

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Journal of Business Venturing

journal homepage: www.elsevier.com/locate/jbusvent

A country-level institutional perspective on entrepreneurship productivity: The effects of informal economy and regulation

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ARTICLE INFO

Keywords:

Entrepreneurship productivity
Opportunity-driven entrepreneurship
Necessity-driven entrepreneurship
Informal economy
Regulative institutions
Institutional incongruence

ABSTRACT

Developing the concept of institutional incongruence and employing panel data from 60 countries, we outline an alternative view of the informal economy and the effects of regulative institutions on entrepreneurship productivity. We find evidence that the informal economy's size is, largely, negatively associated with entrepreneurship productivity, and that in the presence of a large informal economy, governmental efforts to improve governance quality can be counter-productive. Our results suggest policy interventions aimed at changing institutions to practice formal entrepreneurship should be implemented cautiously to avoid inducing institutional incongruence.

1. Executive summary

Although the informal economy constitutes a considerable percentage of business activity around the world, its effects on entrepreneurship have received little research attention (Bruton et al., 2012). As governments in countries with large informal economies attempt to develop their regulative institutions constraining informal business activities, it is important to understand the potential effects on entrepreneurship productivity. Entrepreneurship productivity captures conditions that can lead to entrepreneurship-driven structural transformation and economic growth. Our study provides insights on how the informal economy's institutional conditions and formal regulation interact to influence entrepreneurship productivity.

We focus on the informal economy's size and extent of regulation, in the form of governance quality. Our cross-country analysis finds the informal economy's size, reflecting the cognitive and normative institutions of informal business practice, is in most cases negatively associated with entrepreneurship productivity in terms of the ratio of opportunity-to-necessity entrepreneurship.

Moreover, we find support for our claim that improving governance quality decreases entrepreneurship productivity when cognitive and normative institutions accept informal business activities. This challenges the literature that argues for developing regulative institutions (e.g., Aparicio et al., 2016). Instead, we find support for an alternative view suggesting the effects of improving regulative institutions on entrepreneurship depend on the state of informal institutions in the country (Kim & Li, 2014a).

We build the arguments on negative effects of improving governance quality based on the institutional incongruence concept (Cullen et al., 2014; Webb et al., 2009), which we define as misaligned formal and informal rules of the game. We conclude that policymakers should be aware that formal regulations, if not in line with informal institutions, could result in unintended outcomes for entrepreneurship. In other words, they should approach policy implementation carefully to minimize institutional incongruence.

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<https://doi.org/10.1016/j.jbusvent.2020.106002>

Received 14 December 2018; Received in revised form 3 February 2020; Accepted 5 February 2020

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Overall, we extend previous research in concluding that to harness the potential of entrepreneurship as a driving force for economic development, governments should not only focus on developing the quality of regulative institutions but also target the cognitive and normative institutions of the individuals operating in larger informal economies. This way governments could implement policies to shrink the informal economy without hampering entrepreneurship productivity, and consequently better position themselves for technological change, structural transformation and, in turn, economic growth.

2. Introduction

Does a country's informal economy influence its entrepreneurship productivity? Can informal economy regulation backfire? We investigate these questions by examining the opportunity-necessity entrepreneurship ratio, which represents entrepreneurship productivity rather than quantity (Acs and Amorós, 2008; Thompson et al., 2010; Williams and Youssef, 2014). Opportunity entrepreneurship occurs when entrepreneurs have other work options, but still decide to pursue a business opportunity. Compared to necessity entrepreneurship, it is a key construct in understanding a country's development ability (Acs et al., 2008; Wennekers, Van Wennekers, Thurik, & Reynolds, 2005). This is important in studying entrepreneurship productivity (Baumol and Strom, 2007; Webb et al., 2019), as the opportunity-to-necessity entrepreneurship ratio points to technological change, structural transformation, and economic development (Acs and Varga, 2005; Anokhin and Wincent, 2012; Gries and Naudé, 2010). It furthermore reflects institutional factors affecting opportunity identification and pursuit, as well as the opportunity costs of entrepreneurship in a country. Thus, a consideration of the informal economy's influences, and its regulation, on the ratio of opportunity-to-necessity entrepreneurship would be key to investigating those questions.

We shed light on the informal economy's role, which deliberately hides from the authorities unregistered economic activities that could have been part of GDP (Chaudhuri et al., 2006; Hassan and Schneider, 2016; Mazhar and Méon, 2017). The effects of the informal economy's institutional conditions on entrepreneurship productivity are open to debate. Institutions are the rules of the game in society (North, 1990), and shape the context in which entrepreneurs act. They involve not only regulative and formal rules of the game, but also informal rules shared by social groups surrounding entrepreneurs (Webb et al., 2009). Studying the informal economy, we primarily seek to extend the earlier research on governance quality effects and potential downsides of its improvement. Regulative institutions capture how "authority in a country is exercised" (Kaufmann et al., 2011, p. 4), and the extent of the state's ability and willingness to effectively establish authority denotes governance quality (cf. Ault and Spicer, 2014; Kaufmann et al., 2011).

We discuss how implementing high-quality governance may conflict with actors' informal rules in the informal economy. A large amount of the prior research has concluded the implementation of high-quality governance adds to certainty and encourages entrepreneurship (e.g., Dau and Cuervo-Cazurra, 2014; Valdez and Richardson, 2013). We argue that stronger governance quality in a large informal economy breeds tension between formal and informal rules, which might have negative consequences. This argument approaches an emerging stream of entrepreneurship literature (Dreher and Gassebner, 2013; Kim and Li, 2014a) calling for further research on the effects of institutional conditions that create incompatible rules of the game.

We develop arguments on the tension caused by the incompatibility of formal institutions of strong governance quality and informal institutions of a large informal economy. We follow entrepreneurship scholars such as Cullen et al. (2014), and Webb et al. (2009), to combine studying formal and informal institutions and develop the concept of institutional incongruence. We argue that macro level regulative institutions, and cognitive and normative institutions related to social groups, are often incompatible in countries with large informal economies. Studies have overlooked this, and our approach advances a dialogue on tensions among institutions imposed by sociopolitical factors, and those that are cognitive or normative and related to social relationships (Aldrich and Fiol, 1994), and the potential downsides of such tensions.

Additionally, we pioneer the study of how the informal economy's size at country level relates to entrepreneurship productivity. This provides institutional arguments, and argues for the negative role of the informal economy's size on entrepreneurship productivity. We further argue that a large informal economy hinders access to resources that are key constituents of opportunities, and reflects a culture of informal employment that frequently leads to low incomes, insufficient to meet employees' basic needs. Thus, the institutional conditions emerging from a large informal economy favor necessity entrepreneurship over opportunity entrepreneurship.

We utilize a multisource country-level panel dataset and apply fixed-effects and difference Generalized Method of Moments (GMM) estimators (Arellano and Bond, 1991; Arellano and Bover, 1995). We perform additional analyses checking for robustness. We find full support for high governance quality strengthening the negative relationship between the informal economy's size and entrepreneurship productivity. Our empirical results furthermore suggest that most often, depending on the country's governance quality, a large informal economy damages entrepreneurship productivity. We discuss the theoretical implications of these findings and outline possible avenues for future research.

3. Theory and hypotheses

3.1. An institutional perspective on the informal economy and entrepreneurship productivity

3.1.1. Institutional conditions of the informal economy

North (1990, p. 3) defines institutions as "the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction." Institutional scholars have long distinguished between institutions imposed by sociopolitical factors,

including regulations and governance, and cognitive and normative institutions representing internalized understandings of the world and based upon historical culture, traditions, and what are considered appropriate behaviors (Aldrich and Fiol, 1994; Scott, 1995).

