

Back to Planning:

How to Close Brazil's Infrastructure Gap in Times of Austerity

July 12, 2017

Martin Raiser

Roland Clarke

Paul Procee

Cecilia Brinceño-Garmendia

Edith Kikoni

Joseph Kizito

Lorena Viñuela



WORLD BANK GROUP

ACKNOWLEDGEMENTS

This paper is a summary of a number of background papers analyzing the challenges of infrastructure in Brazil. These papers were prepared by a large team of World Bank Staff and consultants including: Thadeu Abicalil, Sinuê Aliram, Bernardo Alvim, Heinrich Bofinger, Cecilia Briceño-Garmendia, Cesar Calderon, Catalina Cantu Canales, Roland Clarke, Mark Dutz, Gregoire Gauthier, Edith Kikoni, Joseph Kizito, Marcos Mendes, Miguel-Santiago Oliveira, Steven Pennings, Paul Procee, Frederico Rabello, Fernanda Ruiz Nuñez, Luis Serven, Lorena Viñuela and Tito Yepes-Delgado, whose work is gratefully acknowledged by the authors of the summary paper. In addition, the authors would like to thank Fabio Bittar, Igor Carneiro, Flavia Nahmias and Mônica Porcidônio for their excellent assistance in producing this report.

*Back to Planning:
How to Close Brazil's Infrastructure Gap in Times of Austerity*

*"You and I travel by bus and train, but economists travel on infrastructure."
Margaret Thatcher*

July 12, 2017

1. Investment in infrastructure tops the policy agenda in many countries around the world.

Infrastructure is seen as key to sustained economic development, the integration of domestic and international markets, and the access to economic opportunities for all. Smart cities, the motors of modern economies, rely on public transport, clean energy, green buildings, pollution control and waste management to attract the best talent and foster innovation. Around the globe, politicians and entrepreneurs tout the digital dividends that could be generated through better internet connectivity (World Bank, 2016b). Infrastructure may be noticed even more when it is absent or of low quality. In many countries, enterprises complain about power shortages or damages inflicted on merchandise as a result of poor transport facilities. Infrastructure deficiencies are holding countries back in the quest to reach high income status. Numerous studies point to a large and growing global infrastructure gap (McKinsey Global Institute, 2014).

2. Infrastructure investment is also a target for policy makers seeking to stimulate their economies. As global demand has remained subdued in the wake of the great recession of 2007-2008, investing in infrastructure is seen as a recipe to reawaken economic growth (IMF, 2014); (World Bank Group, 2017). High expected returns would repay any short-term outlays, while incomes and employment would receive much needed support.

3. However, developing infrastructure in many countries confronts two common challenges. First, investing wisely and effectively in infrastructure is complicated. The technical issues of choosing the most beneficial projects are often overshadowed by political considerations. Environmental and social concerns need to be taken into account. Taxpayers and auditors rightly worry about cost overruns, voters about the impact of interventions in their "backyard" (Flyvbjerg, Garbuio, and Lovallo 2009 and Flyvbjerg, Bruzelius, and Rothengatter 2003). Technical complexities and construction risks require strong oversight to protect financiers and users, and prevent collusion and corruption. Moreover, numerous "white elephants" around the globe are a reminder that infrastructure investment succeeds only when it is part of a comprehensive development strategy, and institutions are in place to help select the right projects and have them implemented cost effectively. Second, in many countries, public resources are strained by years of slow growth and rigid social welfare spending commitments. While private investment in infrastructure has increased substantially since the 1990s, in many cases this has not been sufficient to compensate for declining public investment.

4. Brazil is a prime example both for infrastructure's promise and for the challenges that need to be overcome to realize it. Since the 1980s, investment in infrastructure has declined from over 5 percent of GDP to just under 2 percent of GDP, insufficient even to cover depreciation.

The result is a significant infrastructure gap, whether measured in terms of the physical capital stock or of investor perceptions. Over the same period, Brazil has struggled with stagnant productivity growth and the poor status of infrastructure is widely believed to be a key reason for Brazil's growth malaise (SCD, World Bank, 2016a). Against this background, there has been no shortage of national flagship programs targeting infrastructure. Their impact has been disappointing, however. Neither was Brazil able to substantially raise its total rate of investment in infrastructure, nor did the quality of services improve. Empty stadiums, incomplete airport terminals and urban rail tracks, as well as a systemic corruption scandal involving the country's largest construction firms and a significant share of its political elite are potent symbols of the country's failure to effectively manage infrastructure despite increased public spending.

5. This Report analyzes the causes of Brazil's infrastructure gap and examines possible solutions. The central argument is that Brazil can and will need to substantially increase the efficiency of infrastructure spending to close the gap and this will require rebuilding its capacity for planning, budgeting and managing infrastructure assets. While public funding will remain constrained by Brazil's ongoing fiscal adjustment, private investment is unlikely to be an effective substitute unless infrastructure governance improves. However, with appropriate policies, institutions and regulation in place, substantial gains in infrastructure performance could be achieved as a result of efficiency gains coupled with marginal complementary public investments. This in turn would make infrastructure much more attractive to private investors. One implication of this analysis is that the current policy focus of Brazil's authorities on mobilizing commercial financing for infrastructure and strengthening the role of the private sector in infrastructure management (through PPPs or outright privatization) needs to be complemented with much stronger efforts in planning, pipeline development, contract management, regulation, public oversight and other aspects of infrastructure governance.

6. The argument of this Report is developed in six steps. First, international benchmarking is used to establish the size and significance of Brazil's infrastructure gap. Second, the potential contribution infrastructure investment could make to lifting the country's growth rate is examined, bearing in mind Brazil's domestic savings constraint. Third, sectoral and project level evidence is used to estimate the size of existing inefficiencies in Brazil's physical infrastructure, focusing both on allocative inefficiencies (the wrong assets, in the wrong places) and technical or management inefficiencies (too expensive, poorly performing assets). This analysis suggests that Brazil's efficiency losses in infrastructure are roughly of the same size as its annual investments. If these gains could be captured and reinvested, Brazil's effective infrastructure investment rate would double. Fourth, the underlying causes of inefficiencies are examined looking at the entire infrastructure investment value chain. This examination highlights weaknesses in investment planning as a root cause of subsequent governance and management failures at later stages of the project cycle. Fifth, the potential role of the private sector in overcoming the defects of the public investment management system and the increasingly constrained public investment budgets is examined. The conclusion is that, despite some evidence of superior performance of privately managed infrastructure assets, an optimal use of PPPs and project finance requires strong public sector capacity and is not a substitute for the lack of it. Sixth, the weaknesses in Brazil public investment management framework are traced back to the specific incentives

embedded in Brazil's political system and the institutions that developed after the return to democracy in the mid-1980s.

7. The Report stops short of developing detailed policy recommendations. These are elaborated for specific sectors (transport, energy and water and sanitation) and specific steps in the value chain (planning and budgeting, auditing and the framework for private financing of PPPs) in a series of background papers. Overall, the changes required to realize the potential gains from improved infrastructure performance are challenging and unlikely to be implemented overnight. Some early wins can be realized in the context of upcoming new concessions and privatizations in the transport and logistics, and energy sectors respectively, both by creating a more transparent and reliable contractual framework and by gradually introducing elements of risk sharing into project finance. But such changes will not fundamentally improve the quality of Brazil's infrastructure on their own. The findings in this study suggest that more fundamental changes in the institutional setup for planning and regulating infrastructure and in Brazil's investment budgeting system will be needed to overcome inefficiencies resulting from fragmented decision making and political rent-seeking.

1. Brazil's Infrastructure Gap¹

1.1 Brazil's stock of physical infrastructure is relatively small

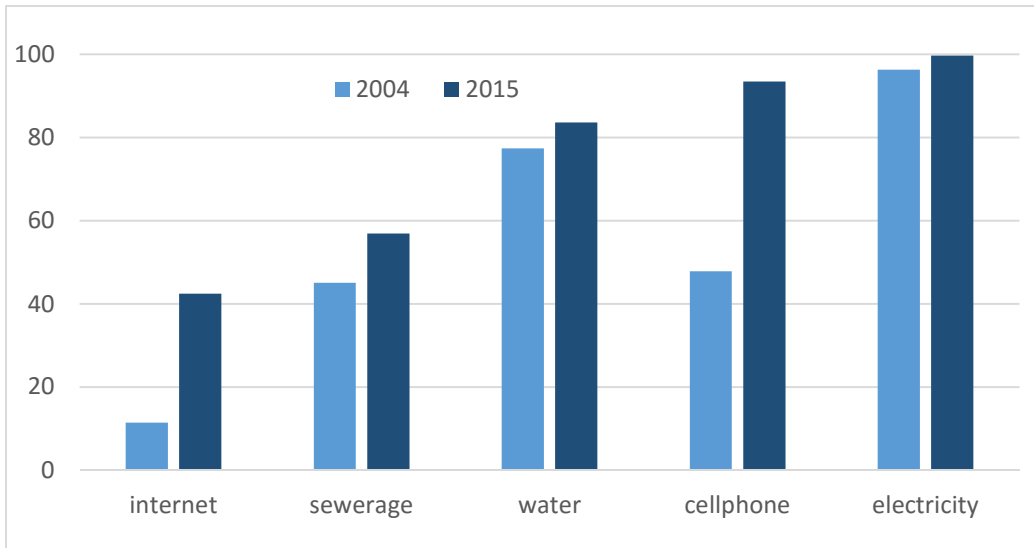
8. Brazil's stock of physical infrastructure is smaller than that of most countries with a similar income level. This is particularly the case for transport and water and sanitation infrastructure. Access to electricity and telecommunications is mostly on par with other middle income countries after substantial improvements in the past 20 years.

9. In part, this is due to Brazil's vast territory, which makes investments in connectivity both more challenging and more important. To illustrate the extent of Brazil's infrastructure gap in different areas of the economy, this study carried out a benchmarking exercise. This compares volumes and quality of infrastructure across countries, taking into account relevant characteristics, such as geographical size, population and income levels, through either a graphical comparison (in the case of only one control variable) or a regression analysis (in the case of multiple control variables). This enables broad comparisons to be made across countries, and gives a heuristic impression of Brazil's performance relative to comparable peers.

10. Access to infrastructure services in Brazil has increased over the past decade (Figure 1.1). The main drivers of this are: the lagged effects of the privatization programs of the 1990s (especially in telecommunications), the adoption of public programs aimed at expanding coverage in remote areas (especially in electricity due to the *Luz Para Todos* program), and the combination of faster household income growth and falling inequality that lasted until 2014 which encouraged private investment in improved services in remoter areas.

¹ This section draws upon World Bank, 2017h, *The State of Brazil's Infrastructure*, Background paper for Brazil Infrastructure Analysis

Figure 1.1: Brazil: share of population with access to infrastructure services (percent), 2004 and 2015



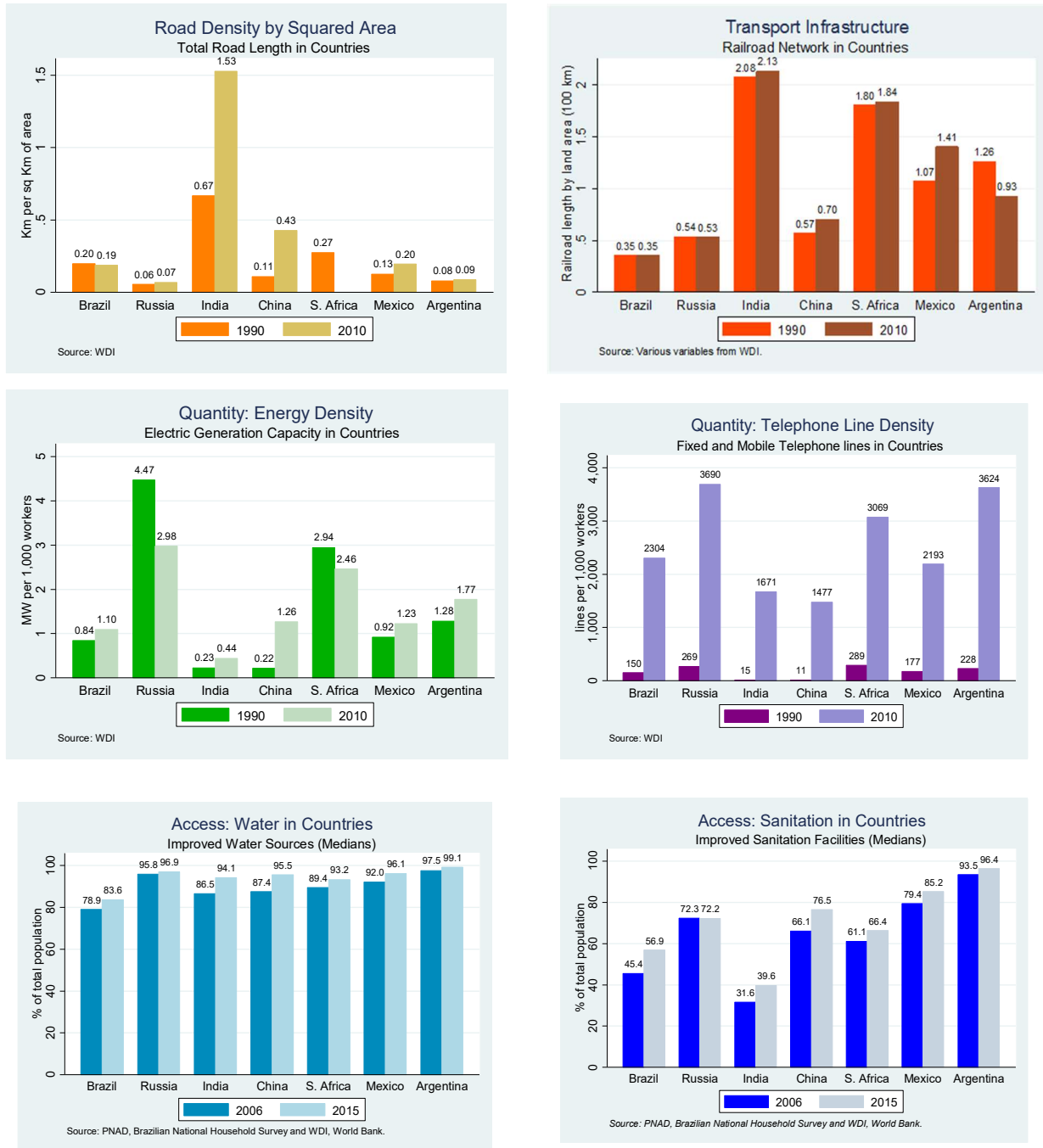
Source: PNAD - Pesquisa Nacional de Amostra de Domicílios, 2004 and 2015, IBGE

11. However, Brazil remains below most of its peers in the stock of physical infrastructure². As can be seen in Figure 1.2, road and rail infrastructure stocks have barely grown since 1990, while other middle-income countries have expanded them significantly. Indeed, Brazil's road density has fallen slightly, whereas that for all comparator countries has increased. Despite some expansion, the length of Brazil's rail network remains the lowest compared to peer countries, and most of the very low investment in the sub-sector went into rolling stock (wagons and locomotives) rather than expansion of capacity (new lines). The country has more installed electric capacity than the average country in the LAC region, after taking into account relative income levels, but slow growth in generation capacity has left Brazil behind most competitors. While Brazil has boosted its telecommunications infrastructure over the past 20 years, it is still somewhat behind countries like Russia, South Africa and Argentina. Finally, access to improved water has increased by about 6 percent between 1990 and 2010 and access to sanitation facilities has increased by about 25 percent, but these figures are lower than in any of the comparator countries except India³.

² The report uses two comparator groups: (1) the medians across different world regions; namely, Latin America and the Caribbean (LAC), East Asia and Pacific (EAP), Europe and Central Asia (ECA) and industrialized countries (IND) and (2) six peer countries with broadly similar characteristics: Russia India, China, South Africa, Mexico and Argentina.

