

1. Introduction

Since the mid-1990s, Brazil has made progress in achieving macroeconomic stability and implemented reforms in product and input markets. However, productivity growth has been disappointing, lagging behind developed and emerging economies. Demographic dividends are nearly exhausted, with Brazil being one of the fastest aging societies in the world. This implies that in the next decades improvements in living standards will crucially depend on an acceleration of productivity growth.

At the heart of Brazil's low and stagnant productivity is a business environment that discourages competition and induces misallocation of resources. Alongside important reforms, such as trade liberalization in the 1990s and improvements in credit collateral and bankruptcy procedures in the 2000s, several competitive distortions were created in the last two decades. In particular, credit subsidies, tax exemptions and local content requirements were introduced to benefit specific sectors and firms, distorting labor and capital markets rather than fostering competition.

As a result, the development model based on state intervention and import-substitution that prevailed from the 1930s until the 1980s is still present to a large extent. Instead of a level playing field, the business environment favors incumbents and hampers entry. The lack of competition in both domestic and external markets in turn reduces efficiency and undermines productivity growth.

The objective of this paper is to review the literature on reforms and growth in Brazil in order to understand why there has been so little productivity growth in the last decades. I will discuss reform mechanisms and how their effects depend on other determinants of productivity, such as the schooling level of the labor force. I will also analyze the evidence on the impact of competitive distortions on productivity. The goal is not only to assess their direct effect, but also to analyze how they may have dampened the impact of some reforms, such as trade liberalization and formalization policies. Based on the main lessons from this review, I will discuss a reform agenda to improve productivity in the coming years.

The paper is structured as follows. Section 2 will present the main stylized facts on aggregate and sectoral productivity in Brazil and a discussion of the contribution of structural change in the last decades. Section 3 will discuss the evidence on misallocation and growth dynamics. Section 4 will analyze the effect of several competitive distortions on productivity. Section 5 will review the literature on reforms and productivity growth. Section 6 will discuss a reform agenda to improve productivity in Brazil and reduce the income gap with developed countries in the next decades.

¹ This survey of the literature on reforms and productivity growth in Brazil was prepared in 2021 for a World Bank report entitled "The Brazil of the Future: Towards Productivity, Inclusion, and Sustainability", which was released in 2023. I am grateful to Marek Hanusch and Gabriel Zaourak for helpful comments. Please cite as Veloso, F. (2021). "Productivity and Growth in Brazil". Background paper for World Bank (2023). *The Brazil of the Future: Towards Productivity, Inclusion, and Sustainability*. This paper is available at Observatório da Produtividade Regis Bonelli: <https://ibre.fgv.br/observatorio-produtividade/artigos/categorias/artigos>

² Coordinator of Observatório da Produtividade Regis Bonelli at FGV IBRE.

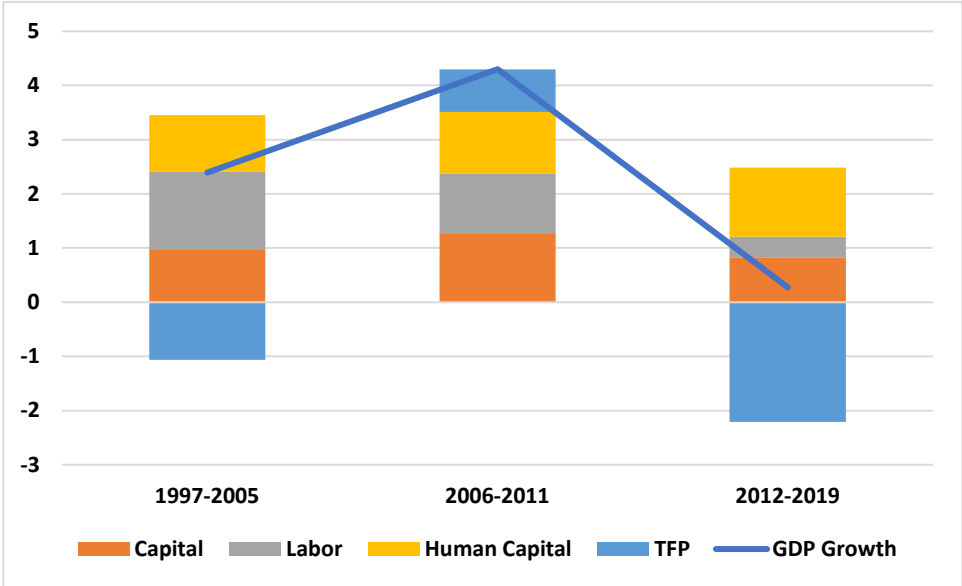
2. Stylized facts on aggregate and sectoral productivity growth

This section documents the main productivity facts in Brazil at the aggregate and sectoral level since the mid-1990s.

2.1. Aggregate productivity growth

Economic growth in Brazil since the mid-1990s has been driven by factor accumulation, namely an expansion of the employed labor force, human and physical capital.³ An analysis of the decomposition of GDP growth shows that during the 1997-2005 period, factor accumulation had an annual contribution of 3.5% to GDP growth, whereas total factor productivity (TFP) declined 1.1% per year (Figure 1).⁴ The GDP growth acceleration from 2.4% to 4.3% per year between 1997-2005 and 2006-2011 was entirely due to TFP, since the contribution of factor accumulation remained around 3.5%. Between 2012 and 2019 there was a sharp deceleration of annual GDP growth to 0.3%, reflecting a decline in the contribution of factor accumulation to 2.5% per year and a collapse of TFP (-2.2% per year). The reduction of factor accumulation in the recent subperiod reflects lower physical capital accumulation and a significant slowdown in labor force growth. The contribution of human capital has been positive throughout the 1997-2019 period, averaging a little more than 1% per year.⁵

Figure 1: Real GDP growth and contributions, percentage points, Brazil



Source: Penn World Tables 10.0. World Bank staff calculations.

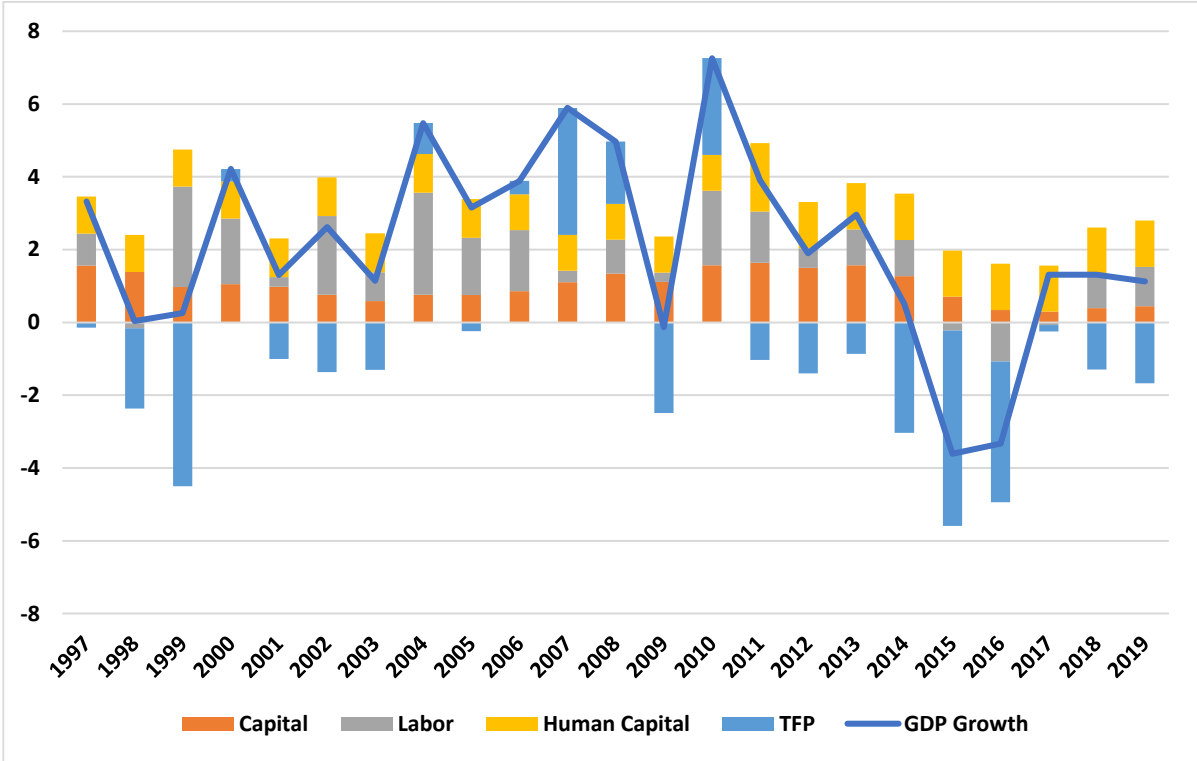
³ See Gomes et al. (2003), Ferreira and Veloso (2013), Bonelli and Bacha (2013) and Bonelli et al. (2017) for an analysis of the productivity evidence in Brazil.

⁴ Figures 1-5 are updated versions of figures presented in Qian et al. (2018) and Dutz (2018).

⁵ The data used to perform the growth decomposition exercises was obtained from the Penn World Table 10.0. The human capital index is constructed using the average years of schooling for the population aged 15 and older and rates of return based on cross-country Mincerian wage regressions.

The negative contribution of TFP during the 2012-2019 period may in part reflect the fact that TFP is calculated as a residual, so it may appear that the recession of 2014-2016 was caused by a negative contribution of productivity, when in fact it may have been driven by other unobserved factors such as an increase in spare capacity. Nevertheless, the fact that TFP growth was still negative in the 2017-2019 period seems to suggest that its decline in recent years has not only been due to cyclical factors (Figure 2).

Figure 2: Real GDP growth and contributions, percentage points (annual data), Brazil

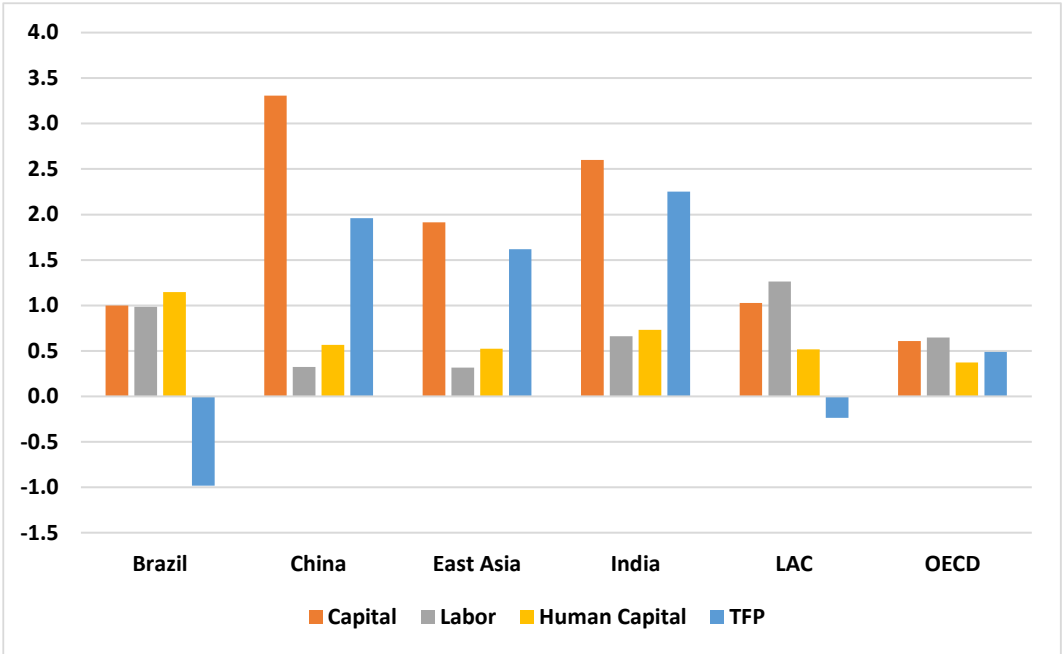


Source: Penn World Tables 10.0. World Bank staff calculations.

International comparisons confirm that Brazil’s negative TFP growth stands out in comparison to other emerging and developed economies (Figure 3). Whereas TFP declined at an annual rate of 1% per year between 1997 and 2019 in Brazil, it increased around 2% per year in China and 2.3% in India. Even though there was also a TFP decline in the Latin America and the Caribbean (LAC) region, it was much smaller than in Brazil (-0.2% per year).⁶ Average annual TFP growth in the OECD was modest but positive (0.5%) and much stronger in East Asia (1.6%).

⁶ See Ferreira et al. (2013) for evidence on the evolution of TFP in Latin America in the last decades.

