

IMPACTS OF LOWER BUREAUCRACY ON INFORMALITY: NEW EVIDENCE FROM BRAZIL

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ABSTRACT

The presence of a high level of bureaucracy, with complex and costly procedures to start a business, is often pointed in economic literature as one of the main reasons behind high informality in developing economies. The present work brings additional evidence on this topic by evaluating the impacts of ‘Empreenda Fácil’, a program launched by São Paulo’s City Hall in May/2017 that simplified the process of opening a firm, reducing the number of days to start a business from 104.5 to 13.5 in two years. The fact that only firms in ‘low-risk’ activities (e.g., flower shops, stationery shops, consulting offices) were eligible to the program allows to separate industries among treatment and control groups and use a difference-in-differences empirical strategy to identify the impacts of the policy on formalization. Using data from the Pesquisa Nacional por Amostra de Domicílios Contínua (PNADC), the obtained results indicate that the program had positive impacts on formalization, entailing an increase between 12.4% and 17.6% on the registration of formal entrepreneurs in eligible industries. Also, evidences were found that such increase in formalization was originated by the transition of informal employees into formal entrepreneurship. Therefore, the achieved results bring additional support to the view that policies which simplify business entry regulations can lead to lower informality.

Keywords: informality, bureaucracy, firm creation, simplification, doing business

RESUMO

A existência de um elevado grau de burocracia, com procedimentos complexos e custosos para a abertura de empresas, é frequentemente apontada como um dos principais determinantes do alto nível de informalidade nas economias em desenvolvimento. O presente trabalho busca trazer evidências empíricas adicionais sobre esse tema ao avaliar os impactos do ‘Empreenda Fácil’, um programa lançado em maio/2017 pela Prefeitura de São Paulo que simplificou os processos para o registro de firmas, reduzindo o número de dias necessários para abrir uma empresa de 104,5 para 13,5 em um intervalo de dois anos. O fato de que apenas empresas em atividades de ‘baixo risco’ (como floriculturas, papelarias e escritórios de consultoria) eram elegíveis ao programa permitiu a separação das atividades entre grupos de tratamento e controle e a utilização de um modelo de diferença-em-diferenças como estratégia empírica para identificar os impactos do programa na formalização. Usando dados da Pesquisa Nacional por Amostra de Domicílios Contínua (PNADC), os resultados obtidos indicaram que a política teve resultados positivos sobre a formalização, acarretando um aumento entre 12,4% e 17,6% no registro de empreendedores formais nas atividades de ‘baixo risco’. Ademais, também foram encontradas evidências apontando que o aumento na formalização foi originado na transição de indivíduos que eram empregados informais antes do programa. Assim, os resultados alcançados reforçam a visão de que políticas que simplificam as regras para o registro de empresas podem levar a menos informalidade.

Palavras-chave: informalidade, burocracia, abertura de empresas, simplificação, doing business

JEL: J46; D73; E26

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1 INTRODUCTION

Informality is a constant economic reality in developing countries. La Porta and Shleifer (2014) report that, for countries in the lower quartile of per capita income, the informal sector can account for 30 to 40% of the economic activity, and around 46% of total employment. Several negative economic consequences can arise in regions with elevated informality, such as lower tax revenues, higher misallocation of resources, and smaller social protection to workers. Consequently, the economic literature started to investigate what are the main reasons behind elevated informality and what actions should be taken in order to curtail it.

While some authors, such as Maloney (2004) and Levy (2008), state that informality is a rational choice made by firms and workers, that distinguish more costs than benefits in formalization, other articles, as in Djankov et al. (2002), emphasize that informality is a consequence of an adverse business environment, with elevated bureaucracy imposing high costs and complex procedures to firm registration.

The idea that elevated bureaucracy was an important determinant of informality has influenced a number of policymakers around the world to implement programs aiming to reduce the cost and complexity of registering firms. However, the existing literature dedicated to evaluate the effectiveness of such programs shows that the outcomes can vary significantly, depending on the type of intervention.

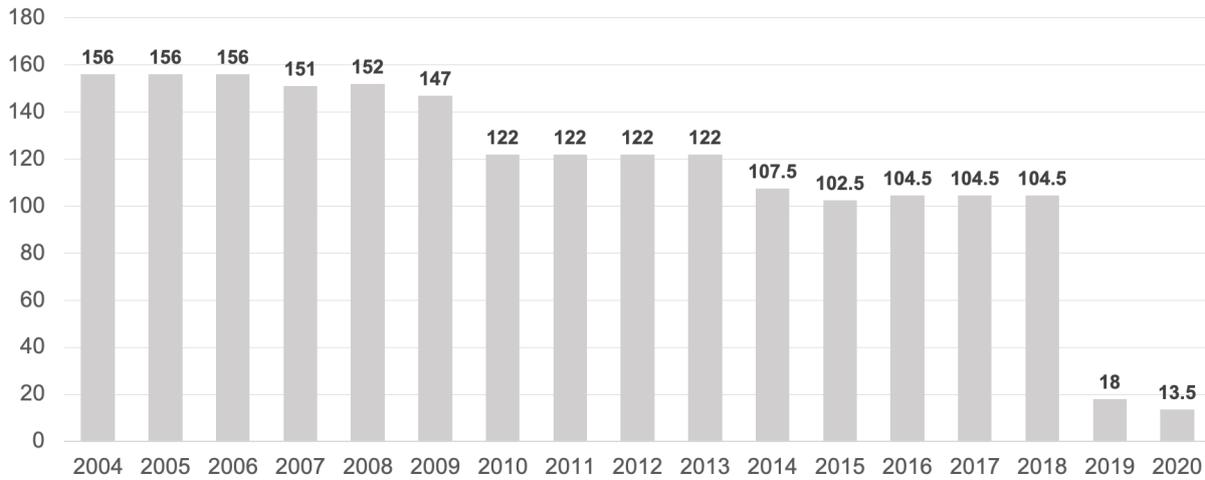
On one hand, policies that only target to increase information and simplify procedures regarding firm registration appear to have a subdued or insignificant impact on formalization (e.g., De Giorgi and Rahman (2013); De Mel et al. (2013)). On the other hand, when those policies are combined with some financial incentive, they can entail more significant results (e.g., Monteiro and Assunção (2012); Rocha et al. (2018)). Also, programs that increase inspection and law enforcement also contribute to decrease informality (e.g., De Andrade et al. (2016)).