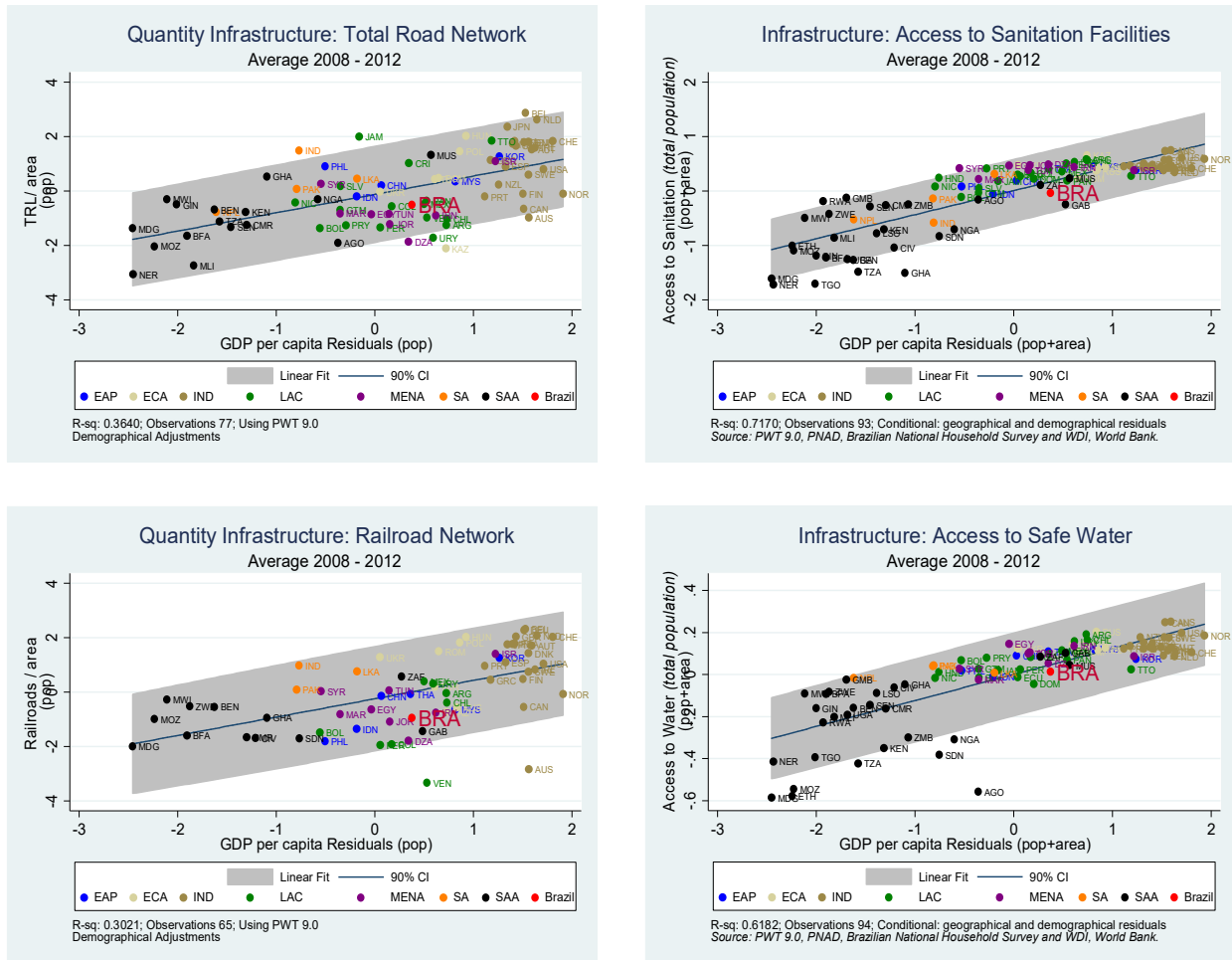
³ There is some debate in Brazil regarding the comparability of access data, particularly to water and sanitation, as it does not account for disruption in supply nor in the type of sanitation offered. Difference in the quality of infrastructure services are considered further below.

Figure 1.2: Infrastructure stock in roads, rail, electricity, telecoms, water and sanitation



12. Size matters in these comparisons, but even taking into account Brazil's vast territory and relatively low population density, the country remains below its peers in infrastructure stock (Figure 1.3). This is particularly the case for transport infrastructure. Both the length of Brazil's road and rail network are below the level that would be expected for a country of its size and per capita income level. Water coverage and sanitation infrastructure is closer to but still below the international trend line.

Figure 1.3: Adjusted infrastructure gaps for size of territory and population density



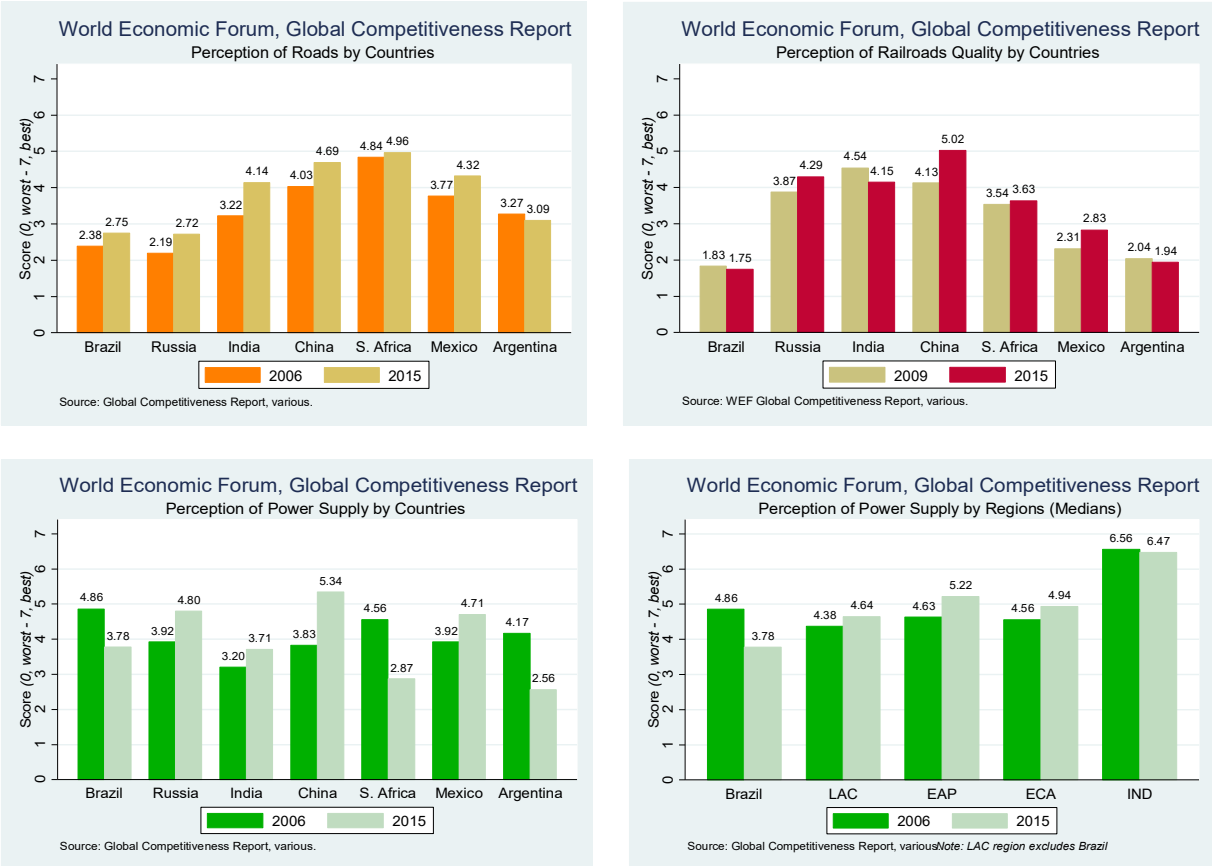
1.2 The quality of infrastructure services is low

13. The available stock of infrastructure can be an imprecise measure of the services actually available to households and enterprises. Thus, data on access and performance, such as transmission losses, freight and passenger loads, delays in transshipment, among others, is an important dimension of a country's infrastructure gap. Unfortunately, comparable data on the quality of infrastructure services is not easy to come by. The broadest set of comparators can be obtained from international enterprise surveys, such as the data collected by the World Economic Forum (WEF) or the World Bank's Logistics Performance Index. Additional evidence can be obtained from household and enterprise surveys within countries to reveal regional patterns and priorities as well as variations across income groups. This section briefly summarizes evidence on inter-country variation in quality and within-Brazil variation in both access and quality.

14. Brazil performs badly in the perception of the quality of infrastructure services (particularly in transport and logistics). Data from the annual WEF Global Competitiveness Report suggests that the quality of Brazil's infrastructure appears to be worse than that of its

competitors (Figures 1.4). The perception of the quality of roads has improved but is still lower than in any of the comparator countries. Most large emerging market countries experienced improvements in the perceived quality of the rail network; Brazil registered a decline. Brazil's perception of quality fell from 1.83 in 2009 to 1.75 in 2015—a score that trails LAC, ECA, and EAP region averages and benchmark countries. Its score is less than half that of India (4.15) and China (5.02). Similarly, the quality of ports and airports felt relative to other countries between 2006 and 2016. The Logistics Performance Index bears this out, placing Brazil 55th out of 160 countries in 2016, well below Turkey (34th), India (35th), China (27th) and South Africa (20th); but close to Mexico (54th) and ahead of Russia (99th). Only power supply is relatively well rated, but the perception of quality has deteriorated since 2006.

Figure 1.4: Perceptions of infrastructure quality (roads, rail, and electricity)



15. Given Brazil's size and heterogeneities, it is not surprising that access to infrastructure services varies significantly across regions (Table 1.1). Generally speaking, the wealthier Southern and Southeastern states have access to more and better infrastructure. Regional differences in access are most significant in water, sewerage and internet services. For example, access to internet services is only 15 percent in Maranhão while in the Distrito Federal it is 67 percent. Internet access in the South is almost five times higher than in the North East. Beyond regional differences, coverage of infrastructure services remains much lower in rural areas except for the case of electricity, where the *Luz para Todos* program has largely reduced access gaps.

16. Nonetheless, given higher population densities in the South and Southeast, the extent to which households and enterprises regard infrastructure as a constraint is more evenly distributed across regions of Brazil. For instance, in 2009 over 40 percent of firms in Rio de Janeiro identified transport services as a major or severe constraint, against 5 percent in Paraíba and less than 30 percent in Brazil as a whole.⁴ Firms in São Paulo suffered an average of 2.3 power outages a month against only 0.2 in Ceará. Differences in demand thus modulate differences in access to determine variations in the quality of infrastructure services.

17. Variations in infrastructure access reflect and reinforce Brazil’s poverty profile and income inequality. Access rates among the poor have been improving in the last decade but coverage remains much higher among wealthier groups. The poor and bottom 40 percent continue to lag behind especially in access to sewage treatment, water and internet. In 2015, less than half of the bottom 40 percent of the population had access to sanitation facilities, compared with 80 percent of the richest, and only about one fifth had access to the internet.

Table 1.1: Infrastructure access by region, urban-rural, and income group

		Electricity	Sewage	Water	Internet	Mobiles
Regional	NE	98.3	49.0	31.0	11.2	78.2
	SE	100.0	58.3	92.2	43.9	95.5
	South	100.0	79.2	93.3	55.0	95.6
	Ratio (NE/South)	1.0	1.6	3.0	4.9	1.2
Urban-Rural	Rural	98.0	4.9	31.0	11.2	78.3
	Other urban	100.0	58.3	93.4	43.9	95.6
	Metro	100.0	79.1	93.5	55.0	95.6
	Ratio (Rural/Metro)	1.0	16.1	1.0	4.9	1.2
Income	Poorest 40%	99.4	42.3	75.5	21.1	90.7
	Richest 10%	99.9	79.2	94.0	84.8	98.6
	Ratio	1.0	1.9	1.3	4.0	1.1

Source: PNAD - Pesquisa Nacional de Amostra de Domicílios, 2015, IBGE

18. Differences in access and quality of infrastructure services to some extent reflect differences in the ease with which private investment can be attracted to the sector. This mirrors both the quality of regulation in the sector and the extent to which users are willing and able to pay for infrastructure services. Transport (road, rail and air), logistics (ports) and water and sanitation have faced both numerous regulatory changes over the years and obstacles to the

⁴ Based on the World Bank Enterprise Survey data for Brazil. The Enterprise Survey focuses on identifying the many accommodating and constraining factors that shape the business environment and productivity of firms in a range of areas including: infrastructure, trade, finance, regulations, taxes and business licensing, corruption, crime and informality, finance, innovation and labor. In Brazil, the Enterprise Survey was carried out between May 2008 and June 2009, covering 1,802 manufacturing and service establishments in 14 states: Amazonas, Bahia, Ceará, Distrito Federal, Goiás, Mato Grosso, Minas Gerais, Paraíba, Paraná, Pernambuco, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, São Paulo.

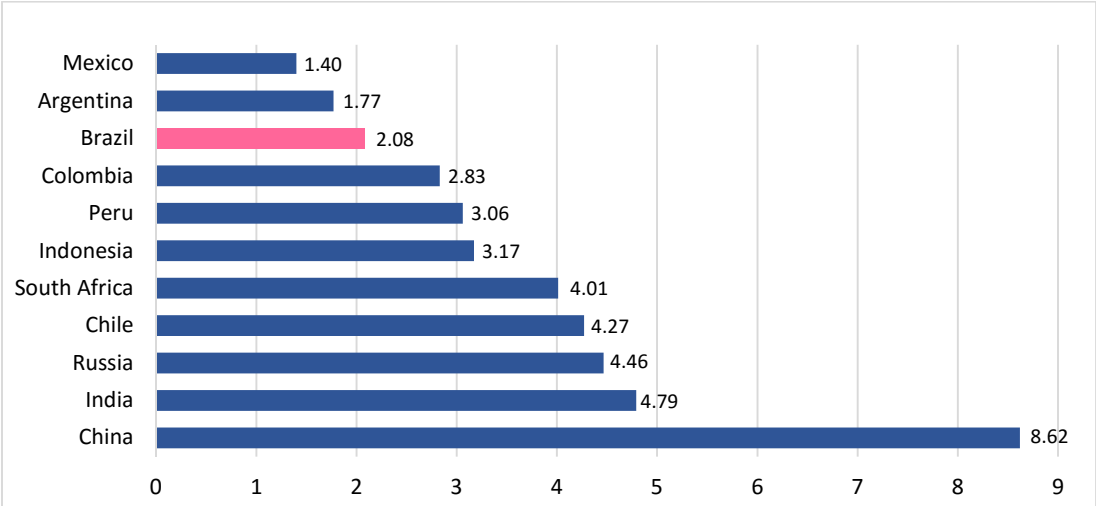
full recovery of costs from users. Electricity and telecommunications, which have had more stable regulatory regimes (at least until recently), and where cost recovery through user fees is easier, have attracted substantial private investment following the privatizations of the 1990s and access and quality are correspondingly higher. While there is scope to increase private investment and commercial funding in all areas of infrastructure, the public sector will continue to play an important, and oftentimes critical, role and this will require fiscal space. The following section traces the emergence of Brazil’s infrastructure gap to the decline in investment rates since the 1980s, with a particular focus on the role of declining public investment.

2. Brazil’s Underinvestment in Infrastructure⁵

2.1 Why investment in infrastructure in Brazil declined sharply after the 1980s

19. One of the key reasons for Brazil’s poor infrastructure performance is the lack of investment. Fast growing emerging market economies have tended to spend around 5-7 percent of their GDP on infrastructure (Growth Commission, 2008). Brazil over the past two decades has spent less than 2.5 percent of GDP (Figure 2.1). At this level, Brazil’s investment in infrastructure barely covers depreciation costs.⁶ In other words, Brazil’s infrastructure stock can at best expect to remain constant and quality may in fact deteriorate further if the little investment that does take place is not adequately allocated to maintain existing assets and account for regional and sectoral shifts in demand.

Figure 2.1: Infrastructure Spending, 2000-2013, percent of GDP



Source: World Bank staff, compiled from multiple sources

⁵ This section draws on World Bank, 2017c, *Infrastructure, Growth and Social Performance in Brazil* and World Bank, 2017d, *Infrastructure Investment and Financing in Brazil over the Last Two Decades*, Background papers for Brazil Infrastructure Analysis.

⁶ For Brazil the aggregate infrastructure depreciation rate is estimated at about 2.03 percent of GDP per year.

20. Brazil was not always a country that invested little in infrastructure. During Brazil’s long period of rapid catch-up growth from the 1920s-1980s, investment rates in infrastructure exceeded 5 percent of GDP (Table 2.1). These were years in which Brazil’s per capita incomes grew around 4 percent per annum per year. The country explored its vast interior territory, relocated the capital from Rio de Janeiro to Brasília, and invested heavily in power and connecting infrastructure. At the same time, Brazil underwent rapid urbanization, with over 60 percent of the population living in urban areas as early as 1980. However, this was also a period in which the potential conflicts between rapid economic development, and the conservation and protection of Brazil’s unique natural assets and cultural and ethnic diversity came into sharp relief. Moreover, economic inequality and with it inequality in access to services was persistently high.