We focus on institutions closely associated with a large informal economy. Intuitively, it might seem reasonable that a large informal economy is merely defined by its regulative institutions, or lack thereof, but this is not the case. Kim et al. (2016) note that regulative institutions concern the macro level and a country's overall governance structure, while cognitive and normative institutions promoting informality relate to actual practices in the entrepreneurs' social groups, including suppliers, customers, partners, subcontractors and the like. A large informal economy reflects cognitive and normative institutions. Informal business contributes to value added and should be included in GDP, but go unregistered by national measurement agencies (Chaudhuri et al., 2006; Hassan and Schneider, 2016; Mazhar and Méon, 2017). At country level, a large informal economy means a multitude of business activities meet this description and, thus, the country's cognitive and normative institutions accept informal businesses.

3.1.2. *Entrepreneurship productivity*

The literature distinguishes between two types of entrepreneurship: opportunity and necessity (Block and Sandner, 2009; Williams, 2009). Opportunity entrepreneurs have other work options but become involved in business creation because they find opportunities that could increase their current income (Sautet, 2013), whereas necessity entrepreneurs start a business when they have no other income options (Bosma and Levie, 2009). Studying the ratio of opportunity-to-necessity entrepreneurship in a country reveals information about the broader mix of underlying entrepreneurial drivers. This is more informative on entrepreneurship productivity than solely examining the prevalence of entrepreneurship or a single type. The ratio also captures economic development through technological change and structural transformation (Acs and Varga, 2005; Gries and Naudé, 2010), irrespective of the total rate of entrepreneurship in a country. Therefore, the ratio captures entrepreneurship productivity, rather than its level per se that is not necessarily a productive force for the economy (Baumol, 1996; Chowdhury et al., 2019; Webb et al., 2019). Highly productive entrepreneurship implies a stronger prevalence of pull factors in the underlying institutional settings. That is, the institutional settings more often make entrepreneurs see their endeavors are primarily motivated by opportunity pursuit. Less-productive entrepreneurship indicates the prevalence of institutional conditions that push individuals to entrepreneurship, given no better reasonable income alternatives.

3.1.3. *Informal economy downsides for entrepreneurship productivity*

Institutional conditions shape the intertwined push and pull factor balance through influencing country-level opportunities and business startup opportunity costs (Amorós et al., 2019; Levie and Autio, 2011). Greater availability of high-quality opportunities and higher levels of opportunity identification and pursuit strengthen pull factors, favoring opportunity entrepreneurship. The lower the opportunity costs of entrepreneurship in a country, especially if insufficient to meet an individual's basic needs, the stronger the push factors, and the more favorable the conditions for necessity entrepreneurship.

Against this backdrop, the informal economy's size is likely to influence entrepreneurship productivity. Resource restrictions in the informal economy could limit opportunity prevalence in identification and pursuit (Ardichvili et al., 2003; Wiklund and Shepherd, 2003). Aggravating the problem, the informal economy's institutional conditions generally restrict access to knowledge-based and formal financial resources; a formal economy enables these resources. Expert and knowledge-based resources are often embedded within formal institution networks such as universities and corporations (cf. Arenius and De Clercq, 2005; O'Shea et al., 2005; Wiklund and Shepherd, 2003). Beyond human capital, a large informal economy's institutions provide entrepreneurs less access to formal financial and contract-based resources (Feige, 1990; Webb et al., 2013). Accumulated resource constraints can reduce country-level high-quality resource and opportunity availability (cf. Anokhin et al., 2011; Wiklund and Shepherd, 2003).

A large informal economy's institutional conditions also engender lower business startup opportunity costs. Informal employment working conditions are often poor, meaning entrepreneurship opportunity costs, i.e., potential income from informal employment, can be so low they do not even cover basic needs (Amorós et al., 2019; Levie and Autio, 2011). As a result, the institutional conditions favor necessity entrepreneurship. A large informal economy also hampers opportunity identification and pursuit, which lowers entrepreneurship productivity.

Therefore, we contend that alongside low entrepreneurship opportunity costs stemming from poor working conditions, a large informal economy's institutional conditions limit the required resource access to identify and pursue high-quality opportunities. Countries with a large informal economy therefore exhibit lower entrepreneurship productivity, and taken together these arguments generate our first hypothesis:

Hypothesis 1. The larger the informal economy, the lower the entrepreneurship productivity.

3.2. *Governance quality in a large informal economy and entrepreneurship productivity*

3.2.1. *Governance quality and formal, regulative institutions*

Regulative institutions imply political and legal ground rules (Bruton et al., 2010; Peng, 2003; Roberts, 2008). These formal frameworks capture how "authority in a country is exercised" (Kaufmann et al., 2011, p. 4). Studying formal institutions commonly involves assessing governance quality (e.g., Amorós and Stenholm, 2014; Cabrales and Hauk, 2011; Farla et al., 2016; Wang, 2013). We define governance quality as the degree to which the state is able and willing to effectively establish authority (cf. Amorós et al., 2019; Ault and Spicer, 2014, p. 1819; Kaufmann et al., 2011). It can be further broken down into elements such as rule of law, voice

and accountability, control of corruption, and government effectiveness (Kaufmann et al., 2011). Researchers often study a bundle of the elements, since they all measure a single factor: the state's ability and willingness to establish effective formal rules of the game. Strengthening governance quality elements forces or encourages entrepreneurs to formalize their business activities. For example, the strong rule of law encourages businesses to enter the formal economy ensuring they receive certain protections concerning contracts and property rights (Dabla-Norris et al., 2008; Johnson et al., 1998). Controlling corruption forces entrepreneurs' shift towards formal activities, because public agents are less likely to exploit their position for private gain (Belitski et al., 2016; Mohamadi et al., 2017). Political stability and an absence of violence signal a state's ability to establish formal rules of the game, including a monopoly on the use of violence (Ault and Spicer, 2014). As businesses acknowledge the state's power in establishing formal rules, they are more likely aware of the legal consequences of engaging in informal business activities (e.g., shut-down, penalties).

3.2.2. Institutional incongruence

A recent entrepreneurship research stream (e.g., Kim et al., 2016; Stephan et al., 2015; Webb et al., 2019) emphasizes integrating institutional economics and studying cultural and sociology-based factors, accounting for both regulative and informal institutions. Building on this stream, we find certain circumstances where institutions' regulative aspects are at odds with their cognitive and normative aspects. Acknowledging entrepreneurship scholars such as Cullen et al. (2014) and Webb et al. (2009), we define institutional incongruence. It concerns situations where there is incongruence between informal institutions that motivate certain goals, and formal institutional conditions that inhibit reaching those goals (Cullen et al., 2014). For example—and this is relevant to our study—regulative institutions might encourage formalization, while cognitive and normative institutions expect unregistered businesses. We denote this instance formal-informal institutional incongruence.¹ Since institutions change slowly (Roland, 2004), formal-informal institutional incongruence is not a permanent state, and can dissipate, if the formal and informal institutions eventually converge.

