The Relationship Between Entry Regulation and Nascent Entrepreneurship Revisited

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Abstract. Following the seminal study by Djankov et al. (2002), several studies have confirmed that there is a positive relationship between the ease of starting up a formal business (in terms of the time and cost needed to meet legal requirements for starting an officially registered business, i.e., entry regulation) and various measures of formal entrepreneurship. However, studies linking up entry regulation with measures of total (formal + informal) entrepreneurship have been much rarer. The results of the latter studies are ambiguous, with several studies finding no significant relationship between entry regulation and the total volume of entrepreneurial activity. The present paper revisits the relationship between entry regulation and (nascent) entrepreneurship using more recent data and more sophisticated (multilevel) estimation techniques. In our sample of 246,731 individual-level observations from 66 countries covering the years 2015-2016, we find a negative relationship between country-level regulatory quality (lighter entry regulation) and total (formal + informal) individual-level nascent entrepreneurship. Further analyses show that this result is driven by the negative effect of regulatory quality on opportunity entrepreneurship in factor-driven and efficiency-driven countries. The negative relationship for these countries is consistent with a shift from (opportunity) entrepreneurship in the informal sector to wage-employment in the formal sector when regulatory quality increases. On the contrary, the impact of regulatory quality on nascent (opportunity) entrepreneurship in innovation-driven countries is positive. This positive relationship is more in line with the original Djankov et al. (2002) study, because the informal economy tends to be smaller in richer countries.

Keywords: entry regulation, entrepreneurship types, perceived ease of starting a business.

1. Introduction

Business regulations are seen as an important determinant of economic growth. Djankov, McLiesh and Ramalho (2006) find that improving from the worst quartile of business regulations to the best one implies a significant 2.3 percentage point increase in annual economic growth for a country. They use an aggregate

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indicator of business regulations taken from the by now well-known World Bank Doing Business (WBDB) data, averaging country scores on seven areas of regulation. The present paper is specifically concerned with one of these areas of regulation: the regulation of entry, or the easiness of starting a business. Entry regulation may be defined as the "legal requirements that need to be met before a business can officially open its doors, the official cost of meeting these requirements, and the minimum time it takes to meet them if the government does not delay the process" (Djankov, La Porta, Lopez-de-Silanes and Shleifer, 2002, p. 2). The seminal study by Djankov et al. (2002), which first introduced the entry regulation indicators of the WBDB data, shows that in their sample of 85 countries stricter entry regulation is related to more corruption and large unofficial economies benefiting incumbents and politicians. However, in this study, stricter entry regulation was not significantly related to higher-quality products, decrease of pollution or more intense competition.

The article by Djankov et al. (2002) generated a lot of response, both from policy makers and researchers. Following their article, multiple countries eased their entry regulations (Van Stel, Storey and Thurik, 2007), although this may in part have been the result of digitalization of procedures in general as well. Regarding research, as will be documented in the next section of this paper, there is now a large body of literature which emerged after the publication by Djankov et al. (2002) on the relationship between entry regulation and entrepreneurship. Most of these studies find a positive link between lighter entry regulation and measures of entrepreneurship. Therefore, in current relevant publications, such as those by the World Bank, the conclusions of Djankov et al. (2002) are still widely accepted. When the 2020 report on *Doing Business* by the World Bank (2020a, p. 13) states that "[s]tudies show that higher business start-up costs adversely affect the number of new market entrants", they refer to Djankov et al. (2002) as well.

However, many studies in this area are not deliberately concerned with the entrepreneurship measure they use, and most of them actually use a measure of *formal* entrepreneurship such as the number of newly registered businesses. Formal entrepreneurs operate officially registered businesses, but the businesses of informal entrepreneurs are not registered although they sell legitimate goods and services (Autio and Fu, 2015). By definition, entry regulations refer to starting up a formal or official business. Hence, the quote above from the World Bank report actually refers to a positive link between the ease of starting up a formal business and the rate of formal entrepreneurship. Although an important finding, it does not allow to draw conclusions regarding to what extent stricter entry regulation may cause a shift in entrepreneurship from the formal to the informal sector to escape strict regulations in the formal sector. As a result, it remains relatively unexplored how entry regulation influences the total volume (formal + informal) of entrepreneurial activity.

By its nature, entrepreneurship in the informal sector is very difficult, if not impossible, to measure. Nevertheless, various researchers have made attempts to

create country-level measures of informal entrepreneurship by combining data on the number of limited liability firms from firm registries with the number of entrepreneurs according to the Global Entrepreneurship Monitor (GEM) data base (Thai and Turkina, 2014; Autio and Fu, 2015). While it is debatable whether data from such different sources (firm registries and individual-level surveys) can be combined to create a reliable measure of the number of informal entrepreneurs, it does seem undisputed that the GEM measure of entrepreneurship captures both formal and informal entrepreneurship (without distinguishing these types at the individual level). This is because GEM is a survey among the adult population, rather than among firms.

Van Stel et al. (2007) link the ease of starting up a formal business with measures of total (formal + informal) entrepreneurship, i.e., the rates of nascent and young business entrepreneurship as measured by GEM. Using data for 47 countries from the period 2000-2005, these researchers do not find evidence of a significant link between entry regulation and total entrepreneurship.[2] They interpret this finding in a Baumol (1990)-spirit, in the sense that "rules of the game" (i.e., entry regulation) may alter the nature of entrepreneurship (i.e., the distribution between formal and informal entrepreneurship) rather than the total volume of entrepreneurial activity. The notion that institutions may alter the allocation of entrepreneurial activity across different types was also highlighted by Bowen and De Clercq (2008) who focus specifically on high-growth entrepreneurship.

The present paper replicates the study by Van Stel et al. (2007) using more recent data (2015-2016) and more sophisticated (multilevel) estimation techniques. The total analysis sample comprises 246,731 individual-level observations from 66 countries. In particular, we investigate the relationship between country-level entry regulation and an individual-level measure of (nascent) entrepreneurship that does not distinguish between formal and informal entrepreneurship.[3] Moreover, we also investigate whether the results differ for countries in different stages of economic development. This is important, because the size of the informal economy varies across countries, and hence the trade-off between formal and informal entrepreneurship resulting from changes in entry regulation may be different for countries in different stages of economic development (Ayyagari, Beck and Demirguc-Kunt, 2007). Finally, because

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2.   More precisely, Van Stel et al. (2007) do not find a significant relationship between entrepreneurship rates and the time, the cost, and the number of procedures needed to start an official business. They do, however, find a significant relationship between entrepreneurship rates and the paid-in minimum capital required to start a business.

3.   In contrast to Van Stel et al. (2007), in the present paper we do not investigate young business entrepreneurship. In their study, (the country rate of) young business entrepreneurial activity is modelled as a function of (the country rate of) nascent entrepreneurial activity. Although this relationship can be estimated using GEM data at the country level, this is not possible at the individual level because GEM is a repeated cross-section rather than a panel. Therefore, in GEM it is not possible to follow individuals over time, although it is possible to follow countries over time.

individuals are likely to act on their perception of regulations rather than on the objective regulations themselves (Van Stel and Stunnenberg, 2006), we also investigate whether the perceived ease of starting a business mediates the relationship between entry regulation and the propensity of individuals to be a (nascent) entrepreneur.