Table 2.1: Infrastructure Investment in Brazil, by Sector, 1980–2015 (percent of GDP)

Year	Land Transport			Electricity			Telecommunications			Water & Sanitation			Total Infrastructure		
	Total	Public	Priv.	Total	Public	Priv.	Total	Public	Priv.	Total	Public	Priv.	Total	Public	Priv.
1971-1980	2.03	na	na	2.13	na	Na	0.80	na	na	0.46	na	na	5.42	na	na
1980-1988	0.86	0.54	0.32	3.28	2.62	0.66	0.73	0.35	0.38	0.31	0.31	0.00	5.18	3.82	1.36
1990-2000	0.19	0.09	0.10	1.06	0.71	0.35	0.90	0.30	0.60	0.20	0.20	0.01	2.36	1.30	1.07
2001-2015	0.63	0.38	0.24	0.65	0.33	0.32	0.61	0.00	0.60	0.19	0.17	0.02	2.06	0.89	1.18

Source: Calderon and Serven (2017) and Frischtak (2017) for this report

21. Investment in infrastructure started to tail off rapidly at the end of the 1980s and has remained depressed since then. To some extent this was due to the ongoing fiscal crises and macroeconomic instability at the time, but there were deeper political and structural reasons as well, with longer term implications. Following the return to democracy, the 1988 Constitution promised to reconcile the goal of development with social inclusion and greater concern for the environment. Free access to education and health services, combined with minimum expenditure levels, as well as generous welfare provisions for formal and public sector workers were enshrined in basic legislation (see SCD chapter 2). In addition, following the great recession of 2008-2009, rising tax benefits and interest rate subsidies on state directed credits added to the fiscal pressures. The resulting trend increase in current public spending at a rate of around 2 percent above the rate of GDP growth led to an increase in current central government expenditure from 16.5 percent of GDP in 1997 to 22.8 percent in 2015⁷. The legislative mandates and political pressures for current expenditure eroded the fiscal space for public investment. In other words, Brazil’s rising social spending and generous privileges granted to multiple groups after the 1980s may have come at the cost of stagnating quality of infrastructure services.

⁷ General Government primary expenditure is estimated to have increased from about 25% of GDP from 1997 to 34.3% of GDP in 2015. Prior to 1997 there is no consistent data series. However, the growth from 1997 appears to be a continuation of a trend from at least the late 1980s.

2.2 The private sector was unable to compensate for the decline in public investment

22. Declines in public investment in infrastructure need not be associated with reduced investment, if the private sector steps in to compensate. In other countries in the region, private investment has compensated for the decline in public investment. In Chile, for example, it more than offset declining public investment, resulting in an increase in the investment rate in infrastructure from 3.1 percent of GDP in the 1980s to 5.2 percent between 2000 and 2006. In other countries, such as Colombia, where public investments remained unchanged, private investment increased by a factor of five in the 1990s.

23. Brazil like many other countries implemented a series of reforms in the 1990s to attract private investment into its infrastructure sectors. These efforts went furthest in the power and telecommunications sector, where privatizations and concessions opened the way to private investors. Between 1994 and 2015, 38 percent of private investment in infrastructure went to the energy sector and 34 percent went to telecommunications. Transport (25 percent) and water and sanitation (3 percent) received significantly fewer resources. Many private investors were from abroad, with foreign inflows into infrastructure totaling US\$506 billion in the past 15 years. Private investment in telecoms peaked in 1998, when Brazil broke up Telebrás, the state-owned telecom monopoly. In the power sector, private companies are responsible for 55 percent of investment, with the federal government investing through Eletrobrás and a few state governments retaining significant stakes in partially privatized state-level companies. Private sector investments are concentrated in distribution while the public sector has invested primarily in generation and transmission (recently the authorities decided to leave new transmission investments to the private sector). In transport, private investment has been lower and focused on railways and ports. Five major airports were awarded as concessions after 2012 in joint venture arrangements, with four additional concessions having recently been awarded in 2017.⁸

24. Nevertheless, private infrastructure investment in Brazil has remained low and insufficient to fill the gap left by declining public investments. While the private sector shares in total infrastructure investment increased to around half of total investment in the 1990s from less than a third in the 1980s, as a share of GDP it remained below 1.5 percent. It is important to note here that while the private sector invests in infrastructure, private investors do not pay for infrastructure services – users or tax payers pay. The willingness to pass costs on to users or assume public payment obligations is thus key to attract private investment (Fay et al., 2017). It is also key to maintain adequate investments in publicly owned and managed infrastructure assets. On both counts, Brazil has fallen short over the past three decades.

25. In part as a result of the poor financial viability of many projects, even when the investor was private, the public sector has remained the main source of financing for infrastructure.

⁸ Concessions have been the main vehicle for private participation in infrastructure. During 1994–2015, Brazil realized 1,922 projects with private participation. Concessions accounted for 88 percent of them (36 percent were greenfield projects and 52 percent involved existing assets). Concessions accounted for 73 percent of the US\$506 billion these projects over this period. Following the conclusion of major divestiture programs in 1998, private flows fell for all sectors. They recovered beginning in 2008, with peaks in 2012 and 2014, when Brazil attracted investment for the World Cup and the Olympics in addition to successful concessions, particularly in transportation, much of it however with the help of considerable subsidies (and equity and quasi equity contributions) from the public sector.

One of the principal funding mechanisms has been through quasi-fiscal transactions with the public banks, principally *Banco Nacional de Desenvolvimento Econômico e Social* (BNDES), *Caixa Econômica Federal* (CEF) and the *Banco do Brasil* (BB). In 2014, the sum of government equity, resources from public enterprises (both at the federal and sub-national levels), and from government-controlled investment funds (FAT and FI-FGTS – essentially forced savings deducted from payrolls), plus debt from BNDES and CEF added up to 67.9 percent of the total sources funding infrastructure investment. Adding financing from International Financial Institutions (IFIs) and other sources with Treasury guarantees, the public sector accounted for 70.6 percent of total funding (equity and debt). Brazil’s private sector contribution to infrastructure finance is significantly lower than in peer countries. For example, in the United Kingdom the public funding share is between 20-25 percent of infrastructure finance and in India 50-55 percent. This is important as funding through public banks, too, requires fiscal space or contributions from depositors. In times of economic recession, neither source is as abundant as before, forcing a rethink in public policies on infrastructure investment and financing.

2.3 Consequences of Brazil’s low infrastructure investment for long-term growth prospects

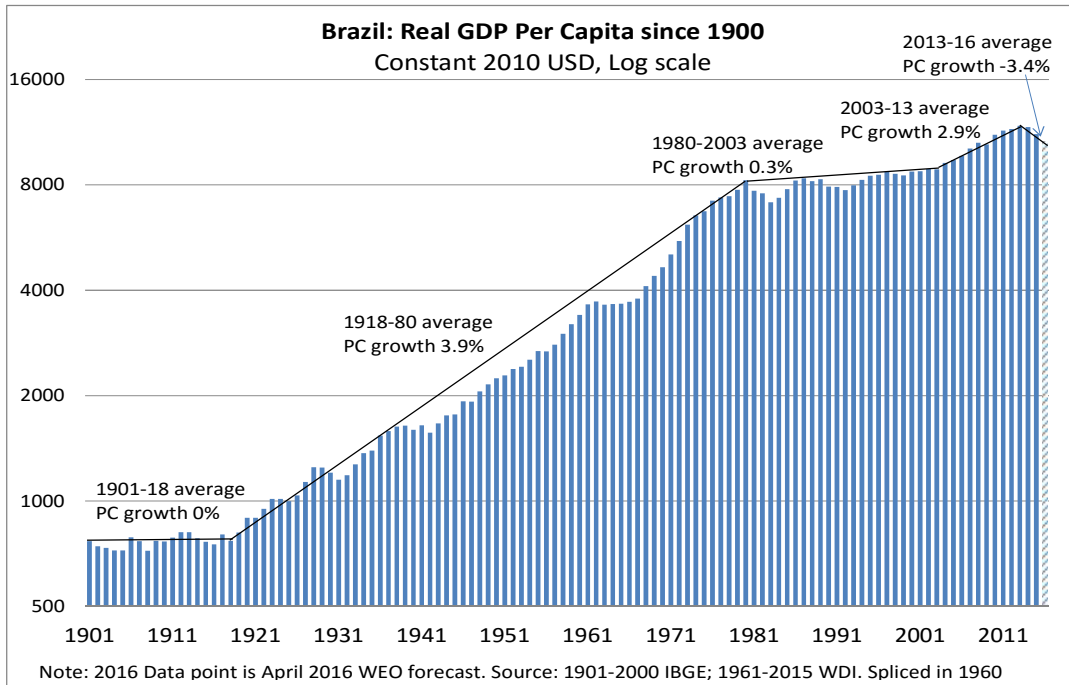
26. The decline in infrastructure investment in Brazil has negatively affected economic growth.

From 1918-80 GDP per capita growth averaged almost 4 percent (Figure 2.2). This period included steady industrialization from the early 1940s to the early 1960s with average growth of 4.4 percent. Growth accelerated during the decade from 1968 as Brazil achieved “miracle” growth rates around 6 percent per year, similar to countries in East Asia. However, since 1980, real GDP per capita growth has averaged at a mere 0.7 percent. After some volatility in the early-mid 1980s associated with the debt crisis and political transition, Brazil grew at around 0.5 percent per capita in the 15 years from 1988. The commodity boom in the decade from 2003 relaxed macroeconomic constraints and allowed GDP per capita to grow by almost 3 percent per year. However, infrastructure investment did not recover during this period and the resulting gap has come to be seen increasingly as a constraint on future growth prospects.

27. A number of empirical studies illustrate the impact of infrastructure stocks on growth.

Calderón and Servén (2004) estimate the potential growth payoffs of improving infrastructure quantity (stocks) and quality. They find a robust impact of both infrastructure quantity and quality on Brazil’s economic growth: if Brazil’s infrastructure stock and quality were to catch up with the median East Asian tiger economy, Korea, per capita GDP growth rates would be higher by 4.4 percentage points.

Figure 2.2: Brazil: Real GDP per capita since 1900



28. Expanding the rate of productive infrastructure spending could thus generate sizeable output effects for Brazil over the long term. An analysis of the medium and long term effects of infrastructure investment on output in Brazil, conducted for this report, suggests that a permanent 1 percent of GDP increase in infrastructure investment would increase the size of Brazil’s economy by 1.5 to 3 percent after a decade and 4 to 8 percent after 30 years⁹ (Figure 2.3).¹⁰ The same increase in infrastructure investment would boost potential output growth rates by around 0.17 to 0.28 percent, though growth would fall slowly over time as infrastructure gaps are closed (Figure 2.4).¹¹ Output effects can be larger when infrastructure investment “crowds in” other factors, most importantly private investment.

⁹ The size of the impact depends on the elasticity of output with respect to public capital (among other things), which is debated in the literature. The lower results (1.5 percent after a decade, 4 percent after 30 years) reflect an elasticity of 0.1, similar to estimates in Calderon et al (2015), and Bom and Ligthart (2014) for aggregate public capital. Results at the upper end of the range reflect an elasticity of 0.17, similar to Bom and Ligthart (2014)’s estimates for core infrastructure, and those used in Buffie et al (2012). It also depends critically on the quality of the investment. It will be argued in subsequent sections, that not only has public investment been low, but that it has been ineffective in many cases. On this issue in general see Pritchett (2000).

¹⁰ The results are consistent with other estimates reported. For example, the estimates are also in the range of those in the IMF World Economic Outlook (2014) where the same shock leads to almost a 1.5% increase in output in emerging markets after a decade.

¹¹ These boosts to growth only include effects on potential output and do not include “multiplier” effects in the short run.

Figure 2.3: Output level improvement from a permanent 1 percent of GDP increase in investment

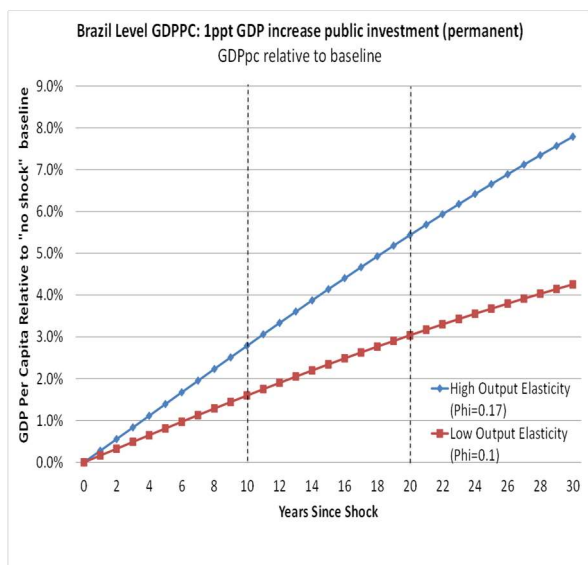
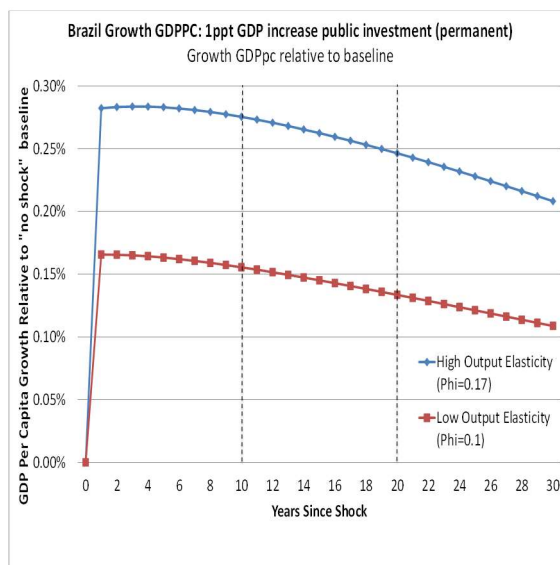


Figure 2.4: Growth improvement from a permanent 1 percent of GDP increase in investment



29. However, the growth enhancing effects of infrastructure investment are dependent on implementation quality, financing, the existing infrastructure stock and an array of other country-specific factors (Pritchett, 2000). The effects of additional investment can be small if the efficiency of the investment process such as project selection and implementation is relatively low—so that only a fraction of the amount invested is converted into productive capital stock. This has been a systemic problem in Brazil over the last three decades.¹² Likewise, funding infrastructure with distortionary taxation can crowd out other productive activities and potentially even reduce growth.

30. There is no precise estimate of the size of Brazil’s additional infrastructure needs, but all existing studies point to a substantial gap. Estimates of infrastructure investment needs can vary substantially depending on the target objective. For instance, in a baseline scenario, investment requirements could be estimated based simply on maintaining current access and quality levels taking into account rising demand.¹³ Brazil could also invest with the purpose of meeting broader aspirations such as providing universal access to roads, clean water and sanitation. Finally, investment requirements could be estimated against the objective to increase the quantity and quality of infrastructure services to levels similar to a comparator country like South Korea. In the

¹² Some notorious examples of wasteful investment in infrastructure in Brazil include the 29-year old North–South railroad and the BR-163 highway, launched 40 years ago, and the Comperj refinery and petrochemical plant, which has so far cost US\$21.6 billion, is still not functioning several years later than originally planned has cost over three times the original budget of US\$6.5 billion.

¹³ Future demand includes investment required to meet the needs of a growing population as well as the investment required to support projected economic growth between now and 2025 and maintain typical current levels of infrastructure capacity and service relative to GDP.

baseline scenario, and following the methodology outlined in Fay and Yepes (2003) and Yepes (2008), Brazil's infrastructure investment rates will have to rise from around 2 percent of GDP on average over the past 10 years to 4.25 percent through 2025 (see Table 2.2). Lower rates of infrastructure investment could make even historical GDP growth of 2 percent unsustainable as assets depreciate and congestion increases. Note that in this scenario approximately 57 percent of estimated investment requirements are needed for maintenance alone. Should Brazil wish to raise growth rates or improve access and quality of infrastructure services, investment rates in excess of 5 percent of GDP could be required.

