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Creating their Own: A Cross-National Examination of New Venture Creation

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INTRODUCTION

Entrepreneurial activity and new venture creation represent fundamental catalysts of innovation, job creation, and economic development (Agarwal, Audretsch & Sarkar, 2007; Decker, Haltiwanger, Jarmin & Miranda, 2014; Stoica, Roman & Rusu, 2020). Nations fostering the transition to an entrepreneurial focus have been shown to enjoy higher levels of employment and growth (Prasetyo & Kistanti, 2020; Thurik, 2008). Moreover, new venture creations have also been shown to impact social welfare by providing opportunities for mobility and alternative means of economic attainment (Neumann, 2021; Carroll & Hannan, 2000). As such, identifying what factors influence entrepreneurial activity and firm creation is of fundamental importance. Such insights not only inform practice and policy but also contribute to theoretical development. (Wurth, Stam & Spigel, 2022).

A large literature within psychology, sociology, and economics has sought to identify the conditions that give rise to entrepreneurship (e.g., Shepherd, Souitaris & Gruber, 2021; Verheul, Wennekers, Audretsch & Thurik, 2002). Historically, much of this research has focused on individual-level determinants, resulting in early calls to investigate the important role of national-level predictors (Freitag & Thurik, 2007). While progress has been made in this area, recent research indicates that our understanding of how national-level determinants might impact new venture creation remains incomplete (Berger & Köhn, 2020; Kim, Min, Wang, Schuler & Oh, 2020). Consequently, scholars have begun to explore the impact of national policies and institutions on entrepreneurial activity in conjunction with the individual-level drivers identified in previous research

Scholarly interest has coalesced around three common themes: resources, culture, and institutions (Berger & Köhn, 2020; Stephan & Uhlaner, 2010). For example, resources (e.g., human capital, financial capital) promote entrepreneurial activity by supporting needed institutions (Prasetyo & Kistanti, 2020) and providing a nation with a potential supply of entrepreneurs. Institutions and social norms have been shown to legitimize entrepreneurship (Meek, Pacheco & York, 2010), resulting in better education, increased media attention, and more tax incentives to encourage startups, or conversely decrease entrepreneurial activity when the social norm is mis-aligned with entrepreneurship, as in the case of post-materialistic societies (Uhlaner and Thurik, 2007). National-level institutions continue to play a role in either fostering or hindering entrepreneurial activity (e.g., Anokhin & Schulze, 2009; Audretsch, Grilo & Thurik, 2007)

Considered individually, resources, culture and institutions appear to impact entrepreneurial activity. However, a careful examination of the literature reveals a growing need for further theoretical development and empirical verification (Acs, 2006; Acs, Desai & Klapper, 2015; Salvi, Belz & Bacq, 2023). Specifically, most studies investigating entrepreneurial determinants cross-nationally do not consider

how resources, culture, and institutions might simultaneously promote entrepreneurship. In addition, empirical support for the argument that resources, culture, and/or institutions stimulate entrepreneurial activity and firm creation remains inconclusive (Desai, 2009; Hoffman, Larsen & Oxholm, 2006; Salvi, Belz & Bacq, 2023).

In our study, we build on Verheul and colleagues' (2002) theory of a push/pull model of entrepreneurship that distinguishes between supply-side and demand-side determinants. In so doing, we simultaneously examine the impact of resources, culture, and institutions on new venture creation. In the process, we identify an important and often overlooked consideration, namely entrepreneurial form (Acs, 2006). Using both GEM and WBGES data we are able to disentangle formal entrepreneurial activity from informal entrepreneurial activity. Findings suggest an asymmetrical impact of resources, culture, and institutions on entrepreneurship. Specifically, we find that the magnitudes of the effects are contingent on which form of entrepreneurship is being considered (i.e. formal, informal). We conclude with a brief discussion of both the practical and theoretical implications as well as the need for future research in this area.

THEORY DEVELOPMENT & HYPOTHESES

Entrepreneurial research is an interdisciplinary endeavor relying on a wide array of theoretical lenses, across multiple levels of analysis, and implementing a diverse set of methodologies (Freytag & Thurik, 2007; Shepherd et al., 2021). As a result, no generally accepted definition of entrepreneurship has emerged (Prince, Chapman & Cassey, 2021; Wu, Wu & Arno Sharpe, 2020). Empirically, entrepreneurship is frequently defined as "the creation of new enterprise" (Low & MacMillan, 1988: 133). This conceptualization proves especially useful for two reasons. First, by conceptualizing entrepreneurship as new enterprise (i.e. new ventures, startups, foundings), a clean comparison across nations can be obtained. Second, the explicit link between entrepreneurship and economic development strengthens the practical and theoretical implications of the findings.

