public pension and financial-sector liabilities is in any case indexed, either to nominal wages or to nominal interest rates. Even if it were not, a return to inflation would have an immediate effect on Brazil’s own country rating, and almost certainly result in reduced credit availability for the region. As a case in point, a recent survey of top investment managers indicated that stabilization in Brazil is an important determinant of capital flows not just to Brazil but also to all of Latin America.

70. Besides, trading inflation for debt is hardly a way to ensure economic growth, if Brazil’s own experience is a guide. The figure illustrates what many Brazilians know. Brazil experienced a stratospheric annual growth rate of 10 percent between 1968 and 1973, when both inflation and debt were low. Moderate levels of debt and inflation between 1974 and 1981 were associated with respectable growth rates averaging 6 percent. With high inflation and rising debt between 1985 and 1994, GDP growth fell below 2 percent implying, for the first time, that the per capita income of Brazil actually fell. With the *Plano Real*, Brazil swapped high inflation for higher debt, and economic growth has increased only modestly. The path to success is then to lower the debt service burden while keeping inflation low. At current levels of debt and debt service, even small increases in inflation may compromise economic growth.

71. Inflation in Brazil has also been shown to hurt the poor more. It is difficult to find instruments that result in a higher growth rates for the poor in Brazil—lowering inflation is one such rare policy measure. No doubt partly for this reason, there is no sympathy at all in Brazil for the notion of a return to inflation as an ingredient in economic management.

**A return to
inflation would
cut growth,
hurt the poor,
and reduce
credit to the
whole
continent**

Inflation, Debt, and GDP Growth in Brazil, 1968-2000



Source:
World Bank

Paying Down Debt: Implicit and Explicit

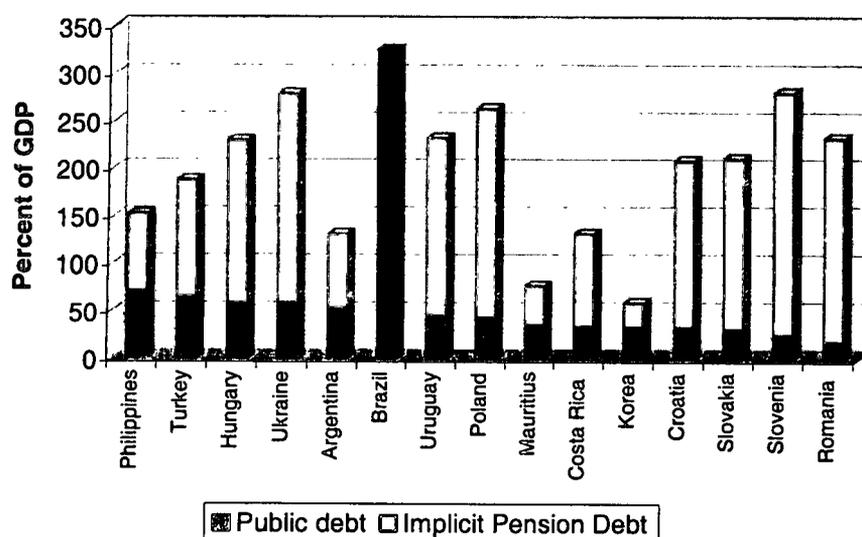
72. What must Brazil do to reduce its debt-servicing burden? Paying down the debt will help: although lower debt-to-GDP ratios do not by themselves guarantee better terms: (Eichengreer and Mody, 1998, found that in neither Latin America nor East Asia has this been the case), better credit ratings for the country would almost certainly follow. Paying down debt and successful debt servicing improves these ratings, which in turn improves borrowing terms. Conversely, debt-rescheduling episodes result in worse terms for the country.

73. But there are other steps that can be taken to improve the country's terms of credit. One is a reduction in pension debt and pension payments. Implicit pension debt is factored into the country risk by investors. Even if implicit pension debts did not affect creditworthiness, the burden of *servicing* them is as "explicit" as those on financial sector debt. Brazil's implicit pension debt is—depending on the discount rate used—between 250 and 300 percent of its GDP, easily the highest among middle-income countries (see figure, based on Holzmann, Palacios and Zviniene, 2001). Even among high-income countries, which have older populations, only Italy comes close.

74. A higher pension debt implies higher pension payments now or soon. In Brazil's case—even with a relatively young population—these payments are already about 11–12 percent of GDP, and as the population ages this ratio will get higher. In just nine years between 1988 and 1997, social security spending went from 8 percent of GDP to 12 percent due to changes in pension rules; with a much older population, the US spends 8 percent of GDP on old age benefits.

Implicit pension debt is factored into long-term country risk by investors and thus raises Brazil's debt service

Public Debt and Pension Debt in Middle-Income Countries, Circa 2000



Source:
Holzmann
et. al, 2001

75. Indeed, one hopes that the current borrowing terms faced by Brazil already reflect these factors, for if not these terms will worsen. Without cutting benefits or further raising taxes, the government has to resort to borrowing. In recent years, with interest payments on public debt around 8 percent of GDP added to pensions, and taxation above 30 percent of GDP, the government has spent some six out of every ten *reais* collected as revenue just servicing its liabilities. Brazil has to run primary surpluses of 3 to 4 percent of GDP even with growth at a respectable 3 to 4 percent, just to maintain the status quo. Investors dislike such arithmetic.

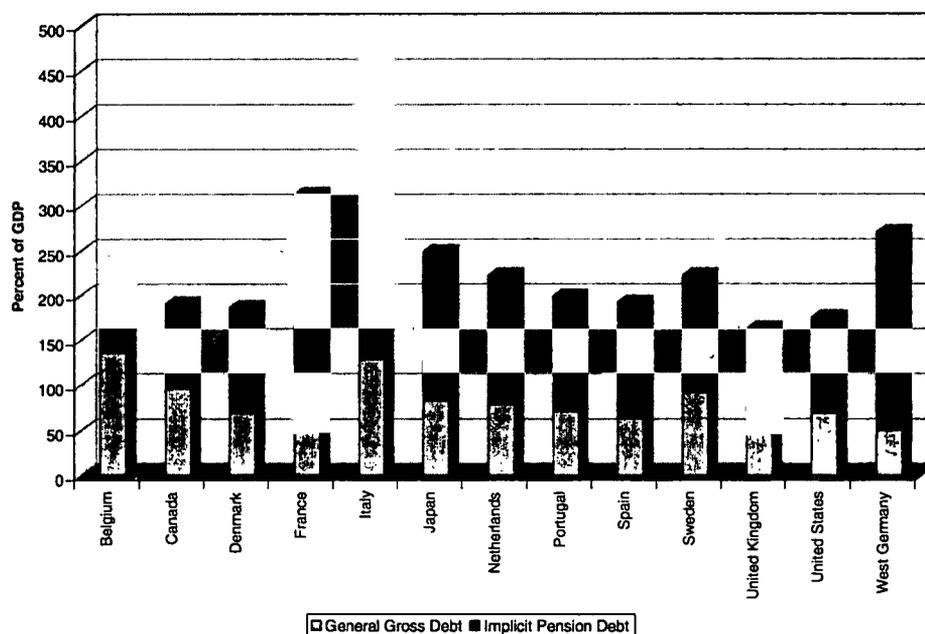
76. Reforms to the private-sector social security system (*Regime Geral da Previdência Social* or RGPS) between 1998 and 2000, introducing more rigid rules concerning time of contribution and actuarial adjustments, have generated significant gains. The priority for reform is now the system for government employees (*Regime Jurídico Único* or RJU). The RGPS and RJU run annual deficits of about R\$10 billion and R\$40 billion respectively, with half of the RJU deficit at the federal level. The annual subsidy in 2000 was about R\$500 per RGPS beneficiary, but R\$14,000 for Federal RJU retirees, making the system both unsustainable and inequitable.

77. It must be recognized, however, that it is politically difficult to reform the RJU. Recent attempts to tax civil service pensions have foundered in the Supreme Court. But social consensus has increased for reform, as both its urgency and the unfairness of the present system have been more broadly disseminated.

78. An apparent alternative avenue might be to bring down the cost of financing the debt by adopting a credible fiscal adjustment program with only a partial reform of social security. Faced with high explicit and implicit debts (see figure), this is what Italy has done since 1993. Another option is to reduce the service cost by paying down debt, and enacting a deep social security reform that simultaneously reduces the implicit pension debt and creates a domestic market for long-term government debt. This was the path chosen by Chile when faced by high external debt in 1983. Are there any clues for Brazil in the experience of these two countries, both of which have good economic growth records?

**The public
sector spends
6 out of every
10 reais it
collects on
servicing debt
and pension
liabilities**

Public Debt and Implicit Pension Debt In the OECD, Circa 1995



Source:
Holzmann
et. al, 2001

Chile 1983–1990: More Than Just “Growing Out of Debt”?

79. In 1983, Chile’s debt-to-GDP ratio was 125 percent, much of it external, and debt service payments were 25 percent of GDP. Chile’s debt sold for 30 cents on the dollar. GDP contracted by 14 percent in 1982. After an IMF-assisted fiscal adjustment, growth reached almost 6 percent in 1987. By 1993, Chile’s external debt was 45 percent of GDP, and sold for 90 cents on the dollar. Debt service to GDP was 7 percent, debt-to-GDP had fallen to 66 percent (half its 1985 level), and a large part of this was private-sector debt. GDP growth in 1991–1993 was about 8 percent annually, and unemployment fell to less than 5 percent. Since then, things have got better. Chile’s public external debt was \$5 billion in 2001 and combined with other public debt, this amounts to less than \$30 billion or about 10 percent of GDP. In 2000, the country overtook Brazil in GDP per capita. What accounts for Chile’s success in growing under debt?

80. First, an aggressive privatization program was used to bring down the debt. Debt-for-equity swaps allowed Chile to reduce its foreign debt from \$17 billion in 1982 to \$8 billion in 1990, and helped promote FDI. Overall, the debt swaps allowed Chile to exchange \$3.6 billion of external debt for equity in Chilean businesses and buy back \$7.5 billion (about 33 percent of GDP) worth of debt. There were investment subsidies built into these deals, and almost 90 percent of FDI was through these debt-equity swaps. But Chile has since been rewarded with a sharp rise in capital flows in the 1990s: annual average inflows rose from \$1 billion in the 1980s to \$3 billion in the 1990s.

81. Second, an aggressive pension reform lowered the implicit debt and helped Chile keep interest rates low. The pension debt was about 80–100 percent of GDP at the time of the reform and the system looked a lot like Brazil’s (see Edwards, 1996). The new system was funded. Those who had contributed to the old system were given recognition bonds (that could not be traded in the market until 1995). Bond values were calculated using a complicated formula, with an implied real rate of return of between 1 and 2 percent on past contributions. At an assumed market rate of 4 percent, these two factors implied a markdown of the pension debt by about 15–20 percent. Further, the real rate of return on these bonds was fixed at 4 percent, which—given that the market yielded 7–8 percent over the next two decades—implied a further markdown of 10–15 percent. Chile’s pension debt was thus marked down by at least 25 percent. Chileans had traded high and uncertain obligations for those that were lower but serviceable. The package turned out to be a good deal for most creditors. By 1991, with high economic growth, the pension in the new system had grown by about 40 percent for old age pensions, 90 percent for disability pensions, and 20 percent for widows and orphans (Laban and Larrain, 1998).

82. Third, macroeconomic policies targeted interest rates, not inflation. Pension funds that became the system’s mainstay were initially allowed to invest only in

Chile grew out of high debt in the 1980s, but its pension debt was marked down by at least 25 percent

Reducing Debt Service: Any Pointers for Brazil?

- Brazil’s debt to GDP ratio is less than half of those faced by Chile in 1983 and Italy in 1993. But Brazil has had to break the back of inflationary expectations, while Chile and Italy did not face this problem.
- Like Italy and Chile, privatizations have played an important part in Brazil’s stability program. Estimates indicate that Brazil’s public debt would have been about 8 percent of GDP higher without privatization proceeds between 1994 and 1999. But Brazil’s debt burden has risen during this time, whereas privatization efforts coincided with falling debt-to-GDP ratios in both Italy and Chile.
- Like Italy, Brazil has partially reformed its national social security system. Unlike Chile, Brazil’s reforms have not boosted domestic savings rates nor increased domestic demand for long-term government debt. And unlike Italy, much of Brazil’s pension debt remains untouched by social security reform because of the unique circumstance that pensions for government workers are the larger part of the implicit debt.
- Like Italy and Chile, the Brazilian government has committed itself fully to its stabilization effort. But unlike Italy it does not have the helpful pressure exerted by the EMU, which has been used by the Italian government to implement an austerity program despite unruly politics. And unlike Chile it is attempting this in a lively democracy with vigorous opposition and a coalition government.

Chile 1983–1990: More Than Just “Growing Out of Debt”?

79. In 1983, Chile’s debt-to-GDP ratio was 125 percent, much of it external, and debt service payments were 25 percent of GDP. Chile’s debt sold for 30 cents on the dollar. GDP contracted by 14 percent in 1982. After an IMF-assisted fiscal adjustment, growth reached almost 6 percent in 1987. By 1993, Chile’s external debt was 45 percent of GDP, and sold for 90 cents on the dollar. Debt service to GDP was 7 percent, debt-to-GDP had fallen to 66 percent (half its 1985 level), and a large part of this was private-sector debt. GDP growth in 1991–1993 was about 8 percent annually, and unemployment fell to less than 5 percent. Since then, things have got better. Chile’s public external debt was \$5 billion in 2001 and combined with other public debt, this amounts to less than \$30 billion or about 10 percent of GDP. In 2000, the country overtook Brazil in GDP per capita. What accounts for Chile’s success in growing under debt?

80. First, an aggressive privatization program was used to bring down the debt. Debt-for-equity swaps allowed Chile to reduce its foreign debt from \$17 billion in 1982 to \$8 billion in 1990, and helped promote FDI. Overall, the debt swaps allowed Chile to exchange \$3.6 billion of external debt for equity in Chilean businesses and buy back \$7.5 billion (about 33 percent of GDP) worth of debt. There were investment subsidies built into these deals, and almost 90 percent of FDI was through these debt-equity swaps. But Chile has since been rewarded with a sharp rise in capital flows in the 1990s: annual average inflows rose from \$1 billion in the 1980s to \$3 billion in the 1990s.

