# Measuring Investment Incentive Effectiveness: Findings from a Natural Experiment in Brazil

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# Abstract

We contribute to the literature on the effectiveness of investment incentives by utilizing a quasi-natural experiment in Brazil to measure how incentives shape firm decision-making. As part of our methodological strategy, we exploit an unexpected declaration by the Brazilian Supreme Court in 2017, wherein federal states of Brazil were no longer permitted to receive differentiated tax subsidies. Using deal-level data on both projects and incentives, we examine the flows of foreign direct investment before and after the unexpected change in incentive policy. Our results reinforce existing findings that incentives are ineffective tools for influencing firm decision-making, given that disadvantaged regions did not see a major shift in investment patterns after the change in investment law. The findings provide new insight into how sub-national competition affects investment flows in the developing world.

# 1 Introduction

How effective are investment incentives in shifting firms' decisions about where they will invest? The question is of central importance to the structure of the global economy and the ability of foreign direct investment (FDI) to contribute to development. In particular, inequality is growing between agglomeration economies with high pre-existing levels of investment and disadvantaged locations that lag in both their level of investment and other key metrics of economic development. Moreover, despite the ongoing debate about investment incentives and skepticism in the academic literature about their effectiveness, the amount of public funds spent on programs with the stated goal of attracting investment continues to grow. The amount spent globally on investment incentives – such as tax abatements, tax holidays, subsidies, or other targeted financial inducements that governments offer firms to locate in their jurisdiction – has grown to more than 100 billion USD per year (Oman, 2000; Thomas, 2011; Tavares-Lehmann et al., 2016). Determining the degree to which, or the conditions under which, tax incentives are effective is essential to understanding how states tax and regulate investment, as well as how firms decide where to invest. Moreover, predicting how companies respond to incentives is crucial to policy-makers who must decide whether to direct tax dollars on such programs or to other forms of spending with greater public benefit, such as education, health, or infrastructure.

We evaluate the claim, frequently offered as a justification for investment incentives, that they induce firms to locate in specific locations, both at the national and sub-national levels (Blanton and Blanton, 2007; Hays, 2003; Plumper et al., 2009; Prakash and Potoski, 2007). We address important policy questions, including whether incentives help disadvantaged locations "catch up" to investment hubs or merely deprive those locations of much-needed tax revenue. These questions tie into canonical questions within comparative and international political economy about the power of firms vis-à-vis states, and whether there is a regulatory "race to the bottom" whereby firms shift investments to locations where regulatory and taxation capacity are the weakest (Greenhill et al., 2009; Mosley, 2011). Because investment incentives are public policies that signal government willingness to make concessions to multinational corporations (MNCs), they represent an important measure of the relative power of states in harnessing global markets for economic development (Moran, 2006). To the degree that investment incentives do little to genuinely change firm behavior, they simply represent a transfer of public revenue to private companies. Conversely, to the degree that they alter firm decisions, they represent a tool that has the potential to strengthen the state's role in regulating firms and shift investment to the locations where it is most needed for economic development. Thus, we are engaging not only with empirical de-

bates about the effectiveness of incentives but also with broader theoretical questions about the role of states and sub-national governments in an era of deep economic inter-connectedness.

To answer these questions, we employ a novel empirical strategy. We exploit a quasi-natural experiment in Brazil, wherein an unexpected 2017 Supreme Court ruling and change in investment law vastly reduced the ability of Brazilian states to offer sub-nationally differentiated investment incentives. We examine investment flows before and after this break in investment policy, measuring how investment flows shifted, both in aggregate and across sectors. With fine-grained data on investment projects and investment incentives at the state level, we are able to measure how investment flows responded to the unexpected change in investment policy. The empirical analysis indicates that investment flows altered little after the change in investment law, undermining claims that the ability to offer differentiated sub-national incentives shifted firm decision-making (Basinger and Hallerberg, 2004). Importantly, this finding also weakens the claim, made by governments as well as scholars such as Moran (2002), that incentives can be used to help disadvantaged locations counter the challenges that they face in attracting investment. Our findings indicate that agglomeration economies, once they have established themselves, can be difficult to unseat; instead, their first-mover advantage results in the continued attraction of further investment. Investment incentives, instead of reducing the inequality between advantaged and disadvantaged locations, are ineffective in reducing differences across regions and may even exacerbate them.

We make several contributions to the existing debate on investment incentives. First, we leverage a quasi-natural experiment that improves causal inference and realism, advancing a literature that has largely relied on observational studies and firm surveys. Second, we focus on Brazil, a large developing country, whereas the existing literature has focused primarily on the developed world, leaving unanswered questions about the effectiveness of incentives in the global South. Finally, we focus on how the change in fiscal laws affects incentive levels and actual FDI flows; linking incentives to investment flows allows us to credibly measure the effectiveness of offered incentives and their ability to shift investment decisions.

Our findings reinforce previous research findings that investment incentives rarely affect firm decision-making and that investment incentives largely represent a transfer to firms and tend to be an ineffective tool for disadvantaged regions to hasten development. Our findings advance the literature on investment promotion and challenge the notion that investment incentives can promote development. While this paper does not assess the cost-effectiveness of incentives or their importance relative to other forms of investment policy, it does challenge the claim that incentives are effective ways to influence firm behavior. Although our analysis is focused on sub-national competition for investment in Brazil, we discuss the broader

implications of our findings for the developing world.

The remainder of the paper is organized as follows. First, we review the existing research and associated debates about the role of incentives in attracting foreign direct investment. We then discuss the particular case of Brazil, outlining how it fulfills the conditions for a quasi-natural experiment. We then present our data and methodological approach, highlighting our findings that investment flows to disadvantaged regions were not higher during the period in which Brazil's federal states were allowed to offer differentiated incentives. In addition, we discuss the implications of our findings for the broader literature and discussions of investment incentive programs, as well as the external validity of our findings, including how the results travel to other regions of the developing world. Finally, we conclude by highlighting future areas of research regarding the effectiveness of investment incentives.

## 2   Are Investment Incentives Effective?

A lively debate has emerged in international political economy about the degree to which firms are sensitive to investment incentives when selecting locations. Investment incentives are ostensibly designed to encourage multinational corporations to move to a particular investment location. However, they have been heavily critiqued by the existing literature, much of which begins with the puzzle of why investments are offered, given that they are ineffective (?) investment incentives have continued to expand, despite the critiques in the literature. This debate partially reflects the growing popularity and use of investment incentives in both the developed and developing worlds (Tavares-Lehmann et al., 2016; UNCTAD, 2018). The debate has intensified given the continued expansion of incentive programs, with an increasing number of investment promotion agencies (IPAs) administering tens of billions of dollars annually.

Much of the existing literature, based on firm surveys and observational studies, questions the effectiveness of investment incentives. In particular, analyses of the cost-effectiveness of investment incentives routinely find the value of incentives in foregone tax revenue routinely surpasses the income generation effects of these investments by several multiples. For example, a World Bank study found Yemeni incentives amount to 6,000 USD per job created, which exceeds average per capita income by a factor of six (Thomas, 2011; Ghauri and Oxelheim, 2004). Similar studies find investment incentives on a per-job basis cost between 3.5 and 16 times average wages in Tunisia and Thailand respectively (Johnson et al., 2013). Incentives in the U.S., Brazil, India, and Germany have topped over 200,000 USD per job, with Germany providing an astonishing 800,000 USD in tax incentive value per job for investment by Dow Chemicals (Johnson et al., 2013). Despite the high costs of

investment incentives, both on an absolute and per-job basis, there is little evidence that they are consequential to firms' locational decisions (James, 2010; Jensen, 2012). A 2003 McKinsey survey of firms investing in India found that incentives are not among the top three factors firms consider when making locational decisions and a 1997 Business location study by Fortune and Deloitte and Touche found tax policies ranked 13 among 26 factors covered (McKinsey, 2003; Fortune/Deloitte and Touche, 1997). Surveys from the world bank and UNIDO yielded similar findings (UNIDO, 2011; James, 2013). Collectively, these surveys create substantial doubt as to whether incentives are key factors in firm decision-making.

Despite this evidence that incentives are ineffective in shifting firm behavior, governments continue to allocate public funds for such programs. Many countries have developed investment promotion strategies that rely in large part on tax incentives, administered through investment promotion agencies (IPA). Notably, many of these programs are intended to address inequality in development outcomes, particularly across subnational regions. To the degree that such policies are part of a broader industrial policy, they are intended to form public policies to both hasten economic growth and reduce economic inequality. Indeed, many incentive programs, such as North Carolina's, are intentionally structured to give higher tax incentives to locations that are more disadvantaged, policies mirrored in Europe and parts of Asia, including Vietnam (Jensen and Malesky, 2018). The proliferation of incentives continues despite a growing consensus among development experts that such offers are ineffective at generating high-quality investment and growth (Johnson et al., 2013; James, 2010; Echandi et al., 2015). The expansion in the number of programs and the amount of public money spent on such programs indicates that states are willing to provide substantial financial support for investment promotion, despite academic findings that incentives are ineffective.