Scholars interested in predicting entrepreneurship on a national level have numerous theoretical frames from which to work (Audretsch et al., 2007). Those investigating the psychological underpinnings of entrepreneurship often examine the role of personality (e.g. risk-taking, locus of control, need for achievement) and individual differences in predicting entrepreneurial behavior (Siyanbola et al., 2012; Ye & Zheng, 2023). In contrast, sociological arguments frequently emphasize the role of network structure and content (e.g. norms, values, and culture) (Beugelsdijk & Noorderhaven, 2004; Stephan & Uhlaner, 2010). Economic models of entrepreneurship highlight how resources, industry dynamics

(e.g. barriers to entry, competition) and growth drive entrepreneurship and firm creation (Spinelli, Ensign & Adams, 2014).

Inquiries into the determinants of new venture creation should begin with a consideration of the environment. The argument provided is that the environment itself experiences organizational birth. Similarly, Freytag and Thurik suggest, "...the environment in which the business is conducted plays a crucial role in fostering or weakening entrepreneurial activities..." (2007: 122). Venkataraman (1997) posits a beneficial entrepreneurial environment is achieved at the intersection of both lucrative opportunities and enterprising individuals.

Research examining cross-national determinants of entrepreneurship has followed this advice by investigating how heterogeneous resources, culture, and institutions influence venture creation (Berger & Khön, 2020; Stephan & Uhlaner, 2010; Uhlaner & Thurik, 2007; Wu et al., 2020). Empirical results, however, are mixed. Studies examining the impact of human capital (Kim et al., 2020; Uhlaner & Thurik, 2004; Blanchflower, 2004), financial capital (Acs et al., 2015), and institutions (Cao & Shi, 2021; Klapper, Amit, & Guillén, 2007; van Stel, Storey & Thurik, 2007) on entrepreneurial activity provide conflicting findings. In the following section, we identify one possible explanation for the ensuing confusion. Specifically, we demonstrate how formal and informal entrepreneurial activity constitute separate but related phenomenon. Next, we extend an existing theory of entrepreneurship (Verheul et al., 2002) to examine how resources, culture, and institutions influence both formal and informal forms of entrepreneurship.

Formal and Informal Entrepreneurship

What motivates entrepreneurial activity and what form does the given activity take? The entrepreneurship literature addresses these questions through three dichotomies: necessity/opportunity, formal/informal, legal/illegal (Desai, 2009). The necessity/opportunity dichotomy directly addresses the motivation of the entrepreneurial activity, need, or opportunity. Formal/informal refers to whether the entrepreneur has formally registered the business. Lastly, entrepreneurial activity is classified legal if the *nature of the activity* is in accordance with the laws of the nation. Although related, all six classifications demonstrate unique variance. Moreover, the theoretical mechanisms and policy implications vary accordingly. As Desai (2009) notes,

Some countries undergoing or planning reforms may be best served by focusing on policies of formalization... Other countries may be better served by policies to boost economic participation of certain demographics, which often equates to necessity entrepreneurship. Still others can pursue policies that focus on firm creation or on high-growth entrepreneurship. The

appropriate policies to serve these purposes can be vastly different, i.e., microfinance versus venture capital. (p 6-7)

Entrepreneurial scholars have largely failed to separate these important dichotomies resulting in an incomplete and difficult-to-interpret body of literature. Specifically, past research has used multiple sources of entrepreneurial data interchangeably (Desai, 2009; Hoffmann, et al., 2006). Moreover, these data capture the different forms of entrepreneurship (e.g. formal / informal) to varying degrees. As such, aggregating the various dichotomies creates unnecessary noise, thereby rendering interpretation difficult. This study addresses this problem by unpacking how cross-national determinants of entrepreneurship impact both formal and informal activity.

The distinction between formal and informal entrepreneurial activity is important for both practice and theory (Webb, Tihanyi, Ireland & Sirmon, 2009). The informal economy represents over 75% of official GDP in Nigeria to approximately 10% in the United States (Schneider & Enste, 2000). Although results remain mixed, the informal economy has been shown to positively impact national economic growth.

