

Greasing the wheels of entrepreneurship?
A complement according to
entrepreneurial motives

M. Dejardin & H. Laurent

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Greasing the wheels of entrepreneurship? A complement according to entrepreneurial motives [‡]

Marcus DEJARDIN¹ and H el ene LAURENT²

¹University of Louvain & University of Namur

²University of Namur

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Abstract

We consider the effects that corruption and regulation may have on entrepreneurship according to the underlying motivation compelling an individual to open a business. By doing this, we document the idea, widely studied within the context of economic growth, that corruption may be beneficial or detrimental according to its interrelationships with regulation. More specifically, we complement the findings by Dreher and Gassebner (2013) supporting the assumption that corruption “greases the wheels” (vs “sands the wheel”) of strict regulation for early-stage firms. We provide evidence that opportunity-driven entrepreneurs are much more affected by corruption and regulation than necessity-driven ones.

Key words: Entrepreneurship, Corruption, Regulation, Doing business, “Grease the wheels”, “Sand the wheels”, Opportunity-Necessity motives

JEL Classification: D73; F59; J24; L26; M13

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[†]e-mail: marcus.dejardin@unamur.be; helene.laurent@unamur.be

Greasing the wheels of entrepreneurship? A complement according to entrepreneurial motives

1 Introduction

Most of the literature supports a negative effect of corruption on economic development and welfare. The ‘grand corruption’ – intended as the corruption of high-level politicians — is consensually seen harmful for a long term viable economy (Bardhan, 1997; Rose-Ackerman, 2002 and 2003; Svensson, 2005). In the entrepreneurial literature, corruption is also generally considered to be detrimental. Anokhin and Schulze (2009) advance that corruption inhibits the level of entrepreneurial activities in a country. It prevents the institutional trust that is necessary for entrepreneurial activities to flourish by increasing the uncertainty of venture’s expected returns. The higher the corruption level of a country and the lower the probability of being caught, the more likely that a bureaucrat will divert a part of the venture’s profits, thus lowering the venture’s profitability.

Likewise, occupational choice theory highlights the negative impact of ‘rent-seeking’ activities. In a highly corrupted context, talented individuals prefer unproductive or destructive activities over productive ones (see Murphy *et al.*, 1993, Baumol, 1990, Desai *et al.*, 2010 and Sanders and Weitzel, 2010). Indeed, if corruption is high and law enforcement is weak, potential entrepreneurs may be discouraged from establishing a firm.

Yet, a minor stream of literature suggests that ‘petty’ corruption — concerning small amount of money or implying low level of public officers — may, in specific contexts, be positive. It maintains that “corruption may be beneficial in a second best world by alleviating the distortions caused by ill-functioning institutions” (Méon and Weill, 2010, p.244). This is the so-called ‘greasing the wheels hypothesis’ (see Leff, 1964, Leys, 1965 and Huntington, 1968). In the particular context of defective institutions, corruption improves the system by speeding up the service delivery, and improving the quality of public services, etc. That is, even if corruption is detrimental *per se*, it reduces the negative impact of inefficient institutions¹.

Even if this argument is rather old, it is only since 2008 that empirical findings have supported this theory (see Campos *et al.*, 2010 for a meta-analysis about the impact of corruption on growth). For example, Aidt *et al.* (2008) and Méon and Weill (2010) find evidence that corruption ‘greases the wheels’ of productivity or growth. Similarly, an empirical microanalysis of Indonesian firms by Vial and Hanoteau (2009) documents that corruption is not an impediment to growth when the organization of the corruption is centralized and coordinated.

Dreher and Gassebner (2013) provide evidence that corruption may temper the negative effect of regulation on early-stage entrepreneurship. Like Djankov *et al.* (2002), the authors find empirical evidence (on a panel of 43 developed and developing countries over the period 2003-2005) that some measures of regulation decrease the propensity of being an entrepreneur. These results feed a discussion that starts a long time ago. Indeed, understanding the link between regulation and entrepreneurship has been a central concern of many researchers. Pigou (1928, 1938) judges that the intervention of the State was necessary to reduce market imperfections — bad product quality, negative externalities, etc. But Coase (1960) discusses the argument showing that intervention is not always the best response, in particular when it is influenced by lobbies. That is, regulation may be inopportune if guided by insiders’ interests².

¹The counter argument, the ‘sand the wheels’ hypothesis, hints that corruption does not temper the costs of regulation but that it adds new costs to them (see Rose-Ackerman, 1978 and 2003 and Méon and Sekkat, 2005 for a review of these two hypotheses).

²Initial empirical results find that strict regulation deters entrepreneurial activity (Djankov *et al.*, 2002). Later results, Pinotti (2012) and Aghion *et al* (2010), question these findings on the basis of estimation issues, while Iyigun and Rodrik (2004) highlight the rather negative effect of deregulation on growth.

Dreher and Gassebner (2013) report that entry regulation decreases the propensity of becoming an entrepreneur. Furthermore, they show that when the level of regulation is high, the possibility for the entrepreneurs to circumvent excessive administrative rules by bribing public servants is beneficial. That is corruption ‘greases the wheels’ of the administrative machinery³.

Their contribution sheds a first light on the regulation - corruption and entrepreneurship interplays and leads to further investigation. Indeed, entrepreneurship is well recognized as an engine for growth and employment (Carree and Thurik, 2003; Van Praag and Versloot, 2007) and is, consequently, of particular interest for policy makers. Besides, it is suggested that entrepreneurs contribute diversely to growth, innovation and employment (Acs and Varga, 2005; Wong *et al.*, 2005; Acs, 2006; Hessels *et al.*, 2008). Public policy should then be focused on the right targets. For example, Shane (2009) finds that policy makers should support start-ups that actually foster growth. This is also true for the underlying institutional framework. Because entrepreneurs have different motives and expectations when establishing their own business, they have individual reactions to the institutional environment (see Ho and Wong, 2007; McMullen *et al.*, 2008; Gohmann, 2010; Troilo, 2011; Levie and Autio, 2011; Stenholm *et al.*, 2013). Understanding the differences between entrepreneurs in their response to institutional aspects should help foster better policy. In particular, understanding how entrepreneurs react to a corrupted context will help us better understand corruption, regulation and their interactions.

The Global Entrepreneur Monitor (GEM), an international research consortium, distinguishes entrepreneurs according to their motive for creating a business (see Reynolds *et al.*, 2002): opportunity or necessity. Opportunity-motivated entrepreneurs (OME) create their business in order to seize an opportunity in the market, while necessity-motivated entrepreneurs (NME) do so by necessity, because they do not have any other career alternatives⁴. The distinction is essential because we might expect the two types of entrepreneurs to differ in terms of socio-economic characteristics (Block and Wagner, 2010), contribution to growth (Acs and Varga, 2005; Acs, 2006) and in their reaction to the institutional environment (McMullen *et al.*, 2008). Indeed, Reynolds *et al.* (2002) report important differences between the two types of entrepreneurs concerning their expectations for job creation and the innovative process of their activity. According to GEM based studies, opportunity-motivated entrepreneurs generally have higher expectations in terms of growth and employment. Verheul and van Mil (2011) also emphasize their higher ambitions and preferences for growth. In addition, Mc Mullen *et al.* (2008) empirically show that OME and NME respond differently to government-related variables. High taxes and price uncertainty (labor and monetary freedom indexes) mainly reduces necessity-driven activities because these last are usually imitative and offer narrower profit margins. On the contrary, property rights chiefly affects OME because of their innovative profile.