Empirical literature that seeks to evaluate policies targeting the reduction of red tape for firm registration is increasing, but is still very incipient. In that sense, the present work intends to bring new evidence on the theme, by analyzing a specific policy that started in the city of São Paulo in 2017.

Data from the Doing Business project¹ report an interesting occurrence in São Paulo between 2018 and 2020. During this time course, the number of days to start a business presented a significant drop, from 104.5 to 13.5 days. As it can be seen in the following graph, the number of days to start a business in São Paulo had already gone through other episodes of reduction, but none of them was so aggressive as the one experienced since 2018.

¹World Bank (2020)

Figure 1: Number of Days to Start a Business in São Paulo



Source: World Bank

The main reason behind this development was ‘Empreenda Fácil’, a program launched by São Paulo’s City Hall in May/2017 that simplified the process of opening a firm by creating an online system that integrated the registration and delivery of documents of several Secretaries, at the federal, state, and municipal levels.

The fact that only firms in ‘low-risk’ activities (e.g., flower shops, stationery shops, consulting offices) were eligible to register through the ‘Empreenda Fácil’ program allows to separate industries among treatment and control groups and use a difference-in-differences empirical strategy to identify the impacts of the policy on formalization.

Using quarterly data from the *Pesquisa Nacional por Amostra de Domicílios Contínua* (PNADC), the obtained results found that the policy had an impact between 12.4% and 17.6% on the registration of formal entrepreneurs. Moreover, estimates at the individual level pointed that the increase in formalization was originated by the transition of informal employees into formal entrepreneurship. Therefore, the achieved results support the argument that informality is a consequence of elevated bureaucracy, and that policies that simplify business entry regulations can lead to higher formalization.

The remainder of this article is organized as follows. Section 2 summarizes the literature on policy interventions that seek to reduce informality. Section 3 details the ‘Empreenda Fácil’ program. Section 4 describes the utilized data, while Section 5 presents the empirical strategy. Section 6 reveals the main results and robustness checks, and Section 7 concludes.

2 LITERATURE REVIEW

Ulyssea (2020) states that the dominant concept of informality in the economic literature is the legalistic definition, according to which informal workers and firms are those operating at the margins of laws and regulations. Therefore, informal firms are those that do not entirely comply with business regulations, such as paying taxes, and informal workers are those who do not have formal labor contracts.

Since informal firms do not pay taxes or comply with its countries' laws and regulations, a series of economic problems might emerge in regions where informality is elevated.

First, according to Besley and Persson (2013), higher informality can have negative implications for long run growth, given that a country with bigger tax revenues can spend more on public goods and investments that enhance the economy's productivity.

Second, as mentioned by De Mel et al. (2013), informality implies a stronger misallocation of resources, considering that, for a certain industry, informal firms will have lower marginal costs of production than formal companies.

At last, as Neri and Fontes (2010) point out, economies with higher informality provide a subdued social protection to its workers, hindering them from assistance in the occasion of economic shocks, or any events such as health issues and unexpected maternity, for example. The lack of a stronger social protection net can even amplify negative impacts of a recessionary shock suffered by an economy.

Even entailing such worrisome consequences, a high level of informality is still a frequent occurrence. According to La Porta and Shleifer (2014), the informal sector accounts for 30% to 40% of total economic activity in the poorest countries, and an even higher share of employment.

So, the question that immediately arises is: if informality has so many undesirable effects, why do we find so many countries with an elevated presence of informal firms and workers?

Some authors, like Maloney (2004) and Levy (2008), claim that informality, rather than an inferior form of activity, is a rational choice made by firms or workers, because they do not perceive that the benefits of becoming formal (e.g., having easier access to credit, and becoming eligible to sell products to governments and big companies) are higher than the more elevated costs arising from formalization (e.g., taxes and labor costs).

Another branch of the literature argue that high informality is a byproduct of elevated costs and complex procedures for registering new firms, as in Djankov et al. (2002). In this article, the authors build a data set aggregating all entry regulations of start-up firms for 85 different countries and conclude that regions with heavier regulation of entry have larger informal economies. The article of Djankov et al. (2002) was a seminal work towards the construction of the Doing Business project, created by the World Bank to document and quantify the quality of business environment among countries, and to advocate in favor of reforms that facilitate the

register and operation of firms.

