Entrepreneurship and enforcement institutions: disaggregated evidence for Spain

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Abstract  Entry of new firms, both in the form of entrepreneurs or corporations, fosters competition and productivity. Both the entry of firms and productivity have been low in the Spanish economy over the recent years. This paper analyzes the determinants of entry focusing on the role of the design and efficacy of enforcement institutions (the judicial system), a traditionally overlooked aspect. In order to do so, we examine disaggregated data at the local level in Spain. We find that higher judicial efficacy increases the entry rate of firms, while it has no effect on the exit rate. Crucially, that impact only occurs in the case of the entry rates of entrepreneurs, defined as self-employed, but not in the case of limited liability corporations. This finding may be explained by the fact that judicial (in)efficacy can be regarded as a fixed cost to be paid by agents that litigate. Hence, the economic activity of entrepreneurs -and specifically, their entry into the market- is expected to be more affected than that of larger firms.

Keywords  Entrepreneurship · Judicial efficacy · Barriers to entry

JEL Classification  L26 · M13 · K40 · R12
1 Introduction

Entry of new firms, either in the form of self-employed entrepreneurs or larger companies, such as limited liability corporations, generates a competitive pressure on existing enterprises and endows the market with the newest capital (Brandt 2004; López-García and Puente 2007). Not surprisingly, Scarpetta et al. (2002) found evidence suggesting that the substitution of the most obsolete firms by new firms can stimulate productivity growth. Following Foster et al. (1998), around 25% of productivity growth in the U.S. manufacturing sector could be explained by the “net entry effect”, that is, the exit of less productive plants that are displaced by more productive entering firms. The impact on productivity could be explained by the fact that new businesses often emerge in areas related to ICT or R&D, as noted by Brandt (2004). In fact, she finds that the major differences in entry rates between the countries in her study are explained by the entry rates in ICT industries. Related to this, entrepreneurs, i.e., businessmen who independently own and run their firms, have been regarded as catalysts of economic change due to their capacity for innovation and risk-taking (Armour and Cumming 2008).

The literature has highlighted several factors that affect entrepreneurship, such as access to credit and related liquidity constraints (Evans and Jovanovic 1989; Aghion et al. 2007; Samila and Sorenson 2011), education (European Commission 2012), the regulatory environment, in the form of taxation (Glenn Hubbard and Gentry 2000; Cullen and Gordon 2007; Djankov et al. 2010), labor market regulations (Scarpetta et al. 2002; Botero et al. 2004; van Stel et al. 2007), entry regulations (Djankov et al. 2002; Klapper et al. 2006; Ciccone and Papaioannou 2007; Branstetter et al. 2014), forgiving personal bankruptcy laws (Audretsch 2002; Fan and White 2003; Armour and Cumming 2008) and culture.

Nevertheless, a less studied aspect is the impact of the efficacy of enforcement institutions (i.e., the efficacy of courts in making parties honour their contractual obligations) on entrepreneurship. This seems to be an important issue for Spain as the Spanish judicial system underperforms compared to other comparable economies. To the best of our knowledge, there are only three works referring to this issue at the international level (Desai et al. 2005; Ardagna and Lusardi 2010; Stephen et al. 2009) and two at the specific country level (Chemin 2009; Lichand and Soares 2014 for Pakistan and Brasil respectively). These studies find that lower quality of contract enforcement (in the sense of slower tribunals, less trained judges or more “formal” systems depending on the study) has a negative impact on entrepreneurship. In the case of Ardagna and Lusardi (2010), the authors find that lower efficiency of the judicial system diminishes the positive effects of social networks, skills or labor force status for a multiplicity of countries. Desai et al. (2005) find that greater judicial interference and greater

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1 As a clarification, the term “limited liability corporation” is used in this paper as opposed to the term “unlimited liability firm”. The first term includes all those companies that have limited liability. In this sense, the term includes companies that are called both “sociedades anónimas” and “sociedades de responsabilidad limitada” under Spanish law.

2 See also Baliamoune-Lutz and Garello (2014) for a complete literature review on the specific issue.
formalism of the judicial procedures are associated with lower entry rate of new firms in the market. They find that the effect is especially important for emerging markets (thus, the impact is lower in the case of developed western economies). However, both Ardagna and Lusardi (2010) and Desai et al. (2005) use aggregate data at the country level, based on estimations (not direct judicial efficacy data). Finally, Stephen et al. (2009) analyze the nature of the interplay between labor markets and enforcement institutions (although they also use the Djankov et al. 2003 indicator). They find that the greater the formality of the country’s legal system, the less effective the (restrictive) labor regulations are, with the subsequent positive impact on entrepreneurship.

Turning to Spain specifically, the positive impacts on productivity of higher entrepreneurship and entry of new firms have also been found in the case of the Spanish economy (see Martin-Marcos and Jaumandreu 2004 for the case of manufacturing firms). Specifically Huergo and Jaumandreu (2004) observed that new manufacturing firms in Spain are more likely to innovate compared to incumbents. In terms of TFP, Fariñas and Ruano (2004) confirmed that the replacement of exiting firms by new entering firms in Spain had a significant positive effect on TFP in manufacturing firms as well.

The study of entrepreneurship is also important to the Spanish economy for several other reasons. First of all, the entry rate of new firms is low by international standards. Spain is below the European average and below all major economies with the exception of Italy. The results of López-García and Puente (2007) also show that entry rates in Spain are below those of the U.S. and Canada. GEM (Global Entrepreneurship Monitor 2011) data also show that the rate (5.8 %) of Total Entrepreneurial Activity is below than in many other OECD countries and almost half that of the U.S. (12.3 %) or Australia (10.5 %). Moreover, Spain is a country characterized by low productivity growth and low innovation (Mora-Sanguinetti and Fuentes 2012) over recent years.

This study shows that more effective courts in Spain, measured using real judicial performance data at the local level, seem to promote the entry of entrepreneurs into the market. We concentrate on civil cases and, therefore, the problem studied is how the low enforcement of contractual obligations between private parties may discourage entry into the market. This study therefore uses real judicial efficacy measures in line with Chemin (2009) and Lichand and Soares (2014). Our data are obtained directly from the courts and allow us to differentiate the efficacy of the judicial system by province, subject and by procedure.

Specifically, we find that higher judicial efficacy increases the entry rates of firms, while has no effect on exit rates. Crucially, that impact only occurs in the case of the entry rates of entrepreneurs, defined as self-employed, but not in the case of

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3 When we observe the average entry rate for the period 2004–2010 (using Eurostat Business Demography Statistics). This result complements the findings of López-García and Puente (2007) who show that the “turnover” of companies in Spain was lower than in other countries, especially due to the low rates of exit of firms.