Hence, the purpose of this paper is twofold. First, we aim to find out whether there is a cross-level relationship between the quality of entry regulation at country level and the engagement in nascent entrepreneurship at the individual level, while distinguishing between opportunity-driven and necessity-driven nascent entrepreneurship (following Van Stel et al., 2007). With our use of an entrepreneurship measure capturing both formal and informal entrepreneurship, we enrich the stream of studies triggered by Djankov et al. (2002) about the relationship between the ease of starting a business and entrepreneurship. Second, we analyze whether there are indirect effects of entry regulation via the ease of starting a business as perceived by the individual. If individual perceptions on the ease of starting a business are a prime channel through which entry regulation affects individuals to become a nascent entrepreneur, targeting these perceptions alongside actual entry deregulations may be effective in stimulating nascent entrepreneurship.

The structure of this paper is as follows. Section 2 reviews existing literature on the relationship between (entry) regulation and (nascent) entrepreneurship, and derives hypotheses to be tested. Sections 3 to 7 present the data, methodology, results, discussion, and conclusions, respectively.

2. Literature Review and Hypotheses

This section discusses the existing literature and develops hypotheses on the relationship between entry regulation and nascent entrepreneurship. The discussion revolves around the model shown in Figure 1. The figure shows the relationships between county-level entry regulation and individual nascent entrepreneurship as hypothesized in Sections 2.1 and 2.2. Section 2.1 discusses the direct cross-level relationship between a country's (entry) regulation and individual-level (nascent) entrepreneurship and Section 2.2 discusses whether this relationship may run through the perceived ease of starting a business.

Figure 1: The hypothesized relationships between country-level entry regulation and individual-level nascent entrepreneurship.
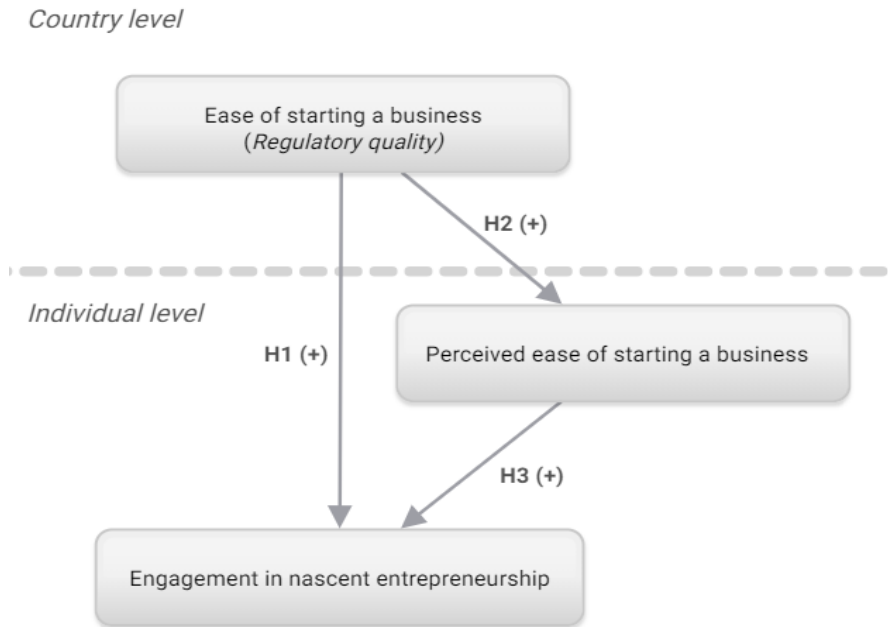
2.1. The Relationship Between (Entry) Regulation and Entrepreneurship

After the seminal study by Djankov et al. (2002), discussed in the Introduction above, multiple other studies analyzing the relationship between (entry) regulation and entrepreneurship appeared. These studies used data from different time periods and data sources, and also employed different operationalizations of both regulation and of entrepreneurship. We review these studies, by making a distinction between studies analyzing measures of formal entrepreneurship (Section 2.1.1) and measures of total (formal + informal) entrepreneurship (Section 2.1.2). In Section 2.1.3, we develop our hypothesis about the relationship between entry regulation at country level and nascent entrepreneurship at the individual level.

2.1.1. Studies Using Measures of Formal Entrepreneurship

Studies analyzing the relationship between (entry) regulation and formal entrepreneurship generally suggest that there is a negative relationship between these factors. Using data of 45 countries over the period 1981 to 1990, Ciccone and Papaioannou (2007) show that 'cutting red tape' (i.e., reducing bureaucracy)

fosters entrepreneurship. In this study, especially the time needed to start a business was found to be important. Using data from 1998 on about 394,000 firms in 33 European countries, Desai, Gompers, and Lerner (2003) found that entry regulations decrease the number of entrants. Klapper, Laeven and Rajan (2006) use the same data source as Desai et al. (2003), albeit that they also use the data from 1999. Covering three million firms from 21 European countries, they draw similar conclusions: entry regulations decrease new firm formation and the average size of entrants. Based on a large sample of 24 million firms, Alfaro and Charlton (2006) find similar effects for a combined measure of entry and exit regulations in almost 100 developed and developing countries. Another large study that established a negative relationship between regulation and entrepreneurship is that of Nyström (2008). She used more general indicators for regulation, such as government size and regulation of credit, labor, and business, instead of just entry regulation. For a panel consisting of 23 OECD (Organisation for Economic Co-operation and Development) countries spanning three decades, she found that higher index scores—less regulation— were related with higher self-employment rates.

Nevertheless, some studies provide slightly different results. Scarpetta, Hemmings, Tressel and Woo (2002) use firm level data of ten member countries of the OECD, and find a negative effect of product regulations on the entry rate of small firms but no effects or positive effects on the entry rate of larger firms. This is in line with public choice theory, as it especially affects smaller players. In the same vein, Bailey and Thomas (2017) show that more-regulated U.S. industries experienced fewer new firm births over the period 1998 to 2011, especially affecting the smallest incumbents. This is in line with research on the effect of regulation on the size distribution of existing firms, showing that regulation appears to operate as a fixed cost for firms. This leads to an increased share of larger firms (Calcagno and Sobel, 2014). Chambers and Munemo (2019) use the number of firm registrations per 1000 people in the age category 15 to 64 as dependent variable. Using panel data of 119 countries over the period 2001 to 2012, they find lower business creation in countries with higher barriers to entry. Specifically, increasing the number of steps required to start a new business by one reduces entrepreneurial activity with 3 to 7 percent.

2.1.2. Studies Using Measures of Total (Formal + Informal) Entrepreneurship

Even though multiple studies provide evidence about a negative relationship between regulation and entrepreneurship, this relationship is not as clear-cut as it seems. Verheul, Van Stel and Thurik (2006) look into differences between male and female entrepreneurship with data from 2002 but found no effect of regulatory quality on either total, male or female entrepreneurship. Van Stel et al. (2007) discuss the impact of the paper by Djankov et al. (2002) and examine the

same relationship between (entry) regulation and entrepreneurship, but using a different measure of entrepreneurship. Using GEM data from 47 countries in the period 2000-2005, they could not replicate the Djankov et al. (2002) findings regarding the link between entry regulation and entrepreneurship and therefore they state that their "findings imply that this link needs reconsideration" (p. 171). According to Van Stel et al. (2007), regulatory barriers with respect to entry do not influence the level of entrepreneurial activity, but rather the distribution between the formal and the informal economy. Capelleras, Mole, Greene and Storey (2008) conclude something similar from an in-depth comparison between (heavy-regulated) Spain and (low-regulated) Great Britain. They found that firms in Great Britain start smaller and grow faster, but this only holds when unregistered firms are excluded from the analysis.