In this paper, we engage with the ongoing debate about the effectiveness of investment incentives (or the conditions under which they are effective) as well as with research that discusses the political motivations behind investment incentive programs. In particular, we engage with two of the competing theories for why investment incentives persist. The first focuses on globally mobile capital: according to this argument, companies are footloose enough to shift to the locations which offer the most generous incentives. Locations that do not offer incentives risk losing that investment to another location (Lindblom, 1977; Frieden, 1991; Strange, 1996). Others go so far as to argue that incentives simply represent forms of regulatory capture (Culpepper, 2011). Tax incentives may also be a signal of host country willingness to provide a business-friendly climate, even beyond the financial benefits associated with the investment itself. To the degree that incentives do not alter firm behavior but simply represent a transfer of funds from taxpayers to MNCs, they are indicative of the ability of firms to extract greater rents and profits (Oman,

2000).

In this view, competition for investment causes governments to offer investment incentives because they are forced to do so; otherwise, they risk losing investment to another state that is willing to provide a similar or better deal. Other scholars have looked at which types of locations offer incentives as part of an effort to evaluate whether incentives are necessary to compensate for otherwise less attractive investment locations, focusing on the effects of tax rates in particular (Bellak and Leibrecht, 2009; Blonigen and Davies, 2004; Egger et al., 2009; Mutti and Grubert, 2004). For example, Li finds that democracies are less likely to offer incentives, as they are more attractive investment locations with more stable policy regimes and more secure in legal and institutional features such as property rights. Moreover, Li finds that FDI inflows are negatively associated with investment incentives, so that places receiving more investment are less likely to offer incentives (Li and Resnick, 2003; Egan, 2010).

An additional literature has focused on the electoral incentives of leaders; Nate Jensen and Eddy Malesky, in particular, have focused on the electoral incentives of leaders to offer incentives as an explanation for their growth and persistence. By this logic, leaders know that investment incentives are not effective, or are least are skeptical that incentives are necessary to "seal the deal". However, politicians' political reward structures create a sub-optimal equilibrium in which voters are rationally ignorant about the effectiveness of investment incentives, and politicians continue to offer them in order to attract investment (Jensen et al., 2015; Jensen and Malesky, 2018). From this perspective, electoral incentives are not intended to actually shift investment decisions; instead, they are devices for credit-claiming and blame-shifting or electoral pandering by political leaders (Jensen and Malesky, 2018). Importantly, these political effects also seem to occur in developing countries and in authoritarian regimes, such as Vietnam. Rickard (2018) similarly argues that these political incentives, along with institutional features to channel voter preferences and business interests, are the cause of economic subsidies and broader economic policies that favor some industries over others.

Other authors have offered alternative perspectives, arguing that investment incentives may in fact reflect the development priorities of host country governments (Danzman and Slaski, 2021a). However, even in such cases, incentives may have limited use; the fundamental puzzle of why states offer so many inefficient incentives remains, especially when most firms claim that such incentives are not the deciding factor in their locational decisions UNIDO (2011). A final potential explanation lies in the bureaucratic politics of investment promotion agencies, with socialization and professional incentives explaining differences in the provision of incentives (Danzman and Slaski, 2021b). These studies challenge the idea that investment incentives, and broader kinds of economic subsidies, are best explained by

an electoral politics lens. Moreover, while the electoral politics literature has relied on the assumption that incentives are ineffective, it has not received an experimental test.

In short, there is an ongoing debate in the existing literature about the degree to which investment incentives shift investment decisions, if at all. However, very little of this work has tested the effectiveness of incentives in a quasi-experimental context; instead, much of the work has used firm surveys and observational studies. However, outside of firm surveys and observational studies, little work has looked at firm changes in response to an unexpected change to investment incentives. Moreover, the literature has focused on the developed world, with less focus on developing democracies; to the extent that developing countries have been studies, research has focused on electoral incentives of politicians, rather than the effectiveness of the incentives themselves.[1] Finally, little research has looked at both changes in incentives and investment flows simultaneously, to more plausibly test the role of incentives in creating patterns of investment.

Understanding whether or how investment policy can redirect investment to less developed regions is particularly important given the ongoing concentration of investment in agglomeration centers. As noted by others such as Osgood et al. (2017), investment by MNCs is highly concentrated and has become even more so over time. Locations that have the first-mover advantage are able to attract even more investment, in what becomes a positive feedback loop. At the most extreme, the competition for investment can become "winner take all" wherein single regions or even cities attract the vast majority of investment. These early locations have advantages such as ports or other favorable geographic features, improved infrastructure, an educated workforce, attractive policies, or simply luck that allowed them to develop a lead in investment flows. Moreover, there are network and agglomeration effects that make concentrating investment in locations with pre-existing investment sensible decisions for firms.

Focusing on sub-national economic clusters, we link our arguments to the early literature on "enclave economies" wherein particular regions or municipalities have linkages into the global economy that make them distinct from other areas (Kaufman and Ubiergo, 2001; Wibbels and Arce, 2003; Wibbels, 2006). Importantly, by looking only sub-nationally, we control for domestic institutions that may mediate the choice of investment location (Mosley, 2003; Rudra, 2008). We are thus able to focus on whether companies are willing to invest in more or less disadvantaged regions in the same country. We also argue that our findings about competition between locations for investment, while based on a subnational experiment, should have implications for cross-national investment flows and the effectiveness

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[1] A notable exception comes in the literature on special economic zones (SEZs) and export processing zones (EPZs) (Schrank, 2001; MOBERG, 2015).

of investment incentives for disadvantaged locations. While most of the existing literature has focused on national competition, some previous research has focused on fiscal competition generated through political decentralization (Li, 2016). Notably, we are not the first scholars to look at sub-national competition for investment; Jensen and Malesky have studied state-level competition in the US extensively (Jensen and Malesky, 2018). A previous experimental design in Russia focused on how different regions were allowed to cut taxes, finding mixed evidence that the non-discretionary tax cuts led to additional FDI but that discretionary cuts did not (Baccini et al., 2014). In a separate study, looking subnationally Russian subnational units, Baccini and coauthors found that, in the aggregate, targeted tax incentive programs did not lead to higher levels of foreign investment (Baccini et al., 2018). We build on these previous studies by studying sub-national competition for investment in Brazil.

In engaging with these existing theoretical approaches, we are making both an empirical contribution and an empirical one. We seek to evaluate the degree to which governments maintain the ability to tax and regulate MNCs as investment flows increase and firms grow increasingly mobile. As firms search for higher profits across the globe, do incentives merely represent transfers from states to international business? To what degree can disadvantaged locations catch up to advantaged ones that benefit from pre-existing networks of investment, positions within supply chains, domestic labor, and access to markets and natural resources?

# 3 Interstate Competition for Investment: Brazil's "Tax Wars"

Despite the enormous sums that are spent on investment incentives, we have relatively little evidence of their effectiveness. Because it is often difficult to obtain systematic data on investment incentives, this literature has relied on observational studies, small case studies, or survey experiments.[2] These data limitations have made it difficult to adjudicate between institutional and firm-level effects, particularly beyond the US context, where data availability issues are less pronounced and existing research is more developed (Hines, 1996). Most importantly, little of the existing research has been (quasi-)experimental, with a direct focus on firm responses to policy changes, creating challenges for causal inference.

Our ultimate outcome of interest is firm behavior, and in particular how firms respond to investment incentives. We examine this question in the context of Brazil,

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[2]One notable exception is that of Jensen and Malesky (2018) with their experiment on whether sub-national leaders in Vietnam are more willing to offer incentives when they are up for promotion; however, this experiment largely focused on the motivation to offer incentives, rather than their effectiveness.

one of the largest recipients of FDI in the developing world. Examining subnational competition between Brazilian states is instructive for broader patterns of competition over investment between and among states. Effective investment policy has the potential to reduce the gap between regions with differential levels of existing investment, with implications for economic inequality on a global scale. To that end, we focus on one claim frequently used to justify such programs: compensatory rewards for poor investment climates (Li, 2016).

Brazil is an ideal location in which to study the effects of incentives on FDI flows and agglomeration effects more broadly. Brazil is the largest recipient of investment in Latin America and the sixth largest in the developing world. Brazil has the world's ninth largest economy, with a range of different types of investment and a highly diversified economy, allowing us to evaluate FDI flows across a range of sectors. Brazil is a uniquely well-suited case to study investment incentives because its federal structure allows us to explore competition between states, especially given the range of levels of development across Brazilian states.

