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Cross-country Evidence of Corruption Spillovers to Formal and Informal Entrepreneurship

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CROSS-COUNTRY EVIDENCE OF CORRUPTION SPILLOVERS TO FORMAL AND INFORMAL ENTREPRENEURSHIP

AZIZ N. BERDIEV and JAMES W. SAUNORIS

Using cross-country data this paper examines the spillovers of corruption to formal and informal entrepreneurship in neighboring countries. Whereas research has shown that entrepreneurs move underground to escape corruption, we argue that entrepreneurs may also seek refuge in neighboring countries. Indeed, the empirical results show that in response to a ceteris paribus increase in corruption in neighboring countries formal entrepreneurship increases in the home country with no effect on informal entrepreneurship. This is consistent with entrepreneurs circumventing corrupt public officials by immigrating to countries with presumably less corruption. These results withstand a battery of robustness checks. (*JEL* D73, L26)

I. INTRODUCTION

The president of the World Bank once declared corruption as "public enemy number one."[1] The omnipresence and damaging effects of corruption across all countries make it an important topic for researchers and policy makers looking to better understand its consequences and ways to eradicate it (Dimant and Tosato 2018; Lambsdorff 2006; Seldadyo and de Haan 2006).[2] In particular, corruption has become a major obstacle for economic growth (Mauro 1995) as it serves as a "tax" on formal sector production (Johnson, Kaufmann, and Shleifer 1997). Moreover, by distorting the allocation of public funds, corruption undermines the nation's ability to provide public resources (Buehn and Schneider 2012; Mauro 1998). Accordingly, corruption undermines market supporting institutions and destroys the incentive to accumulate wealth.

Entrepreneurs, being the engine of economic growth, are especially vulnerable to corrupt government officials who demand bribes in exchange for such things as licensing and permits, which formal entrepreneurs require to bring their products and services to markets. As this corruption "tax" becomes too onerous, entrepreneurs may cease production altogether, thereby depriving countries of new businesses to create growth. Additionally, the uncertainty that comes along with corruption further adds to the cost of bringing businesses to market. Furthermore, corruption weakens market-supporting institutions that would otherwise encourage risk taking and entrepreneurship. As a result, many have argued that economic agents may be "voting with their feet" by migrating underground to escape corruption (see, e.g., Friedman et al. 2000; Hibbs and Piculescu 2005; Hindriks, Keen, and Muthoo 1999; Johnson et al. 2000; Johnson, Kaufmann, and Shleifer 1997; Johnson, Kaufmann, and Zoido-Lobaton 1998).[3] Recent empirical results from Berdiev and Saunoris (2018) confirm that entrepreneurs find refuge from corrupt public officials by retreating to the informal sector.

While entrepreneurs may seek refuge in the underground, a complementary argument in this paper is for entrepreneurs to escape corruption

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1. http://www.worldbank.org/en/news/press-release/2013/12/19/corruption-developing-countries-world-bank-group-president-kim

2. Following Treisman (2000, 399), corruption denotes "the misuse of public office for private gain."

3. In this paper, while the terms "underground," "shadow," and "informal" are utilized interchangeably, they represent those entrepreneurs who function beyond the legal structure of the economy (for details see Loayza 2016).

ABBREVIATIONS

GDP: Gross Domestic Product
VIFs: Variance Inflation Factors

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by migrating to another country to set up their business. According to Transparency International, when "[d]emanding and paying bribes become the norm[,] [t]hose unwilling to comply often emigrate, leaving the country drained of its most able and most honest citizens."[4] Thus, corrupt countries impose externalities on neighboring countries by encouraging mobility of entrepreneurs across national borders. In other words, entrepreneurs respond to a relative increase in corruption in the home country by moving their entrepreneurial ventures across the border. We therefore contribute to the literature by accounting for corruption spillovers and its impact on formal and informal entrepreneurship in neighboring nations.

Using cross-country data, we find that corruption decreases (increases) formal (informal) entrepreneurship consistent with the current literature (see, e.g., Berdiev and Saunoris 2018). In addition, the results show that increases in corruption in neighboring countries cause an increase in formal entrepreneurship in the home country. Furthermore, we find no evidence that corruption in neighboring countries has an effect on entrepreneurs already in the informal sector. Overall, these results support the idea that entrepreneurs not only seek refuge from corruption by moving underground but also consider the benefits of migrating across the border to countries with relatively higher quality institutions. These findings withstand a battery of robustness checks including alternate measures of corruption, accounting for simultaneity across equations, alternate measures of formal and informal entrepreneurship, correcting for outliers, and accounting for additional control variables.

The rest of the paper is structured as follows: the next section provides the theoretical considerations and literature review; Section III explains the data and empirical methodology; Section IV reports the results and robustness checks; and the final section concludes.

II. THEORETICAL CONSIDERATIONS AND LITERATURE REVIEW

When entrepreneurs are deciding to bring products or services to market they are faced with several options including opening a formal (registered) business or instead moving underground to start an informal (unregistered) business (Autio and Fu 2015; Berdiev and Saunoris 2018; Godfrey 2011).[5] In making this decision, entrepreneurs weigh the relative costs and benefits of participating in the formal versus the informal sector, where this cost–benefit differential is primarily a function of institutional quality.[6] In this paper, we argue that corruption impairs institutional quality and therefore distorts this cost–benefit differential by reducing the benefits of operating in the formal sector (Autio and Fu 2015; Berdiev and Saunoris 2018). That is, corruption serves as an added "tax" on formal sector production (Berdiev, Goel, and Saunoris 2018; Buehn and Schneider 2012; Dreher and Siemers 2009), thereby increasing the costs of participating in the formal sector (Aidis, Estrin, and Mickiewicz 2012; Johnson et al. 2000; Johnson, Kaufmann, and Shleifer 1997). Accordingly, entrepreneurs, in response to bribe demands, may choose to cease production completely if the corruption tax exceeds expected benefits, or alternatively they may decide to circumvent dealing with corrupt agents by moving their operations to the shadow sector (Berdiev and Saunoris 2018; Berdiev, Saunoris, and Schneider 2018; Friedman et al. 2000; Hibbs and Piculescu 2005; Hindriks, Keen, and Muthoo 1999; Johnson et al. 2000; Johnson, Kaufmann, and Shleifer 1997; Johnson, Kaufmann, and Zoido-Lobaton 1998).[7]

Because corruption generates high costs of operating in the formal sector and diminishes the benefits of formal sector institutions, the growth of formal entrepreneurship is impeded while the development of informal entrepreneurship is accelerated. Empirical literature finds a considerable amount of support for the argument

4. https://transparency.am/en/resources/language-guide#q3

5. Note that the informal economy exists across high- and low-income countries (Schneider and Enste 2000).

6. Williams and Nadin (2011) offer four views to explain what drives entrepreneurs underground: modernization, structuralist, neo-liberal, and post-structuralist. The authors argue that these views are not contending theories to describe the prevalence of informal entrepreneurship. Indeed, using survey data from 861 interviews during the period from 1998 to 2003, they discover that a mixture of these views is imperative in explaining the growth of informal entrepreneurship in England. Arguably, the interaction between corruption and formal and informal entrepreneurship can be related to a combination of these views (see Berdiev and Saunoris 2018 for a discussion).

7. An alternate theory suggests that corruption "greases the wheels" of commerce by serving as a mechanism through which entrepreneurs can obtain easier access to licensing and permits by circumventing burdensome regulation and red tape (see, e.g., Dreher and Gassebner 2011). More recently, Bologna (2017) hypothesizes that institutional quality influences corruption's effect on competition.

that economic agents react to corruption by moving to the shadow sector (see, e.g., Hindriks, Keen, and Muthoo 1999; Friedman et al. 2000; Johnson et al. 2000; Hibbs and Piculescu 2005; Gulzar, Junaid, and Haider 2010; Buehn and Schneider 2012; Goel and Saunoris 2014).[8] Closely related is Autio and Fu (2015) who find that economic and political institutions impact the allocation of entrepreneurship across formal and informal sectors employing data for 18 Asia Pacific countries.[9] Likewise, Berdiev and Saunoris (2018), using cross-country data for over 60 countries, show that corruption discourages formal entrepreneurship and encourages informal entrepreneurship. Single country studies such as Williams, Shahid, and Martínez (2016) and Williams and Shahid (2016) for Pakistan and Williams and Nadin (2014) and Williams and Round (2007) for Ukraine also find that corruption is associated with increased informality.

