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Determinants of the Cost of Starting a Business in Mexico*

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Abstract: We construct a panel data at the state level in Mexico for the years 2006, 2008 and 2011 in order to investigate the impact that entry deregulation efforts have on the cost of opening new businesses in Mexico, where this cost is taken from the Doing Business in Mexico report of the World Bank. Using a model that the controls for the financial strength of the states, market profitability, regional fixed effects, and considering endogenous effects, we find that the measures of entry deregulation are strongly associated with a reduction in the cost of opening a new business.
Keywords: Deregulation; Cost of Opening New Businesses; GDP per capita.
JEL Classification: L88, O25, C33, O10.

Resumen: Se construye un panel para las entidades federativas en México con información de 2006, 2008 y 2011 a fin de investigar el impacto que esfuerzos de desregulación para facilitar la apertura de empresas ejercen sobre los costos de abrir empresas, donde estos costos se toman del reporte Doing Business in Mexico del Banco Mundial. Utilizando un modelo que controla por la fortaleza financiera de las entidades federativas, la rentabilidad potencial de un mercado, efectos fijos regionales, y que considera efectos endógenos, encontramos que las medidas de desregulación están fuertemente asociadas con una reducción en el costo de abrir nuevas empresas.
Palabras Clave: Desregulación; Costos de Abrir Nuevos Negocios; PIB per cápita

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1. Introduction

Recent literature suggests that lowering the Costs of Starting Businesses (CSB) in market economies tends to foster growth and employment through different channels. Some research shows, for instance, that when the CSB decreases, the entry of firms to formal markets becomes easier encouraging the creation of new firms, increasing business density, and improving the productivity of existing firms.[1] Other research shows, in turn, that reforms aimed at lowering the CSB tend to positively affect the level of investment in industries such as transportation, communications, and the provision of services, sectors which are identified as tending to preserve and promote competition.[2] Likewise, other works report that more efficient regulations for firms' registration in formal markets increase productivity and performance at the macroeconomic level.[3]

The main message of this literature, namely, that lowering the CSB through improved regulation (or deregulation) tends to boost production and employment, turns out to be of interest for a country like Mexico, where, according to World Bank data, the referred costs differ significantly among its states.[4] The magnitude of such differences is such that its elimination may result in higher levels of productivity and employment.[5] Considering the above, this work reviews the impact of recent deregulation efforts on the CSB in the Mexican states.

Although we recognize that there is already some literature focusing on the impact of deregulation efforts on the CSB in Mexico, it is also the case that the existing work has focused mainly on explaining the impact that a specific program of the Mexican Government aimed at facilitating the opening of new businesses, -named the Rapid Business Opening System, or *Sistema de Apertura Rápida de Empresas* (SARE)[6]- has had on the *opening-up rate* of formally registered firms. Kaplan et al (2006), for instance, use data of firms and employees registered at the Mexican Social Security Institute (IMSS, for its acronym in Spanish) from 2000 to 2006, and report that the SARE's

[1] See World Bank (2012); Klapper et al (2009); Klapper et al (2006); Bruhn (2008).
[2] See Alesina et al (2005).
[3] See Loayza et al (2005); Restuccia (2011); Barseghyan and Di Cecio (2011).
[4] These costs are presented in the reports *Doing Business in Mexico* 2007, 2009 and 2012, published by the World Bank. In these reports the World Bank also presents data at the state level regarding the costs of: i) obtaining building permits; ii) registering property; and, iii) ensuring contract enforcement. It should be pointed out that the *Doing Business* report of the World Bank calculates, for comparison purposes at the international level, an "Ease of Doing Business Index" (EDBI) which considers, besides the four indicators mentioned above, the indicators relative to: v) the costs to obtain energy; vi) easiness to obtain bank credit; vii) investors protection; viii) tax compliance; ix) cross-border trade; and x) resolve disputes. This EDBI, however, is only calculated for the countries' capitals, which implies that the data for Mexico indeed correspond to the Federal District.
[5] The *Doing Business* 2012 of the World Bank ranks Mexico 36th among 185 countries in "business set-up costs", which could be considered quite acceptable. However, this figure, just as indicated in the previous footnote, refers to the Federal District data. Within the country, however, the differences in start-up costs are significant, varying not only across states, but also across time. This variation is the one we are interested in this work.
[6] Section 2 presents a more detailed description of this program.

adoption increased the opening-up rate of formal businesses in Mexico by 4 to 9 percent. Another example is Bruhn (2008), who uses data from the Economic Census and the National Occupation and Employment Survey of INEGI for the period 2000-2004 and reports that adopting the SARE has led to a higher number of formally registered firms, lower consumer prices and revenues of already established businesses, and higher income for workers who had been previously outside the labor market. Likewise, the Federal Commission of Regulatory Improvement (COFEMER, for its acronym in Spanish), which is the Mexican government agency in charge of promoting the policy of regulatory improvement in Mexico and of managing the SARE, released a study in 2011, using data for five federal States for the period 2009-2010, that reports a positive impact of SARE's implementation over the amount of economic units in the formal sector of the economy.[7]

In contrast to existing work, our research looks at the link between the CSB in Mexico and deregulation efforts. In particular, we use panel data of these costs *at the state level* for the years 2006, 2008 and 2011, taken from the World Bank's reports *Doing Business in Mexico* (DBM) 2007, 2009, and 2012 respectively[8], to study how they react to changes in the regulatory framework for setting-up firms, where these changes are captured via the adoption or not of the SARE program. In our estimates, we control for states' financial solvency, state's per capita income levels, and we also include regional fixed effects to consider for the possible effect of local factors on the costs of setting-up new businesses. [9,10] Furthermore, we use instrumental variables as a method of estimation in order to take into account two possible endogeneity problems: i) the possible endogenous relationship between the CSB and per capita GDP; and ii) the possibility that states that would benefit the most from the implementation of deregulatory measures, could have been also the first ones in implementing them (overestimating the impact on the CSB), or could have been those already with lower CSB (underestimating the impact on the CSB). Our estimates suggest that efforts aimed at facilitating the entry of new businesses in Mexico via the adoption of the SARE program effectively tend to reduce the CSB.

The paper is organized as follows. Section 2 reviews some recent literature which links the CSB to deregulation efforts. Section 3 presents the definitions as well as some statistical features of the variables we will employ for our estimates. Section 4 describes the empirical model, while section 5 shows the results and a discussion of their robustness. Section 6 concludes.

[7] See COFEMER (2011).

[8] For convenience, throughout the document we will refer to the Federal District as a "state".

[9] We must acknowledge that the list of explanatory variables used in our analysis was driven mainly by data availability.

[10] Regarding this local dynamics, see Banco de México (2012).

2. Deregulation Efforts and the Cost of Starting a Business: A Brief Literature Review

Economic growth depends critically on the Schumpeterian process of creative destruction, process which, as it is well known, is associated to factors that facilitate or complicate the creation of new firms. On this regard, the evidence suggests that when the creation of new firms is facilitated (obstructed), economic growth tends to be higher (lower) (Hause and Du Rietz, 1984; Black and Strahan, 2002; Fullerton et al, 2007; Licerio et al, 2010); and this connection is what lies behind our exploration on the possible determinants of the CSB.