Brazil represents an important case of sub-national competition for investment projects, wherein states engage in "fiscal wars" as they compete for scarce investment projects. Brazil is also a particularly useful case for this analysis because its complex and decentralized tax system creates theoretically interesting variation in investment incentive packages at both the state and municipal level. Brazil has an extremely high level of inequality: with a Gini coefficient of 53, sub-national inequality is also very high: The federal district has a per capita income approximately 6.5 times that of the state with the lowest per capita income, Maranhão (for reference, the state with the highest per capita income, Massachusetts, has approximately a per capita income double that of Mississippi, the state with the lowest per capita reading). The state of São Paulo has an economy 185 times larger than that of the Brazilian state with the smallest economy, Roraima.[3]

The federal government has several incentive programs aimed at attracting foreign and domestic investment in priority sectors (mainly infrastructure and manufacturing) and disadvantaged regions (particularly the Northeast and Amazon), including free trade and export processing zones (EPZ) in Manaus and Bahia. The concerns about competition within a federal system have been substantial in Brazil, where corruption is high and sub-national inequality is vast. Brazil has offered more incentives than any other country in Latin America, partially as a result of the system of allowing competition among states for firm investment. In fact, Brazil is one of the canonical examples of sub-national competition for investment in Latin America, as highlighted by Thomas (2011). In fact, in one of the most famous cases, Ford received a 1.4 billion dollar investment incentive to locate in the state of Bahia

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[3]For reference, this is approximately double the difference in size between the size of the largest US state economy (California) and that of the smallest US state economy (Vermont).

(Jensen and Malesky, 2018). More broadly, Brazil's automotive industry, which compromises approximately 10% of GDP, has been the subject of case studies on the inefficiency of incentives in subnational competition for investment, such as the one by Rodriguez-Pose and Arbix (2001).

Competition between agglomeration centers and disadvantaged locations is particularly fierce in Brazil. São Paulo is the clear investment hub in Brazil: its 750 billion USD (nominal) GRP (gross regional product) represents approximately half of the country's economy and makes it nearly a "country within a country". Its GRP per capita of 13,000 USD is more than 50 percent higher than the average in the country and its 44 million people represent approximately a fifth of the Brazilian population. It hosts several of Brazil's leading universities, banks, and is deeply integrated into the national transportation and other infrastructure. São Paulo was also one of the most important initial centers of large-scale plantation style agriculture and the first state to transition towards industrialization. While several other locations have become smaller regional hubs, investment in Brazil is in many ways a story investing in São Paulo (and several other highly developed neighboring states, discussed in the next section) versus not investing in São Paulo. These factors make this region the clear economic hub of the country: out of 5209 investment projects in the period we study, 2208 went to São Paulo. According to a "race to the bottom" logic, locations in Brazil that are less attractive for investment, for reasons of underdevelopment, weaker institutions, or factors like limited infrastructure or a less educated workforce, would be expected to compete most aggressively for investment by using incentives because they are disadvantaged relative to states like São Paulo.

## 3.1  Conditions for Quasi–Natural Experiment

In this section, we review the complex tax structure in Brazil, including the conditions before and after the change in investment law, in order establish the conditions for a quasi-natural experiment. Subnationally, Brazilian states and municipalities long enjoyed substantial fiscal authority and have used their authority over specific sales taxes to extend incentive packages to investors on a case-by-case basis. Brazilian states and municipalities held authority over specific sales taxes, and they used their ability to set rates to attract investors. Brazil levels a variety of state and regional taxes, the most important of which (and the main focus of investment incentives) are value-added or indirect taxes (VAT). The most important VAT in Brazil is the ICMS (Imposto Sobre Circulação de Mercadorias e Serviços) the tax on the circulation of goods and transportation and communication services, a state sales tax, and its parallel ISS (Imposto sobre serviços) a municipal services tax. Brazilian states' capacity for incentivizing investment stems mainly from this tax, owing to

importance relative to other taxes.[4,5]

The headline ICMS by state can be quite high; the state of Sao Paulo had a rate of 18 percent and in 2011 the total amount was 8 percent of GDP. In 2010, the ICMS accounted for over 20 percent of all Brazilian tax receipts, or 8 percent of GDP (Melo, Pereira, and Souza 2010, pg. 68). Municipalities are empowered to impose three main taxes: a tax on service (ISS), on urban property (IPTU), and on transfer of real estate (ITBI). Moreover, there is a process of tax substitution by which taxes are collected at the initial stage rather than at other points along the supply chain, resulting in tax sharing to lower tax locations, making differences in interstate rates more extreme. Tax substitution of the ICMS is also common, with additional taxes being applied at the initial production site and credited later in the supply chain, rather than being charged at each step of the value chain that adds value to the product, a way to shift taxes to jurisdictions with lower rates (Seppala et al., 2014; Rezende, 2013; Poulsen, 2020). The Complementary Law 24/1975 was a law that any ICMS tax incentive granted by one state should be granted by all, as part of an agreement with the National Council of Fiscal Policy (CONFAZ). However, despite ongoing constitutional challenges, in practice many states granted such incentives regularly.[6]

The controversy of the fiscal war arises from the reduction of taxes, particularly the ICMS, at the state level (although similar debates exist over the ISS at the municipal level). In addition, other taxes (such as the COFINS and PIS, described below) are important because they are included in the calculation of the value upon which the ICMS will be levied. For decades, less developed Brazilian states have used changes in the ICMS rate, alongside other methods such as Free Trade Zones (most notably, one in Manaus and others in the Northeast) to incentivize investment in those regions. Numerous attempts have been made to reduce the effects of these differences in the ICMS, including a 2011 Supreme Court case that disallowed 14 such state incentives.[7]

Since then, challenges have occurred on a regular basis; however, the most central change came in 2017 with the Supreme Court case.[8] In March 2017, the

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[4]Two closely related taxes, used in the calculation of the ICMS, are the COFINS (Contribuição Para o Financiamento da Seguridade Social): social contribution for social security financing, and the PIS (Programa de Integração Social): employees' profit participation program.

[5]PWC Worldwide Tax Summaries: Brazil. "Corporate - Tax credits and incentives." 22 February 2021. Price Waterhouse Coopers.

[6]"New federal law aims to end "tax wars"". Deloitte. tax@hand. 08/10/2017. See also "The aftermath of Brazil's Supreme Court ruling on excluding ICMS when calculating COFINS and PIS. International Tax Review. March 30 2017 and Cubas, Renata Correia. "Tax wars in Brazil and the great expectations for 2018." January 30 2018

[7]Faro, Maurício Pereira. 2011. "Disputes over tax benefits and the position of Brazil's Supreme Court." BMA Law, International Tax Review.

[8]12/18/2017. Mattos Filho Lawyers. Memorandum to Clients: Tax. ICMS Convention nᵒ. 190/17 – Rules for the revalidation of ICMS Tax Benefits. See also "Brazilian tax authorities rule on the manner in which companies may exclude ICMS from PIS/COFINS tax basis Local contact." Ernst and Young

Brazilian Supreme Court ruled that states could no longer provide these incentives. This was followed by a Brazilian congressional ruling on 12 July 2017, wherein the Congress approved all the ICMS tax incentives currently granted and the passing of law (Complementary Law (CL) No. 160/2017) on 7 August 2017 which required that states publish all existing incentives, disallowing future incentives and permitting states to match any existing incentive, that even built on the Supreme Court decision.[9] This law was designed to level the playing field on the "fiscal wars" or "tax wars". This process effectively banned state differentiation in investment incentives. All states are now required to list their ICMS tax incentives publicly, in accordance with Complementary Law 160/2017 and CONFAZ Agreement 190/2017.

We evaluate whether disadvantaged locations are effective in their use of investment incentives to shift the decisions of investing firms. We argue that explanations for patterns of incentives and associated investment flows should reflect both the advantages of those locations and shifts in policy. If the unexpected removal of incentives shifts firm behavior to invest in hubs rather than disadvantaged locations, then it follows that incentives were effective. If not, then the incentives merely reduced tax revenue for those disadvantaged locations. We are interested in comparing sub-national differences in deals in Brazil before and after an unexpected change in investment law that restricted the ability of sub-national units to offer differentiated tax incentives. The findings inform our theoretical test of whether incentives counterbalance the effects of agglomeration by allowing disadvantaged areas to compete and "compensate" relative to other investment hubs. The contrasting argument is that these incentives have no effect on investment, and simply represent transfers to MNCs from the locations least able to afford the loss of tax revenue. In order to do so, we exploit a plausibly unexpected change in investment law that allows us to measure the effects on both investment incentive provision and FDI flows.