The above arguments suggest that some entrepreneurs have the option to move their operations underground to avoid dealing with corrupt officials. However, another option not discussed extensively in the literature is for entrepreneurs to remain in the formal sector by moving their entrepreneurial ventures to another country. In other words, entrepreneurs may react to corruption by relocating to a neighboring country, where the prevalence of corruption is relatively lower, in order to enjoy the benefits of formality. Indeed, the opportunity cost of moving underground is access not only to formal sector institutions in the home country, but also the formal sector institutions in neighboring countries. In their home country, for instance, entrepreneurs may face limited use of government resources associated with the legal system and protection of property rights (Dreher and Schneider 2010; Loayza 1996; Loayza, Servén, and Sugawara 2009; Schneider 2010).[10] Additionally, entrepreneurs may experience restricted access to financial institutions thereby increasing obstacles to accessing capital (Berdiev and Saunoris 2016; Capasso and Jappelli 2013; Straub 2005). As a result, entrepreneurs may decide to move underground or they may decide to remain formal and migrate across the border. For example, it is possible that some entrepreneurs may altogether exit the formal economy (Shleifer 1997; Williams and Round 2007). It is also possible that corrupt bureaucrats may pursue entrepreneurs for bribes in the informal sector, thereby making it more burdensome to operate in the informal sector in the home country. Thus, another alternative is to move to a neighboring country that has a sound legal system which keeps corrupt government officials in check. For example, in a nation with higher quality institutions, entrepreneurs who experience bribery by a public agent can report the corrupt bureaucrat to the police without fear of retribution (Dreher and Schneider 2010).

Research notes that economic agents respond to government distortions by "voicing" their displeasure in political elections or "voting with their feet" by leaving the country (Hirschman 1970). In particular, fiscal decisions of governments impose externalities on neighboring countries by encouraging migration of a mobile tax base (see, e.g., Case 1993). For example, according to the Tiebout (1956) hypothesis, when deciding where to reside individuals shop each community for the bundle of public goods that match their preference at a given tax price (see also Cebula 1978; Tullock 1971).[11] Alternatively, in the case of yard stick competition, externalities take the form of informational spillovers. In this case, individuals judge the competency of their government by comparing it to their neighboring country's government (see, e.g., Besely and Case 1995). Poprawe (2015) suggests that the choice to migrate also depends on corruption; namely, more corrupt nations induce economic participants to relocate to nations that experience comparatively lower corruption. Indeed, employing cross-country bilateral data for 230 countries, Poprawe (2015) finds that corruption deters immigration and contributes to emigration.[12] Following Poprawe (2015), we argue that entrepreneurs base their decision whether to move underground or across the border on the relative differences in corruption between their home country and that of their neighbors.

8. Notice that Dreher and Schneider (2010) argue that the relationship between corruption and informality differs across high-income and low-income nations.

9. Also, Saunoris and Sajny (2017) find that the returns from economic freedom are highest when formal and informal entrepreneurship is most prevalent.

10. The prevalence of corruption undermines the legal system which includes such things as a court system and protection of property rights.

11. Empirical support for the "Tiebout-Tullock hypothesis" has been provided by Cebula (1978, 2009).

12. See also Dimant, Krieger, and Meierrieks (2013) and Cooray and Schneider (2016) for the relationship between corruption and migration.

Entrepreneurs are therefore attracted to the benefits of sound formal sector institutions.[13] Consequently, when entrepreneurs examine the cost–benefit differential of participating in the formal versus the informal sectors (Berdiev, Saunoris, and Schneider 2018; Kaufmann 1997; Loayza 1996; Rauch 1991) they are likely to consider in their cost–benefit analysis the option to move to a neighboring country where the prevalence of corruption is relatively lower. Indeed, Seldadyo, Elhorst, and De Haan (2010) emphasize the importance of cross-border governance spillovers. Also, recent research provides evidence of corruption spillovers across territories (see, e.g., Becker, Egger, and Seidel 2009; Goel and Nelson 2007; Goel and Saunoris 2014). Viewed from a slightly different angle, we account for corruption spillovers and its effect on formal and informal entrepreneurship in neighboring countries. In fact, Goel and Saunoris (2014) find that increases in the shadow economy in neighboring countries reduces own-country corruption. While corruption spillovers likely have no effect on informal entrepreneurs that are already "flying under the radar," they may impact formal entrepreneurs and their decision to migrate underground or across the border.

Thus, when formal sector entrepreneurs experience the additional cost of corruption, they can find refuge from corrupt public officials by moving to the informal sector or, alternatively, by relocating across the border to continue their formal entrepreneurial activities in a neighboring country. This may be particularly the case for those entrepreneurs who live at or near the border of another country. Whereas the decision to relocate might be considered costly, Ariu et al. (2016, 238) show that "college graduates are more willing to migrate to countries with good institutional quality, and they tend to emigrate more from countries with low governance quality despite potentially greater migration costs." As discussed above, the probability of corruption in neighboring countries influencing entrepreneurs already underground is small; however, the corruption differential across borders may impact formal entrepreneurs that rely on quality formal institutions.

Based on the above discussion, we have the following testable hypotheses:

H1: Corruption discourages formal entrepreneurship, ceteris paribus.

H2: Corruption promotes informal entrepreneurship, ceteris paribus.

H3: Neighboring corruption raises formal entrepreneurship, ceteris paribus.

H4: Neighboring corruption has no impact on informal entrepreneurship, ceteris paribus.

III. DATA AND EMPIRICAL METHODOLOGY

A. Data

We use cross-country data on over 50 countries averaged from 2001 to 2010 to test the above four hypotheses. The sample of countries includes developed and developing countries, thus corruption and formal and informal entrepreneurship vary within the sample. While the sample of countries is relatively small for examining spatial relations, advancements in communication and technology along with the general rise in globalization has allowed for entrepreneurs to more easily migrate over great distances (Knight 2000). The variables used in this analysis come from various reputable sources—see Table A1 for a list of countries used in the analysis and Table A2 for variable details including sources and descriptive statistics. Many previous studies that examine the relationship between entrepreneurship and corruption focus only on formal entrepreneurship or aggregate (formal and informal) entrepreneurship (for discussion see Autio and Fu 2015, Dau and Cuervo-Cazurra 2014, Berdiev and Saunoris 2018, and Goel, Saunoris, and Zhang 2015, 2016). Alternatively, we use novel estimates from Autio and Fu (2015), who disaggregate entrepreneurship to capture entrepreneurial activities in the formal and informal sectors of the economy.

Autio and Fu (2015), in particular, estimate the entry density of both formal entrepreneurship (*FormalENTRE*) and informal entrepreneurship (*InformalENTRE*) assuming a constant entry rate over 42 months and an exponential survival rate. Formal entrepreneurship comes from the number of new business incorporations from the World Bank Entrepreneurship Snapshot database and consists of the number of formal or informal businesses per 100 working age (18–64) adult

13. Globerman and Shapiro (2002) for example show that sound institutions entice foreign direct investment inflows.

population. Informal entrepreneurs, on the other hand, are more difficult to measure given their propensity to escape detection. However, Autio and Fu (2015) using data from the Global Monitor Adult Population survey and World Bank Entrepreneurship Snapshot are able to back out an estimate for this inherently secretive group of entrepreneurs. To do this, Autio and Fu (2015) use the Global Monitor Adult Population survey of a random set of 2000 individuals in a given country, which identifies new entrepreneurs as those individuals that owned a business that has paid salaries between 3 and 41 months; however, the survey does not ask about registration status and therefore it can be assumed that this includes both registered and unregistered businesses. Using this measure, the authors estimate the annual entry rate of new formal and informal entrepreneurs (based on a constant entry rate and exponential survival rate). Lastly, to back out an estimate for the annual entry rate of informal entrepreneurs, the authors subtract from this estimate the number of registered corporations from the World Bank Entrepreneurship Snapshot. According to these two measures, New Zealand (Ghana) has the highest formal (informal) entrepreneurship and Pakistan (Belgium) the lowest. Note that we utilize alternate measures of formal and informal entrepreneurship from Dau and Cuervo-Cazurra (2014) to check the robustness of our findings (see Section IV.C).