3.2.3. Institutional incongruence downsides for entrepreneurship productivity

While a large informal economy is present, improving governance quality primarily engenders formal-informal institutional incongruence, damaging entrepreneurship productivity. It amplifies informal economy limitations, breeding lower entrepreneurship productivity. An incongruent institutional condition further hinders opportunity identification and pursuit. Entrepreneurs associate and connect information on the rules of the game to pursue opportunities (Tang et al., 2012). In an incongruent environment, while connecting and associating information, entrepreneurs struggle for opportunities because they must simultaneously match both the informal understanding they share with their social groups and the country's formal rules. That is, entrepreneurs struggle when choosing between following informal rules or formal regulations.² Both choices are risky and costly. The former entails the risk that the authorities may fine or shut down the entrepreneur, while the latter makes doing business with informal social groups inefficient and costly. Thus, institutional incongruence means less opportunity identification and discourages entrepreneurs' pursuing opportunities, amplifying opportunity identification and pursuit's decline. In informal economies, stronger governance quality bringing additional ambiguity amplifies the negative effects on opportunity entrepreneurship.

Incongruent institutions reduce not only opportunity identification and pursuit, but also the opportunity costs of entrepreneurship, predominantly favoring necessity entrepreneurship. The state's increasing ability and willingness to formalize the country's employment creates additional obstacles to informal employers finding staff. Earning a sufficient income in the informal sector to cover basic needs is already hard for many, and the introduction of new formal rules further worsens the situation. This implies more necessity entrepreneurship, at least in the short term. Our first hypothesis had a similar opportunity cost mechanism, but this is amplified by formal-informal institutional incongruence: Individuals seeking to meet their basic needs find necessity entrepreneurship more attractive, while entrepreneurial opportunities reaching more ambitious goals are difficult to identify and pursue. Thus, the opportunity cost mechanism prevails, unless the formal and informal institutions eventually become better aligned.

Taken together, improving a large informal economy's governance quality augments formal-informal institutional incongruence. That generates an amplified decline in aggregate entrepreneurship productivity, because it augments the ambiguity of how entrepreneurs identify and pursue opportunities. Furthermore, it reduces job prospects in the traditional informal economy, generating an amplified decrease in the opportunity costs of starting your own business. Entrepreneurs are then more likely to be primarily necessity-driven. Thus, stronger governance quality moderates the negative relationship between the informal economy's size and entrepreneurship productivity. This reasoning constitutes our second hypothesis:

Hypothesis 2. Governance quality moderates the negative relationship between the informal economy's size and entrepreneurship productivity: the higher the governance quality, the stronger the negative relationship between the informal economy's size and

¹ There is also another type of formal-informal institutional incongruence. In rare cases, informal institutions discourage informal businesses, but governance quality is so low that it encourages entry into the informal economy. This situation nonetheless also results in an instance of institutional incongruence.

² Concerning formal-informal institutional incongruence discussed in footnote 1, we expect contradicting institutional conditions would mean entrepreneurs similarly face challenges in opportunity identification and pursuit. Thus, entrepreneurs' primary challenge would be identifying and pursuing formal economy opportunities, where governance structures are weak and ineffective, and informal institutions offer no legitimate alternative. Developing higher-quality governance would therefore be the preferred option to resolve institutional incongruence. Theoretically, growing the informal economy would also resolve the incongruence; however, among its many drawbacks, we hypothesized in Section 3.1.3 that a larger informal economy damages entrepreneurship productivity.

entrepreneurship productivity.

4. Research methods

4.1. Data and sample

We employ a multisource country-level panel dataset to examine the research hypotheses. The key database for our main variables of interest—opportunity entrepreneurship and necessity entrepreneurship—is the Global Entrepreneurship Monitor (GEM), and in particular its Adult Population Surveys. Launched in 1999, GEM is a global project that runs annual surveys on entrepreneurship in > 100 countries and regions (Acs et al., 2004).

Following prior research (Amorós and Stenholm, 2014; Cabrales and Hauk, 2011; Farla et al., 2016; Wang, 2013), we measure governance quality using Worldwide Governance Indicators (WGIs). The database emerged as a project for the World Bank in 1996 and spans > 200 countries (Kaufmann et al., 2011). We use the World Bank's World Development Indicators (WDIs) as measures of macroeconomic conditions.

Measuring the informal economy's size in a country is inherently difficult because, by definition, it comprises activities that are not formally recorded. A multitude of approaches have been proposed and refined over several decades of research, each with different strengths and weaknesses (cf. Schneider and Buehn, 2018). We adopt the shadow economy estimation approach by Schneider (1997, 2016, 2002, 2010) as a proxy for the informal economy's size. Their approach has been widely adopted in the prior research on the size of the informal economy (Andrews et al., 2011; Bovi and Dell'Anno, 2010; Dreher et al., 2009; Enste, 2010; Miller and Kim, 2016), and is based on estimating a latent variable in a multiple-indicator, multiple-cause (MIMIC) model (Hassan and Schneider, 2016). The estimation procedure relies on estimating relative temporal changes in the shadow economy, and then extrapolating that economy's size by calibrating the raw index based on a fixed reference point. The approach's main strengths include its high country-year coverage, which increases overlap with the GEM, WGI, and WDI datasets, and its design using the within-country variation as its starting point, which reflects the estimation requirements that control for country fixed-effects. The approach has, however, been particularly criticized for its sensitivity to calibration value selection, and its broad scope, which may lead to inflated between-country differences (Feige, 2016; Schneider, 2016). We also considered alternative survey data to the MIMIC data: the World Bank Enterprise Survey (WBES) contains one of the largest panel datasets investigating the informal economy's size (IFC, 2017, pp. 53–58). Unfortunately, it has only a modest overlap with the GEM and WDI datasets.³ However, comparing the overlapping WBES and MIMIC data does not raise concerns over the applicability of the MIMIC data for this study's purposes.⁴

Dau and Cuervo-Cazurra (2014) also published an alternative dataset for the informal economy, based on a country's electricity consumption (Kaliberda and Kaufmann, 1996). This approach assumes the income elasticity of energy, and particularly electricity, is constant (in this case, one). However, elasticity can vary across years and countries (Hanousek and Palda, 2006; Restrepo-Echavarría, 2014). Especially, prior research has shown that energy and electricity in developed countries are inelastic (Lee and Lee, 2010; Medlock III and Soligo, 2001). Given these limitations, our analyses using a temporally extended version of the Dau and Cuervo-Cazurra (2014) dataset nonetheless demonstrate consistency with the results using the MIMIC measure. See Table A4 in the Appendix for further details.

By combining the GEM, MIMIC, WGI, and WDI datasets, and requiring two or more observations per country for fixed-effects estimators,⁵ we obtained a dataset of 374 country-year observations from 60 countries (2005–2014). The data are limited for earlier years by the availability of relevant GEM data, and for the later years by the availability of informal economy size data. A list of the country-years used in the analyses is presented in Table A5 in the Appendix.

4.2. Measures

4.2.1. Dependent variable

The phenomenon of interest in this study is entrepreneurship productivity, and particularly the composition of entrepreneurship—necessity versus opportunity—at country level. GEM defines opportunity entrepreneurship as the percentage of individuals in a country involved in entrepreneurial activities, who (1) claim to be driven by opportunity as opposed to finding no other option for work, and (2) indicate that the main driver for involvement in this opportunity is independence or increasing their income, rather than simply maintaining their income (Singer et al., 2014, p. 24). Necessity entrepreneurship, in comparison, is defined as “the percentage of individuals involved in early-stage entrepreneurial activity ... who claim to be driven by necessity

³ Our dataset would, at best, be limited to only 20 country-years from 10 countries, were we to replace the MIMIC dataset with WBES data in our fixed-effects time series analyses.

⁴ The WBES data contain country-year data on the percentage of firms competing with unregistered or informal firms. Comparing these data with MIMIC values, regarding their use in fixed-effects regression, we first identified country-years in the combined dataset where WBES data were also available, and retained countries that had more than one observation, as required by the within-transformation (i.e., for both variables, we subtracted the country-level mean values). We subsequently found a reasonably strong within-correlation of 0.68 ($N = 20$ country-years from 10 countries) between the MIMIC values and the WBES data, providing support for the measure's face validity.