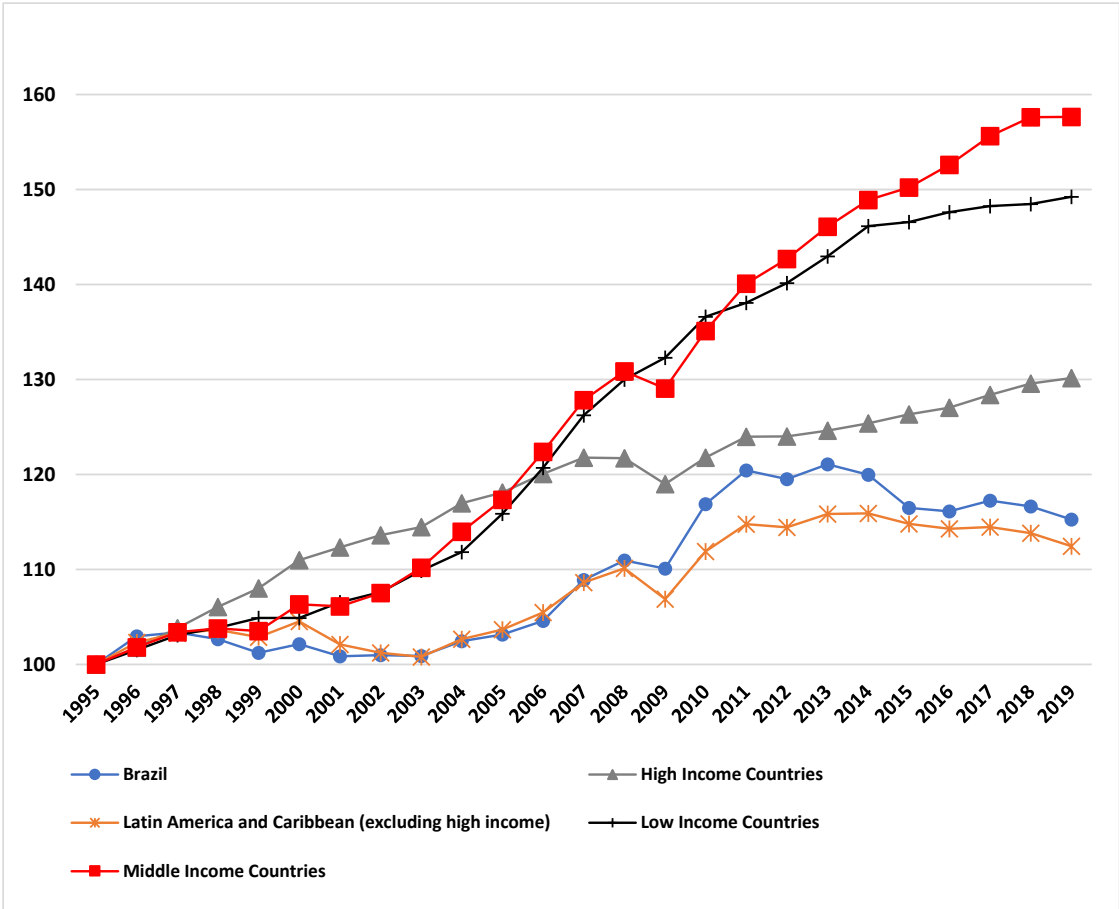
Figure 3: Real GDP growth contributions, percentage points, 1997-2019



Source: Penn World Tables 10.0. World Bank staff calculations.

Low TFP growth is reflected in Brazil’s labor productivity trajectory, which grew less than advanced countries and other emerging countries since the mid-1990s. Between 1995 and 2019, value added per worker in Brazil has been growing at about the same rate as the rest of Latin American and Caribbean (LAC) countries, but much below low and middle-income countries (Figure 4). After catching up with developed economies in the 2000s, Brazil’s productivity trajectory diverged in the last decade.

Figure 4: Labor productivity, 1995=100



Source: WDI. World Bank staff calculations.

BOX: The Covid-19 Pandemic and Productivity

The COVID-19 pandemic is an adverse event on a massive global scale and could have a large and persistent impact on global productivity. Epidemics and pandemics can affect productivity and long-term economic growth through a variety of channels (Dieppe, 2021).

For instance, they may disrupt value chains and reduce investment because of heightened uncertainty. Major epidemics can have a negative effect on labor supply by causing sickness and fatalities. Mitigation efforts to contain the spread of the disease also disrupt the functioning of labor markets and undermine the productivity of those remaining in the workforce owing to the loss of skills. There may also be an adverse long-run impact on human capital accumulation due to school closure during the pandemic.

In the short-run, however, composition effects can have a major effect on productivity. In particular, since low productivity sectors, and the least productive firms among them, were disproportionately affected, this can lead to an increase in average productivity.

Data from the Bureau of Labor Statistics (BLS) indicates that labor productivity per hour increased 2.5% in the United States in 2020. In the United Kingdom, data from the Office for National Statistics (ONS) indicates a sharp difference between two labor productivity measures. Whereas output per worker declined 9.5%, there was an increase of 0.4% in output per hour in 2020. This difference reflects the fact that since many workers were put on furlough (jobs on furlough are assumed to remain but at zero hours), the number of jobs has fallen by much less than hours worked.

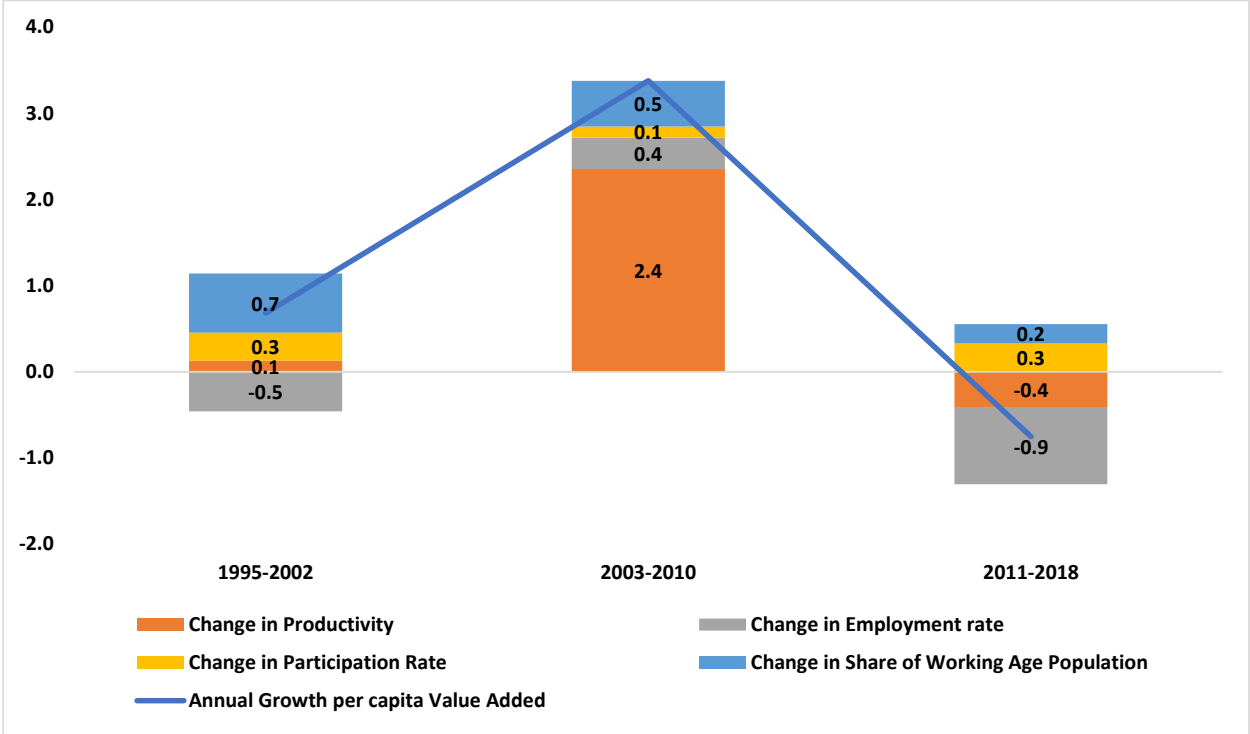
Using survey data from the Decision Maker Panel, Bloom et al. (2020) find similar differences between the measures of productivity per hour and per worker in the UK, with a sharp increase in the former measure and a decline in the latter in the second quarter of 2020. They also estimate the contribution of within and between (composition) effects for aggregate labor productivity and TFP dynamics and show that positive composition effects were very sizable in 2020, especially in the second quarter.

In Brazil, productivity per worker increased 4.3% in 2020, according to data from Observatório da Produtividade Regis Bonelli at FGV IBRE. Output per hour had a significantly larger increase (12.4%). As in the UK, the difference between the two indicators reflects the fact that hours fell much more than employment, as the Brazilian government put in place a program similar to the furlough policies adopted in the UK and other European countries. There is some evidence that composition effects played an important role in the aggregate productivity increase in Brazil, as low-productivity sectors such as accommodation, leisure and domestic services were much more negatively affected than high-productivity sectors, such as financial intermediation and information and communication technologies (Veloso et al., 2021).

The Conference Board Total Economy Database indicates that whereas the world average of output per hour increased 4%, output per worker declined 0.9% in 2020. In Latin America, output per hour increased 10.5%, much higher than average growth in advanced economies (1.1%). Whereas the latter group experienced a decline in output per worker (-2.2%), Latin American countries had positive growth (1.8%). This suggests that composition effects may have played an important role for productivity growth in many countries in 2020. To the extent that these effects are temporary, it is likely that these productivity gains will be reversed in 2021. In fact, Conference Board projects that in 2021 labor productivity will decline in most countries, especially in Latin American and other emerging economies.

The lack of sustained productivity growth in Brazil is particularly worrisome because the contribution of labor to per capita Value Added (VA) growth will probably decline in the next decades due to the fast aging of the Brazilian population. Per capita annual VA growth increased significantly from 1995-2002 (0.7 percent) to 2003-2010 (3.4 percent), and turned negative in 2011-2018 (-0.8 percent) (Figure 5). Between 1995 and 2002, the change in labor productivity was slightly positive (0.1 percent per year). There was a significant acceleration to 2.4 percent in 2003-2010, but it was followed by a decline in 2011-2018 (-0.4 percent per year).

Figure 5: Decomposition of Growth in Per Capita Value Added, Brazil



Source: WDI. World Bank staff calculations.

Throughout the period, an increase in employed labor force as a result of demographic growth and in labor force participation played an important role. However, the contribution of the increase in the share of the working age population declined from 0.7 percent per year in 1995-2002 to 0.5 percent in 2003-2010 and only 0.2 percent in 2011-2018, reflecting the aging of the labor force.

The increase in the participation rate also had a positive contribution to per capita VA growth, varying between 0.1 percent per year (2003-2010) and 0.3 percent per year (1995-2002 and 2011-2018). On the other hand, the change in the employment rate has been negative during most of the 1995-2018 period, with the exception of the 2003-2010 subperiod.

2.2. Sectoral labor productivity growth

In the last decades, agriculture was the only major sector that had significant and sustained labor productivity growth (Table 1).⁷ Whereas the industry sector had negative annual growth (-0.4%)⁸ in 1996-2020, services' productivity was stagnant (0.1% per year) throughout the period. Since services account for more than 70% of total employment in Brazil, the lack of productivity growth in this sector contributed significantly to the sluggish aggregate productivity growth. The subperiod 2003-2010 was characterized by substantial productivity growth in several service activities, such as retail and financial intermediation. However, this turned out to be an exception, since services had negative productivity growth both in 1996-2002 and 2011-2020.

Table 1: Sectoral Labor Productivity Growth, Brazil – 1996-2020 (% per year)

Years	1996-2002	2003-2010	2011-2020	1996-2020
Agriculture	5.3%	5.7%	6.2%	5.8%
Mining	6.3%	2.2%	2.5%	3.5%
Manufacturing	-3.7%	0.3%	0.1%	-0.9%
Construction	-2.8%	0.6%	-1.4%	-1.2%
Utilities	3.7%	2.4%	3.2%	3.1%
Retail	-2.5%	2.1%	-0.2%	-0.1%
Transportation	-1.2%	0.5%	-2.4%	-1.1%
Information Services	-3.1%	-1.7%	1.7%	-0.7%
Financial Intermediation	0.6%	5.0%	0.3%	1.9%
Other Services	-1.2%	0.4%	-1.0%	-0.6%
Real Estate	2.3%	-0.5%	0.8%	0.8%
Government Services	0.7%	-0.2%	-1.4%	-0.4%
Agriculture	5.3%	5.7%	6.2%	5.8%
Industry	-2.6%	0.5%	0.5%	-0.4%
Services	-0.5%	1.1%	-0.4%	0.1%

Source: Observatório da Produtividade Regis Bonelli at FGV IBRE.