Ho and Wong (2007) state that using individual-level data from GEM comes with the advantage of including those entrepreneurs who may not have officially registered their firm (yet) and thus that these data also capture the informal businesses that are not included in official business registration statistics. Covering 36 countries in 2002, Ho and Wong (2007) found no effect of regulatory business costs on necessity-driven entrepreneurship. However, they do find a negative relationship between regulation and opportunity-driven entrepreneurship. They also looked at entrepreneurship with high growth potential, but this was not significantly related to entry regulation, although this type of entrepreneurship is closely related to opportunity-driven entrepreneurship. Aparicio, Urbano and Audretsch (2016) use a panel of 43 countries for the period 2004 to 2012. They find a significant and negative effect of the number of procedures on GEM's measure of opportunity-driven entrepreneurship. They do not investigate other aspects of entry regulation, such as the time or cost needed to register a business, nor do they investigate the effect of the number of procedures on necessity-driven entrepreneurship.

Bowen and De Clercq (2008) use data from forty countries over the period 2002 to 2004. Using the proportion of high-growth entrepreneurship from GEM as dependent variable, they could not find a significant effect of regulatory protection or complexity on entrepreneurship. Another GEM-based study, Bjørnskov and Foss (2008), found no relationship between regulation and entrepreneurial activity across 29 countries in 2001. No significant relations between regulation and necessity-driven entrepreneurship or opportunity-driven entrepreneurship were found. Using GEM data, Levie and Autio (2011) also analyzed both types of entrepreneurship for the period 2000 to 2008, though they use the terms strategic and non-strategic entrepreneurship for respectively opportunity-driven and necessity-driven entrepreneurship. Using index scores for entry regulation, they found that less regulation leads to more necessity-driven and more opportunity-driven entrepreneurship. In our empirical analyses, we will also consider the distinction between opportunity-driven and necessity-driven entrepreneurship.

2.1.3. Hypothesis

Stricter entry regulation is associated with higher costs and more time needed to meet the legal requirements for starting a business in the formal economy. Therefore, stricter entry regulation makes starting up a formal business more burdensome for the prospective entrepreneur. Reasoning from utility maximization and occupational choice theory, stricter entry regulation lowers the utility that can be obtained from (formal) entrepreneurship and thus makes alternative occupations relatively more attractive. Such an alternative occupation may involve a job in the wage sector but also starting up a business in the informal economy.

Indeed, almost all studies using measures of new firm births (a measure of formal entrepreneurship) find that stricter entry regulation is related to lower levels of entrepreneurship. However, for studies using (GEM-based) individual-level measures of entrepreneurship (covering both formal and informal entrepreneurs), the evidence is more ambiguous, and several studies do not find significant relationships. This may reflect that, in light of the utility maximization paradigm, one of the alternative occupations to starting up a formal business, namely starting up an informal business, is now also captured by the entrepreneurship measure employed. Those GEM-based studies that do find a significant relationship, generally find a negative relation between stricter entry regulation and the level of entrepreneurship. This is particularly the case for opportunity-driven entrepreneurship, possibly because their opportunity costs (i.e., their earning capacity in alternative occupations) are higher. Overall, considering the evidence in the existing literature, we hypothesize:

Hypothesis 1: The regulatory quality in a country—indicating lighter entry regulation—is positively associated with the likelihood that an individual engages in nascent entrepreneurship.

2.2. The Relationship Between (Entry) Regulation and Entrepreneurship Through the Perceived Ease of Starting a Business

As the actual regulatory quality of a country may be difficult to assess for an individual, there may be indirect ways through which regulation at country-level impacts behavior at the individual level. In this study, we focus on individual perceptions about the ease of starting a business (see Figure 1). Our reasoning is that if it is objectively easier to start a business in a country (in terms of requirements with respect to procedures, time, cost and paid-in capital), individual perceptions on the ease of starting a business are likely to be relatively positive in this country. These perceptions may in turn lead to increased levels of nascent entrepreneurship. Regarding the first path, the relationship between entry

regulation and individual perceptions, it is often assumed that these two are related. For example, Hoelscher and Elango (2012, pp. 2-3) state that "[i]f the government is perceived to be one of control and suppression, the potential entrepreneur will consider the economic environment too hostile to enter."

However, with the exception of studies that use data on the perceived administrative complexity for entry from the Eurobarometer public opinion surveys coordinated by the European Commission (e.g., Van Stel and Stunnenberg, 2006), we are not aware of peer-reviewed journal articles focusing on the perceived ease of starting a business. We amend this literature by drawing upon a relatively recently introduced GEM measure about the perceived ease of starting a business. The Global Report of GEM (2019) clearly shows that this measure differs from perceptions of good business opportunities, as for example 82% of the adults in the United Kingdom believe it is easy to start a business, while only 44% of the respondent are perceiving good business opportunities. Besides other factors, such as economic circumstances or personal characteristics, it thus seems likely that entry regulation is a determinant of the perceived ease of starting a business. Therefore, we hypothesize:

Hypothesis 2: The regulatory quality in a country—indicating lighter entry regulation—is positively associated with the likelihood that an individual perceives it is easy to start a business.

Whereas there is no prior research about the relationship between entry regulation and the perceived ease of starting a business, there is some research on the relationship between perceptions about entrepreneurship in general and (nascent) entrepreneurship. Arenius and Minniti (2005) show how several general perceptions about entrepreneurship relate to nascent entrepreneurship. They find that having entrepreneurial ties (knowing entrepreneurs), confidence in one's skills, fear of failure, and opportunity perception are all significant determinants of nascent entrepreneurship. Davidsson and Honig (2003) find something similar for entrepreneurial ties. Besides studies analyzing these general perceptual variables, there is also some research analyzing perceptions about institutional aspects. For example, Johnson, McMillan and Woodruff (2002) show that perceived protection of property rights affects investment decisions. Begley, Tan and Schoch (2005) examine how (perceived) politico-economic resources relate to the feasibility and desirability of starting a business. One of these resources is supportive government regulation, measured by whether someone agreed or disagreed with the statement "Bureaucracy does not hinder economic development" (Begley et al., 2005, p. 45). They found a surprisingly negative relationship between this indicator and both the feasibility and desirability of starting a business in thirteen countries. This effect appeared to be driven by individuals from East Asian countries. However, there are some limitations on the generalizability of these findings, because this study draws on

a non-random sample of predominantly male MBA-students. Moreover, this study does not control for regulatory quality apart from perceptions.

In line with the general findings on the relationship between perceptions about entrepreneurship and actual entrepreneurship, and in accordance with the theory of planned behavior (Azjen, 1991; Kautonen, Van Gelderen and Fink, 2015), we expect that a positive attitude towards the ease of starting a business is associated with a higher probability of engaging in nascent entrepreneurship. Therefore, our third hypothesis is:

Hypothesis 3: Perceiving starting a business as easy is positively associated with the likelihood that an individual engages in nascent entrepreneurship.

3. Data

In order to test the hypotheses, data from four different sources are combined. We use data from the Global Entrepreneurship Monitor (GEM), the World Bank (WB), the International Labor Organization (ILO) and the International Monetary Fund (IMF). The data cover two levels, the individual level (GEM data) and the country level (WB, ILO, and IMF data). We discuss characteristics of the individual level data first and then the characteristics of the country level data.