Ulyssea (2018) argues that those views not necessarily exclude one another. The author presents a framework that distinguishes two types of informality: (i) the extensive margin, that is, whether firms register and pay the required entry fees to become formal; and (ii) the intensive margin, that is, if formal firms hire workers “off the books”, without paying labor costs and taxes.

By breaking the direct association between firm and worker informality, the model proposed by Ulyssea allows the firm-level decision making to be heterogeneous and the choice of informality is simultaneously affected by both the costs of entry, as suggested by Djankov et al. (2002) and others, and by the costs of remaining formal (taxes, administrative costs) and informal (fines charged by government inspection agencies), as proposed by Levy (2008) and others.

The creation and development of the Doing Business project ended up putting business environment reforms at the forefront of the economic policy debate. Bruhn and McKenzie (2014) highlight that, between 2003 and 2012, the Doing Business project have registered 368 different business environment reforms, which led to a decrease in the world average time to start a business, from 50 to 30 days, and to a reduction in the cost of starting a business, to one-third of what it was previously. This paved the way for empirical research aiming to evaluate if the aforementioned improvements observed at the Doing Business indicators has had significant economic impacts.

As in Jessen and Kluge (2021), to better organize the discussion, we can divide the interventions aimed to reduce informality in 5 categories:

1. **Information** – providing firms with information regarding the registration process and the benefits of registration. Such measures are often combined with other types of intervention.
2. **Simplification / registration** – facilitating business entry regulations and registration procedures.
3. **Tax incentives / social security reduction** – diminishing the costs of being formal, by reducing the tax burden or social security contributions.
4. **Labor inspection / enforcement** – increasing the compliance of regulations through a more intense inspection from the authorities.
5. **Financial incentives** – enhancing information or simplification interventions by granting some kind of financial payment or discount.

To assess the potential impact of information interventions, De Giorgi and Rahman (2013) implemented a randomized controlled trial with informal firms in Bangladesh. The authors

randomly chose firms to receive a visit from a facilitator, which provided information about the business registration process and its potential benefits. The results pointed that the treatment had no relevant impact on formalization, even though firms became significantly more aware about the registration procedures.

De Mel et al. (2013) conducted a similar experiment among informal firms in Sri Lanka, randomly dividing the sample into four treatment groups and a control group. The first treatment group was given information about the procedures, costs, and benefits of registering, and were exempt from registration costs. The other control groups were given the same information as the first group, but were also offered a direct payment to register, which value increased for each of the treatment groups. The authors find that merely providing information did not induce firms to register, but information combined with financial incentives, on the other hand, was able to significantly increase the registration of informal firms.

Regarding simplification policies, both Bruhn (2011) and Kaplan et al. (2011) estimated the impacts of the Rapid Business Opening System (SARE), created in Mexico in 2002 to ease business entry regulation and reduce the number of days to start a business, which have dropped from 30.1 to 1.4 after policy implementation. The authors used different datasets, but reached similar conclusions, encountering a significant impact of SARE on firm registration.

Another significant effect of a simplification policy was found by Monteiro and Assunção (2012), who studied the impact of SIMPLES (Sistema Integrado de Pagamento de Impostos e Contribuições das Microempresas e Empresas de Pequeno Porte), a Brazilian program introduced in 1996 that reduced the bureaucracy related to tax payments and promoted a reduction in tax burden to micro and small firms. Estimates pointed to a 13% increase in formal licensing among companies of the retail sector, and no significant impact on construction, transportation, services, and manufacturing sectors.

A similar policy implemented in 2009 in Brazil was the Individual Micro-Entrepreneur Program (Programa do Microempreendedor Individual - MEI, in Portuguese), designed for micro firms with up to one employee. The MEI program had two phases of implementation. In the first phase, the program reduced costs of entry and simplified the registration process. Two years later, in the second phase, the social security contribution of formal micro firms was reduced from 11% to 5% of the minimum wage. Rocha et al. (2018) did not find any significant effect of the first phase of the program on formalization. However, the second phase entailed a 4,3% increase in the number of small formal firms.

The effects of inspection and enforcement policies were analyzed by De Andrade et al. (2016), that carried out a field experiment in the city of Belo Horizonte, in Brazil. The authors randomized four different types of treatment: (i) providing information on the registration process, with the distribution of brochures and creation of a helpline; (ii) combining the measures of the first treatment group with the exemption of registration fees and the provision

of free accounting services for one year; (iii) assigning a municipal inspector to check if the firm is registered; and (iv) having a neighboring firm visited by a municipal inspector, to assess the spillover impacts of stronger inspection. The results showed no impact in formalization coming from the information provision policies. However, the assignment of an inspector to visit firms have led to a significant increase in registration. Finally, no evidence of spillovers from neighboring firms were found.

The bottom line of the aforementioned empirical literature is that, when it comes to reducing informality, the results can be very different depending on the type of intervention. Information and simplification policies appear to have an insignificant or very subdued effect on formalization. However, when coupled with some kind of tax exemption or financial incentive, such policies can have stronger results. At last, higher inspection and law enforcement measures can also contribute to a reduction in informality.

However, Bruhn and McKenzie (2014) alert that, even though there is an increasing number of studies measuring the impacts of policies aiming to increase formality, there is, up until now, a limited evidence base and some important gaps in the literature, such as the fact that existing research is concentrated in a small number of countries and focused mainly on registration and tax regulation reforms.