2.3. Contribution of structural change

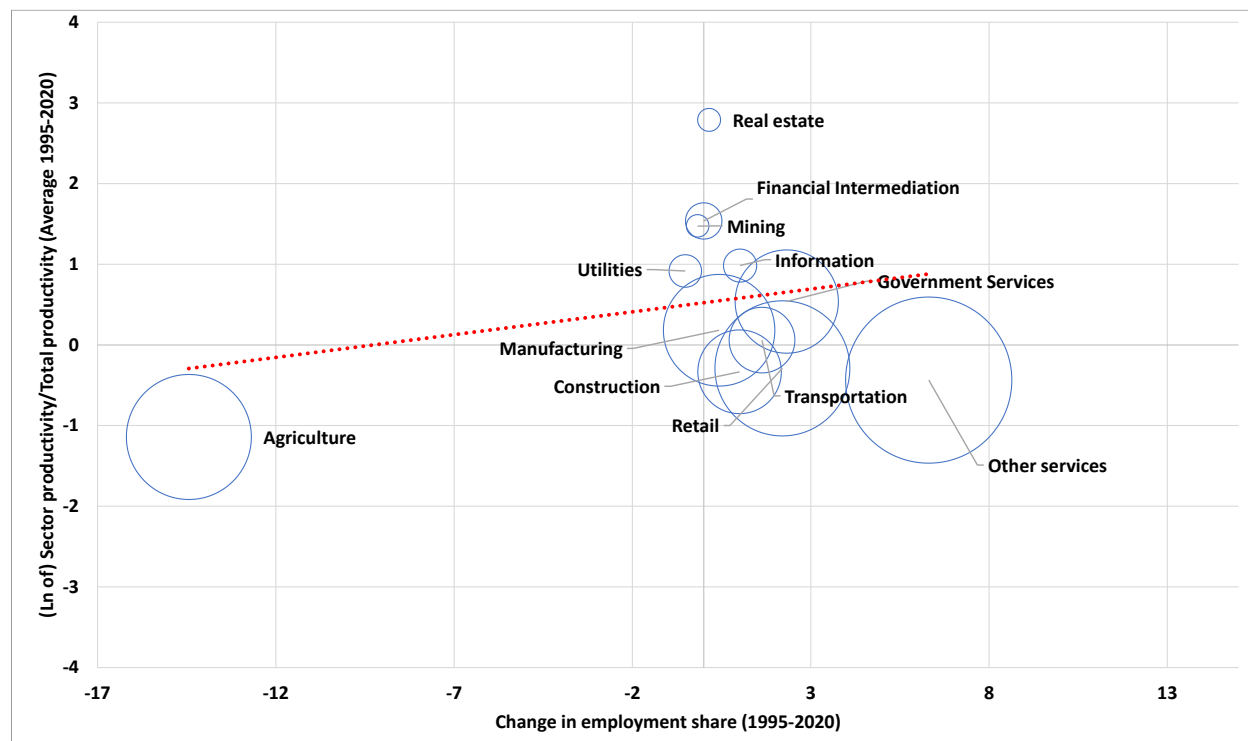
Figure 6 shows the relationship between changes in employment shares and relative sectoral productivity, measured as the log of the ratio between sectoral productivity and aggregate productivity averaged between 1995 and 2020. For positive gains to occur through structural change, sectors would either be located in the top-right corner (e.g. financial intermediation) where labor shifts into relative high-

⁷ Labor productivity is measured as value added per worker. Other sectors, such as mining and financial intermediation, also experienced sustained growth in the last decades, but they account for a much smaller proportion of value added and employment.

⁸ The industry sector includes mining, manufacturing, construction and utilities. Manufacturing had negative productivity growth during 1996-2020 (-0.9% per year).

productivity sectors or the low-left quadrant (e.g. agriculture) where labor shifts out from low productivity sectors.

Figure 6: Labor shifts and productivity changes (1995-2020)



Source: Observatório da Produtividade Regis Bonelli at FGV IBRE.

Note: The size of the circle represents the average employment share of the corresponding sector between 1995 and 2020.

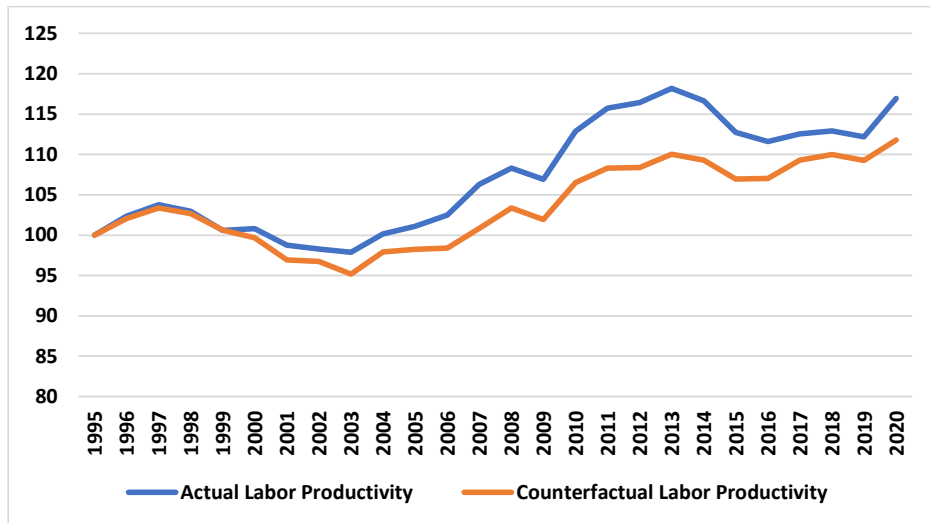
A steady shift in employment from agriculture to services underpins the productivity gains from structural change. Despite its strong productivity growth in the last decades, agriculture is still a low-productivity sector. Hence its employment decline of 14 percentage points contributed to aggregate productivity growth, as well as the employment expansion in higher-productivity sectors such as other services, retail and government services.⁹

Computing the counterfactual aggregate productivity using the 1995 employment distribution and actual labor productivity dynamics and labor force increases, Figure 7 shows that aggregate labor productivity increased purely due to structural change by 4.4 percentage points in 2020, which corresponds to roughly

⁹ Using data from Brazil, Bustos et al. (2019) show that, while positive in the short-run, improvements in agricultural productivity can generate specialization in less-innovative industries and have negative effects on manufacturing productivity in the long-run. Bustos et al. (2020) find that agricultural productivity growth in Brazil generated an increase in savings, and that capital was reallocated toward urban regions, where it was invested in the industrial and service sectors.

one quarter of the accumulated aggregate productivity growth between 1995 and 2020. Hence structural change had a positive but limited contribution to productivity growth in the last decades.¹⁰

Figure 7: Labor productivity: actual vs counterfactual



Source: Calculations based on data from Observatório da Produtividade Regis Bonelli at FGV IBRE.

Using productivity and employment data for 35 sectors from the Social Economic Accounts, Veloso et al. (2017) perform a counterfactual exercise which shows that if Brazil had the same sectoral labor allocation as the U.S., aggregate productivity would increase by 68%. If instead Brazil had the same productivity as the U.S. in all sectors, aggregate productivity would be 430% higher.¹¹ A similar comparison with a sample of developed countries suggests that Brazil could increase aggregate productivity by 50% if it had the same sectoral labor allocation and by 192% if it had the same sectoral productivity levels. This suggests that the main reason for the low level of aggregate productivity in Brazil in comparison to developed countries is the low productivity level in most sectors and not the sectoral allocation of labor.

¹⁰ Perez-Sebastian et al. (2021) analyze the relationship between grid electrification and structural transformation in Brazil. In their model, increasing electricity availability induces a reallocation of inputs to more productive activities by generating higher returns and lowering entry costs in sectors with greater infrastructure intensity. The results of modeling and econometric analysis based on Brazil's data over the period 1970–2006 show that the manufacturing sector benefited the most, followed by services and agriculture.

¹¹ The Social Economic Accounts contain sector-level data on employment, capital stocks, gross output and value added at current and constant prices and are part of the World Input-Output Database. Veloso et al. (2017) use data from 2009 in these counterfactual exercises. In order to make international comparisons at the sectoral level, the authors use sectoral PPP indexes obtained from the Groningen Growth and Development Centre Productivity Level Database, which are based on the methodology developed by Inklaar and Timmer (2014).

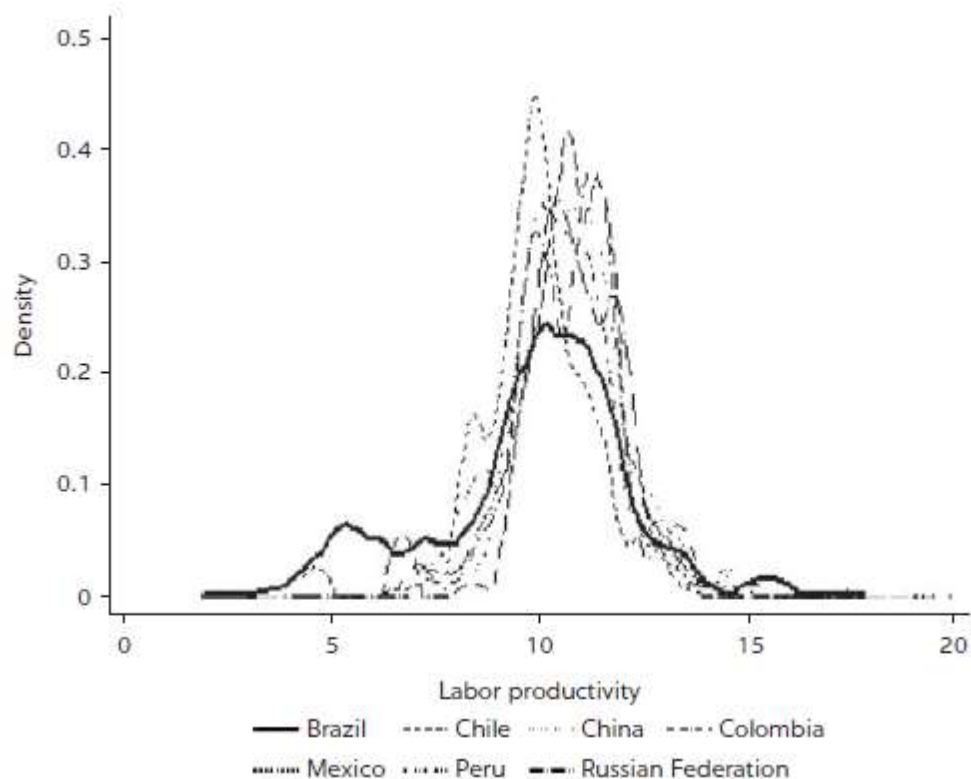
3. Misallocation and productivity dynamics

The previous evidence indicates that even though there are potential productivity gains associated with changes in the sectoral allocation of labor, Brazil will have to improve productivity in most sectors to reduce significantly the productivity gap with developed countries. This highlights the fact that factor misallocation in each sector may have important implications for the low level of sectoral and aggregate productivity. To shed light on these issues, this section analyzes the literature on misallocation and productivity dynamics in Brazil. Moreover, it will discuss the evidence on the relation between informality and productivity.

3.1. Productivity dispersion and misallocation

Barbosa Filho and Corrêa (2017) use data for emerging economies from the World Bank Enterprise Survey and compare the distribution of firm labor productivity in Brazil with China, Chile, Colombia, Mexico, Peru and Russia.¹² They show that the dispersion of labor productivity in Brazil is higher than in the comparator countries. Moreover, Brazil has a large concentration of low-productivity firms in comparison to the other emerging economies (Figure 8).

Figure 8: Distribution of Labor Productivity - Brazil



¹² Due to limitations in the available data, the information for Brazil is from 2009. For the other countries, it varies between 2008 and 2010. The productivity measure is labor productivity expressed in purchasing power parity to allow for international comparisons.

Source: Barbosa Filho and Corrêa (2017). Reproduced from Dutz (2018).

Note: Labor productivity (in logs) is expressed in PPP.