81. Second, an aggressive pension reform lowered the implicit debt and helped Chile keep interest rates low. The pension debt was about 80–100 percent of GDP at the time of the reform and the system looked a lot like Brazil’s (see Edwards, 1996). The new system was funded. Those who had contributed to the old system were given recognition bonds (that could not be traded in the market until 1995). Bond values were calculated using a complicated formula, with an implied real rate of return of between 1 and 2 percent on past contributions. At an assumed market rate of 4 percent, these two factors implied a markdown of the pension debt by about 15–20 percent. Further, the real rate of return on these bonds was fixed at 4 percent, which—given that the market yielded 7–8 percent over the next two decades—implied a further markdown of 10–15 percent. Chile’s pension debt was thus marked down by at least 25 percent. Chileans had traded high and uncertain obligations for those that were lower but serviceable. The package turned out to be a good deal for most creditors. By 1991, with high economic growth, the pension in the new system had grown by about 40 percent for old age pensions, 90 percent for disability pensions, and 20 percent for widows and orphans (Laban and Larrain, 1998).

82. Third, macroeconomic policies targeted interest rates, not inflation. Pension funds that became the system’s mainstay were initially allowed to invest only in

Chile grew out of high debt in the 1980s, but its pension debt was marked down by at least 25 percent

Reducing Debt Service: Any Pointers for Brazil?

- Brazil’s debt to GDP ratio is less than half of those faced by Chile in 1983 and Italy in 1993. But Brazil has had to break the back of inflationary expectations, while Chile and Italy did not face this problem.
- Like Italy and Chile, privatizations have played an important part in Brazil’s stability program. Estimates indicate that Brazil’s public debt would have been about 8 percent of GDP higher without privatization proceeds between 1994 and 1999. But Brazil’s debt burden has risen during this time, whereas privatization efforts coincided with falling debt-to-GDP ratios in both Italy and Chile.
- Like Italy, Brazil has partially reformed its national social security system. Unlike Chile, Brazil’s reforms have not boosted domestic savings rates nor increased domestic demand for long-term government debt. And unlike Italy, much of Brazil’s pension debt remains untouched by social security reform because of the unique circumstance that pensions for government workers are the larger part of the implicit debt.
- Like Italy and Chile, the Brazilian government has committed itself fully to its stabilization effort. But unlike Italy it does not have the helpful pressure exerted by the EMU, which has been used by the Italian government to implement an austerity program despite unruly politics. And unlike Chile it is attempting this in a lively democracy with vigorous opposition and a coalition government.

government issues, bank time deposits, corporate bonds, and shares of other pension funds, with limits on the last three. The government concentrated on keeping interest rates low, and kept inflation at moderate levels. Key interest rates were close to 5 percent in annual real terms, while annual inflation hovered around 20 percent for almost a decade.

Italy 1993–2000: EMU Gives The Stability Program Credibility

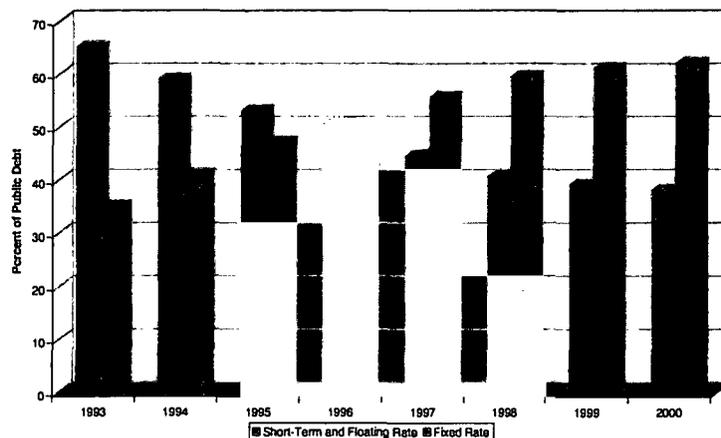
83. Brazil has not been able to sell its stabilization program to its creditors, so it has been difficult to increase the maturity of public debt. In the year to April 2001, the average maturity rose from 27 to 32 months. New issues now average 3.5 years, as compared with 2.5 a year ago. Contrast this with Italy: average maturity was 3 years in 1995 but has increased to about 5.6 years by 2000. Brazil's fixed rate share in Central Bank and Treasury securities was 12 percent in April 2001, while 50 percent was indexed to the overnight lending rate, 25 percent to the exchange rate, and 12 percent to inflation. Contrast this with Italy: between 1993 and 1997, the share of fixed rate issues has risen from 35 to 63 percent (see figure). Interest payments fell from 9.5 percent of GDP in 1995 to 7 percent in 1999. Per capita GDP in Italy has grown steadily at about 1.5 to 2 percent annually over this period. How has Italy been able to do this?

84. First, Italy (like Brazil) has used privatization to retire some debt, though not nearly as aggressively as Chile. From 1994–1999, privatization of shares in public utilities (1.5 percent of GDP) and financial institutions have brought in more than \$50 billion, and helped lower the debt from 124 percent to 115 percent. The aim is to get to 100 percent by 2003. Second, while not reforming social security as aggressively as Chile, Italy did reduce its implicit pension debt, though it still faces growing pension expenditures. Pension spending is set to rise from 14.2 percent of GDP in 1998 to 16 percent in 2015–2030, and then decline to 14 percent by 2050. Before pension reforms implemented in 1992–1997, which increased the working period and added pension funds and personal insurance for old age support, these figures were forecast to be 15.5 percent in 1998, 18 percent in 2015, and a peak of 24 percent in 2040.

85. Third, Italy belongs to the EMU, a rich club that wants it as a member. Investors know that excluding Italy would create a problem for the European market (France in particular fears devaluation of the lira). So they see Italian debt as effectively underwritten by countries such as Germany and France. Long-term rates fell from 13 percent in 1995 to below 6 percent in 1999 and interest payments—20 percent of Italy's budget—have also fallen. When times turn bad, Italian spreads still rise. In 2000, the spread between German and Italian ten-year bonds rose by 30 percent on political uncertainty in Italy. But EMU may have facilitated genuine reform: the government pushed a reformist budget through a fractious parliament in 1997 in the name of Italy joining the EMU.

**EMU
membership
underwrites
Italian debt, but
may also have
facilitated
genuine reform**

Italy Reduced the Uncertainty of Interest Payments While Lengthening Debt Maturity Between 1993 and 2000



Source:
World Bank

Three Things Brazil Must Do

86. Brazil's debt stood at about 53 percent of GDP by end 2001, with almost a third repayable within a year. Currency devaluations played their part in raising this ratio. And half the country's public debt is tied to overnight interest rates so that even with longer maturities, interest payments rise quickly in crises. When crisis in Argentina drove the overnight rate to 19 percent in mid-2001 and the *real* to above 2.5 to the dollar, annualized interest payments rose sharply from 8.7 to 9.9 percent of GDP.

87. A reduction of public debt service will improve growth by improving the terms of credit for Brazilian firms and easing private investment, and by increasing room for investment in human capital and infrastructure. For this, three difficult tasks must *simultaneously* be effected:

- (a) Maintain monetary policies to keep inflation low (and possibly undertake institutional reform such as strengthening central bank independence),
- (b) Continue diligently servicing and start to repay existing public debt,
- (c) Renegotiate public pension debt obligations to government workers for future retirees, mandating a funded scheme such as that for US federal government workers if necessary.

The experience of countries with a track record for successfully dealing with high levels of debt indicates that little else will work for a country in Brazil's circumstances.

***Brazil could
mandate a
funded
pension
system for
government
workers as
in the USA***

3. SPARKING GROWTH: THE INVESTMENT CLIMATE

Evidence across Countries

88. Cross country evidence suggests a positive link between investment and growth, but that this link is attenuated by numerous instances of misdirected or inefficient investment that is largely unrelated to growth. Barro (2001) summarizes a sensible conclusion as follows:

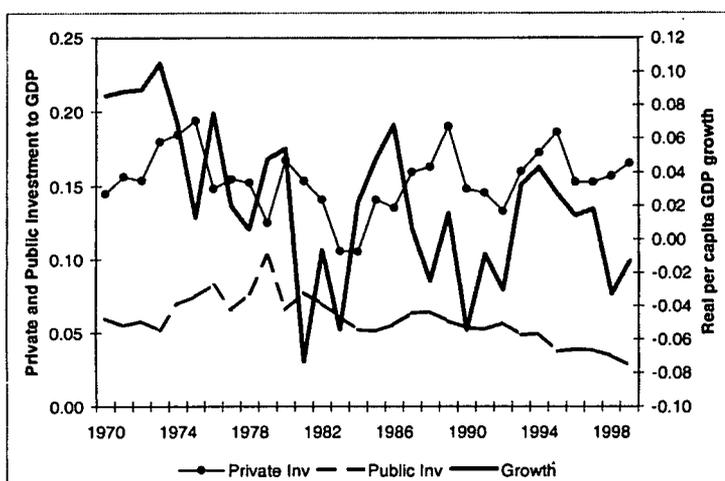
“A reasonable interpretation of the results is that some policy variables—such as better maintenance of the rule of law, lower government consumption, and price stability—encourage economic growth partly by stimulating investment. However, if investment is higher for given values of the policy instruments—perhaps because of variations in thriftiness across economies that lack perfect capital mobility—then the positive effect on growth is weak.”

89. Volume II, Chapter 2, finds that the link between investment and economic growth between 1960 and 2000 has been tenuous in Brazil. In particular, investment levels have remained relatively constant (as a share of GDP) over the period, while growth rates have been far more variable, and showed a one-off decline in level in the early 1980s.

90. The exercise suggests several explanations. The first is that data may be flawed: obtaining accurate saving and investment ratios is difficult during periods of high and accelerating inflation, so data for the 1970s and 1980s may be unreliable. Another problem is the discrepancy in the share of capital in output which—following accepted practice—is assumed to be 0.3 in Volume II Chapter 2, but which Brazilian national accounts data suggest is about 0.5 (see Castelar et. al., 2001). The third is that Brazilian public sector investment has generated decreasing economic returns, or that the investment climate encourages private investment in unproductive sectors by creating incentives for rent-seeking by entrepreneurs in certain sectors. But regardless of how these numbers are calculated or interpreted, variations in total factor productivity growth account for a considerable part of the changes in Brazilian economic growth rates since the 1970s.

**The link
between
investment
and
economic
growth in
Brazil has
been
tenuous**

Growth has been more variable than investment...



Source:
Vol. II, Ch. 2

Evidence across Brazilian States

91. Volume II, Chapter 4, illustrates that economic growth of Brazilian states is caused by (a) the quality of public administration in the state (as measured by the average educational attainment of public employees), (b) political uncertainty, and (c) policy uncertainty. The magnitude and significance of these effects varies depending on the specification and details of the estimation, but all three factors appear significant in some analysis, with political uncertainty and policy uncertainty dominating. While these effects are significant in the analysis, their magnitude is not large, allowing us to imagine a gain of perhaps a half to one percent in state economic growth through improvements in these variables within their current band in the data, probably not more.

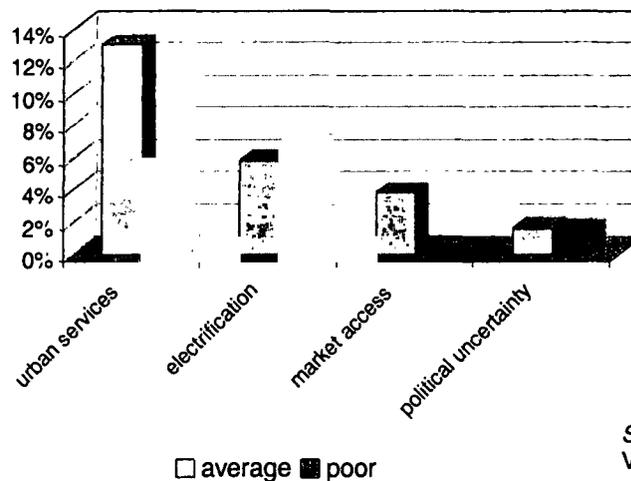
92. The chapter also emphasizes the possibly growth-enhancing roles of trade and access to markets (they find a negative effect of distance from the sea on subsequent household growth), and, related, the role of public infrastructure provision (in particular, electrification shows a strong effect on subsequent income growth in household data). Trade and infrastructure regulation deserve special attention within Brazil's investment climate.

93. Volume II, Chapter 4, also assesses the effects of these variables on the distribution of income growth in Brazil: how much do incomes rise for the poor versus the average? In this regard, the impact of the quality of public governance is pro-poor, in the sense that the income effects of these variables are comparable or higher for the poor than for the average. On the other hand, urban services (proxied by trash collection) seem to have a higher impact on income growth outside the poor. Finally, although significant, the effects of variations in trade access were relatively small compared with the effects of infrastructure variations.

*The quality of
public
governance
and
infrastructure
regulation
deserve
special
attention for
their pro-poor
effects*

Policies Differ in their Impacts on Income Growth...

Effect of a One Standard Deviation Increment in Policy



Source:
Vol. II, Ch. 4

Evidence from Brazilian Firms

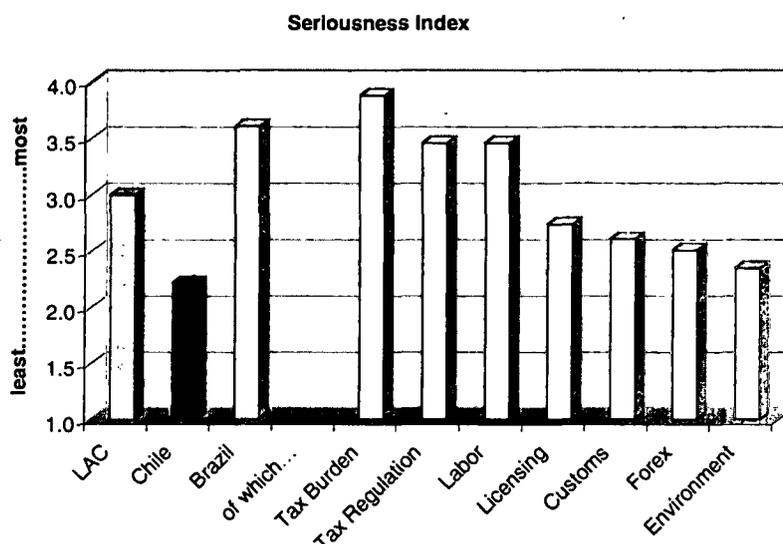
94. Volume II, Chapter 3, finds that new firms typically possess higher and faster growing TFP, and that TFP growth leads to growth in firm size, and hence suggests that the easing of regulations governing entry could go a long way towards raising aggregate TFP growth.