What effect did this unexpected event have on both investment and FDI flows and the provision of investment incentives? The result was that less advantaged states no longer had the ability to offer differentiated incentives. Because we have access to the data before and after the changes, we are able to assess the effects of eliminating laws that partially allow competition between states. Our primary goal in this analysis is to test whether firms respond to changes in investment policy. Notably, if firms are not sensitive to investment policies and incentives simply represent transfers of state revenues to firms, we should see no differences in the amount and pattern of investment after the change in investment law. Conversely, following a logic in which incentives compensate firms for a less attractive investment cli-

Global. 1 Nov 2018

[9]Marcus Melo. Carlos Pereira Saulo Souza. 2010. "The Political Economy of Fiscal Reform in Brazil: The Rationale for the Suboptimal Equilibrium" Inter-American Development Bank. See also Priyanka Kher and Peter Kusek. 2020. *2019 Investment Policy and Regulatory Review: Brazil.* World Bank Group.

mate implies that the poorest and least developed states of Brazil should receive less investment after the change in investment policy.

## 3.2 Testable Hypotheses

From the discussion of the literature above we derive the following testable hypotheses:

**Hypothesis 1** *The total amount of FDI will fall after the change in investment law.*

**Hypothesis 2** *The amount of FDI flowing into disadvantaged states will be the same after the change in investment law.*

# 4 Data

Our data includes data on the investment project, incentives, and Brazilian states. The unit of analysis is the state-sector-month. We use the most comprehensive database on incentives available[10] and examine the determinants of over twelve hundred deal-level incentives concluded in thirteen Latin American countries from 2010 to June 2021. Data are available at the monthly level, allowing us to measure the shifts in investment flows immediately before and after the announcement. This approach offers several advantages over previous research. Using deal-level financial incentive data, we explore the systematic covariates of state- and firm-level attributes that explain variations in FDI flows. We also capture the characteristics of the projects, as well as the political and economic conditions under which the investment is made, including the number of incentives in that state-sector-month.

Our dependent variable is FDI inflows from the fDiMarkets database. The incentives data comes from IncentivesWave (formerly Incentives Monitor). We include several characteristics of the firm and deal itself. First, defenders of incentive programs often emphasize the importance of investment for job creation. Jobs measures the expected employment generation of the investment project. Similarly, the size of the project indicates its potential impact on the economy; we therefore include the capital investment, in millions of dollars. FDI Project is an indicator variable that denotes investment deals between a host and a foreign firm. The FDI and incentives data is available from January 2010 to July 2021. There are a total of 5209 projects in the time period from January 2010 to July 2021 and total of 1660 investment incentives in that time period. A table of the number of projects in each state and each year is included in the appendix.

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[10] fDiMarkets data is a proprietary and comprehensive dataset of investment projects, with information on the location, investing company, and number of jobs.

We combine these data with regional controls for Brazil. While such controls are only partially available, we use them for the years that they are available, given that they are slow-changing measures. Our state-level variables measure concepts we believe should influence locational attractiveness. All Brazilian State data are from IGBE (The Brazilian Institute of Geography and Statistics.[11] We include state-level population (from the IGBE), Gross regional product per capita; state spending and revenue from the Tesouro (which are then logged). We assume that firms will want to invest in areas with a sufficient stock of skilled labor. To account for this, we include Education, which is measured as the percent of students age 11 to 14 years in the final stages of elementary education.education data, the IDEB (O Índice de Desenvolvimento da Educação Básica) a Brazilian indicator of state-level education (I use all schools at the 8th grade level).[12] Finally, we include per capital state per capita income in reais.[13]

We also include data from the IGBE about the share of each state's economy in a range of sectors, to capture whether investments are more likely to flow to places where other investments in that sector already exist.

In the primary analysis, we include six of the states that receive the largest amount of investment: São Paulo, Rio de Janeiro, Minas Gerais, Rio Grande do Sul, Parana, and the Federal District.[14] To test sensitivity, we include models which varying definitions of "agglomeration center" in the appendix that include subsets of these six states. All of these states, with the exception of the specially designated Federal District, are in the highly developed Southeast Region of Brazil. The remaining states that are "disadvantaged" are Mato Grosso, Santa Catarina, Mato Grosso do Sul, Espírito Santo, Goiás, Amazonas, Rondônia, Roraima, Tocantins, Amapá, Pernambuco, Rio Grande do Norte, Sergipe, Bahia, Acre, Pará, Ceará, Paraíba, Alagoas, Piauí, Maranhão.[15]

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[11]http://www.ibge.gov.br/english/ IBGE. Diretoria de Pesquisas, Coordenação de População e Indicadores Sociais.

[12]https://www.gov.br/inep/pt-br/areas-de-atuacao/pesquisas-estatisticas-e-indicadores/ideb

[13]Rendimento médio mensal real da população residente, com rendimento, a preços médios do ano.

[14]One of the challenges in this analysis is defining which states qualify as centers of agglomeration. While São Paulo and Rio de Janeiro are clearly agglomeration centers, and other states are clearly advantaged, other states could be classified as either advantaged or disadvantaged. The Federal District is a wealthy region; although it is not a state and is smaller, it is administratively similar to a state, the per-capita income is, in fact, nearly double that of São Paulo, due to the high number of jobs for the federal government. While its economy is based on government services, its high level of development makes it a potential candidate for agglomeration, second only to the Federal District, which is both significantly smaller and much more heavily reliant on public spending, given its role as the capital. We include it in robustness checks.

[15]Municipal data are also available; we plan to use these data in extensions.

# 5 Empirical Approach

We present the data and outline in greater detail our methodological approach here. Our primary methodological approach is that of differences-in-differences in order to explore the systematic co-variates of state- and firm-level attributes that explain variations in patterns of enacted investment incentives. The key assumption in such an approach is that of "parallel trend": that both the disadvantaged states and agglomeration centers of Brazil would have continued on the same separate trends, had it not been for the natural experiment of the change in investment law resulting from the Supreme Court Case.

As outlined above, our theory about the politics of investment incentives generates a particular set of expectations about how firm and country level factors influence patterns of investment flows. We test this theory by using data on foreign investment and investment incentives as described above. Further, we harness the variation in Brazilian federal states to measure the co-variates that predict investment incentive packages and associated investment decisions at both the state.

## 5.1 Model Specification

We proceed in this section by describing the strengths and limitations of our outcome variable. After providing some basic descriptive information about the outcome variables and the dataset from which they are drawn, we discuss our operationalization strategy to test the hypotheses introduced in the previous section. We then provide results of our cross-national empirical tests.

We estimate a series of equations that take the following basic form:

$$FDIFlows_{ims} = \alpha + \beta_1 Agglom_i + \beta_2 PostInvLaw_m + \beta_3 Agglom*PostInvLaw_{im} + \beta_4 Incentives_{ims} + \beta_5 SHostState_{im} + \beta_6 Investment_{ims} + \beta_7 Sector_{ims} + \epsilon_{ims}$$

For state i, month m, and sector s.

Wherein FDI inflows are the count of investments in that state-sector-month, $\alpha$ represents the intercept and $\epsilon$ is the error term, $Agglom$ is an indicator variable to indicate states that are agglomeration centers, as described above. $PostInvLaw$ is an indicator variable indicating time periods after the change in investment law, and the interaction of these two terms represents the difference-in-difference estimator. $Incentives$ represents the number of incentives in a given sector-state-month, matched with the sector of investments in that state-month. $HostState$ include a vector of theoretically relevant measures of the economic and political investment

climate in the federal state. Note that the state data is only partial for 2020, resulting in a reduced sample size. *Investment* represents other characteristics of the investment, particularly the number of jobs created and amount of capital. Finally, we use the fDiMarkets definition of *Sector*.

# 6   Results

We begin with a visual comparison of the investment before and after the change in investment law.

The number of projects per state are graphed in 2016 and 2018; the results are similar, with São Paulo continuing to receive the vast majority of investment, with little change in investment flows to the rest of the country. This provides preliminary visual evidence that incentives were ineffective in influencing firm decision making on investment locations.