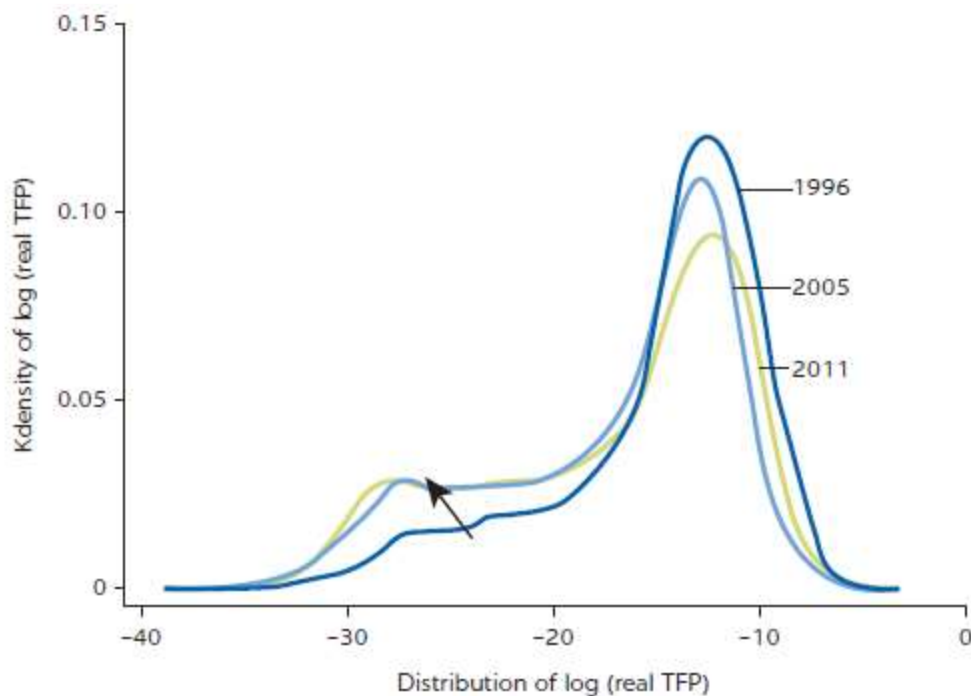
The authors also analyze the productivity distribution for several sectors, including textiles, garments, food, machines and equipment, chemicals and pharmaceuticals, automobiles, retail, hotel and restaurants, construction, transportation and other services. The results confirm the patterns documented at the aggregate level. There is a large productivity dispersion and high concentration of low-productivity firms in most sectors in Brazil in comparison to the other countries. This indicates that these productivity facts do not result from the sectoral composition of the Brazilian economy, but that they are instead systemic characteristics of the business environment.

This evidence suggests that misallocation is possibly high in many sectors in Brazil.¹³ Some papers investigate this possibility for specific sectors. Vasconcelos (2017) documents the existence of resource misallocation in the Brazilian formal manufacturing sector. Using the methodology developed by Hsieh and Klenow (2009) and firm-level data from the Annual Survey of Industry (Pesquisa Industrial Anual, PIA) for 1996-2011, the author finds evidence of misallocation in the manufacturing sector during this period.

First, Vasconcelos shows that there is a large TFP dispersion among manufacturing firms and that the proportion of firms with low TFP increased over time (Figure 9). He then calculates how much manufacturing output in Brazil could increase if capital and labor were reallocated to equalize marginal products across firms to the extent observed in the U.S. He finds that moving to U.S. efficiency would increase manufacturing output by 160-180%. He also uses production factors parameterized using the Brazilian firm-level data. In this case, he finds that moving to Brazilian Firm-Specific efficiency would increase manufacturing output by 110-130%. The results also show that misallocation increased since 2005.

¹³ It should be noted, however, that productivity dispersion does not necessarily imply that there is misallocation. For instance, it is possible that dispersion in observed measures of labor productivity (or TFP) are associated with variable markups. See Restuccia and Rogerson (2017) and Cusolito and Maloney (2018).

Figure 9: Distribution of Total Factor Productivity – Brazil



Source: Vasconcelos (2017). Reproduced from Dutz (2018).

Vasconcelos (2017) also shows that the allocative inefficiency of capital in the manufacturing sector is relatively high. The firm's capital wedge in the 90th percentile of the productivity distribution is 4 (U.S. Industry Share) or 3 (Brazilian Firm-Specific Share) times greater than the capital wedge for firms in the 10th percentile. The firm's labor wedge is considerably smaller, varying between 2 (U.S. Industry Share) and 2.75 (Brazilian Firm-Specific Share).

De Vries (2014) analyzes the existence of resource misallocation in the Brazilian formal retail sector. The author uses firm-level data from the Annual Retail Survey (Pesquisa Anual de Comércio, PAC) constructed by Instituto Brasileiro de Geografia e Estatística (IBGE). The author applies the Hsieh and Klenow (2009) methodology to study changes in resource allocation in Brazil's retail sector during the period from 1996 to 2006.

The findings suggest there are large potential output gains from the reallocation of resources to the most efficient retailers. Improvements in resource reallocation may increase TFP levels by a factor of two. However, he does not find any allocative efficiency improvements for the retail sector between 1996 and 2006.

Brazil opened up its retail sector in the World Trade Organization's 1995 General Agreement on Trade in Services, and also within MERCOSUR. Furthermore, the participation of foreign capital in Brazilian retail firms was freed from restrictions in the Sixth Constitutional Amendment of 1995. It could thus be expected that these reforms would result in a productive reallocation through the expansion of modern retail chains and the growth of small successful retail businesses.

According to De Vries (2008), however, the Brazilian experience suggests a different pattern. Retail chains did not replace mom-and-pop stores during the period following reforms. The author argues that this may

be partly explained by business regulations, such as zoning laws, and difficulties in setting up national distribution systems because of the low quantity and quality of rail and road networks. The limited role of reallocation in Brazil's retail sector may explain its low productivity growth.

3.2. Informality and productivity

The previous analysis provided evidence of significant misallocation of factors of production among Brazilian formal firms. However, to have a broader picture of misallocation in Brazil we need to consider the large informal sector.¹⁴

Meguir et al. (2015) use data from the Monthly Employment Survey (Pesquisa Mensal de Emprego, PME), which provides a rotating panel of individuals sampled from the six main metropolitan regions of Brazil.¹⁵ They show that the lowest part of the productivity distribution is populated only by informal firms. However, over a large segment of the support of the productivity distribution, formal and informal firms coexist. The increased probability of detection for larger informal firms together with the regulatory costs means that informal firms are much more prevalent in lower levels of productivity and are much smaller.

Ulyssea (2018) develops and estimates an equilibrium model of informality using data from Survey of the Urban Informal Sector (Pesquisa de Economia Informal Urbana, ECINF), a survey of informal firms conducted by IBGE in 2003. He considers two margins of informality. First, the decision of firms to not register their business (extensive margin). Second, the choice to hire workers "off the books" (intensive margin).

The model integrates the three leading views of informal firms (La Porta and Shleifer, 2014) in a unified setting. The first view argues that the informal sector is a reservoir of potentially productive entrepreneurs who are kept out of formality by high regulatory costs. The second sees informal firms as "parasite firms" that are productive enough to survive in the formal sector but choose to remain informal due to the cost advantages of not complying with taxes and regulations. The third argues that informality is a survival strategy for low-skill entrepreneurs who are too unproductive to ever become formal.

The results show that the largest proportion of informal firms in Brazil (48.8%) correspond to the view that informal firms correspond to low-skill entrepreneurs who are too unproductive to ever become formal. The view that informal firms are to a large extent "parasite firms" also corresponds to a significant fraction of informal firms (41.9%). On the other hand, the view that informal firms are potentially productive firms hindered by high regulatory costs corresponds to only 9.3% of informal firms in Brazil.

This evidence on heterogeneity of firm productivity in the Brazilian informal sector suggests that the potential effects of formalization policies focused on the reduction of formal sector entry costs are probably limited. On the other hand, human capital policies that increase the skill of informal entrepreneurs may have significant effects. We will return to these issues when we discuss the evidence on formalization policies in section 5.

¹⁴ See Ulyssea (2020a) for a recent review of the literature.

¹⁵ PME has been discontinued in 2016. It was replaced by PNAD Contínua, which also has a rotating panel but is representative at the national level.

3.3. Productivity dynamics

Using data from the World Bank Enterprise Survey, Barbosa Filho and Corrêa (2017) show that the average size of Brazilian firms is small in comparison to other emerging economies.¹⁶ The average number of workers per firm in Brazil is similar to the one found in Russia, but considerably smaller than the average size in Chile, Colombia and China.

The authors also note that older firms are not much larger than young firms in Brazil. Moreover, productivity does not increase with age. This suggests that the competitive selection mechanism is weak in Brazil. As a result, more productive firms do not grow and low-productivity firms stay in the market, contributing to the sluggish growth of aggregate productivity.

Cavalcanti et al. (2021) present further evidence on firm dynamics using data from *Relação Anual de Informações Sociais (RAIS)*, a matched employer-employee administrative dataset covering all formal firms in Brazil that follow firms and workers over time. They find that firm size in Brazil is increasing but concave in age over the first 15 years of firm life, on average rising 50 percent relative to its entry size. This growth is significantly less than the lifecycle growth for manufacturing plants reported by Hsieh and Klenow (2014) for the U.S., which shows 8-fold average growth over 30 years, but greater than the roughly 1.25-fold increase reported for India.

Ulysea (2020b) analyzes both formal and informal firm dynamics in Brazil, combining firm-level data with a structural model. The paper documents that in both sectors firms display an increasing and concave age-size profile. However, the growth in size is significantly higher for formal firms. The results show that after 10 years there is a 50 percent growth in the sample that includes only formal firms and their formal workers in contrast with the 20 percent average growth that one obtains when using both formal and informal firms.

The author shows that the age-size profile using only formal firms and workers in Brazil is very similar to the one documented for Mexico by Hsieh and Klenow (2014). However, once he incorporates informal firms, the age-size profile of Brazilian firms becomes much closer to that of Indian firms, which is remarkably flatter.

These facts show that dynamic selection takes place in both sectors but is substantially weaker in the informal sector. They also suggest that the lack of dynamism found in the Indian data might also be present in other high-informality countries. Failing to incorporate informal firm dynamics may therefore lead to a substantial underestimation of the lack of dynamism among developing countries' firms.¹⁷

¹⁶ This evidence was obtained from the same dataset that Barbosa Filho and Corrêa (2017) used to compare the distribution of labor productivity in Brazil to other emerging economies.

¹⁷ See Akcigit et al. (2021) for an analysis of the differences in the competitive selection mechanism between India and the United States and their aggregate implications.

4. Competitive distortions and productivity

There are significant barriers to competition in Brazil, many of them policy-induced. This section will discuss the evidence on the effect of several competitive distortions on productivity in Brazil.

4.1. Credit subsidies, financial frictions and lack of competition in credit markets

In the presence of financial market imperfections, the process of efficient allocation of resources can break up. Financial frictions can reduce aggregate productivity via two channels. First, they may distort entry and technology adoption decisions and thus reduce the productivity of individual firms. Second, financial frictions may generate differences in the returns to capital across individual firms, thus generating efficiency losses through misallocation (Banerjee and Duflo, 2005; Restuccia and Rogerson, 2008; Hsieh and Klenow, 2009).

One potential source of financial frictions are policy-induced interventions. During several decades the Brazilian government intervened heavily in credit markets. As will be discussed later, several credit reforms contributed to a substantial increase in private credit in the 2000s. However, after the 2008-2009 financial crisis there was a significant increase in the expansion of subsidized credit provided by public banks. The main source of long-term financing to firms in Brazil is the Brazilian Development Bank (Banco Nacional de Desenvolvimento Econômico e Social, BNDES), a government-owned development bank.

Several papers do not find positive effects of BNDES financing on productivity, especially for large firms.¹⁸ Even when there is evidence of a positive impact on productivity, it does not seem to be strong enough to be cost-effective when the sizable subsidy costs are considered. I will next briefly discuss a few papers that illustrate the main issues.

Bonomo et al. (2015) use a large repository of loan contracts between banks and firms to investigate the effect of the BNDES credit expansion between 2004 and 2012. Their results show that larger, older and less risky firms benefited most from the government sponsored credit expansion. Additionally, the effect on investment appears to be insignificant for publicly traded firms. These results are consistent with the hypothesis that those established public firms in part substituted subsidized loans for more expensive credit.

Calice et al. (2018) study the impact of BNDES credit on resource misallocation in Brazil, using manufacturing firm-level data from 2003 until 2014. The paper first estimates measures of resource misallocation based on Hsieh and Klenow (2009), documenting high variation in firms' capital and output distortions. It then estimates the effect of access to BNDES loans on distortions and their dispersions.

The analysis finds some preliminary evidence that the use of BNDES credit is not associated with a more efficient allocation of resources. The lower cost of BNDES loans reduces the marginal cost of capital and induces firms to reallocate inputs from labor to capital. This effect is amplified for more financially dependent firms. The authors point out that their results only refer to a particular credit line, FINAME, which finances the acquisition of machines and equipment in the domestic market. They suggest that

¹⁸ World Bank (2017b) reviews the costs and benefits of business support policies in Brazil, including subsidized credit policies by public banks. Inter-American Development Bank (2017) provides a detailed evaluation of the impact on productivity of subsidized credit programs and other business support policies in Brazil. Calice et al. (2018) provide a review of the literature on the effects of BNDES credit on several performance indicators and analyze its effects on misallocation.

though relatively large firms are the main recipients of BNDES financing, the impact of BNDES on smaller firms may be different.