4 Calculated as an indicator that equals one if individuals are starting a new business or are owners and managers of a young firm. The result is expressed as a % of respondents answering yes to the question.
limited liability corporations. This finding may be explained by the fact that judicial (in)efficacy can be regarded as a fixed cost to be paid by agents that litigate. Hence, the economic activity of entrepreneurs—specifically, their entry into the market—is expected to be much more affected than that of larger limited liability companies. A large company may have an internal legal department or specialized in-house counsel to deal with legal conflicts or compliance issues. However, this does not normally occur in a small business. That is, seeking legal assistance can be much more expensive in relative terms for small businesses.

The rest of the paper is organized as follows. Section 2 explains how the Spanish judicial system is organized and describes the construction of our measure of judicial efficacy. Section 3 presents a detailed analysis of both the entry and exit rates of firms in Spain at the local level, and the differences between entrepreneurship and other forms of entry in the market. It also explains the controls necessary to construct our estimations. Section 4 describes our identification strategy and Sect. 5 shows the main results. Section 6 concludes. Some additional information can be found in the “Appendix”.

2 The structure of the Spanish judicial system and its relevance for enterprises

Spain has a judicial system that enforces a continental (civil-roman) Law system and is structured around four jurisdictions (civil, criminal, administrative and labor). Each jurisdiction is served by a separate body of judges that enjoys some specialization (at least at the higher instances) and is regulated by a specific procedural Law that establishes how to enforce the substantive law.

The efficacy of Spanish judicial system seems to be lower than in countries with a comparable level of development. Table 1 shows a summary of the positions of the five largest economies in the European Union with respect to quality-related measures of the functioning of their judicial systems. The measures usually refer to the functioning of the civil justice specifically. Spain performs worse than the average country and/or shows significant differences with respect to the major economies of the area (with the exception of Italy). These results seem to be in line with the dissatisfaction detected in the judicial system users in Spain. As an example, we could cite the Circulo de Empresarios (2003) survey among Spanish

5 Our analysis crucially hinges on the fact that limited liability companies are larger than the businesses run by self-employed individuals. See Sect. 3.1 for empirical evidence. Moreover, in Spain the creation of a limited liability company requires a minimum amount of initial capital (3,000 euros for a “sociedad limitada” and 60,000 euros in the case of a “sociedad anonima”). It should be noted that the sum of limited liability companies and companies with unlimited liability, such as those founded by entrepreneurs individually, account for nearly 100% of companies in Spain. That is, there are some companies with a hybrid nature (“cooperativas” and “sociedades comanditarias”) but they are less than 1% of the total number of firms and are not considered in this study.

6 The same argument can be found in the literature on the costs of “red tape” (OECD 2001 or Nijsen and Vellinga 2002).

7 There is also a military jurisdiction, which could be considered extraordinary.
Table 1  Classifications of EU countries regarding the effectiveness of the judiciary

| Country                  | Length | Country               | Position (on 189 countries) | Country ranking (enforcing contracts indicator, Doing Business) | Country ranking (tenant eviction formalism) (Djankov et al. 2003) |
|--------------------------|--------|-----------------------|-------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|
| Germany                  | 200    | United Kingdom        | 10                           | United Kingdom                                               | 2.22                                                          |
| Spain                    | 272    | Germany               | 21                           | France                                                       | 3.6                                                           |
| France                   | 274    | France                | 38                           | Germany                                                      | 3.76                                                          |
| England and Wales        | 350    | Spain                 | 52                           | Italy                                                        | 4.24                                                          |
| Italy                    | 564    | Italy                 | 65                           | Spain                                                        | 4.81                                                          |
| Mean (all countries)     | 238    |                       |                               | Mean (all countries)                                         | 3.58                                                          |

Source: Djankov et al. (2003), Doing Business 2014 (World Bank) and Palumbo et al. (2013)
enterprises on the state of the Spanish judicial system. As it was already mentioned, these results justify studying the impact of the efficacy of the judicial system on important aspects of general economic performance, such as entrepreneurship.

The business of an enterprise usually has a private (civil) nature. It is for that reason that the analysis of this paper focuses on considering how it affects the effectiveness of the civil jurisdiction in the entry decisions of firms. The analysis of this jurisdiction also seems appropriate because the civil courts are those that, by far, support a higher burden of conflicts in the judicial system. Moreover, both substantive and procedural Civil Laws have a residual nature with respect of the rest of the legal system and should apply in the absence of other rules.

Civil courts enforce civil law and, in order to do so, apply procedures specifically regulated in the Civil Procedure Law of 2000. This Law establishes that conflicts between companies (private parties) enter the judicial system through the “first instance and instruction” courts (which are the courts that we evaluate in this paper). The procedure used depends on the monetary amount of the conflict, but the most common one is the “ordinary” procedure (procedimiento ordinario), which is the one we analyze in this study. A more extensive analysis of the structure and functioning of the Spanish judicial system can be found, among others, in García-Posada and Mora-Sanguinetti (2015).

In this paper we construct a measure of judicial efficacy, the judicial congestion rate, following the methodology explained in Mora-Sanguinetti (2012) and García-Posada and Mora-Sanguinetti (2015) and the data from the General Council of the Judiciary (CGPJ). The congestion rate is the ratio between the sum of pending cases (measured at the beginning of the year) plus new cases in a specific year and the cases resolved in the same year (see equation below). A lower congestion rate means greater judicial efficacy. For instance, an average congestion rate of 2.52 in Seville over the period 2001–2009 indicates that approximately two and a half cases (summing up the pending cases and the new cases arriving to the courts of Seville in a specific year) were awaiting resolution for each one case that the courts were able to resolve.

An important aspect that needs to be clarified in order to guarantee the validity of our identification strategy is the territorial competence rules that apply between

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8 The results of the Doing Business, although cannot be considered real efficiency measures, may be useful as a measure of entrepreneurs’ expectations about institutional reliability and their perception regarding the easiness in enforcing contracts (Ippoliti et al. 2014).

9 The new law completely replaced the old Civil Procedure Law of 1881. The new procedures and structures were very different from the old ones. This is why our analysis starts in 2001, at the time the new Law came into force. Mora-Sanguinetti (2010) provides a detailed analysis of the evolution from the old to the new Law.

10 Results for other procedures are available upon request. The conclusions are consistent with those shown in this paper.

11 The CGPJ is the governing body of the Spanish judiciary.
courts and businesses in the cases analyzed in this paper. The Civil Procedural Law fixes some principles clarifying where the parties in a conflict may litigate. As a result of those rules, companies in Spain cannot usually choose the place (province) where to file a claim (see García-Posada and Mora-Sanguinetti 2015, for further details). Moreover, even if companies could choose where to litigate, there are other reasons why Spanish companies, especially those that have just entered the market, are “attached” to a particular place of residence. For instance, access to aid programmes for the creation of new companies in Spain is closely related to the petitioner’s residence while these programs tend to be managed by regional or even local administrations. For instance, an entrepreneur cannot apply for entrepreneurial support in Seville if she wants to create a business in Madrid. Similarly, the company must be located in “San Sebastian de los Reyes” (a municipality of the region of Madrid) if the manager wants to apply for a grant from the city council. The cumulative effect of these rules leads us to consider that studying the judicial system at a local/provincial (rather than national) level is relevant to the production cycle of companies.