Number of FDI Projects Across All Sectors, Brazilian States, 2016
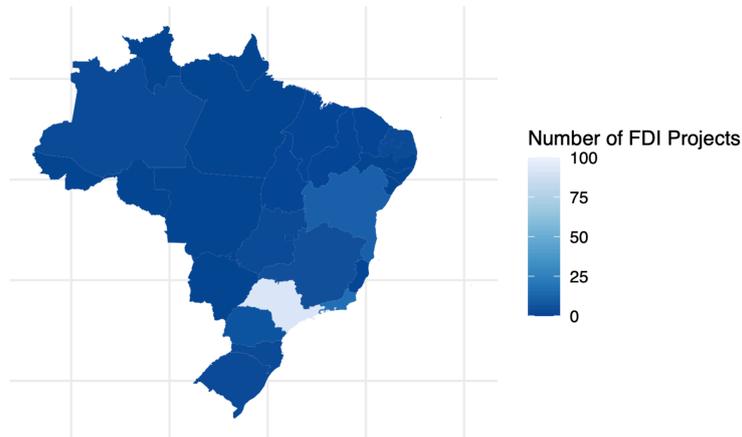


Number of FDI Projects Across All Sectors, Brazilian States, 2018
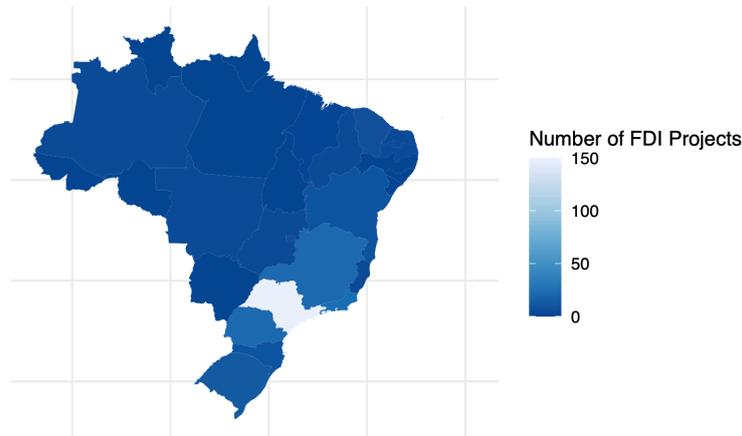


Figure 1: **Investment Projects in Brazil Before the Change in Investment Law**
The figure displays the number of investment projects in Brazil in 2016 and 2018,
before and after the change in investment law. The light state represents São
Paulo.

The main results are presented in table 1. The models are presented in sequential order; model 1 simply presents the difference-in-difference estimator, with no other controls. The results show, unsurprisingly, that agglomeration centers receive more investment. They also show a small decrease in total investment after the supreme course decision. The difference-in-difference interaction term shows

that there is actually a small decrease in investment flows to agglomeration centers after the change in investment law. Model 2 includes the number of investment incentives as a control; the results are unchanged. Model 3 includes controls for the sector of the investment; again, the results are unchanged. Model 4 includes controls for the state, including the population, per-capita income, education score, state spending, and state revenue. The agglomeration center term switches signs, likely because these controls are capturing many of the factors that account for the relative economic advantage of the state. Finally, model 5 includes the sectoral percentage that already exists in the state (table 10 in the appendix includes interactions of the existing sectoral percentages with the sector of the investment). In these models, the difference in difference term is no longer significant, indicating that the shift in investment law did not impact investment flows; by extension, this implies that firms were not responding to investment incentives.

Table 1

| | Dependent variable: | | | | |
|---|---|---|---|---|---|
| | FDI | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Agglomeration Center | 0.065*** | 0.065*** | 0.065*** | −0.014*** | −0.011*** |
| | (0.002) | (0.002) | (0.002) | (0.003) | (0.003) |
| Post–Supreme Court Decision | −0.005*** | −0.005*** | −0.005*** | 0.002 | 0.003 |
| | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) |
| Agglomeration Center x | −0.015*** | −0.015*** | −0.015*** | 0.002 | 0.001 |
| Post Supreme Court Decision | (0.003) | (0.003) | (0.003) | (0.003) | (0.005) |
| Incentives Count | | 0.0001 | 0.001 | 0.006** | 0.013** |
| | | (0.003) | (0.003) | (0.003) | (0.006) |
| Population | | | | 0.000*** | 0.000*** |
| | | | | (0.000) | (0.000) |
| Per Capita Income | | | | 0.00002*** | 0.00003*** |
| | | | | (0.00000) | (0.00000) |
| Education Score (IDEB) | | | | 0.004** | 0.001 |
| | | | | (0.002) | (0.002) |
| State Revenue (logged) | | | | 0.003*** | 0.003*** |
| | | | | (0.0004) | (0.0005) |
| State Spending (logged) | | | | −0.038*** | −0.045*** |
| | | | | (0.002) | (0.002) |
| Sector Percent | | | | | 0.002*** |
| | | | | | (0.0002) |
| Constant | 0.015*** | 0.015*** | 0.002 | 0.709*** | 0.878*** |
| | (0.001) | (0.001) | (0.003) | (0.034) | (0.043) |
| Sector Controls | | | X | X | X |
| Observations | 161,240 | 161,240 | 161,240 | 83,520 | 64,368 |
| $R^2$ | 0.014 | 0.014 | 0.038 | 0.095 | 0.101 |
| Adjusted $R^2$ | 0.014 | 0.014 | 0.038 | 0.095 | 0.100 |

*Note:* *p<0.1; **p<0.05; ***p<0.01
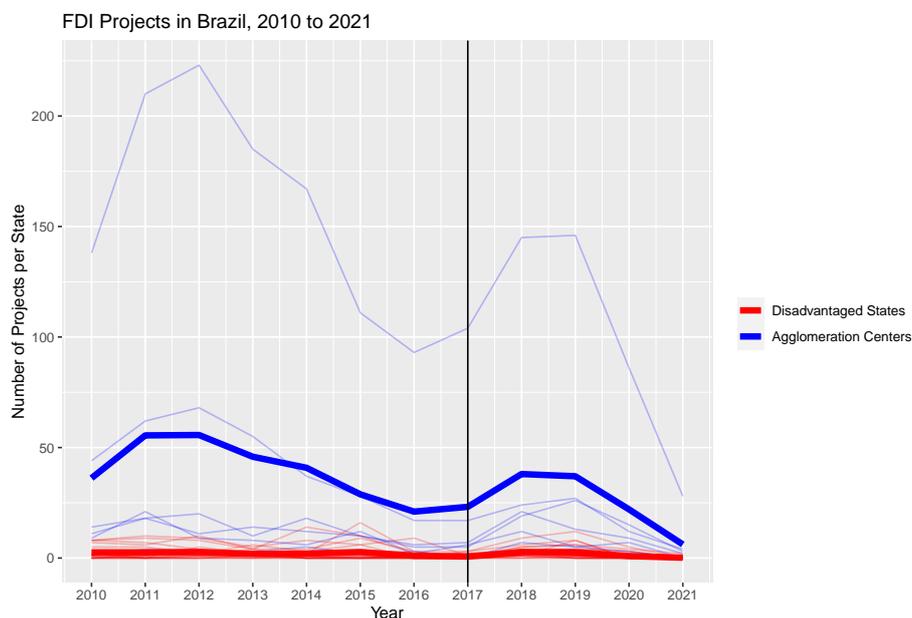
Figure 2: **Investment Projects in Brazil Before the Change in Investment Law**
Patterns of investment seem unchanged before and after the law. The bold lines represent averages; the light lines represent individual states. The top light blue line is the state of São Paulo.

Figure 2 above shows a visual representation of investment flows over time. Again there appears to be little shift in investment before and after the change in investment law.

The appendix presents summary statistics in table 2. Moreover, the number of FDI projects per state is available in table 3 and the number of investment incentives per state in table 4. Table 5-8 present the same models as the primary one, but with progressively expanding definitions of "agglomeration center". The six states we define as agglomeration center, based on both their income and level of development and the amount of investment, are São Paulo, Rio de Janeiro, Minas Gerais, Rio Grande do Sul, Parana, and the Federal District. Table 5 begins with only São Paulo and Rio de Janeiro, then tables 6-8 progressively add in the additional states. The findings are not affected by the different definitions of "agglomeration center".

Table 9 presents the same models, but using the passage of the new investment in Congress rather than the Supreme Court Case, to assess whether using an alternative "cutoff" for the natural experiment affects the results. The results remain similar to the primary results. Table 10 presents an interaction model, interacting incentives with the agglomeration center to determine if the effects are conditional, and also including an interaction of incentives and the post-investment law period, to assess whether the effect of incentives is temporally conditional. Notably, incen-

tives become significant, although only at the 90 percent level. Continuing through the appendix, Table 11 includes both the number of jobs and amount of capital as controls. Finally, table 12 presents the results dropping states that are "not specified" and sectors that are "not specified", given that many projects are in unspecified states; again the results are substantively the same.

Returning to the hypotheses, there is little support for **H1**; in fact, the total amount of investment grew after the ruling. However, there is support for **H2**: there is no change in the amount of investment flowing to disadvantaged states before and after the change in investment law. In total, the results provide consistent strong evidence that investment incentives are ineffective, undermining claims that they are potential ways to assistant disadvantaged states.