Therefore, the present work aims to bring new contributions to this still growing literature. In May/2017, the City Hall of São Paulo launched ‘Empreenda Fácil’, a program that targeted a decrease in the number of days to start a business in the city. To accomplish this goal, an online system was developed to facilitate the delivery of documents and to unify several registration procedures at the federal, state and municipal levels. The program was very successful in reducing the number of days to open a firm, which fell from 104.5 to 13.5 in 2 years, according to data from the Doing Business project.

The question that follows is: can such a significant drop in the number of days to start a business entail more formalization?

More details on the institutional framework of the program will be detailed in the coming section.

3 INSTITUTIONAL SETTING - THE ‘EMPREENDA FÁCIL’ PROGRAM IN THE CITY OF SÃO PAULO

Launched in May/2017 by São Paulo’s City Hall, the ‘Empreenda Fácil’ program aimed to decrease bureaucracy in the process of opening a business at the city. Before the program implementation, starting a business in São Paulo involved an elevated number of procedures, and demanded firm owners to show up in person to at least five different federal, state, and

municipal agencies. Consequently, over 100 days were required to complete the whole process of starting a business in the city.

To simplify all these procedures, the ‘Empreenda Fácil’ program created an online system that integrated the registration and delivery of documents of several Secretaries, at the federal, state, and municipal levels.

The program was eligible only to firms that operated ‘low-risk’ activities. A low-risk business is defined as an activity with little potential of incurring damages to physical integrity and human health, as well as to the environment and public properties². Examples of low-risk businesses are flower shops, stationery shops, law firms, and consulting offices. In contrast, ‘high-risk’ activities are those that bring more elevated risks and, consequently, need a more thorough analysis from authorities before being allowed to operate, such as gas stations, hotels, and amusement parks.

Prior to the ‘Empreenda Fácil’ program, even firms of low-risk activities had to wait for the visit from a municipal inspector, to certify the business’ risk level and allow the company to start its operations. This was viewed as one of the main bottlenecks of the whole process of starting a business in São Paulo.

Hence, one of the key innovations of the program was to eliminate such procedure by implementing a ‘self-declaration’, in which the business owner, under the penalties of the law, declares that the firm belongs to a low-risk activity and commits to comply with all the legal requirements for the functioning of the company. Therefore, to accelerate the proceedings of starting a business, the State considers that the information provided a priori by the entrepreneur is true and verifies that a posteriori, through inspection.

In addition, by digitalizing the required procedures to start a business, the ‘Empreenda Fácil’ program entailed a more efficient and standardized service to the citizens willing to open a firm, bringing a more comfortable and transparent institutional framework to potential entrepreneurs.

The results obtained in terms of number of days to start a business were notable. By March/2020, almost three years after the beginning of the program, the average number of days to open a firm fell from 100 to 3,5 days. Also, São Paulo City Hall has stated that, in February/2020, the city has reached the number of 200 thousand firms opened through the ‘Empreenda Fácil’ system³.

Lastly, the program brings not only benefits to potential entrepreneurs but also to the public sector, reducing costs, by decreasing the number of documents that need to be presented and stored physically, and increasing efficiency of the public sector, diminishing the number of registration errors among different Secretaries, and eliminating duplicated requests for starting a business.

²The precise legal definition of low-risk activities is found at the Municipal Decree N° 57.298 of September 8, 2016.

³As informed in Prefeitura de São Paulo (2020).

At first glance, the reported results are quite impressive. The length of reduction in the number of days to start a business was very aggressive, especially in such short span of time. That is a factor that sets the ‘Empreenda Fácil’ program apart from other policies analyzed in the studies mentioned in the previous section. Consequently, a more detailed investigation on the causal effects of the program on the reduction of informality seems appropriate and will be developed in the coming sections.

4 DATA

To assess the possible impacts of the ‘Empreenda Fácil’ program on formalization, the main data set used in the analysis was the *Pesquisa Nacional por Amostra de Domicílios Contínua* (PNADC).

The PNADC is a household survey carried out by the Brazilian Institute of Geography and Statistics (IBGE) that covers the entire country and aims to monitor the short, medium and long run evolution of Brazilian labor force, tracking both formal and informal workers and entrepreneurs. The survey is a rotating panel in which every household is interviewed five times, one in each quarter, until it leaves the sample.

With microdata from PNADC it is possible to analyze the impacts of the policy at an aggregated level, by computing the number of formal firms in each industry and using this as an outcome variable. It is also viable to examine what happened with the individuals’ transitions among occupational statuses after the policy has started, including transitions into formal entrepreneurship⁴, which is the main goal of the ‘Empreenda Fácil’ program⁵.

For the industry aggregated effects, the sample begins at 1Q2012 and ends at 4Q2019. For the individuals transitions, however, a smaller sample had to be adopted, given that a single individual is surveyed only five times, and leaves the sample after that. Hence, for the estimates at the individual level, the sample begins at 1Q2016, five quarters before the beginning of the policy, and end at 4Q2019. In addition, the sample was restricted only to individuals and entrepreneurs inside the metropolitan area of São Paulo, where the policy was effectively executed.