95. The same chapter finds that growth rates are higher in larger Brazilian firms during the 1990s, controlling for other factors. This accords with two stylized facts. First, the shortage of credit for the private sector leads to the rationing of long-term credit to larger firms who represent lower transactions costs for lenders. Other evidence backs this assertion: Volume II, Chapter 3 cites causality between profits and investment, but point out that such evidence is weak owing to problems of reverse causality. However, other empirical work (Thomas, 2001) has examined this question in more depth for Brazilian firms on the São Paulo stock market, and found clearer evidence of liquidity constraints in investment, so the chapter's suspicions are probably correct. A second cause of the size effect in TFP growth may be bureaucratic obstacles such as onerous tax registration requirements and permits for construction work, which are documented to impede small firms and start-ups.

96. World Business Environment Survey respondents in São Paulo ranked "tax and regulations" alongside policy uncertainty as the largest single obstacle to private sector activity. When the questionnaire entered into greater detail, the major concerns were taxation, labor and licensing regulations. Of course these concerns surface in the views of private sector managers in most countries: nonetheless, they stand out in Brazil by international comparison.

New firms in Brazil show higher and faster-growing TFP, so easing their entry could raise aggregate productivity

Tax, labor and licensing regulations create serious barriers to Brazilian firms...



Source:
World Business
Environment Survey

International Good Practice

97. Volume II, Chapter 7, discusses a number of instances of reform and international good practice in the context of (a) regulations governing start-up companies, and (b) export-oriented foreign direct investment. The watchword of good practice in promoting investment is removing unnecessary barriers. In Ireland, for example, new companies can register and complete the steps to becoming a legal entity on the internet in a single day. In Chile, companies receive a single identification number for all their dealings with government.

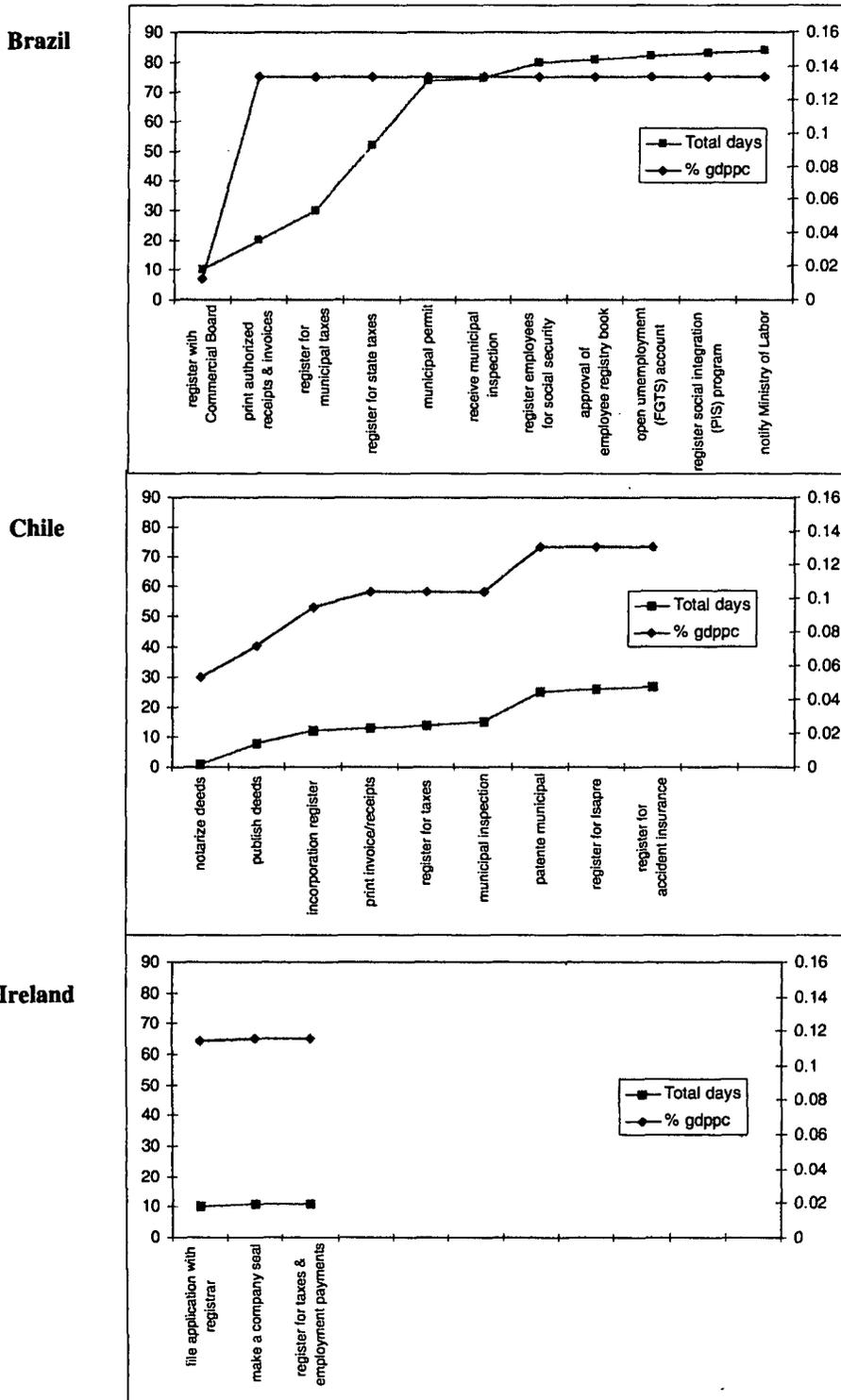
98. From the viewpoint of economic theory, efficiency is enhanced if fiscal incentives to invest in given countries or locations are minimized. Recognizing that this is an unreasonable expectation, and that many countries or regions face a “prisoner’s dilemma” in that their competitors would gain from offering such incentives if they do not, a lesser requirement is that these incentives do not increase the bureaucracy faced by the very firms they aim to attract. In this regard, some degree of federal coordination of information regarding the incentives offered by Brazil, its states, and its municipalities, may ease FDI. Investment information services at the federal level could collate details on federal, state, and municipal incentives along the lines followed in Canada. Moreover, international experience suggests that the tax holidays that Brazil relies on in many of its incentive schemes have a high fiscal cost.

99. In the area of infrastructure regulation, Brazil’s immediate problem is in energy, where best practice examples of integrated wholesale markets for energy are mainly to be found in Norway and Spain (both markets dominated by hydroelectric power like Brazil), and also in the UK, Australia and New Zealand. These systems allow market prices to reflect marginal production costs of energy across different production technologies, with spot prices determined by actual trades.

***In Ireland, new
companies
may complete
the steps to
become a legal
entity on the
internet in a
single day***

It's easier to start a business in Ireland...

Steps to Register a Company



Source:
Vol. II, Ch. 7

The Administrative Burden of the State

100. Brazil's public sector can no longer lead the country's investment effort. Yet the public sector continues to exert a heavy influence in private sector investment decisions. International evidence suggests that this can be reduced, and Brazilian evidence suggests that there are large gains to be made from doing so. By reducing the burden of the state in investment decisions, Brazil may hasten the substitution of private investment for the public investment of the past.

101. This and the next two sections make recommendations in three areas relating to Brazil's investment climate. The first is the administrative burden. The second is international trade, where the report recognizes that much has been done and that there are significant obstacles. Third, the report discusses the impact of infrastructure regulation and provision.

Easing Procedures for Start-up Companies

102. One area of company activity where it is relatively easy to document regulatory obstacles concerns starting a company. One factor that emerges here recurs in many private-sector accounts of doing business in Brazil: the time and uncertainty associated with dealing with three levels of government. For startup firms this factor manifests itself in various guises.

103. Volume II, Chapter 7, reports results from Djankov *et al* (2000) suggesting that Brazil's three-tier administrative structure for company registration creates huge obstacles to entrepreneurs. Best practice in business registration would suggest developing single points of contact in each municipality (or group of municipalities) where businesses would register for municipal, state, and federal purposes. At this time the business would be required to fill in one business registration form and would receive a number to be used in interactions with at all levels of government.

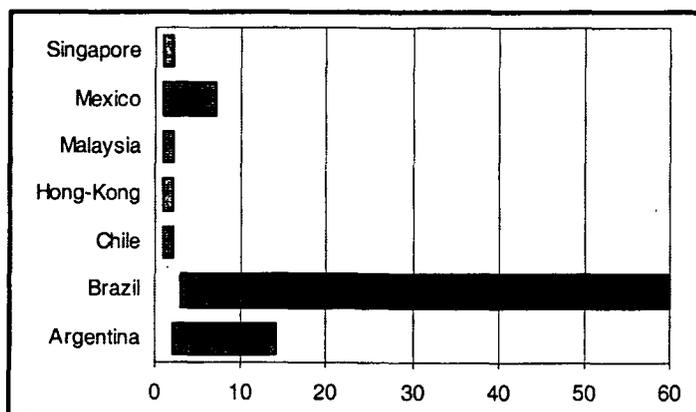
104. In a second stage, and in some cases concurrently with the above, it may be possible to develop systems whereby firms go online to complete the formalities in the previous paragraph. Such systems have been implemented in most Western European countries.

105. A further set of reforms would revolve around guaranteeing entrepreneurs that registration requests would be processed (whether accepted or rejected) within a given period. Such guarantees are recommended practice in the European Union, with the idea

The time and uncertainty of dealing with three levels of government emerges in many private sector accounts

Brazil Makes its Entrepreneurs Wait...

Time Taken for Business Registration in Selected Countries



Source: FIAS

being that an application be deemed to be approved if the administration does not process the request on time.

Easing Tax Administration

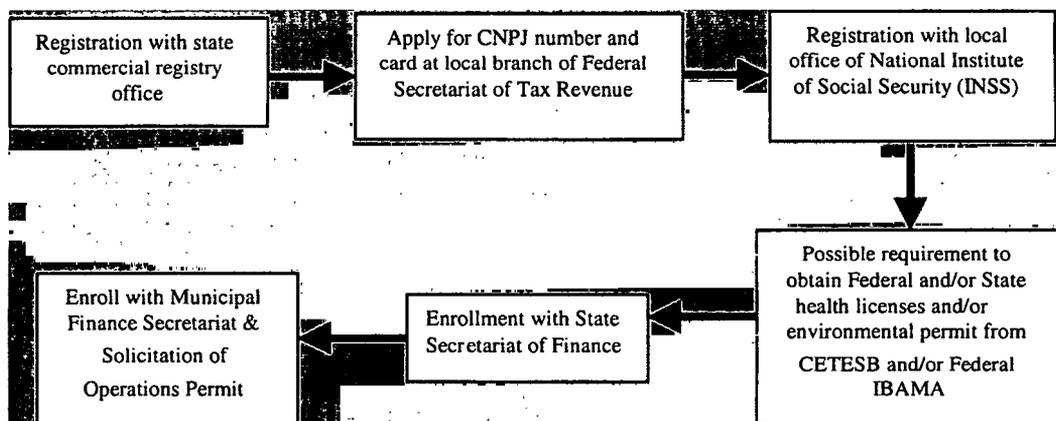
106. Companies also currently register to pay taxes at all three levels of government, and this involves much duplication of effort. The simplification of this registration process should not await the reform of the tax system in Brazil, since the latter involves more negotiation at the political level (and in certain cases amendments to the constitution), whereas the former is a mechanistic matter of the public sector taking a greater share of the transactions burden that a federal political structure inevitably creates.

107. Tax registration should ideally be merged with company registration, as it is in the USA. Companies receive a federal tax identification number, which then serves as a tax identifier at state and municipal level.

108. In a recent report (FIAS, 2001), the World Bank's Foreign Investment Advisory Service suggested Canadian practice in this area as international best practice. In Canada, tax registration is free and may be performed over the internet. Tax registration may be undertaken at the same time as company registration, and the company's tax number and confirmation of its tax status within one week. Brazil has started down this road, with the new SIMPLES tax system for small and medium-sized enterprises and with investments in electronic government, but still has some way to go, in particular at state and municipal levels.

**In Canada,
tax
registration
is free and
may be
performed
over the
internet**

Typical steps for tax registration...



Source: FIAS

Land Acquisition and Construction

109. Companies have problems buying and developing land in Brazil, partly because there is a conflation of zoning requirements with administrative requirements for deeds and titling. This means that municipalities must issue land-use certificates for all newly acquired land, rather than companies simply being required to obey existing zoning restrictions on their activities.

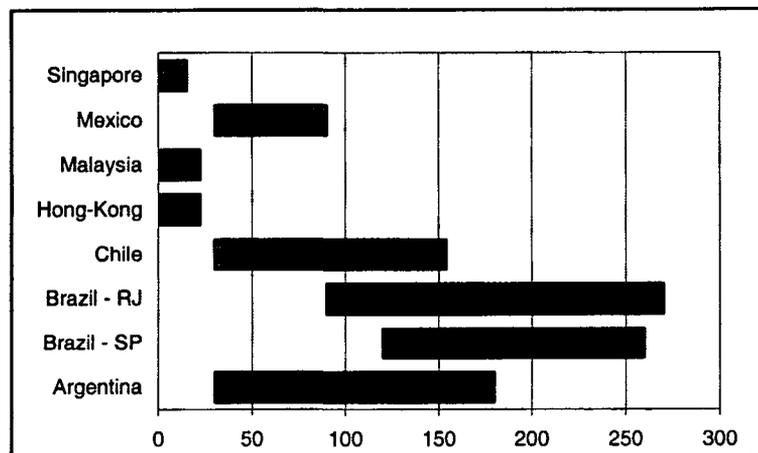
110. It may be possible to simplify the procedures for land acquisition and development by increasing the use of industrial parks. In these cases, the industrial zone developer effectively undertakes the fixed transactions costs of land acquisition and utilities provision (e.g., water, power) on behalf of all its clients, and then oversees the activities of companies that locate in the park. Campinas is the best-known example of this system in Brazil, and has been highly successful in attracting industrial activity to its region. For an international example, industrial parks have been a central feature in the regeneration of lagging areas of the United Kingdom: Scotland and Wales provide many successful examples.