# 7 Discussion

While we believe there is value to a quasi-natural experiment to explore the effect on the removal of investment incentives on FDI flows, we also take seriously the problems that arise from such analysis. In particular, one concern may be challenges to the conditions for the natural experiment. Importantly, for the conditions for the quasi-natural experiment to be valid, the ruling and subsequent change in investment law must have been unexpected. Otherwise, businesses would begin to adjust investment decisions and move investment projects before the change in investment laws, making any comparisons of FDI flows before and after invalid. While the evidence in news coverage points to surprise about the ruling as unexpected, there are still a number of potential challenges to the ruling as constituting a sharp discontinuity. First, the ruling was presaged by a number of other challenges to Brazilian investment law. The Brazilian Supreme Court ruled in June 2011 that state-supplied tax subsidies related to interstate commerce are unconstitutional in the absence of consent from the National Council of Fiscal Policy (Confaz). In response, the Ministry of Finance proposed to set interstate goods taxes nationally. In June 2015, federal lawmakers approved a constitutional amendment that sets tiered ICMS rates for interstate sales. However, none of these rulings had the same significance as the 2017 ruling, although they may have caused some investments to be shifted in advance of the 2017 ruling. Conversely, the fact that the previous rulings had occurred and proven to be minor could have made the 2017 ruling even more surprising.

One puzzle is that the number of incentives not only does not appear to impact the amount of investment a state receives, but also that the number of incentives does not seem to correlate with whether states are disadvantaged or not. São Paulo, the main agglomeration center of Brazil, offers 68 incentives, even though that state would appear to have no difficulty securing investment. The state that offers

the largest number of incentives – Mato Grosso do Sul, at 314 – is not a disadvantaged location and already received substantial amounts of investment. Locations in the relatively poor Northeast of Brazil, including Pernambuco (226) and Bahia (126) provide an extremely high number of incentives. However, other neighboring states, like Ceara (11) and Paraiba (12) offer far fewer. It is not clear what the differences are between these states, which are geographic neighbors and share similarities in their economies. It is possible that different states have different strategies for attracting investment, or that once paths of offering incentives begin, it is difficult to change. However, more research is necessary to understand why ostensibly similar states appear to adopt such different strategies to attract investment.

In addition, it should be noted there are two temporally close events, each of which county be considered as the discontinuity: the Supreme Court ruling and the change in investment law. Although separated by only three months, it is unclear which of these events led to the shift in investment flows. We therefore run the analysis with both events as the discontinuity and compare the effects in the appendix. Moreover, only a few years of data are available following the change in investment law, limiting the scope of the analysis. The time period also includes the pandemic, which reduced the amount of investment inflows and may also contaminate the findings.

It is also important to recall the relative rarity of both incentives and investment. Out of 161,240 state-sector-months, only around 2.6 percent have an investment project. Moreover, some of the states are so small as to offer few incentives and receive very little investment. For example, the state of Roraima has only 1 project in the entire dataset; by contrast, São Paulo has 2195. Because the disadvantaged states have so few projects, it may be difficult to detect whether they are receiving even less investment than they did before the shift in in- vestment law. Finally, our analysis is sub-national; while we use the results to apply lessons to cross-national analysis, it is possible that sub-national competition may be structurally different from cross national competition (Basinger and Hallerberg, 2004).

It should be noted that this is a case study of a country that already receives substantial amount of FDI, with pre-established centers of agglomeration. It is possible that incentives function differently in novel destinations, where no particular location has established itself as the hub for investment. It's also possible that the effect is difficult to observe because disadvantaged areas simply don't receive much investment to begin with, therefore any changes are relatively small. The effects thus might be more visible in other contexts with smaller gaps between advantaged and disadvantaged locations. A further possible reason why agglomeration states came out favorably is that once other states' incentives became public, agglomeration centers were able to outbid them, given their more substantial resources. In addition, although we include several years in the data after the investment, it's possible that

the lag time was insufficient to show difference in investment flows.

Given that this experiment is being conducted in one country, it is worth discussing the conditions for external validity. Brazil is a large developing, middle-income country, and a middle power. Our findings would be most directly applicable to other medium size developing countries with high inequality; however, the results should also be informative for the entire world. However, there are some notable features of Brazil that may limit generalizability, Brazil is notable for not having signed any BITs, a defining feature of investment law in the global South. Brazil also has a federal system, and its possible that this has separate effects, as well as the difficulty of comparing sub-national and cross-national incentives. Brazil is famous for its "Custo Brasil", the name for its high level of red tape which may not apply to other countries with simpler tax systems. The structure of the Brazilian tax system is also unique; because of its high tax rates, incentives represent a reduction from that high "headline" rate, rather than other form of incentives such as subsidies.

It is possible that these results are unique to Brazil or that there were unaccounted-for trends that occurred in this period. It is also important to note that Brazil was in a deep recession in the 2015-2017 period. Moreover, there may be structural reasons that prevent easy comparison between Brazil and other developing countries, including its high level of inequality, forms of federalism, or the structure of its incentive programs. The differences in differences approach would be contaminated if something else had been happening at this same time. Perhaps it is easier (or, given the geographic distances and complex legal frameworks within Brazil, more difficult) to move sub-nationally than cross nationally.

Finally, the ruling did not abolish incentives, but merely "froze" existing incentives. In fact, the total number of incentives in 2018 is still quite high when compared to 2016. It is possible that incentives were shifted to other programs, given that this experiment is focused only on ICMS. That is, investment incentives were transferred into other programs, as one channel was closed off. It is notable that the total number of incentives fell from 193 in 2017 to 152 in 2018, but then rose to 257 in 2019. Therefore, investment incentives appear to be continued to be offered, even after the change in investment law, possibly making the natural experiment less effective than was expected. In the conclusion, we discuss the external validity of the findings and the challenges in applying the lessons from Brazil to other countries in the developing world.

# 8   Conclusion

In this paper, we have engaged with a growing body of research that has examined the effectiveness of incentives in inducing firms to invest in a specific country, state, or municipality. That literature has largely sought to explain tax incentives as a puzzle, given their high cost, and evidence that incentives are unimportant relative to other locational factors. We advance the field, which has largely used cross-national observational studies or firm surveys, with the use of a quasi-natural experiment in Brazil. Moreover, we expand the discussion of investment incentives, which has focused on advanced industrial countries, to the developing world. While we look sub-nationally, we include a discussion of the potential extensions for the rest of the developing world. Our results indicate that the loss of decentralized fiscal authority does not affect the process of agglomeration, and that regions with high preexisting levels of investment continued to receive higher levels of investment flows after the change in investment law, with minimal changes resulting from the loss of the ability to offer differentiated incentives. This leads the conclusion that incentives reinforce inequality between investment locations, rather than allowing disadvantaged locations to catch up.

We argue that given that, despite the unique features of Brazil, our quasi-experiment remains a valid test of the effectiveness of investment incentives. Because it has such fierce competition for investment, and because the use of investment incentives is such an important policy strategy, it represents a "mostly likely" case. In fact, it is often cited as the representative example of subnational competition for investment and the "overuse" of incentives. Therefore, we argue that our quasi-experiment provides credible evidence that investment incentives are relatively ineffective in developing country contexts.

More work needs to be done to understand both how sub-national states are designing investment policy and how firms respond to that policy. Most notably, there is heterogeneity among the disadvantaged states with regards to the number of investments that are offered, with some states offering very few and some offering many. Why did some disadvantaged states offer so many incentives, despite receiving so little investment? In addition, why do the agglomeration centers, such as São Paulo, offer incentives when they already receive so much investment?

An additional area of future research entails exploring the differences among sectors. Although the sectoral effects are not significant in these models, it is possible that the models are obscuring important differences in particular sectors, such as those that are more capital-intensive. For example, Brazil is particularly well known for its competition for automotive manufacturing projects. It is also possible that incentives are effective in particular sectors, but that, given the small number of projects, the effects are difficult to capture. Additional work needs to be done to

explore the causal mechanisms, including deeper research on the heterogeneity both across and within advantaged and disadvantaged states, as well as the process that firms went through when deciding what role incentives should play in their locational decision before and after the change in investment law.

Our findings have important implications for policy debates about investment incentives and their importance in fostering development. The results support the claim that public funds spent on incentives are better redirected to other forms of spending – education, health, or infrastructure – that more directly foster development. Our paper also speaks to the effects of agglomeration economies and potential efforts to combat the forces that drive inequality between "havea" and "have-not" investment locations. In attempting to combat the effects of agglomeration, less developed states are unlikely to find investment incentives to be an effective tool. Instead, other forms of redistribution or coordinated national investment policy that reduces subnational competition may be more effective strategies. Future work should continue to explore how to reduce the inequality between locations, given that investment trends appear to continue to exacerbate these differences.