Judicial congestion rates in Spain show enough variation both between provinces and over time (i.e., within the same province) to explore its possible impact on business demography (see Figs. 1, 2). Figure 1 graphs the average congestion rate for the period 2001–2009. At first glance, many of the provinces that have undergone rapid developments in the construction sector during the boom years, or that have received more immigration (which is not unrelated) also appear to have suffered more congestion. We will control for these and other factors in the model. Figure 2 shows the evolution of the congestion rate for some provinces over the period considered. The change of the Civil Procedural Law in 2000 may be behind the high level of congestion in 2001 (first year of implementation of the new law). That is, lawyers may have waited to bring their cases before the courts until the new law was applicable. Moreover, judges needed time to resolve the new cases.

3 Measuring business demography and related controls in the Spanish economy

3.1 Business demography in the Spanish economy

In order to measure business demography in Spain, we use information on the number of firms, entries and exits by province and year over the period 2001–2009. These data come from the DIRCE database (Directorio Central de Empresas) constructed by the Spanish National Statistics Institute (INE), and are broken down by the legal form of the firm and by the province where its registered office is

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12 As an example: Decree-Law 8/2013 of Andalusia of May 28, de medidas de creacion de empleo y fomento del emprendimiento.

13 Ordenanza (AGES 2013) reguladora de la concesión de subvenciones a pequeñas y medianas empresas de San Sebastián de los Reyes para la generación de empleo neto.
located. Therefore we can distinguish between newly created limited liability corporations (sociedades anónimas and sociedades limitadas under the Spanish Law) and self-employed individuals creating an enterprise (who have unlimited liability). Using this information, we can compute aggregate (all firms) entry and exit rates, as well as separate entry and exit rates for corporations and entrepreneurs (whose empirical counterparts are the self-employed). As previously explained, the entry and exit rates computed in this paper account for nearly 100% of the entry

Fig. 1 Congestion rate: geographical variation. Source: García-Posada and Mora-Sanguinetti (2015)

Fig. 2 Congestion rate: time variation. Source: García-Posada and Mora-Sanguinetti (2015)
and exit of firms in Spain, as we have only excluded firms with a hybrid nature under Spanish Law (sociedades cooperativas and sociedades comanditarias) which account for less than 1% of the total number of firms.

There are several arguments why we proxy entrepreneurs with self-employed. First, as one can see in Fig. 3, firms run by self-employed are significantly smaller than corporations (defined as limited liability companies). 14 Second, there are minimum capital requirements to create a limited liability company, which range between 3,000 and 60,000 Euro, depending on the type of company (sociedad de responsabilidad limitada and sociedad anónima, respectively). 15 While those costs seem to be affordable, the benefits are none. The reason is that, in practice, Spanish banks ask for personal guarantees to entrepreneurs, wiping out the de jure limited liability. This phenomenon has also been studied in the U.S. case by Berkowitz and White (2004). Finally, most entrepreneurs do not want to incorporate their businesses because of tax reasons. As a self-employed, one must pay the income tax. By contrast, the corporate tax rate is 25% for SMEs (24% in the Basque Country). 16

Fig. 3 Size distribution per legal form: average 2001–2009. Source: DIRCE data from the National Statistics Institute (INE). Corporations are private or publicly quoted joint stock companies with limited liability for those owning shares. Self-employed entities are personally owned businesses with no limit to personal liability. Size in terms of number of employees: micro: [0, 9]; small: [10, 49]; medium: [50, 199]; large: 200 employees or more

14 The figure still shows a proportion of corporations with few employees. In fact, according to the business register of the Spanish National Statistics Institute, there were around 425,000 limited-liability companies with zero employees. Most of them, according to anecdotal and to Bank of Spain evidence, are not usual firms, but just legal entities that belong to families and whose only purpose is to handle a family’s wealth in order to benefit from improved taxation.

15 A new type of company, Sociedad Limitada Nueva Empresa, also has capital requirements, which range between 3,012 € and 120,202 €.

16 The recent reform of the tax code, which entered into force on 1 August 2014 (out of our sample period) establishes a reduced tax rate of 20% for SMEs that meet some financial criteria.
The entry rate is defined as the number of firms that enter a market in a given year as a percentage of all the active firms in that market at the end of the year (which include new and continuing firms). Consistently, the exit rate is defined as the number of firms that exit the market in a given year as a percentage of all of the active firms in that market at the end of the year. There is little correlation between entry and exit rates for all firms (0.01), while that correlation is moderately positive in the case of entrepreneurs (0.15) and negative for corporations (−0.22). In our empirical analyses, the log transformation has been used for all entry and exit rates in order to correct for their skewed distributions.17

3.2 Control variables

There are a wide array of factors that may affect business demography and entrepreneurship. We attempt to control for them through the following variables and our identification strategy.

All controls are province-level variables for our period of study, i.e., 2001–2009. We include GDP (in logs) as a measure of market size18 and GDP per capita to capture economic development. We control for the unemployment rate as, on the one hand, higher unemployment reduces the demand for goods and services and in turn deters entry but, on the other hand, higher unemployment reduces the chances of finding a salaried job, which incentivizes self-employment. Credit availability seems to affect firm entry and it is itself a function of the efficiency of the legal system (Levine 1998; La Porta et al. 1997, 1998; Jappelli et al. 2005; Ponticelli 2013). Therefore, we include the banking credit to GDP ratio (Credit/GDP), the number of bank branches per 10,000 persons (Branches), the non-performing loans ratio of credit institutions (Npl ratio) and the ratio of defaulted accounts receivable to GDP (Dar/GDP). The banking credit to GDP ratio is a measure of the importance of the banking sector in financing firms (Rajan and Zingales 1995) and, in the case of bank-oriented economies like Spain, a measure of financial development. Branches per capita captures competition in the banking sector. In both cases we expect higher values to be associated with more credit availability. Both the non-performing loans ratio and the ratio of defaulted accounts receivable to GDP are proxies of the default rate in banking credit and trade credit, respectively. In both variables a higher ratio means, ceteris paribus, lower incentives for borrowers to repay—probably because of poor creditor protection or contract enforcement—which causes more credit rationing.

It is also necessary to control for industrial composition because entry and exit rates vary across industries due to factors such as fixed costs, the degree of competition and the elasticity of demand.19 Industrial composition is measured by the ratio of the gross value added of the main six industries (primary sector, energy,
manufacturing, construction, market services and non-market services) over the total gross value added of each province.

We also control for other market characteristics, such as market concentration, its degree of vertical integration and its level of capital intensity. Concentrated markets are usually less competitive and incumbent firms with enough market power may engage in several strategies to deter entry or to drive out of the market weaker firms. Highly vertically integrated firms may be less harmed by judicial inefficacy, as they are less reliant on the judicial system to enforce contracts with suppliers and customers (Johnson et al. 2002). Capital intensive firms may also be less affected by poor contract enforcement as, at least in developed economies such as Spain, the legal system may be sufficient to protect physical capital (as its measurement is quite straightforward) while protection of the company’s intangible assets (copyrights, patents, etc.) is more difficult (Kumar et al. 2001). Nonetheless, those firms may face higher entry costs due to costly initial investments.