**Table 2.2: Projected Annual Investment Requirements for Infrastructure in Brazil 2015–25 (Baseline)
(percent of GDP)**

Sector	Required		Actually Invested	
	Total	Maintenance	2001–10	2011–15
Transportation	1.91	1.20	0.54	0.64
Roads	1.81	1.12	0.39	0.42
Paved	1.37	0.77		
Unpaved	0.44	0.35		
Rails	0.07	0.06	0.11	0.14
Ports	0.03	0.01	0.05	0.09
Telecommunications	0.29	0.26	0.68	0.45
Telephone mainlines	0.06	0.06		
Mobile lines	0.26	0.20		
Electricity	1.90	0.87	0.62	0.70
Electricity generation	1.79	0.78		
Electricity access	0.11	0.09		
Water and sanitation	0.11	0.08	0.19	0.18
Water	0.04	0.03		
Sanitation	0.08	0.05		
Total	4.25	2.41	2.04	1.97

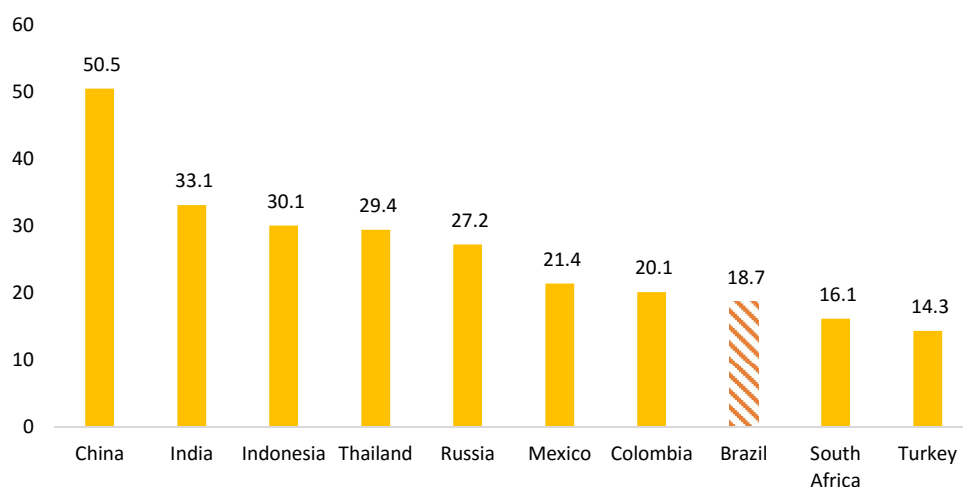
Source: Own estimates

31. Confirming the evidence presented in the previous section, the largest infrastructure gap is in the transport sector. In the baseline scenario, 45.3 percent of the investment gap – equivalent to 1.91 percent of GDP– is attributable to transport infrastructure, reflecting Brazil's particularly large deficits in the sector. Brazil has invested less than a third of what is required in this area in recent years, with investment dropping to just 0.54 percent of GDP in 2015. Between 2006 and 2015 investment in transport was close to US\$118 billion at 2015 prices. The requirements for the next ten years add to US\$352 billion implying an increase of US\$235 billion over historical levels. In the electricity sector, the investment gap is around 1.2 percent of GDP over historical levels. Interestingly, the baseline scenario suggests there is no gap in telecoms and water and sanitation – but note that this is based on the assumption of no further improvements

in access and quality, which in the water and sanitation sector in particular, is a highly unsatisfactory assumption.

32. Despite these evident needs, Brazil’s low public and private savings rates probably preclude a substantial increase in investment rates in the next few years. In international comparison, savings rates in Brazil are low, even relative to Latin American peers (Figure 2.4). Total savings increased from 16.0 percent of GDP in 2002 to 20.1 in 2008 but subsequently decreased to just 15.9 percent of GDP by 2014. As part of recent reforms the government has introduced a constitutional limit on primary expenditure (keeping it fixed in real terms at the level prevailing in 2016). If this limit is adhered to, and other parallel reforms to current spending are implemented, it will, over a period of three or four years, create some fiscal space for higher public investment. Social security reform and the proposed changes to credit markets may encourage higher household savings and larger retained earnings in the corporate sector as well, although private savings are generally not so easily amenable to policy. Should efforts to increase public savings succeed, a large stock of domestic financial liabilities exist that could potentially be allocated towards infrastructure (and away from government bonds) if fiscal policy remains tight and if new financial instruments are developed. In addition, there is growing international interest in infrastructure as a potential long-term asset class. We return to this further below.

Figure 2.3: Savings International Comparisons, 2005—2014 (percent of GDP)



Source: IMF WEO

33. Given the context of low domestic savings, the efficiency with which funds are used acquires particular importance. The importance stems not only from direct growth effects of more efficient investment, but also from the fact that raising the growth rate through more efficient investment may in turn help to gradually raise the savings rate. Conversely, simply increasing investment without fixing underlying inefficiencies may yield few results, as Brazil’s experience with a series of public flagship infrastructure programs demonstrates. The next section analyzes the efficiency of existing infrastructure investment in Brazil. This shows that there is substantial room for improvement and that a combination of better targeted

investments and changes in the governance framework could substantially increase the effective resources available to close Brazil's infrastructure gap.

3. Brazil's Investment Inefficiencies as a Cause for the Gap

34. In the last three decades, Brazil has launched a number of flagship programs with the objective of increasing public investment rates and improving the quality of public investment. In the late 1990s and early 2000s, the Federal Government introduced two consecutive initiatives to increase and prioritize investment. These programs were the "Brazil in Action, Advance Brazil" (*Brasil em Ação, Avança Brasil*), and the Pilot Project of Investment (*Projeto Piloto de Investimento* or PPI). Projects financed through those programs were submitted to careful selection methodology and intensive monitoring. The programs were created to reduce the execution time of priority investments, particularly in the transport sector. Additional objectives were to attract private sector investments and give visibility to governmental actions.

35. While initially successful, these programs became much less effective once they were expanded. The Brazil in Action program and the Pilot Project of Investment had good results because the number of projects financed was small. When the government tried to scale-up the *Brasil em Ação* program and expanded the number of projects, creating the *Avança Brasil* program, the quality of the monitoring and management declined. This problem became even more acute when the government transformed the PPI into the much larger Program of Growth Acceleration (*Programa de Aceleração do Crescimento* or PAC) in 2007.

36. The difficulties in scaling up programs derive from the limited overall capacity for the planning, executing and monitoring of complex projects. The PAC committed over US\$700 billion in two phases to flagship infrastructure initiatives (including the government's flagship public housing program). Financing through the state-owned development banks, especially BNDES, was made available at substantially subsidized rates to lubricate the growing presence of private operators and concessionaires, including in sectors that had not previously seen large private investment, such as in roads, airports, water and sanitation and urban infrastructure (the latter additionally boosted by Brazil's hosting the 2014 Soccer World Cup and the 2016 Summer Olympic Games).

37. The relatively unsuccessful experience of the PAC demonstrates that the lack of resources was not the binding constraint on public investment. The PAC was launched during an economic boom, when fiscal revenue was growing quickly. Between 2007 and 2012, public investment grew from 0.7 percent to 1.3 percent of GDP. In addition, the projects financed by PAC were not included in the primary surplus target, so that they were not subject to ad hoc in year adjustments to meet the fiscal targets, in the way that other expenditures were. Nevertheless, disbursement data shows a consistent gap between the commitment of funds and their effective disbursement, which results from the low capacity for execution of the government. The Federal Government and other SOEs executed less than 30 percent of the planned investment expenses between 2001 and 2015. Many of the payments made in 2013 and 2014 reflect commitments made between 2010 and 2012. Without commensurate improvements in the institutions and

processes governing planning, management, and implementation it is unlikely that future flagship public investment programs would fare any better.

38. This section examines inefficiencies in infrastructure investment from two different angles. First, we look at allocative and operational inefficiencies in the transport, and water and sanitation sectors. By allocative inefficiency we refer to the poor targeting of investments, so that the highest priority needs remain unaddressed. Operational inefficiency is reflected in poor quality services, high costs compared to international benchmarks, poor utilization of existing assets, or high losses. Second, the Report summarizes findings of individual project performance audits carried out by Brazil’s Federal Court of Accounts (TCU). These findings, too, point to large inefficiencies both at the planning and execution stage.

3.1. Sector wide inefficiencies: the case of transport and water and sanitation services¹⁴

39. Quantifiable annual inefficiencies in the transport and water sectors amount to 2.1 percent of national GDP. By solving allocative inefficiencies in the transport modal-mix matrix and operational inefficiencies in the federal highway system (FHS), Brazil could potentially save 1.4 percent of GDP which is 2.2 times the current annual investment in the transport sector. By addressing operational inefficiencies in the water sector, an additional 0.7 percent of the GDP could be saved. The latter is more than three times the level of investment in the water and sanitation sector.

40. In the transport sector, the most conspicuous challenge for domestic connectivity is the modal mix which is skewed towards roads, thereby imposing economic and environmental costs. The present transport modal split in Brazil remains dominated by road transport with 63-65 percent of the share of net ton-kilometers, compared to 21% in China and 39% in India¹⁵. The highway mode has a strong presence in internal market activity involving industrial and consumption goods. The railway system supports exports of mainly agro-industrial products, grains and minerals.

41. Allocative inefficiencies are estimated by quantifying the user cost saving of switching the transportation of goods from roads to railroads. The benefits of using railroads over roads quickly accumulate given the volume of freight and the distances travelled in Brazil. A rough estimate of the annual savings in transportation for bulk solid minerals is in the order of US\$11.8 billion (0.5 percent of GDP) with an additional US\$4.7 billion for agriculture cargo (0.2 percent of GDP) – see Table 3.1. Most of those benefits are generated in the South East for minerals

¹⁴ This section draws upon World Bank, 2017f, *Operational Overview of Brazil’s Land Transport Sector* and World Bank 2017i *Water and Sanitation Services in Brazil: Operational Analysis*, Background papers for Brazil Infrastructure Analysis

¹⁵ World Bank. 2012. “How to Decrease Freight Logistics Costs in Brazil.” *Transport Papers* 39.

(accounting for more than half of the transport cost savings for minerals) and in the North East for agriculture (accounting for 43% of the transport cost savings for agriculture).

42. Although the Government has made changing the modal mix a top priority in recent decades, in practice results have been limited. Efforts to promote PPPs in the rail sector, to develop export corridors around railway lines, and incentives for goods transported mainly by railways have not led to any significant investment in network expansion. Aside from the high cost of investment in new railway lines, the limited effectiveness of government efforts has to do with poor regulation and institutional fragmentation that prevents the coordination of actors around flagship rail investments¹⁶.

43. Operational inefficiencies in the transport sector are directly linked with poor service quality. For roads, 44 percent of the network faces deficiencies such as the need for rehabilitation, widening to accommodate additional traffic, and paving. In order to calculate operational inefficiencies in the highways sector, we quantify the potential reduction of user operating costs (time saving and vehicle operating cost) if these deficiencies were eliminated. Close to 0.7 percent of GDP is lost due to bad road quality, under-engineering of the network and congested roads. Over 40 percent of the inefficiencies can be tracked to the Southeast region. Congestion is the leading cause for inefficiency along with under-engineering. Notably, about 34 percent of the operational inefficiencies can be attributed to highways under concession to private operators.¹⁷ Evidently, existing concession contracts do not always provide sufficient incentives to tackle issues of maintenance or capacity expansion. In particular, concessions tendered out on the basis of the lowest possible toll may have encouraged investors to “low-ball” their bids and hope for renegotiation. This is also demonstrating that involving the private sector in infrastructure is no panacea to resolve sector inefficiencies and that sound regulation and oversight are key.

¹⁶ The railway reform of 2011, which foresaw the unbundling of track and rolling stock assets, and the creation of a national rail company (Valec) to allocate freight rights and coordinate investments in new track on priority routes failed, in part due to corruption and political capture.

¹⁷ It is important to note that this estimate combines data on the quality of roads with data on road usage. Looking at road quality data alone, less than 2 percent of roads under private concession are reported to be in poor or very poor condition against around 20 percent of public roads (CNI, 2017). However, this to some extent reflects selection bias.

Table 3.1: Total Annual Hidden Cost in the Transport Sector

	Potential Gains (%GDP)	Bottlenecks or What would it take to Unleash these Resources
Increasing use of Railways	0.7	<ul style="list-style-type: none"> Regulatory issues Long-term planning and proper budgeting Effective PPPs or bolder role of the public sector
• <i>Mineral cargo</i>	0.494	
• <i>Agricultural bulk cargo</i>	0.197	
Solving Deficiencies in FHS	0.7	As one off investment: 0.89% GDP over 4 years (13.7 US\$-billion) → 0.2%GDP/year, a return of over 250%
• <i>Quality of Roads</i>	0.069	* 2.5 US\$-billion over 4 years
• <i>Congestion</i>	0.227	* 6.5 US\$-billion over 4 years
• <i>Congestion and Quality</i>	0.188	* 2.2 US\$-billion over 4 years
• <i>Under-engineering</i>	0.215	* 2.6 US\$-billion over 4 years
<u>Adding up:</u>	<u>1.4</u>	This is 2.2 times current spending in the sector

Source: Authors' own calculations

44. In the water sector, inefficiencies can be mainly traced to underpricing and the poor management of water utilities. These inefficiencies lead to overconsumption and the waste of scarce resources. We provide monetary estimates of three types of inefficiencies: under-collection of revenues, unaccounted water consumption or technical losses, and underpricing. Each can be expressed as a percentage of the utility's revenues. These inefficiencies are known as hidden costs, as they are not reflected in a utility's declared cost of production but ultimately lead to increased losses that need to be financed by direct or indirect subsidies.

45. Operational inefficiencies in the water sector amount to around 0.7 percent of national GDP (Table 3.2). There is significant heterogeneity across regions with utilities in the North and Northeast recording average inefficiencies of 134 percent and 98 percent of revenues, respectively, against less than 50 percent in the better performing utilities in the Southeast. Unpaid bills are the main source of inefficiencies across utilities followed by technical losses. Targeting investments for maintenance and replacement of assets, increasing metering coverage and changing collection policies are essential to reduce technical losses and collection inefficiencies. Doing so would dramatically increase the resources available for investment in the water sector.

Table 3.2: Total Annual Hidden Cost in the Water sector

Category	Potential Gains (%GDP)	Bottlenecks and What would it take to unleash these resources
Collection inefficiency (unpaid bills)	0.36%	Governance, increasing metering coverage and changing collection policies
Technical losses (unaccounted for water)	0.31%	Targeting investments for maintenance and replacement of assets
Under-pricing	0.07%	Regulations and targeted subsidies
Adding up	0.7%	This is 3 times current spending in the sector

Source: Authors' own calculations based on data from Agência Nacional de Águas

3.2. Project level inefficiencies: a summary of TCU audit findings

46. Audits carried out by TCU (at federal level) and the former Controladoria Geral da União (CGU) (at the municipal level) are an important tool to identify project level inefficiencies and patterns of irregularities at the different stages of the project cycle. According to the 2015 FISCOBRAS report of the TCU, 535 irregularities were identified in a total of 97 audits (Table 3.3). The most common irregularities concern poor execution of works and failure to adhere to public procurement rules during the bidding process, present in over 40 percent of contracts reviewed in 2015. Poor designs and weak contract administration affected around one quarter to one third of contracts and overpricing and inadequate monitoring around one fifth to one sixth.

Table 3.3: Nature of irregularities identified in audits of the TCU

Irregularities	2013	2014	2015
Number of incidences of irregularity	381	840	535
Percentage of projects with following irregularity:			
- Execution of works	13.2%	41.2%	44.3%
- Bidding process	35.3%	14.7%	42.3%
- Basic Design and Engineering Plan	23.5%	34.3%	32%
- Contract administration	15.4%	14.7%	25.8%
- Overpricing	29.4%	8.8%	21.6%
- Project monitoring	17.6%	20.6%	12.4%

Source: FISCOBRAS 2015

47. A further look at the TCU reports indicates that the most common problems stem from poor planning, as well as ineffective management practices during implementation. At the proposal stage, frequent deficiencies include low quality of work plans, incomplete basic designs, insufficient or no counterpart funding, badly drafted budgets, and insufficient characterization of the problem to be solved, among others. In terms of financial performance, the TCU bemoans that disbursements are often not aligned with the physical execution of projects, the use of funds

to pay non-eligible expenses, the drawing funds without authorization, prepayment to suppliers, the use of inadequate documentation to claim expenses, the keeping of cash balances without investing them in the short term, not returning financial balances to the Union, change in project scope without pre-authorization from the Federal Government, and the absence of monitoring to check on physical and financial progress. Procurement problems observed comprise the lack of disclosure and inaccuracies in calls for proposals, fractioning of contracts to avoid more demanding bidding modes, single-source selection, non-compliance with the Procurement Law, excess requirements in the call for proposals that reduce the number of eligible competitors, and poor or absent market research. Contract management suffers from payments not foreseen in the original contracts, extensions of closing dates, overpricing, and contracts addendums that exceed the limits established by the Procurement Law.

48. To give an additional perspective on implementation problems, a random sample of CGU audits at the municipal level was analyzed. The analysis, drawn from the 2015 audits, focused on contracts between municipalities and the ministries of Cities (MCID) and National Integration (MINT). These two ministries concentrate 96 percent of all infrastructure investments made by states, municipalities, and public consortia (see Table 3.4). The projects selected cover 96 contracts in 59 municipalities. In 88 cases, federal resources provided the total value of the contract, that is to say that there was no counterpart financing involved. The median project size was R\$2.1 million (around US\$600,00 in 2015), with a maximum size of R\$216 million (around US\$60 million). These included projects for water supply to small communities, sidewalks and street paving, flood control works, and sanitation and drainage. Table 3.5 shows the descriptive statistics of the sample analyzed.