Accordingly, one may question whether regulation and corruption will affect OME and NME in the same way. The aim of the paper is to provide deeper insight this research question. We find that the impact of corruption and regulation, as well as their interaction term have a greater impact on entrepreneurs seizing an opportunity in the market. This finding may be explained through the lenses of occupational choice (Parker, 2009) and job search theories (Fonseca *et al.*, 2001), which consider entrepreneurship as an alternative to employment. Corruption and regulation, because they determine a part of the expected revenues of an activity, affect the incentives that individuals face. As cost regulation increases, the expected payoffs of an activity drops and opening a business becomes less and less attractive with respect to other career alternatives. This is especially true for opportunity-motivated agents, who have a higher reservation wage — the minimum wage that an individual would accept. They are more sensitive to a decrease of venture’s expected benefit because their opportunity cost is higher. On the contrary, it might not change the decision of becoming entrepreneur if this decision is driven by necessity. In that case, even if the individual faces a reduction in their expected revenues, they has no choice other

³Tables of results and interpretation are reported on appendix 1.

⁴These are similar to push and pull motivations (Amit and Muller, 1995; van Gelderen *et al.*, 2006).

than becoming entrepreneur because of the absence of outside option.

The remainder of the paper is as follow. We briefly report the data and methodology in section 2. Results are exposed in section 3 while the section 4 concludes.

2 Data and Methodology

2.1 Data

The data used are collected from 4 distinct datasets. Variables, sources and descriptions are provided in tables 5 and 6 of appendix B. The Global Entrepreneurship Monitor develops several indicators from their international Adult Population Survey to better discern the plurality of entrepreneurship. It first proposes a large definition for entrepreneurship, the Total early-stage Entrepreneurship Activity (TEA). This indicator spans nascent entrepreneurs⁵ and owners of new businesses⁶. But, GEM also develops other indicators including indicators for the motive underlying the entrepreneur's decision to open a business. Individuals are asked whether they establish their firm in order to take advantage of a business opportunity or because they have no better choice for work⁷. GEM then distinguishes two categories of entrepreneurs: (1) the agents choosing the creation of business amongst others career alternatives, called the opportunity-motivated entrepreneurs (OME); and (2) the ones having no outside option, named necessity-motivated entrepreneurs (NME). OME and NME indicators report the percentage of individuals between 16 and 64 years old who are willing to create a business in order to seize an opportunity in the market, or because they have no other career alternatives, respectively.

We use these indicators, OME and NME, as dependent variables in our regressions. We also consider the nascent entrepreneurs in order to check for the comparability of our results with respect to Dreher and Gassebner (2013). For the same reasons, we select the control variables and countries used by Dreher and Gassebner (2013)⁸. Further, we expanded the period under study to 2003-2011 in order to increase the precision. Using the World Bank's Doing Business Datasets, we study four measures of entry regulation: (1) the official cost of starting a business (in percentage of GDP per capita); (2) the minimum capital required to start a business (in percentage of GDP per capita); (3) the number of days required to start a new business; and (4) the number of procedures — any interaction with officials — required to start a business. A fifth indicator is the sub-index on regulation from the Economic Freedom Index developed by Gwartney and Lawson (2006). This last index encompasses credit market, labor market and business regulations⁹. To proxy corruption, we adopt the Corruption Perception Indicator (CPI) of Transparency International as well as the World Bank's Corruption Indicator (WBC)¹⁰. In addition to these variables, we control for the gross domestic product per capita and its square, as well as for the communist history of the countries under study¹¹.

2.2 Methodology

We choose a stacked linear regression with panel-corrected standard errors method. In doing so, we adopt the methodology of Beck and Katz (1996) in a logic *à la Zellner* (1962). Our choice is motivated by the peculiarities of the dataset and the purpose of the paper. Our dataset is

⁵That is the percentage of individuals between 16 and 64 years old who have taken some action toward creating a business.

⁶People who manage newly created businesses and receive income from this activity for more than 3, but less than 42, months.

⁷See the GEM 2010 Adult Population Survey.

⁸Details are in appendix A.

⁹The index is inverted so that a higher value means more regulation.

¹⁰Like Dreher and Gassebner (2013), we rescaled the indexes so that higher values correspond to greater corruption.

¹¹See Dreher and Gassebner (2013) for an extreme bound analysis and the selection of the control variables.

an unbalanced panel consisting of 43 developed and developing countries. The data used have been collected for only a short period of time (the earliest available data was collected in 2000) and GEM data are not consistently available across time for all the countries in the sample. The Beck and Katz methodology for unbalanced data allows us to include all the available information. It increases our sample from 43 to 281 observations. We use a pooled estimator, but correcting the disturbance for heteroskedasticity and contemporaneous correlation across panels¹². As in Dreher and Gassebner (2013), we also correct for first-order autocorrelation of the error term within panels, restricting the coefficients of the AR(1) process to be equal in all panels (see Beck and Katz, 1995). We use a Prais-Winsten transformation to preserve the first observation for each panel. The AR process explicitly takes the persistence of some variables, such as corruption, into account.

In a first step, we replicate the results of Dreher and Gassebner (2013) to our enlarged sample. The results displayed in appendix C are corroborative. In a second step, we address our research question through various modellings. We rely on a stacking methodology to compare the impact of explanatory variables on our two dependent variables, OME and NME. To check for robustness, we replicate the test for the 10 modellings (arising from the 2 measures of corruption, combined with 5 measures of regulation, see tables 1 to 3). Our baseline regression is specified as follows:

$$Ent_{i,t} = \beta_0 + \beta_1 GDP_{i,t} + \beta_2 GDP_{i,t}^2 + \beta_3 Com_{i,t} + \beta_4 Cor_{i,t} + \beta_5 Reg_{i,t} + \beta_6 CorReg_{i,t} + \epsilon_{i,t} \quad (1)$$

where i and t stand for country and year, respectively while ϵ is for the error term. Ent is the entrepreneurship indicator. Depending on the specification, it is the Nascent Entrepreneur, the OME or the NME. The gross domestic product per capita is represented by GDP , while Com is a dummy for communist history. Cor depicts corruption, namely or CPI or WBC. Reg is one of the 5 entry regulation measures and $CorReg$ stands for the interaction term between the corruption index and the regulation measure. This last term captures the so-called “greasing the wheel” hypothesis. If the assumption is confirmed, this interaction term has a positive and significant coefficient, illustrating the fact that corruption and regulation temper each others.

3 Empirical results

3.1 Preliminary step: validity of the enlarged dataset

To ensure the comparability of the results, we first replicate the modelling of Dreher and Gassebner (2013) to our enlarged sample. Tables 9 and 10 in appendix C display the empirical results for the five regulation measures and the two corruption indicators when the dependent variable is the nascent entrepreneur. In the first column of each table, the entry regulation measure is the official cost to open a business. In the next columns, the regressions with the four other entry regulation measures are reported: the minimal capital required to open a business, the number of days required to start a business, the number of procedures needed to open a business and the regulation Economic Freedom sub-index in columns (2), (3), (4) and (5), respectively.

Our results display align with those of Dreher and Gassebner (2013). Corruption and entry regulation measures both have, at the zero value of the other variable, a significant and negative impact on early-stage entrepreneurs. Moreover, the interaction term between corruption and the regulation measure has a positive coefficient when it is significant, which is the case in all but two regressions. This result bears out a softening effect of corruption and regulation on each other. For example, in table 9 column (3), we observe the negative impact of corruption on

¹²This method is appropriate if the inter-individual component explains a huge part of the model, while the intra-individual part is almost null. Anova tests on the different regressions confirm that a model considering the mean rather than the deviation to the mean suits better the data. Indeed, we can not reject the null hypothesis that the time does not explain any variance of the modelling.

the percentage of nascent entrepreneurs when the time required to start a business activity is zero. Though, as the number of days required to start a business increases, the total effect of corruption on nascent entrepreneurship becomes positive. At the upper limit of the number of days (given by the marginal effect on the table), a change of one point in the corruption index enhances entrepreneurship by 6.33 percentage points.