The study of the determinants of the CSB contemplates an array of aspects, both at the theoretical and empirical level. In this literature, factors such as the level and quality of regulation, the legal environment, the level of corruption, political instability, fiscal distortions, income levels, etc., have been thoroughly analyzed using aggregate as well as micro data.[11] Notwithstanding the variety of factors that could possibly affect the dynamics of the CSB, our focus in this paper will be to analyze, for the Mexican case, the potential effect of deregulation efforts on the former variable. In particular, we will attempt to capture the extent to which our deregulatory effort variable, measured through the adoption or not of the SARE program, affects the CSB.

On this subject, theoretical work by Fonseca et al (2001) shows that fewer restrictions to starting new firms reduce the costs of their start-ups, which in turn increase the number of entrepreneurs, lower the share of the population willing to belong to the working class, and boost jobs creation.

These theoretical results find empirical support on research presented by Klapper et al (2006, 2009), Bruhn (2008), and the World Bank (2012), in which it is shown that improved regulations designed to ease business openings reduce the CSB, facilitate the entry of new firms to formal markets, increase business density and improve the productivity of the existing firms. Likewise, work by Alesina et al (2005) reports that efforts aimed to facilitate firms' registration to formal market tend to increase aggregate productivity.

Motta et al (2010), in turn, review the findings of three types of studies which quantify the effects of implementing a single window regimen (the type of deregulation scheme implemented in Mexican states via the SARE) on the costs of starting a business, and report that: (i) fewer permits are associated with lower costs of setting-up a business and with a higher entry rate; (ii) the above propitiates that a greater share of new firms survives and grows; (iii) new businesses increase competition, forcing the existing firms to become more efficient -or face extinction-, which in turn

[11] See Klapper et al (2009).

results in higher levels of investment and productivity; and (iv) that reforms intended to facilitate the entry of businesses into a market will tend to have a greater impact when accompanied by measures designed to improve the investment environment. The studies reviewed by Motta et al cover microeconometric analyses that establish direct links between reforms to facilitate the entry of businesses and changes in the economic activity, econometric studies that use panel data across countries to examine the average effect of entry barriers on the economic activity, as well as studies at the firm level that relate business demography with economic activity.

In summary, theoretical arguments as well as empirical evidence suggest that deregulation strategies help reduce the CSB. Based on these arguments, we review the Mexican case in order to explore whether recent modifications to the regulatory environment related to the opening of new firms, have had an impact on the CSB. If so, this would certainly be a good sign for the economic prospects of the Mexican economy.

3. Definitions and Statistical Features of Our Data

This section reviews features of the CSB in the Mexican states, the SARE program, and also of some of those variables that will be used as controls in our estimates. Once we have a better understanding of the data we have available, we move to the model specification and estimation stages.

3.1. The Dependent Variable: Concept and Measurement of CSB at the State Level in Mexico

Trying the capture accurately the CSB is a complex task given the amount of variables that should be taken into account for that objective. And the task complicates even further once we move from national to subnational level data. Fortunately, in the Mexican case the World Bank has been working for several years to produce a consistent data set on the CSB in the Mexican states. In what follows, we review the main features of the methodology employed by the World Bank to estimate the CSB in the Mexican states, since this variable is at the core of our estimations.

The first factor worth specifying regarding the CSB measurement is the type of business it refers to. In this regard, the DBM report points out that the CSB refers to the cost of opening-up a firm with the features described in Table 1. That is, it refers to a variable capital company which operates in the most relevant business center of the state, carries out industrial or commercial activities, leases

its plant or offices, and that after one month of starting its operations it has a minimum of 10 and a maximum of 50 employees, among other characteristics.[12]

Table 1: Features of the Businesses to be Opened, according to DBM Report

1.	Is a limited liability company. The most popular form among domestic firms is the *Sociedad Anónima*.
2.	Operates in the state's most important city for business.
3.	100% domestically owned and has 5 owners, none of whom is a legal entity.
4.	Has start-up capital of 10 times income per capita at the end of 2010, paid in cash.
5.	Conducts general industrial or commercial activities, such as the production or sale of products or services to the public. It does not perform foreign trade activities and dos not handle products subject to a special tax regime, for example, liquor or tobacco. The business is not using heavily polluted production processes.
6.	Leases the commercial plant and offices and is not a proprietor of real estate.
7.	Does not qualify for investment incentives or any special benefits.
8.	Has between 10 and 50 employees 1 month after the commencement of operations, all of them nationals.
9.	Has a turnover at least 100 times the state's income per capita.
10.	Has a company deed 10 pages long.

Sources: Prepared with data from DBM 2012 of the World Bank.

Another relevant aspect regarding the calculation of the CSB has to do with the different formalities and procedures (and their respective costs) that need to be complied with in order to start a "representative" business. Table 2 presents, as an example, the requirements that must be met to set up a new business in the Federal District with the features mentioned in Table 1, as well as the costs of each procedure. As it can be seen, 6 procedures must be complied within the Federal District, with four of them having a monetary cost: (i) obtaining the permit to use the registered name and the articles of incorporation draft online; (ii) procedures related to register the company in the Business Information System of the Ministry of Economy; (iii) the notarization of articles of incorporation of the business (which includes the company's listing in the Federal Taxpayers' Registry (RFC, for its acronym in Spanish); and (iv) the registration of the business in the Public Registry of Property and Commerce. The remaining procedures and formalities, most of them at the federal level, are free of charge.

Table 2: Procedures Required to Open a New Business in the Federal District

No.	Procedures	Cost
i.	Register the company name and file the draft deed of incorporation online.	$965.00
ii.	Sign the deed of incorporation with a Public Notary, obtain Tax Registry Number (RFC) and file the deed of incorporation with the Public Register of Commerce.	$12,020.00
iii.	Register to the Mexican Social Security Institute (IMSS).	No fee
iv.	Register with the local tax administration (Secretaría de Finanzas de Gobierno de Distrito Federal) for payroll tax.	
v.	Notify the local government (Delegación) online of the opening of the mercantile establishment.	No fee
vi.	Register with the National Business Information Registry (Sistema de Información Empresarial, SIEM)	$385.00

Source: Prepared with data from DBM 2012 of the World Bank.

[12] It is worth mentioning that in the DBM report, the CSB is estimated for the most important city in each state, which generally is the capital city. This is a common practice in the *Doing Business* reports. In the case of Mexico, the CSB corresponds to 21 state capitals.

Meanwhile, if we review the required procedures to set up a company in each of the remaining 31 states, we find that the number of procedures is very similar: it ranges from 5 to 8 procedures, with 4 or 5 of them (depending on the state) implying a monetary cost. Table 3 presents the procedures which may involve a monetary cost and the number of states which charge those costs. According to the table, in all states a certain cost is charged for procedures (i) through (iv), while the cost of obtaining the operating license is only applied in 16 states. Notice also that procedures (i) and (ii) have the same costs in the 32 states, since that they are federal procedures; while categories (iii), (iv) and (v) have differentiated costs.[13]

Table 3: Features of Firms to be Opened according to DBM

No.	Procedures	Minimum	Maximum	n
i.	Obtain the authorization for the company name from the Ministry of Foreign Affairs (Secretaria de Relaciones Exteriores).	$965.00	$965.00	32
ii.	Register the company in the Mexican System of Business Information (Sistema de Información Empresarial, SIEM).	$385.00	$385.00	32
iii.	Legalize the company status (sign the deed of incorporation) and obtain Tax registry Number (RFC).	$4,500.00	$16,811.00	32
iv.	Register the company statutes with the Public Registry of Commerce.	$227.00	$14,620.00	32
v.	Obtain operational license.	$57.00	$1,716.00	16

n: States in which cost of process is different from zero.