Table 3.4: Capital Transfers by Ministry (BRL billion), 2015

	Millions BRL	Participation %
Ministry of Cities	3.083	70%
Ministry of National Integration	1.154	26%
Presidency of the Republic	87	2%
Ministry of Transport	59	1%
Ministry of The Environment	5	0%
Ministry of Communication	1	0%
Ministry of Health	0	0%
Ministry of Agrarian Development	0	0%
Total	4.389	100%

Source: Siafi. Sistema Siga Brasil.

Table 3.5: Number of Contracts Analyzed

No. of contracts analyzed	96
Agreements (<i>convênios</i>)	31
On-lending	65
No. of Municipalities	59
Ministry of Integration	25
Ministry of Cities	71
No. of contracts with contract values reported	88
Average amount (Millions BRL)	15.5
Median amount (Millions BRL)	2.1
Max amount (Millions BRL)	216.2

Source: CGU–Relatórios do Programa de Fiscalização a Partir de Sorteios Públicos–Edição 2015.

49. Even more than in the case of Federal infrastructure projects, managerial capacity was the principal problem. Table summarizes the main findings of the audits of the CGU. Almost half (47 percent) of the projects presented problems related to low managerial capacity of local government, such as errors in administrative and contractual procedures. This illustrates the gap between the complexity of legal requirements and the limited technical capacity of municipalities and hence the need to simplify contractual and accountability procedures. Most projects saw delays in the physical execution of works (46 percent), the suspension of works before completion (16 percent), and had low-quality final outputs (31 percent). Low-quality output is often the consequence of the poor quality of winning bidders (10 percent of cases). Delays make public works that should be completed in a year or two drag on for five or six years. Often the municipalities' priorities change during implementation. As a result, in several cases mayors redirected the resources for a different purpose than the one foreseen in the grant contract (17 percent of cases).

Table 3.6: Main Problems Identified by Audits of the CGU

Problem	Incidence %
Delays or failures in processing in local government	47%
Delays in execution	46%
Low quality of works	31%
Incompliance to procurement laws	30%
Overbilling, overpricing or payments for unaccomplished services	22%
Execution interrupted during auditing	20%
Discrepancy between works and object contracted	17%
Partial execution	16%
Deficiency in basic project design	10%
Delays in release of resources by Federal Government	9%
Delays or errors in procedural protocol at the Federal Government	8%
Conflicts/ obstacles with regulatory or judicial institutions	8%
Inadequate work plan	6%
Execution not started	5%
Deficient monitoring by the Federal Government	4%
Additive for value enhancement (?)	4%
Delays or errors in procedural protocol in State Government	1%

Source: CGU – Relatórios do Programa de Fiscalização a Partir de Sorteios Públicos – Edição 2015.

50. Low capacity and complex regulations also facilitate corruption. Among the most common problems related to corruption were a lack of respect for the requirements of the procurement legislation (considered as serious cases where the violation of the law results in restriction of competition in the bidding) and numerous cases of overpricing, overpayment, or payment for uncompleted works or services. Table 3.7 shows these problems are widespread. Of the 96 contracts reviewed, only 9 (9.3 percent) did not have any of the problems. As some of these grant agreements were in the same city, only 5 of the 59 municipalities (8.5 percent) had no problems in their contracts. On average, each contract had 2.85 problems reported by the CGU.

Table 3.7: Number and Distribution of Problems

No. of incidences	274
Average incidences per contract	2.85
Median incidences per contract	3
Maximum incidences per contract	8
No. of contracts without incidences	9
No. of municipalities without incidences	5

Source: CGU – Relatórios do Programa de Fiscalização a Partir de Sorteios Públicos – Edição 2015.

51. In short, the picture that emerges is one of the low technical capacity of states, municipalities and contractors, ineffective control mechanisms (facilitating deviations and corruption), and difficulties for central ministries to monitor and ensure proper execution. The data indicates significant potential savings from improving the selection of subnational investments financed by federal funds. The simplification of rules, greater transparency, the empowerment of citizens to monitor execution and results, and the training of local managers are all important.

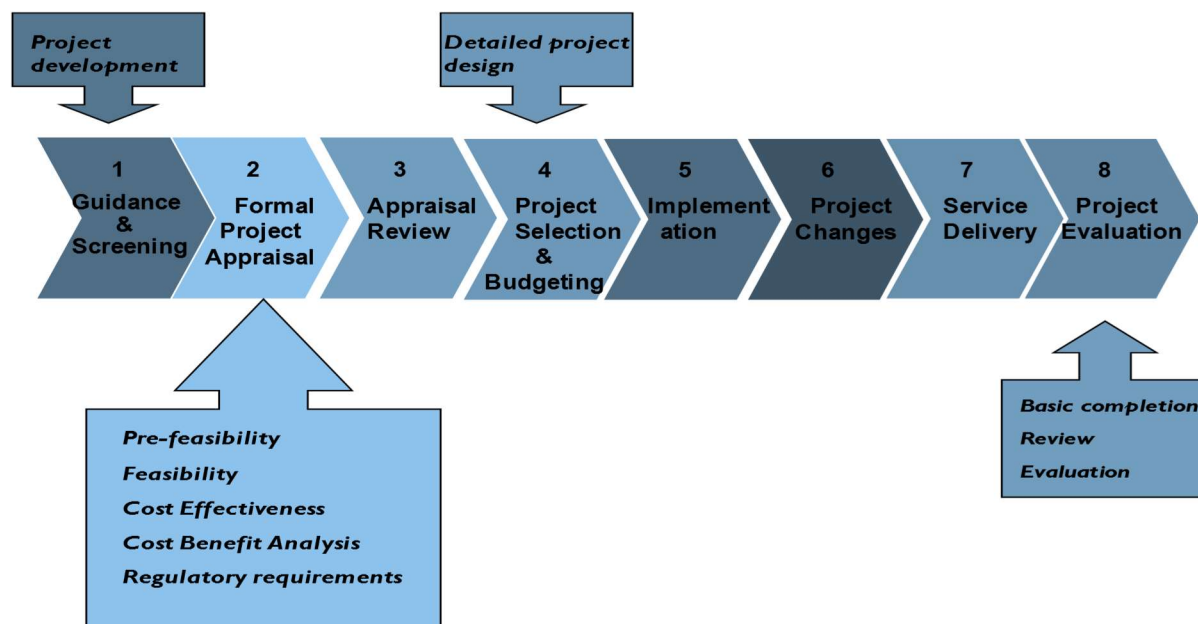
52. TCU and CGU reports contain a thorough and largely undisputed diagnosis of the weaknesses in Brazil’s public investment process. The TCU has repeatedly recommended to strengthen upstream planning capacity, increase standards for basic engineering designs, improve risk identification and mitigation at the project preparation stage to avoid disruptions during implementation, to tighten requirements for economic and financial feasibility, and to increase the effectiveness of bidding processes. Yet, although the diagnosis seems to be clear, the problems identified recur from one year to the next due to insufficient follow up on the recommendations. The next section therefore looks in detail at the deeper institutional reasons behind the persistent problems in planning, selecting, budgeting and executing infrastructure investments in Brazil.

4. Why Brazil Invests Poorly¹⁸

53. As the previous section indicates, inefficiencies can be present at various stages in the investment cycle from planning, selection of projects and allocation of resources, to implementation and evaluation. The public investment management diagnostics framework proposed by Rajaram et al. (2010) sets out eight minimum stages a public investment project should pass through to ensure that it emerges as a productive and sustainable public asset (see Figure 4.1). In the following, we provide a brief review of the main weaknesses of the public investment management process at various stages. This review highlights that most problems can in fact be traced back to the weakness of planning, project appraisal and selection.

¹⁸ This section is based upon: World Bank (2017e), *Institutional and Governance Challenges in Public Investment Management*, Background paper for Brazil Infrastructure Analysis.

Figure 4.1: A Public Investment Management Minimal Features



Source: Rajaram et al. (2010)

4.1 Planning, Appraisal and Selection

54. Investment Guidance and Preliminary Screening. This is one of the weakest links in the public investment management value chain. Brazil has a formal multi-year plan (*Plano Pluriannual* or PPA), which covers a four-year period stretching from the second year of a government's term through the first year after new elections, and defines the main overall government strategy, as well as all programs and actions to be implemented. However, government priorities are so comprehensive that they do not effectively impose any restrictions for investment projects to be included in the PPA and later in the budget. While there is a formal process of negotiations between line ministries and the Ministry of Planning to define what investment projects are included in the PPA, these negotiations often focus on prioritizing past projects that have not yet been concluded, rather than ensuring that new projects follow strategic guidance. Consequently, an effective formal process of preliminary screening is not in place.

55. In addition, the PPA coexists with multiple sectoral strategies that are not necessarily integrated into the overall development strategy. For instance, the National Plan for Transport Logistics (*Plano Nacional de Logística de Transportes*) approved in 2007, indicates priorities for transport infrastructure development over the next 20 years, based on expected demand in the main transport corridors. Similarly, the National Plan for Water and Sanitation (PLANSAB), also from 2007, outlines investment priorities and financing needs for the ambitious goal of providing access to water supply and sanitation to all households by 2030. Yet, the existence of these sector strategies has had little impact on the screening or selection of investment projects in either the transport or water and sanitation sectors. As we saw in the previous section, in the transport

sector, one consequence has been the misallocation of resources on a big scale, with underinvestment in railways versus roads, and in expansion of capacity, operation and maintenance versus new road construction. Moreover, the multiplication of sectoral plans simultaneously creates overlaps (where two sector plans follow similar objectives) and leaves loopholes (where sectoral investments could create synergies that are not captured).

56. Formal Project Appraisal of Investment Projects. Brazil has a set of norms and regulations that institute a *de jure* system for program and project appraisal. In 2005, as part of the Pilot Project for Infrastructure, the Federal Government created the Monitoring and Evaluation Commission (CMA), which is responsible for defining the criteria for project appraisal and includes representatives of all Federal agencies and the Ministry of Planning. The CMA has two technical bodies: the Technical Committee for Monitoring and Evaluation (CTMA) and the Technical Committee of Large Projects (CTPGV). The responsibility of the CPTGV is to analyze large infrastructure projects (with a cost above R\$50 million) and to verify their technical and socioeconomic feasibility, prior to their inclusion in the PPA. Similarly, the monitoring and evaluation of the PPA, carried out by the CMA, became a requirement in 2005. However, the impact of such initiatives have been limited because of the weak appraisal norms and guidance and low technical capacity in the CMA. Moreover, in 2008 a decree exempted PAC projects from undergoing this analysis, which undermined previous efforts to construct an appraisal system.

57. Despite the formal arrangements for project appraisal and independent review, this does not function in practice. Ministries are able to include investment projects both in the PPA and in their budgets without these having been subject to formal appraisal. Project costing is often perfunctory and there is frequently no consideration of alternative approaches to reach project objectives. The lack of clear and transparent requirements to determine what projects can be included in national or sectoral investment plans weakens the appraisal process across the public investment program.

58. Project Selection and Budgeting. One of the most evident problems is the lack of alignment between expenditure allocations set in multi-year plans, annual budgets, and the amounts of investment effectively executed. The instruments that guide the budget cycle include the Multi-Year Plan, the Budgetary Guidelines Law (LDO), the Annual Budget Law (LOA) and the associated decrees authorizing budgetary appropriation and financial execution. The PPA has lost a great part of its original objective of guiding the strategic allocation of government resources. The PPA's programmed investments are not based on accurate estimates of the macroeconomic and fiscal variables that define resource availability and often do not take adequately into account the absorption and execution capacity of executing agencies. The indicative budget allocations in the PPA for investment projects are often not realistic, limiting the prioritization and effectiveness of resource allocation. The LDO is supposed to make the link between the PPA and annual budgets. It defines revenue, expenditure, and fiscal balance targets in a three-year rolling framework, but, in practice, the LDO does not effectively link the PPA and annual budgets because revenue forecasts are often unrealistic, forcing repeated adjustments of expenditure allocations to meet fiscal targets.

59. While the budget legislation states that programs and projects that are not in the PPA cannot be included in the budget, changing the PPA to include new expenditure items is quite

easy. Therefore, new projects can surface very late in the cycle and be included into the annual budget before it is submitted to Congress.

60. Individual parliamentary amendments introduced during budget approval further distort the link between strategic planning and budget allocation. Approximately 10,000 amendments are inserted into the budget every year, accounting on average for around 20 percent of the discretionary expenses included in the LOA (Tollini 2009). While the amendments in principle need to be compatible with the PPA, the LDO, and the LOA, there is little screening and discussion of their content. The execution of amendments is usually done through grant agreements (*convênios*), which are loosely controlled by line ministries. Amendments affect mainly the capital budget, by introducing new investment projects as well as changing the allocations to projects already included in the budget. Budgetary amendments are a key mechanism for obtaining political support and this accounts, to a large extent, for the fragmentation and lack of strategic coherence of the planning and appraisal process (Box 1).

Box 1: Budgetary Amendments as a Tool for Political Patronage

Legislative amendments represent a significant portion of the capital budget of the three main ministries related to infrastructure, namely Transport, National Integration, and Cities. Error! Reference source not found. 4.1 shows the amount of investments planned for each of the three ministries in the version of the budget submitted by the Executive branch to Congress and compares these figures to the amount that Congress added through amendments. For the three ministries, the amendments approved in Congress considerably expanded the allocations for investment. In the case of the Ministry of Cities, for example, the additions made by Congress represented more than 60 percent of the appropriations proposed by the Executive both in 2010 and 2015. Therefore, analyzing the profile of these amendments and how they are applied by each ministry is critical to understanding the decision-making process of resource allocation for infrastructure.

Table 4.1: Budgeted Investments and Amendments for the Ministries of Transport, National Integration, and Cities (BRL billion), 2010 and 2015

Ministry	2010			2015		
	Legislative proposal	Additions via amendments	Amendments / Legislative Proposal	Legislative proposal	Additions via amendments	Amendments / Legislative Proposal
	(A)	(B)	(B) / (A)	(A)	(B)	(B) / (A)
Cities	5	3.1	62%	7.1	4.8	67%
Integration	3.8	1.7	45%	4.2	1.4	34%
Transport	12.7	2.9	23%	13.5	2	15%
TOTAL	21.4	7.7	36%	24.8	8.2	33%

Source: SIGA, 2016.

The Ministry of Transport receives mainly amendments from state delegations, while the budgets of the Ministries of Integration and Cities include a greater share of individual amendments. This leads to greater pulverization of investments of the latter two ministries, while the amendments to the Ministry of Transport’s budget tend to add resources to large projects. In addition to fragmentation of the budget as a result of individual amendments, the amended budget also frequently lacks correspondence to the strategic directions proposed by line ministries and instead focus on the execution of works or purchase of equipment, often without assessing properly what local needs are. For example, a municipality may need to expand its network of sewers but ends up getting a sports court because a legislative amendment approved was earmarked for that purpose. There is no proper alignment between mayors and representatives in the Congress in the selection of projects. Federal lawmakers prefer to present amendments that are more likely to be approved than to present amendments aimed at solving problems properly diagnosed in the municipalities that make up their electoral base.

4.2 Implementation

61. Procurement and Environmental Licensing Delays. Poor planning and project selection is compounded by specific implementation issues, such as cumbersome procurement and complex environmental procedures. Implementation problems are driven by coordination

difficulties between agencies and levels of government, lack of technical staff (especially engineers) to elaborate quality projects, and burdensome procurement processes. The limited skills and lack of focus on results further hamper investment implementation.

62. The procurement process in Brazil is regulated by a comprehensive law following international standards (World Bank, 2017a). The national procurement law 8666, dating from 1993, is very detailed, reflecting the legalistic traditions of the Brazilian public administration. It was approved in the wake so a series of corruption scandals in the early 1990s. However, almost 25 years of experience have shown that the detailed prescriptions in the law do not necessarily lead to the best value for money, do not stop fraud and corruption, and tend to prevent innovation. The law gives more weight to formal rather than to substantive aspects of procurement, often causing protracted disputes, which are commonly taken to court. Moreover, the law allows for 24 acceptable reasons to depart from truly competitive procedures, opening the door for a considerable amount of public procurement to be carried out through non-competitive methods, mainly in order to avoid the time-consuming bidding process.