The fact that only low-risk activities were qualified for the program allows to separate industries and individuals among treatment and control groups. However, in order to do so, some adaptations were required. As mentioned in the previous section, low-risk businesses

⁴Formal entrepreneurs are defined as individuals classified as employers or self-employed workers that own a National Company Registration Number (CNPJ), which identifies the company as a taxpayer to the Federal Government.

⁵The PNADC microdata does not have an identifier code for every single individual, only for each household. Therefore, an identifier variable for each individual was created, combining the household identifier codes (UPA, v1008 and v1014) with the date of birth of every individual

were classified by the Municipal Decree N° 57.298 of September 8, 2016, which presents a list of low-risk activities based on the subclasses of the National Classification of Economic Activities (CNAE)⁶, at a 7-digit industry level. On the other hand, the PNADC uses a different industry classification, called ‘Household CNAE’ (CNAE Domiciliar), which regroups the classes from the CNAE to have a better representation of activities that more frequently appear in household surveys. Thus, to determine whether each activity from the PNADC is a low-risk one, it is necessary to match the classifications from the CNAE and the Household CNAE. This is possible using a concordance table released by IBGE⁷.

In order to confirm the robustness of the results obtained with the PNADC, estimates at the industry level were also computed using data from the Cadastro Nacional de Pessoa Jurídica (CNPJ).

This dataset, administered by the Brazilian Tax Authority (Receita Federal - RFB), consists of a register of all formal establishments of interest for tax purposes of the country’s federal and local governments. For every registered firm, the database stores their unique identifier number, their name and address, the date of entry and closure (if closed), the firm’s industry (at a 7-digit CNAE level), their legal nature and information about the partner’s of the firm, when owned by more than one person.

Just as it was done with the PNADC database, an industry-level panel was built, starting at 4Q2009 and ending at 3Q2020. The outcome variable will once again be the number of formal firms at each industry.

Not all entities found at the CNPJ are business units. Institutions such as public enterprises and agencies, foreign diplomatic representations, and clubs and investment funds, to name a few, are also obliged by law to register at the CNPJ. Therefore, in order to confine the CNPJ data to a sample that more precisely represents entrepreneurial activities, all units that were not business units⁸ were removed from the sample. Also, as was done with the PNAD data, only establishments within the metropolitan area of São Paulo were kept in the analysis.

The following table presents the descriptive statistics for all the variables used in the estimates. All numbers refer to the quarters previous to the beginning of the ‘Empreenda Fácil’ program (2Q2017)

⁶CNAE is the economic activity classification adopted by the IBGE in the production and dissemination of economic statistics, and by the Public Administration in the identification of economic activities in business’ registries of the country.

⁷Available at: <http://concla.ibge.gov.br/classificacoes/correspondencias/atividades-economicas>.

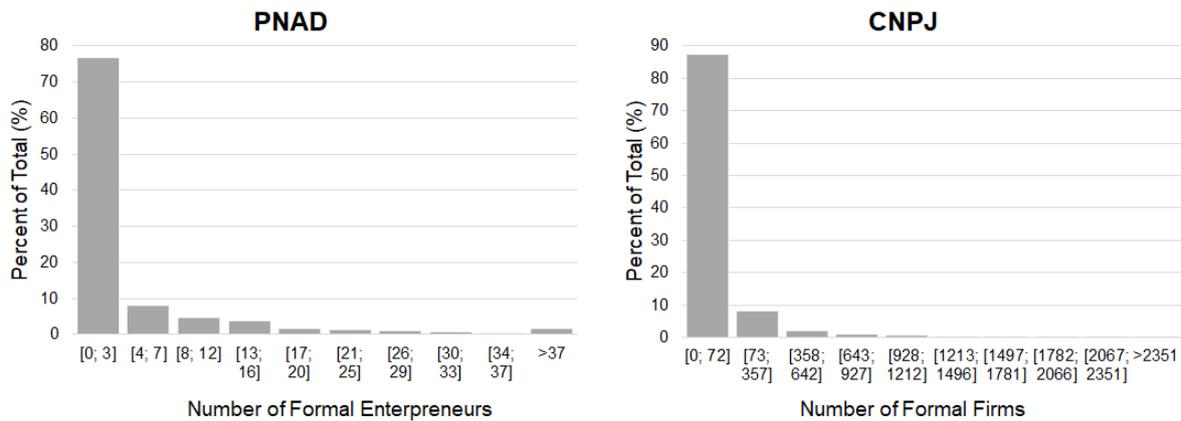
⁸As in Hsu Rocha and de Farias (2021), business entities were defined as the ones with any of the following legal natures: Sociedade Anônima Aberta, Sociedade Anônima Fechada, Sociedade Empresária Limitada, Sociedade Empresária em Nome Coletivo, Sociedade Empresária em Comandita Simples, Sociedade Empresária em Comandita por Ações, Empresário Individual, Sociedade Simples Pura, Sociedade Simples Limitada, Sociedade Simples em Nome Coletivo and Sociedade Simples em Comandita Simples.