In fact, Cavalcanti and Vaz (2017) use a variation in access to a targeted loan program from BNDES to assess the causal effect of better credit conditions on investment and productivity of Brazilian manufacturing firms. The estimated causal effects point to positive effects on investment and productivity for small and medium firms. The authors argue that their results support the hypothesis that financial constraints for long-term investment matter for small and medium firm's productivity and investment decisions.

In addition to significant government intervention in credit markets, Brazil also has very large private lending spreads (the difference between lending rates and the deposit rate). According to the International Financial Statistics, the average interest rate spread is approximately 0.7 percent in Japan, 3 percent in the United States, 10 percent in Uruguay and 40 percent in Brazil.¹⁹ High spreads may arise due to several reasons, such as poor collateral, credit taxes, regulatory costs and lack of competition. The banking sector is very concentrated in many countries, but concentration in Brazil seems to be particularly high and increasing over time. Between the mid-1990s and 2016, the share of assets held by the 5-largest banks in Brazil increased from 50% to more than 85%.²⁰

Joaquim and Van Doornik (2019) use heterogeneous exposure to large bank mergers to estimate the effect of bank competition on both financial and real variables in local Brazilian markets. Specifically, they use merger and acquisitions episodes of large Brazilian banks between 2005 and 2015 as a source of exogenous variation of competition in local banking markets to identify the causal effect of bank competition. The authors find that a reduction in bank competition results in a significant increase in lending spreads and a decrease in loan volume. They also show that bank competition has real effects. A 1% increase in spreads leads to a 0.2% decline in employment. Moreover, they show that if Brazilian spreads fall to world levels, output would increase by approximately 5%.

In addition to a high average level, there is a large dispersion in credit spreads to Brazilian firms. Cavalcanti et al. (2021) develop a quantitative dynamic general equilibrium model and calibrate it to the Brazilian data for the period 2005-2016. They use data from the Brazilian credit registry, a confidential loan level data set covering all the credit operations in Brazil and containing information on loan characteristics and interest rates. They merge these data with Brazil's linked employer-employee administrative dataset to examine how interest rates and loan size vary with firm characteristics.

The results show that, even controlling for several loan characteristics, the loan interest rate and the volume of credit vary considerably with firm characteristics, such as firm size and age. In particular, young and small firms pay higher interest rates. The calibrated financial frictions lower output per capita by 31% relative to a frictionless credit benchmark. TFP is 25% lower and capital is 26% lower relative to the frictionless credit benchmark. Counterfactual simulations reveal that spread variation coming from direct intermediation costs drive the vast majority of impacts.

The evidence thus suggests that the high average level and large dispersion of spreads in Brazil has significant negative effects on output and productivity. There is also some evidence that lack of

¹⁹ See Cavalcanti et al. (2021).

²⁰ See Joaquim and Van Doornik (2019). They report that during this same time span the share of assets held by the 5-largest banks in the U.S. increased from 30% to more than 45%. Averaging across countries, the share of assets held by the 5 largest banks is 78%.

competition and high intermediation costs may contribute to high spreads. In Section 5 we will examine the potential role of poor collateral in also accounting for these patterns.

4.2. Labor market frictions

4.2.1. Labor informality

The previous discussion about informality emphasized the decision of firms to not register their business (extensive margin) and its implications for aggregate productivity. I will focus next on distortions that may affect the firm's choice to hire workers "off the books" (intensive margin).

Meghir et al. (2015) show that search frictions reduce the competition for workers and make it harder for workers to locate to higher productivity firms. In their model, search frictions increase the prevalence of low-productivity firms and reduce the probability of workers matching with higher productivity firms, thus reducing output.

One of the most important stylized facts of the Brazilian labor market is the decline in labor informality in the 2000s. Between 2003 and 2012 the informality rate among salaried workers fell by 10.5 percentage points and unemployment fell by 7.5 points. This decline in labor informality is particularly puzzling because, during the same period, the minimum wage increased by 61% in real terms and changes in other labor regulations were negligible.²¹

Haanwinckel and Soares (2020) develop a search model of informal labor markets with worker and firm heterogeneity, intra-firm bargaining with imperfect substitutability across types of workers, and a comprehensive set of labor regulations. They estimate the model using Brazilian data and use it to understand the main determinants of the reduction in labor informality. The model accounts for 57% of the decline in informality and 58% of the reduction in unemployment observed during the 2003-2012 period.

Subsequently, they assess the contribution of several factors in generating the observed decline in informality. Overall, the composition of the labor force, productivity and demand parameters are, together with the minimum wage, the main determinants of the changes observed in the Brazilian labor market during this period. The change in the composition of the labor force appears as the main driving force behind the reduction in informality. The model predicts that without an increase in the share of skilled workers, informality would have gone up instead of declining.

Moreover, positive productivity and demand shocks contributed to reduce informality. In their model these shocks benefited mainly the formal firms and induced their expansion. This in turn increased the formalization of labor through the intensive margin. In particular, the sizable improvement in terms of trade associated with the commodity boom may have contributed to labor formalization. In Section 5 we will discuss some evidence that the credit expansion of the 2000s may have also played an important role.

In the model, an increase in the relative supply of skilled workers makes their labor market less tight. Since formal firms are more intensive in skilled workers, the improvement in the skill composition of the labor force induces an expansion of formal firms. Moreover, due to the complementarity between skilled and unskilled workers, the productivity of unskilled workers increases. Both forces end up reducing informality through both the intensive and extensive margins. There is a reallocation of labor to formal firms and

²¹ See Haanwickel and Soares (2020). Barbosa Filho et al. (2016) provide a detailed discussion of the decline in labor informality in Brazil during the 2000s.

marginal informal firms choose to become formal. Haanwickel and Soares (2020) show that these model predictions are consistent with the Brazilian evidence.

4.2.2. Minimum wage

Between the mid-1990s and the mid-2010s, Brazil has seen a remarkable decline in income inequality.²² Over the same period, Brazil's real minimum wage more than doubled. This fact has motivated several studies about the effects of the minimum wage and other variables on earnings inequality. However, very few papers addressed the effects of the minimum wage increase on the efficiency of labor allocation among firms.

Engbom and Moser (2021) combine rich administrative and survey data with an equilibrium model of the Brazilian labor market and quantify the effects of the increase in the minimum wage in Brazil from 1996 to 2012 on inequality and employment. They show that the rise in the minimum wage accounts for a large part of the decline in earnings inequality in Brazil during this period.

The paper focus on the role played by heterogeneous firms in mediating the effects of the minimum wage policy. In their model the increase in the minimum wage affects mostly low-productivity firms, for which the minimum wage is more binding. The results show that these firms cut employment creation as the increase in the minimum wage squeezes their profit margins. The easier recruiting environment in turn induces higher-productivity firms to increase hiring. As a result, in their model the minimum wage primarily reallocates employment from lower- to higher-productivity firms rather than to unemployment.

The magnitudes of their estimated effects of the minimum wage on inequality are driven by how binding the minimum wage is together with the extent of firm productivity dispersion in Brazil. The authors argue that they find muted negative effects of the minimum wage on employment and aggregate output due to the heterogeneous effects of the minimum wage across the firm productivity distribution.

However, Haanwinckel and Soares (2020) obtain different results. Specifically, they find that the decline in unemployment between 2003 and 2012 would have been greater in the absence of a minimum wage rise in the magnitude observed in the data. They also show that the decline in informality in Brazil would have been considerably larger if the minimum wage had not increased. To the extent that higher informality is associated with lower productivity, their results suggest that the increase in the minimum wage might have been detrimental to productivity growth.

It thus remains an open issue how the rise in the minimum wage affected informality and productivity in Brazil during the 2000s. In any case, it should be noted that in Brazil an increase in the minimum wage has significant fiscal effects since many social benefits, including pension payments and unemployment insurance, are indexed to the minimum wage. Hence, possible positive effects of an increase in the minimum wage have to be compared to the associated fiscal costs and their implications for investment and innovation decisions.

4.2.3. Misallocation of labor between the public and the private sector

There is a large body of evidence showing that for many countries the structure of wages and pensions and the labor law legislation are different for public and private employees. Such differences affect the

²² Firpo and Portella (2019) analyze the decline in wage inequality in Brazil since the mid-1990s.

occupational choice of agents and might generate some type of misallocation. This is particularly relevant for Brazil, a country with a high public sector premium.²³

Cavalcanti and Santos (2021) develop a life-cycle model with endogenous occupational choice and heterogeneous agents to study the implications of an overpaid public sector in Brazil. The paper investigates whether differences in labor compensation and labor legislation between private and public workers affect individuals' occupational choice, investment and aggregate productivity.

The authors analyze the effects of both static and dynamic types of misallocation. First, the existence of a public earnings premium influences the occupational decision of agents. The main idea is that such premium might attract high-productivity entrepreneurs who would not apply for a job in the public sector in the absence of such a public wage premium. Moreover, there may be negative long-run consequences, since investment decisions depend on the agents' occupational choices.

The results show that an overpaid public sector has sizable productivity losses. They show that a decrease in the public wage premium from 19 percent to 15 percent can produce a significant positive effect on long-run aggregate output (7 percent increase) without any substantial decrease in public infrastructure. They also show that the reallocation of factors of production accounts for about 19 percent of the aggregate change in output. The rest is due to changes in factor accumulation.

The authors also argue that pension reforms can have similar aggregate effects, but such reforms change more the incentive of agents to invest in financial assets and most of the impact on output is due to changes in factor accumulation. Changes in legislation that result in a decrease of job stability in the public sector also produce important quantitative effects on aggregate output and productivity. They find that when the job destruction rate in the public sector increases from 0% to 1% the number of applicants to public sector jobs decreases by nearly 15% and output increases by more than 3%.

4.3. Subsidies to national innovation and low management quality

In addition to a more efficient allocation of resources across firms, one important source of productivity gains is innovation. In the last decades Brazil has implemented several innovation policies, most of them involving fiscal incentives. For instance, *Lei de Informática* (Informatics Law), instituted in 1991 and renewed in 2001, 2004 and most recently in 2014, promotes increased local content of ICT hardware and related electronics assembly plus investments in local R&D operations. Similarly, *Lei do Bem* (Fiscal Incentives Law), which was instituted in 2007 and replaced a prior 2005 law, expanded incentives for investments in R&D, authorizing companies that invest in R&D and meet certain requirements to claim tax incentives automatically for certain types of spending.

Several papers show that the incentives for innovation and R&D provided by *Lei de Informática* have not been effective.²⁴ In particular, Kannebley Júnior and Porto (2012) show that it has been ineffective in stimulating productivity-enhancing R&D. Although the incentives have contributed to leading global ICT hardware firms to produce locally, the beneficiaries have not been able to produce internationally competitive ICT products.

Regarding the *Lei do Bem*, the evidence suggests that the program had a positive but modest impact on innovation. For instance, Devereux and Guceri (2015) find that the average realized R&D intensity is relatively low. They argue that this is because the legislation design favors incumbent, older and larger

²³ See World Bank (2017a).

²⁴ See World Bank (2017b) for a review of the effect of innovation policies on productivity in Brazil.

firms and does not reach most small or new companies. This is due to the fact that *Lei do Bem* excludes firms that declare income tax returns based on their presumed profit, which includes most of the young firms. To the extent that *Lei do Bem* favors incumbent firms, it may have contributed to slow down the reallocation process from low-growth incumbents to high-growth young firms.²⁵

A recent paper by De Souza (2021) studies a Brazilian innovation program implemented in 2001 that taxed the leasing of international technology to subsidize national innovation. The Brazilian Technology Substitution Program (TSP) created a 10% marginal tax rate on the payments of any international intellectual property. The revenue raised by the tax was used to subsidize innovation projects by firms in targeted sectors.

The author uses a novel firm-level dataset with information on international technology leasing, patent applications, and employment of Brazilian firms and calibrates a model to analyze the effects of the innovation policy. He shows that the program led firms to replace technology licensed from developed countries with in-house innovations, which led to a decline in employment and an increase in the share of low-skilled workers. He finds that firms more exposed to the TSP program had an increase of 4.47 percentage points in the probability of having at least one patent, in comparison to the control firms, while drastically reducing the probability of leasing technology from developed countries.

Another important source of efficiency gains at the level of the firm is through an increase in management quality.²⁶ World Bank (2017b) provides evidence on the average management quality of firms in Brazil relative to some peers (Mexico, Chile, Turkey and Argentina) and to higher-income OECD countries.²⁷ It shows that average management quality of Brazilian firms is lower than most comparator countries. Moreover, management quality dispersion of firms in Brazil is higher than in other countries, with a much larger share (18 percent) of firms being poorly-managed. This contrasts with 2 percent of firms in the U.S., 6 percent in China, and 11 percent in Mexico.