63. Weaknesses in the public procurement process contribute to inefficiencies in public investment in infrastructure. First the litigious nature of procurement means that public officials often exercise an abundance of caution and bidding processes can face long delays. Second, the antiquated nature of procurement regulation regarding services – the concept of consulting services is absent in the law and services contracts are selected on the basis of price at the expense of quality – by and large prevents public entities from contracting high quality engineering and design services, thereby exacerbating their own weaknesses in project appraisal. Third, collusion and fraudulent practices are recurrent and not always detected, as the TCU and CGU reports mentioned above, abundantly demonstrate. Fourth, as a consequence of the legal framework being focused on formal compliance, repeated change orders lead to constant renegotiation, undermining contract management and accountability. Change orders are, in addition, often the result of poor engineering designs and the lack of clarity on original project objectives. They also result from the disconnect between project selection and budget allocation, which leads to delays during which political priorities may shift.

64. Environmental licensing in Brazil formally follows good international practices. The environmental licensing law introduced in 1981 establishes the need for a full environmental risk assessment to be conducted prior to obtaining an environmental license. However, project sponsors have complained about the cumbersome and lengthy process for obtaining environmental licenses, and on occasion works have been interrupted by the environmental protection agency IBAMA as new environmental risks have come to light. IBAMA's limited capacity accounts for some of these complaints, as does the fragmentation of environmental licensing authorities across different levels of government. However, the lack of quality and specificity of many project proposals compounds the problem. Without clear plans and designs,

environmental risks are difficult to evaluate and ex post intervention remains a possibility.¹⁹ In addition, the current legal licensing framework does not provide for cumulative environmental impact assessment, which can be critically important in fragile eco systems, watersheds and along river basins (cumulative impact assessment is included as a proposal in the Ministry of Environment's draft revision of the base law under discussion in Congress).

65. Budget sequestration (contingenciamento): the use of within-year sequestration as the main tool to achieve fiscal targets hampers the proper implementation of public programs. Sequestration is the right of the Executive and its only effective tool to execute fiscal policy in line with macro equilibrium. The tendency of Congress to increase revenue projections during voting on the budget law in order to create artificial space for budget amendments undermines fiscal control, which is then regained through executive orders. Constitutional and legislative rules protect large sways of current spending from sequestration, leaving the capital budget as the main adjustment variable (SCD, World Bank 2016a).²⁰ Moreover, the release of funds is also used as an instrument of political management of the congress. The consequence is that line ministries and public entities have virtually no predictability on the resources actually available. All this has been exacerbated by the deep economic recession and consequent fiscal crisis in recent years.

66. Sequestration in fact may lead to incentives to include projects in the budget for no other reason than to get contracting authority. Once a project is approved, public managers can start issuing contracts and thus create spending commitments, even if no resources are available to fully honor them. This provides a tool for political interference and a reason to claim additional resources in the following year. The accumulation of spending commitments carried over to the following year (the so-called "*restos a pagar*") thus provides incentives to over program and gives discretion to public managers to choose which expenses to execute. The result is the introduction in the budget of projects that are highly likely to fail and investments of questionable value for money. The political economy behind this highly ineffectual budget process is analyzed further in Section 6.

67. Adjustments for Changes in Project Circumstances. Weaknesses in project appraisal mean that cost and benefits are rarely estimated adequately making a periodic review difficult. Flaws in project design often lead to implementation irregularities. For instance, contractors change projects' specifications to make them more expensive. Additional contracts are signed without the formalization of changes in the project. The quality control from contracting agencies is often

¹⁹ Proposals under discussion in Congress to set a fixed time limit for environmental appraisal and grant automatic licenses after the period has elapsed thus look risky without a corresponding increase in IBAMA's capacity and higher minimum standards for project proposals to be sent for evaluation (see World Bank, 2017a, available at: <http://documents.worldbank.org/curated/en/553231495705155637/pdf/115256-PN-Policy-Notes-Environmental-Licensing-PUBLIC-PORTUGUESE.pdf>). Proposals to further decentralize responsibilities for environmental licensing to local government levels and to exempt certain sectors wholesale from licensing requirements risk aggravating existing regulatory uncertainties by widening the room for discretion and driving a wedge between Brazilian legislation and international standards.

²⁰ Until 2015 investments under the PAC were protected from budget sequestration and allowed to follow simplified procurement procedures. But as described earlier this hardly improved the efficiency of PAC investments, which suffered from the same planning and governance shortcomings as other public investments.

lacking. When such irregularities are detected, the TCU halts the execution until they are addressed. This control procedure contributes to the accumulation of unfinished works.

68. Another issue is the fragmentation of funding and capital transfers. It is very common that ministries sequence and divide the work into several phases. For each phase, a grant agreement (convênio) is signed. The result is that any specific infrastructure project may be made up of a patchwork of separate agreements, each with their own rules and commitments. There are ongoing efforts to solve this problem through the Management System of Grant Agreements and Voluntary Transfers (*Sistema de Gestão de Convênios e Contratos de Repasse* or SICONV). However, this reform initiative faces the opposition of members of Congress given its potential to block the execution of amendments without adequate appraisal and underlying documentation.

4.3 Service Delivery

69. Regulation: Whether infrastructure projects result in improved service delivery depends on how the resulting assets are operated and maintained. The previous section has documented widespread inefficiencies in the operation and maintenance of the road network, for instance, as well as large losses among water utilities. These inefficiencies result from poor oversight over those entities – public or private – charged with service delivery.

70. Regulatory uncertainties can significantly increase risk perceptions and undermine the economic viability of many projects. Although formally independent, there is considerable evidence that regulatory agencies have become more politicized over time (Correa, Melo, Mueller and Pereira, 2017). In particular, many appointments to regulatory agencies are from activists in political parties who have no clear technical qualifications. The controversial appointment in 2015 of an inexperienced 28 year old (his only experience in the sector was two internships lasting a year and a half), who was related to a leading senator of the governing coalition to a directorship in the national civil aviation agency ANAC is a case in point. Despite widespread protests his appointment was confirmed by a large majority in the Senate. In other cases, appointments to agencies are delayed, sometimes for many years, leaving the agency unable to take actions. Over the period 2003-2010, vacancies surpassed the 55 percent mark, such that the default mode of operation of regulatory agencies became to operate without a full board.²¹ Political interference in regulatory agencies and discretionary policy shifts are the result, negatively affecting private sector risk perceptions and increasing the cost of projects. An example of this is in the electricity industry where in 2013, operators were arm-twisted into accepting contractual changes with the objective of lowering tariffs to contain inflation. The effects of such decisions undermine not just the sector in which they are implemented, but all other sectors as well, as confidence in pre-established frameworks is undermined.

71. In the transport and water and sanitation sectors, an additional problem is the fragmentation of the regulatory landscape. In transport, different regulators are responsible for different transport modes, and regulatory policy thus lacks inter-modal coherence. Moreover,

²¹ The most extreme case was in the oil and gas sector, where the regulator (ANP) had a full board only 21 percent of the time.

subsector regulations are often ill-designed and do not create the right incentives for efficiency gains. For example, port regulations until recently may have presented an obstacle against capacity expansion investments by existing operators (Dutz, Frischtak and Willig, 2015)²². In rail, the currently dominant limited access concessions may discourage inter-modal connections and sector expansion. An integrated (end-to-end service provision) concession model supported by procompetitive structural and open access plans could in principle create investment conditions similar to those that allowed spectacular gains to be achieved by the US railroad regulation experience following the passage of the Staggers rail act in 1980 (Willig and Dutz, 2015). In the water and sanitation sector, the fragmentation of asset ownership and lack of coordinated regulation across municipalities leads to underinvestment in sanitation particularly in metropolitan areas, most starkly illustrated by the failure of Rio de Janeiro to clean up the Guanabara Bay. In addition, with few notable exceptions such as the state of São Paulo, little is done to effectively control state owned utilities, which often remain stuffed with political appointees and persistently fail to improve their operational performance. Background work done for this Report and the data briefly summarized in Section 2 above highlight both the large average losses in the water and sanitation section and the tremendous variation across states and municipalities, which can be directly attributed to the quality of management and regulatory oversights²³.

4.4 Evaluation and Monitoring²⁴

72. External audit and government assurance mechanisms: Thanks to the efforts of Brazil's Court of Accounts (TCU) and the network of accountability institutions established under Brazil's 1988 Constitution, the inefficiencies plaguing Brazil's project planning, execution and management processes are today better documented and understood. The TCU enjoys a strong mandate to carry out its function of external oversight, underpinned by a robust legal and regulatory framework. In addition to the annual audit of the Government's financial statements, the TCU prepares a special purpose Report on the Audit of Public Works (*Fiscalização de Obras* –

²² For post-1993 ports, the limited number of years left in most leases could have led incumbents to save on investments, on the presumption that corresponding returns might be significantly below the cost of capital. More generally, for existing and new assets to be deployed for best social use, the use of a single, clear and transparent criterion of maximum value (the *Outorga Onerosa*) to allocate investment rights is preferred to the standards of highest promised level of port capacity or minimum promised terminal charges to users -- together with extending the time of new leases significantly beyond the economic life of the underlying assets.

²³ See World Bank (2017i), *Water and Sanitation Services in Brazil: Operational Analysis*, Background paper for Brazil Infrastructure Analysis.

²⁴ This section is based upon World Bank, 2017b, "Infrastructure Development and Accountability Institutions"

FISCOBRAS) that summarizes the results of audits of infrastructure projects and makes recommendations that are aimed at improved implementation arrangements.²⁵

73. The increased scrutiny of infrastructure projects is rooted in a 1995 Congressional Commission of Inquiry report that resulted in the adoption of a recommendation for the TCU to report to Congress annually on the results of the audits of projects. The Commission of Inquiry also recommended that the TCU enhance its capacity for undertaking such audits, and place more focus on preventive controls in order to help public agencies resolve problems before project implementation reached a critical stage. The TCU possesses some of the necessary formal institutional features for being an effective accountability institution, including organizational independence, sufficient funding, competent staff and professional audit staff, contributing to assessments that indicate it as one of the strongest Supreme Audit Institutions (SAIs) in the region²⁶. In a formal sense the mandate of the TCU is thus robust and in line with international good practices.

74. However, TCU findings have not yet led to policy decisions that would address underlying incentive problems. One of the central questions for governance in Brazil is whether the TCU and other control institutions have been effective in balancing accountability with efficiency and also whether accountability has been effective. In this regard, there are some questions that are worth considering in reaching an ultimate conclusion on the effectiveness of the impact of the TCU.

75. The first key question is whether there is a clear demarcation of responsibilities along the public investment chain that enables the focus of the TCU to be placed solely on the provision of external oversight of the projects. The impact of a SAI is greatest where it operates within a robust institutional framework in which responsibilities are clearly defined and delineated, and are carried out effectively. Such arrangements include the broad relationships between the Parliament, the SAI and the Executive. The preponderance of weaknesses in the planning of projects has over the years led the TCU to target its audit efforts to earlier phases of the public investment chain in a bid to identify issues before much damage is done. While this approach may be effective in achieving this objective, there is a risk that the TCU's activities may enter into the realm of those that should be carried out by the Executive through a robust assurance mechanism. The need for the TCU to target efforts to early phases of implementation may blur this demarcation of responsibilities and blunt the achievement of intended outcomes of the process. Furthermore, where the Government undertakes internal assurance activities effectively, it is easier to place the focus of audits on performance rather than compliance. The TCU's approach may be seen as focused primarily on compliance. With the level of activities it carries out and the possible consequences for the wrong decisions, its interventions arguably have contributed to excessive risk aversion and delays in decision making during the implementation of public investments.

76. This leads to the question of whether the interventions of the TCU are excessive. In this regard, the results of FISCOBRAS audits summarized above show a declining trend in the

²⁵ This section focuses on the federal level external auditor, TCU. There are also state-level courts of account (TCE). Most of them have much weaker capacity and in some cases their independence has been called into question.

²⁶ see OECD, 2013 and Melo and Pereira, 2013.

suspension of projects as a result of the recommendations of the TCU to Congress. Moreover, additional scrutiny of public investment projects is a common practice of SAIs all over the world due to the high cost and complex nature of the projects, the high risk of misuse of funds, and the fact that such projects are historically prone to delays and cost overruns. Most importantly though, the fact that numerous weaknesses and irregularities are uncovered through the FISCOBRAS and other audit processes undertaken by the TCU appears to point to the fact that it is the level of weakness in the arrangements for implementation of projects that occasion, and may justify, the degree of intervention of the TCU. An argument could thus be made that if these weaknesses were adequately addressed, the need for TCU interventions would be reduced.

77. The level of intervention of the TCU, however, is also a function of the particular role of the Legislature in exercising control. In Brazil, the decision to suspend a project based on external audit findings lies with Congress rather than the executive. Parliamentary demands may thus have influenced the TCU to intervene more extensively in the project implementation process. In the UK, by contrast, the decision to suspend a project is the responsibility of the executive and not the legislature. There is a case to examine whether strengthening the Government's assurance mechanisms in respect of projects would reduce the need for the legislature to undertake the duty, and thus diminish the level of interventions of the TCU.

78. Ultimately, however, unless the deficiencies in the planning, project appraisal and selection process are addressed, implementation problems will continue to surface and incentives to improve performance will be mitigated. In view of the paucity of planning capacity, Brazil in the past two decades has increasingly come to rely on unsolicited bids from the private sector as a substitute for government project preparation and appraisal. The following section examines whether reliance on the private sector has helped resolve the issues identified with the public investment management process.

5. Has Involvement of the Private Sector Helped Overcome Inefficiencies?

5.1 The Private Sector as an Alternative to Government Project Preparation

79. As public funding declined and the capacity of state institutions for project planning and appraisal was allowed to erode, the Brazilian authorities at both federal and state level have increasingly resorted to the private sector to help close the gap. Indeed, Brazil has been the largest market for PPPs in Latin America over the past two decades, with around US\$517 billion invested between 1990 and 2015, according to the World Bank's Private Participation in Infrastructure Database²⁷ Nonetheless, as this section will show, the same public sector

²⁷ <https://ppi.worldbank.org/snapshots/country/brazil>. Note that the Brazilian definition of PPPs excludes pure concessions, without any public sector commitment, which are regulated under the 1995 Concessions Law. PPPs as

weakness in project planning, appraisal and quality assurance also plague the implementation of Brazil's PPP program. Of course, this does not suggest that private sector ownership, management or operation of infrastructure assets could not result in significant efficiency gains. However, it will do so only within an appropriate public interest framework, including prioritization, project appraisal and sector regulation.²⁸ In its absence, this Section argues, the gains from asset sales or PPPs may remain limited.

80. Once assigned to the PPP pipeline, there are several ways in which a project can be prepared for the market. It can be prepared in house within the public entity, contracted out to *Empresa Brasileira de Projetos* (EBP) or to a joint IFC/BNDES/IDB facility by hiring transaction advisors to prepare and tender the project, or prepared under the various Federal flagship programs.

81. All of these options are constrained by capacity limits to see PPP transactions through preparation, tendering and implementation. The main constraints in bringing viable projects to market include:

- a) **Lack of capacity in the Public Sector to prepare projects.** The structuring of a PPP project requires different levels of skills and coordination. Public entities normally lack these capacities, especially in financial and legal structuring (e.g. according to EBP, only six out of 26 states have the capacity to undertake a PPP). Even in technical aspects, oftentimes expertise is spread out among various ministries and coordinating a single concerted effort internally is a challenge.
- b) **Use of transaction advisors is sporadic.** This results from time and budget constraints. In order to hire transaction advisors, the granting authority needs to procure the service using the procurement law (Law 8.666/93). As mentioned above, antiquated rules for the procurement of services lead to long delays and often result in poor quality consultants being hired.
- c) **Limited capacity of project preparation facilities such as EBP and the IFC/BNDES/IDB Facility.** These entities function as independent parties; therefore, projects prepared by them are balanced in terms of attractive conditions for the public, and private sector. Both work on success fees basis, so no upfront payment is needed and can be contracted directly without conducting a regular procurement. However, both have limited capacity and thus can make only a limited contribution to increasing the PPP pipeline. The reimbursement of costs through a success fee means that working capital has to be provided by the facility upfront, and may skew the choice of projects away from more complicated but ultimately more strategic transactions. Risks for these project

defined under the 2004 PPP Law always include explicit public sector funding. The World Bank database on PPPs combines both, and this section refers to both together accordingly.

²⁸ The São Paulo water utility SABESP is a good example of the benefits of bringing private sector investment and capital market discipline to bear on enterprise governance within the context of a well-structured regulatory framework. Fay et al. (2017) report data on water utilities across Latin America showing that the average efficiency of a privately-owned utility is higher than a state-owned one, but that this difference disappears completely for the top 10 percent of state-owned water utilities. The point is that governance rather than ownership matters.

preparation facilities are exacerbated by government entities often changing their mind at the last minute about whether to take a project to market or not.