111. Even where investments do not take place in industrial parks, there may be opportunities to lighten the administrative burden placed on investors. One such opportunity would entail merging the procedures for obtaining a location permit and environmental clearance.

Industrial parks have been a central feature in the regeneration of areas of the UK

Land acquisition is lengthy in Brazil...

The Length of the Land Acquisition Process in Various Countries (days, minimum to maximum)



Source: FIAS

Further Opening to Trade and Foreign Investment?

112. Volume II, Chapter 7, suggests that some of the lower productivity sectors in Brazilian industry are also those with the least foreign competition. This suggestion echoes other work analyzing Brazil's tariff reductions of the early 1990s, which suggests that sectors that received higher import penetration also showed greater productivity gains (Moreira and Correia, 1996).

113. Brazil's trade opening has stalled in recent years as recessions have led Mercosul members to negotiate a series of small tariff increases. At the same time, several studies and conferences have focused attention on non-tariff barriers. There is little quantitative work on this matter, but given that lobbying by industries may make it hard to reduce tariffs sharply, a focus on non-tariff barriers may be a more productive avenue. Moreover, some of the administrative barriers to investment listed above also act as effective barriers to trade.

114. Cohen (2001) gives strong evidence that the gains from trade are only maximized in the presence of a flexible labor market, and this paper offers the most plausible explanation for the relatively disappointing response of the Brazilian export sectors to trade liberalization. This finding emphasizes that in the case of Brazil two of its hardest and domestically most controversial reform priorities are closely linked to one another.

115. Finally, concern that Brazil's natural resource endowments may impede knowledge- and innovation-led productivity growth should be tempered in the light of counterexamples such as Australia, Canada, Sweden, Finland, and Chile. Recent detailed work on Latin America (De Ferranti et al, 2001) suggests that rather than hindering technological innovation, the combination of knowledge with natural resource endowments, human capital investment and open trade policies is a potentially powerful growth engine. In this view, knowledge and natural resources are complements, whose potential can best be unleashed in Brazil through greater openness, continued negotiation to reduce barriers to Brazil's exports, investment in human capital, and public-private R&D partnerships in natural resource-intensive sectors.

In the short term, focusing on non-tariff barriers may be the most productive avenue

Trade Openness and Labor Market Flexibility are Complements...



Source:
Cohen (2001)

Infrastructure Provision and Regulation

116. Perhaps nowhere is the fiscal constraint more keenly felt than in Brazil's array of public policy choices regarding infrastructure provision. Evidence in favor of the positive link between infrastructure and economic growth in Brazil is quite plentiful. Volume II, Chapter 4, reports strong growth effects across Brazilian states from proxies for infrastructure provision such as trash collection and electrification. Volume II, Chapter 2 confirms this at the national level with cross-country evidence. And studies of spatial agglomeration in Brazil (Mossi, Aroca, Fernández, and Azzoni, 2000) and elsewhere (Jalan and Ravallion, 2000) suggest that infrastructure plays a large role in attracting economic activity. The government's planning approach, identifying strategic investments through a methodology of quantifying infrastructure bottlenecks, under its multiyear planning framework (the *Plano Plurianual*) reflects its recognition of the issues.

117. The importance of private sector regulation is paramount. As the government and parastatals take up a dwindling fraction of infrastructure provision, owing both to the privatization program and to fiscal limitations, the regulatory framework becomes the main device through which investment in infrastructure is either encouraged or discouraged.

118. The recent energy shortages in Brazil are the highest visibility instance of this. The box below provides a brief account of events leading up to the 2001 energy shortage, by way of an illustrative example. But a more detailed discussion of sector-specific regulatory issues is beyond the scope of this report.

As the recent energy crisis illustrates, regulation is the main device through which infrastructure investment is encouraged

The Investment Climate in the Energy Sector: A Timely Example

Exceptionally low rainfall throughout early 2001 resulted in Brazil having to implement rationing of electricity in order to cut consumption by approximately 20 percent. More than 90 percent of Brazil's electricity supply comes from hydroelectric power. But the underlying cause of the shortage was under-investment by private enterprise in the Brazilian power sector, and this in turn was because of the pattern of government regulation that had been introduced during the privatization program. Barriers to private investment included ceilings on distributors' tariffs, rules for passing on generation costs to distributors, and lack of hedging mechanisms. Some of the same causes have also discouraged the development of alternative sources of energy (e.g., burning sugar cane waste).

Investment in new generating capacity and in transmission facilities has therefore not kept pace with growth in power demand for the past 20 years. In the early 1980s, the debt crisis cut finance to indebted state companies and work on 23 power stations was suspended. Between 1995 and 2000, demand rose by 4.5 percent per annum, whereas supply rose by only 3.8 percent. Low economic growth in the 1990s combined with energy efficiency improvements in industry to postpone any crisis, but weather conditions in 2001 proved the final straw. Economic growth forecasts for 2001 were cut by approximately one percent as a consequence of energy rationing.

4. SPEEDING GROWTH: KNOWLEDGE AND INNOVATION

Evidence from Brazilian Firms

119. Volume II, Chapter 3, finds that the highest TFP growth in the 1990s occurred in electrical equipment and vehicles and parts, while the slowest TFP growth occurred in food, textiles, leather, and non-metallic minerals. This evidence supports other studies of Brazilian industry (Rossi and Ferreira, 1999; McKinsey, 1998). The differences in TFP growth rates between those industries that advanced technologically and the rest also explains a relative opening up between TFP growth rates in the South and Southeast of the country, which grew faster, and the Northeast, where productivity grew more slowly (offsetting relative income gains through improvements in public management and productivity in agriculture and services; see Volume II, Chapter 4).

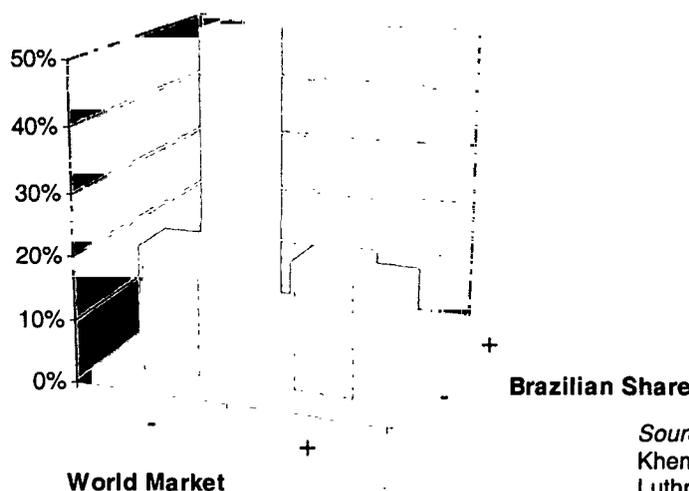
120. The same chapter finds that higher shares of information technology investment in total investment subsequently raise both TFP and its growth rate. In contrast, Volume II, Chapter 3 does not find that embodied technological progress in foreign or new machinery exhibits a significant effect on TFP growth.

121. Other researchers (e.g., Khemani and Luthria, 1999) have linked Brazil's relatively slow exports growth in the 1990s to a weak presence in sectors that exhibited the fastest technological progress. They find decreasing Brazilian specialization in dynamic markets (where trade volumes are increasing) and increasing specialization in stagnant markets accounting for two-thirds of Brazil's exports for 1990-96. A fifth of Brazil's exports represented missed opportunities: Brazil's share of dynamic markets was falling.

122. At the same time, there is no doubt that Brazil's will remain a resource-rich economy, and that its international exports to the rest of the world will and ought to reflect its generous endowment of natural capital (see De Ferranti et al, 2001, for a detailed discussion of trade patterns and endowments in Latin America). But the evidence suggests that there are large potential gains to Brazil from maximizing its use of global knowledge flows and technological progress in conjunction with its existing factor endowments.

**Increased
use of
global
knowledge
flows will
improve
Brazil's
trade
balance**

**Greater Innovation Would Improve Brazil's Trade Balance over Time...
Trade Specialization 1990-96**



Source:
Khemani and
Luthria

Evidence from International Policy

123. Volume II, Chapter 5, uses a four-dimensional framework to discuss countries' policies towards technological innovation. The dimensions are (1) the economic incentive and institutional regime, (2) education and skills, (3) the innovation system, and (4) the information infrastructure. Overall, the chapter suggests many areas where Brazil could increase its pace of innovation, both internally and through greater exposure to global knowledge flows.

124. The most striking findings concern the third of these categories, Brazil's innovation system. By this, the authors take to mean measures of business research and development (R&D) expenditure per capita, numbers of scientists and engineers, patent applications, technical research, royalty and license fee payments (as a percentage of GDP), entrepreneurship (an index developed by the IMD business school), venture capital, the ease of starting a business (see the previous section and FIAS, 2001, for a more detailed discussion of this aspect), and research collaboration between the private sector and industry.

125. When compared with similar Latin American countries, and with India and China, which represent its most serious competitors on world markets, Brazil ranks well on inputs such as spending on R&D, but ranks less well on outputs, such as technology exports and patent applications granted.

126. One of the reasons for this is Brazil's workforce, which the authors treat under (2). Brazil has a lower proportion of professional and technical workers in its workforce than any of its major Latin American competitors (Argentina, Chile, Mexico). And tertiary enrollments are also lowest in Brazil out of these Latin American countries (they are lower in India and China, although fast increasing in China). Brazil also spends less on worker training. We shall return to these themes in the next section on human capital.

Brazil ranks well on R&D inputs but less well on outputs, signaling weaknesses in institutions and complementary factors

Brazilian Spends but its Innovation Needs Support...

Ranking of Brazil on each Category among 6 Countries (Argentina, Chile, Mexico, India, China, Brazil)	
Business R&D Expenditures	1
Total R&D Expenditures	1
Royalties and License Fees	1
Technology Exports	3
Technical Papers	3
Patent Applications Granted	4
Research Collaboration	4
Number of Scientists and Engineers	5
Venture Capital	5
FDI (percent of GDP, 1990-98)	5

Source:
Vol. II, Ch. 5

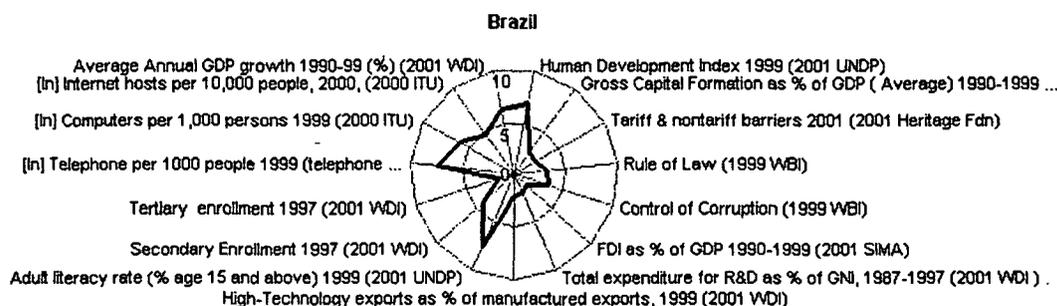
127. A second candidate to explain Brazil's relatively low innovation is its information infrastructure, taken to comprise telecom costs and investments, computer processing power, internet hosts, and the prevalence of mainline telephones, mobile telephones, TVs, computers, radios, newspapers, and e-commerce. Volume II, Chapter 5 investigates this and finds that Brazil compares favorably with a peer group of countries. It is always possible to compare with the USA (for example) and conclude that more can be done, but a fair assessment seems to be that privatization and deregulation in telecommunications, combined with the relaxation of the laws from the early 1990s governing the computer industry, have been successful in delivering to Brazil a rapid transformation of its information infrastructure. This is therefore not the place to look for radical changes to deliver faster innovation to Brazil.

128. Another issue concerns the regional concentration of this infrastructure in the Southeast of Brazil. Fewer than 10 percent of Brazilians have access to the internet, for example, yet this part of the population is extremely concentrated in São Paulo, Rio de Janeiro, and a small number of other urban Southeastern centers. Low cost public efforts to expand coverage to the remoter and poorer areas of the country would be worthwhile to maximize the benefits of information flows at the national level (see box: Democratizing ICT in Brazil).

129. The same chapter also points out that only 30 percent of Brazil's R&D takes place in the private sector, compared with the equivalent figure of 45 percent in China, 70 percent in Japan, and 95 percent in the USA. This paints a picture of Brazil as a country that undertakes considerable expenditures on research, science, and technology, but where these expenditures are unequal across regions, undermined by human capital considerations, and concentrated in the public sector.

130. The following paragraphs lay out an appropriate policy response. It comprises efforts to increase the economic incentives to innovate through greater competition (foreign and domestic) and improved protection of intellectual property rights, the use of new technologies in the sectors of activity important in the North and Northeast, such as agriculture and natural resource management and use, fostering links between the traditional public locus of R&D activity in Brazil and industry through reforms to tertiary education, and perhaps selective programs of subsidies to private sector initiatives.

***R&D is unequal
across regions,
undermined by
human capital
considerations,
and
concentrated in
the public
sector***



Source:
Vol. II, Ch. 5

Recommendations for the Innovation System

131. The recommendations below fall into three categories. First there are those regarding patents, licensing, and foreign technical assistance: areas where Brazilian regulations slow the flow of global knowledge into the country. Second, there are recommendations regarding more active government policy, such as initiatives to spread innovation to regions and sectors in Brazil where it is currently scarcest. Finally, the report touches on Information and Communications Technology (ICT), that is, the information infrastructure.

Intellectual Property Rights

132. The first area of focus to increase innovation is to remove barriers to it. In Brazil these come in essentially three forms: delays to patent applications, the requirement that the national patent office (INPI: *Instituto Nacional de Propriedade Intelectual*) approve all royalty payments (for technical assistance or technology transfer), and weak enforcement of property rights. Three measures would help in this regard.