3.1. Individual-Level Data

3.1.1. Dataset

At the individual-level, this study uses data from the GEM Adult Population Survey (APS) of 2015 and 2016. The GEM APS is the principal global data source in entrepreneurship research (Bosma, 2013). GEM annually measures the level and nature of entrepreneurial activity around the world by surveying the adult population. Additionally, the APS includes information on several socio-economic and demographic characteristics of the respondents. The survey is administered to representative national samples of at least 2,000 respondents in a country. For the wave of 2015, the sample consists of approximately 180,000 individuals from 60 countries. For the wave of 2016, the sample consists of around 195,000 individuals from 65 countries. As the participation of countries in GEM varies by year, this boils down to a total of 74 unique countries. The data in our study is limited to the waves of 2015 and 2016, as these are the only waves for which data on the perceived ease of starting a business was publicly available at the time of conducting the empirical analyses.

3.1.2. Individual-Level Variables

<u>Main Variables</u>
The main dependent variable is a dichotomous measure for nascent entrepreneurship, which equals 1 if someone responds to be a nascent entrepreneur according to the definition of Reynolds et al. (2005). That is, it equals 1 for an individual who has taken some action toward creating a new business in the past year and expects to own a share of the business (s)he is starting. However, this business should not yet have paid any wages or salaries for more than 3 months. The variable equals 0 if someone responds to be a wage worker.

Besides nascent entrepreneurship in general, we also consider opportunity-driven and necessity-driven nascent entrepreneurship. Opportunity-driven (nascent) entrepreneurs are individuals that are pulled to entrepreneurship because they perceived a good business opportunity, desired independence, or sought to increase income (Global Entrepreneurship Monitor, 2020). Necessity-driven (nascent) entrepreneurs are pushed towards entrepreneurship out of necessity because they have no other choices for work or because they wanted to maintain their income. We use dichotomous variables for these types of entrepreneurship, where value 1 refers to someone being an opportunity-driven, respectively being a necessity-driven nascent entrepreneur. To have a homogeneous control group in the regressions, these two variables equal 0 for wage workers.

The perceived ease of starting a business is the dependent variable in the models testing Hypothesis 2 and the main explanatory variable in the models testing Hypothesis 3. It corresponds to a new question that is included in the Adult Population Survey from 2015 onwards, reading: '*In my country, it is easy to start a business*'. Besides refusing to answer, answers to this question are either *Yes*, *No* or *Don't know*. For both years 2015 and 2016, more than 90% of the respondents answered with either *Yes* or *No*. Other answers than these were treated as missing and the variable is analyzed as a dummy variable (0=*No*, 1=*Yes*).

<u>Control Variables</u>
We control for a wide range of socio-economic factors that may affect both perceived ease of starting a business and nascent entrepreneurship. The choice of controls is based on previous research by Davidsson and Honig (2003) and Arenius and Minniti (2005), of which the latter study used GEM data too. Like the present study, these two studies explain nascent entrepreneurship at the individual level. Control variables include individual opportunity perception, perceived entrepreneurial skills, entrepreneurial ties, and fear of failure. These perceptual variables measure aspects of one's social capital and self-efficacy, and are important determinants of nascent entrepreneurship (Davidsson and Honig,

2003). All four variables are dichotomous (0=*No*, 1=*Yes*), except for opportunity perception. As approximately 1 out of 6 respondents responded *Don't know* on whether they perceived opportunities for starting a business, treating these as missing would result in the loss of relatively many observations. Besides, as other literature finds that the *Don't know*-group behaves similar to the *No*-group, this answer apparently does convey information (Stuetzer et al., 2014). Opportunity perception is thus treated as a categorical variable, with *No* as the reference category and *Don't know* and *Yes* as other categories.

Finally, several demographic characteristics are included, as these are known to critically impact nascent entrepreneurship. Following Arenius and Minniti (2005), these characteristics include gender, age, education, and household income. As women tend to exhibit lower rates of (nascent) entrepreneurship, a dummy for gender is included (0=*Male*, 1=*Female*). As both relatively young and old people tend to exhibit higher entrepreneurial intentions, the individual's age is included and a squared term of it is included to account for a possible quadratic effect. As education relates to entrepreneurship, it is also included. Education is included using a categorical variable distinguishing three levels of education: (1) pre-primary education to first stage of basic education, (2) (upper) secondary education, and (3) post-secondary or tertiary education. The first group is the reference category. Household income is included, as financial resources and constraints are important for someone when starting a business. Data on household income are available in terciles. As there were missing values for approximately 1 out of 6 respondents, primarily originating from the more developed countries, missing values were included as a separate category. This resulted in a categorical variable with values 1, 2 and 3 corresponding to respectively the first, second and third tercile of household income, and value 4 corresponding to those individuals with missing information on household income.

3.2. Country-Level Data

3.2.1. Dataset

The individual-level data from the APS are supplemented with country-level data from four different datasets, originating from several sources. The main source, Doing Business by the World Bank (WBDB), contains data about (entry) regulation. For control variables, we use data from the World Governance Indicators (WGI) by the World Bank about political stability, data from the ILOSTAT database by the International Labour Organization (ILO) about unemployment, and data from the International Monetary Fund (IMF) about GDP per capita and GDP growth.

Major advantages of using WBDB data are its consistent measurement across countries and its common use in empirical research (World Bank, 2020a, 2020b). A disadvantage is that the WBDB measures only takes national regulation into account. Therefore, it might be less reflective for entry regulation in larger countries with locally adjusted entry regulations. Second, WBDB relates to requirements for a company with between 5 and 50 employees one month after start-up. This is significantly larger than most firms of the entrepreneurs surveyed by GEM.

3.2.2. Country-Level Explanatory Variables

<u>Main Explanatory Variable</u>
The main explanatory variable at the country-level is the percentile rank score for a country's regulatory quality from the Ease of Starting a Business Index. As discussed earlier, this is part of the larger Ease of Doing Business Index and it is based on four indicators. For each indicator, a percentile rank score is made, where the country's regulatory performance is compared to the best performance on that indicator for all countries in the WBDB data base since 2005. The simple average of these four percentile rank scores for a country, gives its score for Ease of Starting a Business. An economy's Ease of Starting a Business Index score is reflected on a scale from 0 to 100, where 0 represents the lowest and 100 represents the best performance. For example, an Ease of Starting a Business Index score of 75 means an economy was 25 percentage points away from the best regulatory performance constructed across all economies and over time (World Bank, 2020a, 2020b).[4] As entry requirements are sometimes different for females than for males, the requirements are measured for both females and males separately. We used the separate scores for gender when linking the individual-level data to the country-level data. In our analyses, we divided a country's score by 100 to enhance the interpretation of the regression results.

Although the methodology for other subindices of WBDB has changed over time, the methodology behind Starting a Business has not changed since its development by Djankov et al. (2002). The four underlying indicators correspond to requirements with respect to procedures, time, cost and paid-in minimum capital necessary to start a limited liability company with between 5 and 50 employees one month after start-up in the largest business city in a country. It includes both the procedures that are required by law and those that are commonly done in practice. It is assumed that the entrepreneur pays no bribes to speed up or skip procedures. Procedures refer to the number of interactions between the company founder and external parties that are necessary to start a firm, both before, during and after the incorporation. Time refers to the number

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4. These percentile rank scores are also known as 'Distance to frontier' scores, where the benchmark score of 100 represents the 'frontier'.

of days necessary to fulfill all procedures. Costs are expressed as a percentage of GDP per capita and include only the official fees and taxes, thus excluding any form of bribes. The paid-in minimum capital requirement (further: capital) is expressed as a percentage of GDP per capita as well and refers to the amount that an entrepreneur has to deposit in a bank or with a notary during the process of the company registration (World Bank, 2020b).