82. Lack of capacity for project preparation has created incentives for a substantial increase in the use of unsolicited bids. These are known in Brazil as *Procedimento de Manifestação de Interesse* (PMI). PMI is a process by which companies from the private sector prepare the PPP studies for a given project and deliver them to the public sector for consideration. Unlike a traditional PPP or Concession procurement, under the PMI process, project feasibility studies are developed by private companies interested in the future tender of a PPP or Concession or by independent advisors. The party expressing its interest will need an authorization in order to develop the studies, to be granted by the relevant public body. While the preparation of the study is compensated by the state entity if selected for financing, compensation is both uncertain and usually does not fully cover cost. Indeed, the real interest of private sponsors in the PMI model is the advantage a sponsor may gain in the subsequent concession award process.

83. The use of PMI procedures has helped move projects, but it does not provide an alternative to weak public sector appraisal capacity. The lack of public capacity to review designs and specifications to ensure that they are aligned with the public interest means that PMIs do not perse resolve weaknesses in planning and project appraisal. Companies proposing new projects for selection are not fully remunerated for the quality of their preparation. Since their true interest is the award of the actual concession, they have an incentive to hide important project information during the proposal stage, such as to gain an advantage during subsequent bidding. There is thus a considerable risk that the infrastructure created will follow the preference and capacity of private sponsors rather than an assessment of socio-economic development priorities. Poor quality project proposals in turn increase implementation risks (both construction and regulatory/licensing risks), which are dealt with through multiple addenda to the original contract. This fundamental contractual uncertainty has kept sponsors unfamiliar with the Brazilian market away and reduced competition. It has also made the assurance process far more difficult.

84. An attempt has been made recently to address these shortcomings through the creation of a new central decision making body for PPPs under the Presidency of the Republic, the so-called Investment Partnership Program (*Programa de Parcerias de Investimentos PPI*). The PPI has tightened appraisal standards and is working in cooperation with the state banks, the Ministry of Planning and the *Empresa Brasileira de Logística (EPL)* to strengthen project preparation. Directly reporting to the Presidency of the Republic, it has the authority to coordinate various government agencies. We come back to the potential role of the PPI in the concluding section.

5.2 Capital Markets as a Source of Funding for Infrastructure?

85. Contractual uncertainty is also one of the principle reasons why a market for project finance does not exist and the bulk of infrastructure financing continues to come from public sources. Project finance is the practice of financing based on the cash flow of a project, “*where the collateral are assets and receivable of the same project*” (see Box 2). It allows both public and

private parties to optimally share risks in a project. By letting the private sector do what it does best: design, construct and operate an asset to its full capacity, public sector gains in innovation, better services and positive economic internal rate of return (IRR). However, the optimal use of project finance does require a significant degree of predictability of future cash flows (or at least the factors affecting cash flows). When projects are poorly prepared, this predictability suffers and project financiers will be reluctant to provide limited recourse funding. In the absence of project financing structures, Brazil has funded the bulk of its infrastructure through long-term senior lending from its state-owned development bank, BNDES, usually at heavily subsidized rates and against full collateral provided by the project sponsor itself.

Box 2: Definition of project finance in Brazil

There is no legal definition of project finance in Brazil. This is a market driven definition. BNDES puts it as *“a form of financial engineering contractually based on the cash flow of a project, where the collateral are the assets and receivables of the same project.”* During the construction phase, as a general rule, BNDES will require corporate guarantees from the sponsors. The conditions that must be met for project finance eligibility with the bank are, in general, the following:

- The borrower shall be a corporation incorporated with the sole purpose of implementing the project financed, in order to segregate the cash flows, assets and risks of the project;
- The expected project’s cash flows must be sufficient to repay the loans;
- The project future revenues are assigned or transferred to lenders;
- The projected Debt Service Coverage Ratio (DSCR) for each year of the project’s operational phase to be at least 1.3. The DSCR may be, at minimum, 1.2, if the project Internal Rate of Return (IRR) is equal to least 8% p.a. in real terms;
- Shareholders’ equity must be at least 20% of the total project investment; and,
- The financial agreements should preclude the granting of loans from related parties to borrower and foresee rules in relation to the performance of payments from borrower to its shareholders.

Source: www.bndes.gov.br

86. With the onset of the fiscal crisis in Brazil in 2014, the authorities have begun to rethink the role of BNDES in infrastructure financing and to seek alternative sources of commercial funding. Under BNDES’s new operational procedures, access to long-term financing at subsidized rates (TJLP) is restricted to some sectors only and even there only to a share of financing. Sponsors are required to mobilize capital market financing as part of the long-term financing package. Moreover, lending at TJLP will be gradually phased out and rates for BNDES long-term lending will converge towards the market rate on inflation linked government bonds. These measures have the potential to fundamentally change infrastructure financing (see also Byskov and Frischtak, 2017).

87. Brazil has extensive domestic capital markets, which could be mobilized for long-term development financing. Domestic pension funds as of December 2016 had a total of around R\$740 billion under management. In addition, private banks and insurance companies have another R\$1.5bn in assets under management. Falling interest rates on government bonds are

pushing fund managers to seek alternatives, including long-term infrastructure assets. Brazil thus potentially would have the resources to finance part of its development needs domestically. This is an important advantage over other countries in LAC which do not have the size of Brazil's domestic capital markets and hence need to mobilize resources from abroad, with associated foreign exchange risks.²⁹

88. Nonetheless, high interest rates and a history of inflation have led to strong risk aversion by Brazilian investors and have prevented the issuance of long-duration instruments by corporates. While there has been an increase in infrastructure debentures, 90 percent of them are indexed to the short term floating rate (CDI) which makes the financing of long-term assets difficult. Even government paper beyond 10 years of maturity is limited³⁰. Inflation-linked bonds have been more successful and are issued at longer-maturities, due to strong demand especially from defined-benefit pension funds whose liabilities are linked to inflation³¹.

89. In addition, efforts to mobilize capital markets for long-term infrastructure investments need to confront a number of specific challenges. First, institutional investors are typically unwilling to take construction or ramp-up risk. Financing during the construction phase so far has been largely provided through bridge loans from banks and BNDES or through banking guarantees to back-up a long-term BNDES financing package. These structures have generally been full recourse to the project sponsor and thus face natural limits in the availability of corporate guarantees. Moreover, since long-term financing is often not secured at contract signing, bridge lenders and project sponsors face refinancing risks, particularly now that BNDES long-term financing has become scarcer. Second, Basel III regulations mean that commercial banks cannot substitute BNDES in long-term financing and are limited to medium-term tenor. Third, Brazilian institutional investors have little knowledge and experience in project financing structures, the sharing of security packages with senior lenders, and their appetite for infra bonds is mitigated by the absence of a secondary market, particularly for defined benefit pension funds with shortening investment horizons. Fourth, Brazilian tax legislation provides incentives to individual bond investors but not to institutional investors, which in a thin market leads to unattractive pricing.

90. A number of possible solutions are being developed to address these challenges. The majority involve the use of BNDES or other public entities to provide guarantees during construction. They differ in whether guarantors take project or sponsor risk, and whether bond investors are offered collateral (funded) or rely on the creditworthiness of the guarantor

²⁹ Foreign investment into infrastructure could bring significant advantages through increased competition with domestic sponsors, supply of new technology and management practices. In sectors with a natural foreign exchange hedge, such as airports, ports, parts of the energy sector etc., foreign investment could also come with long-term foreign financing. The mobilization of foreign portfolio investment into infrastructure assets in Brazil including through the provision of explicit foreign exchange guarantees seems less urgent in Brazil given the potential depth of domestic capital markets.

³⁰ For example, from the total amount of government bonds, only around 3% of them are long-term (more than 5 years of maturity) fixed-rate bonds. In total fixed-income market, both public and private, which amounts to around R\$3.6 trillion (US\$1.15 trillion equivalent), only around 1.5% are long-term fixed-rate securities.

³¹ Brazil has the largest inflation-linked market among Emerging Market Economies, and one of the largest in the World. Inflation-linked securities are issued with maturities that go above 30 years. Pension Funds are by far the largest holders.

(unfunded). Efforts are also under way to develop regulatory risk products, including through the *Agência Brasileira de Garantias Econômicas e Financeiras* (ABGEF), where project sponsors and financiers obtain liquidity support while a rebalancing clause is litigated in the courts, as well as deepening the insurance market including the use of performance bonds. In parallel, the authorities are working on standard documentation to reduce regulatory risks and accelerate project approvals including financial close. All of these efforts are welcome but are likely to fall short unless more public attention and resources are placed on generating a robust project pipeline. Why this remains a challenge becomes evident when we examine the political economy behind Brazil's weak infrastructure governance.

6. The Political Roots of Brazil's Infrastructure Gap

91. The preceding sections have repeatedly pointed to weak public sector capacity as the key problem for infrastructure management both in the public sector and through PPPs. Yet, despite repeated infrastructure flagship initiatives and new institutional arrangements, little fundamentally seems to have changed since the 1980s. One of the main reasons for this is that political incentives, emerging from the manner in which parties are created and operate, governing coalitions are built, campaigns are financed, the frequent rotation of representatives in Congress, and Brazil's multi-layered and complex political structure drive the fragmentation of budgetary allocations for capital investments and the frequent selection of poorly designed projects. The role that capital grants and transfers have in the maintenance of frail coalitions made of numerous parties is at the root of political incentives militating against the strengthening of executive capacity in project planning, appraisal, selection and oversight and assurance. The multiplication of agencies and public companies has also been driven by these incentives.

92. In most countries, politicians trade pork for votes but in Brazil politicians trade capital transfers for money, in the form of campaign contributions (and sometimes outright graft). Unlike most countries where the submission of amendments to the annual budget provide political returns as resources and projects are delivered to constituencies, the highly uncertain perspectives that legislators face shift the focus to the most immediate types of benefits that these allocations may have, usually in the form of signing a contract.

93. There is a political rationale for focusing on obtaining resources rather than good public policy (Ames, 1991, 1994; Samuels, 2003). Electoral districts in Brazil are large, the states of the Federation. Although some lawmakers focus their election campaigns in regions of the state, "getting federal money" for a broader set of municipalities increases their chances of electoral support. So, instead of analyzing the needs of one or two municipalities, a Deputy would rather "get money" for several municipalities, without evaluating the best allocation of resources in each of them. In addition, the term of office of a deputy is four years and the majority do not complete their terms or run for reelection. This is short compared to the time required for implementation of medium complexity of infrastructure. This creates incentives for legislators to present amendments for simple and quick works, or purchase equipment at the expense of more complex works. For deputies what matters is getting credit for the funds secured. The task is to get the resource for the municipality. If the mayor is unable to obtain effective release of money or implement the project, the responsibility falls on the latter, and not on representatives.

94. The release of funds for legislative amendments is routinely used as a bargaining chip in exchange for legislative support in Congress. Thus, there is a weakening of the incentive for the ministry that releases the resource to commit itself to its proper application. The important thing is to release the resource in exchange for political support. The effective use of resources becomes secondary. The importance of these amendments has increased since the adoption of Constitutional Amendment No. 86, 2015, which mandated the release of funds for individual amendments in the sum of at least 1.2 percent of net current revenue of the Union (RCL). With a R\$674 billion RCL in 2015, this means the mandatory allocation of resources in the order of R\$8.1 billion. This type of transfer is more prone to distortions and misallocations. Although part of these resources allocated through amendments can still be sequestered, a substantive part is no longer the main target of sequestration.

7. Towards Improved Infrastructure Governance in Brazil

95. The foregoing analysis has highlighted the central role of improved infrastructure governance at all stages of the project cycle. Improvements in strategic planning and project appraisal and evaluation capacity are needed to make better choices which projects to fund, and what contractual model to choose to optimally allocate risk and reward among different parties. Improvements in the capital budgeting process and institutions are needed to ensure that projects that are selected are also reliably funded and don't suffer delays or renegotiation because of the sequestration of funds. Political decision makers at local and national level should be made accountable for the delivery of investment projects, and not just for securing their inclusion in the budget. Transparent rules and independent regulators would help encourage private investors to take risks and incentivize them to deliver cost-effective solutions. Oversight and control institutions should go beyond exposing existing inefficiencies and strengthen accountability for results.

96. The reforms required to create an appropriate investment framework in Brazil are challenging, complex and involve changes in the way key institutions function. They will unlikely be implemented over night. Hence, this Report develops a set of policy recommendations for the short-run and the medium-to-long run. In the short-run, key steps could include:

- a. Strengthening further the role of the PPI in project appraisal, selection and contract oversight;
- b. The integration of existing data and information systems on public investments;
- c. Revisions to the procurement and environmental licensing regime to streamline procedures without jeopardizing the public interest;
- d. Strengthening of the regulatory agencies by appointing competent independent directors and mandating regulatory impact assessments before changing regulation. In addition, a couple of milestone reforms have already been approved, including the new law on state-owned enterprises, which significantly strengthens their corporate governance;
- e. Implementing the reforms announced to BNDES operational procedures and to the setting of rates on long-term dedicated credits. Both measures are critically important to

create the space for commercial financing of infrastructure, bringing the discipline of private sector contracts to help appraise the viability of projects and ensure their efficiency implementation.

97. The newly announced Program of Investment Partnerships (*Programa de Parcerias de Investimentos*, or “PPI”) aims to increase government coordination and capacity for project planning and appraisal. The PPI, created in 2016, will be responsible for the project governance and delivery of PPPs and concessions. The PPI is part of the President’s office, reflecting the high priority the administration attaches to the initiative. The creation of a single body brings much-needed clarity and accountability to project planning and delivery and – to some extent - replaces the previously complex arrangement featuring multiple agencies including regulators, ministries and the national audit office.

98. The main objectives of PPI are to create more opportunities for national and foreign enterprises to participate in the program. The PPI supports line ministries in preparing a credible pipeline of projects and feasibility studies. It also serves as the entry point for national and international investors, providing up-to-date information about projects and about the Federal Government’s policies for investments. A number of changes to the tender process have been introduced, to maximize the chance of a successful outcome and widen the field of bidders. Projects will need to have detailed business cases before going to tender, which brings much-needed assurance to potential bidders and moves Brazil closer to international best practice. The Ministry of Environment is included in the PPI’s governance mechanism, potentially creating greater predictability in relation to environmental licensing. Longer terms (increased from 90 to 180 days) for the bidding procedures are allowing investors to more accurately assess the project characteristics and complexities. BNDES is part of the PPI governance body with the specific task to advise on financial structuring with a view to attract greater commercial funding into the financial package. The new model has shown initial success with the recent auction of four airports, where for the first time in Brazil’s recent history concessions were awarded to strategic international investors rather than domestic construction companies. To repeat this success in more complex areas, such as railways, greenfield roads, or water and sanitation infrastructure, additional efforts to build project appraisal capacity, and defining the specific role of the PPI in this regard, will be needed however.

99. Revising the procurement and environmental licensing framework could contribute to greater speed and quality of decisions throughout the investment process. In respect to procurement, the aim would be to make the tendering process less prone to disputes and to introduce changes in the procurement legislation to facilitate the hiring of consultancy services based on quality evaluations. Less prescriptive laws, such as in the United Kingdom (<https://www.gov.uk/guidance/public-sector-procurement-policy>), oriented to principles of value for money, fit-for-purpose and transparency have proven to be much more efficient, more compatible with international principles and less prone to the need for adjustments as time goes by. For environmental regulations, the goal would be to clarify competencies amongst the three levels of government and introduce cumulative impact assessment requirements to align environmental licensing with sectorial and territorial planning. While the latter requires a change in legislation, many of the problems in environmental licensing would be resolved through better planning and project preparation. Worryingly, several of the amendments to the licensing law

currently under discussion in Congress would seem to go in the wrong direction. These include the exemption of entire activities from environmental licensing, the decentralization of key decisions to the municipal level and hence the risk of further fragmentation, and the introduction of fixed terms to issue licenses, regardless of the quality of the underlying information. The consequence of a badly designed licensing reform could be more uncertainty, greater perceptions of risk and could keep bona fide investors away.

100. The authorities have also drafted legislation to increase the independence of regulatory agencies. Draft law PL 6621/2016, which has been approved by the Senate and is now awaiting debate in the Chamber of Deputies, proposes the introduction of professional criteria for public regulators, including former relevant experience and technical expertise. In its current version, the draft stipulates that the President of the Republic appoints Directors of regulatory agencies from a list of three options prepared by the board. In addition, strict time limits for vacancies are set. Despite some shortcomings the bill closes many loopholes in the current legal arrangement and addresses adequately many of the problems associated with politicization and interference.