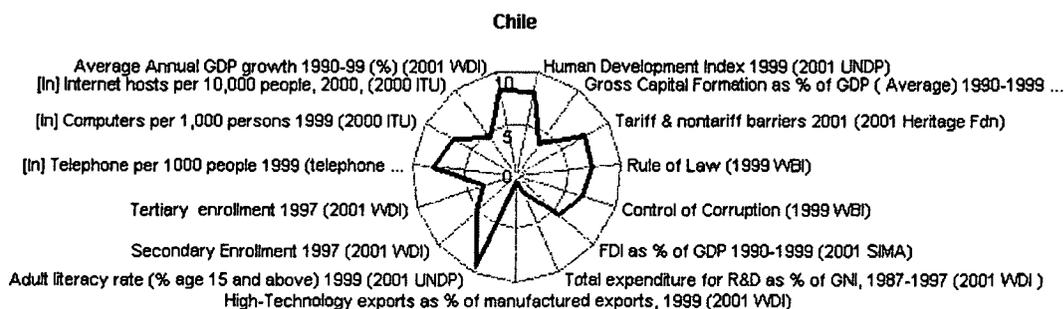
133. First, the institutional capacity if INPI could be strengthened, to reduce the time it takes to process a patent application from the current five year period, to a more reasonable time span by international comparison (most developed countries process patent applications in about 12 months).

134. Second, requirements for the approval of royalty payments could be abolished. Such requirements are absent from the intellectual property frameworks of Chile and the United States, to give two examples of countries that Brazil could be aiming to emulate in this area.

135. Third, a review of the enforcement of property rights by the courts could be launched. This is clearly an area where government has relatively little power to change institutional practices, but it may emerge that there are legislative changes that are possible in order to facilitate the protection of intellectual property. While international evidence suggests that best practice is a happy medium between stringent application of patent protection and the freedom to adapt and imitate, the consensus is that Brazil falls too far towards the latter position on this spectrum. (One example of this concerns the requirement that the plaintiff prove precise monetary damage. See FIAS, 2001.)

INPI could be strengthened, controls on technology transfer abolished, and property rights enforcement reviewed

... A Better Knowledge Scorecard for Chile...



Source:
Vol. II, Ch. 5

Public-Private Partnerships in Innovation and The Regional Dimension

136. There is scope for greater collaboration in promoting innovation between the public sector and industry in Brazil. Most assessments point to the overwhelmingly public profile of most technological innovation in Brazil. Brazil's scientific community has been concentrated in public universities and public-sector pockets of research such as Embrapa, Embraer (no longer a public company), Petrobras, CBERS (Satellites), and Genoma. Even today, technology transfer from these centers to Brazil's industrial private sector is relatively low.

137. Clearly this state of affairs is not independent of the intellectual property rights regime discussed above. But further reforms are worth considering. One possibility is the introduction of industrial R&D doctoral programs in universities. Here Denmark is an interesting case for study. A second possible intervention concerns inventions stemming from R&D performed in universities or public-sector businesses. In the US, the Bayh-Dole Act allows benefiting entities to retain the titles to inventions made under federally funded research and encourages their commercialization, particularly through small enterprises. More generally, impediments—some of them constitutional—to foreign and private-sector universities and to self-financing in tertiary education could be removed.

Information and Communications Technology

138. Brazil performs relatively well by comparison with other countries in this area. Consequently, the report makes relatively few recommendations. In particular, the liberalization of the state telecom monopoly since 1998 has been viewed as a success, and is visible today in the explosion of new services available to business and consumer. Nonetheless, Brazil's income distribution has kept the internet out of the reach of most people, and a recent study (Frischtak, 2000) estimated that internet penetration was lower in Brazil (at 60 per 1000 inhabitants) than in Argentina (174), Chile (156) and Mexico (95). The correct public response here would seem to be through greater provision of ICT training and access in the education system rather than any other form of subsidies.

***Removing
impediments
to self-
financing by
universities
could
promote
greater
public-private
collaboration
in R&D and
technology***

Democratizing ICT in Brazil

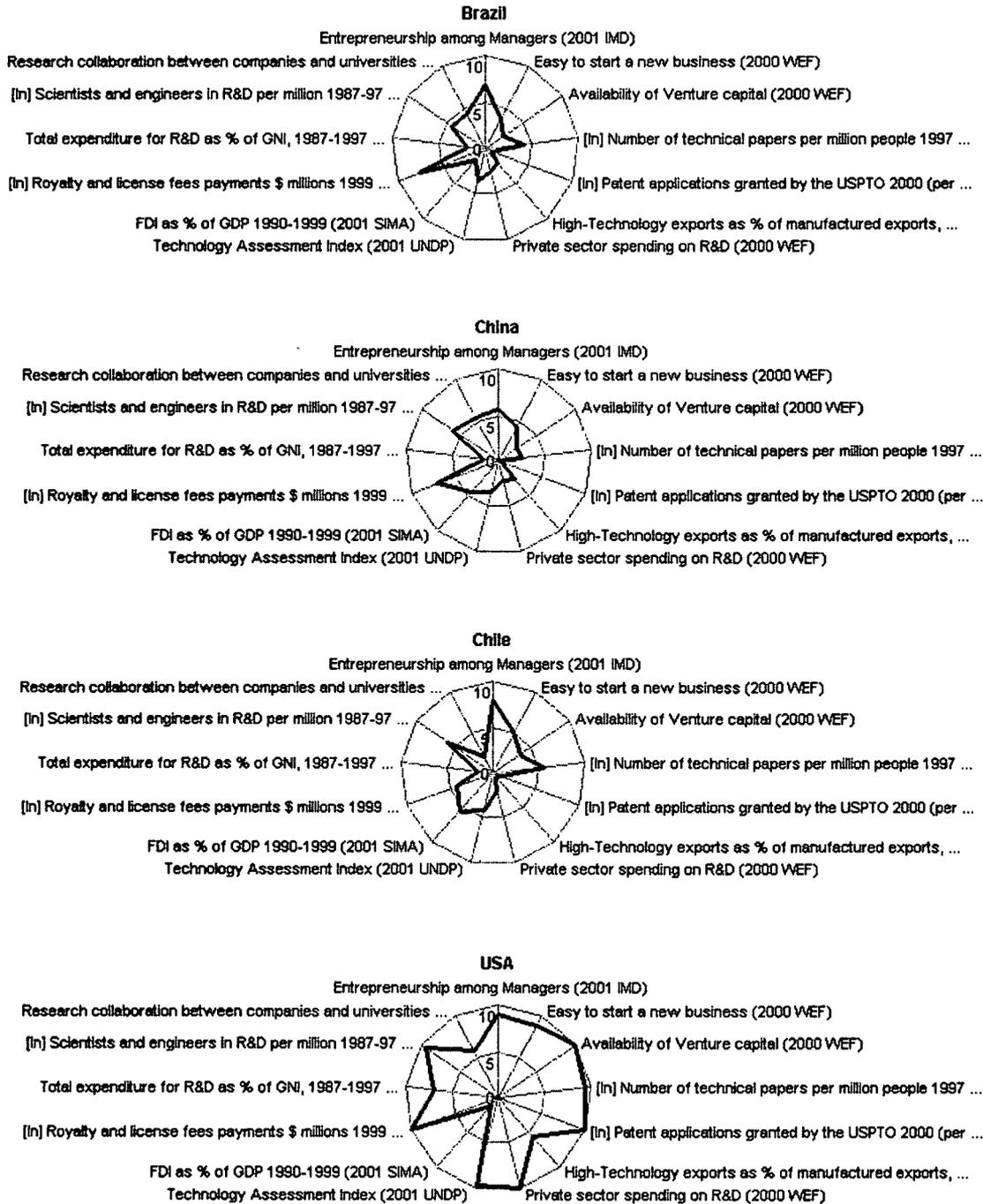
A series of measures could improve Brazil's information access. Although recent entry of producers with higher scale and productivity (plus competition from gray-market producers and imports) has led to a fall in equipment costs, PC penetration was still low at 26 per 1000 inhabitants in 1999 (by comparison, Mexico's penetration rate was 37; Argentina's 39; Chile, 54; and the US, 407).

Equal in importance, with few national backbones, connection costs to the IP network charged by Embratel are a multiple of equivalent services in other countries with greater competition.

Finally, high-speed communications depend on fiber-optic infrastructure, unavailable in the North and Northeast. These regions will depend for some time on satellite communication. But with taxes on local calls averaging 28.6 percent, the cost of local calls in Brazil remains high for the region, and dedicated connections are prohibitively expensive. Here, alternative tariff plans (such as unlimited local calls or byte-based rates) for internet usage may help.

Brazil and Other Middle Income Countries Can Accelerate Their Innovation...

Innovation Systems Scorecards



Source:
Vol. II, Ch. 5

5. SUSTAINING GROWTH: HUMAN CAPITAL

139. Volume II, Chapter 6, tries to identify what a government that faces a tight budget constraint can do to ensure that the country's human resources at least do not dampen economic growth and preferably boost it. This is a rather confining definition of scope: there are good reasons to improve education and health levels in their own right, such as national pride or social welfare, regardless of their growth effects.

Brazil: An "Intangible Capital" Laggard

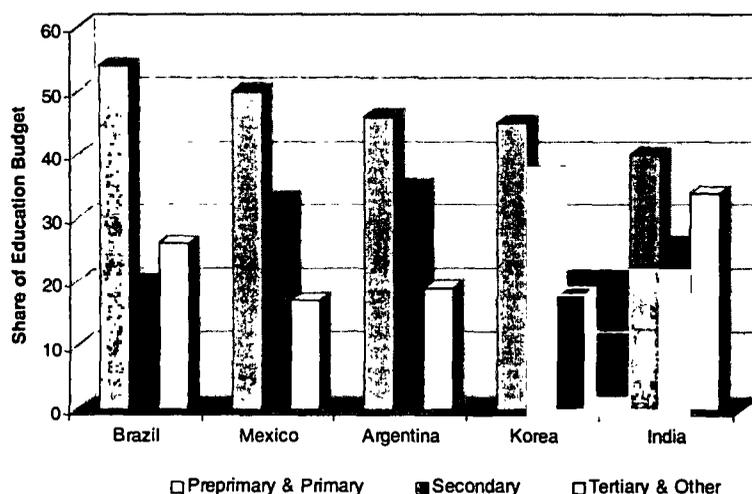
140. *Health.* Trends in health status in Brazil are encouraging, though the Brazilian people are now said to suffer from both the health problems of the industrialized world and the preventable diseases of the developing world. Brazil has experienced a sharp decline in fertility over the last two decades, which has reduced the risks to childhood health. Diarrhea among children has declined sharply and diseases preventable through vaccination are largely under control. Brazil has also made progress in combating HIV/AIDS. An epidemiological transition is said to occur when, through modernization and development, infant mortality and fertility decline, life expectancy increases, and infectious and parasitic diseases are no longer the leading causes of death. As early as 1980, "post-transition" conditions became the leading causes of death in every region of Brazil. Cardiovascular disease remains the leading cause of death. Sharp regional inequalities persist: endemic parasitic diseases threaten rural and remote areas in all parts of Brazil, and child health, maternal education, health care and water are poorer in the Northeast and worst in the rural Northeast. The design of the public health system leads to regional inequality and rationing. But these are not unusual problems for a middle-income country.

141. *Education.* The Brazilian education system has also expanded rapidly. In 1964 there were about 10 million students in the system; by 2000 there were more than four times as many. The education system has three levels: basic (grades 1-8), secondary (grades 9-11) and higher. Notable features are high repetition and dropout at basic and secondary levels, low net secondary enrollments (35-40 percent), and over-subscription to higher education. Brazil spent 5 percent of its GDP on education in 1995, more than Argentina, Mexico, Korea, and India. By 2000, Brazil had increased this ratio to 5.5 percent.

142. There is no doubt that Brazil has striven to make rapid educational improvements in the past ten years. Primary enrollment rates have risen from 88% in 1994 to near universal levels. The proportion of children aged 15-17 in high school rose from 21 to 33 percent from 1994 to 1999. What still stands out is the low priority given in

Brazil had made the epidemiological transition in health by the early 1980s

Brazil spends less on secondary...



Source: Vol. II, Ch. 6

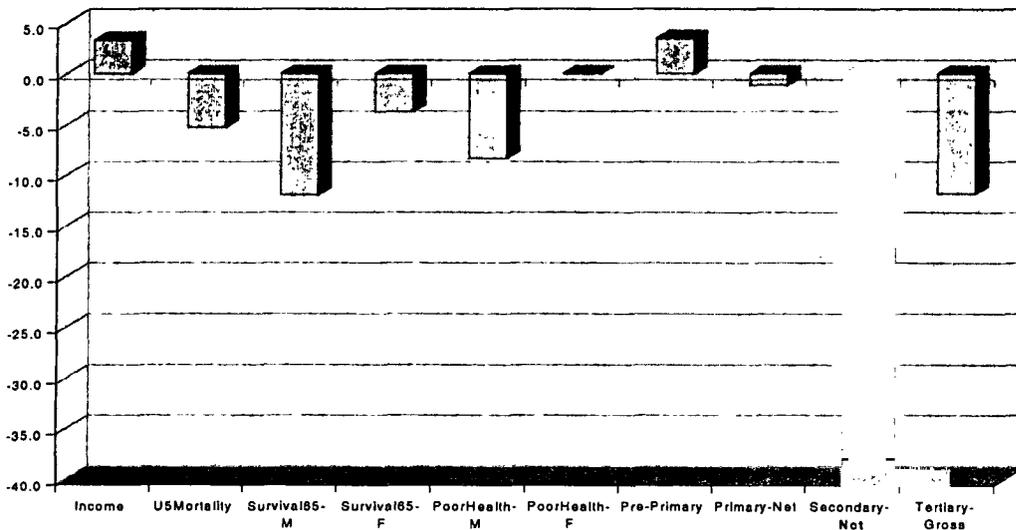
the Brazilian budget to secondary education, and the high priority given to higher education (see figure above). Brazil's state and municipal governments spend about R\$500-650 per student in primary and lower secondary education and about R\$700 per student at the upper secondary level, but spending at tertiary levels is greater than R\$10,000 per student. In general, however, Brazil's education system resembles those in many low-income countries such as India, rather than those of other upper-middle income countries.