Control Variables
At the country-level, we control for a variety of macro-economic aspects that are found to determine entrepreneurship, both theoretically and in previous empirical research. First, we control for GDP per capita (in current international $) and GDP growth (using real GDP growth in %). Both GDP per capita and GDP growth are important, as they indicate the market potential for start-ups (Desai et al., 2003). As the distribution of GDP per capita is skewed, the variable is logarithmically transformed. Before taking the logarithm, we divided GDP per capita by 100 to enhance the interpretation of regression coefficients. We also control for the unemployment rate (% of total labor force), following studies such as Verheul et al. (2006) and Hoelscher and Elango (2012). Finally, we use the World Governance Indicator (five-point scale) for 'political stability and absence of violence/terrorism' to control for political stability. Political instability might increase transaction costs in the labor market, affecting its overall functioning. Higher values indicate a more stable country. Finally, we control for time fixed effects using a dummy that equals 1 if the year is 2016 and 0 if the year is 2015.

To reduce endogeneity issues, all variables at the country-level are lagged with one year. As discussed by Bellemare, Masaki and Pepinsky (2017), this procedure does not completely solve the endogeneity problems. However, it is likely to reduce to a certain extent endogeneity caused by reverse causality. Nevertheless, we caution that the estimates obtained should be interpreted as conditional correlations and not as causal effects.

4. Methodology

As the individual data are grouped by country, the dataset is both hierarchical and clustered. Given this nature of the data, the hypotheses are tested using a multilevel logistic regression model. Multilevel methods have several advantages over other methods and have been used for mediation analyses in analogous contexts. For example, Stuetzer et al. (2014) have investigated how several regional characteristics affect individual nascent entrepreneurship via opportunity perception using multilevel modelling. Shepherd (2011, p. 412) discusses the importance of multilevel entrepreneurship research, as it bridges "the levels of the decision, the individuals, and the contexts in which they are embedded." Multilevel modelling thus allows to investigate inter-level mechanisms, such as

examining indirect effects of country-level regulation on individual entrepreneurship via perceptual variables. For the context of institutions in particular, Bjørnskov and Foss (2016, p. 301) discuss the importance of multilevel research, as "the relationships among institutions, entrepreneurship, and aggregate outcomes are, as a logical matter, multilevel."

The objective of this paper is to examine both the relationship between country-level regulation on individual-level nascent entrepreneurship and the indirect relationship via the individual perceptions about the easiness to start a business. To test for mediation, we follow the procedure developed by Baron and Kenny (1986). We need three different models to execute this procedure. In the first model, we test whether there is a direct relationship between entry regulation and nascent entrepreneurship (Hypothesis 1). Individual perceptions are not included in these models. In the second model, the relationship between regulatory quality and the perceived ease of starting a business is examined (Hypothesis 2). In the third model, we estimate the effect of both the regulatory quality and the perceived ease of starting a business on nascent entrepreneurship (Hypothesis 3). Mediation takes place if there is (i) a direct relationship between regulatory quality and nascent entrepreneurship (Model 1), (ii) a relationship between regularity quality and the perceived ease of starting a business (Model 2), (iii) a relationship between the perceived ease of starting a business and nascent entrepreneurship (Model 3), and (iv) a significant change in the coefficient for regularity quality when comparing Model 3 to Model 1. The significance of the mediating effect can be calculated using the Sobel test.

Besides a full sample estimation, we also estimate separate regressions for two country groups, namely innovation-driven economies versus factor- and efficiency-driven economies. This is relevant because the size of the informal economy varies by the level of economic development (Djankov et al., 2002, Ayyagari et al., 2007) and hence, at the country level, the trade-off between formal and informal entrepreneurship related to different levels of entry regulation may be different in these two groups of countries.

5. Results

5.1. Descriptive Results

Table 1 provides descriptive statistics for all model variables, both at the individual and the country level. In the analyses, 246,371 observations from 66 countries were used. Overall, 7.4% of individuals in the analysis sample are engaged in nascent entrepreneurship. This percentage ranges from less than 1.5% in Vietnam and the United Arab Emirates to approximately 23% in Botswana and Ecuador. The regulatory quality of the countries in our sample seems to be

relatively high, with a mean of 85 on a 0 to 100 scale. For comparison, in the complete WBDB data base spanning 211 countries, the mean is 77.8. The mean of our variable capturing the perceived ease of starting a business variable equals 0.363, implying that approximately one third of the individuals in our sample believes that starting a business in their country is 'easy'.

Table 1. Descriptive statistics of the analysis sample.

	N	Mean	S.D.	Min.	Max.
Individual-level variables					
Nascent entrepreneurship	246,731	0.074	0.262	0.000	1.000
Nascent entrepreneurship (opportunity)	242,438	0.058	0.234	0.000	1.000
Nascent entrepreneurship (necessity)	232,667	0.018	0.135	0.000	1.000
Perceived ease of starting a business	246,731	0.363	0.481	0.000	1.000
Female	246,731	0.493	0.500	0.000	1.000
Education: Low	246,731	0.309	0.462	0.000	1.000
Education: Medium	246,731	0.335	0.472	0.000	1.000
Education: High	246,731	0.356	0.479	0.000	1.000
Age (years)	246,731	39.098	13.007	18.000	64.000
Income: Lowest tercile	246,731	0.300	0.458	0.000	1.000
Income: Middle tercile	246,731	0.273	0.446	0.000	1.000
Income: Highest tercile	246,731	0.275	0.447	0.000	1.000
Income: Missing	246,731	0.152	0.359	0.000	1.000
Entrepreneurial ties	246,731	0.412	0.492	0.000	1.000
Perceived skills	246,731	0.533	0.499	0.000	1.000
Fear of failure	246,731	0.413	0.492	0.000	1.000
Opportunity recognition: Yes	246,731	0.363	0.481	0.000	1.000
Opportunity recognition: No	246,731	0.525	0.499	0.000	1.000
Opportunity recognition: Don't know	246,731	0.112	0.315	0.000	1.000
Country-level variables					
GDP per capita (lagged, logarithm)	66	4.803	1.089	1.848	6.999
Economic growth (lagged)	66	0.032	0.033	-0.023	0.251
Unemployment (lagged)	66	0.087	0.059	0.002	0.270
Political stability (lagged)	66	0.114	0.781	-1.564	1.410
Regulatory quality (lagged)	66	0.850	0.087	0.647	0.982

Notes: S.D.=Standard deviation; Min.=Minimum; Max.=Maximum.

5.2. The Relationship Between Entry Regulation and Entrepreneurship

Table 2 presents models estimating the relationship between entry regulation and total, opportunity-driven, and necessity-driven nascent entrepreneurship in the full sample of 66 countries. Of importance here is the first of every two columns included for each type of entrepreneurship in Table 2 (i.e., the models without the

variable capturing the perceived ease of starting a business). We see that regulatory quality is negatively related to total nascent entrepreneurship at the 5% significance level. This negative relation is stronger for opportunity nascent entrepreneurship (significant at the 1% level) but non-significant for necessity nascent entrepreneurship. Thus, the results in Table 2 do not support Hypothesis 1.

Table 3 focuses on the subsample of 24 innovation-driven economies.[5] In contrast to Table 2, here we observe a significantly positive relationship between regulatory quality and both total and opportunity-driven entrepreneurship. Thus, for innovation-driven countries, our results are in line with Hypothesis 1. Again, we find that necessity entrepreneurship is not affected by regulatory quality. Table 4 focuses on the subsample of 43 factor-driven and efficiency-driven economies. In line with the results in Table 2, we find a negative and significant association between regulatory quality and opportunity-driven entrepreneurship. Thus, the results in this subsample are against Hypothesis 1.

Table 2. Results of the multilevel logit regressions with random intercept explaining nascent entrepreneurship.