This evidence is consistent with the stylized facts previously discussed according to which Brazil has a larger productivity dispersion and a higher proportion of low-productivity firms than other emerging economies. The existence of a large segment of poorly-run firms suggests insufficient management training and lack of market competition.²⁸

4.4. Rent-seeking

Another potentially important source of misallocation in Brazil is rent-seeking. A few recent papers have explored rich data sets to examine the effects of patronage and corruption on public employment selection and firm performance in Brazil. Colonnelli et al. (2020) use a detailed matched employer-employee data on the universe of public employees in Brazil over 1997–2014 and a regression

²⁵ See Klenow and Li (2020) for evidence on the importance of young firms for innovation.

²⁶ See Bloom et al. (2016).

²⁷ There is available data for many countries, including Brazil, in the World Management Survey (<http://worldmanagementsurvey.org>).

²⁸ Ranasinghe (2020) finds substantial differences in the extent of misallocation across male and female establishments spanning over 75 low and middle-income countries. In South American and South Asian countries female establishments face higher distortions on production, whereas in Eastern European countries male establishments face higher distortions.

discontinuity design in close electoral races to examine the role of political connections for public employment selection in Brazil.

In particular, they empirically investigate whether discretion in public employment decisions is used as a patronage tool, and the consequences on the selection process in the context of the Brazilian public sector. Patronage represents an obvious friction in the selection of a high-quality public workforce, since political support can act as a substitute for individual competence in the process of government hiring.

They establish three main findings. First, political connections are a key and quantitatively large determinant of employment in public organizations in Brazil, for both bureaucrats and frontline providers. Second, patronage is an important mechanism behind this result. Third, political considerations lead to the selection of less competent individuals.

In addition to patronage, there is recent evidence on the effect of corruption on firm performance in Brazil. Colonnelli and Prem (2020) estimate the effects on local economic activity of a randomized anticorruption crackdown. On average, they find a 0.9% increase in the number of firms and business establishments operating in treated municipalities in the three years after the audit. They also find that audits increase real economic activity, with a rise in sales by local firms by about 6%. There is also evidence of large spillover effects, as a nearby audit has an impact on non-audited municipalities that is similar to their main effects. They also show that their magnitudes can be rationalized by an average corruption tax on firms in the range of 5-23%.

Finally, they provide evidence that is informative of the role of corruption as a source of misallocation across firms. Consistent with the presence of a corruption tax, they find that incumbent firms in government-dependent sectors grow the most after an audit. On the other hand, politically connected firms shrink considerably, suggesting that a potential channel through which corruption affects local economic activity is by allowing connected but inefficient firms to operate and stifle competition.

They conclude the paper by highlighting the central role played by public procurement in the empirical findings they document. They suggest that an effective anti-corruption policy would be to improve governance and best practices in public procurement.²⁹

5. Reforms and productivity growth

This section will discuss the literature that analyzes the effect on productivity of several reforms implemented since the 1990s. Several of them tried to reduce distortions that were discussed in the previous section and thus improve the efficiency of factor allocation.

5.1. Trade liberalization

In the late 1980s Brazil started a process of trade liberalization that lasted until the mid-1990s. This episode consisted of large, unilateral, import tariff reductions. Average tariffs fell from 31 to 13 percent,

²⁹ Zaourak (2019) argues that rent-seeking activities, in the form of bribes, have aggregate effects through two channels. First, they generate misallocation of resources across firms, since they prevent resources from flowing to the most productive firms. Second, rent-seeking activities affect the allocation of resources within firms, since they drive resources away from innovation activities. He then quantitatively shows that these two channels can help explain why Brazil has both more misallocation across firms and less investment in research and development than developed economies.

and there was ample variation in the magnitude of tariff cuts across sectors. After 1995, tariffs remained relatively constant.

Using a panel of manufacturing firms, Ferreira and Rossi (2003) measure the impact of trade reform on productivity growth. The results show that the tariff reduction had a substantial positive impact on the growth rates of TFP and output per worker. Moreover, this effect was widespread in the manufacturing sector, with most activities experiencing large productivity improvements. Lisboa et al. (2010) show that one important mechanism through which the tariff reduction increased productivity was that it allowed national producers to have access to more technologically advanced equipment and components from abroad.

Despite the evidence that the trade liberalization reform increased productivity at the firm level, there were not sizable aggregate effects in the 1990s. Menezes Filho and Muendler (2011) provide evidence that is informative about this issue. They find that even though output shifted to high-productivity export-oriented firms, there was a labor flow away from these firms because their labor productivity increased faster than their production. The labor that was shed from these productive firms moved to low-productivity service activities, unemployment and out of the labor force. As a result, despite sizable gains at the firm level, the labor reallocation induced by trade liberalization seems to have reduced its aggregate effect.

Using data from Brazil, Dix-Carneiro (2014) shows that the slow reallocation of workers and capital toward export-oriented industries leads to substantially lower gains from trade compared to traditional frictionless models. He estimates 11 to 26 percent lower gains from trade compared to a situation where reallocation occurs immediately. In addition, he estimates that adjustment costs are heterogeneous across the population. In particular, older, less educated, and female workers face substantially higher barriers to mobility across sectors. These workers in import-competing sectors experience substantial losses following liberalization, so governments willing to compensate the losers from trade should pay particular attention to workers with these characteristics.

Dix-Carneiro and Kovak (2017) investigate how Brazilian region-specific labor market outcomes have responded to local shocks induced by the tariff cuts, tracking the evolution of these effects over time. They show that regions facing larger negative shocks induced by liberalization experienced declines in formal sector employment relative to regions facing smaller shocks. These effects gradually increased following the beginning of liberalization and only stabilized fifteen years afterward. These results indicate that formal sector employment adjustment in response to trade liberalization was large but slow. They also document that wages in harder-hit locations steadily declined for years and never recovered.

The slow reallocation of capital led to a steady amplification of the initial local labor demand shock, making workers in harder-hit regions even less productive over time compared to those in more favorably affected regions. Agglomeration economies also amplified the labor market effects of trade liberalization. As firms in harder-hit regions left the market, the productivity of remaining local firms gradually declined, further reducing local wage and employment growth.

This evidence focused on how aggregate formal sector and regional-level labor market outcomes responded to liberalization. In another study, Dix-Carneiro and Kovak (2019) analyzed how individual labor market trajectories responded to the trade-induced labor demand shocks. Following individual workers over time using the *Relação Anual de Informações Sociais* (RAIS) data, they show that tradable sector workers initially employed in harder-hit locations were more likely to switch to nontradable sectors in response to liberalization. However, this response did not offset the large losses in employment in tradable sectors. Finally, they document that the formal employment trajectories of workers initially

employed in nontradable sectors were affected almost as much as those of tradable sector workers, indicating the presence of important spillovers from tradable to nontradable sectors locally.

Dix-Carneiro and Kovak (2019) also investigate how the structure of local labor markets responded to the trade-induced local shocks over longer time periods. In the medium run (1991 to 2000), nonemployment and informal employment increased in harder-hit locations relative to the national average. Yet in the long run (1991 to 2010), nonemployment did not respond to local trade shocks, but informal employment strongly increased in harder-hit regions. This indicates that trade-displaced workers spend some time unemployed or out of the labor force, but eventually find reemployment in the informal sector.

The evidence thus suggests that informal employment constitute an important margin of labor market adjustment in response to trade shocks. To shed light on this issue, Dix-Carneiro et al. (2021) build an equilibrium model of a small open economy with labor market frictions and imperfectly enforced regulations. They estimate the model using data from Brazil and use counterfactual simulations to understand how trade affects economic outcomes in the presence of informality. They find that trade openness leads to large declines in informality in the tradable sector. On the other hand, the effects of trade openness on informality in the nontradable sector are more context-dependent. As a result, the overall effect of trade on informality is ambiguous, and generally small. They also find that trade openness is associated with substantive increases in productivity and that the productivity gains from trade are understated in studies focusing exclusively on the formal sector of the economy.

5.2. Credit reforms

5.2.1. Repossession of collateral

There is a large literature documenting the relationship between collateral and better credit conditions, in particular larger loan volumes and lower interest rates.³⁰ To remove inefficiencies in the auto loan and other credit markets, in 2004 was enacted the Law 10.931, *Lei de Alienação Fiduciária* (Fiduciary Law), which affected the auto loan, mortgage, and capital markets. Among other changes, the credit reform simplified the sale of repossessed cars used as collateral for auto loans. Before the reform, even though banks were allowed to repossess the autos of borrowers who failed to repay their loans, they could not resell these repossessed cars without court approval. As a result, the time from repossession of a car to its resale by the bank averaged more than two years. After the reform the process of reselling a repossessed car became simpler and faster. Borrowers and creditors engaged in direct relationships and courts played a significant role only when borrowers explicitly requested it. The law thus avoided unnecessary trials, reduced the reliance on courts and increased the enforceability of auto loan contracts.

Assunção et al. (2014) use micro-level data from one of the largest banks in Brazil to provide direct evidence on the consequences of the reform. They show that the reform resulted in larger loans with lower spreads and longer maturities. It also expanded credit to riskier, low-income borrowers for newer, more expensive cars. They thus concluded that collateral and repossession play a crucial role in the liberalization and democratization of credit in Brazil.

³⁰ See Djankov et al. (2007).

5.2.2. Payroll lending reform

In December 2003, the Brazilian Congress passed a law (Law 10.820) that allowed banks to offer loans with repayment through automatic payroll deduction (*Lei do Crédito Consignado*), which turned future income into collateral. The law regulated the procedures through which commercial banks underwrite payroll loans to private sector employees and to those receiving social security benefits from the Instituto Nacional do Seguro Social (INSS), the federal pay-as-go pension system.

Payroll lending has existed in Brazil since the establishment of Law 8.112, which was enacted in December 1990 to regulate the provision of such loans to public sector retirees and public servants. However, private sector retirees and employees were not included in the scope of the law. The new legislation introduced in 2003 extended the mechanism of payroll lending to private sector workers and social security beneficiaries.

Coelho et al. (2012) estimate the impact of the new law. They find that payroll lending caused a reduction in interest rates and a large surge in personal loans in Brazil. Their results suggest that policies that strengthen collateral have a major impact on lenders' ability to underwrite, and they thus improve borrowers' access to finance.

5.2.3. Bankruptcy reform

In early 2005, the Brazilian Congress approved a new bankruptcy law (Law 11.101, *Lei de Falências*). One of the most significant changes was to enhance the protection given to creditors, which was implemented through two channels. First, the new law increased their priority order to receive proceeds. Second, it allowed them to actively participate in the reorganization procedure. The law also aimed at increasing the efficiency of the bankruptcy system by reducing the cost and time of both reorganization and liquidation, leading to an increase in the value of distressed firms. It improved on existing rules by providing in- and out-of-court options to reorganize, and by allowing the conversion of reorganization proceedings into liquidation.

Using data from Brazilian and non-Brazilian firms, Araújo et al. (2012) estimated the effect of the bankruptcy reform on debt variables. Specifically, they compared Brazilian firms to non-Brazilian firms from Argentina, Chile and Mexico with respect to the behavior of debt related variables. They found a reduction of approximately 8% in the cost of debt and increases of 10% and 23% in the amount of both total debt and long-term debt in Brazil, respectively. Since secured creditors have benefited more from the new law than unsecured ones, the effect is more pronounced on long-term debt, which is known to be more correlated with secured debt.

Brazilian judicial districts are highly heterogeneous in terms of efficiency. In some districts, cases are closed within time frames comparable to those observed in the United States. In others, the functioning of courts is undermined by the large number of pending cases. Therefore, when the new bankruptcy law entered into force, the efficiency of local courts became a key determinant of the ability of both creditors and firms to reap the benefits of the reform.

Ponticelli and Alencar (2016) exploit variation in the congestion of civil courts across Brazilian municipalities to estimate the effect of enforcement of the new bankruptcy law on firm access to finance, investment, and size. The paper assessed the impact of a potential misallocation friction—the inefficiency of local judicial institutions—on credit markets as well as firm investment and growth. To establish the direction of causality, they use an instrumental variable strategy that exploits differences in court congestion across judicial district borders within the same state. They find that firms operating in

municipalities with less congested courts experienced a larger increase in the use of secured loans, as well as a larger increase in investment and value of output in the years after the reform.

The authors argue that their results make the case that an efficient Judiciary is a necessary precondition for firms to benefit from these reforms. In this sense, to increase the impact of reforms on productivity it is important to find the right balance between promoting necessary changes in legal rules and investing to increase the efficiency of the judicial institutions in charge of enforcing.

Judicial decisions in bankruptcy are often influenced by the goal of preserving employment in financially distressed firms. Araújo et al. (2021) construct a new court-level measure of pro-labor bias based on the text of judicial decisions and exploit the random assignment of cases to courts within judicial districts in the state of São Paulo in Brazil to study the effect of pro-labor bias on labor market outcomes.