143. **Human Capital Scorecard.** It is useful to compare Brazil's human capital performance with Latin America. Brazil does poorly, but not uniformly. Child mortality is marginally worse at about 6 percent higher than the average Latin American country. Female health indicators are about average: these are areas in which Brazil has made much recent progress. Brazilian males fare worse: longevity and quality of life indicators are about 10 percent worse than for Latin America. Brazil has caught up with Latin America in pre-primary and net primary education enrollments. By far the worst performance is for net secondary enrollment, for which Brazil is 40 percent below average. Brazil also does poorly in higher education, lagging by 13 percent. Over the last half-century, Brazil has done somewhat better in the *tangible* areas of health and longevity (though it remains behind on male health and survivability) than it has in fostering the *intangible* human capital most needed by a middle-income country (see below).

144. While Brazil made the epidemiological transition during the 1980s, it has yet to make the analogous transition in education. A primary objective of policymakers is thus to implement measures to enable Brazil to make this "pedagogical transition" to middle-income education levels in the next decade.

**Brazil has still
to make a
"pedagogical
transition"
to middle-
income
education
status**

Brazil Lags Behind Latin American Countries Most in Secondary and Tertiary Education and in Male Health



Source:
Vol. II, Ch. 6

Schooling and Growth in Brazil

145. Measuring school attainment as the average years of completed schooling of 20 year-olds in any year, Fiess and Gill (2001) construct a 1951–1999 time series on schooling using household survey data and perform econometric tests for causality between schooling and growth. Perhaps not surprising, there is no evidence of short-run causality between school attainment and growth. In the long term, school attainment causes growth, but growth does not cause school attainment (short or long-run). Time series data for Brazil over the last fifty years thus appear to be consistent with the main result of cross-country data analysis: countries with higher levels of education, other things being equal, seem to grow faster; but marginal increases in education levels do not result in perceptibly higher growth rates. The apparent inconsistency—how stocks and flows of the same variable (education) have such different effects on growth—is resolved by long lags in the relationship. Today’s flows are tomorrow’s “initial conditions” or stocks.

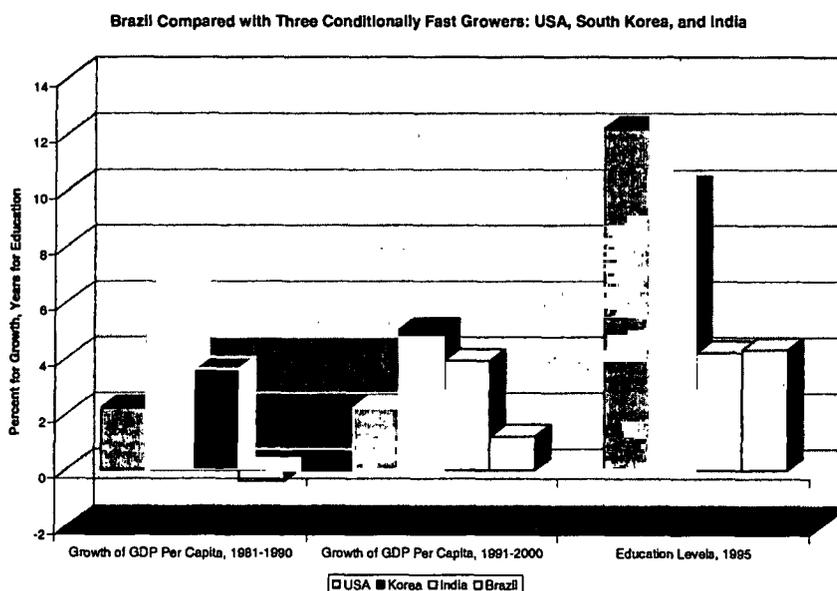
International Policy Evidence: Three Episodes

146. It is not obvious at what level policy should be focused—education levels can increase if some people acquire a lot more education, or if many people acquire a little more education. The study of “growth episodes” or “good practice” from other countries can help in this regard. Volume II, Chapter 6, studies three episodes of remarkable growth in per capita GDP: the US 1901–2000, the Republic of Korea (henceforth Korea) 1951–2000, and India 1976–2000: The choice of countries is deliberate, and the periods chosen are long. The chapter contrasts currently democratic countries at various stages of economic growth, from the US at a per capita income of about \$30,000 and Korea at \$10,000, to Brazil at \$4,500 and India at \$450. All are countries that exhibited rapid growth during the last two decades or more (see figure), conditional on levels of output or inputs. Since 1980, the US was a fast grower conditional upon initial income, Korea was a fast grower conditional upon natural resources, and India was a fast grower conditional upon initial physical, infrastructure, and human capital. We contrast these “conditionally quick” growers with Brazil.

United States, 1901–2000: America’s “Human Capital Century”

147. At the beginning of the 20th century, the US and European countries such as

While short-term linkages are weak, over the long term, schooling has led to growth in Brazil



Source:
Vol. II, Ch. 6

Germany, France, and the UK all had secondary school enrollment ratios around 20–25 percent, not too different from Brazil's now. Barely 10 percent of US youth were high school graduates in 1910. Shaped by what has been termed a "Republican ideology" and facilitated by new world endowments, the US devised an education system that made it the leader in post-elementary education within three decades. By the late-1930s, the US was three or four decades ahead of Britain and France in post-elementary education, and these gaps persisted until after the 1950s. By the mid-1930s, the median youth had a high school diploma, so that public initiatives to expand access to higher education—such as the GI Bills for returning soldiers in the 1940s and 1950s—can safely be classified as non-elitist, at least outside the Deep South. While post-World War II Europe struggled to expand secondary enrollments, the US was well on its way to ensuring robust tertiary education enrollments.

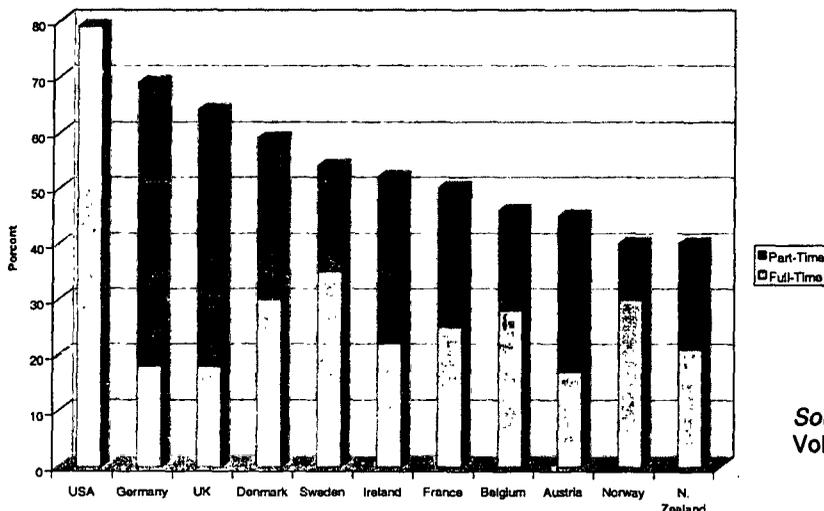
148. By 1970, many countries had caught up with US secondary enrollment, but it took some another three decades to achieve the gross tertiary enrollment of more than 70 percent that the US had attained. The 20th century has been termed the "American century"—for some of the same reasons, it is also the "human capital century." Since 1950, the US economy has benefited from increases in both educational attainment and research intensity: one growth accounting exercise concluded that 30 percent of US growth between 1950 and 1993 was due to the rise in educational attainment and 50 percent to the rise in research intensity, facilitated by the high educational stocks in the US.

149. What distinguished the US secondary education system from its European counterpart was that it was open, infinitely forgiving, lacking universal standards, and academic yet practical, while the European system was closed, unforgiving, with uniform standards, and academic for some and industrial for others. One was egalitarian; the other was elite. Another distinguishing feature was decentralization. The US high-school expansion was not federally led; even state compulsory education laws were only a secondary factor. After attaining high primary, secondary, and tertiary enrollment, and motivated by equality concerns, the US has launched pre-primary programs such as the Perry Preschool Program and Head Start for disadvantaged children. US experience also shows that such interventions must be well funded to succeed, so governments must be selective in where and how they intervene. When this condition is met, the beneficial effects are estimated to be high and lasting for poorer families. In contrast, public training programs often fail to meet simple cost-benefit criteria.

150. A final issue is competition at the primary and secondary level, motivated again by equality of opportunity considerations, and spurred by the example of US higher education, widely regarded as the world's best. The US primary and secondary education system is decentralized to the district level. Since the rich are more mobile, they can move to districts that have better schools. There is thus a concern that the US system of

**The
distinctive
feature of the
US education
system is its
forgiving and
non-elitist
nature**

Secondary School Enrollment Ratios in the Mid-1950s



Source:
Vol. II, Ch. 6

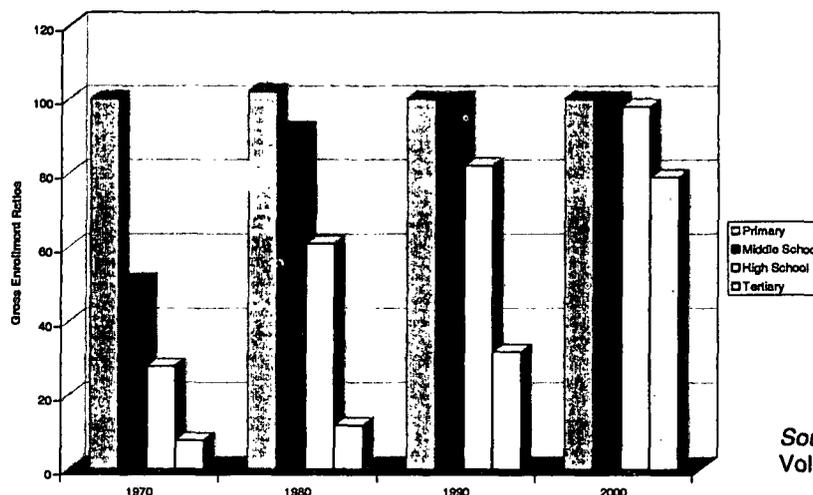
education does not serve the poorest sections of society well. Greater competition between school districts is suggested as a solution since it results in large gains in costs, parental involvement, and student performance, but teachers' unions oppose such reforms. Brazil, with its decentralized education system, can learn from US experience.

Korea, 1951–2000: Accelerated expansion, not “leapfrogging”

151. In the last half-century, South Korea grew faster than any other country. During this time, the average education level in Korea has increased from less than four years to more than ten, and is now higher than some Western European countries. In three decades, it achieved almost universal secondary coverage, and now has a tertiary education sector as large as many developed countries'. In turn, Korea's economy has benefited from its human resources, which have played a key role in absorbing technology from developed countries. The noteworthy features of Korean education are (a) accelerated expansion, (b) egalitarianism; and (c) “conservative sequencing” in that primary enrollment levels were high before a massive secondary initiative was undertaken, and secondary enrollment rates were high before a massive tertiary expansion. In the second two aspects, one could argue that South Korea's experience during the last fifty years was uncannily similar to that of the US during the last century.

**The
noteworthy
feature of
Korean
education
development
was careful
sequencing of
primary,
secondary,
and tertiary
expansion**

By 2000, Korea had Universal Primary and Secondary School Enrollment



Source:
Vol. II, Ch. 6

152. The 1950s and 1960s were a period of emphasis on primary education in Korea. The rapid expansion necessitated that much education be “low cost”—double shifts, large class size, and growing public discontent marked this phase. By the mid 1960s, the shift to better quality primary and rapid expansion of (vocational) secondary education had begun, but the big increase in the number of high schools did not occur until 1975–1980, when high schools increased by almost 300 and enrollment by half a million. In the mid 1970s, the government started to pay attention to access to colleges by all groups, especially through improved quality of instruction in secondary schools. By the late 1980s, despite concerns of a possible “over-education” of Koreans, the pace of educational progress has not slowed.

153. Korea is exceptional in how quickly enrollment increased: Korea accomplished in about three decades (1950–1980) what took the US six decades after 1900. It did this by careful sequencing. Rapid expansion at the secondary school level occurred between 1970 and 1990, *after* achieving (between 1950 and 1970) universal enrollment at the primary school level. Again, the big push at the tertiary education level occurred between 1990 and 2000, *after* near-universal secondary enrollment had been achieved and so public initiatives to encourage higher education enrollments could safely be classified as “non-elitist”. While this does not mean that *no* expansion took place at the higher levels before universal enrollment was attained at the lower levels; the point is that *public policy* aimed at a sequenced expansion. Between 1950 and 1970, the share of primary education (grades 1–6) remained at about 70–75 percent of the budget, starting to decline to about 50 percent in the 1970s, only after universal primary enrollment had been achieved. At this time (1968), entrance restrictions to middle schools were abolished and a system of random allocation of students to middle and high schools was instituted to make the system more egalitarian. The pattern still remains egalitarian in its most basic features: over the last three decades, the share of public school enrollments has remained high, but the share of private institutions in enrollment has increased at the tertiary level.

India 1976–2000: Growth and Higher Education Investments Amidst Illiteracy

154. India is sometimes held up as a counter-example to the advice that countries move sequentially from an emphasis on primary education to one on secondary education, and only then on to higher education. After all, counter to this advice, India has spent a large chunk of its public money on higher education, especially on technical institutes, and seems to be the better for it. Despite its high illiteracy, India, it is said, has become a technology leader in the world. India’s new growth engine, information technology, will pull it to higher living standards. Volume II, Chapter 6, scrutinizes this story and surveys evidence on the Indian Institutes of Technology (IITs), and on India’s rapidly growing information technology (IT) sector around Bangalore.

155. In 1946, drawing on the Massachusetts Institute of Technology as a model, India built six campuses to train engineers. At various times, the US, UK, the former Soviet Union and Germany have provided financial and technical support. The IITs have also teamed up with industry; companies such as Intel and Philips are big recruiters at the IITs. The government pays most of the \$3,000—six times the per capita income of India—it costs annually to educate each student. One view is that India has been able to produce world-class universities at low cost and the country will reap the rewards as graduates invest in India and draw it into the circle of global trade and prosperity. But, in fact, about 40 percent of IIT graduates leave the country and do not return. They do well abroad: more than a third of Silicon Valley start-ups are Indian-spawned and, of those, half by IIT graduates.