⁵ The main fixed-effects estimates (Model 3) are also robust to requiring a fully balanced panel, which is available for 15 countries, resulting in 150 country-years of data (40% of the full sample).

(having no better choice for work) as opposed to opportunity” (ibid, p. 24). The dependent variable in this study is opportunity entrepreneurship divided by necessity entrepreneurship. We apply a log transformation for distributional purposes.⁶

4.2.2. Independent variable

This study employs the panel data provided by Hassan and Schneider (2016) to capture the informal economy's size in different countries over time. We adopt a measure based on a MIMIC model that uses tax burden, regulatory burden, unemployment rate (first differenced), and economic freedom (first differenced) as causes (inputs), and GDP growth and currency held by the public (first differenced) as indicators (outcomes)⁷ (Table 3 in Hassan and Schneider (2016), pp. 6–8). This estimation approach is one of a broader family of techniques that indirectly estimates an informal economy's size based on the relationships of adjacent and measurable economic phenomena (see Schneider and Buehn (2018) for a review).

4.2.3. Moderating variable

In order to study institutional incongruence effects, we required a measure for governance quality. The WGIs comprise six indices: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. These aggregate indicators are created from several hundred sub-indices adopted from different databases. The WGI data are based on interviews that reflect how public, private, and non-governmental organization (NGO) experts perceive governance. In this study, we use an aggregate measure of all the WGI indices (i.e., their sum, $\alpha = 0.97$) as the moderating variable.

4.2.4. Control variables

We chose time-varying control variables based on the extant country-level entrepreneurship literature, while considering the informal economy's MIMIC-based operationalization.

We control for per capita GDP (in 2010, USD, '000s; log-transformed) to account for a country's level of development, which the prior research suggests is associated with the entrepreneurship type (e.g., Amorós et al., 2019) and institutional conditions (e.g., Acemoglu et al., 2001). To capture other general economic and labor market conditions, we control for GDP growth (PPP), the unemployment rate (log-transformed), and inflation (percent, log-transformed) (e.g., Kim and Li, 2014a, 2014b). Openness (foreign trade as a percentage of GDP) and foreign direct investment (FDI) (as a percentage of GDP; log-transformed) control for information flows and additional resources (Anokhin and Wincent, 2012; Kim and Li, 2014b). We also include the official exchange rate (relative changes; log-transformed) to capture currency fluctuation effects (Kim and Li, 2014b). Furthermore, we control for the domestic market's potential size through the country's population ('000,000s; log-transformed). While often very slow-moving, a larger home market may provide greater economies of scale (cf. Ault and Spicer, 2014), and may shape the nature of entrepreneurial opportunities and institutional conditions. Especially, larger countries may be inherently more difficult to govern than smaller nation states. The aforementioned variables were all obtained from the World Bank's WDI database.

We also control for the general level of entrepreneurship, using total early-stage entrepreneurial activity (TEA) from GEM (log-transformed). TEA is operationalized as the percentage of adults aged 18–64 setting up a business or owner-managing a young firm (< 42 months old) (Reynolds et al., 2005), and enables controlling for unobserved institutional and other national conditions that might also be associated with the distribution of entrepreneurial motives. Year dummies are applied throughout. We additionally perform robustness checks with slightly modified sets of control variables, which we report in Table A3 in the Appendix.

4.3. Analysis techniques

4.3.1. Fixed-effects regression

We rely primarily on fixed-effects regression to test our hypotheses, which is robust to time-invariant unobserved heterogeneity.⁸ Among the applicable panel analysis techniques, this approach maximizes usable data, but relies on the strict exogeneity assumption for unbiased identification (e.g., Wooldridge, 2010). The independent and moderating variables are mean-centered, and all regressors are lagged by one year throughout.

4.3.2. Difference GMM

We employ the Difference GMM estimator to further increase robustness (Arellano and Bond, 1991). In addition to controlling for time-invariant unobserved heterogeneity, this allows for the use of lagged dependent variables, which may also serve as proxies for various forms of time-variant unobservables. Moreover, in the absence of applicable external instrumental variables, the estimator can utilize lagged regressor values to create internal instruments for the lagged dependent variable, and other variables in the model that may be endogenous.⁹ However, the number of countries in the data (60) places limitations on the models' complexity, due to

⁶ This dramatically improves the model fit. The normality of the residual distribution is also improved.

⁷ This estimation variant choice does not include the self-employment rate as a cause in the estimation model, which increases data availability. However, Hassan and Schneider's (2016) estimates of the informal economy's size do not vary dramatically as a result.

⁸ A Wald test of zero between-effects in Model 3 ($p < 0.001$) suggests that the assumptions of a random-effects specification would be clearly violated (Wooldridge, 2010, p. 333).

⁹ We prefer the Difference GMM estimator over the system GMM estimator, because the former does not assume that changes in the instrumenting variables are uncorrelated with the fixed effect, i.e., that units are not too far from steady states. We take this conservative approach because the

Table 1
Descriptive statistics.

	Variables	Mean	SD	Min	Country-year ^a	Max	Country-year ^a
1	Opportunity-to-necessity ratio	3.329	3.302	0.345	BIH-2012	22.89	NOR-2006
2	Informal economy size	27.03	12.70	8.290	USA-2013	73.33	GTM-2010
3	Governance quality	3.927	5.007	-7.340	IRN-2010	11.91	FIN-2005
4	Population (millions)	78.66	211.7	0.292	ISL-2005	1357	CHN-2014
5	Per capita GDP (th. USD)	26.31	20.95	0.598	UGA-2010	91.59	NOR-2007
6	GDP (PPP) growth	0.0531	0.0471	-0.157	LVA-2009	0.258	CHL-2006
7	Official exchange rate ^b	-0.000137	0.0821	-0.171	BRA-2005	0.512	IRN-2013
8	Inflation (customer price)	4.203	4.232	-1.350	JPN-2009	39.27	IRN-2013
9	TEA	9.898	6.519	1.480	HUN-2005	40.08	NGA-2013
10	Openness	82.82	53.16	22.11	BRA-2009	422.3	SGP-2006
11	FDI	4.877	8.505	-16.09	HUN-2010	87.44	NLD-2007
12	Unemployment rate	8.456	5.214	0.700	THA-2012	28.10	BIH-2012

Notes: number of observations = 374; number of countries: 60; descriptive statistics are reported for untransformed variables.

^a ISO alpha-3 (3166-1) codes are used to refer to specific countries for minimum and maximum observations for each variable.

^b Relative change.

Table 2
Variance inflation factors (VIF), intra-class correlations (ICC), and correlation matrix.