Source: Own calculation with data from DBM 2012 of the World Bank.

The methodology used to obtain the CSB at the state level is likely to generate doubts on whether it really captures the actual cost of opening a new business. For instance, the fact that the CSB considers only the *monetary costs* of setting up firms may be criticized since it does not capture the opportunity cost of the time invested by economic agents to comply with the required formalities to open up a firm. This opportunity cost may be high and closely related to the number of procedures and formalities to be satisfied in the business set-up, and they could make an important difference between the monetary and the real cost of opening the business.

Despite the above, we consider that analyzing the monetary cost is still a useful exercise for two reasons: first, because it represents a component of the real cost of a business start-up; and, second, because it is also the only source of information that we know of which allows integrating a panel of the CSB at the state level in Mexico.

[13] It is important to mention that these costs only consider those required by the law; i.e., do not consider other type of costs, such as those related to business construction or rent, operating costs, bribes, etc.

Table 4 presents the CSB in the Mexican states for the years 2006, 2008 and 2011, where it is readily seen that there are significant differences of the variable among the states .[14]

Table 4: CSB Levels at the State Level as % GNI Per Capita 2006, 2008 and 2011
Maximum, Minimum and Average (percentage points)

States	Cost (% of Gross national income per capita)			Absolute Change in Cost	Relative Change in Cost. (%)
	2006	2008	2011	2011 vs. 2006	2011 vs. 2006
Aguascalientes	13.2	11.4	16.2	3.0	23.1
Baja California	38.4	26.7	26.6	-11.7	-30.6
Baja California Sur	15.3	14.8	12.4	-2.8	-18.5
Campeche	8.5	7.4	6.0	-2.5	-29.8
Chiapas	13.0	12.1	9.7	-3.3	-25.3
Chihuahua	28.0	25.6	21.4	-6.5	-23.3
Coahuila	21.4	21.0	12.8	-8.6	-40.3
Colima	12.4	11.3	9.6	-2.7	-22.0
Distrito Federal	14.2	12.5	11.2	-3.0	-21.1
Durango	24.9	24.4	23.4	-1.4	-5.8
Estado de México	25.2	22.6	9.3	-15.8	-62.9
Guanajuato	9.4	8.7	7.1	-2.3	-24.5
Guerrero	17.1	15.9	13.9	-3.2	-18.7
Hidalgo	17.4	15.8	14.4	-3.0	-17.4
Jalisco	9.3	8.3	6.9	-2.3	-25.2
Michoacán	9.7	9.7	6.7	-3.0	-30.9
Morelos	11.7	11.4	9.2	-2.5	-21.7
Nayarit	20.3	19.0	17.0	-3.3	-16.3
Nuevo León	17.5	15.7	13.7	-3.8	-21.9
Oaxaca	-	12.6	11.4	-1.2	
Puebla	10.6	9.4	7.9	-2.7	-25.1
Querétaro	12.6	11.2	8.9	-3.7	-29.4
Quintana Roo	12.8	11.5	9.8	-3.0	-23.7
San Luis Potosí	15.2	13.0	11.6	-3.6	-23.6
Sinaloa	21.7	21.1	20.0	-1.7	-7.9
Sonora	10.6	9.7	8.4	-2.1	-20.2
Tabasco	18.7	17.0	9.5	-9.1	-48.9
Tamaulipas	16.1	16.0	14.4	-1.8	-11.0
Tlaxcala	12.1	10.6	6.5	-5.6	-46.5
Veracruz	-	12.5	9.5	-3.1	
Yucatán	9.7	9.3	7.4	-2.3	-23.6
Zacatecas	8.5	7.2	8.1	-0.3	-3.8
Maximum	38.4	26.7	26.6	3.0	23.1
Minimum	8.5	7.2	6.0	-15.8	-62.9
Max-Min	29.9	19.4	20.7	18.9	86.0
Average	15.8	14.2	11.9	-3.7	-23.2
Std. Deviation	6.8	5.4	5.1	3.5	15.1

Source: Prepared with data from DBM 2006, 2008 and 2011.

[14] It should be pointed out that to facilitate comparisons, the DBM expresses the CSB data in the states as a percentage of per capita gross national income, scale which we maintain throughout the document.

For instance, taking 2006 as a reference, it is observed that the maximum value of the CSB is 38.4 percent of the gross national income (GNI) per capita (posted by Baja California), while the minimum equals to 8.5 percent (posted by Zacatecas); in 2008, the maximum value is 26.7 percent (Baja California) and the minimum is 7.2 percent (Zacatecas); while for 2011 the values are 26.6 percent (Baja California) and 6 percent (Campeche), respectively. It is noteworthy that the average CSB value falls moderately throughout the period, shifting from 15.8 percent in 2006 to 11.9 percent in 2011; and the same is observed with the standard deviation, which goes from 6.8 to 5.1 percent in the referred years.

Another relevant aspect of Table 4 is that the CSB dropped across practically all the states, with the State of Mexico, Baja California, Tabasco, Coahuila, Chihuahua and Tlaxcala registering the largest absolute declines (in all cases, above 5 percentage points). Only Aguascalientes recorded an increment in the CSB by shifting from 13.2 percent in 2006, to 16.2 percent in 2011. In relative terms, the states with the largest reductions are also the ones indicated above, with the exception of Chihuahua, which is now replaced by Michoacán. In these states, the reduction in the CSB was above 30 percent. Finally, Table 4 reveals also that despite the changes in the CSB through time, the rankings of 2006 and 2011 are not radically different, as suggested by a Spearman's correlation coefficient of 0.85.

Therefore, the DBM data reveal considerable variability in the CSB when comparisons across states are made within the same year, and also that their absolute levels register a moderate downward trend practically across the entire country, although without observing yet a leveling in these absolute levels.

3.2. The SARE Program

As indicated earlier, there is a variety of arguments supporting the hypothesis that deregulatory efforts can contribute to reduce the costs of entry of new firms which, in turn, can encourage their creation and therefore increase productivity, production and employment. It goes also without saying that the measurement of deregulation efforts is a complex task, and more so when one attempts to follow up these efforts over time. Despite all of the above, in the case of Mexico it is possible to resort to a relatively simple measure of deregulatory effort in the form of the adoption or not of the SARE program. The SARE, which is a program established by COFEMER in 2002, consists in setting up a single window (i.e., a "one stop shop") to carry out various procedures required *at the municipal level* to facilitate the entry of new firms (see Table 5 for a description of the main elements of the program), and whose implementation seeks to promote the "establishment

of a differentiated regulation that would reduce the cost of entry of new firms that pose low risks to health, environment or civil protection."[15]

Table 5: SARE Features

i) Single window regimen, "One stop shop".
ii) Identification of risk level per economy activity, deregulating as much as possible those with low or zero risk.
iii) Single application form and subjection to the cost-benefit analysis according to the requirements and formalities established.
iv) Maximum time resolution (72 hours).
v) Adjustments to the regulations and to the municipal operations for the formal establishment of SARE.
vi) Post-authorization checks for the start of operations.