The main measure of corruption (*CORR (ICRG)*) is from the Political Risk Services Group's International Country Risk Guide, and measures, based on expert ratings, the political risk due to corruption (for further details see Knack and Keefer 1995). In our sample, the country that is most corrupt is Kazakhstan while Finland is least corrupt. Due to the multidimensional nature of corruption, we consider two other widely used measures of corruption from Transparency International (*CORR (TI)*) and the World Bank's Worldwide Governance Indicators (*CORR (WB)*) (Kaufmann, Kraay, and Mastruzzi 2010). *CORR (TI)* captures perceptions of public sector corruption, whereas *CORR (WB)* captures perceptions of both petty and grand forms of public sector corruption. All three measures of corruption are highly correlated with correlation coefficients that exceed 0.94. All three measures of corruption are measured on different scales. Thus, to facilitate interpretation we re-scaled each variable from 0 to 10 where higher values represent more corruption.

The spatial lag of *CORR* (*CORRW*) captures the externalities imposed by neighboring countries where *W* is a 50X50 (50 is the number of countries) row-standardized weight matrix used to define "neighborliness." To ensure identification the weights need to be exogenous (Anselin and Bera 1998), thus we use geographic distance following Tobler's law of geography that "everything is related to everything else, but near things are more related than distant things."[14] To construct the weight matrix *W* each *ij*th element of *W* is defined as $\omega_{ij} = \frac{1}{d_{ij}}$ where d_{ij} measures the geographic distance in kilometers between country *i* and country *j* (distance based on country centroid); thus, countries that are closer receive higher weights than those more distant. Simply, *CORRW* is a weighted average of neighboring countries' corruption. The correlation between *CORR* and *CORRW* is not surprisingly high with a correlation coefficient of 0.55; consistent with the existence of corruption spillovers.[15]

The control variables come mostly from the extant literature (see, e.g., Goel, Saunoris, and Zhang 2016; Berdiev and Saunoris 2018). Because, according to Godfrey (2011), the decision to be an entrepreneur is followed by the decision to be formal or informal, many of the control variables primarily apply to entrepreneurship in general, while we include alternate variables to account for unique characteristics related to informal and formal entrepreneurship. The controls that are consistent across both models include real gross domestic product (*GDP*), democracy (*DEMOC*), and a dummy variable for transition countries (*Transition*).

Greater prosperity, measured by *GDP*, means more opportunities in the formal sector thereby discouraging informality. However, *GDP* likely has an offsetting effect for formal entrepreneurship as higher income countries have easier access and opportunities for formal employment that raise the opportunity cost of formal entrepreneurship, while higher income countries

14. To calculate distance we use the haversine distance formula, which calculates the great-circle distance between two countries' longitude and latitude on a sphere.

15. As a robustness check, we created a weighting matrix composed of the three nearest neighbors and re-ran the results reported in Table 1 to show that the results are overall robust to alternate weighting schemes. These results are available upon request.

also have extended markets that results in more opportunities for formal entrepreneurial ventures. Democratic countries give individuals power to voice their dissatisfaction with elected officials and the ability to remove ineffective politicians from office thereby discouraging individuals from moving underground and encouraging individuals to start new formal businesses. Finally, transition countries with their developing institutions provide unique challenges to both formal and informal entrepreneurship, therefore, we include a dummy variable for transition countries (Goel, Saunoris, and Zhang 2016).

As discussed, many of the same factors influence the decision to be an entrepreneur while other factors play into the decision to be either formal or informal. To account for these unique cases we include education (*EDUC*) as an additional control variable for formal entrepreneurs. More educated individuals have more opportunities in the capital intensive formal sector. Alternatively, labor regulations that prevent formal sector employment encourage individuals to seek other opportunities in the informal sector; therefore, we include a measure of hiring and minimum wage regulations (*MinWageReg*) as an additional control for informal entrepreneurs. We also employ additional control variables to check the robustness of the results (see Section IV.F).

B. Empirical Methodology

To test the abovementioned hypotheses, we construct the following linear regression model:

$$(1)\quad Entrepreneurship_i^k = \beta_0 + \beta_1 CORR_i^p + \beta_2 CORRW_j^p + \gamma_i' X_i^k + \varepsilon_i$$

where i indexes individual countries. The dependent variable is entrepreneurship where k denotes the entry density of formal entrepreneurship (*FormalENTRE*) or informal entrepreneurship (*InformalENTRE*). *CORR* is the degree of corruption and *CORRW* is the spatial lag of *CORR* capturing the degree of corruption in neighboring country j, and p designates the specific measure of corruption (i.e., *CORR (ICRG)*, *CORR (TI)*, or *CORR (WB)*). The variable X is a vector of control variables where k denotes controls for formal and informal entrepreneurship. For formal entrepreneurship, X includes real GDP per capita (*GDP*), education (*EDUC*), democracy (*DEMOC*) and a dummy variable for transition countries (*Transition*). For informal entrepreneurship, X includes the same set of control variables except that we include a measure of minimum wage regulations (*MinWageReg*) in place of education. Finally, ε_i is the white noise error term.

To estimate Equation (1) we employ two-stage least squares to account for the potential endogeneity of corruption and its spatial lag and instrument them using the following instrumental variables (along with their spatial lag): ethnic and religious fractionalization (Alesina et al. 2003), absolute latitude (La Porta et al. 1999), and population density (see Berdiev and Saunoris 2018 for further details).[16] Countries more divided ethnically or religiously make it difficult to form corrupt relations while urban areas with dense population make it easier to form corrupt relations. Furthermore, we argue ethnic and religion fractionalization and urban areas have only an indirect effect on entrepreneurship through their effect on corruption.[17] To ensure that these instruments are both relevant (i.e., correlated with the endogenous variables) and valid (i.e., correctly excluded from the estimated equation) we conduct several diagnostic tests and report the results at the bottom of Table 1. First, the relevancy of the instruments is tested using the Kleibergen–Paap rk LM test under the null that the instruments are not correlated with the endogenous variables. However, instruments can perform poorly if they are only weakly correlated with the endogenous variables, thus we also report the Kleibergen–Paap rk Wald test statistic that is compared with critical values (based on bias and test size) from Stock and Yogo (2005). Finally, to test for instrument validity the Hansen J test is reported under the null that the instruments are valid (see Baum, Schaffer, and Stillman 2007 for more details on each test).

In addition to the instrument diagnostic tests, we also report the Pagan-Hall test for general forms of heteroscedasticity (null hypothesis is homoscedasticity) and variance inflation factors (VIFs) to check for multicollinearity. Based on convention a $VIF > 10$ signals potential problems with multicollinearity. All diagnostic tests are reported at the bottom of Table 1.

16. Preliminary exogeneity tests of corruption and its spatial lag suggest they are endogenous and thus require IV estimation.

17. As an additional test, we test the validity of the subset of suspect instruments (i.e., ethnic and religious fractionalization, population density, and their spatial lags) using the difference-in-Sargan test and the high p values suggest that this subset of instruments is indeed valid.