To measure those market characteristics we use a sample of nearly 900,000 firms from the commercial database SABI, which contains the annual accounts of private and publicly held Spanish companies, as well as some general information such as the location of the registered office. Market concentration is captured by the Herfindahl-Hirschman index (HHI) at the province level. We measure average vertical integration by the ratio of value added to sales. This ratio is higher for vertically integrated firms because of their lower expenses in outside purchases of intermediate inputs. We first compute this ratio at the firm level and then we average it across firms. Regarding average capital intensity, we first compute the firm-level capital intensity as the ratio of capital stock (tangible fixed assets plus inventories) to the number of employees and then we average it across firms.

We also control for the level of education in the province through the number of dissertations -PhDs- approved by local campuses and we include the share of foreigners in the population (Foreigners) to control for cultural differences, such as entrepreneurial spirit, between natives and immigrants. Moreover, the attraction of immigrants among provinces during the boom years was uneven (partly due to the greater or lesser strength of the construction sector). Finally, following Carmignani and Giacomelli (2010) we use the number of lawyers per 100 people (Lawyers) as a proxy of litigation intensity because cheaper access to legal services may promote firm entry but it may also congest courts.

Another important determinant of entrepreneurship, the personal bankruptcy law, is set at the national level and does not change across Spanish regions. Thus, it

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20 The raw data has been cleaned using several filters. We have eliminated: (i) state-owned companies, as they resolve their conflicts in different courts than those analyzed in this study; (ii) foreign companies, as they may resolve their conflicts in other countries; (iii) consolidated accounts, as they may include subsidiaries whose registered offices are not in the same province as that of the parent company, consequently using courts of different provinces; (iv) non-profit organizations and membership organizations; (v) data inconsistencies.

21 It would also seem appropriate to control for population density, since regions with high population density, such as those with large metropolitan areas, normally attract more human capital. While it has been used in a number of experiments -without changes in the results- it has finally been dropped because of the high correlation (0.81) with GDP.
| Variable                        | Definition                                                                 | Source                                              |
|--------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------|
| Entry rate                     | Number of firms (entrepreneurs) (corporations) that enter a market in a given year as a percentage of all the active firms (entrepreneurs) (corporations) in the market at the end of that year | Spanish National Statistics Institute (INE)          |
| Exit rate                      | Number of firms (entrepreneurs) (corporations) that exit a market in a given year as a percentage of all the active firms (entrepreneurs) (corporations) in the market at the end of that year | Spanish National Statistics Institute (INE)          |
| Congestion rate (ordinary)     | Ratio between the sum of pending cases (measured at the beginning of the period) plus new cases in a specific year and the cases resolved in the same year. Ordinary procedures | Consejo General del Poder Judicial                   |
| GDP                            | Current GDP at market price                                              | INE (Regional accounts)                             |
| GDP per capita                 | Ratio between current GDP and population                                  | INE (Regional accounts)                             |
| Unemployment rate              | Percentage of total workforce who are unemployed and are looking for a paid job | La Caixa                                            |
| Credit/GDP                     | Loans to Spanish companies by Spanish financial institutions, divided by GDP | Bank of Spain and INE                               |
| Npl ratio                      | Ratio of non-performing loans to total banking loans (only to Spanish companies by Spanish credit institutions) | Bank of Spain                                       |
| Dar/GDP                        | Trade credit in arrears divided by GDP                                   | Spanish National Statistics Institute (INE)          |
| Branches                       | Number of bank branches per 10,000 people                                | La Caixa                                            |
| Weight primary/energy/manufacturing/construction/market services/non-market services | Ratio of the gross value added of the main five industries (primary sector, energy, manufacturing, construction, market services, non-market services) over the total gross value added of each province | INE (Regional accounts)                             |
| Capital intensity              | Average ratio of capital stock (tangible fixed assets plus inventories) to the number of employees | SABI                                                |
| Vertical integration           | Average ratio of value added to sales, where value added has been corrected for extraordinary positions | SABI                                                |
| Foreigners                     | Share of foreigners in population                                        | Fundacion de las Cajas de Ahorros (FUNCAS)          |
| Variable     | Definition                                                                 | Source                                      |
|--------------|---------------------------------------------------------------------------|---------------------------------------------|
| Lawyers      | Number of lawyers inscribed in Bar associations per 100 people            | Consejo General de la Abogacía              |
| PhD graduates| Number of PhDs over population                                            | Spanish National Statistics Institute (INE) |
| HHI          | Herfindahl-Hirschman index                                                | SABI                                        |
cannot be included as a control. The same may be said about the general level of “formalism” (as the civil procedural rules are common to all provinces) and labor regulations (again, common to all provinces).

Table 2 provides a description of all the variables used in our analyses, while Table 3 displays their descriptive statistics.

### 4 Identification strategy

We regress the entry and exit rates (for all firms, for entrepreneurs and for corporations) on the congestion rate, province fixed effects, time dummies and a group of relevant controls.

The estimates are obtained via the following specification:

**Table 3** Descriptive statistics

| Variable                      | Obs | Mean  | Std. Dev. | Min  | Max  | Scale/units |
|-------------------------------|-----|-------|-----------|------|------|-------------|
| Entry rate (all firms)        | 450 | 10.78 | 2.30      | 5.75 | 24.98 %|
| Entry rate (entrepreneurs)    | 450 | 10.65 | 2.70      | 4.87 | 38.96 %|
| Entry rate (corporations)     | 450 | 10.26 | 2.72      | 4.70 | 20.83 %|
| Exit rate (all firms)         | 450 | 9.49  | 2.23      | 4.45 | 24.70 %|
| Exit rate (entrepreneurs)     | 450 | 11.26 | 2.61      | 5.46 | 30.98 %|
| Exit rate (corporations)      | 450 | 5.73  | 2.16      | 1.62 | 18.96  %|
| Congestion ordinary           | 450 | 2.18  | 0.63      | 1.36 | 5.39   |
| GDP                           | 450 | 17,973.43 | 27,686.95 | 1,448.74 | 193,049.50 | Millions € |
| GDP per capita                | 450 | 19.44 | 4.69      | 10.64 | 35.23 | Thousands € |
| Unemployment rate             | 450 | 6.51  | 2.57      | 2.40 | 17.70 %|
| Credit/GDP                    | 450 | 0.52  | 0.22      | 0.19 | 1.52   |
| Npl ratio                     | 450 | 0.02  | 0.02      | 0.00 | 0.16   |
| Dar/GDP                       | 450 | 0.01  | 0.01      | 0.00 | 0.08   |
| Branches                      | 450 | 10.50 | 2.61      | 5.41 | 18.54  Per 10,000 |
| Weight primary                | 450 | 0.06  | 0.05      | 0.00 | 0.23   |
| Weight energy                 | 450 | 0.03  | 0.03      | 0.01 | 0.18   |
| Weight manufacturing          | 450 | 0.15  | 0.07      | 0.03 | 0.38   |
| Weight construction           | 450 | 0.12  | 0.02      | 0.06 | 0.20   |
| Weight market services        | 450 | 0.47  | 0.08      | 0.33 | 0.70   |
| Weight non-market services    | 450 | 0.16  | 0.03      | 0.09 | 0.26   |
| capital intensity             | 450 | 161.36 | 66.33     | 54.52 | 560.53 | Fraction |
| Vertical integration          | 450 | 0.37  | 0.02      | 0.31 | 0.44   |
| Foreigners                    | 450 | 7.11  | 5.33      | 0.57 | 24.41  %|
| Lawyers                       | 450 | 0.19  | 0.07      | 0.08 | 0.51   |
| PhD graduates                 | 450 | 0.12  | 0.14      | 0.00 | 1.70   |
| Herfindahl-Hirschman Index    | 450 | 0.02  | 0.02      | 0.00 | 0.15   [0,1] |
\[ Y_{jt} = p_j + \beta \text{Judicial.Inefficacy}_{jt} + \sum_{k=1}^{K} \delta_k \text{Control}^k_{jt} + \sum_{t=1}^{T-1} \gamma_t d_t + u_{jt} \]