Source: Prepared with data from COFEMER.

Since the SARE is implemented at the municipal level, before presenting our definition of deregulatory efforts that we will adopt in our analysis, we should review the correspondence between state capitals and municipalities for which the CSB data are available. This information is presented in Table 6. The referred table shows in column (I) the state to which each municipality belongs to and for which the CSB was estimated; column (II) presents municipalities for which the DBM estimated the CSB and in which the SARE was also adopted; and column (III) shows, for each municipality, the year in which the SARE was adopted. According to the table, the first state to adopt the SARE and for which the DBM also estimated the CSB was Puebla in 2002, followed by Aguascalientes, the State of Mexico and Jalisco in 2003. The last state in adopting the SARE and for which the CSB is provided is Tlaxcala, in 2011. By that year, only 3 states (in the sample) had not adopted the SARE (the Federal District, Nayarit and Oaxaca).

Given the above, we now move on to define our two measures of deregulatory effort that will be considered in our analysis. The first one, identified as DEREG1, is the number of years over which the program has been instrumented in a given state with respect to years 2006, 2008 and 2011[16]. The second, called DEREG2, is simply a dummy variable that takes the value of 1 if a state has adopted the SARE, and zero otherwise.

Taking as an example the information for the state of Guerrero in Table 6, obtaining our two deregulation variables would be as follows. Under the first definition, and given that the SARE was implemented in Guerrero in 2007, DEREG1 takes a value of zero in 2006 (since SARE had not been adopted), a value of 1 in 2008 (one year after SARE's adoption) and a value of 4 in 2011 (4

[15] COFEMER (2011), p.8.

[16] It must be stressed that the SARE is adopted at the municipal level. However, to facilitate our discussion we will be referring to it as it were being adopted at the state level. Also, keep in mind that the DBM estimates the CSB only for the most "representative" municipality in each state.

years after SARE's adoption). Under the second definition, DEREG2 takes a value of zero in 2006, and a value of one in both 2008 and 2011.

By virtue of the fundamental goal of the SARE, which is "to reduce the regulatory cost in the start-up of those businesses that represent a low risk to health, environment or civil protection", [17] we expect our measures of deregulatory effort to be negatively related to the CSB; i.e., the deregulatory efforts (captured via the years over which SARE has been implemented, or via the implementation or not of the SARE) should be reflected in lower CSB.

Table 6: States that Implemented the SARE and Year of Adoption

	States (I)	Municipality (II)	Adoption of SARE (III)
1	Aguascalientes	Aguascalientes	2003
2	Baja California	Tijuana	2005
3	Baja California Sur	La Paz	2005
4	Campeche	Campeche	2004
5	Chiapas	Tuxtla Gutiérrez	2005
6	Chihuahua	Ciudad Juárez	2006
7	Coahuila	Torreón	2004
8	Colima	Colima	2005
9	Distrito Federal	Ciudad de México	NA*
10	Durango	Durango	2006
11	Estado de México	Tlalnepantla de Baz	2003
13	Guanajuato	Celaya	2004
12	Guerrero	Acapulco	2007
14	Hidalgo	Pachuca de Soto	2004
15	Jalisco	Guadalajara	2003
16	Michoacán	Morelia	2004
17	Morelos	Cuernavaca	2005
18	Nayarit	Tepic	NA*
19	Nuevo León	Monterrey	2005
20	Oaxaca	Oaxaca de Juárez	NA*
21	Puebla	Puebla	2002
22	Querétaro	Querétaro	2004
23	Quintana Roo	Cancún	2010
24	San Luis Potosí	San Luis Potosí	2004
26	Sinaloa	Culiacán	2005
25	Sonora	Hermosillo	2004
27	Tabasco	Villahermosa	2005
28	Tamaulipas	Matamoros	2005
29	Tlaxcala	Tlaxcala	2011
30	Veracruz	Veracruz	2006
31	Yucatán	Mérida	2004
32	Zacatecas	Zacatecas	2005

*NA: Program has not been adopted.
Source: Prepared with data of DBM and COFEMER.

[17] COFEMER (2011), p.8.

3.3. Control Variables

In our estimations, we included as control variables state's public revenues, state's per capita income, and regional effects. The reasons for including these variables as controls are indicated next.[18]

i) Public Revenue at the State Level ("ingpub_pc"). It is well-known that public revenues at the state level in Mexico (as a proportion of GDP) are among the lowest in Latin America and the OECD. Another feature of such revenues in Mexico is that most of them (around 85 percent) stem from federal transfers via branches 28 (revenues) and 33 (expenditures) of the Expenditure Budget of the Federation (Presupuesto de Egresos de la Federación) even when state governments hold the authority to apply different taxes as well as their rates.

Despite the fact that Mexican states obtain most of their revenue from federal sources, significant differences are observed across states relating to revenues raised from their own sources. For example, while in 2010 the state of Tlaxcala barely obtained 2 percent of their total revenue via local taxes, in the Federal District this level amounted to 36 percent. Although these differences could derive from several factors, it is possible that the low level of state revenues (measured in per capita terms) could be reflecting a weak financial position of the states. In this situation, one may argue that authorities could be forced to increase total taxes by various means, such as increasing the number and/or the cost of the permits required to set up businesses. That is, a *tax-collection motive* could induce increases in the CSB. Undoubtedly, this motive could be socially undesirable, but the need for resources that frequently arises in many states could encourage authorities to use the quantity and/or the cost of permits for this purpose. We have not found direct bibliographic references analyzing this effect, and therefore our analysis might be considered as a contribution to the literature on the determinants of the costs of starting business.[19]

ii) Per capita GDP ("GDP_pc"). It is possible that local authorities have incentives to appropriate a fraction of the income that a new business may generate. Hence, higher per capita state GDP might be associated with a higher purchasing power, which in turns could increase the profitability of a business. From this viewpoint, states in which businesses have a higher probability to obtain more revenue, captured through a higher per capita GDP, the cost of the permits will be higher. The

[18] We must acknowledge that the inclusion of only these variables as controls was due to data availability.

[19] We found, however, a study (Joyce and Mullins, 1991) establishing that the structure of local government funding changes over time in response to the local environment and to the amount of revenue from federal transfers.

above implies, again, that efficiency and/or equity considerations are left aside since the goal of local authorities is to obtain as much resources as possible.[20]

iii) Other Variables. Four regional dummy variables ("Northern", "North-Central", "Central" and "Southern") are also considered in our model in an attempt to control for all other factors that may affect the CSB in a given region but that are different from those explicitly considered so far. Theoretically, if the variables explicitly identified in our model accounted for all variety of start-up costs, the coefficients of our four dummy variables should not be statistically different from zero. In addition, we include the "homicide rate" to determine to what extent such variable may affect the CSB.[21,22]

iv) Instrumental variables. At this point, it is convenient to mention that there is also a subset of instrumental variables that will be considered in our estimations. These instrumental variables are state's average education ("schooling"), wage inequality ("inequality"), and number of days required to start a business in a given state ("days"). With these variables, we attempt to control for possible endogeneity issues among some of the explanatory variables, issues which we will explain in more detail below.