TABLE 1
The Effect of Corruption on Entrepreneurship

	Baseline Results		Robustness Check 1: Alternate Measures of Corruption			
Dep. Variable →	**(1.1) *Formal ENTRE***	**(1.2) *Informal ENTRE***	**(1.3) *Formal ENTRE***	**(1.4) *Informal ENTRE***	**(1.5) *Formal ENTRE***	**(1.6) *Informal ENTRE***
CORR (ICRG)	**−0.172*** **	**0.934*** **				
	(0.060)	**(0.303)**				
CORRW (ICRG)	**0.372** **	**−0.578**				
	(0.179)	**(0.879)**				
CORR (TI)			**−0.119*** **	**0.840*** **		
			(0.039)	**(0.216)**		
CORRW (TI)			**0.241** **	**−0.435**		
			(0.123)	**(0.575)**		
CORR (WB)					**−0.272*** **	**1.916*** **
					(0.089)	**(0.501)**
CORRW (WB)					**0.540** **	**−1.161**
					(0.264)	**(1.286)**
GDP	−0.042	−0.431**	−0.044	−0.424***	−0.043	−0.447***
	(0.032)	(0.171)	(0.033)	(0.144)	(0.032)	(0.149)
EDUC	0.179		0.186		0.203	
	(0.140)		(0.165)		(0.164)	
DEMOC	−0.001	0.091	−0.000	0.141	−0.006	0.180*
	(0.014)	(0.108)	(0.012)	(0.096)	(0.012)	(0.105)
Transition	0.425***	−2.640***	0.351***	−2.537***	0.362***	−2.613***
	(0.117)	(0.641)	(0.087)	(0.504)	(0.088)	(0.544)
MinWageReg		−0.217*		−0.287***		−0.264**
		(0.115)		(0.111)		(0.110)
Observations	58	58	58	58	58	58
R-squared	0.297	0.252	0.400	0.442	0.420	0.447
VIF	3.67	2.52	3.25	2.29	3.47	2.50
Pagan-Hall statistic	17.09	15.37	22.65**	10.22	22.32**	11.68
	[0.146]	[0.222]	[0.031]	[0.597]	[0.034]	[0.472]
Kleibergen–Paap rk Wald *F* statistic	2.595	2.846	3.545	4.387	3.991	4.697
Kleibergen–Paap rk LM statistic	10.24	13.10*	12.25*	17.20**	12.21*	17.11**
	[0.175]	[0.070]	[0.093]	[0.016]	[0.094]	[0.017]
Hansen's J statistic	0.953	8.469	2.052	9.627	2.151	10
	[0.987]	[0.206]	[0.915]	[0.141]	[0.905]	[0.125]

Notes: See Table A2 for variable details. Constants are included but not reported. Robust standard errors are in parentheses and probability values are in brackets. Excluded instruments for *CORR* and *CORRW* include *PopDen*, *EthnicFrac*, *ReligiousFrac*, and *Latitude* (and their spatial lag).

Asterisks denote the following significance levels: ***$p < .01$, **$p < .05$, and *$p < .1$.

IV. RESULTS

A. *Baseline Results*

Table 1 reports the main results. The *R*-squared shows that the models have decent explanatory power. In response to the mixed Pagan–Hall test results, which provides some evidence of heteroskedastic errors, we report robust standard errors in parentheses. The VIFs are all below the conventional threshold of 10 indicating no concerns with multicollinearity. Finally, the significance of the Kleibergen and Paap (2006) rk LM test statistics and insignificance of the Hansen J test statistics suggest that the instruments are both relevant and valid.

Models 1.1 and 1.2 of Table 1 report the baseline results with formal entrepreneurship and informal entrepreneurship as the dependent variables, respectively, and *CORR (ICRG)* as the main independent variable. Consistent with the results from Berdiev and Saunoris (2018) and Hypotheses 1 and 2, we find that corruption effectively reduces formal entrepreneurship and promotes informal entrepreneurship. These findings support the movement of prospective entrepreneurs underground in response to, for example, bribe demands from corrupt public official for necessary licensing to open a legitimate business (Berdiev, Goel, and Saunoris 2018; Choi and Thum 2005).

However, nation states do not exist in a vacuum, thus when entrepreneurs are deciding where to start their business they likely consider in their cost–benefit calculation re-locating

to neighboring countries. This is especially likely for those entrepreneurs that live on or near the border. To account for this aspect we include neighboring countries' corruption as an additional determinant in Equation (1). As expected, the results show a significant positive impact of neighboring corruption on formal entrepreneurship and no significant effect on informal entrepreneurs. Accordingly, these findings confirm Hypotheses 3 and 4. That is, when faced with the added cost of corruption, formal entrepreneurs can choose to escape dealing with corrupt government officials by migrating underground or by migrating across the border to set up their business in a neighboring country. All else constant, it is no surprise that neighboring corruption does not affect informal entrepreneurs because these entrepreneurs are already hidden from corrupt government officials, thus we would not expect these entrepreneurs to move over the border unless they were to become formal. This result is consistent with those of Goel and Saunoris (2014) who find no significant spillovers from corruption to the shadow economy. Our consideration of corruption spillovers to, and its asymmetric effect on, formal and informal entrepreneurs offers new insight to the literature.[18]

Turning to the control variables, we find that *GDP* negatively affects informal entrepreneurs and has no effect on formal entrepreneurs. While greater prosperity enhances opportunities for entrepreneurs, this is offset by more opportunities for formal employment resulting in no statistical effect on formal entrepreneurs. Alternatively, the higher opportunity costs associated with greater prosperity effectively discourages informal entrepreneurs. In other results, more democratic nations show no statistical influence on entrepreneurship. Education is positive albeit insignificant (Model 1.1), whereas minimum wage regulations is negative and significant (Model 1.2). Finally, transition nations have more formal entrepreneurs and less informal entrepreneurs (Goel, Saunoris, and Zhang 2016).

Overall, these results support our four main hypotheses. However, to ascertain the validity of our baseline results, we consider the robustness of our results to alternate measures of corruption (Section IV.B); to alternate measures of formal and informal entrepreneurship (Section IV.C); after accounting for outliers (Section IV.D); to error correlation across equations (Section IV.E); to inclusion of additional control variables (Section IV.F); and after accounting for entrepreneurial spillovers (Section IV.G).

B. Robustness Check 1: Alternate Measures of Corruption

Given the multidimensional nature of corruption, we consider two alternate perceptions based measures of corruption from Transparency International and the World Bank's Worldwide Governance Indicators (Kaufmann, Kraay, and Mastruzzi 2010). Specifically, we replace *CORR (ICRG)* with *CORR (TI)* (Models 1.3 and 1.4) and *CORR (WB)* (Models 1.5 and 1.6). Based on the results in Models 1.3–1.6 of Table 1, the baseline results are confirmed across both measures of corruption. That is, the results reveal that corruption decreases (increases) formal (informal) entrepreneurship, whereas neighboring corruption increases formal entrepreneurship and has no significant influence on informal entrepreneurship. With the exception of the positive coefficient on *DEMOC* in Model 1.6 the rest of the control variables are also consistent with the baseline models.

C. Robustness Check 2: Alternate Measures of Entrepreneurship

As with corruption, entrepreneurship, especially informal, is difficult to measure, thus we re-estimate the baseline models using an alternate measure of formal and informal entrepreneurship from Dau and Cuervo-Cazurra (2014). These results are reported in Table 2 across all three measures of corruption. In support of the baseline results and the main hypotheses we find that corruption significantly decreases formal entrepreneurship and increases informal entrepreneurship. As before, neighboring corruption promotes formal entrepreneurship and has no significant impact on informal entrepreneurship. Moreover, the control variables show similar effects with the baseline models. For instance, *GDP* has a negative and significant effect in Models 2.4 and 2.6 with informal entrepreneurship as the dependent variable. Education, democracy, and minimum wage regulations all have limited

18. Ideally, data on migration patterns would help strengthen our arguments; therefore, we normalize the number of formal and informal entrepreneurs by migration inflows and re-estimate the baseline models. While doing so severely limits the sample to only 28 countries thus reducing statistical significance, the results show that the signs and magnitudes of the coefficients on corruption and its spatial lag are consistent with the baseline models. We thank an anonymous referee for this suggestion and make the results available upon request.