They motivate their focus on Brazil for a number of reasons. First, Brazil has relatively strict labor-protection laws and a judicial system often described by local observers as biased in favor of debtors and workers. They cite survey evidence which shows that a large fraction of the Brazilian Judiciary perceives itself as having a redistributive role. Second, according to the data collected for the paper, there is a large degree of variation in the degree of pro-labor bias across Brazilian courts dealing with bankruptcy cases.

They find that workers of firms assigned to high-pro-labor courts experience 4.4% lower post-bankruptcy earnings. They also try to identify what explains the negative effect of pro-labor bias on workers' earnings. They show that courts with higher pro-labor bias tend to facilitate the continuation of insolvent firms, by either rejecting liquidation requests at a higher rate, or converting reorganization cases into liquidations at a lower rate. Then they show that employees of insolvent firms whose cases were assigned to a high-pro-labor court are more likely to stay with the same employer in the post-bankruptcy period.

Finally, the authors try to understand why do employees remain with the same employer when they could potentially earn more if searching for a new job. They find that the relative decline in earnings is stronger in areas with limited internet coverage. Their interpretation of this result is that when information costs are high, individuals limit their search and are more likely to stay longer with their current employer, even if this implies a wage reduction.

Overall, their empirical findings suggest that judicial bias matters for employees' earnings and employment trajectories in Brazil and have important policy implication for the role of bankruptcy institutions. This is consistent with the results of Alencar and Ponticelli (2016) and their implication that an efficient Judiciary is an important precondition for firms to benefit from these reforms.

5.2.4. Financial deepening

Catão et al. (2009) examine empirically a link between credit markets and formalization. Since access to bank credit typically requires compliance with tax and employment legislation, firms are more likely to incur such formalization costs once bank credit is more widely available at lower cost. Since the cost of remaining an unregistered firm is that of having either limited or no access to formal credit markets, financial deepening would tend to shrink the relative size of the informal sector.

They exploit the fact that in the 2000s Brazil experienced both a sizable credit expansion and a large decline in labor informality. The share of workers with a formal labor contract (*carteira assinada*) rose from 38 percent in 2003 to nearly 45 percent of the urban labor force by early 2008. They note that this upward trend in formality took place with a simultaneous credit expansion. The ratio of credit to firms rose from 15 percent of GDP in 2003 to 22 percent in 2008.

They investigate this credit channel for Brazil using the Rajan-Zingales measure of financial dependence and a difference-in-differences approach applied to household survey data. They find that formalization rates increased with financial deepening, especially in sectors where firms are typically more dependent on external finance. They also highlight that the main channel through which formalization took place was through shifts in the formality rate within each firm size category. To a lesser extent, they also find some evidence that financial deepening shifted the composition away from self-employment and towards larger firms.

Regarding the interpretation of their results, they note that one important implication is that financial deepening may lead to better resource allocation and hence to higher productivity through a reduction of informality.³¹ Another implication is that public programs of credit subsidies to small enterprises should be designed with the requirement that such firms comply with a host of regulations and financial obligations associated with formal employment.

5.3. Formalization policies

5.3.1. Special tax regimes for micro and small firms

Most of the formalization policies analyzed in the literature have been in the direction of reducing the costs of formality. Specifically, great emphasis has been placed on reducing registration costs, which are often regarded as a major constraint to firm creation and formalization.³² However, the available evidence suggests that reducing the costs of entering the formal sector has a very limited effect on formalization.³³ This suggests that the perceived benefits of formalization are very low for most small-scale entrepreneurs.

In the last decades several formalization policies were implemented in Brazil. In general, they reduced the costs of entering and operating in the formal sector. Most prominent among them were special tax regimes for micro and small firms. I will discuss next some of these programs and their evaluations.

In 1996 a federal reform was enacted to reduce red tape costs and simplify the tax system for micro and small enterprises (MSEs). The SIMPLES program combined six different federal taxes and social contributions into one single monthly-based rate. The reform reduced the tax burden considerably and red tape costs as well. In the beginning, only a few sectors were covered by the new law.³⁴ With Complementary Law No.123 of December 14, 2006, several additional activities were included. Moreover, under the new system (SIMPLES Nacional), state and municipal taxes were combined with the federal taxes and contributions into one single monthly-based rate.

Fajnzylber et al. (2011) used the change in legislation at the end of 1996 as a natural experiment to estimate the causal effects of the program on formalization rates and performance outcomes. They found that the program led to an increase in the formalization rates of about 11 percentage points (or 50 percent). They also found a positive impact on revenues, profits and employment. However, a study

³¹ Barbosa Filho and Veloso (2016) provide some evidence that the reallocation of labor from the informal to the formal sector contributed to increase aggregate productivity in the 2000s.

³² Djankov et al. (2002).

³³ Bruhn and McKenzie (2013).

³⁴ Retail, manufacturing, transportation, construction, and other services that do not require professionals with regulated occupations, such as auditors and engineers, among others.

published a year later obtained different results. Monteiro and Assunção (2012) found positive effects of SIMPLES on formalization rates only for firms in the retail sector. For the whole sample of firms, their estimates suggest that SIMPLES did not affect formalization rates.³⁵

Piza (2018) evaluates the SIMPLES program with the same data sets used in both studies and shows that the large effects of the program on formalization rates found previously were likely confounded by measurement error in the assignment variable and seasonal shocks that affected more intensely the sectors that the reform initially targeted. He then suggests two alternative empirical strategies to deal with the identification problems present in the two studies.

The new estimates suggest that SIMPLES did not increase formalization rates of micro and small firms. The author then argues that given the expansion of the program over the years, it would be important to evaluate SIMPLES in its current format so that the potential effects of the program on tax collection through higher formalization rates of micro and small businesses could be confronted with its large fiscal costs.³⁶

Rocha et al. (2018) estimate the impact of another large-scale formalization program implemented in Brazil, the *Individual Micro-Entrepreneur Program* (Programa do Microempreendedor Individual, MEI). Introduced in 2009, the program targeted entrepreneurs with at most one employee, and was designed to reduce both registration and ongoing costs of remaining formal, by reducing monthly taxes and red tape. In its first phase, the program eliminated entry costs for eligible entrepreneurs, and in the second phase it substantially reduced the tax burden. The authors exploit this staggered implementation to assess the effects of reducing the tax burden faced by small formal firms.

They find that the first phase had no effect on formalization, while the second led to an increase of around 11%. This result is entirely driven by the formalization of existing informal firms and not by the creation of new formal businesses, nor by greater survival among formal firms. However, the authors argue that these interventions were not cost-effective, since the program led to net losses in tax revenues.

Taken together, these results indicate that reducing the costs of entering the formal sector had very limited or no formalization effects in Brazil, while reducing the ongoing costs of formality was more effective, but the effects were not large and the policies do not seem to be cost effective.³⁷

This raises the question of why reducing the costs of formality have such limited effects. As discussed previously, Ulyseia (2018) finds that only 9.3% of informal firms in Brazil are potentially productive firms hindered by high regulatory costs. The informal firms that could formalize once formal sector's entry costs are removed, but choose to remain informal to enjoy the cost advantages of informality, correspond to 41.9% of all informal firms. Finally, the remaining 48.8% correspond to firms that are too unproductive to ever become formal.

Hence a very small fraction of informal firms in Brazil seems to be constrained by high formalization costs, and therefore reducing them will have a limited effect on formalization. Since these policies involve fiscal costs, they are in general not cost-effective even when they have positive formalization effects.

³⁵ Monteiro (2016) shows that SIMPLES is not cost-effective. Even in the retail sector the increase in revenues that results from formalization does not compensate for the revenue loss of already formal micro and small firms that have a reduction in their tax burden.

³⁶ Corseuil and Moura (2016) evaluated the effect of SIMPLES on several firm performance indicators in the manufacturing sector for several years, including the SIMPLES Nacional in 2007. They found no effect of SIMPLES on firm performance.

³⁷ See Ulyseia (2020a) for a discussion of the evidence on formalization policies in Brazil and other countries.

5.3.2. Other formalization policies (reduction of entry costs, increase in enforcement)

Even though reforms targeted at the reduction of formal sector's entry costs have not been effective in inducing firms to formalize, they might still produce important aggregate effects. Indeed, some papers show that reducing entry costs into the formal sector can produce positive and sizable aggregate effects in general and specifically in Brazil.

Ulyssea (2010) develops a two-sector matching model that incorporates the main features of Latin American labor markets. The model is numerically solved using Brazilian data and several policy simulations are performed. The simulation results show that lowering the costs of entry into the formal sector substantially improves employment composition. Making formal sector's entry costs similar to informal sector's would increase formal employment by nearly 31% and reduce unemployment by 36%.

As a consequence of the changes in employment composition and the reduction of unemployment rate, average productivity and specially welfare show a substantial increase. Hence, high entry costs not only play an important role in determining employment composition, but also generate a considerable deadweight loss. This latter effect comes from the fact that high creation costs reduce the number of formal vacancies created and, as the informal sector is not able to completely absorb all workers, unemployment increases.

In a recent article, Ulyssea (2018) shows that reducing entry costs into the formal sector eliminates deadweight losses from wasteful barriers to entry, which leads to more competition and an increase in aggregate production in the formal sector. It also increases high-skill wages, since the formal sector is more intensive in high-skill labor. Since the formalization process is concentrated among low-productivity firms, there is a negative composition effect that leads to a decrease in aggregate TFP. Nevertheless, total output increases because there is a substantial increase in the mass of active firms in the economy.

In contrast, increasing enforcement can have a substantial impact on informality and productivity, since a large fraction of firms could be formal but optimally choose to remain informal. However, this policy can have potentially large negative effects, since nearly half of all informal firms in Brazil are not productive enough to ever survive in the formal sector.

Andrade et al. (2013) randomly assign municipal inspectors to firms in order to assess whether higher enforcement can induce firms to formalize in the state of Minas Gerais, Brazil. Their results show that being assigned to the enforcement treatment increases registration rates with the municipality by 2–4 percentage points. The authors find no evidence of spillovers on neighboring firms, which they attribute to the relatively low increase in inspections and to the fact that many firms indicate that they do not communicate with their neighbors.

Meghir et al. (2015) find that reducing informality by increasing enforcement does not increase unemployment and increases welfare by enabling the reallocation of workers to higher productivity jobs. As a consequence, overall wages go up and inequality is decreased. These results keep labor market regulation fixed and greater welfare gains may be obtainable from deregulation. In any case, they argue that an intermediate world where the informal sector is tolerated at the current levels of enforcement is not a welfare-enhancing policy.

Ulyssea (2018) also analyzes the effects of enforcement on informality and productivity. He uses the estimated model to conduct counterfactual analyses of two enforcement policies. One is to increase the cost of the extensive margin of informality through greater enforcement on informal firms. The other is to increase the costs of the intensive margin through tighter enforcement on formal firms that hire informal workers.

The results show that increasing enforcement on the extensive margin nearly eradicates informal firms, which generates a large positive effect on aggregate TFP due to composition effects, as this policy eliminates many small and unproductive informal firms. This positive effect on aggregate TFP more than compensates the reduction in the mass of active firms, and total output increases by more than 3 percent. On the other hand, an increase in enforcement on the intensive margin may induce small formal firms to move to the informal sector. As a result, aggregate informality may increase when there is more enforcement on the intensive margin.

Despite reducing informality and increasing productivity, a policy of increased enforcement may generate an overall welfare loss in the economy due to the elimination of informal firms and possible unemployment consequences. If the adjustment of labor from the informal to the formal sector takes a long time and differs across skill levels, the overall welfare cost might be substantially higher. In addition to adjustment costs, an increase in enforcement probably involves significant implementation costs, given that informal firms are numerous, small and often geographically spread.

5.3.3. Payroll tax reform

The evidence on the effects of reducing payroll taxes on labor market outcomes is quite mixed. A few studies find that the incidence of such costs is fully on wages with no significant effects on employment in the U.S. and some Latin American countries. Other papers show that only part of the increase in the payroll tax burden was passed onto wages. More recent work finds a sizable impact on employment in Sweden and Colombia.³⁸

A few studies reviewed in World Bank (2017b) find that a large reduction in payroll taxes for selected sectors in Brazil had very limited effects on formal employment creation. However, a recent paper found different results. Baumgartner et al. (2021) study the effects of Plano Brasil Maior (PBM). Such tax reform altered the tax base upon which payroll taxes are calculated for selected sectors in Brazil. Instead of paying a payroll tax of 20% on wages, firms were required to contribute to social security with tax rates between 1% and 2% on gross revenue. This amounted to a de facto average reduction in the total tax burden associated with payroll of more than 50%.