The definitions and sources of the variables to be used in our estimations [CSB, per capita GDP ("GDP_pc"), per capita public revenues ("ingpub_pc"), homicide rate per 100,000 inhabitants ("homicides"), average schooling ("schooling"), wage inequality ("inequality") and the number of days required to start up a business in the state ("days")] are presented in Table 7. This table identifies two groups of control variables. The first one includes "GDP_pc", "ingpub_pc" and "homicides", which are the variables identified as direct controls in our estimates. The second group includes "schooling", "inequality", and "days", which will be used as instruments.

[20] The relevance of the previous two motives to account for the CSB must not be ignored. If evidence supports the *tax-collection motive*, it would point to the fact that weak local public finances indeed have a negative impact on managing small and medium-size businesses. On the other hand, if evidence is found supporting the *revenue appropriation motive*, this would imply that local governments which seek to appropriate resources from entrepreneurs could be discouraging the rate of new business start-ups. In other words, the need to address the revenue weaknesses and/or the wish to appropriate income, by reducing the rate of setting-up new businesses, would be affecting the potential long-term growth of an economy. A similar idea (although in a different context) was proposed by Bender and Shwiff (1982), who claim that local governments appropriate part of the rents generated by boomtowns.

[21] There is evidence suggesting that governments increase their defense, security and justice system expenses when homicide rates are high (González and Posada, 2001; Vargas and García-Pinzón, 2008). Thus, another possible explanation is that when the homicide rate is high, local governments need more funds to fight the negative effects generated by these problems, and therefore, holding other fund revenues constant, they have incentives to establish higher CSB. Other references studying the economics of crime are Shapiro (1999), Brand and Price (2000), and Lewis and Davodi-Far (2008).

[22] As a measure of insecurity levels we employed the homicide rate per 100,000 population, instead of a composite index, since other measures of criminality in Mexico register huge sub-reports (ICESI, 2009), which might generate larger measurement error issues.

Table 7. Variables Definition

	Variable:	Definition:	Sources:
	DEREG1	Time (measured in years) that SARE has been implemented with respect to 2006, 2008 and 2011.	COFEMER
	DEREG2	Indicator variable which takes value 1 when the state adopted SARE, zero otherwise.	COFEMER
Group 1	**GDP per capita by state** *GDP_pc*	Average state GDP in 2003 Pesos (measured in millions), divided by population.	INEGI and CONAPO
	Public revenues per capita by state *ingpub_pc*	Public state revenue at 2003 prices, divided by population. Public state revenues are the sum of net tax income, rights, improvements, products, contributions for improvements, as well as net revenues (federal share), federal contributions, other revenues on behalf of third parties, financing and initial availability.	INEGI and CONAPO
	Homicides by state *homicides*	Homicide rate per 100,000 population, by state.	INEGI
Group 2	**Average education by state** *schooling*	Average years of schooling, by state.	SEP
	Wage inequality by state *inequality*	Working population with less than 2 minimum wages, divided by working population with more than 5 minimum wages, by state.	ENOE-INEGI
	Days to start up a business in the entity *days*	Days required to complete all necessary procedures to open a new business in a state.	World Bank

Source: Authors' elaboration.

3.4. Descriptive Statistics

Table 8 shows simple averages for 2006, 2008 and 2011 for each of the variables considered in our study grouped in the four regions that Banco de Mexico adopts in its "Reporte sobre las Economías Regionales": Northern, North-Central, Central and Southern.[23] The table reveals first that the average CSB is higher in the Northern region, and lower in the Southern region. A similar pattern is observed for "DEREG1", "DEREG2", "GDP per capita" and "schooling". Regarding "ingpub_pc", the states of the North-Central and Southern regions register higher averages; while the highest levels of "homicides" are reported in the Northern and North-Central regions. Finally, the table reveals that "inequality" levels are lower in the Northern region and higher in the Southern, pattern that is also observed for the case of the number of "days" that it takes to start up a business.

[23] The states that belong to the Northern region are: Baja California, Chihuahua, Coahuila, Nuevo León, Sonora and Tamaulipas. The states that belong to the North-Central region are: Baja California Sur, Aguascalientes, Colima, Durango, Jalisco, Michoacán, Nayarit, San Luis Potosí, Sinaloa and Zacatecas. The states that belong to the Central region are: Distrito Federal, Estado de México, Guanajuato, Hidalgo, Morelos, Puebla, Querétaro and Tlaxcala. Finally, the states that belong to the Southern region are: Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz and Yucatán.

Table 8. CSB and Control Variables: Average Values 2006, 2008 and 2011*

	Variable	Domestic	Northern	North-Central	Central	Southern
Dependent	**CSB**	14.11	19.11	14.00	12.04	11.81
	DEREG1	5.5	6.2	5.9	5.5	4.5
	DEREG2	0.85	1.0	0.90	0.79	0.75
Group 1	**GDP_pc**	73.2	98.9	68.7	73.7	54.6
	ingpub_pc	8.1	7.9	8.6	7.4	8.4
	homicides	16.9	27.2	18.6	8.6	14.7
Group 2	**schooling**	8.4	9.2	8.5	8.6	7.4
	inequality	3.9	1.9	3.0	4.8	6.2
	days	24.3	22.1	23.2	22.4	29.6

* Note: For the CSB there are 30 observations in 2006, 32 in 2008 and 32 in 2011. For the remaining variables, there are 32 observations per year.

Source: Based on data from the World Bank, COFEMER, CONAPO, INEGI and SESNSP.

Table 9 shows, in turn, the correlation matrix for the same variables, although using data at the state level. According to the table, the CSB is negatively correlated with "DEREG1", "DEREG2", "GDP_pc" and "ingpub_pc" (-0.01, -0.29, -0.12 and -0.20, respectively), and positively correlated with "homicides" (0.34).

Table 9. Correlation Coefficients

	CSB	DEREG2	DEREG1	PIB_pc	ingpub_pc	inseguridad	escolaridad	desigualdad	días
CSB	1.000								
DEREG2	-0.007	1.000							
DEREG1	-0.289	0.531	1.000						
GDP_pc	-0.119	0.009	0.016	1.000					
ingpub_pc	-0.204	-0.164	-0.047	0.514	1.000				
homicides	0.338	0.017	0.132	-0.106	0.016	1.000			
schooling	0.214	-0.063	0.082	0.331	0.197	0.089	1.000		
inequality	-0.375	-0.045	0.156	-0.359	-0.140	0.002	-0.624	1.000	
days	0.189	-0.284	-0.613	-0.053	-0.008	-0.179	-0.117	-0.130	1.000

Source: Own estimates with data from the World Bank, COFEMER, CONAPO, INEGI and SESNSP

Notice that the correlations between the CSB with deregulation variables (DEREG1 and DEREG2) turned out to be as expected; i.e., higher levels of "deregulation" are negatively correlated with the CSB; while higher levels of "ingpub_pc" and "homicides" are positively associated with higher levels of the CSB. The association between the CSB and "GDP_pc", which was expected to be positive, turned out to be slightly negative. In the next section we analyze these relationships in more depth applying regression analysis.