where \( Y_{jt} \) is either the entry rate or the exit rate (for all firms, for entrepreneurs or for corporations) in logs, \( P_j \) are province fixed effects, \( \text{Judicial.Inefficacy}_{jt} \) is proxied by the congestion rate (in levels), \( \text{Control}^k_{jt} \) is a set of \( K \) control variables (see Sect. 3.2), \( d_t \) are time dummies and the indices \( j, t \) refer to the province and time period, respectively. Note that this log-linear specification implies, if \( \beta < 0 \), that the entry (exit) rate is a decreasing and convex function of the congestion rate. In other words, if a province is extremely congested, further backlogs barely have an effect upon the entry/exit decisions of firms, which seems a plausible assumption. The above regressions are estimated via the within-group estimator with clustered standard errors robust to heteroskedasticity and serial correlation.

We are not concerned about reverse-causality problems between our key regressor, Congestion Rate, and the dependent variables, entry and exit rates, for several reasons. In the case of entry rates, we should firstly emphasize that reverse-causality could only take place if firms litigated frequently in their first year of life - in which they are registered as entries in our dataset- implying that they would increase court congestion. Second, conflicts related to the entry of companies may be solved in administrative courts (if the entrant has to challenge an administrative action) which are different from the general civil courts we analyze in this study.

In the case of exit rates, as before, we need to highlight that reverse-causality could only take place if firms litigated in their last year of life - in which they are registered as exits in our dataset. In addition, conflicts regarding exits are generally resolved in courts other than the general civil courts analyzed in our database. Specifically, conflicts concerning layoffs are resolved by the labor tribunals while bankruptcy procedures are tried in specialized mercantile courts since 2004.

Even in the case where entry and exit rates had some impact on court congestion through an increase in litigation, we control for differences in litigation intensity across provinces by adding the variable “Lawyers” in some specifications. Finally, please also note that we know the sign of the reverse-causality bias in that case: we should expect a positive correlation between entry (exit) rates and congestion rates due to an increase in litigation. In contrast, since our estimates show a significant negative relationship in the case of entries and a non-significant negative relationship in the case of exits (see Sect. 5), our estimates would be the lower bound of the true causal impacts.

Finally, the identification strategy makes use of the province fixed effects to remove omitted-variable biases and relies on the time dummies to control for

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22 Nevertheless, log-log and linear-log specifications have also been fit, yielding similar results but a lower R-squared.

23 The current bankruptcy law (\textit{Ley Concursal}), which entered into force in September 2004, established the creation of new courts (mercantile courts) which are specialized in bankruptcy procedures. Prior to that law, bankruptcy procedures were solved in the general civil courts.

24 Although entry regulations (see Djankov et al. 2002; Klapper et al. 2006 for a discussion on this specific issue) and, in general, institutions, change slowly over time (and thus the province-fixed effects
correlations among some of the variables due to the business cycle (e.g., entry and exit rates, the congestion rate, GDP, unemployment, non-performing loans ratio).

5 Results

Tables 4 and 5 display the impact of judicial (in)efficacy, as measured by the congestion rate of ordinary judgments (Congestion Ordinary), on entry and exit rates for the cases of entrepreneurs, limited liability corporations and for all firms. For each case, the first specification only includes Congestion Ordinary, fixed effects and time dummies, the second one adds to the first one a large set of controls, which is augmented in the third by adding Lawyers. Finally the fourth one includes (log) GDP per capita instead of (log) GDP.\(^{25}\) For simplicity of exposition the coefficients and standard errors of non-significant controls are omitted in these tables.\(^{26}\) The whole set of controls has been described in Table 2.

With respect to entry rates (Table 4), the coefficient on Congestion Ordinary is negative and statistically significant in all the regressions where the dependent variable is the entry rate for all firms. However, when we differentiate the entries among those carried out by entrepreneurs and those by limited liability corporations notice that the negative impact is only significant in the first case. While the coefficients in the regressions for entrepreneurs are always significant and equal or larger than those for all firms, those for corporations are never significant and systematically much smaller. This finding may be explained by the fact that judicial (in)efficacy can be regarded as a fixed cost to be paid by agents that litigate, so that it is expected to be a higher barrier to entry for entrepreneurs than for larger corporations.

Other controls, such as GDP per capita, unemployment rate and proxies for credit availability, have the expected sign when significant: a higher GDP per capita, lower unemployment and a less risky credit market (lower npl ratios and less defaulted accounts receivable) are associated with higher entry rates of corporations. The province’s industry composition also seems to play a role. However, many controls are not significant, as their impact is already captured by the fixed effects and the time dummies. In fact, the R-squared of the specifications with controls are only marginally higher than the one of the first specification, where only fixed effects and time dummies are included.

Footnote 24 continued

may capture them quite accurately in a short time period like the one used in our sample, 2001–2009), we checked, as a robustness exercise, if introducing an effective measure of entry regulations affected our results. In the presence of the other variables and fixed effects, the regulation variable [taken from Matea and Mora-Sanguinetti (2012)] has no significance or does not affect the results of our variable of interest. We do not show the results in this version of the paper while the variable only has regional variation (and hence the estimates lose a large number of observations). The results are available upon request or in the WP version. The same can be said when including a variable capturing regional taxation (tax pressure).

\(^{25}\) Correlations among the regressors, shown in the Appendix, suggest that there are no multicollinearity problems except in the case of Lawyers, so we only include this variable in some specifications.