	Total		Opportunity		Necessity	
Individual-level variables						
Perceived ease of starting a business		-0.002		-0.001		-0.001*
		(0.001)		(0.001)		(0.001)
Female	-0.011***	-0.011***	-0.012***	-0.012***	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Education: Medium	-0.003*	-0.003*	0.000	0.000	-0.003***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Education: High	0.005***	0.005***	0.010***	0.010***	-0.006***	-0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age	-0.000***	-0.000***	-0.000***	-0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Income: Middle tercile	0.003*	0.003*	0.007***	0.007***	-0.005***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Income: Highest tercile	0.003*	0.003*	0.013***	0.013***	-0.011***	-0.011***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Income: Missing	0.000	0.000	0.004**	0.004**	-0.005***	-0.005***

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5.   While our full sample comprises 66 countries, the subsample of innovation-driven countries contains 24 countries and the subsample of factor-driven and efficiency-driven economies contains 43 countries. This is due to the fact that Slovakia is considered to be an innovation-driven economy in 2015 and an efficiency-driven economy in 2016.

	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Entrepreneurial ties	0.043***	0.043***	0.036***	0.036***	0.010***	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Perceived skills	0.064***	0.064***	0.049***	0.050***	0.018***	0.018***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Opportunity recognition: Don't know	0.000	0.000	0.001	0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Opportunity recognition: Yes	0.036***	0.037***	0.033***	0.034***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Fear of failure	-0.018***	-0.018***	-0.017***	-0.017***	-0.002***	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Country-level variables						
GDP per capita (lagged, logarithm)	0.007	0.007	0.003	0.003	-0.001	0.000
	(0.006)	(0.006)	(0.005)	(0.005)	(0.002)	(0.002)
Economic growth (lagged)	0.204**	0.205**	0.131*	0.132*	0.077*	0.078*
	(0.070)	(0.070)	(0.062)	(0.062)	(0.033)	(0.033)
Unemployment (lagged)	-0.114	-0.115	-0.091	-0.091	-0.006	-0.007
	(0.081)	(0.081)	(0.067)	(0.067)	(0.029)	(0.029)
Political stability (lagged)	-0.014*	-0.014*	-0.006	-0.006	-0.002	-0.002
	(0.007)	(0.007)	(0.006)	(0.006)	(0.003)	(0.003)
Regulatory quality (lagged)	-0.078*	-0.078*	-0.094**	-0.094**	-0.006	-0.007
	(0.036)	(0.036)	(0.032)	(0.032)	(0.017)	(0.017)
ICC	0.031	0.031	0.025	0.025	0.011	0.011
Observations	246,731	246,731	242,438	242,438	232,667	232,667
Countries	66	66	66	66	66	66

Notes: Regression coefficients for the time dummy and constants are not reported, but available upon request from the authors. Standard errors in parentheses; * $p<0.05$, ** $p<0.01$, *** $p<0.001$; All country-level variables are centered at their grand mean, all non-dichotomous individual-level variables are centered at their country mean; Reference categories for education, household income and opportunity recognition are respectively 'Low education', 'Income: Lowest tercile' and 'No'. ICC=intra-class correlation.

Table 3. Results of the multilevel logit regressions with random intercept explaining nascent entrepreneurship (innovation-driven countries).

	Total		Opportunity		Necessity	
Individual-level variables						
Perceived ease of starting a business		0.000		0.002		-0.001
		(0.002)		(0.001)		(0.001)
Female	-0.008***	-0.008***	-0.008***	-0.008***	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Education: Medium	-0.004*	-0.004*	-0.005**	-0.005**	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Education: High	0.005*	0.005*	0.005**	0.005**	-0.001	-0.001

	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Age	-0.001***	-0.001***	-0.001***	-0.001***	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Income: Middle tercile	-0.005*	-0.005*	-0.001	-0.001	-0.004***	-0.004***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Income: Highest tercile	-0.002	-0.002	0.004*	0.004*	-0.007***	-0.007***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Income: Missing	0.000	0.000	0.001	0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Entrepreneurial ties	0.042***	0.042***	0.036***	0.036***	0.007***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Perceived skills	0.054***	0.054***	0.044***	0.044***	0.012***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Opportunity recognition: Don't know	0.003	0.003	0.004*	0.004*	0.000	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Opportunity recognition: Yes	0.030***	0.030***	0.029***	0.028***	0.003***	0.003***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Fear of failure	-0.019***	-0.019***	-0.018***	-0.018***	-0.002**	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Country-level variables						
GDP per capita (lagged, logarithm)	-0.006	-0.006	-0.006	-0.006	-0.005	-0.005
	(0.011)	(0.011)	(0.009)	(0.009)	(0.003)	(0.003)
Economic growth (lagged)	-0.024	-0.024	0.017	0.016	-0.014	-0.013
	(0.079)	(0.079)	(0.069)	(0.069)	(0.023)	(0.023)
Unemployment (lagged)	-0.048	-0.047	-0.048	-0.046	0.010	0.009
	(0.085)	(0.085)	(0.073)	(0.073)	(0.022)	(0.022)
Political stability (lagged)	-0.003	-0.003	0.000	0.000	0.001	0.002
	(0.009)	(0.009)	(0.008)	(0.008)	(0.002)	(0.002)
Regulatory quality (lagged)	0.305**	0.304**	0.284***	0.283***	0.017	0.018
	(0.100)	(0.100)	(0.086)	(0.086)	(0.025)	(0.025)
ICC	0.013	0.013	0.011	0.011	0.003	0.003
Observations	95,507	95,507	94,655	94,655	91,836	91,836
Countries	24	24	24	24	24	24

Notes: Regression coefficients for the time dummy and constants are not reported, but available upon request from the authors. Standard errors in parentheses; * $p<0.05$, ** $p<0.01$, *** $p<0.001$; All country-level variables are centered at their grand mean, all non-dichotomous individual-level variables are centered at their country mean; Reference categories for education, household income and opportunity recognition are respectively 'Low education', 'Income: Lowest tercile' and 'No'. ICC=intra-class correlation.

Table 4. Results of the multilevel logit regressions with random intercept explaining nascent entrepreneurship (factor-driven and efficiency-driven countries).

	Total		Opportunity		Necessity	
Individual-level variables						
Perceived ease of starting a business		-0.004**		-0.003*		-0.002*
		(0.002)		(0.001)		(0.001)
Female	-0.013***	-0.013***	-0.015***	-0.015***	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Education: Medium	-0.003	-0.003	0.002	0.002	-0.005***	-0.005***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Education: High	0.006**	0.006**	0.014***	0.014***	-0.009***	-0.009***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Age	-0.000***	-0.000***	-0.000***	-0.000***	0.000**	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Income: Middle tercile	0.007***	0.007***	0.012***	0.012***	-0.005***	-0.006***
	(0.002)	(0.002)	(0.002	(0.002)	(0.001)	(0.001)
Income: Highest tercile	0.006**	0.006**	0.018***	0.018***	-0.013***	-0.013***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Income: Missing	-0.005	-0.005	0.003	0.003	-0.010***	-0.010***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
Entrepreneurial ties	0.043***	0.043***	0.035***	0.035***	0.012***	0.012***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Perceived skills	0.070***	0.071***	0.053***	0.053***	0.022***	0.023***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Opportunity recognition: Don't know	-0.006*	-0.006*	-0.003	-0.003	-0.003*	-0.003*
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
Opportunity recognition: Yes	0.039***	0.039***	0.036***	0.036***	0.006***	0.006***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Fear of failure	-0.017***	-0.017***	-0.016***	-0.016***	-0.003**	-0.003**
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Country-level variables						
GDP per capita (lagged, logarithm)	0.018	0.018	0.007	0.007	0.006	0.006
	(0.010)	(0.010)	(0.008)	(0.008)	(0.004)	(0.004)
Economic growth (lagged)	0.213*	0.216*	0.113	0.115	0.124*	0.125*
	(0.097)	(0.097)	(0.086)	(0.086)	(0.052)	(0.052)
Unemployment (lagged)	0.064	0.065	-0.004	-0.004	0.040	0.040
	(0.127)	(0.127)	(0.104)	(0.104)	(0.047)	(0.047)
Political stability (lagged)	-0.013	-0.013	-0.005	-0.005	-0.003	-0.003
	(0.009)	(0.009)	(0.008)	(0.008)	(0.004)	(0.004)
Regulatory quality (lagged)	-0.077	-0.077	-0.108**	-0.108**	0.006	0.006
	(0.041)	(0.041)	(0.036)	(0.036)	(0.021)	(0.021)
ICC	0.033	0.033	0.026	0.026	0.013	0.013