Furthermore, we also obtain the expected findings concerning the control variables. As shown in tables 9 and 10, there is a non linear relationship between nascent entrepreneurship and GDP per capita. Countries with a higher GDP per capita generally offer greater career and wage possibilities. Therefore, the negative sign highlights the opportunity cost of starting a new business over another career alternatives. Meanwhile, the convexity of the link reflects the increase in opportunities to start business when a country is more developed¹³. Finally, we observe that countries with a communist history have a lower percentage of nascent entrepreneurs than comparable countries. Freytag and Thurik (2007) provide similar evidence, showing that the propensity to become self-employed is lower in post-communist countries. As outlined in the Transition Economics' literature, those countries have particular formal and informal institutions that are not favorable for entrepreneurs (see Estrin and Mickiewicz, 2010). Even if formal reforms toward market openness have been made, the transition is seldom complete. Financial constraints and ineffective commercial law (lack of law enforcement) still discourage potential entrepreneurs. Moreover, even when the transition is completed, those countries may still suffer from a general lack of trust reducing the effectiveness of institutions. Estrin and Mickiewicz (2010) point out that traditions and social norms take a long time to change, what they refer to as a generational effect.

3.2 The corruption- regulation- entrepreneurship nexus according to entrepreneurial motives

Do corruption - regulation - entrepreneurship interplays depend on the motivation of entrepreneurs? To answer this question, we adopt a stacked linear regression with panel-corrected standard errors method, *à la Zellner* (1962). The methodology allows us to test restrictions on the parameters of different equations. Moreover, it makes sense to consider that the two types of entrepreneurs face correlated country-wide or worldwide shocks. The specification of our estimation is as follows:

$$\begin{cases} NME_{i,t} = \beta_0 + \beta_1 GDP_{i,t} + \beta_2 GDP_{i,t}^2 + \beta_3 Com_{i,t} + \beta_4 Cor_{i,t} + \beta_5 Reg_{i,t} + \beta_6 CorReg_{i,t} + \epsilon_{1,i,t} \\ OME_{i,t} = \gamma_0 + \gamma_1 GDP_{i,t} + \gamma_2 GDP_{i,t}^2 + \gamma_3 Com_{i,t} + \gamma_4 Cor_{i,t} + \gamma_5 Reg_{i,t} + \gamma_6 CorReg_{i,t} + \epsilon_{2,i,t} \end{cases} \quad (2)$$

where the error terms, ϵ_1 and ϵ_2 , are correlated. The NME and OME stand for necessity-motivated entrepreneurs and opportunity-motivated entrepreneurs, respectively. The other symbols are the same as before.

Tables 1 to 3 present evidence that the motivation to open the business does matter for the understanding of the corruption - regulation interplays. We report a variety of specifications to support the robustness of our findings. We display the empirical results for the 5 entry regulation measures, combined with CPI or WBC. Each sub-table is titled with the name of the regulation measure used in the regression. In each, the first three columns are dedicated to the specification with CPI, while the three following are with WBC. The coefficients related to NME are reported in columns (1) and (4), while the ones related to OME are in columns (2) and (5). In columns (3) and (6), we find the the p-value of the Wald test on the equality of β coefficients.

¹³We here speak about association between entrepreneurship and growth, rather than causality. Indeed, another growing stream of the Entrepreneurship literature studies how entrepreneurship, through innovation process, is an engine to growth (see Carree and Thurik, 2008, and Audretsch, 2015). Nevertheless, Fritsch and Dejardin (2011, p.377) also emphasize that “ the most important growth effects of startups tend to occur with a time lag of up to ten years”.

3.2.1 Common trends

Generally speaking, we observe similar results to those of Dreher and Gassebner (2013). Strict regulation and corruption reduce the propensity of being an entrepreneur whatever the motive, the corruption index or the entry regulation measures. That is, in the absence of corruption, regulation hinders the creation of firms. Similarly, in a context of effective institutions (in the sense here of proper regulation), corruption is detrimental for entrepreneurship. But, in almost all regressions, we also find a positive and significant coefficient for the interaction term between corruption and regulation. Again, this supports the so called “greasing the wheel” hypothesis. Let us illustrate this with some figures. In the first column of table 1.1, we observe that if the number of procedures required to start a business is zero, an increase of one point in the corruption index decreases necessity-motivated entrepreneurs by 0.56 percentage points. On the contrary, at the upper limit of the number of procedures (see the marginal effect at the maximal value of regulation), the same increase in the corruption index enhances necessity-motivated entrepreneurs by 0.74 percentage points.

The effects go in the same direction for opportunity-motivated entrepreneurs (second and fourth columns). At the upper limit of procedures, a one point increment in the corruption index increases entrepreneurial likelihood by 1.24 percentage points. This also reflects the possibility of greasing the wheels of the administrative machinery. Gohmann (2010) also finds that preferences for self-employment tend to be higher in countries with more corruption.

Turning to the control variables, findings are consistent with existing literature. As shown by Mc Mullen *et al.* (2008), the GDP per capita is a determinant of both OME and NME. Further, we still have a U-shaped relationship with GDP per capita. The negative sign reflects the attractiveness of creating a business with respect to the employment option, while the quadratic function illustrates the increase in opportunities when economic development is higher.

Contrariwise, findings about the communist history are nuanced. Communist history does influence OME but not NME. Both Dreher and Gassebner (2013) and our regressions find a negative impact a communist history on nascent entrepreneurs. What is highlighted here is even more worrisome. Indeed, our results suggest that among entrepreneurs, OME are the ones that are hampered by the communist legacy. This finding has unpleasant implications in terms of growth and employment because OME have higher expectations in terms of innovation, employment and growth (Reynolds *et al.*, 2002), and would contribute more to growth (Acs and Varga, 2005; Acs, 2006).

Our finding might be explained in different ways. As assumed by Scott (2007), the institutional dimensions of an entrepreneur may be divided in three pillars: regulative, cognitive and normative. Countries with communist history clearly have shortfalls across all three. The regulative dimension refers to regulation, rules, laws and to their enforcement. The general high level of corruption and weak rule of law in these countries (Estrin and Mickiewicz, 2010) hinder entrepreneurship. We partly control for this aspect in our regressions. Concerning the normative pillar, Sztompka (1996, in Estrin and Mickiewicz, 2010) emphasizes that the norms and values inherited from communism are unfavorable to entrepreneurship because they promote dependence, conformity and suffer from rigidity in beliefs over tolerance and innovation. It clearly affects the way individuals consider opportunities in the market (cognitive pillar). In addition, ex-communist countries do not create an environment conducive for innovation. This is what Stenhlom *et al.* (2013; p.183) refer to as the fourth pillar, the “conductive pillar”. The authors underscore the need for high-impact entrepreneurs to evolve in an “environment providing support and interplay between innovation, skills and resources”, which is clearly not assured in most post-communist countries. Indeed, Estrin and Mickiewicz (2010) point out that ex-communist countries score poorly in the access to credit. Many banks are still owned by the government and favor public companies over private ones. Unfortunately, the informal network to substitute

for this ineffective financial formal sector is limited ¹⁴.

Table 1: Necessity-motivated and opportunity-motivated entrepreneurs, 2003-2011, stacked linear regression with panel-corrected standard errors method

1.1 Number of procedures	(1)	(2)	(3)	(4)	(5)	(6)
	NME	CPI OME	p-value β 's equality	NME	WBC OME	p-value β 's equality
lagged (GDP/Cap)	-0.0004*** (-9.30)	-0.0007*** (-6.04)	[0.0010]	-0.0004*** (-9.19)	-0.0007*** (-6.52)	[0.0002]
lagged (GDP/Cap) squared	6.40E-09*** (8.37)	1.04E-08*** (5.60)	[0.0035]	6.26E-09*** (8.56)	1.03E-08*** (5.84)	[0.0017]
dummy for communist history	-0.4702 (-0.97)	-3.8287*** (-5.61)	[0.0000]	-0.4547 (-1.03)	-3.7649*** (-5.65)	[0.0000]
corruption	-0.5579*** (-4.25)	-0.7125*** (-5.85)	[0.2063]	-1.343*** (-4.37)	-1.7818*** (-6.02)	[0.1452]
number of procedures	-0.2729*** (-3.72)	-0.8146*** (-5.84)	[0.0000]	-0.2147*** (-4.01)	-0.6960*** (-5.50)	[0.0000]
corruption x number of procedures	0.07223*** (4.55)	0.1085*** (4.63)	[0.0299]	0.1696*** (4.47)	0.2453*** (4.90)	[0.0445]
constant	10.1259*** (10.85)	22.2606*** (12.83)	[0.0000]	9.678*** (10.94)	21.8957*** (13.98)	[0.0000]
marginal effect(at the min proc)	-0.5579***	-0.7125		-1.3430***	-1.7818**	
marginal effect(at the max proc)	0.7423**	1.2414**		1.7102***	2.6336*	
difference between marginal effects	1.3002***	1.9539**		3.0532***	4.4153**	
Observations		286			286	
Countries		43			43	
R ²		0.7946			0.7980	