Table 1: Descriptive Statistics

	Full Sample			Low Risk Activities (Treatment)			High Risk Activities (Control)		
	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD
PNADC									
<i>Aggregate Level</i>									
Number of Formal Entrepreneurs	2,471	4.48	7.68	1,388	6.57	9.34	1,083	1.81	3.17
<i>Individual Level</i>									
Formal Entrepreneur	86,473	0.06	0.24	36,152	0.12	0.33	13,394	0.07	0.26
Informal Entrepreneur	86,473	0.09	0.28	36,152	0.15	0.36	13,394	0.14	0.34
Formal Employee	86,473	0.34	0.47	36,152	0.56	0.50	13,394	0.70	0.46
Informal Employee	86,473	0.09	0.28	36,152	0.17	0.37	13,394	0.10	0.29
Unemployed	86,473	0.09	0.29	36,152	0.00	0.00	13,394	0.00	0.00
Male	104,043	0.48	0.50	36,152	0.50	0.50	13,394	40.71	13.19
Schooling Years	98,212	9.76	4.64	36,152	11.60	3.85	13,394	11.74	3.59
Age	104,043	36.08	21.12	36,152	39.95	13.42	13,394	40.71	13.19
Mean Monthly Wage	49,222	2,790	4,433	35,908	2,679	4,240	13,314	3,090	4,903
Low Risk Activity	49,546	0.73	0.44	36,152	1.00	0.00	13,394	0.00	0.00
CNPJ									
Number of Firms	22,684	75.60	252.55	11,778.00	110.12	326.08	10,906.00	38.32	123.10

For both databases, it was possible to note a large number of industries that, in some quarters, had a very small (or null) number of firms, as it can be seen in the histograms below.

Figure 2: Histograms - Number of Formal Firms



Source: IBGE and RFB

In order to deal with this issue and check the consistency of the results, along with the traditional linear panel data estimates, Fixed Effect Poisson regressions were also estimated. In that sense, the following session will bring more details about the adopted empirical strategy.

5 EMPIRICAL STRATEGY

The fact that only low-risk activities were qualified for the ‘Empreenda Fácil’ program allows the adoption of a difference-in-differences strategy to estimate the impacts of the policy on formalization.

As mentioned in the previous session, and following an approach similar to Rocha et al. (2018), two different groups of regressions are estimated: one to evaluate aggregate effects of the policy, at the industry level, and another to verify the impacts on individual transitions among occupational statuses.

For the industry aggregate effects, the following specification was used:

$$Y_{s,t} = \beta(Post_t * LowRisk_s) + X'_{s,t}\psi + \theta_s + \gamma_t + \rho_{s2,t} + \epsilon_{s,t}, \quad (1)$$

where:

- $Y_{s,t}$ is the log of 1 + the number of formal entrepreneurs in industry s ;
- $Post_t$ is a dummy variable that equals 1 while the policy is in effect, that is, $\mathbb{1}[t \geq 2Q2017]$;
- $LowRisk_s$ is a dummy variable equal to 1 if industry s is a low-risk activity, that is, is affected by the policy;
- $X'_{s,t}$ is a vector of industry-level covariates: mean wage, share of female workers, mean worker's age and worker's average years of schooling;
- θ_s and γ_t are industry and time fixed effects, respectively;
- $\rho_{s2,t}$ is an interaction between time and 2-digit industry level fixed effects, that allows to control for time-varying trends that are specific to each sector⁹;
- $\epsilon_{s,t}$ is an unobserved error term.

The main parameter of interest of the equation is β , which represents the average effect of the policy on treated industries.

For the individual transitions, the model specification is slightly different than equation (1):

$$Y_{i,s,t} = \beta(Post_t * LowRisk_s) + X'_{i,s,t}\psi + \theta_s + \gamma_t + \rho_{s2,t} + \epsilon_{s,t}, \quad (2)$$

where:

- $Y_{i,s,t}$ is a dummy variable that equals one when the individual i in sector s at quarter t is a formal entrepreneur;
- $X'_{i,s,t}$ is a vector of individual-level covariates: mean wage, gender, age and years of schooling;

⁹A 2-digit industry fixed effects was chosen in order to avoid a model with an exaggerated number of parameters.

- The remaining terms have the same interpretation of equation (1).

To analyze the transitions into formal entrepreneurship, different regressions were estimated, restricting the sample according to the individual's occupational status in the quarter previous to the beginning of policy (1Q2017): formal employee, informal employee, unemployed, informal entrepreneur and formal entrepreneur.

The obtained results are presented in the coming section.

6 RESULTS

6.1 Aggregate effects at the industry level

Table 2 presents the estimates of equation (1) for different combinations of control variables and econometric methods.

Table 2: **Aggregate effects on the number of formal entrepreneurs**

Dependent Variable: Log of the Number of Formal Entrepreneurs (PNADC)				
	(1)	(2)	(3)	(4)
β	0.259 ***	0.176 **	0.273 ***	0.124 ***
<i>s.d.</i>	0.094	0.077	0.049	0.041
obs.	4,919	3,152	4,189	3,136
Adj. R ²	0.255	0.454	0.272	0.143
<i>model</i>	<i>FE Panel without control covariates</i>	<i>FE Panel with control covariates</i>	<i>FE Poisson Regression without control covariates</i>	<i>FE Poisson Regression with control covariates</i>

Notes: Robust standard errors are clustered at the industry level. Coefficients reported for Poisson Regressions are the marginal effects. Significance: *** p<0.01, ** p<0.05, * p<0.1

The results in Table 2 evidence that, for all adopted specifications, there is a positive and significant effect of the policy on the number of formal entrepreneurs. Using the regressions with a higher number of covariates as a baseline (columns (2) and (4)), the estimates point out the 'Empreenda Fácil' program had an impact between 12.4% and 17.6% on the registration of formal entrepreneurs in eligible industries.