4. The Empirical Model

Since we have panel data, it is desirable to consider for the existence of regional fixed effects as well as for the possible endogeneity between per capita GDP at the state level and the CSB.[24] The endogenous relationship emerges, on one side, because local governments have incentives to charge larger CSB since higher per capita state GDP might be associated with a higher purchasing power, which in turns could increase the profitability of a business. On the other side, lower CSB might be associated with the creation of new firms, higher business density, and higher productivity of the existing firms, and all these elements are associated with higher levels of GDP and growth. Likewise, we should control for the possibility that states that would benefit the most from the implementation of deregulatory measures (as captured in our estimates through DEREG1 and DEREG2) could have been the first in implementing them (overestimating the impact on the CSB), or for the possibility that the first states to adopt them would be those already with lower CSB (underestimating the impact on the CSB).

Therefore, we apply the generic model proposed by Baltagi (2005) and Anderson and Hsiao (1981), which uses the following form for each equation in the system:

$$y_{it} = Y_{it}\gamma + X_{1it}\beta + \mu_i + \nu_{it} = Z_{it}\delta + \mu_i + \nu_{it} \quad (1)$$

where:

y_{it} is the dependent variable (CSB);

Y_{it} is a vector of 1 x g observations of endogenous variables included as explanatory variables, which can be correlated with ν_{it};

X_{1it} is a vector of 1 x k_1 observations of included exogenous variables;

Z_{it} = [Y_{it} X_{1it}];

γ = is a vector of g x 1 coefficients;

β = is a vector of k_1 x 1 coefficients;

δ = is a vector of K x 1 coefficients, where K = g + k_1.

μ_i and ν_{it} represent the region fixed effect and the error term, respectively.

[24] The available number of observations does not allow the use of fixed effects at the state level.

The model above takes into account unobserved regional fixed effects and also considers the endogeneity issues outlined above, which implies fewer restrictions with respect to the classic regression model and the traditional fixed-effects model. In our base model, the vector Y_{it} contains the variables "GDP_ pc" and "DEREG1"; while X_{it} is a vector that contains the variables "homicides" and "ingpub_pc".

The estimates are obtained by applying the method of instrumental variables using "schooling" and "inequality" as instruments to identify "GDP_pc". On the other hand, the variables "days" and "schooling" at the state level were used as instruments to identify the "DEREG1" variable. Hence, the model could also be seen as a structural model (a feature that will be exploited below to identify the effect of the CSB on "GDP_pc") consisting of the following 3 equations:

$$CSB_{it} = GDP\_pc_{it}\gamma_{11} + DEREG_{it}\gamma_{12} + X_{1it}\beta_1 + \mu_{1i} + \nu_{1it} \quad (2)$$

$$GDP\_pc_{it} = CSB_{it}\gamma_{21} + X_{2it}\beta_2 + \mu_{2i} + \nu_{2it} \quad (3)$$

$$DEREG_{it} = CSB_{it}\gamma_{31} + X_{3it}\beta_3 + \mu_{3i} + \nu_{3it} \quad (4)$$

where X_{1it} is a vector that contains "homicides" and "ingpub_pc"; X_{2it} is another vector formed by "schooling" and "inequality"; and finally X_{3it} is a vector integrated by "schooling" and "days".

According to Wooldridge (2002) a good instrument must be uncorrelated with ν_{1it} and should be correlated with the corresponding endogenous variable, once the other endogenous variables have been netted out. The variable "days" is a good instrument for DEREG1 because it is negatively correlated with the latter (-0.61), and because it is not related with the variable CSB since the amount (cost) of their main components (presented in Table 3) is already fixed and does not depend of the time required to acquire the permission to start the business. [25]

The idea for using "schooling" also as an instrument for DEREG1 is that societies with higher education levels tend to push harder for the implementation of systems like SARE, and in principle we do not have reasons to believe that "schooling" is correlated with CSB. In addition, and as mentioned in the introduction, there is abundant literature relating schooling and inequality to per capita GDP, and also there is not apparent reason to believe that they are correlated with ν_{1it}. For that reason, we decided to use them as instruments for the variable $GDP\_pc_{it.}$

Despite the previous arguments, formal tests to verify the validity of the instruments were applied. Specifically, we ran the over-identification test developed by Wooldrridge (1995) and the Stock and

[25] The same logic applies for DEREG2.

Yogo (2005) test to verify the validity of the instruments (the results are presented in the annex); the results of both tests suggest that the model was correctly specified and that the instruments employed represent a good choice.[26]

5. Results

5.1 Base Results

Table 10 presents in its last column the estimated parameters of our base model (IV-FE), while the first two columns present, for comparison purposes, the estimated coefficients obtained via ordinary least squares (OLS) and fixed effects (FE), respectively.[27] The numbers in parentheses represent the standard errors.[28]

Our base model results indicate that the main differences among the coefficients obtained using the different methods are found, as expected, in the variables controlled by endogeneity; i.e., "DEREG1" and "GDP_pc". Notice that in the model IV-FE the coefficients of "DEREG1", "GDP_pc", "homicides" and "ingpub_pc" are all statistically different from zero and have the expected signs.

Table 10. Base Estimates

Variable	MCO	EF	IV-FE
DEREG1	-0.860***	-0.829***	-1.224***
	(0.208)	(0.187)	(0.406)
GDP_pc	0.006	-0.0004	0.056**
	(0.008)	(0.006)	(0.027)
ingpub_pc	-0.797**	-0.562	-1.578***
	(0.362)	(0.361)	(0.604)
homicides	0.121***	0.083***	0.116***
	(0.026)	(0.026)	(0.036)
Cons	21.018***	18.428***	22.918***
	(3.064)	(2.699)	(3.558)
obs	92	92	92

Note: *, **, *** indicate statistical significance at 10, 5 and 1 percent, respectively.
Source: Own estimates with data of the World Bank, COFEMER, CONAPO, INEGI and SESNSP.

Given that the variables are measured in units that complicate the direct interpretation of the coefficients, Table 11 presents the estimated changes in the CSB in response to changes in its

[26] In addition, as an informal test to validate the instrument, we estimate the correlation coefficient between the instrument and the CSB, for both the group of municipalities adopting SARE (0.22) and the group not implementing SARE (0.20). If the instrument is not valid (that is, that it helps explain the CSB) then the expected correlation coefficient must be much higher for those municipalities implementing the deregulation system in relation to those who decided not adopt it.

[27] The equations of the structural model and the equations in the reduced form can be consulted in Annex. The estimates were realized in the econometric software STATA 12.

[28] Robust standard errors were estimated to avoid possible problems of heteroskedasticity.

determinants. According to the table, the "DEREG1" coefficient, which is the main focus of our study, implies that the adoption of the SARE reduces the average cost of entry by over 1,546 pesos of 2012 per year.[29] Therefore, the effect of "DEREG1" turns out not only statistically, but also economically significant.

Table 11. Summary of Results

Source of change:	**Effect** (In constant pesos of 2012)**:**
Municipalities that have implemented the SARE:	Register an average reduction cost of 1,546 pesos in the start-up of a business per year.
An increase of 1,000 pesos in a state's GDP per capita:	Raises the average cost of starting a business in 70.75 pesos.
An increase of one thousand pesos in a state's per capita revenues:	Reduces the average cost of starting a business in 1,993.58 pesos.
An increase of one homicide per 100,000 inhabitants:	Raises the average cost of starting a business in 146.55 pesos.

Source: Own estimates.

The other determinant with a significant impact on the CSB is state's per capita revenue ("ingpub_pc"), effect that does not rule out the hypothesis –as stated in Section 2.2–that states with higher resource needs may have also more incentives to increase the costs of the permits required to start a business.