Variables	VIF ^a	ICC ^b	1	2	3	4	5	6	7	8	9	10	11	12
1 Opportunity-to-necessity ratio ^c	0.76			<i>-0.24</i>	<i>0.25</i>	<i>-0.00</i>	<i>0.24</i>	<i>0.22</i>	<i>-0.03</i>	<i>0.09</i>	<i>-0.03</i>	<i>-0.21</i>	<i>0.18</i>	<i>-0.38</i>
2 Informal economy size	3.03	0.96	<i>-0.38</i>		<i>0.23</i>	<i>0.08</i>	<i>-0.47</i>	<i>0.24</i>	<i>-0.14</i>	<i>0.10</i>	<i>-0.10</i>	<i>-0.15</i>	<i>0.23</i>	<i>0.23</i>
3 Governance quality	1.58	0.99	<i>0.68</i>	<i>-0.61</i>		<i>-0.06</i>	<i>0.19</i>	<i>0.23</i>	<i>-0.22</i>	<i>0.03</i>	<i>-0.00</i>	<i>-0.24</i>	<i>0.16</i>	<i>-0.39</i>
4 Population (millions) ^c	2.43	1.00	<i>-0.32</i>	<i>-0.04</i>	<i>-0.36</i>		<i>0.47</i>	<i>-0.24</i>	<i>0.21</i>	<i>0.07</i>	<i>0.20</i>	<i>-0.05</i>	<i>-0.02</i>	<i>0.05</i>
5 Per capita GDP (th. USD) ^c	2.47	1.00	<i>0.67</i>	<i>-0.61</i>	<i>0.89</i>	<i>-0.24</i>		<i>-0.03</i>	<i>0.05</i>	<i>0.24</i>	<i>0.27</i>	<i>-0.09</i>	<i>0.07</i>	<i>-0.45</i>
6 GDP (PPP) growth	2.38	0.11	<i>0.02</i>	<i>0.02</i>	<i>-0.15</i>	<i>0.11</i>	<i>-0.20</i>		<i>-0.43</i>	<i>0.19</i>	<i>-0.13</i>	<i>0.11</i>	<i>0.23</i>	<i>-0.29</i>
7 Official exchange rate ^{c,d}	1.98	0.02	<i>-0.13</i>	<i>0.07</i>	<i>-0.17</i>	<i>-0.01</i>	<i>-0.15</i>	<i>-0.35</i>		<i>-0.03</i>	<i>0.12</i>	<i>0.04</i>	<i>-0.20</i>	<i>0.18</i>
8 Inflation (customer price) ^c	1.69	0.61	<i>-0.30</i>	<i>0.35</i>	<i>-0.54</i>	<i>0.03</i>	<i>-0.53</i>	<i>0.21</i>	<i>0.20</i>		<i>0.04</i>	<i>0.02</i>	<i>0.12</i>	<i>-0.33</i>
9 TEA ^c	1.33	0.83	<i>-0.27</i>	<i>0.37</i>	<i>-0.49</i>	<i>0.08</i>	<i>-0.58</i>	<i>0.15</i>	<i>0.13</i>	<i>0.40</i>		<i>0.22</i>	<i>-0.09</i>	<i>-0.02</i>
10 Openness	2.14	0.98	<i>0.24</i>	<i>-0.15</i>	<i>0.31</i>	<i>-0.48</i>	<i>0.21</i>	<i>0.03</i>	<i>-0.04</i>	<i>-0.13</i>	<i>-0.15</i>		<i>0.03</i>	<i>0.34</i>
11 FDI ^c	1.26	0.35	<i>0.14</i>	<i>-0.00</i>	<i>0.11</i>	<i>-0.15</i>	<i>0.02</i>	<i>0.23</i>	<i>-0.17</i>	<i>0.08</i>	<i>0.06</i>	<i>0.30</i>		<i>-0.20</i>
12 Unemployment rate ^c	2.73	0.83	<i>-0.47</i>	<i>-0.01</i>	<i>-0.17</i>	<i>-0.13</i>	<i>-0.16</i>	<i>-0.20</i>	<i>0.12</i>	<i>0.07</i>	<i>-0.08</i>	<i>-0.14</i>	<i>-0.11</i>	

Notes: the lower triangle contains zero-order Pearson correlations and the upper triangle (italicized) correlations are within-country.

^a Within-VIFs based on Model 3.

^b ICCs computed with Stata's 'lonevay' command.

^c Log transformations applied, $\pm \log(|x| + 1)$: positive unless x is negative.

^d Relative change.

instrument proliferation. Hence, we use only the lagged dependent variable and year dummies in addition to the main regression variables in our GMM models (e.g., Acemoglu et al., 2008). We further scrutinize the models by varying the time lags used for the internal instruments (Roodman, 2009a). To improve data availability hampered by gaps in the data, we apply the forward orthogonal deviations (FOD) transformation instead of first differences (Arellano and Bover, 1995). The Windmeijer (2005) finite sample correction is applied to two-step standard error estimates. The independent and moderator variables and their multiplicative interaction term are treated as endogenous, the lagged dependent variable as predetermined, and the time dummies as exogenous (cf. Roodman, 2009b). We also run comparable fixed-effects estimates on the data available for GMM estimation, with and without control variables. We performed our model estimation using Stata SE/16 and the xtreg and xtabond2 (Roodman, 2009b, p. 2) commands.

5. Results

5.1.1. Main results

Table 1 provides the descriptive statistics, and Table 2 contains the within-country and zero-order Pearson correlations. Table 2 shows that the log of entrepreneurship productivity in terms of Opportunity-to-Necessity Ratio is negatively correlated with Informal Economy Size and Unemployment, and positively correlated with the Governance Quality index and Per capita GDP. As Table 2 indicates, after removing the country fixed-effects by performing the within-country transformation, these cross-sectional

(footnote continued)

global financial crisis overlaps with our study period.

Table 3
Fixed-effects estimates with the opportunity-to-necessity ratio (logged) as dependent.

	Variable	Model 1	Model 2	Model 3
H1	Informal economy size		-0.0187* (0.00731)	-0.0410*** (0.0105)
	Governance quality		-0.00929 (0.0511)	0.0105 (0.0477)
H2	Informal economy size × governance quality			-0.00517** (0.00158)
	Population ^a	-0.261 (1.112)	-0.499 (1.082)	-0.378 (1.044)
	Per capita GDP ^a	0.769* (0.362)	0.758* (0.371)	0.632† (0.359)
	GDP (PPP) growth	0.905* (0.450)	0.590 (0.500)	0.447 (0.531)
	Official exchange rate (relative change) ^a	0.501* (0.203)	0.551** (0.196)	0.629** (0.199)
	Inflation rate (customer price) ^a	-0.0289 (0.0357)	-0.0370 (0.0353)	-0.0361 (0.0323)
	TEA ^a	-0.0240 (0.0921)	-0.0241 (0.0881)	-0.0335 (0.0861)
	Openness	-0.00364 (0.00286)	-0.00527 (0.00316)	-0.00655† (0.00332)
	FDI ^a	0.0376 (0.0261)	0.0390 (0.0262)	0.0316 (0.0248)
	Unemployment rate ^a	-0.351* (0.147)	-0.327* (0.145)	-0.235 (0.147)
	Year dummies	Yes	Yes	Yes
	Constant	1.280*** (0.0544)	1.300*** (0.0541)	1.106*** (0.0750)
	Number of observations	374	374	374
	Countries	60	60	60
	R-squared (within)	0.240	0.259	0.288
	Adjusted R-squared (within)	0.201	0.217	0.245

Standard errors clustered by country in parentheses. Constant included in all models.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, † $p < 0.1$; two-tailed t -tests.

^a Log-transformed: $\pm \log(|x| + 1)$; positive unless x is negative.

relationships persist qualitatively, and the correlations' magnitude is generally reduced. This suggests multicollinearity is not a problem in our analyses. In addition, we performed a VIF analysis on the within-transformed variables included in the regression models. The highest VIF value was 3.03, which rules out multicollinearity.