1.2 Official cost	(1)	(2)	(3)	(4)	(5)	(6)
	NME	OME	β 's equality	NME	OME	β 's equality
lagged (GDP/Cap)	-0.0004*** (-6.61)	-0.0007*** (-4.96)	[0.0006]	-0.0004*** (-5.43)	-0.0007*** (-4.97)	[0.0031]
lagged (GDP/Cap) squared	5.18E-09*** (5.66)	9.75E-09*** (4.51)	[0.0024]	6.07E-09*** (4.71)	9.45E-09*** (4.30)	[0.0140]
dummy for communist history	-0.5304 (-1.04)	-3.5038*** (-5.51)	[0.0000]	-0.6766 (-1.34)	-3.4468*** (-6.27)	[0.0000]
corruption	-0.1065 (-0.92)	-0.3082*** (-3.25)	[0.0571]	-0.0362 (-0.22)	-0.6003*** (-3.87)	[0.0012]
official cost	-0.1662*** (-3.41)	-0.1423** (-1.77)	[0.7060]	-0.0225 (-0.38)	-0.1694** (-2.09)	[0.0082]
corruption x official cost	0.0278*** (4.29)	0.02268*** (2.30)	[0.5205]	0.0198 (0.89)	0.0607** (2.30)	[0.0274]
constant	8.1043*** (7.08)	18.1914*** (8.30)	[0.000]	8.004*** (7.28)	17.7631*** (9.73)	[0.0000]
marginal effect(at the min cost)	-0.1065	-0.3083		-0.0362	-0.6003	
marginal effect(at the max cost)	3.3242**	2.4855		2.4077	6.875	
difference between marginal effects	3.4307**	2.5919		2.4439	6.9113	
Observations		286			286	
Countries		43			43	
R ²		0.7898			0.7865	

Notes: Corruption is measured with higher value corresponding to more corruption. When the specification uses CPI index, the scale is of 0 to 10. With the WBC, values lie between -2.51 and 1.71. Higher value of official cost indicates stricter regulation. Z-statistics are given in parentheses. P-values in brackets, bilateral test at 5%. Marginal effects give the marginal effect of corruption on the dependent variable conditional on the value of the official cost or on the number of procedures, respectively. Are reported here the impacts at the minimum and maximum value of official cost or procedures in the estimated sample. They are estimated by bootstrap. *significant at 10 percent, **significant at 5 percent, ***significant at 1 percent.

¹⁴The impediment to accumulate wealth under the communist regime generally left little recourse to this alternative.

Table 2: Necessity-motivated and opportunity-motivated entrepreneurs, 2003-2011, stacked linear regression with panel-corrected standard errors method

2.1 Number of days	(1)	(2)	(3)	(4)	(5)	(6)
	NME	CPI OME	p-value β 's equality	NME	WBC OME	p-value β 's equality
lagged (GDP/Cap)	-0.0005*** (-8.85)	-0.0007*** (-7.43)	[0.0025]	-0.0005*** (-9.25)	-0.0007*** (-7.97)	[0.0025]
lagged (GDP/Cap) squared	7.32E-09*** (7.25)	1.04E-08*** (6.43)	[0.0233]	7.34E-09*** (7.50)	1.05E-08*** (6.67)	[0.0153]
dummy for communist history	-0.7155 (-1.58)	-3.3318*** (-5.09)	[0.0000]	-0.6873 (-1.57)	-3.3834*** (-4.86)	[0.0000]
corruption	-0.1241* (-1.75)	-0.6082*** (-3.96)	[0.0001]	-0.3625* (-1.80)	-1.2862*** (-4.46)	[0.0001]
number of days	-0.0319*** (-3.29)	-0.0975*** (-4.53)	[0.0005]	-0.0273*** (-3.47)	-0.0777** (-4.36)	[0.0005]
corruption x number of days	0.0062*** (3.39)	0.015*** (4.82)	[0.0005]	0.0148*** (3.50)	0.0319*** (4.91)	[0.0005]
constant	9.5778*** (10.25)	20.7144*** (10.88)	[0.0000]	9.6956*** (11.08)	19.9318*** (13.92)	[0.0000]
marginal effect(at the min days)	-0.1241	-0.6082**		-0.3625	-1.2862**	
marginal effect(at the max days)	0.8244*	1.6722		1.8864	3.5660	
difference between marginal effects	0.9485**	0.6082*		2.2489*	4.8522*	
Observations		286			286	
Countries		43			43	
R ²		0.7839			0.7872	

2.2 Minimal Capital	(1)	(2)	(3)	(4)	(5)	(6)
	NME	CPI OME	p-value β 's equality	NME	WBC OME	p-value β 's equality
lagged (CDP/Cap)	-0.0006*** (-7.65)	-0.0009*** (-8.10)	[0.0000]	-0.0006*** (-8.41)	-0.0008*** (-7.90)	[0.0002]
lagged (GDP/Cap) squared	8.37E-09*** (7.04)	1.30E-08*** (7.71)	[0.0001]	8.55E-09*** (7.16)	1.23E-08*** (7.27)	[0.0006]
dummy for communist history	-1.0256 (-0.015)	-3.23203*** (-6.26)	[0.0001]	-0.9484** (-2.22)	-3.0264*** (-6.25)	[0.0000]
corruption	0.0324 (0.28)	-0.2065 (-1.35)	[0.0558]	0.2845 (1.42)	-0.4926** (-2.18)	[0.0000]
capital minimal	-0.01465 (-1.48)	0.0022 (0.13)	[0.0537]	0.0059 (0.61)	-0.0346** (-2.11)	[0.0002]
corruption x capital minimal	0.0017 (1.30)	-0.0009 (-0.41)	[0.0255]	-0.0026 (-0.83)	0.0094* (1.72)	[0.0004]
constant	10.0870*** (6.75)	19.9322*** (9.33)	[0.0000]	9.5248*** (8.69)	19.5269*** (10.88)	[0.0000]
marginal effect(at the min cap)	0.0324	-0.2065		0.2845	-0.4926	
marginal effect(at the max cap)	2.1920	-1.3272		-2.9441	11.1864	
difference between marginal effects	2.1596	-1.1207		-3.2286	11.6791	
Observations		286			286	
Countries		43			43	
R ²		0.7894			0.7825	

Notes: Corruption is measured with higher value corresponding to more corruption. When the specification uses CPI index, the scale is 0 to 10. With the WBC, values lie between -2.51 and 1.71. Z-statistics are given in parentheses. P-values in brackets, bilateral test at 5%. Marginal effects give the marginal effect of corruption on the dependent variable conditional on the value of the number of days or of the minimal capital, according to the sub-table. Are reported here the impacts at the minimum and maximum value of number of days or of the minimal capital in the estimated sample. They are estimated by bootstrap.*significant at 10 percent, **significant at 5 percent, ***significant at 1 percent.