In order to reinforce the results found in the previous regressions, an extension of equation (1) is estimated:

$$Y_{s,t} = \sum_{j=2}^J \beta_j ((Lag\ j)_t * LowRisk_s) + \sum_{k=1}^K \beta_k ((Lead\ k)_t * LowRisk_s) + X'_{i,s,t} \psi + \theta_s + \gamma_t + \rho_{s2,t} + \epsilon_{s,t}, \quad (3)$$

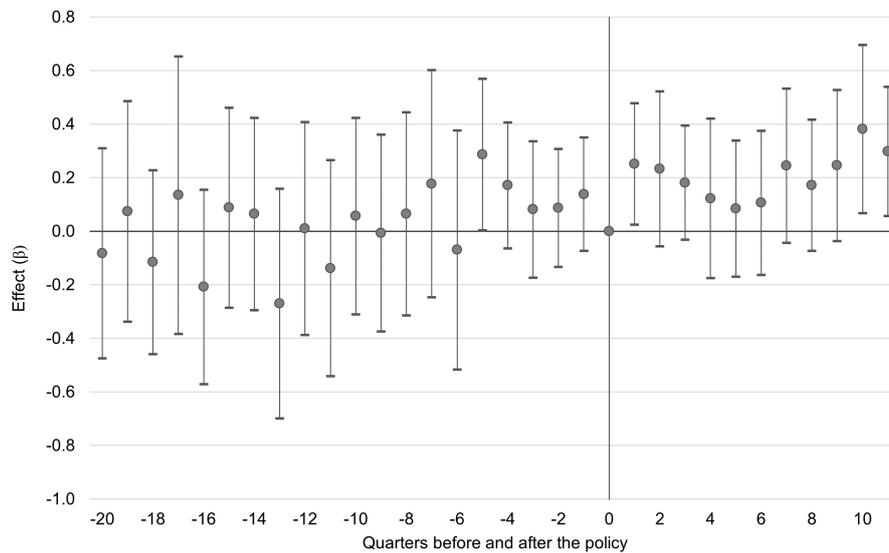
where:

- $(Lag J)_t = \mathbb{1}[t \leq 2Q2017 - J]$;
- $(Lag j)_t = \mathbb{1}[t = 2Q2017 - j]$ for $j \in \{1, \dots, J - 1\}$;
- $(Lead k)_t = \mathbb{1}[t = 2Q2017 + k]$ for $k \in \{1, \dots, K - 1\}$;
- $(Lead K)_t = \mathbb{1}[t \geq 2Q2017 + K]$.

Such equation allows to explore different timing effects of the policy impact. It also makes possible to verify the existence of a differential pre-trend among treated and non-treated industries, which, if verified, would invalidate the use of a differences-in-differences approach.

Figure 3 plots the coefficients found for β_j and β_k of equation (3), assuming $J = 1Q2017$ (the quarter immediately before the beginning of the policy) and $K = 4Q2019$:

Figure 3: **Dynamic Effects of the Policy - Fixed Effects Panel**



Such graph reinforce the results reported in Table 2 - a positive and statistically significant coefficient is reported already in the first quarter in which the policy began. Moreover, it illustrates that the ‘Empreenda Fácil’ program appears to have exerted a more long lasting effect on the formalization of entrepreneurs, given that in the final quarters of the graph, the coefficients once again become statistically significant¹⁰.

The coefficients plotted in Figures 3 also have an important implication to validate the employed empirical strategy. It is possible to note that, for the quarters before the inception of the policy, nearly all of the coefficients are statistically insignificant. This suggests that there

¹⁰Very similar results were obtained when using a Fixed Effects Poisson Regression.

are no differential pre-trends among low and high-risk industries, and consequently, difference-in-differences regressions are a proper method to identify the impacts of the ‘Empreenda Fácil’ program.

6.2 Individual transitions into formal entrepreneurship

The results in the previous subsection indicate that, at the industry level, the reduction of bureaucracy promoted by the ‘Empreenda Fácil’ program was able to entail more formalization. A question that follows is what are the effects of the policy at an individual level.

In order to shed some light to this matter, an analysis of the impacts of the policy on the individuals transitions into formal entrepreneurship was carried out.

Equation (2), described in the previous section, was estimated for each occupational status, restricting the sample to individuals who report being informal employee, formal employee, unemployed, informal entrepreneur, and formal entrepreneur at 1Q2017, one quarter before the treatment started. The estimates are presented in Table 3.

Table 3: **Individual transitions into formal entrepreneurship**

Dependent Variable: Formal Entrepreneur (0/1)					
Transition from:	Informal Employee	Formal Employee	Unemployed	Informal Entrepreneur	Formal Entrepreneur
β	0.034 **	0.001	0.004	0.010	0.053
<i>s.d.</i>	0.016	0.002	0.015	0.018	0.034
obs.	4,691	20,488	1,586	4,868	4,155
<i>model</i>	FE Panel with control covariates				

Notes: Robust standard errors are clustered at the individual level. Significance: *** p<0.01, ** p<0.05, * p<0.1

The obtained results reveal that the policy only had significant impacts on the transition of informal employees. Therefore, the positive impact on formalization found in the aggregate result is likely to have been originated by the transition of informal employees into formal entrepreneurship.