TABLE 2
Robustness Check 2: Alternate Measures of Entrepreneurship

Dep. Variable →	(2.1) *Formal ENTRE*	(2.2) *Informal ENTRE*	(2.3) *Formal ENTRE*	(2.4) *Informal ENTRE*	(2.5) *Formal ENTRE*	(2.6) *Informal ENTRE*
CORR (ICRG)	**−1.610****	**1.467****				
	(0.660)	**(0.658)**				
CORRW (ICRG)	**4.264*****	**0.597**				
	(1.439)	**(1.849)**				
CORR (TI)			**−1.179*****	**1.343*****		
			(0.402)	**(0.476)**		
CORRW (TI)			**2.997*****	**0.505**		
			(1.088)	**(1.273)**		
CORR (WB)					**−2.592*****	**2.985*****
					(0.922)	**(1.080)**
CORRW (WB)					**6.343*****	**0.802**
					(2.275)	**(2.864)**
GDP	−0.494	−0.594	−0.488	−0.629*	−0.491	−0.654*
	(0.472)	(0.362)	(0.455)	(0.325)	(0.468)	(0.335)
EDUC	2.335		2.165		2.458	
	(1.975)		(2.105)		(2.099)	
DEMOC	0.072	−0.158	0.041	−0.077	−0.000	−0.028
	(0.190)	(0.202)	(0.172)	(0.174)	(0.190)	(0.191)
Transition	3.893***	−5.747***	3.301***	−5.652***	3.309***	−5.661***
	(1.396)	(1.425)	(1.071)	(1.177)	(1.083)	(1.250)
MinWageReg		−0.098		−0.256		−0.206
		(0.231)		(0.231)		(0.226)
Observations	56	53	56	53	56	53
R-squared	0.188	0.343	0.243	0.461	0.254	0.473
Kleibergen–Paap rk Wald *F* statistic	2.787	3.409	3.421	5.629	3.970	6.310
Kleibergen–Paap rk LM statistic	10.49	12.32*	11.83	15.50**	11.84	15.05**
	[0.163]	[0.091]	[0.106]	[0.030]	[0.106]	[0.035]
Hansen's J statistic	5.899	5.185	7.149	4.945	7.234	5.280
	[0.435]	[0.520]	[0.307]	[0.551]	[0.300]	[0.508]

Notes: See Table 1 notes. Dependent variables formal and informal entrepreneurship are from Dau and Cuervo-Cazurra (2014).

effects, whereas transition nations have more formal and less informal entrepreneurs.

D. Robustness Check 3: Accounting for Outliers

To account for the possible influence of outliers, we winsorize both formal and informal entrepreneurship. Winsorizing transforms the variable by replacing the three largest and three smallest values with the next value counting inwards (for details see Barnett and Lewis 1994). Using these transformed variables corrected for outliers, we re-estimate Models 1.1–1.6 and report the results in Table 3. Although the magnitudes of the effect of corruption and neighboring corruption are somewhat smaller compared to the baseline models, the sign and significance of these results withstand the influence of outliers and thus instill faith in our main findings: that is, corruption discourages (encourages) formal (informal) entrepreneurial ventures while neighboring corruption raises formal entrepreneurship with no significant effect on informal entrepreneurship. The control variables are also consistent with the baseline results.

E. Robustness Check 4: Accounting for Simultaneity across Equations

Formal and informal entrepreneurs do not behave independently, thus corruption is likely correlated with the errors across equations. Although two-stage least squares give consistent estimates we attempt to improve efficiency by re-estimating Equation (1) as a system of equations using three-stage least squares (for details see Zellner and Theil 1962). These results are displayed in Table 4. As before, we employ all three measures of corruption. According to these results, there are minimal efficiency gains in estimating Equation (1) as a system of equations given their similarity to the baseline results. Nevertheless, this is further evidence of the validity of the baseline findings that entrepreneurs, in

TABLE 3
Robustness Check 3: Accounting for Outliers

Dep. Variable →	(3.1) *Formal ENTRE*	(3.2) *Informal ENTRE*	(3.3) *Formal ENTRE*	(3.4) *Informal ENTRE*	(3.5) *Formal ENTRE*	(3.6) *Informal ENTRE*
CORR (ICRG)	**−0.116*** **	**0.784*** **				
	(0.030)	**(0.242)**				
CORRW (ICRG)	**0.189** **	**−0.305**				
	(0.094)	**(0.716)**				
CORR (TI)			**−0.090*** **	**0.700*** **		
			(0.023)	**(0.167)**		
CORRW (TI)			**0.132***	**−0.227**		
			(0.072)	**(0.465)**		
CORR (WB)					**−0.203*** **	**1.609*** **
					(0.053)	**(0.387)**
CORRW (WB)					**0.297***	**−0.682**
					(0.155)	**(1.034)**
GDP	−0.016	−0.299**	−0.016	−0.292***	−0.015	−0.312***
	(0.022)	(0.127)	(0.020)	(0.100)	(0.020)	(0.104)
EDUC	0.072		0.051		0.068	
	(0.089)		(0.092)		(0.090)	
DEMOC	0.002	0.066	0.001	0.104	−0.003	0.139*
	(0.009)	(0.087)	(0.008)	(0.075)	(0.009)	(0.082)
Transition	0.363***	−2.260***	0.335***	−2.175***	0.340***	−2.240***
	(0.080)	(0.490)	(0.070)	(0.387)	(0.071)	(0.419)
MinWageReg		−0.135		−0.192**		−0.174**
		(0.088)		(0.079)		(0.080)
Observations	58	58	58	58	58	58
R-squared	0.307	0.252	0.458	0.457	0.473	0.464
Kleibergen–Paap rk Wald *F* statistic	2.595	2.846	3.545	4.387	3.991	4.697
Kleibergen–Paap rk LM statistic	10.24	13.10*	12.25*	17.20**	12.21*	17.11**
	[0.175]	[0.070]	[0.093]	[0.016]	[0.094]	[0.017]
Hansen's J statistic	2.178	7.919	2.207	8.029	2.496	8.697
	[0.903]	[0.244]	[0.900]	[0.236]	[0.869]	[0.191]

Notes: See Table 1 notes. Dependent variables are winsorized to remove outliers.

response to corruption, migrate to the shadow sector and relocate across national border. The rest of the explanatory variables are again in line with our earlier findings.

F. Robustness Check 5: Additional Control Variables

Given the multidimensional characteristics of both formal and informal entrepreneurship, we attempt to account for these unique aspects by checking the robustness of our findings to alternate control variables that likely influence entrepreneurial behavior.[19] Specifically, we include as additional control variables the degree of trade openness (*Open*), credit market regulations (*CreditMarReg*), legal enforcement (*LegalEnforce*), and the size of government (*GovtSize*). These results are presented in Tables 5–7. While the baseline results are supported across all measures of corruption the additional explanatory variables show some interesting differences. In particular, both trade openness and legal enforcement prove effective at combating informal entrepreneurship.

G. Robustness Check 6: Entrepreneurial Spillovers

Recent findings suggest that both entrepreneurship and informality spill over across geographic areas (see, e.g., Wiseman 2016, Pijnenburg and Kholodilin 2014, and Goel and Saunoris 2014). To account for these additional spillovers, we estimate an autoregressive spatial lag model by including a spatial lag of formal (*FormalENTREW*) and informal

19. Conceivably the spatial lag of the control variables may influence entrepreneurship and thus create an omitted variable bias. Therefore, we augmented Equation (1) with the spatial lag of each of the control variables and re-estimate the baseline models. While the coefficient on each of the spatial lags of the controls is insignificant, the results confirm our baseline findings with weak statistical support on the coefficient on the spatial lag of corruption. These results are reported in Table A3.

TABLE 4

Robustness Check 4: Three-Stage Least Squares (Simultaneous Equations)

Dep. Variable →	(4.1) *Formal ENTRE*	(4.2) *Informal ENTRE*	(4.3) *Formal ENTRE*	(4.4) *Informal ENTRE*	(4.5) *Formal ENTRE*	(4.6) *Informal ENTRE*
CORR (ICRG)	**−0.152****	**0.674****				
	(0.063)	**(0.269)**				
CORRW (ICRG)	**0.320***	**−0.091**				
	(0.169)	**(0.761)**				
CORR (TI)			**−0.093****	**0.653*****		
			(0.043)	**(0.179)**		
CORRW (TI)			**0.182**	**−0.117**		
			(0.112)	**(0.496)**		
CORR (WB)					**−0.229****	**1.514*****
					(0.100)	**(0.419)**
CORRW (WB)					**0.443***	**−0.462**
					(0.250)	**(1.099)**
GDP	−0.047	−0.412***	−0.052*	−0.408***	−0.049*	−0.429***
	(0.031)	(0.144)	(0.029)	(0.128)	(0.029)	(0.129)
EDUC	0.225		0.266*		0.260*	
	(0.166)		(0.161)		(0.157)	
DEMOC	0.002	0.024	0.005	0.075	−0.001	0.110
	(0.018)	(0.098)	(0.016)	(0.089)	(0.018)	(0.096)
Transition	0.382**	−2.270***	0.291**	−2.259***	0.316**	−2.327***
	(0.172)	(0.761)	(0.145)	(0.627)	(0.149)	(0.644)
MinWageReg		−0.160*		−0.232***		−0.217***
		(0.086)		(0.083)		(0.082)
Observations	58	58	58	58	58	58
R-squared	0.344	0.375	0.428	0.504	0.438	0.502

Note: See Table 1 notes.