Table 3: Necessity-motivated and opportunity-motivated entrepreneurs, regulation sub-index, 2003-2009, stacked linear regression with panel-corrected standard errors method

Regulation sub-index	(1)	(2)	(3)	(4)	(5)	(6)
	NME	CPI OME	p-value β 's equality	NME	WBC OME	p-value β 's equality
lagged (CDP/Cap)	-0.0005*** (-23.79)	-0.0007*** (-7.15)	[0.0340]	-0.0005*** (-12.08)	-0.0007*** (-7.55)	[0.00234]
lagged (GDP/Cap) squared	7.71E-09*** (25.63)	1.06E-08*** (6.78)	[0.0770]	7.62E-09*** (16.32)	1.02E-08*** (7.07)	[0.0798]
dummy for communist history	-1.4011** (-2.52)	-3.8981*** (-5.08)	[0.0000]	-1.3734*** (-2.63)	-3.9146*** (-5.19)	[0.0000]
corruption	-0.5484* (-1.73)	-1.4363*** (-3.55)	[0.0067]	-1.4219*** (-3.12)	-3.3503*** (-5.22)	[0.0019]
regulation	-0.9622*** (-4.14)	-3.0035*** (-6.05)	[0.0000]	-0.7443*** (-4.53)	-2.6047*** (-5.41)	[0.0000]
corruption x regulation	0.1956*** (3.41)	0.4198*** (4.59)	[0.0005]	0.4591*** (4.03)	0.9706*** (5.37)	[0.0013]
constant	11.4075*** (8.64)	26.7378*** (10.73)	[0.0000]	11.00184*** (9.71)	25.24127*** (12.17)	[0.0000]
marginal effect (at the min reg)	-0.5484	-1.4363		-1.4219	-3.3503*	
marginal effect (at the max reg)	0.7566**	1.3641**		1.6410**	3.1248**	
difference between marginal effects	1.3050*	2.8004**		3.0630*	6.4751**	
Observations		219			219	
Countries		43			43	
R^2		0.7920			0.7928	

Notes: Corruption is measured on a scale from 0 to 10 with higher value corresponding to more corruption when the CPI index, on a scale from -2.51 to 1.71 when the WBC index. z-statistics are given in parentheses. P-values in brackets, bilateral test at 5%. Marginal effects give the marginal effect of corruption on the dependent variable conditional on the level of regulation. They are estimated by bootstrap. *significant at 10 percent, **significant at 5 percent, ***significant at 1 percent.

3.2.2 Impacts of different magnitudes

If the impacts of the explanatory variables on the two dependent variables, NME and OME, go in the same direction, results show that the magnitude of these impacts dramatically differs. Columns (3) and (6) in tables 1 to 3 give the p-values of a Wald test (bilateral at 5%) on the equality of the β coefficients related to OME and NME. Save from some rare cases (6 out of 60 cases), they are all statistically different. Table 4 report the divergences in magnitude of the various coefficients. It turns out that opportunity-driven entrepreneurs are generally more sensitive to the explanatory variables than are the necessity-motivated entrepreneurs. The OME coefficient is always either equal to or bigger (in absolute value) than the one for NME.

This result can be interpreted through the lenses of job search (Fonseca *et al.*, 2001) and occupational choice (Parker, 2009) theories. According to these two theoretical frameworks, entrepreneurship is seen as an option among other career possibilities, called outside options. Individuals consider the expected payoffs of a business and the opportunity cost to open it. This latter may vary among individuals. Because they are heterogeneous in their capabilities for work (education, work experience, etc.) and in their socio-economic characteristics (Block and Wagner, 2010), individuals have different reservation wages — the minimum wage they are willing to accept. In particular, job search theory argues that the longer an individual is unemployed, the lower is their reservation wage and, as a matter of fact, the lower their opportunity cost if they establishes a firm. Necessity-motivated entrepreneurs are, by definition, an extreme case. As they create an activity because they lack alternative career choices, their opportunity cost equals either zero or the safety-nets for the unemployed (Ho and Wong, 2007). As a consequence, necessity-motivated entrepreneurs face a lower reservation wage than OME do and are more likely to undertake activities that offer lower expected benefits.

Corruption and regulation, because they determine a part of the expected revenues of an activity, affect the incentives that individuals face. As regulation increases, the expected payoffs for an activity drops and starting a business becomes less and less attractive. This is especially

true for opportunity-motivated agents, who have a higher reservation wage (Block and Wagner, 2010; Amit *et al.*, 1995). They are more sensitive to a decrease of a potential venture’s expected benefit because their opportunity cost is higher. On the other hand, it might not alter the decision to become an entrepreneur if this decision is driven by necessity and no other option is available.

Table 4 presents these findings. Whatever entry regulation measures are considered, the negative impact on OME is either bigger or equal to the one on NME. Entry regulation enters into the costs of an activity and reduces the expected payoffs. The administrative procedures required to start a business are both time and money consuming for individuals. If the regulation is too heavy, the expected payoffs may become too small relative to the alternative career options and the individual may prefer not to establish the firm. However, the administrative burden may be perceived differently by the two kind of entrepreneurs. Indeed, the opportunity cost of spending time in procedures (number of procedures or days) is presumably larger for OME because they are more likely to be employed at the time of the administrative démarche. On the contrary, the official cost, which is not associated with time and salary loss, hinders OME and NME to the same extent.

Similarly, corruption impacts the decision to become an entrepreneur because it increases the uncertainty of the venture’s expected payoffs (Anokhin and Schulze, 2009). In a context of increased uncertainty, an individual may prefer a secured wage. Though, NME generally can not do otherwise than create their own activity, while OME have the opportunity to choose it. As a consequence, we observe that corruption typically deters more OME than NME. This empirical finding supports the previous theoretical modellings of Murphy *et al.* (1993), which suggest that corruption will especially hamper entrepreneurs with high growth expectations, but will not affect subsistence entrepreneurship. Additionally, it turns out that the “greasing the wheels” effect is larger for OME (see the last column of table 4).

Concerning the control variables, we observe the same patterns. The GDP per capita inhibits OME to a greater extent than it does to NME, where having a communist history only hampers OME. A higher GDP per capita is associated with a better potential wage, which make the opportunity cost of starting a business higher. As the GDP per capita increases, the benefit of becoming an entrepreneur decreases and an individual is more likely to prefer being employee over starting an activity. Although, this possibility to choose an alternative career is mostly the fact of the OME. Nevertheless, the impact is not insignificant for NME because countries with a higher GDP per capita generally offer better career and social security prospects. It is then less likely that an individual will need to start a business. For communist history, we refer the reader to subsection 3.2.1.

3.2.3 Limitation of the results

Our empirical results are based on a panel of 43 countries mainly composed of developed countries. Even if we find evidence of the “greasing the wheels” hypothesis, it is possible that this finding only holds for a small number of the countries in our sample. Figures 1 to 2 illustrate the sensitivity in the results. The marginal effects of corruption on OME and NME for the 5 regulation measures¹⁵ are reported. We observe that marginal effects are more accurate for low level of regulation (size of the confidence interval), which reflects the sample distribution. For a low level of the regulation measures, we observe a marginal effect of the corruption on OME or NME that is negative. For these countries, the level of regulation is not burdensome and there is no need to use bribes in order to speed-up procedures. Rather, corruption is, in this context, only an additive cost to the regulatory burden. Note that more than 50 % of the countries in our sample have low levels of regulation.

Moreover, we need to be cautious when interpreting the interaction term. There is no doubt

¹⁵The standard deviation of the marginal effects are estimated by the delta-method.

Table 4: Comparison of the coefficients on OME and NME : $|OME| > |NME|$. Summary of the bilateral Wald tests at 5% displayed in tables 1 to 3.