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# 9  Appendix

Table 2

| Statistic | N | Mean | St. Dev. | Min | Pctl(25) | Pctl(75) | Max |
|---|---|---|---|---|---|---|---|
| FDI Count | 161,240 | 0.026 | 0.212 | 0 | 0 | 0 | 10 |
| Incentives | 161,240 | 0.010 | 0.197 | 0 | 0 | 0 | 28 |
| Income | 103,680 | 1,678.935 | 574.493 | 757.000 | 1,307.250 | 1,926.250 | 4,189 |
| Sector Percent | 104,976 | 6.693 | 5.756 | −0.900 | 2.300 | 9.500 | 31.300 |
| Education Score | 120,000 | 4.217 | 0.551 | 2.900 | 3.800 | 4.700 | 5.500 |
| Revenue (Log) | 103,200 | 24.384 | 1.707 | 22.052 | 23.229 | 24.840 | 30.611 |
| Spending (Log | 103,680 | 23.637 | 0.953 | 21.750 | 22.966 | 24.117 | 26.278 |
| Jobs | 3,162 | 203.090 | 435.958 | 0.000 | 22.000 | 210 | 9,000 |
| Capital | 3,162 | 84.668 | 239.978 | 0.100 | 4.600 | 69.900 | 6,800 |

Table 3

| | Destination State | sum_incentives |
|---|---|---|
| 1 | Alagoas | 96 |
| 2 | Amazonas | 165 |
| 3 | Bahia | 126 |
| 4 | Ceara | 11 |
| 5 | Distrito Federal | 1 |
| 6 | Espirito Santo | 55 |
| 7 | Goias | 43 |
| 8 | Maranhao | 5 |
| 9 | Mato Gross | 3 |
| 10 | Mato Grosso | 10 |
| 11 | Mato Grosso do Sul | 314 |
| 12 | Minas Gerais | 77 |
| 13 | Para | 3 |
| 14 | Paraiba | 12 |
| 15 | Parana | 114 |
| 16 | Pernambuco | 226 |
| 17 | Piaui | 10 |
| 18 | Rio de Janeiro | 20 |
| 19 | Rio Grande do Norte | 12 |
| 20 | Rio Grande do Sul | 232 |
| 21 | Rondonia | 2 |
| 22 | Santa Catarina | 29 |
| 23 | Sao Paulo | 68 |
| 24 | Sergipe | 9 |
| 25 | Tocantins | 16 |
| 26 | Unspecified | 1 |

Table 4

|  | Destination.state | FDI_Count_sum |
|---|---|---|
| 1 | Acre | 2 |
| 2 | Alagoas | 10 |
| 3 | Amapa | 8 |
| 4 | Amazonas | 98 |
| 5 | Bahia | 145 |
| 6 | Ceara | 58 |
| 7 | Espirito Santo | 42 |
| 8 | Federal District | 47 |
| 9 | Goias | 49 |
| 10 | Maranhao | 19 |
| 11 | Mato Grosso | 31 |
| 12 | Mato Grosso do Sul | 20 |
| 13 | Minas Gerais | 262 |
| 14 | Not Specified | 970 |
| 15 | Para | 35 |
| 16 | Paraiba | 15 |
| 17 | Parana | 197 |
| 18 | Pernambuco | 114 |
| 19 | Piaui | 18 |
| 20 | Rio de Janeiro | 541 |
| 21 | Rio Grande do Norte | 43 |
| 22 | Rio Grande do Sul | 158 |
| 23 | Rondonia | 6 |
| 24 | Roraima | 1 |
| 25 | Santa Catarina | 98 |
| 26 | Sao Paulo | 2, 208 |
| 27 | Sergipe | 5 |
| 28 | Tocantins | 9 |

Table 5

| | Dependent variable: | | | | |
|---|---|---|---|---|---|
| | FDI | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Agglomeration Center | 0.188*** | 0.188*** | 0.188*** | 0.042*** | 0.055*** |
| | (0.002) | (0.002) | (0.002) | (0.004) | (0.004) |
| | | | | | |
| Post-Supreme Court | −0.004*** | −0.004*** | −0.004*** | 0.005*** | 0.007*** |
| | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) |
| | | | | | |
| Incentives Count | | 0.002 | 0.003 | 0.006** | 0.013** |
| | | (0.003) | (0.003) | (0.003) | (0.006) |
| | | | | | |
| Population | | | | 0.000*** | 0.000*** |
| | | | | (0.000) | (0.000) |
| | | | | | |
| Per-Capita Income | | | | 0.00001*** | 0.00002*** |
| | | | | (0.00000) | (0.00000) |
| | | | | | |
| Education Score (IDEB) | | | | 0.006*** | 0.003 |
| | | | | (0.002) | (0.002) |
| | | | | | |
| State Revenue (Log) | | | | 0.002*** | 0.002*** |
| | | | | (0.0004) | (0.0004) |
| | | | | | |
| State Spending (Log) | | | | −0.036*** | −0.043*** |
| | | | | (0.002) | (0.002) |
| | | | | | |
| Agglomeration Center x Post Supreme Court | −0.062*** | −0.062*** | −0.062*** | −0.010** | −0.019*** |
| | (0.004) | (0.004) | (0.004) | (0.005) | (0.007) |
| | | | | | |
| Constant | 0.015*** | 0.015*** | 0.003 | 0.696*** | 0.849*** |
| | (0.001) | (0.001) | (0.003) | (0.032) | (0.039) |
| | | | | | |
| Sector Controls | | | X | X | X |
| Observations | 161,240 | 161,240 | 161,240 | 83,520 | 64,368 |

Note:                                                                 *p<0.1; **p<0.05; ***p<0.01

Table 6

| | FDI | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Agglomeration Center | 0.128*** | 0.128*** | 0.128*** | −0.020*** | −0.015*** |
| | (0.002) | (0.002) | (0.002) | (0.003) | (0.004) |
| Post–Supreme Court | −0.005*** | −0.005*** | −0.005*** | 0.003* | 0.005** |
| | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) |
| Incentives Count | | 0.002 | 0.003 | 0.005** | 0.013** |
| | | (0.003) | (0.003) | (0.003) | (0.006) |
| Population | | | | 0.000*** | 0.000*** |
| | | | | (0.000) | (0.000) |
| Per-Capita Income | | | | 0.00002*** | 0.00002*** |
| | | | | (0.00000) | (0.00000) |
| Education Score (IDEB) | | | | 0.006*** | 0.003 |
| | | | | (0.002) | (0.002) |
| State Revenue (Log) | | | | 0.003*** | 0.003*** |
| | | | | (0.0004) | (0.0004) |
| State Spending (Log) | | | | −0.041*** | −0.048*** |
| | | | | (0.001) | (0.002) |
| Agglomeration Center x Post Supreme Court | −0.035*** | −0.035*** | −0.035*** | 0.001 | −0.009 |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.006) |
| Constant | 0.015*** | 0.015*** | 0.003 | 0.793*** | 0.943*** |
| | (0.001) | (0.001) | (0.003) | (0.031) | (0.038) |
| Sector Controls | | | X | X | X |
| Observations | 161,240 | 161,240 | 161,240 | 83,520 | 64,368 |

*Note:* $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Table 7

| | FDI | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Agglomeration Center | 0.097*** | 0.097*** | 0.097*** | −0.013*** | −0.011*** |
| | (0.002) | (0.002) | (0.002) | (0.003) | (0.003) |
| | | | | | |
| Post-Supreme Court | −0.005*** | −0.005*** | −0.005*** | 0.003* | 0.005** |
| | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) |
| | | | | | |
| Incentives Count | | −0.001 | 0.00001 | 0.006** | 0.013** |
| | | (0.003) | (0.003) | (0.003) | (0.006) |
| | | | | | |
| Population | | | | 0.000*** | 0.000*** |
| | | | | (0.000) | (0.000) |
| | | | | | |
| Per-Capita Income | | | | 0.00002*** | 0.00002*** |
| | | | | (0.00000) | (0.00000) |
| | | | | | |
| Education Score (IDEB) | | | | 0.005*** | 0.002 |
| | | | | (0.002) | (0.002) |
| | | | | | |
| State Revenue (Log) | | | | 0.003*** | 0.003*** |
| | | | | (0.0004) | (0.0004) |
| | | | | | |
| State Spending (Log) | | | | −0.039*** | −0.047*** |
| | | | | (0.001) | (0.002) |
| | | | | | |
| Agglomeration Center x Post Supreme Court | −0.026*** | −0.026*** | −0.026*** | 0.002 | −0.004 |
| | (0.003) | (0.003) | (0.003) | (0.004) | (0.005) |
| | | | | | |
| Constant | 0.015*** | 0.015*** | 0.002 | 0.749*** | 0.907*** |
| | (0.001) | (0.001) | (0.003) | (0.032) | (0.039) |
| | | | | | |
| Sector Controls | | | X | X | X |
| Observations | 161,240 | 161,240 | 161,240 | 83,520 | 64,368 |