***In comparison
with Korea,
Argentina,
and Mexico,
Brazil favors
higher over
secondary
education***

156. Bangalore and other technology centers remain small oases of high-skill technology within India. The total employment in the Bangalore software industry is about 200,000, 0.05 percent of India's labor force (440 million), and fewer than the number of Indians granted temporary worker visas in the US in the last decade. India's software revenues are less than 1 percent of an estimated world software market of \$500 billion. Even with the sector's rapid expansion, India's share of total world IT exports has remained 0.5 percent, less than the country's 0.6 percent share of world *aggregate* exports in 1995. And the annual revenue per IT employee in India was \$15,000–20,000, compared with \$100,000 per employee in other software producers such as Israel and Ireland.

157. The lessons for other low- and middle-income countries from India's investments in the IITs are hard to assess. Three points seem relevant. First, while the growth of the IITs is impressive, they are not leading "research centers"—this is not necessarily a bad thing for a country with a per capita income of \$500 that is considerably behind the world's technology frontiers. Second, the IITs were developed in collaboration with institutions in countries that are (or were) the world's technology leaders. Finally, luck seems to have been on India's side—the timing of its human-capital investments has enabled its IIT graduates to benefit from the telecom revolution. Now, by facilitating links between Indian and US firms, some may repay India for its subsidies.

**India's share
of world IT
exports, at 0.5
percent, is
less than its
share of
aggregate
exports**

The Indian Software Industry

Prior to 1984, the Indian software industry operated as a highly regulated, autarkic model of import substitution, industrialization, and self-reliance. This policy isolated India from the global economy and efforts to promote software exports never took off. The post-1984 policy changes helped the Indian software industry grow by allowing domestic producers to exploit domestic resources in global markets. The performance of India's IT industry during the 1990s has been impressive, particularly compared with other sectors of the Indian economy. The sector's growth for 1994–1999 exceeded 40 percent, compared with 6.5 percent for the economy as a whole. This growth was led by software, which in 1999 accounted for 65 percent of India's total IT revenues. A report by McKinsey & Co. forecast that by 2008, India's IT industry would generate \$87 billion in annual revenues, \$225 billion in market value, and 2.2 million jobs.

Summary of Findings

158. *On the benefits of rapidly increasing human capital investments.* The evidence that human capital investments rapidly lead to economic growth is weak at best. There is little evidence from cross-country analysis and country studies that increased flows lead to higher growth rates. From a policy point of view, this means that massive investments in education, training, and health would probably not raise economic growth rates quickly.

159. *On the benefits of having large human capital stocks.* There is evidence that countries that have grown steadily and impressively have higher initial human capital stocks. These two findings mean that countries should view human capital policies as instruments of long-term, not short-term, growth.

160. *On Brazil's education levels and growth since the 1950s.* Simple econometric tests for Brazil support these findings: short-term correlations between human capital and economic growth are as weak as long-term associations are strong. Brazil should therefore maintain steady investments in education and other complementary human capital, without expecting immediate growth dividends.

161. *On investments in health versus education and training.* Brazil has middle-income status in its health indicators, but has education indicators (secondary and tertiary enrollment and teacher qualifications at all levels) more commonly found in low-income countries. While Brazil's health levels can still improve—a lot in the case of adult male health, for example—the emphasis of human capital policies over the next decade should be on education.

162. *On “leapfrogging” in human capital investment.* While countries can “leapfrog” technologies, the experience of the US in the last century and South Korea during the last fifty years indicates that there is little choice for today's middle and low income countries but to build up human capital stocks in basically the same sequence as earlier developers—investing in primary education first, then in secondary education, and finally in tertiary education. Alternative strategies such as building a stock of workers with higher education (e.g., India's technology initiatives) do not withstand closer scrutiny.

163. *On investments in tertiary versus lower levels of education.* While there is some evidence of knowledge- or R&D-related externalities (also called spillovers or leaks), there is little proof of growth-related externalities associated with higher education. Middle-income countries such as Brazil that face tight budget constraints should pursue human capital formation aggressively but not in a frenzied manner. It is doubtful that the lack of workers with higher education is a constraint on growth. Moreover, at current high school graduation rates, public initiatives to expand higher education do not qualify as non-elitist.

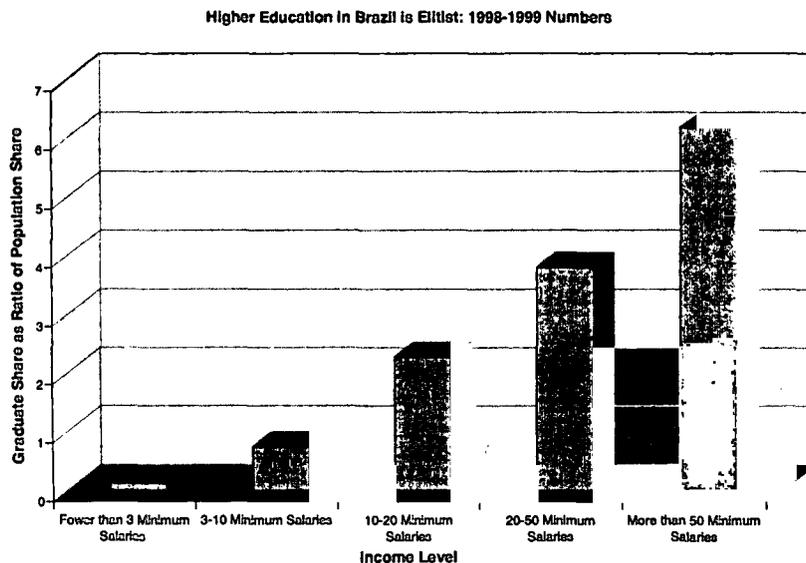
164. *On the importance of secondary school investments.* In Brazil, if there was just one thing policymakers should do, it would be to focus on expanding the access to secondary education of acceptable quality, starting with “junior secondary” schooling (grades 5–10).

**While
Brazilian
health levels
can improve,
the emphasis
of human
capital
policies
should be on
education**

165. *On gradually shifting resources from primary to “adjacent” levels.* Brazil has achieved remarkable progress in primary school enrollments over the last decade but now—like many middle-income countries—faces declining primary school enrollments for demographic reasons (fertility in 2000 was half its 1980 level). The challenge for Brazil, where primary and secondary education are sub-national responsibilities, is to shift resources from primary to secondary levels. New evidence from industrialized countries—corroborated by studies in Brazil—also points to high economic returns and equity-enhancing effects of early childhood interventions, so some of the resources saved at the primary level can also be transferred to pre-primary interventions.

166. *On school versus post-schooling investments in skills.* Job-specific training has a high rate of return when employers and workers determine where, when, and for what workers should be trained. In sharp contrast to such private training, the rate of return to public training initiatives is essentially zero. To foster training that yields high returns, the two things middle-income countries can do are: (a) raise education levels of the workforce, since education and private sector training are strongly correlated; and (b) properly regulate labor markets so that private sector incentives are not distorted.

**While
countries may
“leapfrog”
technologies,
human capital
stocks must
be built
sequentially**



Source:
Vol. II, Ch. 6

Policy Implications for Brazil

167. Over the last two decades, Brazil has made rapid progress in some aspects of human capital—notably in expanding access to primary education and improving its quality, and in dealing with some threatening healthcare issues such as HIV/AIDS. By sheer coincidence—and it is certainly just that—these have also been years of poor and erratic economic growth. Even were this not a coincidence, this would not provide an argument for slowing down investments in human capital: a healthier, longer-lived, more educated citizenry is a goal in itself. But even if economic growth were Brazil’s only objective, the evidence here supports the case for a strengthened human capital effort.

168. Over the next decade, however, Brazil will be hobbled by its debt service obligations. It should take these obligations seriously: paying down its public debt is more likely to help jump-start growth than even large and well-conceived investments in human capital. But this will leave little fiscal room for investment, so Brazil has to be selective in picking public investments and rely on regulatory reform to encourage private sector participation. This report suggests that public spending priorities are maintained effort to improve primary education quality, increased effort to improve access and quality of junior secondary education for everyone, and selected pre-primary interventions for the relatively disadvantaged. Regulatory reform priorities are labor policy changes to encourage private training initiatives, and reform of higher education to ease entry by private (including foreign) providers, increased cost recovery in public institutions, and greater autonomy for all institutions to strengthen links with industry.

169. Perhaps the most important recommendation of this report is that Brazil should dedicate the next decade to improving junior secondary or middle school education, roughly interpreted as the second cycle of *ensino fundamental* (grades 5–8) and all of *ensino médio* (grades 9–11). The most important rule is that government initiatives in the area of social policy be “non-elitist”: the majority of people should already be qualified to benefit from them. The net secondary enrollment rate in Brazil is less than 40 percent, so it is likely—because of high dropout and repetition rates—that less than a quarter of Brazilian youth have high school diplomas. This disqualifies higher education from being a candidate for a large increase in public investment. In keeping with the general approach adopted in this report, the recommendation to focus on secondary education is not predicated on a single statistic that constitutes a “smoking gun”, but is based on piecing together several clues that together make this case (see table on next page).

***Brazil should
dedicate the
next decade
to improving
secondary
education***

Building the Case for Public Investment in Secondary Education	
<i>Indicator</i>	<i>Clues and arguments</i>
Brazil's current schooling levels	Brazil's net secondary enrollment ratio in 2000 is roughly the same as the US level in the 1930s. Brazil lags behind the average Latin American country by about 40 percent in net enrollment ratios: LAC average is 50 percent but Brazil's net ratio is 35 percent—of all human capital indicators, this is the largest shortfall.
Brazil's public spending	Brazil spends relatively less of its education budget on secondary education than countries such as Argentina, Mexico and South Korea, and relatively more than these countries on higher education.
Cross-country evidence for middle income countries	Evidence from cross-country data that improvements in secondary education access and quality yield the greatest payoff for the average middle-income country. Brazil's secondary education levels are worse than the average middle-income country, so the effort should initially be focused at junior secondary level.
Evidence from Brazilian states	Lower secondary education leads to the most egalitarian growth patterns across states and cohorts.
How quickly human capital investments result in growth	Improvements in secondary education will not lead to immediate increases in economic growth, but evidence indicates that it is unlikely that any investment in human capital—e.g., higher education—will do so. So Brazil may as well be patient and egalitarian, instead of being impatient and elitist. It will not suffer a loss in short-term growth performance, and will earn a premium over the long term.
Alternative: more public spending on higher education?	Little evidence of significant positive externalities associated with higher education. The immediate goal should be to shift resources from tertiary levels to junior secondary education: high and rising private returns to tertiary education in Brazil warrant facilitating more private provision and finance, not allocating scarce public funds to higher education.
Alternative: more public spending on primary education?	Due to sharp drop in fertility in Brazil during the last two decades, enrollments in primary education (grades 1–4) will decline. Resources will have to be shifted out of primary education, and a large part be shifted then to secondary education, including grades 9–11.
Role of the private sector	Even if Brazil did not have a heavy fiscal burden, it should encourage the private sector to share the responsibility for this expansion of secondary education. Brazil has a vibrant private sector, which should not be crowded out by the public effort. The secondary education shortfall is so large, and the benefits of competition so well established, that a strong private secondary education sector would improve both access and quality of public education.

CODA: THE NEW GROWTH AGENDA

Recurring Hypotheses

170. We have not tried to pin the blame for Brazil’s disappointing growth dividend from its stabilization through the 1990s on a single cause. The detective work in the chapters of Volume II sheds shafts of light onto the problem, and it is only after one has seen all this evidence that one can begin to form an assessment of the main obstacles to Brazilian growth, and thus a plan for reforms. The matrix at the end of this section very briefly summarizes the findings of Volume II.

171. There is no doubt that Brazil faces an array of economic issues. Yet it is unhelpful simply to list them without setting priorities. The hypotheses that have appeared throughout our analysis are the following. *It should be noted that these are hypotheses: their relevance or lack thereof is to be determined by appealing to empirical observation.*

- Cost of capital and crowding out of private investment by the public sector borrowing requirement?
- Human capital deficiencies, particularly relating to health, primary, secondary, or tertiary education and training?
- Deficiencies in the flow of knowledge and innovation, related to intellectual property rights and/or use of foreign technology?
- Overly rigid and costly formal-sector labor-market regulations driving up the cost of labor, including lengthy and unpredictable labor court delays?
- High tariffs and relative isolation from international trade flows?
- High public-sector investment composition combined with the low-productivity of public-sector investments and/or a lack of investment in infrastructure?
- Poor climate for private investment, including regulatory and administrative barriers and an inefficient judicial system?
- Macroeconomic uncertainty, including rollover risk of external debt, and remaining risk surrounding public debt sustainability and inflation?
- Constraints related to demographics and migration, including the decrease in migratory flows from rural to metropolitan areas, and from the Northeast to the South and Southeast regions?
- High and distorting taxes, including cascading taxes on exports, a financial transactions tax, and an overall tax burden greater than 30 percent of GDP?

172. What is the picture that emerges? First, the *sine qua non* of reducing the uncertainty that Brazil’s public liabilities represent. Section 3 establishes, by reference to other countries’ experiences and Brazil’s circumstances, that only through a thorough reform of the social security for public employees will this condition be met.

173. Second, there are reforms, costless to the public purse, to increase investment and innovation. Brazil has always had strong public institutions, and its federal structure is one of the most decentralized in the world. This has great advantages, not least the delivery of public services from the institutions that are closest to the people they serve. But the three levels of government in Brazil impose too high a burden on investment and innovation. A fundamental review of these burdens, and reforms aimed at taking unnecessary intervention on the part of public institutions out of private risk taking, is

“Then and Now” Redux...

**Relative Effects of Variables:
Now versus 1970**

Positive Factors	Negative Factors
Human Capital	World Growth
Inflation	Debt and related policy uncertainty
Trade Policy	Infrastructure Investment
Global Integration	Taxation and Regulation
	Migration & Urbanization

essential. These would include one-stop shopping for firm registration and taxation, and the removal of restrictions on foreign licensing and technology transfer.