Impact of:	GDP	GDP squared	Communist history	Corruption	Measure of regulation	"Greasing"
Specification with:						
CPI						
Official cost	+	+	+	+	=	=
number of days	+	+	+	+	+	+
number of procedures	+	+	+	=	+	+
regulation sub-index	+	+	+	+	+	+
minimal capital	+	+	+	=	=	-
WBC						
Official cost	+	+	+	+	+	+
number of days	+	+	+	+	+	+
number of procedures	+	+	+	=	+	+
regulation sub-index	+	+	+	+	+	+
minimal capital	+	+	+	+	+	+

that corruption and regulation temper each other's negative impact. However, interpreting this is not straightforward. How can we ensure that it is not regulation that is tempering the negative impact of corruption? Indeed, corruption is also often used as a proxy of ineffective institutions (see, for example, Estrin *et al.*, 2013) because it reflects the way formal institutions (North, 1990) run. Regulation, on the other hand, is a part of the constitutional framework that put limits to the arbitrary behavior of politicians and officials. The softening effect of the interplay between corruption and regulation could then be explained in the opposite way: a highly corrupted country poorly operates and needs more regulation in order to restrain the misbehavior of officials and politicians. In a context of good institutions, regulation is not essential and hampers entrepreneurship, while it becomes beneficial in a context of defective institutions. This argument is also developed by Pinotti (2012), who indicates that market imperfections (in the sense of opportunist behavior of insiders) causes a general lack of trust and a growing aspiration for more regulation. The link between the lack of trust and the desire for more regulation is also suggested by Aghion *et al.* (2010). Unfortunately, we have here no way to conclude about the sense of the tempering effect.

3.3 Discussion and Conclusion

Dreher and Gassebner (2013) assert that corruption may sometimes be beneficial for entrepreneurship. In particular, they find that when the entry regulation is too strict, corruption tempers its negative effect on the propensity of becoming entrepreneur. Bribes "grease the wheels" of the administrative machinery. In this article, we complement their work. We provide evidence that entrepreneurs are heterogeneous in their response to the institutional environment. Opportunity-motivated and necessity-motivated entrepreneurs react to regulation and corruption in different proportions. This finding is explained through the lens of occupational choice theories. Opportunity-motivated entrepreneurs are willing to open a business in order to seize an opportunity in the market. They are usually employed or may choose between different career alternatives, it is to say they have an outside option. As a consequence, they are much more sensitive to an increase in the switching cost to become entrepreneur, i.e. stricter entry regulation, or to an increase in the uncertainty of the venture's expected payoffs, i.e. more corruption, than necessity-motivated entrepreneurs, who have, by definition, no other choice. However, because their economic status is less precarious than the necessity-motivated entrepreneurs, opportunity-motivated entrepreneurs are also more likely to use bribes in order to speed-up the procedures.

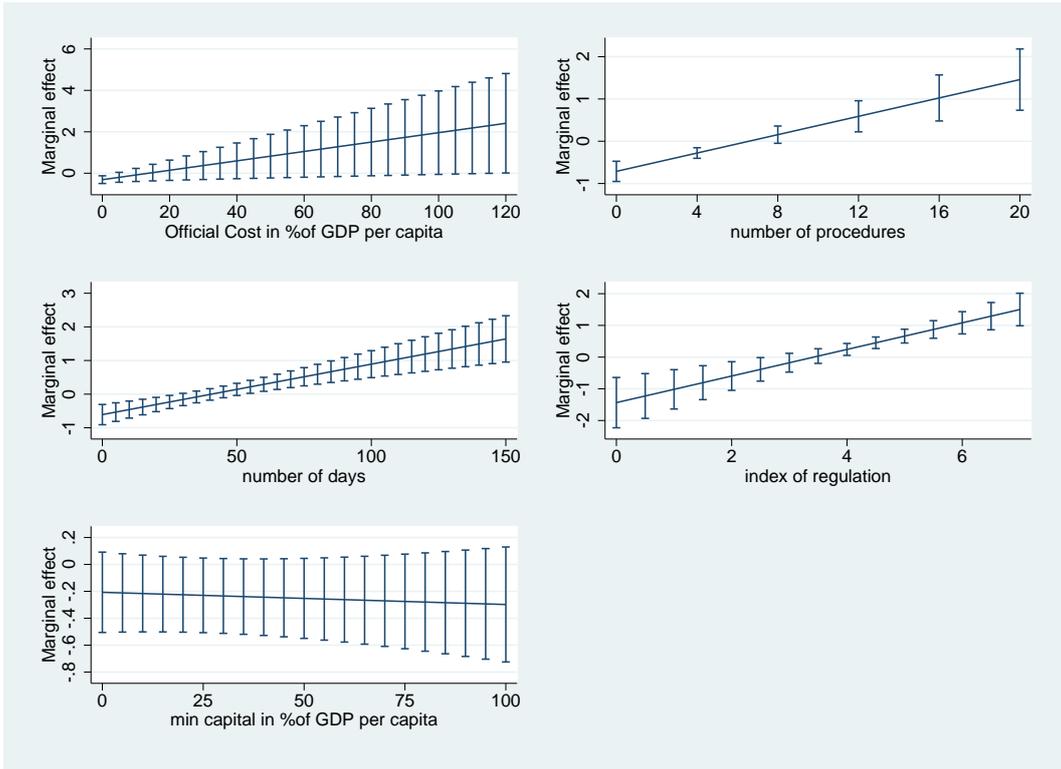


Figure 1: Average Marginal effect on OME

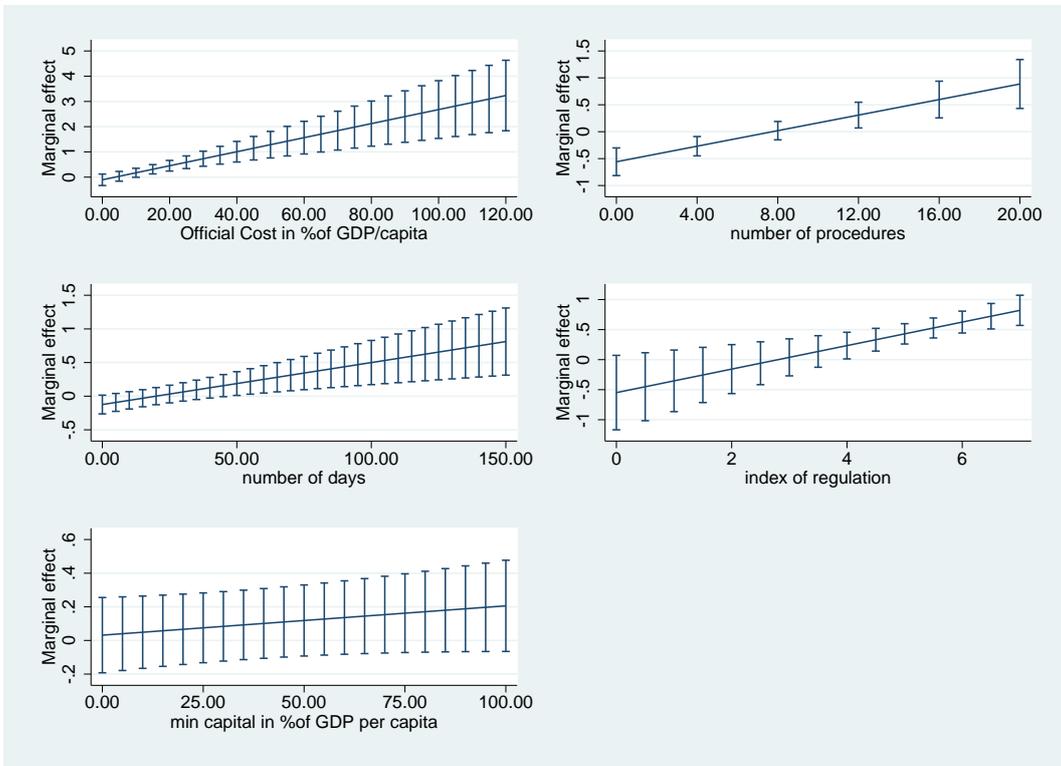


Figure 2: Average Marginal Effect on NME

Even if our results support and complement existing studies, we call for caution regarding the conclusions one might draw from this contribution. First, it turns out from our sensitivity analysis that even if corruption may grease the wheels of ineffective administrative machinery, it is not the case for the majority of our sample. The majority is composed of developed countries that typically adopt regulation conducive for entrepreneurship. For these countries, the marginal effect of corruption is negative. Secondly, the “greasing the wheels” hypothesis is estimated thanks to an interaction term methodology. Unfortunately, we have no way to ascertain that the softening effect does not play the opposite way, that it is regulation tempering the negative effect of corruption. We could reasonably consider that highly corrupted countries operate poorly and, as a consequence, need more regulation in order to limit the opportunist behavior of their politicians and officials. However one interprets this softening effect, it is though opportune to consider heavy regulation and corruption as two illnesses that policy makers need to fight simultaneously. Indeed, clearly the effect of those variables taken individually is to hamper entrepreneurship. Moreover, the effects are larger for the opportunity-motivated entrepreneurs, those more likely to contribute to growth, innovation and employment. Finally, it is not clear than although we find that corruption may be beneficial at a micro-level, the same results will hold at a macro level. “Clearly, if a regulation is onerous and inefficient, then paying for an exemption seems efficient. However, permitting such individualized law compliance can be very harmful. ... Endemic corruption has implications for the legitimacy of the state in the eyes of the citizens. ... This can lead to vicious spirals” (Rose-Ackerman, 2003 pp 18-19).