\(^{26}\) The results displaying the estimates of those controls are available upon request.
Table 4: Impact of judicial efficacy on entry

| Variables          | Log(entry all firms) | Log(entry entrepreneurs) | Log(entry corporations) |
|--------------------|----------------------|---------------------------|-------------------------|
|                    | (1)                  | (2)                       | (3)                     |
| Congestion ordinary| 0.037* (0.020)       | 0.049** (0.021)           | 0.050** (0.021)         |
| Log (GDP)          | 0.236 (0.281)        | 0.297 (0.300)             | 0.213 (0.350)           |
| Log (unemployment  | −0.121* (0.071)      | 0.034 (0.110)             | 0.293*** (0.065)        |
| rate)              | −0.127* (0.070)      | 0.033 (0.108)             | 0.309** (0.064)         |
| Npl ratio          | −0.226 (0.292)       | 0.411 (0.411)             | 0.243*** (0.072)        |
|                    | (0.311)              | (0.432)                   | (0.390)                 |
| Dar/GDP            | −0.692 (1.746)       | 0.431 (1.807)             | −2.237* (1.266)         |
|                    | −0.642 (1.721)       | 0.439 (1.794)             | −2.094* (1.195)         |
|                    | −0.577 (1.703)       | 0.344 (1.810)             | −1.806 (1.172)          |
| Branches           | −0.036 (0.027)       | −0.027 (0.034)            | −0.040 (0.027)          |
|                    | −0.036 (0.027)       | −0.027 (0.034)            | −0.039 (0.026)          |
|                    | −0.035 (0.026)       | −0.021 (0.032)            | −0.045* (0.025)         |
| Weight manufacturing| 0.597 (0.627)       | 0.242 (0.752)             | 1.252* (0.709)          |
|                    | 0.588 (0.634)        | 0.241 (0.752)             | 1.227* (0.713)          |
|                    | 0.521 (0.642)        | 0.179 (0.781)             | 1.137* (0.673)          |
| Weight construction| 0.461 (0.546)       | −0.596 (0.658)            | 1.633** (0.706)         |
|                    | 0.440 (0.538)        | −0.600 (0.655)            | 1.572** (0.696)         |
|                    | 0.354 (0.554)        | −0.481 (0.685)            | 1.202* (0.666)          |
| Weight market      | 0.848 (0.518)        | −0.387 (0.761)            | 2.497*** (0.771)        |
| services           | 0.841 (0.517)        | −0.389 (0.764)            | 2.476*** (0.751)        |
|                    | 0.751 (0.517)        | −0.527 (0.799)            | 2.426*** (0.681)        |
| Weight non-market  | 1.681* (0.929)       | 1.346 (1.032)             | 2.095* (1.087)          |
| services           | 1.624* (0.929)       | 1.337 (1.034)             | 1.933* (1.081)          |
|                    | 1.567* (0.914)       | 1.374 (1.008)             | 1.739 (1.087)           |
| Variables               | Log(entry all firms) | Log(entry entrepreneurs) | Log(entry corporations) |
|-------------------------|-----------------------|--------------------------|-------------------------|
|                         | (1)                   | (2)                      | (3)                     | (4)                      | (5)                   | (6)                      | (7)                     | (8)                      | (9)                   | (10)                    | (11)                    | (12)                    |
| Log (capital intensity) | 0.043                 | 0.045                    | 0.045                   | 0.092*                  | 0.093*                 | 0.094*                  | -0.026                  | -0.019                  | -0.020                |                        |                         |                         |
|                         | (0.036)               | (0.036)                  | (0.036)                 | (0.053)                 | (0.054)                 | (0.054)                 | (0.036)                 | (0.035)                 | (0.033)               |                        |                         |                         |
| Vertical integration    | -1.346*               | -1.319*                  | -1.278*                 | -1.648*                 | -1.644*                 | 1.690**                 | -0.831                  | -0.756                  | -0.594                |                        |                         |                         |
|                         | (0.685)               | (0.702)                  | (0.675)                 | (0.833)                 | (0.842)                 | (0.813)                 | (1.152)                 | (1.151)                 | (1.103)               |                        |                         |                         |
| Lawyers                 | -0.434                | -0.481                   | -0.068                  | -0.020                  | -1.239*                 | -1.420**                |                        |                         |                         |                        |                         |                         |
|                         | (0.782)               | (0.780)                  | (1.011)                 | (0.995)                 | (0.708)                 | (0.700)                 |                        |                         |                         |                        |                         |                         |
| Log (GDP per capita)    | 0.254                 |                          | -0.060                  |                          | 0.724**                 |                         |                        |                         |                         |                        |                         |                         |
|                         | (0.252)               |                          | (0.301)                 |                          | (0.357)                 |                         |                        |                         |                         |                        |                         |                         |
| Fixed effects           | Yes                   | Yes                      | Yes                     | Yes                     | Yes                    | Yes                     | Yes                     | Yes                     | Yes                    | Yes                     | Yes                     | Yes                     |
| Time dummies            | Yes                   | Yes                      | Yes                     | Yes                     | Yes                    | Yes                     | Yes                     | Yes                     | Yes                    | Yes                     | Yes                     | Yes                     |
| Observations            | 450                   | 450                      | 450                     | 450                     | 450                    | 450                     | 450                     | 450                     | 450                   | 450                     | 450                     | 450                     |
| R-squared (within)      | 59.5                  | 62.2                     | 62.2                    | 62.2                    | 30.7                   | 33.0                    | 33.0                    | 32.9                    | 82.5                  | 85.9                    | 86.0                    | 86.2                    |

The dependent variable is the log of the entry rate of all firms in columns (1)–(4), the log of the entry rate of entrepreneurs in (5)–(6) and the log of the entry rate of corporations in (9)–(12). All regressions include a constant. All insignificant controls, except GDP and Lawyers, are omitted in this table: see Table 2 for their description. “Npl” stands for non-performing loans and “Dar” for defaulted accounts receivable. HHI is the Herfindahl-Hirschman index. Clustered standard errors below coefficients. The “within R-squared” is the R-squared from the mean-deviated regression. *** $p < 0.01$, ** $p < 0.05$, * $p < 0$
Table 5  Impact of judicial efficacy on exit