Table 3 summarizes our primary fixed-effects model estimates for testing the hypotheses. Model 2 shows a significant negative relationship between Informal Economy Size and entrepreneurship productivity in terms of the logged Opportunity-to-Necessity Ratio (Model 2: $\beta = -0.0187$, $p < 0.05$), providing support for Hypothesis 1. Model 3 tests and supports Hypothesis 2, as the

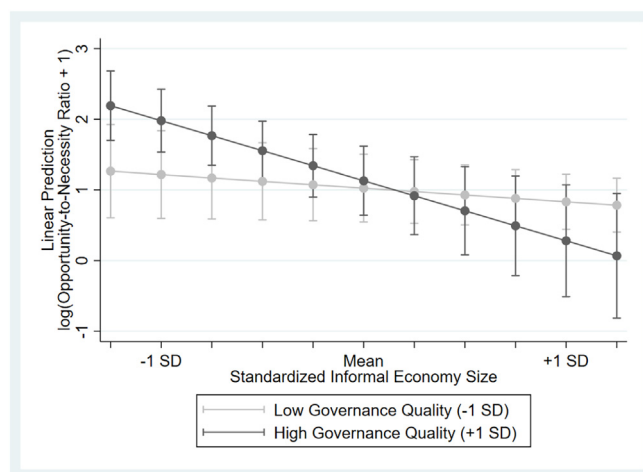


Fig. 1. The interaction effect of informal economy size and governance quality with the opportunity-to-necessity ratio and its log as the dependent variable. Based on fixed-effects estimates (Table 3, Model 3) with 95% confidence intervals.

Table 4

Difference GMM estimates with the opportunity-to-necessity ratio (log-transformed) as dependent variable.

Variable	Difference-GMM		Difference-GMM		FE without controls		FE with controls	
			(Reduced instruments)		(GMM sample)		(GMM sample)	
	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Lagged opportunity-to-necessity ratio ^a	0.286 (0.183)	0.144 (0.134)	0.303 (0.211)	0.212 (0.149)				
H1 Informal economy size	0.000299 (0.00945)	-0.0300* (0.0141)	0.0826† (0.0429)	-0.00452 (0.0366)	-0.0124† (0.00734)	-0.0374*** (0.00938)	-0.0154* (0.00762)	-0.0326** (0.00997)
Governance quality	0.0791 (0.0930)	0.217** (0.0798)	0.0898 (0.181)	0.178 (0.130)	0.113* (0.0482)	0.121* (0.0484)	-0.0217 (0.0533)	-0.00160 (0.0507)
H2 Informal economy size × governance quality		-0.00550* (0.00224)		-0.00608* (0.00294)		-0.00628** (0.00199)		-0.00402* (0.00155)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	No	No	No	No	No	No	Yes	Yes
Constant								
Observations	289	289	289	289	349	349	349	349
Countries	60	60	60	60	60	60	60	60
F-statistic	3.338	4.499	2.247	6.082	3.621	6.439	8.024	8.102
Hansen J-test (p-value)	0.945	0.892	0.226	0.0752				
Number of instruments	77	71	32	40				
Arellano-bond AR(1) (p-value)	0.00688	0.00570	0.0193	0.00275				
Arellano-bond AR(2) (p-value)	0.461	0.830	0.487	0.614				
Arellano-bond AR(3) (p-value)	0.162	0.124						

Two-step Windmeijer-corrected standard errors in parentheses in GMM models. Standard errors clustered by country in parentheses in FE models. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, † $p < 0.1$; two-tailed t-tests.

^a Log-transformed: $\pm \log(|x| + 1)$; positive unless x is negative.

coefficient for the interaction term of Governance Quality and Informal Economy Size is significantly negative (Model 3: $\beta = -0.00517$, $p < 0.01$). Fig. 1 illustrates the nature of this relationship with the logged value of the opportunity-to-necessity ratio on the y-axis, as implied by the estimated model coefficients. In terms of the dependent variable's non-transformed values, when Governance Quality is high (+1 SD), the ratio falls dramatically from 6.24 to 0.32 when moving from a smaller (-1 SD) to larger informal economy (+1 SD). When the governance index is low (-1 SD), a similar change in the informal economy's size is associated with a smaller fall, from 2.38 to 1.30. That is, when Governance Quality is high, for a unit increase in Informal Economy Size, the Opportunity-to-Necessity Ratio decreases more than in the case of low-quality governance. As a robustness check, Table 4 presents Difference GMM estimates using lagged regressor values as internal instruments for the lagged dependent variable, and other variables in the model that may be endogenous due to unobserved time-variant confounders.

We apply two-year lags to the instrument for endogenous variables (informal economy, governance quality, and their interaction term), and a one-year lag to the instrument for the lagged dependent variable (e.g., Heid et al., 2012; Roodman, 2009b), in Models 6 and 7. For GMM Models 4 and 5, we also use instruments from an additional year lag in an attempt to improve estimation efficiency. AR tests suggest Models 4–7 are correctly specified. Furthermore, Hansen's J statistics are within acceptable limits (Roodman, 2009a). No violations of Difference GMM assumptions are detected in any model. In these extended tests, neither Model 4 nor Model 6 provides clear support for H1. However, Models 5 and 7 continue to show a significant negative relationship between the interaction of Governance Quality and Informal Economy Size, and the log of the ratio of opportunity-to-necessity entrepreneurship (Model 5: $\beta = -0.00550$, $p < 0.05$; Model 7: $\beta = -0.00608$, $p < 0.05$), which broadens support for H2.

We conducted several additional tests to explore instances of inconsistent GMM support for H1, which enabled us to draw important conclusions on the relationships in the data. Fixed-effects estimates with the same observations as in the GMM models are presented in Table 4 (Models 8–11), to examine the impact of differences in the samples.¹⁰ Despite being weakly significant, the estimates for the informal economy's direct effect are still negative in the majority of models. Furthermore, the qualitative similarities between Models 8–9 and 10–11 suggest that removing control variables—a necessary cost to find viable GMM model specifications—does not cause pertinent qualitative differences in the fixed-effects estimates. Next, in Fig. 2, we examined the marginal effect of Informal Economy Size as a function of the moderator variable. This revealed that at low governance quality levels, the estimate for the marginal effect of Informal Economy Size becomes positive, though only at a low level of statistical significance. The estimated slopes imply that, for some countries, the Opportunity-to-Necessity Ratio is higher if the informal economy is larger.¹¹

¹⁰ The FOD transformation in the Difference GMM estimates (Models 4–7) employs the panel's last value to transform away the fixed effect, but does not use the last value directly for coefficient estimates. However, only the latter observations are used to report N in the model, which causes a difference of 60 observations compared to Models 8–11.

¹¹ According to the FE estimates (Model 3), there are 25 country-years meeting this requirement: RUS(8), IRN(6), ECU(3), AGO(2), DZA(2), NGA(2), and PAK(2). According to Difference GMM estimates, there are 53 country-years: RUS(7), CHN(6), COL(6), ARG(5), IRN(5), BIH(4), THA(4), ECU(3), PER(3), GTM(2), UGA(2), AGO(1), DOM(1), DZA(1), NGA(1), PAK(1), and SRB(1). Table A5 in the Appendix presents all country-