Moreover, the last column of Table 3 indicates that reducing bureaucracy has not had any significant contribution on helping formal entrepreneurs to endure in this occupational status.

6.3 Robustness checks

As a first robustness exercise, equations (1) and (3) were re-estimated, now using data from CNPJ, an alternative data set to the PNADC, as already described in Section 4. The results are presented in Table 4.

Table 4: **Aggregate effects on the number of formal entrepreneurs (CNPJ data)**

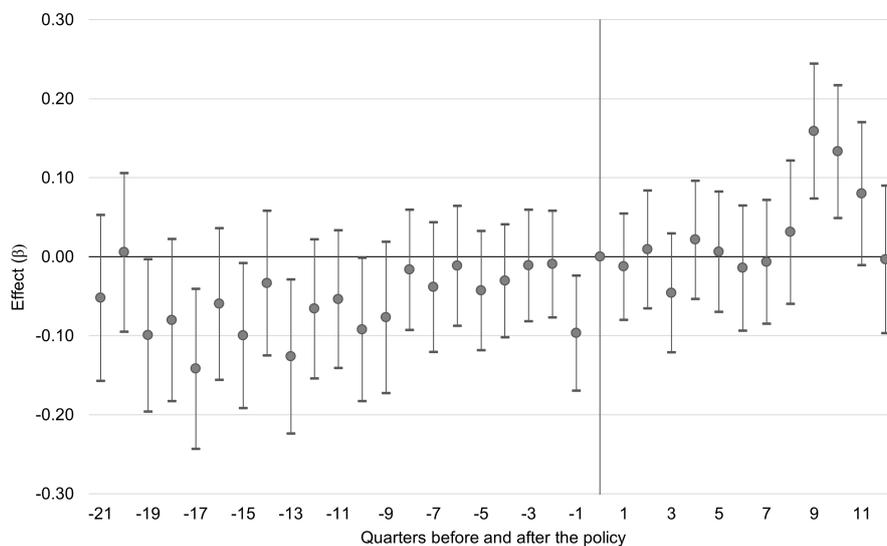
Dependent Variable: Log of the Number of Formal Entrepreneurs (CNPJ)		
	(1)	(2)
β	0.082 **	0.043 ***
s.d.	0.034	0.011
obs.	33,014	32,953
Adj. R ²	0.366	0.266
model	FE Panel without control covariates	FE Poisson Regression without control covariates

Notes: Robust standard errors are clustered at the industry level. Coefficients reported for Poisson Regressions are the marginal effects. Significance: *** p<0.01, ** p<0.05, * p<0.1

For all specifications, a positive and statistically significant effect of the treatment on the number of formal firms registered at the CNPJ was found. The size of the impact was between 4.3% and 8.2%, smaller than the ones obtained with the PNADC.

The dynamic effects estimated for the CNPJ data through equation (3) also point to some positive impact of the treatment on firm registration, specially at the quarters closer to the end of the sample, as can be seen in the figure below.

Figure 4: **Dynamic Effects of the Policy - Fixed Effects Panel (CNPJ data)**



At last, to verify the robustness of the results for individual transitions into formal entrepreneurship, an alternative difference-in-differences approach is implemented, incorporating kernel propensity score weights, as proposed in Villa (2016). In this method, each treated individual is matched with the entire sample of control units, based on a propensity score that is estimated using a set of observed covariates at the individual. For this exercise,

the chosen covariates were mean wage, years of schooling and age. The results are presented in Table 5.

Table 5: Individual transitions into formal entrepreneurship - Propensity Score Matching Difference-in-Differences

Dependent Variable: Formal Entrepreneur (0/1)					
Transition from:	Informal Employee	Formal Employee	Unemployed	Informal Entrepreneur	Formal Entrepreneur
Diff-in-Diff	0.032 ***	0.001	0.029	-0.014	-0.024
s.d.	0.011	0.002	0.033	0.026	0.015
obs.	4,724	20,255	1,428	4,113	4,815

Notes: Significance: *** p<0.01, ** p<0.05, * p<0.1

Just as in the traditional difference-in-differences approach, the only statistically significant impact was found for the transition of informal employees into formal entrepreneurship, strengthening the conclusions that were reached in the previous subsection.

7 CONCLUSION

The present work brings new evidence on the impacts of lower bureaucracy on formalization. In order to do so, the impacts of ‘Empreenda Fácil’, a program that attempted to facilitate firm registration in the city of São Paulo, were estimated. Launched in May/2017, the ‘Empreenda Fácil’ program unified several registration procedures and the delivery of documents in one single online system, and was able to promote a remarkable reduction on the number of days to start a firm in the city, from 104.5 to 13.5 in a span of only two years.

The obtained results indicate that this aggressive decrease in the number of days to start a firm had positive impacts on formalization, exerting an impact between 12.4% and 17.6% on the registration of formal entrepreneurs in industries that were eligible to the program. In addition, evidences were found that such increase in formalization was originated by the transition of informal employees into formal entrepreneurship.

Therefore, the achieved results bring additional support to the argument that informality is a consequence of an unfavorable business environment, with elevated bureaucracy hampering the procedures for registering new firms. Therefore, policies that simplify business entry regulations can lead to higher formalization.

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