| Variables        | Log(exit all firms) |       |       |       | Log(exit entrepreneurs) |       |       |       | Log(exit corporations) |       |       |       |
|------------------|---------------------|-------|-------|-------|--------------------------|-------|-------|-------|-------------------------|-------|-------|-------|
|                  | (1)                 | (2)   | (3)   | (4)   | (5)                       | (6)   | (7)   | (8)   | (9)                      | (10)  | (11)  | (12)  |
| Congestion ordinary | -0.028 (0.041)     | -0.030 | -0.028 | -0.029 | -0.027 (0.042)            | -0.028 | -0.025 | -0.027 | -0.034 (0.050)           | -0.036 | -0.033 | -0.035 |
| Log (GDP)        | -0.086 (0.277)      | -0.091 |       |       | -0.070 (0.260)            | -0.077 |       |       | 0.005                   | -0.003 |       |       |
| Log (unemployment rate) | 0.116* (0.065)   | 0.123* (0.071) | 0.078 |       | 0.147** (0.061)           | 0.157** (0.068) | 0.109 |       | 0.090       | 0.100   | 0.057   |       |
| Branches         | 0.031 (0.021)       | 0.030 (0.021) | 0.036* |       | 0.018 (0.021)             | 0.018 | 0.023 |       | 0.056*       | 0.056** | 0.062** |       |
| Weight energy    | 1.670 (1.053)       | 1.644 (1.075) | 1.848* |       | 1.477 (1.093)             | 1.441 | 1.651 |       | 2.327       | 2.290   | 2.469   |       |
| Weight manufacturing | 1.887** (0.830) | 1.898** (0.835) | 1.945** |       | 2.104** (0.814)           | 2.120** (0.823) | 2.165** |       | 1.225       | 1.242   | 1.267   |       |
| Weight construction | 1.681* (0.866)   | 1.707* (0.877) | 1.971** |       | 1.499* (0.755)            | 1.537* (0.774) | 1.814** |       | 1.139       | 1.178   | 1.439   |       |
| Weight market services | 1.323* (0.762) | 1.332* (0.763) | 1.339* |       | 1.275* (0.707)            | 1.288* (0.709) | 1.288* |       | 0.908       | 0.922   | 0.892   |       |
| Log (capital intensity) | 0.066 (0.051)     | 0.064 (0.054) | 0.064 |       | 0.074 (0.051)             | 0.070 | 0.071 |       | 0.151*       | 0.146*   | 0.147* |       |
| Vertical integration | -1.227 (1.027)   | -1.260 (1.040) | -1.374 |       | -1.071 (1.009)            | -1.117 (1.025) | -1.237 |       | -2.725       | -2.773   | -2.885* |       |
| Foreigners       | 0.015* (0.008)     | 0.016** (0.007) | 0.011* |       | 0.018** (0.007)           | 0.019** (0.007) | 0.014** |       | 0.008       | 0.010   | 0.006   |       |
| Variables          | Log(exit all firms) | Log(exit entrepreneurs) | Log(exit corporations) |
|--------------------|---------------------|-------------------------|------------------------|
|                    | (1)                | (2)                     | (3)                    | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Log(HHI)           | -0.026* (0.014)    | -0.026* (0.014)         | -0.027* (0.014)        |     | -0.024* (0.013) | -0.024* (0.013) | -0.024* (0.013) |     | -0.058* (0.030) | -0.058* (0.030) | -0.059* (0.030) |
| Lawyers            | 0.535 (1.245)      | 0.663 (1.205)           | 0.763 (1.388)          |     | 0.763 (1.347)   | 0.763 (1.347)   | 0.801 (1.274)   |     | 0.801 (1.274)   | 0.924 (1.249)   |     |
| Log (GDP per capita) |                   | -0.484* (0.276)         | -0.500* (0.266)        |     | -0.438 (0.484) | -0.438 (0.484) |               |     |               |               |     |
| Fixed effects      | Yes                | Yes                     | Yes                    |     | Yes             | Yes             | Yes             |     | Yes            | Yes             | Yes             |
| Time dummies       | Yes                | Yes                     | Yes                    |     | Yes             | Yes             | Yes             |     | Yes            | Yes             | Yes             |
| Observations       | 450                | 450                     | 450                    |     | 450             | 450             | 450             |     | 450            | 450             | 450             |
| R-squared (within) | 46.0               | 49.8                    | 49.9                   |     | 43.5            | 49.3            | 49.4            |     | 49.7           | 57.9            | 59.8            | 59.9            |

The dependent variable is the log of the exit rate of all firms in columns (1)–(4), the log of the exit rate of entrepreneurs in (5)–(6) and the log of the exit rate of corporations in (9)–(12). All regressions include a constant. All insignificant controls, except GDP and Lawyers, are omitted in this table: see Table 2 for their description. "Npl" stands for non-performing loans and "Dar" for defaulted accounts receivable. HHI is the Herfindahl-Hirschman index. Clustered standard errors below coefficients. The “within R-squared” is the R-squared from the mean-deviated regression. *** p < 0.01, ** p < 0.05, * p < 0
We evaluate the size of the effect by means of a simple hypothetical experiment: attributing the best law enforcement to the province with the worst judicial efficacy in our sample, the relative increase in the entry rate of entrepreneurs would range between 5 and 7 %, depending on the specification. Note also that, as we control for credit availability in our regressions, we expect those figures to be the lower bound of the total impact of judicial efficacy on the entry rates of self-employed, since previous literature has found a positive effect of judicial efficacy on credit availability (Jappelli et al. 2005; Fabbri 2010) and a positive impact of credit availability on the entry rates of small firms (Aghion et al. 2007). Hence the effect is not only statistically significant but also economically relevant: judicial efficacy promotes entrepreneurship.

Nevertheless, one could argue that there is an alternative interpretation of the results and that judicial efficacy does not really imply firm creation, but rather a “poaching effect” or an “attraction effect” to the most efficient provinces from the most inefficient ones. Firms could choose the location of their registered office in provinces with high judicial efficacy even if carrying out most of their business operations elsewhere. If so, the negative relation between entry and judicial inefficacy would be due to an “attraction effect”, rather than to real firm creation. However, this effect is expected to take place in corporations, rather than in self-employed businesses, due to the costs of such a strategy. Yet, as we find a negative relation between judicial inefficacy and entry in the case of entrepreneurs, but not in corporations, either an “attraction effect” does not exist or it is too small to offset the fact that judicial efficacy has no impact on the creation of new companies.

With respect to exit rates (Table 5), the coefficient on “Congestion Ordinary” is never statistically different from zero, suggesting that judicial efficacy is not a determinant of the decision of firms (neither for corporations nor for entrepreneurs) to leave the market. Regarding the controls, a lower GDP per capita, higher unemployment, less concentrated markets and a higher proportion of foreigners in the population are associated with higher exit rates of entrepreneurs. The province’s industry composition also seems to matter.

6 Conclusions

Entry of new firms is relatively low by international standards in Spain and entrepreneurship (defined in this study as new businesses created by the “self-employed”) is also lower than in other countries with similar levels of development.

Several factors affect entrepreneurship ranging from access to credit to market size. This study concentrates on the effects of the institutional environment.

27 The province with the best law enforcement (i.e., lowest Congestion Ratio) is Alava, with an average value of 1.65 for 2001–2009, while the province with the worst law enforcement (i.e., highest Congestion Ratio) is Alicante, with an average value of 2.80. Hence the simulated change amounts to 1.65 - 2.80 = -1.15.

28 By relative increase we mean 100 * (X(1) - X(0))/X(0), where X(0) and X(1) are the initial and final values, respectively.
Specifically, we focus on the design and efficacy of the judicial system as the representative enforcement institution as it guarantees the application of regulation and private contracts.

This study shows that more effective courts seem to promote the entry of entrepreneurs into the market in Spain. Attributing the best law enforcement to the province with the worst judicial efficacy in our sample, the relative increase in the entry rate of entrepreneurs would range between 5 and 7%, depending on the specification.