*Note:* *p<0.1; **p<0.05; ***p<0.01

Table 8

| | *Dependent variable:* | | | | |
|---|---|---|---|---|---|
| | FDI | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Agglomeration Center | 0.081*** | 0.081*** | 0.081*** | −0.011*** | −0.011*** |
| | (0.002) | (0.002) | (0.002) | (0.003) | (0.003) |
| Post−Supreme Court | −0.005*** | −0.005*** | −0.005*** | 0.002 | 0.004 |
| | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) |
| Incentives Count | | −0.001 | −0.0003 | 0.006** | 0.013** |
| | | (0.003) | (0.003) | (0.003) | (0.006) |
| Population | | | | 0.000*** | 0.000*** |
| | | | | (0.000) | (0.000) |
| Per-Capita Income | | | | 0.00002*** | 0.00002*** |
| | | | | (0.00000) | (0.00000) |
| Education Score (IDEB) | | | | 0.005*** | 0.002 |
| | | | | (0.002) | (0.002) |
| State Revenue (Log) | | | | 0.003*** | 0.003*** |
| | | | | (0.0004) | (0.0004) |
| State Spending (Log) | | | | −0.039*** | −0.046*** |
| | | | | (0.002) | (0.002) |
| Agglomeration Center x Post Supreme Court | −0.020*** | −0.020*** | −0.020*** | 0.004 | 0.001 |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.005) |
| Constant | 0.014*** | 0.014*** | 0.002 | 0.735*** | 0.892*** |
| | (0.001) | (0.001) | (0.003) | (0.033) | (0.040) |
| Sector Controls | | | X | X | X |
| Observations | 161,240 | 161,240 | 161,240 | 83,520 | 64,368 |

*Note:* *p<0.1; **p<0.05; ***p<0.01

Table 9

| | *Dependent variable:* |
| | FDI |
| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Agglomeration Center | 0.065*** | 0.065*** | 0.065*** | −0.014*** | −0.011*** |
| | (0.002) | (0.002) | (0.002) | (0.003) | (0.003) |
| | | | | | |
| Post−Supreme Court | −0.005*** | −0.005*** | −0.005*** | 0.002 | 0.003 |
| | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) |
| | | | | | |
| Incentives Count | | 0.0001 | 0.001 | 0.006** | 0.013** |
| | | (0.003) | (0.003) | (0.003) | (0.006) |
| | | | | | |
| Population | | | | 0.000*** | 0.000*** |
| | | | | (0.000) | (0.000) |
| | | | | | |
| Per-Capita Income | | | | 0.00002*** | 0.00003*** |
| | | | | (0.00000) | (0.00000) |
| | | | | | |
| Education Score (IDEB) | | | | 0.004** | 0.001 |
| | | | | (0.002) | (0.002) |
| | | | | | |
| State Revenue (Log) | | | | 0.003*** | 0.003*** |
| | | | | (0.0004) | (0.0005) |
| | | | | | |
| State Spending (Log) | | | | −0.038*** | −0.045*** |
| | | | | (0.002) | (0.002) |
| | | | | | |
| Agglomeration Center x Post Supreme Court | −0.015*** | −0.015*** | −0.015*** | 0.002 | 0.001 |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.005) |
| | | | | | |
| Constant | 0.015*** | 0.015*** | 0.002 | 0.709*** | 0.878*** |
| | (0.001) | (0.001) | (0.003) | (0.034) | (0.043) |
| | | | | | |
| Sector Controls | | | X | X | X |
| Observations | 161,240 | 161,240 | 161,240 | 83,520 | 64,368 |

*Note:* *p<0.1; **p<0.05; ***p<0.01

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Table 10

| | Dependent variable: | |
|---|---|---|
| | FDI | |
| | (1) | (2) |
| Agglomeration Center | −0.017*** | −0.017*** |
| | (0.003) | (0.003) |
| Post–Supreme Court | 0.005** | 0.005** |
| | (0.002) | (0.002) |
| Incentives Count | 0.013* | 0.013* |
| | (0.007) | (0.007) |
| Population | 0.000*** | 0.000*** |
| | (0.000) | (0.000) |
| Per-Capita Income | 0.00002*** | 0.00002*** |
| | (0.00000) | (0.00000) |
| Education Score (IDEB) | 0.001 | 0.001 |
| | (0.002) | (0.002) |
| State Revenue (Log) | 0.003*** | 0.003*** |
| | (0.0004) | (0.0004) |
| State Spending (Log) | −0.047*** | −0.047*** |
| | (0.002) | (0.002) |
| Agglomeration Center x Post Supreme Court | 0.003 | 0.003 |
| | (0.004) | (0.004) |
| Agglomeration Center x Incentives Count | 0.012 | 0.012 |
| | (0.019) | (0.019) |
| Post Supreme Court x Incentives Count | −0.002 | −0.002 |
| | (0.012) | (0.012) |
| Constant | 0.942*** | 0.942*** |
| | (0.042) | (0.042) |
| Sector Controls | X | X |
| Observations | 64,368 | 64,368 |
| Note: | *p<0.1; **p<0.05; ***p<0.01 | |

Table 11

| | Dependent variable: | | | | |
|---|---|---|---|---|---|
| | FDI | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Agglomeration Center | 0.065*** | 0.065*** | 0.055*** | −0.010*** | −0.008*** |
| | (0.002) | (0.002) | (0.001) | (0.003) | (0.003) |
| Post–Supreme Court | −0.005*** | −0.005*** | −0.004*** | 0.0005 | 0.002 |
| | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) |
| Incentives Count | | 0.0001 | 0.0004 | 0.004* | 0.007 |
| | | (0.003) | (0.002) | (0.002) | (0.005) |
| Jobs | | | 0.001*** | 0.001*** | 0.001*** |
| | | | (0.00001) | (0.00001) | (0.00002) |
| Capital | | | 0.001*** | 0.001*** | 0.002*** |
| | | | (0.00002) | (0.00003) | (0.00004) |
| Population | | | | 0.000*** | 0.000*** |
| | | | | (0.000) | (0.000) |
| Per–Capita Income | | | | 0.00002*** | 0.00002*** |
| | | | | (0.00000) | (0.00000) |
| Education Score (IDEB) | | | | 0.003** | −0.0001 |
| | | | | (0.002) | (0.002) |
| State Revenue (Log) | | | | 0.003*** | 0.002*** |
| | | | | (0.0004) | (0.0004) |
| State Spending (Log) | | | | −0.033*** | −0.038*** |
| | | | | (0.001) | (0.002) |
| Agglomeration Center x Post Supreme Court | −0.015*** | −0.015*** | −0.014*** | −0.001 | −0.001 |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.004) |
| Constant | 0.015*** | 0.015*** | 0.001 | 0.628*** | 0.728*** |
| | (0.001) | (0.001) | (0.003) | (0.032) | (0.038) |
| Sector Controls | | | X | X | X |
| Observations | 161,240 | 161,240 | 161,240 | 83,520 | 64,368 |

Note: *p<0.1; **p<0.05; ***p<0.01

Table 12

| | Dependent variable: | | | | |
|---|---|---|---|---|---|
| | FDI | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Agglomeration Center | 0.076*** | 0.076*** | 0.076*** | −0.014*** | −0.011*** |
| | (0.001) | (0.001) | (0.001) | (0.003) | (0.003) |
| Post−Supreme Court | −0.0005 | −0.0005 | −0.0005 | 0.002 | 0.003 |
| | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) |
| Incentives Count | | 0.002 | 0.002 | 0.006** | 0.013** |
| | | (0.002) | (0.002) | (0.003) | (0.006) |
| Population | | | | 0.000*** | 0.000*** |
| | | | | (0.000) | (0.000) |
| Per-Capita Income | | | | 0.00002*** | 0.00003*** |
| | | | | (0.00000) | (0.00000) |
| Education Score (IDEB) | | | | 0.004** | 0.001 |
| | | | | (0.002) | (0.002) |
| State Revenue (Log) | | | | 0.003*** | 0.003*** |
| | | | | (0.0004) | (0.0005) |
| State Spending (Log) | | | | −0.038*** | −0.045*** |
| | | | | (0.002) | (0.002) |
| Agglomeration Center x Post Supreme Court | −0.019*** | −0.019*** | −0.019*** | 0.002 | 0.001 |
| | (0.003) | (0.003) | (0.002) | (0.003) | (0.005) |
| Constant | 0.004*** | 0.004*** | −0.004 | 0.709*** | 0.878*** |
| | (0.001) | (0.001) | (0.003) | (0.034) | (0.043) |
| Sector Controls | | | X | X | X |
| Observations | 150,120 | 150,120 | 150,120 | 83,520 | 64,308 |

Note: *p<0.1; **p<0.05; ***p<0.01