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Appendices

A List of countries included

Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Croatia, Denmark, Ecuador, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Latvia, Mexico, New Zealand, Norway, Peru, Poland, Portugal, Singapore, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, The Netherlands, Uganda, United Kingdom, USA, Venezuela.

B Source and descriptive statistics for the key variables

Table 5: Source and descriptive statistics of the key variables 2003-2011

Variable	Source	mean	sd	min	max
Nascent entrepreneurship (% of the adult population)	GEM	5.2	4.16	0.450	31.36
Necessity-motivated entrepreneurship (% of the adult population)	GEM	2.2	2.65	0.150	15.58
Opportunity motivated entrepreneurship (% of the adult population)	GEM	6.5	4.22	1.110	29.57
GDP/cap (constant in 2005 dollars, ppp)	World Bank (2013)	25054	11975.8	825.7	52313.9
Transparency International corruption (inverted)	Transparency International	6.5	2.27	1.900	9.700
World Bank corruption (inverted)	World Bank (2013)	1	1.03	-1.220	2.591
Cost of starting a business (in % of GDP per capita)	Doing Business	9.8	15.3	0	123.2
Days required to start a business	Doing Business	27	31.9	2	152
Procedures to start a business	Doing Business	7.4	3.92	2	18
Capital required to start a business (in % of GDP per capita)	Doing Business	32	117.7	0	1236.5

C Dreher and Gassebener (2013) results and interpretation

In tables 7 and 8, we report the results of Dreher and Gassebener (2013) for the five regulation measures: (1) the official cost of starting a business (in percentage of GDP per capita); (2) the minimal capital required to start a business (in percentage of GDP per capita); (3) the number of days required to start a business; and (4) the number of procedures — any interaction with officials— required to start a business. They add as fifth indicator the sub-index on regulation from the Economic Freedom Index developed by Gwartney and Lawson (2006). This last index encompasses credit market, labour market and business regulations¹⁶. Whatever table or column, the dependent variable is the percentage of nascent entrepreneurs in a country. In table 7, the level of corruption is measured by the Corruption Perception Index, while World Bank Corruption index is used in table 8. It turns out from table 7 that, at the minimum value for corruption index, regulation is statistically significant and negatively impacts early-stage entrepreneurship, whatever the regulation measure. The joint significance test on corruption, the regulation measure and their interaction term confirm that corruption affects the propensity of being an entrepreneur. For a low value of regulation, the corruption coefficient is negative,

¹⁶Authors inverted the index so that a higher value means more regulation.

Table 6: Source and descriptive statistics of the key variables 2003-2009

Variable	Source	mean	sd	min	max
Nascent entrepreneurship (% of the adult population)	GEM	5.2	4.16	0.450	31.36
Necessity-motivated entrepreneurship (% of the adult population)	GEM	2.156	2.68	0.150	15.08
Opportunity motivated entrepreneurship (% of the adult population)	GEM	6.424	4.25	1.110	29.57
GDP/cap (constant in 2005 dollars, ppp)	World Bank (2013)	25008.9	12006.7	825.7	49101.8
Transparency International corruption (inverted)	Transparency International	6.505	2.28	1.900	9.700
World Bank corruption (inverted)	World Bank (2013)	1.019	1.04	-1.185	2.591
Economic freedom regulation sub-index	Heritage Foundation	7.099	0.94	4.328	8.907
Cost of starting a business (in % of GDP per capita)	Doing Business	10.50	15.8	0	123.2
Days required to start a business	Doing Business	29.63	33.0	2	152
Procedures to start a business	Doing Business	7.635	3.95	2	18
Capital required to start a business (in % of GDP per capita)	Doing Business	37.86	132.5	0	1236.5

although it is rarely significant. On the other hand, for higher values of regulation (marginal effect at the maximum value), corruption positively impacts entrepreneurship. In particular, when looking at the official cost for starting business (first column), a change of 1 point in the corruption index enhances entrepreneurship by 4.2 percentage point at the upper bound for costs¹⁷. That is, when regulation is very high, the general effect of corruption on the creation of activity is positive, which support a strong hypothesis of the ‘greasing the wheels’. Dreher and Gassebner (2013) find similar results for the three other regulation measures and for the regulation sub-index of the Economic Freedom (see table 7).

In table 8, the coefficients for regulation and corruption considered alone are generally not significant. But the interaction term is positive and significant, validating a ‘greasing the wheels’ hypothesis for corruption.

¹⁷As mentioned by Dreher and Gassebner (2013) in a footnote p.11, the index of perception is ordinal rather than cardinal. A 1 point change may not have the same significance at different initial value of corruption. “However, it is usually treated as cardinal, assuming a linear scale of the ordinal index. See Mauro (1998), Treisman (2000), Méon and Sekkat (2005), Méon and Weill (2010), among many others.”

Table 7: Dreher and Gassebner's results, Nascent Entrepreneurship and CPI, 2003-2005

	(1)	(2)	(3)	(4)	(5)
lagged (GDP/cap)	-0,0007*** (3,20)	-0,0008*** (3,18)	-0,0007*** (3,71)	-0,0007*** (3,46)	-0,0007*** (3,62)
lagged (GDP/Cap) squared	1,28E-08*** (2,99)	1,63E-08*** (3,29)	1,21E-08*** (3,32)	1,42E-08*** (3,28)	1,20E-08*** (3,08)
dummy for communist history	-5,6715*** (3,50)	-5,5242*** (3,82)	-5,3483*** (4,27)	-6,3076*** (3,45)	-6,2299*** (4,18)
CPI	-0,3095 (0,91)	-0,1119 (0,32)	-0,7443** (2,19)	-0,7679 (1,41)	-1,1236* (1,69)
official cost	-0,1804** (-2,99)				
CPI x official cost	0,0345*** (2,80)				
minimal capital		-0,0753*** (-4,39)			
CPI x minimal capital		-0,0106 (-4,20)			
number of days			-0,1149*** (-4,91)		
CPI x number of days			0,0246*** (4,56)		
number of procedures				-0,8919*** (-4,98)	
CPI x number of procedures				0,1441*** (2,99)	
regulation					-1,5721*** (-2,80)
CPI x regulation					0,2773*** (1,65)
Constant	13,6393*** (4,55)	14,4107*** (4,09)	14,8595*** (5,90)	17,7612*** (6,86)	18,7425*** (6,89)
marginal effect (at the min value)	-0,31	-0,11	-0,70**	-0,48	-0,71*
marginal effect (at the max value)	4,22***	9,94***	3,00***	1,68***	0,46
Observations	93	91	93	93	122
Countries	43	42	43	43	42
Joint significance	0,025	0,000	0,000	0,000	0,011
R ²	0,55	0,52	0,58	0,56	0,50