TABLE 5

Robustness Check 5a: Additional Control Variables

Dep. Variable →	(5.1) *Formal ENTRE*	(5.2) *Informal ENTRE*	(5.3) *Formal ENTRE*	(5.4) *Informal ENTRE*	(5.5) *Formal ENTRE*	(5.6) *Informal ENTRE*	(5.7) *Formal ENTRE*	(5.8) *Informal ENTRE*
CORR (ICRG)	**−0.175*****	**1.007*****	**−0.174*****	**1.099*****	**−0.183*****	**1.454*****	**−0.178****	**0.864*****
	(0.060)	**(0.286)**	**(0.061)**	**(0.356)**	**(0.060)**	**(0.494)**	**(0.069)**	**(0.288)**
CORRW (ICRG)	**0.380****	**−0.997**	**0.344****	**−0.656**	**0.372****	**−0.865**	**0.287***	**−0.489**
	(0.177)	**(0.845)**	**(0.170)**	**(0.928)**	**(0.174)**	**(1.009)**	**(0.171)**	**(0.844)**
GDP	−0.042	−0.583***	−0.049	−0.409**	−0.038	−0.621***	−0.043	−0.428**
	(0.033)	(0.185)	(0.034)	(0.183)	(0.034)	(0.194)	(0.032)	(0.174)
EDUC	0.174		0.230		0.192		0.165	
	(0.143)		(0.154)		(0.140)		(0.138)	
DEMOC	−0.002	0.118	0.001	0.094	−0.004	0.192	0.001	0.074
	(0.014)	(0.111)	(0.013)	(0.113)	(0.014)	(0.130)	(0.014)	(0.107)
Transition	0.431***	−2.595***	0.424***	−2.942***	0.463***	−4.267***	0.432***	−2.538***
	(0.119)	(0.623)	(0.117)	(0.757)	(0.127)	(1.216)	(0.127)	(0.619)
Open	−0.003	−1.435**						
	(0.099)	(0.654)						
MinWageReg		−0.272**		−0.221*		−0.224*		−0.207*
		(0.117)		(0.123)		(0.117)		(0.112)
CreditMarReg			0.045	−0.382				
			(0.035)	(0.299)				
LegalEnforce					0.018	−0.656**		
					(0.033)	(0.310)		
GovtSize							−0.054	−0.020
							(0.043)	(0.212)
Observations	58	58	58	58	58	58	58	58
R-squared	0.290	0.258	0.311	0.174	0.277	0.006	0.317	0.292
Kleibergen–Paap rk Wald *F* statistic	2.333	2.844	2.388	2.591	1.776	1.796	2.383	2.883
Kleibergen–Paap rk LM statistic	10.53	14.16**	10.19	13.83*	8.246	8.408	10.26	12.39*
	[0.160]	[0.048]	[0.178]	[0.054]	[0.311]	[0.298]	[0.174]	[0.089]
Hansen's J statistic	0.933	9.133	1.351	7.947	0.917	9.117	0.686	8.843
	[0.988]	[0.166]	[0.969]	[0.242]	[0.989]	[0.167]	[0.995]	[0.183]

Note: See Table 1 notes.

TABLE 6
Robustness Check 5b: Additional Control Variables

Dep. Variable →	(6.1) *Formal ENTRE*	(6.2) *Informal ENTRE*	(6.3) *Formal ENTRE*	(6.4) *Informal ENTRE*	(6.5) *Formal ENTRE*	(6.6) *Informal ENTRE*	(6.7) *Formal ENTRE*	(6.8) *Informal ENTRE*
CORR (TI)	**−0.119*** **	**0.832*** **	**−0.115*** **	**0.978*** **	**−0.116*** **	**1.195*** **	**−0.134*** **	**0.832*** **
	(0.040)	**(0.204)**	**(0.036)**	**(0.230)**	**(0.036)**	**(0.277)**	**(0.047)**	**(0.220)**
CORRW (TI)	**0.219***	**−0.546**	**0.214***	**−0.434**	**0.237** **	**−0.523**	**0.203**	**−0.377**
	(0.116)	**(0.529)**	**(0.109)**	**(0.598)**	**(0.119)**	**(0.590)**	**(0.124)**	**(0.551)**
GDP	−0.057	−0.500***	−0.051	−0.393***	−0.045	−0.591***	−0.043	−0.421***
	(0.035)	(0.154)	(0.034)	(0.149)	(0.035)	(0.139)	(0.032)	(0.146)
EDUC	0.199		0.236		0.189		0.142	
	(0.170)		(0.177)		(0.162)		(0.162)	
DEMOC	−0.000	0.144	0.003	0.142	0.001	0.232**	−0.000	0.136
	(0.011)	(0.096)	(0.011)	(0.097)	(0.011)	(0.102)	(0.012)	(0.097)
Transition	0.359***	−2.448***	0.339***	−2.812***	0.342***	−3.880***	0.382***	−2.526***
	(0.091)	(0.491)	(0.085)	(0.582)	(0.108)	(0.838)	(0.091)	(0.502)
Open	−0.123	−0.721						
	(0.098)	(0.561)						
MinWageReg		−0.306***		−0.296***		−0.309***		−0.282**
		(0.109)		(0.114)		(0.098)		(0.110)
CreditMarReg			0.032	−0.449**				
			(0.032)	(0.226)				
LegalEnforce					−0.002	−0.608***		
					(0.029)	(0.211)		
GovtSize							−0.046	0.032
							(0.043)	(0.162)
Observations	58	58	58	58	58	58	58	58
R-squared	0.417	0.459	0.417	0.414	0.404	0.372	0.404	0.445
Kleibergen–Paap rk Wald *F* statistic	3.716	4.312	3.725	4.375	3.202	3.495	3.458	4.583
Kleibergen–Paap rk LM statistic	12.15*	17.18**	13.43*	17.77**	11.93	15.75**	12.23*	17.91**
	[0.096]	[0.016]	[0.062]	[0.013]	[0.103]	[0.028]	[0.093]	[0.012]
Hansen's J statistic	2.168	10.39	2.493	7.576	2.004	7.898	1.377	9.499
	[0.904]	[0.109]	[0.869]	[0.271]	[0.919]	[0.246]	[0.967]	[0.147]

Note: See Table 1 notes.

(*InformalENTREW*) entrepreneurship. Because the dependent variable and its spatial lag are determined simultaneously, we instrument the spatial lag of each entrepreneurship with the exogenous variables and their spatial lag. These results are reported in Table 8.[20] Even after accounting for the spatial lag our main findings remain robust; however, the spatial lag of corruption negatively affects informal entrepreneurship. Additionally, we find no spillovers of formal entrepreneurship while informal entrepreneurship positively spills over to neighboring countries consistent with Goel and Saunoris (2014). The controls variables are largely unchanged.

20. The reader is advised to exercise appropriate caution in interpreting the results due to the high variance inflation factors (i.e., >10) on the spatial terms suggesting problems with multicollinearity.

V. CONCLUSION

This paper adds a new dimension to the current literature on the effects of corruption on entrepreneurship by considering the influence of corruption in neighboring countries. In particular, we examine the effects of corruption spillovers on formal and informal entrepreneurship in neighboring nations. Entrepreneurs looking to escape corruption may "vote with their feet" by migrating underground to start their business or they may choose to migrate across the border to a neighboring country.

The results in this paper show that corruption discourages formal entrepreneurship yet encourages informal entrepreneurship. Furthermore, an increase in neighboring country's corruption relative to own country causes an increase in formal entrepreneurship in own country and no effect on informal entrepreneurship in own country.