The authors exploit the gradual implementation of the PBM payroll tax reform across 65 sectors from 2011 to 2014. Their empirical findings show a sizable positive effect on total employment due to both firm entry and firm growth in treated sectors, but no impact on wages. Moreover, the effects are driven by labor markets with relatively low levels of concentration, which is consistent with predictions of an oligopsony model.

They also perform a cost-benefit analysis of the PBM payroll tax reform. They find that each created job was around 2.1 times more costly than estimates from a major federal program that transfers funds to municipalities to finance local public spending in Brazil. Hence, despite having achieved a significant impact on employment in treated sectors, the costs of the program in terms of foregone tax income were substantial.

The authors also argue that this cost-benefit analysis does not take into account other consequences of this kind of reform, such as the likely welfare consequences related to lower social security tax revenues and the deterioration of government's fiscal position. They conclude that a more complete and quantitative general equilibrium model would be needed to assess such tradeoffs.

³⁸ See Pagés (2017) and Baumgartner et al. (2021) for a review of the literature.

Other researchers have used structural models to assess the general equilibrium impact of payroll tax reductions. In a recent review of the literature, Ulyssea (2020a) argues that the counterfactual results from both macro and structural models indicate that reductions in payroll tax seem to generate some formalization but with a low elasticity. If one differentiates the effects on the intensive and extensive margins of informality, the effects are stronger on labor informality (intensive margin) and weaker on firm informality (extensive margin). Consistent with the limited effects on informality, the results from different papers indicate that reducing payroll taxes has positive but small effects on productivity.

Haanwickel and Soares (2020) estimate a model for Brazil to analyze a reduction in payroll taxes for low-wage workers while also taking into consideration the fiscal burden imposed on the government. Lower payroll tax rates can lead to a decline in informality, but they can also substantially reduce government revenues. However, only a fraction of government revenues come from payroll taxes on unskilled workers, since their wages are lower and they account for a smaller fraction of formal employment. Thus, a policy in which governments subsidize the employment of low-wage formal workers through a progressive payroll tax may have a larger impact on informality while simultaneously minimizing the implications for government revenue.

They compare the introduction of a progressive payroll tax with a reduction in the overall payroll tax. Their results show that progressive payroll taxes achieve unequivocally better results for unemployment and formalization while minimizing impacts on government revenue. Lower taxes among unskilled workers induce marginal firms to comply, enlarging the tax base. Taxes raised from firms that formalize help offset part of the foregone revenue. Moreover, the policy is clearly beneficial for unskilled workers, lowering their unemployment and increasing average wages. Thus, they conclude that progressive payroll taxes can help alleviate poverty and income inequality without placing an excessive burden on the government fiscal position.

6. Reform agenda

Demographic dividends are nearly exhausted, with Brazil being one of the fastest aging societies in the world. This implies that in the next decades improvements in living standards and reductions in poverty and inequality will crucially depend on productivity growth.

This paper discussed the literature on reforms and growth in Brazil to understand why productivity growth has been so low despite several reforms in the last decades.³⁹ The evidence indicates that reforms such as trade liberalization and improvements in credit collateral had a positive impact on productivity. However, these effects were not strong enough to place Brazil on a sustained growth trajectory.

Alongside reforms that aimed to increase competition, several policy-induced distortions were introduced in the last decades, such as credit subsidies, tax exemptions and local content requirements. The evidence reviewed in this paper suggests that these distortions may have contributed to offset the positive effect of reforms on productivity. Moreover, the analysis showed that the effects of reforms may have been dampened by shortcomings related to other determinants of productivity, such as the low average schooling of the labor force and poor management quality.

At the heart of Brazil's low and stagnant productivity is a business environment that discourages competition and induces misallocation of resources. The lack of competition in both domestic and

³⁹ Mexico has also experienced sluggish productivity growth despite several reforms in the last decades. See Levy (2018) for a discussion.

external markets in turn reduces efficiency and undermines productivity growth. High-productivity firms face several barriers to grow and low-productivity firms stay in the market.

To a large extent, the development model of state intervention and import-substitution that prevailed from the 1930s until the 1980s is still present. In order for Brazil to increase productivity growth in the next decades it will be necessary to complete the transition from a state-led development model to a competitive market-based economy. It is thus necessary to remove distortions that protect incumbents and prevent the reallocation of factors of production from low-productivity to high-productivity firms. To facilitate factor reallocation, it will be important to complement market reforms with policies that enable firms and workers to take advantage of the new opportunities that will be created, especially by enhancing the human capital of workers and entrepreneurs.

Between 2003 and 2005, several credit reforms aimed at improving collateral were implemented. The evidence shows that the credit reform that simplified the sale of repossessed cars used as collateral for auto loans (*Lei de Alienação Fiduciária*), the legislation that allowed banks to offer loans with repayment through automatic payroll deduction (*Lei do Crédito Consignado*) and the bankruptcy reform (*Lei de Falências*) had several positive effects, such as an increase in loan volumes, longer maturities and lower interest rates. They also expanded credit to riskier, low-income borrowers, contributing to promote financial inclusion. In addition, there is some evidence that the credit expansion in the 2000s contributed to the decline in informality observed in that decade. The reallocation of labor from the informal to the formal sector in turn may have contributed to the increase in aggregate productivity during this period.

On the other hand, after the financial crisis in 2008 there was a large expansion of credit provided by public banks, especially BNDES. The evidence presented in this paper indicates that, with the exception of smaller firms, the impact on productivity was small. Moreover, it may have contributed to increase credit misallocation in the manufacturing sector. Since these policies were heavily subsidized, they were also probably not cost-effective.

Since 2015 the government intervention in the credit market has been gradually reversed. The creation of TLP (Taxa de Longo Prazo) in 2017 reduced subsidies in credit provided by BNDES. However, there are still sizable subsidies in housing and rural credit. One promising reform would be to extend the TLP to housing and rural credit lines. This would increase competition in important segments of the credit market.

Another source of misallocation in credit markets in Brazil is the very high level and dispersion of private credit spreads. Despite the credit reforms, there is still much room for improvement. Several reforms already underway may increase the dissemination of information about debtors and thus increase competition. In 2019 was enacted a reform that allowed credit agencies to create personal scores that reflect the individual credit history (*Lei do Cadastro Positivo*), improving upon the original legislation from 2011.

In addition, an Open Banking system is being implemented this year, which allows a bank client to share payments and credit information with other financial institutions. There also some ongoing initiatives to improve collateral through the use of electronic guarantees in central registries authorized by the Central Bank. Finally, there have been important regulatory changes that facilitate entry of new financial institutions, especially fintechs.

These reforms have the potential to substantially increase competition in the financial market, which will contribute to expand credit at lower interest rates. Moreover, they may reduce misallocation to the extent that they increase credit to young innovative firms that are restricted due to lack of collateral.

In addition to removing domestic barriers, it is important to increase the exposure of Brazilian firms to international competition. There is evidence that the trade liberalization reform of the 1990s improved productivity through several channels, such as competitive selection and imports of better quality capital and intermediate goods. However, since the mid-1990s there has been little progress. In fact, several distortions were created in the last decade, especially an increase in non-tariff barriers such as local content requirements.

There are some promising liberalization possibilities, in particular the Mercosur-European Union trade agreement. Another important initiative is the process that has already been initiated of application to OECD membership. This could trigger a process of convergence to developed countries' best regulatory practices, which in turn would contribute to a more competitive domestic business environment. Also, there is much room for tariff reduction of capital and intermediate goods. That could be an important channel of technology adoption.

The evidence reviewed in this paper shows the crucial role of the informal sector in the productivity agenda in Brazil, both in its extensive (firm registration) and intensive margins (labor registration). Since formal firms are much more productive than informal enterprises, a reallocation of labor from the informal to the formal sector has the potential to increase productivity significantly.

However, formalization policies in Brazil had a very limited effect. Special tax regimes for micro and small firms, such as SIMPLES and MEI, had little impact on formalization rates and firm performance variables. In addition, they were not cost-effective. One additional negative effect of size-dependent tax policies such as SIMPLES and MEI is the potential increase in misallocation that they entail by favouring small firms.

One implication of this analysis is that one important reform would be to simplify the tax system for all firms and reduce the scope of special tax regimes for micro and small firms. This would increase competition and reduce the large fiscal costs associated with ineffective programs. There are already some tax reforms in Congress that make proposals along these lines.⁴⁰

The small impact of formalization policies in Brazil is consistent with a study reviewed in this paper which shows that almost half of informal firms in Brazil are too unproductive to ever become formal.⁴¹ Moreover, there is some evidence that average management quality is low and that the proportion of firms that are poorly managed in Brazil is higher than in other countries.⁴² This suggests that policies targeted at micro and small business should focus on human capital and management improvements instead of tax reduction. The credit reforms that are underway will also help providing more credit at lower rates for talented but credit-restricted entrepreneurs.

This points to an important theme that is present in the analysis of several studies reviewed in this paper. Since labor reallocation to high-productivity firms is a fundamental mechanism for productivity growth in Brazil, the smooth functioning of the labor market is crucial to maximize the effects of reforms and reduce possible negative welfare consequences associated with labor transitions.

In 2017, a labor market reform was enacted with the goal of increasing flexibility in hours worked and allowing for new types of contracts (Law 13.467). It also increased the scope of labor benefits that may be freely negotiated between employers and employees. It is difficult to evaluate the effects of this reform

⁴⁰ PEC 45/2019 and PEC 110/2019 combine federal, state and municipal taxes into one single VAT tax. Another legislative project (PL 3.887/2020) proposes the unification of two federal taxes into one VAT tax.

⁴¹ Ulyssea (2018).

⁴² World Bank (2017b).

since in the recent period the labor market in Brazil has been much affected by the great recession of 2014-2016 and the pandemic in 2020. It will be important to assess whether the labor reform will generate more flexibility in the coming years and if new reforms will be necessary.

Another crucial area for productivity gains is education. As discussed in the text, there is evidence that the improvement in skill composition was the most important determinant of the informality decline in the 2000s.⁴³ Better schooling is also necessary to facilitate labor market transitions associated with trade liberalization reforms.⁴⁴ Moreover, there is evidence that the human capital of the entrepreneur is one of the main determinants of the decision to formalize a firm and for the upgrading of firm capabilities.⁴⁵

In addition to better schooling, an improved infrastructure may facilitate the process of factor reallocation to more productive sectors and firms.⁴⁶ A recent paper finds that an increase in electricity access contributed to the process of structural transformation in Brazil, benefiting mostly the manufacturing sector.⁴⁷ One study suggests that difficulties in setting up national distribution systems because of the low quantity and quality of rail and road networks might have prevented productivity gains in the retail sector.⁴⁸ There is also some evidence that better internet connections may improve access to information about job opportunities and thus facilitate labor reallocation to more productive firms.⁴⁹

Finally, the studies reviewed in this paper point to the crucial role of a public sector reform to reduce rent-seeking and increase the effectiveness of business support policies. Specifically, there is evidence that patronage and corruption have significant negative impacts on productivity in Brazil, and that there is misallocation on the allocation of labor between the public and the private sector. In addition, there is evidence that business support policies in Brazil are in general not effective and have high fiscal costs.⁵⁰ One important reason is that they are very poorly coordinated and there is almost no evaluation of their effects.

The agenda of public sector reform should involve several components, such as more transparency and accountability, as well as a reduction of the public wage premium. Moreover, there should be a thorough revision of existent business support policies and the establishment of regular evaluation procedures. It is necessary to establish clear goals, monitor policy implementation and conduct ex-ante and ex-post evaluation. It would also be important to introduce sunset clauses so that policies that do not show positive effects could be discontinued. To increase policy coordination, one interesting possibility would be to create a Productivity Commission, following the model first introduced in Australia and later reproduced in several countries, such as New Zealand, Mexico and Chile.⁵¹

⁴³ Haanwinckel and Soares (2020).

⁴⁴ Dix-Carneiro (2014).

⁴⁵ See La Porta and Shleifer (2014) for evidence on the importance of entrepreneur's schooling for formalization. Cusolito and Maloney (2018) highlight the importance of entrepreneur's human capital for the identification of business opportunities and the upgrading of firm capabilities.

⁴⁶ See Frischtak (2013) for a review of the literature about infrastructure and development in Brazil.

⁴⁷ Perez-Sebastian et al. (2020).

⁴⁸ De Vries (2008).

⁴⁹ Araújo et al. (2021).

⁵⁰ World Bank (2017b).

⁵¹ See Azevedo (2017) for a discussion of Productivity Commissions and their possible adoption in Brazil.

This a challenging but politically feasible productivity agenda that could reduce Brazil's income gap with developed countries in the next decades. The recent pandemic caused by Covid-19, as well as global megatrends, including demographic ageing, globalization, technological and climate change, represent an additional challenge, but they could also serve to disrupt the existing equilibrium and be harnessed for change.

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