174. Third, actions that have costs but that are needed to encourage investment in the short term, and innovation in the medium term. Trade reforms include the strengthening of the customs function and measures to address non-tariff barriers, including drastically simplifying standards and regulations. Brazil's economy remains relatively closed, and this may not primarily be due to its tariffs, although these remain high by international standards. Similarly, reducing barriers to innovation will entail strengthening the powers and capacity of the intellectual property administrator INPI. Despite high absolute levels of inward investment, Brazil is today not maximizing its benefits from the technological spillovers related to FDI.

175. Most fundamentally, investments in human capital will continue to have the highest long run returns for Brazil. Brazil has made great strides in this area, and it is not the intention of this report to understate these, but the education and training level of the workforce remains an obstacle to investment and, most importantly, to the climate for TFP-enhancing innovation. This report highlights lower secondary education as the next great challenge, and one important finding is that only by investing here will Brazil improve its income distribution. A second area with high social returns is early childhood development (pre-school), where the report recommends gradually extending efforts. The report recommends no new public training initiatives: private-sector delivery and targeted subsidies have a good track record in other countries.

176. Finally come big-ticket items with high political and fiscal costs. Here we emphasize reform of taxation and labor markets. This will not surprise anyone who knows Brazil, and both are complex subjects where proposals have already been made. The World Bank is undertaking a specialized study of Brazilian labor market regulations at the time of writing. There will be gains from the reforms listed above, but the reform of taxation and labor markets will no doubt magnify these gains. In particular, there is international evidence that flexible labor and trade openness are highly complementary.

***The keys to 6-
percent growth
lie not just in
physical
investment but
in innovation
and a stronger
human capital
base***

What Can Brazil Expect?

177. Forecasts are not the aim of this report. But it is appropriate to set limits on our expectations. History displays sufficient differences between Brazil's economic miracle years and present circumstances to suggest that a return to 9-percent growth rates is unrealistic. Neither the world growth rate nor Brazil's stage of urbanization make this likely. External conditions probably accounted for one to two percent of the difference between Brazil's miracle growth rates and today's. And Brazil underwent a transition to an urban industrial society that it cannot undergo twice. Net migratory flows from the Northeast to the Southeast of the country have all but ceased.

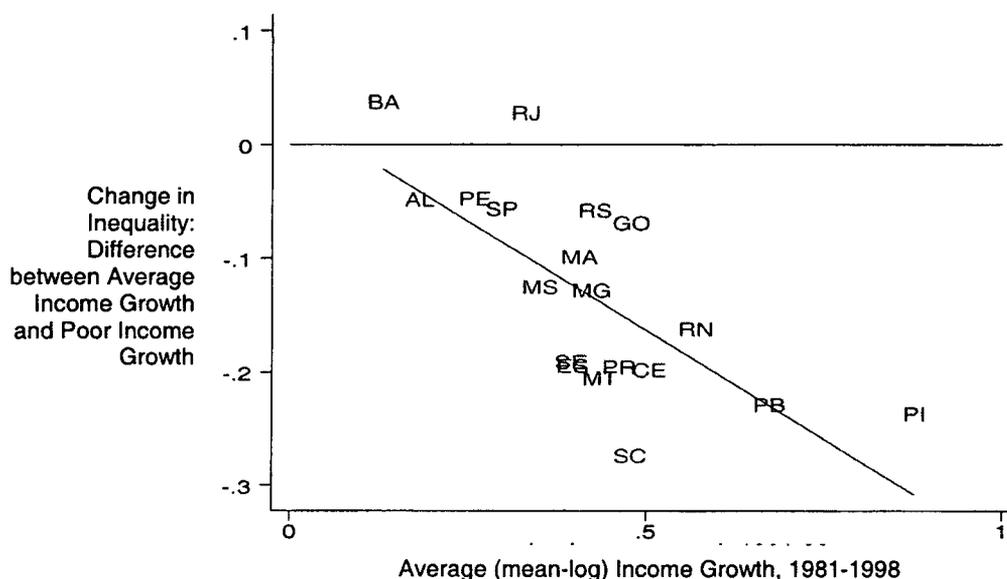
178. Brazil grew at 4.5 percent in 2000. Turbulence in international bond markets and an energy shortage will reduce its 2001 performance well below this number, but econometric evidence suggests that Brazil's potential growth rate without deep reforms is below 5 percent. To raise this even by one or two percent would imply huge welfare gains and poverty reduction over time. The work in these pages suggests that with immediate institutional and regulatory reforms to spur investment, Brazil could exceed 5 percent growth. But the keys to reaching 6-percent growth and higher in the medium term lie not in physical investment *per se* but in innovation, gains in total factor productivity, exports, and, ultimately, a stronger human capital base.

179. Finally, Brazil's recent history suggests that 6 percent growth would come at the cost of rising inequality in the absence of a concerted effort to tilt growth in favor of the poor (see figure below). Yet work here and elsewhere suggests the steps necessary for this to happen, and it turns out that many of these are the same that are necessary for growth, suggesting that, despite historical evidence to the contrary, Brazil today does not face a "growth-inequality tradeoff." First, secondary education would have to become nearly universal. Second, pension reform would have to reform the single largest transfer away from the poor and towards the rich in Brazilian public finance. And third, the tax system would have to shift from indirect taxes, which are on average regressive in Brazil, towards progressive direct taxation. Of these three conditions, the first two are central growth recommendations of this report. The third would also be a reform favorable to the country's growth prospects, though on condition that it did not jeopardize fiscal balance in the country's public accounts.

**With the right
policy mix,
Brazil no
longer faces a
"growth-
inequality
tradeoff"**

Higher growth has led to higher inequality in the past...

Changes in Income and Equality across Brazilian States, 1981-1998



Source:
Vol. II, Ch. 4

Summary of Investment Climate Policy Recommendations

Policy Area	Evidence	Policy Recommendation
Procedures for start-up Companies	Higher TFP and TFP growth in new firms. High bureaucratic barriers in international comparison.	Simplify firm registration. Utilize internet. Merge municipal, state and federal procedures as far as possible.
Corporate taxation	Duplication of procedures at municipal, state, and federal levels. Cascading taxes.	Merging of tax registration and company registration. Simplification of registration procedures including internet registration.
Land acquisition, site development, etc.	Extremely onerous procedures in international comparison. Conflation of zoning and administrative requirements. Complicated administrative requirements to gain access to utilities.	Merge procedures for site license and environmental clearance. Consider increased use of streamlined procedures such as those applying to industrial parks.
Foreign Trade and Investment	Lower tariffs and higher foreign penetration increases TFP level in Brazilian industry. Nontariff barriers reported as onerous in firm surveys. Complementarity between trade opening and labor market reform.	Concentrate initially on non-tariff barriers and negotiating reductions in US/EU tariffs on Brazilian exports. At a second stage, combine further trade opening with a focus on labor-market reforms.
Infrastructure regulation	Dramatic fall in infrastructure investment since the 1970s. Recent apparent shortfalls in private sector investment owing to regulatory factors (e.g., energy sector).	Continue present strategy of incorporation of private sector participation into multiyear plan. Regulatory reform by sector to encourage private sector investment and cost minimization (details not covered in this report).
Taxation	Repeatedly raised by survey respondents as a barrier to investment. Brazil has high and distortionary taxes by international comparison.	Initially address tax administration and most distortionary taxes such as Cofins, CPMF, ICMS/ Over time increase the proportion of direct taxes in the tax collections and decrease regressive indirect taxes.
Labor-market regulation	Brazil has fairly rigid labor markets by international comparison. International evidence suggests complementarity between flexible labor markets and trade openness Evidence from Volume II not strongly in favor of labor-market obstacles to growth.	Labor market reform will likely be growth inducing, but should not be viewed as the main plank of a growth strategy. Social implications are probably more important than growth effects. Reforms should aim to reduce the direct burden on firms of labor-market regulations, including bureaucratic requirements.

Summary of Innovation System Policy Recommendations

Policy Area	Evidence	Policy Recommendation
Intellectual property rights	<p>Technology intensive industries show faster TFP growth and growth in export markets.</p> <p>Capital-intensive industries show faster TFP growth.</p> <p>Long bureaucratic delays by international comparison.</p> <p>Low patent registration.</p>	<p>Strengthen INPI. Dramatically reduce time and cost of processing patent applications and licenses.</p> <p>Remove regulations concerning foreign technology transfer and technical assistance.</p> <p>Review enforcement of IPRs by the court system.</p>
Innovation diffusion and public-private partnerships	<p>Predominantly public sector R&D sector.</p> <p>Low technology transfer from public sector to business.</p>	<p>Industrial R&D Masters and Doctoral programs.</p> <p>Develop a Brazilian analogue of the Bayh-Dole Act in the US.</p> <p>Liberalize tertiary education, in particular removing impediments to self-financing activities, private-sector and foreign entry.</p>
Information and Communication Technology	<p>Low penetration relative to Argentina, Chile, and Mexico.</p> <p>Deep "digital divide" in Brazil</p>	<p>Increase ICT educational efforts at appropriate educational level.</p> <p>Increased use of ICT in teacher training.</p>

Summary of Human Capital Policy Recommendations

Policy Area	Evidence	Policy Recommendation
Pre-primary Education and Health Interventions	Large benefits of well-funded public early childhood programs in US and Brazil, especially for disadvantaged children: schooling attainment up, grade repetition down, earnings up and crime down. Benefit-to-cost ratios of 5 to 8 in the US	Maintain attention to early childhood programs. Increase funding for targeted early childhood—especially preschool— programs for disadvantaged children
Primary Education	Increased primary net enrollment ratios during the last two decades—Brazil now does not lag behind other countries in the region	Continue policies in place since the early 1990s; prepare to reallocate expenditures away from primary education as demographic transition occurs over the next decade
Secondary Education	Brazil under-spends on secondary schooling and has low net enrollment ratio relative to Latin America average, expansion will be non-elitist given near universal primary school enrollment since 1995, evidence indicates junior secondary education has greatest (long-term) effect on growth in Brazil	Increase effort to improve secondary education outcomes over the next decade, starting with junior secondary education, until net secondary enrollment ratios reach 100 percent. Careful sequencing is recommended, not leapfrogging
Higher Education	Brazil overspends on higher education but has low enrollment relative to Latin America average, increasing private returns to tertiary education over the last decade, more government spending will be elitist given low high school completion ratios	Rapid reforms to facilitate private sector expansion. Increase financial autonomy for universities and reduce public spending, diverting saving to junior secondary education. Encourage foreign investment in postsecondary education
Enterprise-based training	When financed and provided by the private sector, training has among the highest return of all forms of human capital investments. When financed and provided by the public sector, the returns are close to zero	Identify and change labor regulations (e.g., severance laws) that create perverse incentives for firms and workers to keep employment relationships short. Limit public training programs to disadvantaged workers
Research and post-graduate study	Institutional autonomy for research universities, public funding for research with a liberal intellectual property rights law such as the Bayh-Dole Act in the US promotes profitable university-industry links	Institutional autonomy for universities, and a law allowing private researchers to profit from inventions/innovations made using public research funds
Maternal and Child Health	High rates of return to public programs	Continue policies in place
Adult Male Health	Brazil lags being other Latin American countries in male longevity and morbidity	Investigate if special attention to this is needed
Tax Policy	Progressivity in income taxes discourages human capital accumulation	Continue policies in place for the next decade—the only major cost of human capital investment that is not tax deductible is college tuition

Investigation Strategy and Schematic Findings of Volume II

		Chapter	Part I—New Data			Part 3—Policy Foci	
			2 Countries	3 Companies	4 Households	5 Innovation	6 Skills
Possible Growth Constraint							
Cost of Capital	Brazil's high capital cost, owing to fiscal deficits and high spreads, reduces investment and thus growth	Causality between savings or investment and growth	Have capital-intensive firms grown less or larger firms more?				Firms' assessment of capital costs as an obstacle to investing
Human Capital (HC)	Brazil's historically low health or education levels constrain growth through both innovation and investment	Correlations between human capital measures and growth	Link between skills mix and TFP growth	Does initial education by state & age cohort cause growth?	Description of Brazil's HC in the context of knowledge flows	Detailed assessment of Brazil's HC mix in an international light	Firms' assessment of human capital as an obstacle to investing
Knowledge	Brazil's economic isolation and innovation system reduces knowledge flows, innovation, and thus TFP		Effects of foreign capital or intermediates on productivity		Description of bottlenecks in the innovation system	Have HC policies favored knowledge-based growth?	FDI composition re other FDI recipients. FDI survey evidence
Labor Regulation	Brazil's labor code and dual labor market deter investment and productivity growth		Shrinking versus growing firms' labor costs	Does formal sector extent affect income growth?		Assessment of international evidence on training initiatives	Firms' assessment of labor regulations as an obstacle to investment
Macro-Trade	Brazil's tariffs, bureaucracy and taxation have a net negative effect on the trade account limiting growth	Trade and tariffs indicators and their relation to growth	Effects of export orientation or foreign penetration on TFP	Effect of measures of trade connectedness on state growth	Description of Brazil's trade regime and its effects on innovation		Extent of export-oriented FDI
Investment Composition & Infrastructure	Public investment and/or rent-seeking in private investment divert resources to unproductive uses	Does public/private composition in Brazil affect growth?	Do resources flow to less productive uses?	Local infrastructure affects household income growth?	Extent of public versus private innovation activities		Firms' assessment of infrastructure as an obstacle to investing
Investment Climate	Bureaucratic barriers to entrepreneurship hinder economic dynamism and constrict the SME sector	Do governance measures matter in growth regressions?	Do new firms show higher productivity? Do small firms grow?	Does policy or political instability at the state level explain growth?	Description of investment climate institutions		Do companies report greater obstacles than overseas?
Macro Stability	Remaining uncertainty in economic expectations deters long-term planning and investment	Granger causation between stability and growth?	Time pattern of firm-level productivity growth	Time pattern of household income growth			Firms cite instability as a main obstacle to investing?
Demographics and Migration	Congestion, crime and other constraints in large cities have curtailed productivity growth through migration			Has growth slowed more in immigration recipient states?			
Taxation	High overall tax burden, high marginal taxes, and distortions impede growth significantly	Tax and spending measures in growth regressions					Do firms report taxes as a main obstacle to investing?

Dark Yellow (13): strong evidence for reform. Light Yellow (11): weak or partial evidence for reform. White (15): opposite, contradictory, or no evidence for reform.

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