TABLE 7
Robustness Check 5c: Additional Control Variables

Dep. Variable →	(7.1) *Formal ENTRE*	(7.2) *Informal ENTRE*	(7.3) *Formal ENTRE*	(7.4) *Informal ENTRE*	(7.5) *Formal ENTRE*	(7.6) *Informal ENTRE*	(7.7) *Formal ENTRE*	(7.8) *Informal ENTRE*
CORR (WB)	**−0.273*** **	**1.899*** **	**−0.263*** **	**2.166*** **	**−0.268*** **	**2.789*** **	**−0.308*** **	**1.897*** **
	(0.092)	**(0.472)**	**(0.083)**	**(0.536)**	**(0.083)**	**(0.673)**	**(0.109)**	**(0.509)**
CORRW (WB)	**0.500** **	**−1.410**	**0.493** **	**−1.179**	**0.528** **	**−1.488**	**0.470***	**−1.095**
	(0.253)	**(1.171)**	**(0.241)**	**(1.328)**	**(0.254)**	**(1.336)**	**(0.266)**	**(1.229)**
GDP	−0.056	−0.526***	−0.049	−0.425***	−0.044	−0.632***	−0.042	−0.445***
	(0.035)	(0.158)	(0.034)	(0.153)	(0.035)	(0.149)	(0.031)	(0.150)
EDUC	0.216		0.244		0.211		0.164	
	(0.169)		(0.173)		(0.161)		(0.161)	
DEMOC	−0.006	0.181*	−0.003	0.185*	−0.005	0.297**	−0.007	0.175*
	(0.012)	(0.104)	(0.011)	(0.107)	(0.012)	(0.118)	(0.013)	(0.106)
Transition	0.369***	−2.523***	0.351***	−2.840***	0.359***	−4.055***	0.392***	−2.600***
	(0.093)	(0.528)	(0.085)	(0.613)	(0.109)	(0.927)	(0.094)	(0.541)
Open	−0.115	−0.765						
	(0.095)	(0.583)						
MinWageReg		−0.286***		−0.269**		−0.281***		−0.262**
		(0.109)		(0.114)		(0.099)		(0.109)
CreditMarReg			0.025	−0.363				
			(0.031)	(0.226)				
LegalEnforce					0.002	−0.630***		
					(0.029)	(0.213)		
GovtSize							−0.044	0.012
							(0.041)	(0.162)
Observations	58	58	58	58	58	58	58	58
R-squared	0.435	0.465	0.432	0.426	0.423	0.388	0.424	0.451
Kleibergen–Paap rk Wald *F* statistic	4.090	4.611	4.168	4.677	3.392	3.595	3.773	4.739
Kleibergen–Paap rk LM statistic	12.09*	17.15**	13.01*	17.23**	11.52	15.02**	11.94	17.58**
	[0.098]	[0.016]	[0.072]	[0.016]	[0.117]	[0.036]	[0.103]	[0.014]
Hansen's J statistic	2.245	11.02*	2.539	8.646	2.109	9.083	1.477	9.966
	[0.896]	[0.088]	[0.864]	[0.194]	[0.909]	[0.169]	[0.961]	[0.126]

Note: See Table 1 notes.

Entrepreneurs respond to the corruption differential between their home country and neighboring countries when deciding where to start their business, while informal entrepreneurs are not influenced by neighboring countries' corruption.

Entrepreneurs weigh the costs and benefits of starting their business and where they should start their businesses either above ground or underground in their home country or in a neighboring country. Entrepreneurs migrating underground deprive their country of tax revenues that would otherwise be used to provide public goods, whereas entrepreneurs that migrate across the border deprive their country of new businesses that promote economic growth. Corruption impairs formal institutions and acts as a tax on productive activity thereby incentivizing entrepreneurs to seek ways to circumvent dealing with corrupt government officials. Employing cross-country data, the results show that entrepreneurs choose both the informal sector (in own country) and formal sector in neighboring countries in response to the burden of home country corruption. These results stand up to a battery of robustness checks.

Because corruption causes entrepreneurs to migrate to the informal sector and relocate to the neighboring country, it deprives nations of new entrepreneurial activities to generate economic growth. This paper sheds new light on government spillovers and cross-border migration of entrepreneurial talent. Mistrust in government along with cross-border corruption spillovers are shown to have significant effects on entrepreneur migration. We therefore emphasize the importance of accounting for cross-country corruption spillovers and its effect on entrepreneurial activities.

TABLE 8
Robustness Check 6: Entrepreneurial Spillovers

Dep. Variable →	(8.1) *Formal ENTRE*	(8.2) *Informal ENTRE*	(8.3) *Formal ENTRE*	(8.4) *Informal ENTRE*	(8.5) *Formal ENTRE*	(8.6) *Informal ENTRE*
CORR (ICRG)	**−0.172*** **	**1.467*** **				
	(0.061)	**(0.510)**				
CORRW (ICRG)	**0.385** **	**−6.914*** **				
	(0.192)	**(3.545)**				
CORR (TI)			**−0.120*** **	**0.965*** **		
			(0.041)	**(0.242)**		
CORRW (TI)			**0.279*** **	**−3.333*** **		
			(0.152)	**(1.619)**		
CORR (WB)					**−0.137*** **	**1.102*** **
					(0.047)	**(0.292)**
CORRW (WB)					**0.318*** **	**−4.056*** **
					(0.169)	**(1.819)**
FormalENTREW	0.290		0.992		1.140	
	(2.012)		(1.950)		(1.960)	
InformalENTREW		5.861*		3.647**		4.087**
		(3.074)		(1.772)		(1.833)
GDP	−0.042	−0.520***	−0.043	−0.505***	−0.042	−0.513***
	(0.033)	(0.192)	(0.034)	(0.144)	(0.033)	(0.148)
EDUC	0.175		0.168		0.180	
	(0.136)		(0.161)		(0.160)	
DEMOC	−0.001	0.160	−0.001	0.178*	−0.007	0.202*
	(0.014)	(0.153)	(0.013)	(0.104)	(0.014)	(0.115)
Transition	0.430***	−2.357**	0.372***	−1.990***	0.388***	−2.102***
	(0.121)	(1.112)	(0.093)	(0.653)	(0.098)	(0.695)
MinWageReg		−0.318**		−0.328***		−0.309***
		(0.144)		(0.112)		(0.114)
Observations	58	58	58	58	58	58
R-squared	0.288	−0.432	0.366	0.371	0.384	0.342
Kleibergen–Paap rk Wald *F* statistic	1.100	1.485	1.276	3.332	1.335	3.039
Kleibergen–Paap rk LM statistic	11.14*	7.109	15.46**	9.608	15.13**	9.336
	[0.084]	[0.311]	[0.017]	[0.142]	[0.019]	[0.156]
Hansen's J statistic	0.926	3.050	1.901	4.375	1.979	4.325
	[0.968]	[0.692]	[0.863]	[0.497]	[0.852]	[0.504]

Notes: See Table A2 for variable details. Constants are included but not reported. Robust standard errors are in parentheses and probability values are in brackets. Excluded instruments for *CORR*, *CORRW*, *FormalENTREW*, and *InformalENTREW* include *PopDen*, *EthnicFrac*, *ReligiousFrac*, and *Latitude* (and their spatial lag).

Asterisks denote the following significance levels: ***$p < .01$, **$p < .05$, and *$p < .1$.

In closing, we discuss some caveats that can be addressed as better data become available. First, the sample of countries used to identify spatial relations is not large. A larger sample of countries makes it more feasible to capture relevant trading patterns and migration flows. With the availability of detailed data on entrepreneurship, it will be important to investigate whether and to what extent those entrepreneurs who live at or near the border are moving underground versus relocating to the neighboring country in response to government corruption. Nonetheless, this study provides an important contribution that informs the discussion of the relationship between corruption and entrepreneurship.

APPENDIX

TABLE A1
Countries in the Analysis

Argentina	France	Latvia	Slovenia
Australia	Germany	Malaysia	South Africa
Austria	Ghana	Mexico	Spain
Belgium	Greece	Morocco	Sweden
Bolivia	Guatemala	Netherlands	Switzerland
Brazil	Hungary	New Zealand	Thailand
Canada	India	Norway	Tunisia
Chile	Indonesia	Pakistan	Turkey
Colombia	Ireland	Panama	Uganda
Costa Rica	Israel	Peru	United Kingdom
Croatia	Italy	Philippines	United States
Czech Republic	Japan	Poland	Uruguay
Denmark	Jordan	Portugal	Zambia
Egypt, Arab Rep.	Kazakhstan	Romania	
Finland	Korea, Rep.	Russian Federation	

Note: N = 58.