Observations	151,224	151,224	147,783	147,783	140,831	140,831
Countries	43	43	43	43	43	43

Notes: Regression coefficients for the time dummy and constants are not reported, but available upon request from the authors. Standard errors in parentheses; * $p<0.05$, ** $p<0.01$, *** $p<0.001$; All country-level variables are centered at their grand mean, all non-dichotomous individual-level variables are centered at their country mean; Reference categories for education, household income and opportunity recognition are respectively 'Low education', 'Income: Lowest tercile' and 'No'. ICC=intra-class correlation.

5.3. The Relationship Between (Entry) Regulation and Entrepreneurship Through the Perceived Ease of Starting a Business

To evaluate Hypothesis 2, we use Table 5 which depicts the estimated relationships between regulatory quality and the perceived ease of starting a business. From the bottom row we can see that the relationship is not significant. It is not significant in the full sample, nor in the subsamples of innovation-driven and factor-driven/efficiency-driven countries. Hypothesis 2 is therefore not supported.

Table 5. Results of the multilevel logit regressions with random intercept explaining the perceived ease of starting a business.

	Full sample	Innovation-driven countries	Factor-driven and efficiency-driven countries
Individual-level variables			
Female	-0.005*	-0.003	-0.006*
	(0.002)	(0.003)	(0.002)
Education: Medium	-0.030***	-0.028***	-0.031***
	(0.002)	(0.004)	(0.003)
Education: High	-0.057***	-0.039***	-0.070***
	(0.003)	(0.004)	(0.003)
Age	0.001***	0.000**	0.001***
	(0.000)	(0.000)	(0.000)
Age squared	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Income: Middle tercile	-0.001	0.002	-0.002
	(0.002)	(0.004)	(0.003)
Income: Highest tercile	0.006*	0.012**	0.003
	(0.003)	(0.004)	(0.003)
Income: Missing	0.000	0.004	-0.005
	(0.003)	(0.004)	(0.004)
Entrepreneurial ties	0.024***	0.015***	0.029***
	(0.002)	(0.003)	(0.003)
Perceived skills	0.063***	0.044***	0.076***
	(0.002)	(0.003)	(0.003)

Opportunity recognition: Don't know	0.047***	0.068***	0.026***
	(0.003)	(0.004)	(0.004)
Opportunity recognition: Yes	0.137***	0.143***	0.132***
	(0.002)	(0.003)	(0.003)
Fear of failure	-0.026***	-0.041***	-0.016***
	(0.002)	(0.003)	(0.002)
Country-level variables			
GDP per capita (lagged, logarithm)	0.050***	0.098*	0.049*
	(0.015)	(0.050)	(0.022)
Economic growth (lagged)	0.658***	0.470	0.725***
	(0.140)	(0.294)	(0.168)
Unemployment (lagged)	-0.531**	-1.498***	0.725*
	(0.197)	(0.363)	(0.303)
Political stability (lagged)	-0.006	-0.018	-0.038*
	(0.016)	(0.044)	(0.019)
Regulatory quality (lagged)	0.022	-0.104	0.063
	(0.068)	(0.449)	(0.071)
ICC	0.090	0.107	0.084
Observations	246,731	95,507	151,224
Countries	66	24	43

Notes: Regression coefficients for the time dummy and constants are not reported, but available upon request from the authors. Standard errors in parentheses; * $p<0.05$, ** $p<0.01$, *** $p<0.001$; All country-level variables are centered at their grand mean, all non-dichotomous individual-level variables are centered at their country mean; Reference categories for education, household income and opportunity recognition are respectively 'Low education', 'Income: Lowest tercile' and 'No'. ICC=intra-class correlation.

To evaluate Hypothesis 3, the relationship between the perceived ease of starting a business and the likelihood of being engaged in nascent entrepreneurship, we use Tables 2-4 again. In none of the specifications we find empirical evidence for the hypothesized positive relationship. In fact, we find a significantly negative relationship between the perceived ease of starting a business and necessity nascent entrepreneurship in the full sample of countries (Table 2), and also significantly negative relationships between this perception and all types of entrepreneurship in factor-driven and efficiency-driven countries (Table 4).

Overarching Hypotheses 2 and 3 was the question whether the perceived ease of starting a business mediates the relation between regulatory quality and nascent entrepreneurship. The methodology of Baron and Kenny (1986) requires amongst others that the explanatory variable (i.e., regulatory quality) is a significant predictor of the mediator (i.e., perceived ease of starting a business). As the perceived ease of starting a business is not significantly affected by regulatory quality (Hypothesis 2), we conclude that the evidence for a mediating effect is inconclusive.

6. Discussion

The earlier literature (see Section 2) provides strong evidence regarding the positive relationship between regulatory quality and formal entrepreneurship. However, the GEM-based measure of nascent entrepreneurship employed in this study comprises both formal and informal entrepreneurship. In our study, for the full sample of countries (which includes both developed and developing countries), we do not find a positive relationship between regulatory quality and total (formal + informal) entrepreneurship (Hypothesis 1). In fact, we find a significantly negative relationship. This negative relationship can be interpreted, as a trade-off between a positive effect of the regulatory quality on formal entrepreneurship (in line with e.g., Djankov et al., 2002) and a negative effect on informal entrepreneurship in which the latter effect apparently dominates. The negative effect on informal entrepreneurship is in line with findings that lighter entry regulation (i.e., higher regulatory quality) is associated with a smaller informal sector (Djankov et al., 2002). In particular, in countries with high regulatory quality (high-RQ), many workers who would probably have run a one-man business in the informal economy in a low-RQ (i.e., heavily regulated) country may now be either a formal entrepreneur or, more likely, a wage-worker in a formal business (Aidis, Estrin and Mickiewicz, 2012).

This trade-off is even stronger for opportunity-driven entrepreneurship: In high-RQ countries there is more room for opportunity entrepreneurs operating in the formal sector. As these formal entrepreneurs are often more growth-oriented, they tend to create more wage jobs. Hence, in this case the trade-off involves a much lower number of (opportunity) entrepreneurs running one-man businesses in the informal economy, versus a higher number of opportunity entrepreneurs in the formal economy. However, the results suggest that the increase in formal entrepreneurship is smaller than the decrease in informal entrepreneurship. This is because opportunity nascent entrepreneurs in the formal sector (intend to) create more wage jobs, so a proportion of informal (opportunity) entrepreneurs from low-RQ economies will now find employment as a wage-worker in an opportunity-driven (and larger) business in the formal sector. This trade-off does not seem to apply to necessity entrepreneurship. Our results show that the total number of necessity entrepreneurs (formal + informal) is not significantly affected by the level of regulatory quality, suggesting that it may not make much difference whether necessity entrepreneurs run their business in a high-RQ or a low-RQ economy. Moreover, due to lack of skills, these entrepreneurs are less likely to benefit from more wage jobs becoming available in high-RQ economies.