We must emphasize, however, that judicial (in)efficacy seems to be an important barrier to entry for entrepreneurs, but not for corporations. This finding may be explained by the fact that access to justice can be regarded as a fixed cost to be paid by agents that litigate, so that it is expected to have a larger influence on entrepreneurs than on larger firms.

We should note that this is the first study on entrepreneurship which uses real judicial efficacy measures at the local level in Spain. That is, we used real data obtained directly from the courts to calculate our own measures of judicial efficacy. The data allow us to differentiate the efficacy of the judicial system by province and by type of court procedure.

The findings of this paper could be mainly extrapolated to countries with similar levels of institutional development compared to Spain. That is, in countries where the formal justice is the primary means of resolving conflicts between companies. The quality of “formal justice” may play a smaller role in economies with low levels of development (as the demand for formal justice may be quite low and alternative informal institutions and procedures may play a more important role in business decisions). This does not completely rule out that courts may also play a role in less developed countries.

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Appendix

See Table 6.

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29 In analogous fashion, Klapper et al. (2004) find that another type of entry barrier, regulation, has no adverse effect on entry in corrupt countries, but only in less corrupt ones. A general discussion on these dynamics could be found in North (1990).

30 See, for instance, Ponticelli (2013) and the above mentioned experiments of Lichand and Soares (2014) and Chemin (2009).
### Table 6  Regressors’ correlation matrix

|                      | Weight manufacturing | Weight construction | Weight market services | Weight non-market services | Log (capital intensity) | Vertical integration | Foreigners | PhD graduates | Log(HHI) | Lawyers |
|----------------------|----------------------|---------------------|------------------------|---------------------------|-------------------------|----------------------|------------|--------------|----------|---------|
| Weight manufacturing | 1.00                 |                     |                        |                           |                         |                      |            |              |          |         |
| Weight construction  | −0.58                | 1.00                |                         |                           |                         |                      |            |              |          |         |
| Weight market services | −0.40               | −0.04               | 1.00                   |                           |                         |                      |            |              |          |         |
| Weight non-market services | −0.47           | 0.31                | −0.35                  | 1.00                      |                         |                      |            |              |          |         |
| Log (capital intensity) | 0.02               | 0.06                | 0.40                   | −0.13                     | 1.00                    |                      |            |              |          |         |
| Vertical integration | 0.16                 | −0.09               | 0.27                   | −0.17                     | 0.47                    | 1.00                 |            |              |          |         |
| Foreigners           | −0.13                | 0.19                | 0.54                   | −0.42                     | 0.53                    | 0.31                 | 1.00       |              |          |         |
| PhD graduates        | 0.00                 | −0.13               | 0.20                   | 0.05                      | 0.18                    | 0.07                 | −0.08      | 1.00         |          |         |
| Log(HHI)             | 0.37                 | −0.30               | −0.23                  | −0.04                     | 0.00                    | 0.29                 | −0.22      | 0.00         | 1.00     |         |
| Lawyers              | 0.00                 | −0.26               | 0.63                   | −0.27                     | 0.44                    | 0.28                 | 0.21       | 0.41         | 0.03     | 1.00    |

|                      | Congestion ordinary | Log (GDP) | Log (GDP per capita) | Log (unemployment rate) | Credit/GDP | Npl ratio | Dar/GDP | Branches | Weight primary | Weight energy |
|----------------------|---------------------|-----------|----------------------|-------------------------|------------|-----------|---------|----------|----------------|----------------|
| Congestion ordinary  | 1.00                |           |                      |                         |            |           |         |          |                |                |
| Log (GDP)            | 0.21                | 1.00      |                      |                         |            |           |         |          |                |                |
| Log (GDP per capita) | −0.23               | 0.36      | 1.00                 |                         |            |           |         |          |                |                |
| Log (unemployment rate) | 0.01            | 0.12      | −0.28                | 1.00                    |            |           |         |          |                |                |
| Credit/GDP           | −0.03               | 0.45      | 0.42                 | 0.17                    | 1.00       |           |         |          |                |                |
| Npl ratio            | 0.15                | 0.05      | 0.05                 | 0.45                    | 0.14       | 1.00      |         |          |                |                |
|                        | Congestion ordinary | Log (GDP) per capita | Log (GDP) | Log (unemployment rate) | Credit/GDP | Npl ratio | Dar/GDP | Branches | Weight primary | Weight energy |
|------------------------|---------------------|----------------------|-----------|-------------------------|------------|-----------|---------|----------|----------------|---------------|
| Dar/GDP                | 0.14                | 0.26                 | 0.07      | 0.13                    | 0.33       | 0.26      | 1.00    |          |                |               |
| Branches               | −0.20               | −0.52                | 0.27      | −0.48                   | −0.06      | −0.03     | −0.06   | 1.00     |                |               |
| Weight primary         | −0.11               | −0.70                | −0.47     | −0.08                   | −0.39      | −0.02     | −0.15   | 0.39     | 1.00           |               |
| Weight energy          | −0.07               | −0.16                | −0.08     | 0.06                    | −0.19      | 0.01      | −0.03   | 0.08     | −0.09          | 1.00          |
| Weight manufacturing   | −0.12               | 0.04                 | 0.42      | −0.41                   | 0.12       | −0.19     | 0.04    | 0.21     | −0.20          | −0.14         |
| Weight construction    | −0.17               | −0.19                | −0.17     | 0.30                    | −0.06      | 0.08      | 0.00    | −0.01    | 0.15           | 0.14          |
| Weight market services | 0.32                | 0.69                 | 0.21      | 0.08                    | 0.24       | 0.09      | 0.08    | −0.41    | −0.59          | −0.26         |
| Weight non-market services | −0.12           | −0.45                | −0.55     | 0.58                    | −0.11      | 0.20      | −0.03   | −0.11    | 0.39           | 0.08          |
| Log (capital intensity)| −0.08               | 0.47                 | 0.59      | 0.20                    | 0.68       | 0.13      | 0.24    | −0.14    | −0.52          | −0.20         |
| Vertical integration   | −0.10               | 0.37                 | 0.56      | 0.31                    | 0.47       | 0.35      | 0.15    | −0.10    | −0.58          | 0.05          |
| Foreigners             | 0.11                | 0.38                 | 0.52      | −0.10                   | 0.45       | 0.21      | 0.25    | 0.10     | −0.34          | −0.21         |
| PhD graduates          | −0.03               | 0.33                 | 0.07      | 0.11                    | 0.16       | −0.02     | 0.13    | −0.19    | −0.27          | −0.08         |
| Log (HHI)              | −0.05               | −0.12                | 0.20      | −0.02                   | 0.19       | 0.07      | −0.07   | 0.07     | −0.06          | 0.06          |
| Lawyers                | 0.14                | 0.81                 | 0.28      | 0.07                    | 0.47       | 0.00      | 0.14    | −0.43    | −0.59          | −0.22         |
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