"GDP_pc" and "homicides" have also statistically significant effects on the CSB, although to a lesser scale. The positive coefficient of state's per capita GDP implies, for instance, that an increase of 1,000 pesos in this variable raises the CSB in 70.75 pesos, with this positive effect suggesting that higher levels of per capita income imply greater business profitability, hence encouraging states' authorities to increase the costs of the permits required to set up a business in order to appropriate a share of that income. Regarding the "homicides" coefficient, our estimates indicate that an increase of one homicide per 100,000 inhabitants leads to an average increase in the CSB of 146.55 pesos. As we mentioned before, a reason behind the positive coefficient could lie in the fact that the parties involved in the process of granting the required permits to open up a firm (for instance, the public notaries) would incur in increased operating costs since they are offering their services in relatively more troublesome areas.

[29] For this conversion, the gross national income of Mexico in 2012, as published by the World Bank (USD 9,600), and the average fix exchange rate of that year (13.16 pesos per USD) were used.

5.2 Robustness of Results

Although the results tell a story consistent with our hypotheses, it is convenient to check for the results' robustness.[30] A first possible weakness of the model would be, for instance, the exclusion of time fixed effects in our estimated model. However, after performing a Hausman test to verify if it was necessary to incorporate them, the results indicated that they were not relevant. Based on this, and considering the limited number of observations available, and applying the parsimony principle, we decided to exclude them.[31]

Another robustness test was based on estimating the model using our alternative measure of deregulation (DEREG2), which was defined as a binary variable taking the value of one if the SARE was adopted, and zero otherwise. Results of this exercise are presented in the last column of Table 12, where it can be observed that the coefficients of all variables, excluding that of our deregulation measure, are very similar to those in the last column of Table 10. Regarding the coefficient capturing the deregulatory effort, this turns out to be significantly higher in absolute value (-12.668) than that in Table 10 (-1.224). To conciliate these results, however, we must recall that in the first model the coefficient measures the annual impact of SARE's implementation, while in our second model the coefficient captures the total effect of the SARE (considering all the years after the implementation). Hence, if we multiply the coefficient of the first model by the average number of years the SARE has been operating in the states that implemented it (6.07 years by the year 2011), the results are not so distant.

Table 12. Estimates Using the Alternative Measure of Deregulation

Variable	MCO	EF	IV-FE
DEREG2	-0.913	-2.368**	-12.668**
	(1.002)	(1.000)	(6.157)
GDP_pc	0.004	-0.002	0.054*
	(0.008)	(0.007)	(0.033)
ingpub_pc	-0.738*	-0.604	-1.934**
	(0.388)	(0.415)	(0.761)
homicides	0.106***	0.064**	0.078*
	(0.026)	(0.026)	(0.042)
Cons	18.922***	17.994***	31.719***
	(3.181)	(3.124)	(7.561)
obs	92	92	92

Note: *, **, *** indicate statistical significance at 10, 5 and 1 percent, respectively.
Source: Own estimates with data from the World Bank, COFEMER, CONAPO, INEGI and SESNSP.

[30] It should be noted that the model was also estimated using the method of least squares in three steps with fixed effects; however, the results did not vary. Hence, we decided to present only the results obtained through the two-stage least-squares estimator (or instrumental variables). The estimates are available upon request.

[31] The equations in the reduced form were also estimated, including dummy variables per year, and it was verified that they were not statistically significant.

Another possible criticism to our estimated model could stem from the fact that states such as Campeche and Tabasco report relatively high levels of per capita GDP due to the revenue generated by oil production, a feature that tends to overestimate their inhabitants' earning capacity. In order to avoid the bias associated to that overestimation, we opted to estimate the same model excluding the referred states. The results are presented in Table 13 where we can observe that they are similar to those in Table 10. The only difference would be in the coefficient "ingpub_pc", which is slightly smaller. However, the main conclusion of the exercise is that the model is also robust under this change in the specification.

Table 13. Estimates Excluding Campeche and Tabasco

Variable	MCO	EF	VI-EF
DEREG1	-0.830***	-0.873***	-1.223***
	(0.217)	(0.206)	(0.377)
GDP_pc	0.033**	-0.002	0.054*
	(0.016)	(0.016)	(0.028)
ingpub_pc	-1.129***	-0.966**	-1.379***
	(0.368)	(0.367)	(0.418)
homicides	0.127***	0.090***	0.110***
	(0.027)	(0.028)	(0.031)
Cons	21.453***	21.622***	21.631***
	(3.412)	(3.236)	(3.483)
obs	86	86	86

Note: *, **, *** indicate statistical significance at 10, 5 and 1 percent, respectively.
Source: Own estimates with data from the World Bank, COFEMER, CONAPO, INEGI and SESNSP.

Finally, Table 14 presents the corresponding estimates using "DEREG2" while simultaneously excluding the states of Campeche and Tabasco. Results, again, turn out to be similar to those in Table 12, particularly those related to the coefficients of "homicides" and "per capita public revenue". This time, however, the coefficient of "GDP_pc" is no longer statistically significant.

Table 14. Estimates Excluding Campeche and Tabasco

Variable	MCO	EF	VI-EF
DEREG2	-1.054	-3.583**	-16.330**
	(1.123)	(1.057)	(7.654)
GDP_pc	0.035*	-0.004	0.02
	(0.015)	(0.015)	(0.041)
ingpub_pc	-1.046**	-1.075**	-2.183***
	(0.377)	(0.428)	(0.731)
homicides	0.112***	0.070**	0.071*
	(0.027)	(0.027)	(0.040)
Cons	19.071***	22.542***	39.063***
	(3.311)	(3.773)	(11.493)
obs	86	86	86

Note: *, **, *** indicate statistical significance at 10, 5 and 1 percent, respectively.
Source: Own estimates with data from the World Bank, COFEMER, CONAPO, INEGI and SESNSP.

5.3 Addendum: CSB as a Determinant of GDP

The analysis presented in the previous subsections identified a link between state per capita GDP - as a measure of per capita income of the state- and the CSB. Nonetheless, as outlined in our introduction and in the model presented in Section 4, this relationship is not necessarily unidirectional. That is, the CSB could also affect the economy by means of different channels, which would impact per capita GDP at the state level. The identification of this effect is, in itself, an interesting exercise, as it would highlight the relevance of this type of measures to boost the level of economic development in Mexico. Besides, there are no references that this effect had been captured before. Given the available data, capturing the effect indicated above is relatively easy, as it is only necessary to estimate equation 2 of the model presented in Section 4. In this case, state's per capita GDP is the dependent variable and CSB is the endogenous explanatory variable. [32] The estimates are presented in Table 15, where we have included "schooling" and "inequality" as additional exogenous variables. In another version of the model, "life expectancy" (used as a proxy for health capital) and "kilometers of road infrastructure" (as a proxy for physical capital) were also incorporated as control variables, but they were not statistically significant for explaining GDP_pc, and hence we decided to leave them out. Further, their exclusion helps us avoid possible over-identification problems in the structural model.[33]

The first column of the table contains the estimates using the fixed effect technique; the second presents the estimates corresponding to the two-stage least-squares model with fixed effects (IV-FE-1); while the last one shows the results of the same model excluding the states of Tabasco and Campeche (IV-FE-2). These estimates show that the CSB has a negative and statistically significant effect on per capita GDP.