101. More generally, changes in the regulatory framework should be preceded by regulatory impact assessment and public consultation with major/key stakeholders. Alternative regulatory solutions should be considered and estimates should be provided before the relevant governmental authority makes a decision. Measures to make regulation more predictable and transparent would help encourage the preparation of better projects, as risks can be properly assessed. Transparent regulation is also key for any possibility to attract project finance, as creditors are unlikely to be willing to shoulder large regulatory risks which are completely outside their own control.

102. In addition to the above, a couple of important reforms have recently been adopted, with potentially far reaching consequences for infrastructure investment. First, the revised Law on State-Owned Enterprises of 2016 establishes a series of mechanisms for transparency and governance to be observed by state owned enterprises. These include rules for disclosure of information, risk management practices, codes of conduct, forms of state and company oversight, constitution and functioning of boards, and minimum requirements for appointment of governing officials. In particular, the rules on appointments to the governing bodies of the SOEs may lead to less politicized and more competent appointments. Over time this could lead to better governance and greater efficiency of these enterprises.

103. Second, the announced reforms of BNDES' operational procedures and the introduction of the TLP as a long-term interest rate converging to market conditions are big steps forward. BNDES long-term funding at TJLP (or now TLP) rates will be limited to between 20 and 80 percent of project costs, with a preference given to sectors with large perceived social or environmental externalities, such sanitation, urban transport, or logistics. The new TLP will converge over a period of 5 years towards the market rate for government inflation linked bonds (NTB). Aside from reducing the fiscal costs of interest rates subsidies, the convergence to market rates should over time encourage greater competition from private players to provide attractive funding conditions. This is a big shift for Brazil's financial sector and it faces considerable resistance from borrowers. It also involves a change in the risk profile of BNDES and – potentially other – state-owned banks and hence an increase in their risk management capacity.

7.1 Reforming the public investment management system – key priorities for the medium-to-long term

104. From a broader perspective, in order to improve the quality of information and the investment selection process, it is important to introduce changes to the budget process. Adopting a multi-year budget for investment is necessary to reduce the incentive to commit expenses even when projects are a long way from being ready. At the same time, more restrictive rules for Congress to introduce amendments to the budget that prioritize pre-screened priority investment projects could reduce the fragmentation of resources and the implementation of projects with low cost-benefit. Moreover, the ability to simply insert new commitments into the budget by raising revenue estimates in Congress should be reviewed, as it undermines the whole budget process. This would likely reduce the need for budget sequestration (*contingenciamiento*) as a fiscal management tool and thus increase the predictability of the planning and budget process. The investment planning and project selection process should include all investments requiring public sector commitments, whether directly through budget financing or indirectly through public sector commitments under PPP arrangements.

105. A new public finance law is finally under consideration to clarify governance of the budget process and public financial management more broadly. The law, already provided for in the Constitution but not yet approved to date, would increase the effectiveness of the budget and, in particular, public investment. It is important to recognize that long-term planning cannot be forced into a situation in which the short-term dominates all political decisions. Therefore, the first step would be to simplify and transform the PPA into a strategic document that indicates costs and guides prioritization of investments, rather than involving an enormous administrative burden which has little value added to the investment and budgetary processes. Also important it is to synchronize the PPA with the political cycle. The PPA should coincide with the four-year term of President, being presented and voted in the first months of the first year in office.

106. Another important point for reform would be the creation of a credible and consistent mechanism for estimating the budgetary revenue. This should be done by an institution with political independence, insulated from the incentives to bias estimates. There is a growing trend around the world of using independent fiscal institutions to guard the integrity of the preparation and implementation of the budget. Some, like United Kingdom's Office of Budget Responsibility, have the function of estimating the budgetary revenues. Other work more as a technical body, not having regulatory powers, such as the United States' Congressional Budget Office. Brazil needs to find a model that is appropriate to its institutions and to break the current practices distorting the estimation of budget revenues. In particular, this would require removing the power from Congress to change the budget revenue estimates.

107. Credible revenue estimates would restore the role of the LDO as a medium-term fiscal framework setting instrument. Medium-term fiscal planning would also allow to reformulate the budget practice on public investments. A promising way would be to create a multi-year investment budget associated with a project database, along the lines of the Chilean and South Korean experience. The allocation for this budget would be given by the medium-term fiscal scenario outlined in the LDO, based on realistic revenue estimates.

108. A project bank of screened investment proposals that have passed through successive stages of feasibility analysis, would provide an important basis for coherent investment decisions. The process would be initiated by the submission of proposals by the various ministries and government agencies to a unit of project evaluation, which would dismiss the projects do not meet the pre-established criteria through simplified procedures and select the promising projects for further analysis. Those projects that reach the final stage of preparation (with an executive project) would be incorporated into the project database. They could only be included in the investment budget if the projects have been registered in the project database. This would limit the discretion of decision-makers, including Congressional Deputies, and provide them a pool a well-design projects from which to choose from.

109. Further centralization of capacity for analyzing and preparing PPPs as well as standard contracts would be welcome. A centralized approach – such as through the creation of a national PPP unit - for screening projects and providing basic contract oversight (including standard methodologies and contract conditions) could enhance the coherence of investments financed through PPPs and improve the performance of existing concessions. The PPI takes an important step in this direction, but so far has no independent capacity for project appraisal. PPI's relationship to the partially privately owned Brazilian company for structuring projects (EBP) should be clarified. Colombia and the United Kingdom are two examples of project appraisal entities formed on the basis of PPPs with some measure of success. Once established, the unified framework for the federal PPPs could be adopted by other levels of government and should be applied to state and municipal projects financed through municipal funds.

110. Beyond strengthening the capacity for project appraisal and selection, improved sector planning is also important. In the transport sector, for instance, the *Plano Nacional de Logística Integrada* needs to be concluded soon and legislation should define clear roles regarding institutions in charge of its implementation. The corporation for logistical planning (EPL) has a mandate to plan and prioritize investments in improving Brazil's logistics sector. Its relationship to the Ministry of Transport and to the federal road authority (DNIT) should be clarified and planning capacity potentially unified in one place. Outdated plans should be formally shelved. The Plan should have a multimodality approach and be efficiency-driven both in terms of implementation costs and environment protection. The PPI should work in close cooperation with the Ministry of Transportation in setting an integrated multimodal strategy for transportation concessions. Similar considerations apply to the energy sector, where the Ministry of Energy has launched a review of its strategic policy framework and the corporation for energy planning (EPE) provides a solid basis for turning national policy into an integrated sector plan.

111. Brazil's fiscal and savings constraints have motivated a focus on investment efficiency and governance in this Report. As the analysis shows, Brazil need not spend a lot more to get improved infrastructure services. Merely by spending better, Brazil could substantially increase the effective resources available to infrastructure and begin closing the performance gap with some of its peers. In doing so, Brazil would also avoid another pitfall of development which has been prominently discussed inside and outside the country: the risk that ambitious, vast infrastructure investments end up costing more in damages to the environment and to Brazil's unique natural patrimony than they yield in economic benefits. Spending better would also seem to be a precondition to attract the considerable domestic and international long-term funding to

Brazil, thereby increasing the resources available for infrastructure despite fiscal constraints. Through better planning, robust project appraisal, and tighter management of the construction and operation phase (including with the help of private ownership and operation of assets within an appropriate regulatory framework), Brazil can ensure that infrastructure investment becomes a pillar of the country's economic recovery and long-term sustainable and inclusive growth.

8. References

- Ames, Barry. 1994. "The Reverse Coattails Effect: Local Party Organization in the 1989 Brazilian Presidential Election." *American Political Science Review* 88 (1).
- . 2001. *The Deadlock of Democracy in Brazil*. University of Michigan Press.
- Bom, Pedro R. D., and Jenny E. Ligthart. 2014. "What Have We Learned from Three Decades of Research on the Productivity of Public Capital?" *Journal of Economic Surveys* 28 (5): 889–916. doi:10.1111/joes.12037.
- Buffie, E. F., A. Berg, C. Patillo, R. Portillo, and L. Zanna. 2012. "Public Investment, Growth, and Debt Sustainability: Putting Together the Pieces." *IMF Working Paper* 12 (144).
- Calderón, César, Catalina Cantu, and Luis Servén. 2017. *Brazil's Economic Infrastructure: An International Perspective*. Washington D.C.: Unpublished paper, World Bank.
- Calderón, César, Enrique Moral-Benito, and Luis Servén. 2015. "Is Infrastructure Capital Productive? A Dynamic Heterogeneous Approach." *Journal of Applied Econometrics* 30 (2): 177–98. doi:10.1002/jae.2373.
- Calderón, César, and Luis Servén. 2004. "The Effects of Infrastructure Development on Growth and Income Distribution." *World Bank Policy Research Working Paper*, no. 3400.
- CENTRAN, DNIT, and Exército Brasileiro. 2007. *Plano Nacional de Logística e Transportes – PNLT*. Brasília: CENTRAN.
- CNI. 2017. Oportunidades para a Privatização de Infraestrutura. O que fazer, como fazer. Brasília. Confederação Nacional das Indústrias. <http://www.portaldaindustria.com.br/publicacoes/2017/5/oportunidades-para-privatizacao-da-infraestrutura-o-que-fazer-como-fazer/>
- Commission on Growth and Development. 2008. *The Growth Report: Strategies for Sustained Growth and Inclusive Development*. Washington DC: World Bank on behalf of the Commission on Growth and Development.
- Correa, Paulo, Marcus André Melo, Bernardo Mueller, and Carlos Pereira. 2017. *Regulatory Governance Practice in Brazil: Evolution and International Benchmarking*. Washington D.C.: Unpublished paper, World Bank.
- Dutz, Mark, Cláudio Frischtak, and Robert Willig. 2015. *Selected Competition, Regulation and Ownership Issues Related to Ports*. Washington D.C.: Unpublished paper, World Bank.
- Fay, Marianne; Andres, Luis Alberto; Fox, Charles James Edward; Narloch, Ulf Gerrit; Straub, Stephane; Slawson, Michael Alan. 2017. Rethinking infrastructure in Latin America and the Caribbean: spending better to achieve more. Washington, D.C.: World Bank Group. <http://documents.worldbank.org/curated/en/676711491563967405/Rethinking-infrastructure-in-Latin-America-and-the-Caribbean-spending-better-to-achieve-more>
- Fay, Marianne, and Tito Yepes. 2003. "Investing in Infrastructure: What Is Needed from 2000 to 2010?" *World Bank Policy Research Working Paper*, no. 3102.
- Flyvbjerg, Bent. 2004. "Procedures for Dealing with Optimism Bias in Transport Planning: Guidance Document."
- Flyvbjerg, Bent, Nils Bruzelius, and Werner Rothengatter. 2003. *Megaprojects and Risk: An Anatomy of Ambition*. United Kingdom; New York: Cambridge University Press.

- Flyvbjerg, Bent, Massimo Garbuio, and Dan Lovallo. 2009. "Delusion and Deception in Large Infrastructure Projects: Two Models for Explaining and Preventing Executive Disaster." *California Management Review* 51: 170–93.
- Frischtak, Claudio R.; Pazarbasioglu-Dutz, Ceyla; Byskov, Steen; Azevedo Hernandez Perez, Adriana. 2017. Finance and markets global practice: towards a more effective BNDES. Washington, D.C. : World Bank Group. <http://documents.worldbank.org/curated/en/306511499659990217/Finance-and-markets-global-practice-towards-a-more-effective-bndes>
- Frischtak, Cláudio. 2013. "Infraestrutura e desenvolvimento no Brasil." In *Desenvolvimento Econômico. Uma Perspectiva Brasileira*, edited by Fernando Veloso, Pedro Cavalcanti Ferreira, Fabio Giambiagi, and Samuel Pessoa. Rio de Janeiro, RJ, Brasil: Campus.
- International Monetary Fund. 2014. "Is It Time for an Infrastructure Push? The Macroeconomic Effects of Public Investment." In *World Economic Outlook October 2014*. International Monetary Fund.
- McKinsey Global Institute. 2014. *Connecting Brazil to the World: A Path to Inclusive Growth*. McKinsey Global Institute.
- Melo, Marcus André, and Carlos Pereira. 2013. *Making Brazil Work: Checking the President in a Multiparty System*. Palgrave Macmillan.
- . 2015. "The Political Economy of Public Investment. Background Paper for the Brazil Systematic Country Diagnostic." Brasília: World Bank.
- OECD. 2013. *Brazil's Supreme Audit Institution*. OECD Public Governance Reviews. Paris: Organisation for Economic Co-operation and Development. http://www.oecd-ilibrary.org/governance/brazil-s-supreme-audit-institution_9789264188112-en
- Pritchett, Lant. 2000. "The Tyranny of Concepts: CUDIE (Cumulated, Depreciated, Investment Effort) Is Not Capital." *Journal of Economic Growth* 5 (4): 361–384.
- Rajaram, Anand, Tuan Minh Le, Nataliya Biletska, and Jim Brumby. 2010. *A Diagnostic Framework for Assessing Public Investment Management*. Washington DC: World Bank: Policy Research Working Paper 5397.
- Samuels, David. 2003. *Ambition, Federalism, and Legislative Politics in Brazil*. Cambridge University Press.
- TCU. 2014. *Relatório e parecer prévio sobre as contas do Governo da República—Exercício de 2013*. Brasília: Tribunal de Contas da União.
- . 2015. "Fiscobras 2015. Consolidação Das Fiscalizações Realizadas Pelo Tribunal Para Atender o Disposto Na Lei 13.080/2015 – Diretrizes Para Elaboração e Execução Da Lei Orçamentária de 2015." <http://portal.tcu.gov.br/lumis/portal/file/fileDownload.jsp?fileId=8A8182A150D20B5E01512551C536197C&inline=1>
- Tollini, Helio. 2009. "Reforming the Budget Formulation Process in the Brazilian Congress." *OECD Journal on Budgeting* 9.
- Viñuela, Lorena. 2015. "Trends and Quality of Decentralized Public Investment." In *Decentralization and Infrastructure in the Global Economy: From Gaps to Solutions*, edited by Jonas Frank and Jorge Martinez. Abingdon, Oxon; New York, NY: Routledge.
- Wagner, Michael, Gabriela Bertol, and Adrian Murphy. 2014. *Enhancing Private Infrastructure Investment in Brazil*. Oliver Wyman.
- Willig, Robert, and Mark Dutz. 2015. *Regulatory Principles for an Integrated Rail Concession Model With Open-Access*. Washington D.C.: Unpublished paper, World Bank.

- World Bank. 2012. "How to Decrease Freight Logistics Costs in Brazil." *Transport Papers* 39.
- . 2016a. *Retaking the Path to Inclusion, Growth and Sustainability: Brazil Systematic Country Diagnostic*. The World Bank.
<http://documents.worldbank.org/curated/en/239741467991959045/pdf/106569-SCD-P151691-PUBLIC-non-board-version.pdf>
- . 2016b. *World Development Report 2016: Internet for Development*. World Bank.
- . 2017a. *Baseline Assessment of Proposals to Revise Federal Environmental Licensing in Brazil: A Contribution to Discussions*. Brasília: World Bank, Environmental Risk Management Team.
- . 2017b. *Infrastructure Development and Accountability Institutions*. Background paper for Brazil Infrastructure Analysis.
- . 2017c. *Infrastructure, Growth and Social Performance in Brazil*. Background paper for Brazil Infrastructure Analysis.
- . 2017d. *Infrastructure Investment and Financing in Brazil over the Last Two Decades*. Background paper for Brazil Infrastructure Analysis.
- . 2017e. *Institutional and Governance Challenges in Public Investment Management*. Background paper for Brazil Infrastructure Analysis.
- . 2017f. *Operational Overview of Brazil's Land Transport Sector*. Background paper for Brazil Infrastructure Analysis.
- . 2017g. *Regulatory Governance Practice in Brazil: Evolution and International Benchmarking*. Background paper for Brazil Infrastructure Analysis.
- . 2017h. *The State of Brazil's Infrastructure*. Background paper for Brazil Infrastructure Analysis.
- . 2017i. *Water and Sanitation Services in Brazil: Operational Analysis*. Background paper for Brazil Infrastructure Analysis.
- World Bank Group. 2016. *Benchmarking Public Procurement 2017: Assessing Public Procurement Systems in 180 Economies*. Washington D.C.: World Bank Group.
http://bpp.worldbank.org/~/_media/WBG/BPP/Documents/Reports/Benchmarking-Public-Procurement-2017.pdf
- . 2017. *Global Economic Prospects, Weak Investment in Uncertain Times*. Washington D.C.: World Bank Group.
- World Economic Forum. 2016. *Global Competitiveness Report 2016-2017*. Geneva: WEF.
- Yepes, Tito. 2008. "Investment Needs for Infrastructure in Developing Countries 2008–15." Unpublished paper.