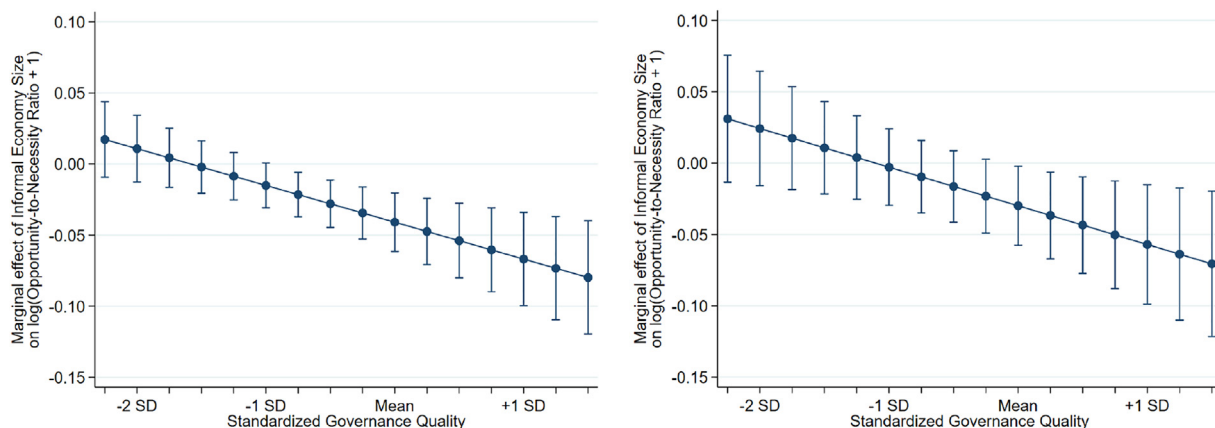


Fig. 2. Marginal effect of informal economy size on the log-transformed opportunity-to-necessity ratio as a function of governance quality with 95% confidence intervals. Left: Based on fixed-effects estimation (Table 3, Model 3). Right: based on difference GMM estimation (Table 4, Model 5).

When moving to higher governance quality levels, the relationship between Informal Economy Size and the dependent variable becomes negative and statistically significant. Especially, the negative relationship is apparent at values higher than approximately one standard deviation below the mean of the moderator, according to the main fixed-effect model (Model 3), and around the mean according to the Difference GMM estimates (Model 5).¹² Therefore, we conclude that H1 is in any case partially supported, and that the nature of the partial support is consistent.

5.1.2. Additional robustness tests

We conducted additional robustness tests, which are described and summarized in the Appendix. These include analyses with alternative dependent variables, namely perceived opportunities, and separate models with necessity and opportunity entrepreneurship as dependent variables (Table A1). In addition, we performed robustness tests regarding outliers and a modified set of control variables (Table A2). We also ran sub-sample analyses based on countries' income level (cf. Chowdhury et al., 2019) (Table A3). Finally, we tested the models with an alternative measure for the informal economy's size, namely a temporally extended version of Dau and Cuervo-Cazurra's (2014) informal economy index (Table A4).

6. Discussion

6.1. Implications for theory and the literature

This research theoretically and empirically examines how the informal economy's size affects entrepreneurship productivity, and how governance quality moderates that effect. Our focus is on entrepreneurship productivity rather than its level per se. We further consider both formal and informal institutions that might exist or be introduced. In doing so, we elaborate on the conceptualization of institutional incongruence, the institutional arrangements corresponding to a tension between formal and informal rules of the game in a country. We find conditions under which the informal economy could damage entrepreneurship productivity, and consequently economic development. We also show that enforcing high-quality governance in the informal economy could counter-intuitively be damaging. Overall, our study aligns with the recent discussions in entrepreneurship research (e.g., Amorós et al., 2019; Chowdhury et al., 2019; Webb et al., 2019), and contributes to them in five key ways.

First, we contribute to the body of entrepreneurship literature promoting the study of both formal and informal institutions. Formal institutional economics concerns institutions that involve explicit, sociopolitical, and governmental regulations aiming to constrain and incentivize organizational actions. Another institutional research stream focuses on implicit cognitive and normative institutions that emerge from internalized understandings of the world, and are based on historical culture, traditions, and behavioral norms (North, 1990; Powell and DiMaggio, 1991; Roberts, 2008; Scott, 1995). The entrepreneurship literature has, accordingly, focused on the effects of either formal regulations (e.g., Autio and Fu, 2015) or cultural factors (e.g., Liñán and Fernandez-Serrano, 2014). In recent years, however, several researchers have called for the study of the combined effects of both formal and informal institutions on entrepreneurship (e.g., Bruton et al., 2010; Kim and Li, 2014b; Stephan et al., 2015), and our research is a step in that direction.

Second, we conceptualize institutional incongruence, an institutional condition where formal and informal institutions encourage

(footnote continued)

years used in the estimation.

¹² The functional form of the informal economy's marginal effect in the reduced instruments GMM model (Model 7) is qualitatively similar to that of Model 5, albeit with broader confidence intervals and an intersection point closer to the mean.

or force individuals to follow incompatible rules of the game. Prior research has long distinguished between formal and informal institutions. Developing the institutional incongruence concept advances previous understandings of the interactions between the two types of institution. Our study adds the idea of possible inconsistency between rules of the game imposed through formal channels, and those implicitly internalized as taken-for-granted informal rules of the game. An inconsistency of this sort has the potential to theoretically explain and predict the outcomes for economic and entrepreneurial factors. This is particularly important because policies, as determinants of formal institutions, could have counter-intuitive outcomes if they engender institutional incongruence. Therefore, a theory that accounts for institutional incongruence could potentially better explain and predict the outcomes. For example, we focus on incongruence that corresponds to formal rules that promote formally run business in the informal economy. This creates tension due to existing informal rules of the game that encourage informal businesses, which has negative consequences for entrepreneurship productivity.

Third, we contribute to the literature that studies entrepreneurship productivity (Baumol and Strom, 2007; Webb et al., 2019). Studying only the entrepreneurship level is less informative regarding economic development through entrepreneurship, as not all entrepreneurship is productive for the economy (Baumol, 1996). We argue that the opportunity-to-necessity entrepreneurship ratio implies institutional forces that pull entrepreneurs into more productive types of entrepreneurial activity, when there is greater potential for opportunity identification and pursuit, and/or pushes them into less productive entrepreneurial activities out of necessity (Acs and Varga, 2005; Gries and Naudé, 2010). Our study, therefore, contributes to the literature on how entrepreneurial efforts can be directed to those that are productive given the country's institutional conditions, specifically examining the opportunity-to-necessity entrepreneurship ratio.

Fourth, we elaborated the informal economy's potential downsides for entrepreneurial productivity. We found partial yet consistent support for our first hypothesis, stating that institutional factors which restrict opportunity identification and pursuit, and decrease entrepreneurship opportunity costs, generate less entrepreneurship productivity. Specifically, fixed-effects and GMM estimations revealed evidence that the informal economy's size is negatively associated with the opportunity-to-necessity ratio for countries with moderate- or high-quality governance. For low-quality governance countries (see footnote 11), it appears the informal economy may actively fill a formal institution void, providing satisfactory but lower-quality resources, such as informal business networks, to fuel opportunity identification and pursuit (Puffer et al., 2010). While in a formal institutional void these resources could produce greater opportunity entrepreneurship, opportunities are limited because of entrepreneurs' commitments to the informal networks, and those networks' inability to handle harsh events (Webb et al., 2019). Nonetheless, our results suggest governance quality and formal institutional voids need to be taken into account, before determining whether the informal economy is damaging or benefitting entrepreneurship productivity.

Finally, we showed that in the informal economy, strengthening governance quality can be detrimental to entrepreneurship productivity, because it amplifies the informal economy's limitations for opportunity identification and pursuit, and for salaried employment. Our second hypothesis challenges the view that developing regulative institutions provides clarity, and always benefits opportunity identification and pursuit (Aparicio et al., 2016; Baumol et al., 2007; Dau and Cuervo-Cazurra, 2014). In line with research such as Kim and Li (2014b), we argue that the benefits of improving governance quality rely on the state of cognitive and normative institutions. We argue that the formal-informal institutional incongruence primarily generated by seeking to improve governance quality where there is a large informal economy is damaging. Accordingly, our results employing both the main FE models and Difference GMM fully support the claim that formal-informal institutional incongruence amplifies the informal economy's limitations, producing a lower opportunity-to-necessity ratio. Our results have greater theoretical implications for entrepreneurship concerning formal regulation boundaries, when informal business is a legitimate practice and provides an alternative view and outline, such that regulation can also have negative consequences.