Notice also that in these estimates, the coefficients of "schooling" and "inequality" have the expected signs for a short- to medium-term relation (Forbes 2000). Taking into account the estimates presented in the last column, which are the ones preventing a possible overestimation due to the effect of oil revenues on per capita GDP, it can be inferred that a 1 percentage point increase (decrease) in the CSB as a share of gross national income (equivalent to 1,236 pesos of 2012) would generate a reduction (an increase) of 1,609 pesos in average per capita GDP of the states.[34]

[32] Under this specification the variables DESREG, inequality and revpub_pc work as instruments for CSB.

[33] Given that the goal of this work is not to study the determinants of states' per capita GDP, no literature review of this topic is presented. Literature regarding the determinants of the levels of state per capita GDP in Mexico can be found in Cisneros (2013), Hernández (2000), Mayer (2001) and Rodríguez-Oreggia (2005).

[34] It should also be noted that regardless of the deregulation measure used (which in this case would operate as an instrument to estimate the CSB), the results were practically the same.

Table 15. Effect of CSB on GDP_pc

Variable	FE	IV-FE-1	IV-FE-2
CSB	-2.737**	-7.823**	-1.609**
	(1.011)	(2.652)	(0.764)
schooling	20.801***	15.994	21.039***
	(5.209)	(10.563)	(3.053)
inequality	-10.995***	-14.592***	-5.039***
	(3.609)	(3.985)	(1.185)
Cons	-19.936	99.701	-63.829*
	(58.984)	(118.231)	(33.888)
obs	92	92	92

Note: *, **, *** indicate statistical significance at 10, 5 and 1 percent, respectively.
Source: Own estimates with data from the World Bank, COFEMER, CONAPO, INEGI and SESNSP.

Therefore, the estimates of Table 15 reveal a causal relation between the CSB and per capita GDP in Mexico. Since this is a first approximation to the topic, it would be convenient to continue exploring in more detail the impact of CSB and other determinants of the ease to do business on the level of development and economic growth in the country.

6. Concluding Remarks

In this work we studied possible determinants of the cost of starting a business in Mexico. In particular, we analyzed to what extent deregulation efforts -after controlling for the strength of public finances in the states, the incentives of local authorities to appropriate a fraction of the potential revenue of business agents when starting a business, and regional differences- had an impact on the CSB in Mexican states. For that purpose, a panel was constructed with data at the state level for the years 2006, 2008 and 2011.

Our work shows that efforts to deregulate the process of opening up new businesses in Mexico, measured by the adoption of SARE (Rapid Business Opening System) have significantly reduced their start-up costs. This result, which is consistent with recent literature on the topic, is relevant in terms of policy implications since the SARE has been implemented in only 209 of the 2,457 municipalities in the country, which means that there is a large scope for implementing measures and strategies aimed at decreasing costs, time frames and formalities required to open up businesses.

Simultaneously, the paper also suggests that the CSB in Mexico at the state level are determined by the necessity to address the weaknesses of local public revenues, as well as by the incentives of local authorities to appropriate the potential income effects that, we would like to stress, have not been documented before.

The estimated effects in this paper are robust to several changes in the specification. However, it should be acknowledged that our estimates cover only a middle time horizon (2006-2013), suggesting the need to continue reviewing them as soon as the series are being updated. In this revision process, it is recommended to further investigate the link between per capita GDP and the cost of starting a business.

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Annex

A1. Structural Model (DEREG1)

	Coef.	Std. Err.	t
CSB´s equation			
GDP_pc	0.056	0.027	2.03
homicides	0.116	0.036	3.22
ingpub_pc	-1.578	0.604	-2.61
DEREG1	-1.224	0.406	-3.01
Northern	4.482	2.057	2.18
North_Central	2.980	1.787	1.67
Southern	-0.096	1.927	-0.05
_cons	22.918	3.558	6.44
GDP_pc´s equation			
schooling	15.994	10.563	1.51
CSB	-7.823	2.652	-2.95
inequality	-14.592	3.985	-3.66
Northern	32.152	25.749	1.25
North_Central	-12.166	17.699	-0.69
Southern	53.336	19.069	2.8
_cons	99.701	118.231	0.84
DEREG1´s equation			
schooling	0.081	0.292	0.28
CSB	0.001	0.096	0.01
time	-0.105	0.018	-5.89
Northern	-0.275	0.965	-0.29
North_Central	0.088	0.593	0.15
Southern	0.012	0.663	0.02
_cons	5.157	2.693	1.92

Source: Own estimates with data from the World Bank, COFEMER, CONAPO, INEGI and SESNSP.

A.2 Equations in Reduced Form

	Coef.	Std. Err.	t
CSB´s equation			**R=0.4091**
ingpub_pc	-0.722	0.339	-2.13
homicides	0.096	0.028	3.4
schooling	-0.092	0.960	-0.1
inequality	-0.725	0.309	-2.35
time	0.089	0.038	2.33
Northern	4.017	1.806	2.23
North_Central	0.543	1.595	0.34
Southern	0.588	1.981	0.3
_cons	18.810	8.686	2.17
GDP_pc´s equation			**R=0.4575**
ingpub_pc	12.925	3.440	3.76
homicides	-0.314	0.286	-1.1
schooling	5.958	9.735	0.61
inequality	-10.046	3.129	-3.21
time	-0.665	0.386	-1.72
Northern	-8.530	18.311	-0.47
North_Central	-33.308	16.176	-2.06
Southern	20.983	20.093	1.04
_cons	-8.019	88.083	-0.09
DEREG1's equation			**R=0.3991**
ingpub_pc	-0.138	0.141	-0.98
homicides	0.002	0.012	0.13
schooling	0.545	0.399	1.36
inequality	0.175	0.128	1.37
time	-0.100	0.016	-6.31
Northern	0.011	0.751	0.01
North_Central	0.610	0.664	0.92
Southern	0.590	0.824	0.72
_cons	1.235	3.614	0.34

Source: Own estimates with data from the World Bank, COFEMER, CONAPO, INEGI and SESNSP.

A.3 Test to validate the instruments (days and Schooling) for DEREG1

First-stage regression summary statistics

Variable	R-sq.	Adjusted R-sq.	Partial R-sq.	F(2,83)	Prob > F
sareyears	0.3858	0.3266	0.3582	23.1663	0.0000

Minimum eigenvalue statistic = 23.1663

Critical Values — # of endogenous regressors: 1
Ho: Instruments are weak — # of excluded instruments: 2

	10%	15%	20%	25%
2SLS Size of nominal 5% Wald test	19.93	11.59	8.75	7.25
LIML Size of nominal 5% Wald test	8.68	5.33	4.42	3.92

A.4 Test to validate the instruments (Schooling and Inequality) for GDP_pc

First-stage regression summary statistics

Variable	R-sq.	Adjusted R-sq.	Partial R-sq	F(2,83)	Prob > F
pib_percap~a	0.4534	0.4007	0.1702	8.51153	0.0004

Minimum eigenvalue statistic = 8.51153

Critical Values — # of endogenous regressors: 1
Ho: Instruments are weak — # of excluded instruments: 2

	10%	15%	20%	25%
2SLS Size of nominal 5% Wald test	19.93	11.59	8.75	7.25
LIML Size of nominal 5% Wald test	8.68	5.33	4.42	3.92