Our results in the separate subsamples of innovation-driven versus factor-driven and efficiency-driven economies support these interpretations. In innovation-driven countries, in line with the findings of Levie and Autio (2011), we observe a significantly positive relationship between regulatory quality and both total and opportunity-driven entrepreneurship. This could be explained by

observing that in innovation-driven economies the size of the informal sector is much smaller, and most entrepreneurs captured by GEM in these countries will operate in the formal sector. Hence, there are not many informal entrepreneurs who can possibly switch to a wage-job in an opportunity-driven formal business when regulatory quality increases. Instead, these results for innovation-driven economies refer to a pure 'within' formal sector effect, and thus confirm the results by Djankov et al. (2002) and many of its follow-up studies discussed in Section 2. In factor-driven and efficiency-driven economies, the informal sector is much bigger and the negative relationship we find between regulatory quality and opportunity-driven entrepreneurship in these countries may therefore reflect a trade-off between a high number of (opportunity) entrepreneurs running very small businesses in the informal sector versus a lower number of opportunity entrepreneurs running relatively larger businesses in the formal sector. That is, when regulatory quality increases, a proportion of informal sector entrepreneurs may find wage-employment in a formal business, thereby lowering the total (formal + informal) number of entrepreneurs.

Surprisingly, our evidence in support of Hypothesis 2 (the relationship between regulatory quality and the perceived ease of starting a business) is inconclusive in the full sample as well as in the two subsamples. A possible explanation could be the presence of parallel trends, when governments that improve entry regulation also support large existing businesses. Such support could make careers in larger businesses relatively more attractive (Begley et al., 2005), and as a result the average perceptions about the *relative* ease of starting a business may deteriorate. Such an explanation may also lie behind the surprisingly negative relationships we find between the perceived ease of starting a business and entrepreneurship, for example when changes in entry regulation covary with the rigidity of labor market regulation (Ayyagari et al., 2007). Evidence in support of this interpretation is that the relationship between the perceived ease of starting a business and nascent entrepreneurship is particularly negative in factor-driven and efficiency-driven economies (Table 4), while unemployment (a labor market condition strongly influenced by labor market regulation) is positively impacting the perceived ease of starting a business in these countries and negatively in innovation-driven countries (Table 5).

7. Conclusion

In this study, we revisited the relationship between entry regulation and entrepreneurship. While Djankov et al. (2002) found a positive relationship between regulatory quality and formal entrepreneurship, we find a negative relationship between regulatory quality and total (formal + informal) nascent entrepreneurship. Further analyses show that this result is driven by the negative effect of regulatory quality on opportunity entrepreneurship in factor-driven and

efficiency-driven countries. The negative relationship in these countries is consistent with a shift from (opportunity) entrepreneurship in the informal sector to wage-employment in the formal sector when regulatory quality increases. On the contrary, the impact of regulatory quality on nascent (opportunity) entrepreneurship in innovation-driven countries is positive. As the informal economy tends to be much smaller in these countries, this positive finding is more in line with the original Djankov et al. (2002) study, where a higher ease of starting up a formal business is associated with higher rates of formal entrepreneurship.

Our results therefore suggest that reforms in entry regulation fundamentally influence the distribution between formal and informal entrepreneurship types, in the spirit of Baumol (1990), rather than the total volume of entrepreneurial activity. The total volume of entrepreneurship is also affected, but only as a result of the shift between formal and informal entrepreneurship in a country. When the informal sector is substantial, as in factor-driven and (some) efficiency-driven economies, there are more informal entrepreneurs who can switch to wage-employment in the formal sector when regulatory quality increases. In these countries, as suggested by the estimated negative relationship, the total number of entrepreneurs may then decrease. When the informal sector is small, as in innovation-driven economies, a similar shift may still take place, but relatively less frequently. As a result, the positive effects of entry regulation reforms on formal entrepreneurship dominate. We find no meaningful effects of regulatory quality on necessity entrepreneurship. This may indicate that, although increases in regulatory quality could shift some necessity entrepreneurs from the informal to the formal sector, the occupational choice of a (relatively well-paid) wage job does not become more accessible for these individuals. More research is needed though to verify the empirical validity of this interpretation.

Overall, these findings paint a nuanced picture about the effectiveness of entry deregulation for stimulating nascent entrepreneurship. And, by extension, it raises the question which mechanism is driving the relationship between regulatory quality and entrepreneurship. Our results show that individual perceptions regarding the ease of starting a business do not seem to mediate the relationship between country-level entry regulation and individual-level behavior, even though this has been suggested in the literature (e.g., Hoelscher and Elango, 2012). As such, our findings show that research on the relation between entry regulation and (nascent) entrepreneurship is not finished yet. Further research could focus on other potential mediating channels or on moderating effects (Ardagna and Lusardi, 2010). Irrespective of whether one wants to analyze mediating or moderating effects in the relation between regulation and entrepreneurship, in line with both Shepherd (2011) and Bjørnskov and Foss (2016), we believe that the value of analyzing macro- and micro-level factors simultaneously in a multilevel model cannot be underestimated.

Despite drawing on a large sample comprising 246,371 observations from 66 countries, the analyses conducted are not without limitations. First of all, due to the cross-sectional nature of the data, the estimated relationships cannot be interpreted as causal but only as conditional correlations. The problem of reverse causality has been partially mitigated by lagging the country-level variables, but the individual-level variables could not be lagged due to the cross-sectional nature of the GEM data. A second limitation is that the perceived ease of starting a business, the central measure for evaluating Hypotheses 2 and 3, was measured with only a single question with two response options ('*In my country, it is easy to start a business*'; Yes/No). With its advantage of being measured in a large representative sample, the absence of a clear relationship between regulatory quality and the perceived ease of starting a business questions to what extent this variable truly captures perceptions about the ease of starting a business in a valid and reliable way. With such a general statement, different respondents may also have different types of businesses in mind. Third, while our results prove the importance of distinguishing between country groups in terms of their level of economic development, we note that the least developed countries remain underrepresented in our study. For example, Dvouletý and Orel (2019) note that African countries have not received much attention from scholars in the past and that internal dynamics may be different from European countries. As such, it will be important to redo our study when more data about the least developed countries become available. Fourth, although we deem our interpretations of the empirical results plausible in light of the literature, our data do not allow us to directly observe the supposed individual-level switches resulting from entry regulation reforms between the formal and informal sector and between entrepreneurship and wage work. Longitudinal data sets are needed to further analyze these hypothesized dynamics. Fifth and finally, future studies may further explore the nature of opportunity entrepreneurship in developing countries. Our empirical results are consistent with the interpretation that many opportunity-driven entrepreneurs in developing countries actually prefer a wage job in the formal sector. This would suggest that, although opportunity-driven, on average the nature of opportunities pursued by entrepreneurs in developing countries may be less promising or profitable compared to those pursued in developed countries.

In conclusion, we believe our study has improved our understanding of the relationship between regulatory quality on the one hand, and the interplay between formal and informal entrepreneurship on the other hand. The distinction between country groups in terms of their level of economic development proved crucial in generating the new insights that emerge from our study.

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