6.2. Implications for policy and practice

Our study results reveal that, in many cases, the informal economy's size is negatively associated with entrepreneurship productivity. Nonetheless, where governance quality is low, that may not apply. This implies the informal economy's size alone is not a sufficient factor to determine the outcomes for entrepreneurship productivity. Instead, policymakers should take into account governance quality as well as the informal business culture, in deciding appropriate policy actions.

We also found that improving governance quality in a large informal economy decreases the entrepreneurship productivity level. Thus, the question remains, if countries aim to decrease their informal economy's size, how can they minimize the negative consequences in practice? Our theory and empirical analyses suggest institutional incongruence causes a relative decline in entrepreneurship productivity. That means minimizing institutional incongruence duration to reduce its harmful effects. In the long term, cognitive and normative institutions could change to follow the formal rules of the game; but in the short term, institutional incongruence damages entrepreneurship productivity, if the policy is only to improve governance quality. Instead, alongside targeting formal institutions, changes in the informal economy's size should be pursued by targeting the cognitive and normative institutions of the individuals operating in larger informal economies, especially those cognitive and normative institutions rooted in entrepreneurs' social groups (Kim et al., 2016). Although we are pioneering the empirical evidence, we are not alone in advancing such a claim. Sutter et al. (2017), for instance, assert that NGOs can play a role in shaping cognitive shared understandings in a large informal economy, until operating formally becomes the preferred option. Through work such as this, cognitive and normative institutions, rather than regulative institutions alone, can drive change in the informal economy's size without generating high institutional incongruence. Thus, the size might be reduced while limiting the negative impact on entrepreneurship productivity.

6.3. Study limitations and future research

While we consider our case for causality robust, an inability to identify applicable external instrumental variables means our evidence's robustness both for and against interaction effect causality rests strongly on control variables and internal instruments, which are known to have limitations (Roodman, 2009a). Furthermore, time lags are unlikely to strongly remedy simultaneity concerns in our fixed-effects models,¹³ and applying a simultaneous equation approach (e.g., Aparicio et al., 2016) may shed more light on the matter.

The GEM entrepreneurship-related measures also have their limitations, notably the entrepreneurship measures' low comparability between developed and developing countries (Acs, 2006). In developing countries, Acs (2006) notes that entrepreneurs are more likely to falsely report or identify themselves as opportunity entrepreneurs. Nevertheless, it should be noted that we controlled for time-invariant systematic measurement errors using country-level fixed-effects, which helps reduce concerns about these measurements.

Moreover, obtaining data on an informal economy's size is inherently difficult. Currently, indirect approaches based on macro-economic data are the only means available to estimate size in a multi-country panel having sufficient overlap with GEM data. These approaches, including MIMIC, are not without their limitations (cf. Schneider and Buehn, 2018; Feige and Urban, 2008; Putniņš and Sauka, 2015). Nevertheless, fixed-effects estimation adds robustness to some limitations, and triangulation with survey-based data sources did not raise significant concerns regarding face validity. Furthermore, since the results using the electricity-consumption-based approach in developed countries were different from developing countries, there is a continuing need to solve measuring the informal economy's size. Another research opportunity exists in further investigating other plausible reasons for the differences in the results related to developed and developing countries in the supplementary analyses.

Even though measuring cognitive and normative institutions is not entirely possible (Deephouse and Suchman, 2008; Roberts, 2008), we followed the existing literature and assumed that informal economy size reflects the cognitive and normative institutions surrounding entrepreneurs (Baum and Powell, 1995; Hannan and Carroll, 1995). Future research could examine how informal institutions' other measures in a large informal economy shape entrepreneurship productivity. Furthermore, informal business practices are institutionalized within social groups surrounding individual entrepreneurs within an informal economy, which makes them slow to change. Yet, any profound progress in reducing the informal economy's size requires such practices' deinstitutionalization (cf. Oliver, 1992), a topic that remains poorly understood.

We examined regulative institutions' development effects broadly. Chen (2012) lists several policies tackling the informal sector, including simplifying registration procedures, introducing clear bankruptcy rules, creating a formal system providing social security, and introducing a minimum wage. Each of these and other policies' entrepreneurship-related consequences in a large informal economy represent future research topics.

Institutional incongruence could prove a useful foundation for future entrepreneurship research. Scholars could empirically test other institutional incongruence instances and investigate their consequences. That is, researchers could examine how any aspect of cognitive or normative institutions contradicts an aspect of regulative institutions to create opposing values, and how such incongruence generates different outcomes. For instance, in a country where cognitive and normative institutions accept and expect power distance, regulative institutions that encourage less power distance—say, by introducing high progressive taxes—could engender another form of institutional incongruence generating different country-level entrepreneurship outcomes. This example and other possible forms of institutional incongruence in entrepreneurship constitute another future research topic.

Finally, future research could continue reconciling formal and informal institution perspectives. Cognitive and normative institutions, which are embodied in the relationships among social groups surrounding entrepreneurs (Aldrich and Fiol, 1994; Kim et al., 2016), have different qualities, including, for example, extents of trust (Kim and Li, 2014a), hierarchy, self-regard, and informal economic activities. As we have argued, whether macro level regulations' development positively affects entrepreneurship depends on cognitive and normative institutional settings emerging from social groups. Thus, future research could consider cognitive and normative institutions to explain the mechanisms whereby macro level regulation affects entrepreneurship.

6.4. Conclusion

Regulations and the informal economy's size are related to both formal and informal institutions, and are complex and intertwined. Therefore, pursuing any changes therein requires great care. This study indicates that governmental efforts to improve governance quality must account for cognitive and normative institutions concerning the informal economy's size. Such efforts might support rules of the game that contradict rules accepted and followed by individuals. While improving governance quality in the presence of a large informal economy, this contradiction produces an amplified decline in entrepreneurship productivity, as this paper has demonstrated. We conclude that researchers and policymakers should be aware of regulations' unintended outcomes for entrepreneurship, and consider reducing institutional incongruence using alternative approaches, such as supporting formality values in the social groups surrounding entrepreneurs.

¹³ While this method is common in the literature (e.g., Meek et al., 2010; Sarkar et al., 2018; Urbano and Aparicio, 2016), it relies on a strict exogeneity assumption for identification. Furthermore, despite common contrary claims, it has been recently underscored that lagging variables does not effectively remedy endogeneity concerns emerging from simultaneity (e.g., Bellemare et al., 2017). Therefore, the limitations' sources we underscore here are not unique to this study but common to a broader entrepreneurship research stream at country level.

CRedit authorship contribution statement

Ashkan Fredström: Conceptualization, Methodology, Validation, Formal analysis, Writing - original draft, Writing - review & editing. **Juhana Peltonen:** Conceptualization, Methodology, Validation, Formal analysis, Writing - original draft, Writing - review & editing. **Joakim Wincent:** Conceptualization, Supervision, Writing - review & editing.

Declaration of competing interest

None.

Acknowledgements

Ashkan Fredström thanks the Evald and Hilda Nissi Foundation and the Hanken Support Foundation for supporting this research.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jbusvent.2020.106002>.

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