Notes: Corruption is measured on a scale from 0 to 10 with higher value corresponding to more corruption. Higher value of regulation indicate stricter regulation. Joint significance gives the p-value of a Wald test on corruption, the measure of regulation and their interaction term. z-statistics are given in parentheses. Marginal effects give the marginal effect of corruption on the dependant variable conditional on the value of the regulation measure. Are reported here the impacts at the minimum and maximum value of regulation in the estimated sample. *significant at 10 percent, **significant at 5 percent, ***significant at 1 percent. source: Dreher and Gassebner (2013)

Table 8: Dreher and Gassebner's results, Nascent Entrepreneurship and WBC, 2003-2005

	(1)	(2)	(3)	(4)	(5)
lagged (GDP/cap)	-0,0006*** (2,65)	-0,0007*** (2,17)	-0,0006*** (3,35)	-0,0006*** (2,92)	-0,0007*** (4,18)
lagged (GDP/Cap) squared	1,08E-08*** (2,50)	1,42E-08*** (2,83)	1,13E-08*** (3,04)	1,16E-08*** (2,75)	1,30E-08*** (3,72)
dummy for communist history	-5,5527*** (3,55)	-5,5479*** (4,06)	-5,3752*** (4,30)	-6,1670*** (3,59)	-6,6376*** (4,19)
WBC	-0,1391 (0,17)	-0,4267 (0,46)	-1,3242 (1,60)	-1,3416 (1,05)	-2,8858* (1,69)
official cost	-0.0129 (-0.53)				
WBC x official cost	0.0753*** (2.69)				
minimal capital		-0.0176*** (-4.70)			
WBC x minimal capital		0.0219*** (4.97)			
number of days			0.0286 (1.22)		
WBC x number of days			0.0504*** (4.13)		
number of procedures				-0.0527*** (-0.24)	
WBC x number of procedures				0.3323*** (3.22)	
regulation					0.0687 (0.09)
WBC x regulation					0.8120*** (1.88)
Constant	11,5167*** (4,87)	13,6233*** (5,53)	10,4437*** (6,67)	12,7767*** (2,94)	12,1049*** (2,63)
Marginal effect (at the min value of regulation)	-0,14	0,43	-1,22	-0,68	-1,67
Marginal effect(at the max value of regulation)	9,75***	21,17***	6,33***	4,31***	1,66
Observations	93	91	93	93	96
Countries	43	42	43	43	42
Joint significance	0,038	0,000	0,000	0,000	0,001
R ²	0,55	0,54	0,58	0,56	0,50

Notes: Corruption is measured on a scale from -2.51 to 1.71 with higher value corresponding to more corruption. Higher value of regulation indicate stricter regulation. Joint significance gives the p-value of a Wald test on corruption, the measure of regulation and their interaction term. z-statistics are given in parentheses. Marginal effects give the marginal effect of corruption on the dependant variable conditional on the value of the regulation measure. Are reported here the impacts at the minimum and maximum value of regulation in the estimated sample. *significant at 10 percent, **significant at 5 percent, ***significant at 1 percent. source: Dreher and Gassebner (2013)

Table 9: Dreher and Gassebner models estimated with enlarged sample (2003 to 2011) and CPI

	(1)	(2)	(3)	(4)	(5)2003-2009
lagged (GDP/cap)	-0.0005*** (-3.39)	-0.0007*** (-4.91)	-0.0006*** (-5.49)	-0.0006*** (-4.03)	-0.0005*** (-4.67)
lagged (GDP/Cap) squared	7.09e-09*** (2.98)	1.03e-08*** (4.77)	7.57e-09*** (4.53)	7.70e-09*** (3.58)	7.83e-09*** (4.25)
dummy for communist history	-3.407*** (-4.33)	-3.2353*** (-5.10)	-2.7881*** (-3.97)	-3.6016*** (-4.71)	-4.1682*** (-4.83)
CPI	0.0442 (0.338)	0.1335 (0.726)	-0.4665*** (-3.71)	-0.3633** (-2.01)	-1.1957** (-2.06)
official cost	-0.1441** (-2.10)				
CPI x official cost	0.0226** (2.47)				
minimal capital		-0.00410 (-0.305)			
CPI x minimal capital		-0.0001 (-0.03)			
number of days			-0.1109*** (-4.81)		
CPI x number of days			0.01856*** (5.63)		
number of procedures				-0.7319*** (-5.20)	
CPI x number of procedures				0.1012*** (3.58)	
regulation					-2.7555*** (-4.62)
CPI x regulation					0.4219*** (3.00)
Constant	13.29*** (5.30)	15.2264*** (5.42)	16.3653*** (10.12)	16.9345*** (9.71)	21.6732*** (10.47)
marginal effect (at the min value)	0.0442	0.13	-0.4294	-0.1609	-0.3126
marginal effect (at the max value)	2.8299	0.1051	2.3556**	1.4577**	1.6191**
R^2	0.699	0.495	0.5335	0.7150	0.7088
Observations	281	281	281	281	219
Countries	43	43	43	43	43

Notes: Period is from 2003 to 2011, except from the last regression, only to 2009. Corruption is measured on a scale from 0 to 10 with higher value corresponding to more corruption. Higher value of regulation indicate stricter regulation. Joint significance gives the p-value of a Wald test on corruption, the measure of regulation and their interaction term. z-statistics are given in parentheses. Marginal effects give the marginal effect of corruption on the dependant variable conditional on the value of the regulation measure. Are reported here the impacts at the minimum and maximum value of regulation in the estimated sample. *significant at 10 percent, **significant at 5 percent, ***significant at 1 percent.

Table 10: Dreher and Gassebner models estimated with enlarged sample (2003 to 2011) and WBC

	(1)	(2)	(3)	(4)	(5)2003-2009
lagged (GDP/cap)	-0.0006*** (-3.39)	-0.0007*** (-5.30)	-0.0006*** (-5.73)	-0.0006*** (-4.10)	-0.0006*** (-4.44)
lagged (GDP/Cap) squared	7.59E-09*** (2.82)	1.02E-0.8*** (4.93)	7.82E-09*** (4.72)	7.75E-09*** (3.52)	7.70E-09** (4.07)
dummy for communist history	-3.4119*** (-4.57)	-2.8429*** (-5.24)	-2.7458*** (-3.85)	-3.4238*** (-4.98)	-4.1030*** (-5.05)
WBC	-0.0347 (-0.14)	0.0107 (0.03)	-1.3077*** (-5.31)	-1.3761*** (-3.90)	-3.3817*** (-3.69)
official cost	-0.0889 (-0.93)				
WBC x official cost	0.0349 (1.11)				
minimal capital		-0.0265** (-2.00)			
WBC x minimal capital		0.0067 (1.54)			
number of days			-0.0905*** (-4.78)		
WBC x number of days			0.0417*** (6.23)		
number of procedures				-0.6099*** (-5.37)	
WBC x number of procedures				0.2346*** (3.80)	
regulation					-2.3121*** (-5.11)
WBC x regulation					1.0275*** (3.89)
Constant	14.2931*** (6.27)	16.2239*** (6.84)	16.7614*** (10.68)	17.8633*** (9.14)	21.3456*** (11.42)
marginal effect (at the min value)	-0.0347	-0.0105	-1.2243**	-0,907	-1,231
marginal effect (at the max value)	4.2679	8.3966	5.036**	2.8465*	3.4734**
R^2	0.699	0.499	0.542	0.714	0.7070
Observations	281	281	281	281	219
Countries	43	43	43	43	43

Notes: Period is from 2003 to 2011, except from the last regression which runs to 2009. Corruption is measured on a scale of -2.51 to 1.71 with higher value corresponding to more corruption. Higher value of regulation indicates stricter regulation. z-statistics are given in parentheses. Marginal effects give the marginal effect of corruption on the dependant variable conditional on the value of the regulation measure. Are reported here the impacts at the minimum and maximum value of the regulation measure in the estimated sample thanks to a bootstrap methodology. *significant at 10 percent, **significant at 5 percent, ***significant at 1 percent.