TABLE A2
Variable Definitions, Descriptive Statistics, and Data Sources

Variable	Description [mean; standard deviation]	Source
InformalENTRE	The average of the prevalence of informal entrepreneurship measured as the entry density of new informal business entries per 100 adult-age population. [1.59; 1.88]	Autio and Fu (2015)
FormalENTRE	The average of the prevalence of formal entrepreneurship measured as the entry density of new formal business entries per 100 adult-age population. [0.30; 0.35]	Autio and Fu (2015)
CORR (ICRG)	Index of corruption based on expert ratings of the risk associated with the degree of corruption in the political system. The original index is on a scale of 0 to 6 with higher numbers representing less corruption. The index was rescaled from 0 to 10 with higher numbers representing more corruption. [4.80; 1.95]	International Country Risk Guide www.prsgroup.com
CORRW (ICRG)	Spatial lag of CORR (ICRG). [4.61; 0.46]	International Country Risk Guide www.prsgroup.com & Authors' calculations
CORR (TI)	Index of corruption based on the perceived levels of public sector corruption. The original index is on a scale from 0 to 100 where 0 is highly corrupt and 100 is very clean. The index was rescaled from 0 to 10 with higher numbers representing more corruption. [4.69; 2.31]	Transparency International https://www.transparency.org/
CORRW (TI)	Spatial lag of CORR (TI). [4.45; 0.56]	Transparency International https://www.transparency.org/ & Authors' calculations
CORR (WB)	Index of corruption based on the perceived extent of the use of public power for private gain including petty and grand corruption and state capture by private interest. The original index is on a scale from −2.5 to +2.5 with higher numbers indicating less corruption. The index was rescaled from 0 to 10 with higher numbers representing more corruption. [3.89; 2.08]	Kaufmann, Kraay, and Mastruzzi (2010) www.govindictors.org
CORRW (WB)	Spatial lag of CORRW (WB). [3.66; 0.53]	Kaufmann, Kraay, and Mastruzzi (2010) www.govindictors.org & Authors' calculations
GDP	The natural log of real GDP (expenditure side) chained PPP in million 2005 US dollars. [12.51; 1.47]	Penn World Tables 8.0
EDUC	The number of years of tertiary education. [0.54; 0.34]	Barro and Lee (2013)
MinWageReg	Index of hiring regulations and minimum wage. This index is a sub-component of labor market regulations. The index ranges from 0 to 10 and was rescaled so that higher scores represent more regulation. [−6.36; 2.54]	Gwartney, Lawson, and Hall (2017)
DEMOC	Index measuring the degree of democracy. This index is on a scale from 0 to 10 with higher values representing higher degrees of democracy. [7.93; 2.95]	Marshall, Gurr, and Jaggers (2017)

TABLE A2
Continued

Variable	Description [mean; standard deviation]	Source
Transition	Dummy variable equal to one if the country is a transition country and zero otherwise.	www.un.org
Open	Trade openness measured as the sum of imports and exports as a percent of GDP. [0.76; 0.35]	The World Bank (2016)
GovtSize	Index of the size of government. This index is based on government consumption, transfers and subsidies, government enterprises and investment, and top marginal tax rates. The index ranges from 0 to 10 and was rescaled so that higher scores indicated more regulation. [−6.19; 1.21]	Gwartney, Lawson, and Hall (2017)
LegalEnforce	Index of legal contract enforcement. This index is a sub-component of the legal system and property rights based on the time and money costs of collecting debt. The index ranges from 0 to 10 with higher values indicated greater enforcement. [−5.00; 1.57]	Gwartney, Lawson, and Hall (2017)
PopDen	Population density measured as the population divided by land area in square miles. [0.08; 0.09]	The World Bank (2016)
EthnicFrac	Ethnic fractionalization measured as the probability that two randomly selected individuals within a country are from the same ethnic groups: Ethnic Fractionalization $j = 1 - \sum_{i=1}^{n} s_{ij}^2$ where s_{ij} is the share of group i in country j. [0.36; 0.25]	Alesina et al. (2003)
ReligiousFrac	Religious fractionalization measured as the probability that two randomly selected individuals within a country are from the same religious groups: Religious Fractionalization $j = 1 - \sum_{i=1}^{n} s_{ij}^2$ where s_{ij} is the share of group i in country j. [0.40; 0.24]	Alesina et al. (2003)
Latitude	Absolute latitude of the capital divided by 90. [0.39; 0.20]	La Porta et al. (1999)

Note: Data are based on annual observations by country averaged over the period 2001–2010.

TABLE A3
The Effect of Corruption on Entrepreneurship: Accounting for Other Spillovers

Dep. Variable →	**(1.1)** ***Formal ENTRE***	**(1.2)** ***Informal ENTRE***	**(1.3)** ***Formal ENTRE***	**(1.4)** ***Informal ENTRE***	**(1.5)** ***Formal ENTRE***	**(1.6)** ***Informal ENTRE***
CORR (ICRG)	−0.171***	0.954***				
	(0.061)	(0.292)				
CORRW (ICRG)	0.388**	−0.185				
	(0.197)	(1.223)				
CORR (TI)			−0.117***	0.843***		
			(0.038)	(0.202)		
CORRW (TI)			0.252*	0.395		
			(0.132)	(0.900)		
CORR (WB)					−0.135***	0.966***
					(0.043)	(0.235)
CORRW (WB)					0.286*	0.274
					(0.146)	(0.959)
GDP	−0.047	−0.490***	−0.050	−0.505***	−0.048	−0.526***
	(0.035)	(0.187)	(0.034)	(0.157)	(0.034)	(0.163)
EDUC	0.148		0.157		0.173	
	(0.135)		(0.163)		(0.162)	
DEMOC	−0.001	0.122	−0.000	0.176*	−0.006	0.216*
	(0.013)	(0.114)	(0.012)	(0.104)	(0.012)	(0.113)
Transition	0.425***	−2.726***	0.359***	−2.670***	0.370***	−2.724***
	(0.117)	(0.609)	(0.085)	(0.452)	(0.086)	(0.491)
MinWageReg		−0.207*		−0.275**		−0.256**
		(0.121)		(0.114)		(0.113)
GDPW	0.057	0.931	−0.043	1.307	−0.045	1.195
	(0.190)	(1.024)	(0.158)	(0.819)	(0.152)	(0.838)

TABLE A3
Continued

Dep. Variable →	(1.1) *Formal ENTRE*	(1.2) *Informal ENTRE*	(1.3) *Formal ENTRE*	(1.4) *Informal ENTRE*	(1.5) *Formal ENTRE*	(1.6) *Informal ENTRE*
EDUCW	0.346		0.982		0.950	
	(1.381)		(1.208)		(1.184)	
DEMOCW	0.011	0.124	0.022	0.430	0.028	0.452
	(0.070)	(0.748)	(0.060)	(0.736)	(0.061)	(0.740)
MinWageRegW		−0.369		−0.854		−0.802
		(0.802)		(0.809)		(0.763)
Observations	58	58	58	58	58	58
R-squared	0.294	0.257	0.406	0.467	0.425	0.474
Kleibergen–Paap rk Wald *F* statistic	2.668	2.511	3.398	4.689	3.850	4.823
Kleibergen–Paap rk LM statistic	10.74	13.30*	11.62	15.89**	11.73	15.93**
	[0.150]	[0.065]	[0.114]	[0.026]	[0.110]	[0.026]
Hansen's J statistic	0.418	11.22*	1.210	9.619	1.310	9.767
	[0.999]	[0.082]	[0.976]	[0.142]	[0.971]	[0.135]

Notes: See Table A2 for variable details. Constants are included but not reported. Robust standard errors are in parentheses and probability values are in brackets. Excluded instruments for *CORR* and *CORRW* include *PopDen*, *EthnicFrac*, *ReligiousFrac*, and *Latitude* (and their spatial lag). Variables *GDPW*, *EDUCW*, *DEMOCW*, and *MinWageRegW* are spatial lags of *GDP*, *EDUC*, *DEMOC*, and *MinWageReg*, respectively.

Asterisks denote the following significance levels: ***$p < .01$, **$p < .05$, and *$p < .1$.

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