On the one hand, a larger shadow economy is related to less tax revenue, which might lead to less investment in public infrastructure and economic growth, particularly in developing countries (i.e. Loayza, 1996). On the other hand, evidence in OECD countries finds that the informal economy has a strongly positive effect on consumer purchases of both durable and non-durable expenditures, and an indirectly positive effect on tax revenue and economic growth (Schneider, 1998; Bhattacharyya, 1999). (Klapper et al., 2007: 5)

Whether or not increases in the informal economy translate directly into economic growth, the role of informal entrepreneurial activity in economic development remains salient (Webb et al., 2009). Fortunately, a growing corpus of literature has examined informal entrepreneurship (for a review see Salvi, Belz & Bacq, 2023). Recently, this has enabled us to see a clearer depiction of the relative advantages of both formal and informal entrepreneurial activity, as well as their relationship with one another, which proves helpful in examining cross-national determinants of entrepreneurship.

The entrepreneurship literature identifies several benefits of formal business registration (Castro, Khavul & Bruton, 2014). Frequently examined advantages include less exposure to corruption, police, and judicial protection, the ability to leverage assets, access to formal credit, protection through contracts, and access to foreign markets (Amin & Okou, 2020; Schneider & Enste, 2000). In summary, formal registration allows the entrepreneur to scale the company by providing the

necessary resources and protections. However, informal entrepreneurial activity is not without benefits. The two most frequently cited are the avoidance of burdensome regulations or bureaucracy (Kus, 2014; Williams & Gurtoo, 2012; Loayza, Oviedo & Servén, 2006) and tax evasion (Lopez, 2017). Additional benefits of informal activity include the avoidance of corruption (Klapper et al., 2007) and alignment with social issues such as gender identity and family situations (Thapa Karki, Xheneti & Madden., 2020).

Building a Comprehensive Model of Entrepreneurship

In an effort to provide a more comprehensive model of entrepreneurial determinants, Verheul et al. (2002) develop an eclectic theory of entrepreneurship. Specifically, the authors address the interdisciplinary challenges of entrepreneurial research by explicitly linking micro and macro-level determinants. Building on previous push / pull models of entrepreneurship, they distinguish between supply-side and demand-side determinants and posit supply-side determinants drive “the extent to which a certain population produces (potential) entrepreneurs” (Verheul et al., 2002: 27). Demand-side determinants influence the extent to which the environment provides opportunities for entrepreneurial activity. In addition to supply and demand determinants, the eclectic theory of entrepreneurship explicitly integrates the role of institutions and government intervention (Verheul et al., 2002; Audretsch et al., 2007). In summary, their eclectic theory of entrepreneurship provides a comprehensive framework of entrepreneurial determinants. By elucidating the psychological, sociological, and economic mechanisms, as well as their interactions, a more complete understanding is obtained.

Supply-side Determinants

The supply side of entrepreneurship identifies those factors that increase the overall supply of entrepreneurs. Verheul et al. (2002) identify four central supply-side factors: demographic composition, resources, abilities, and attitudes. As a field, we have identified which specific resources, abilities, and attitudes play a central role in entrepreneurship. For example, van Stel et al. (2007) examine the impact of population composition, educational attainment, and financial capital on entrepreneurial activity. Similarly, Uhlaner and Thurik (2007) highlight the importance of per capita GDP, education, and life satisfaction. Freytag and Thurik (2007) investigate the influence of culture on both latent and realized entrepreneurship. A brief review of this literature reveals three frequently examined supply-side determinants: human capital, financial capital, and favorable entrepreneurial attitudes (i.e. culture). We consider each *seriatim*.

Malhotra defines human capital as “the combined knowledge, skill, innovativeness, and *ability* of a nation’s individuals to meet the tasks at hand....” (2003: 23). Human capital, as a construct, captures both the ability (i.e. education) and demographics of the population (i.e. percentage of working age population). The theoretical argument of how human capital might influence entrepreneurial activity is relatively straightforward. Education provides individuals with requisite knowledge to both establish and operate a business successfully. Moreover, higher education leads to increased opportunity recognition, creativity, and risk taking (Siyanbola et al., 2012; Ye & Zheng, 2023). Despite the intuitive link between education and entrepreneurial activity, empirical support remains mixed. For example, a comprehensive meta-analysis on the topic has found that education has a positive impact on entrepreneurial outcomes (Martin, McNally & Kay, 2013). Despite this finding, numerous studies have found the opposite (e.g., Uhlaner & Thurik, 2004). Interestingly, it might depend on location, as Blanchflower (2004) suggests education is positively associated with entrepreneurial activity in the United States and negatively associated in Europe.

A possible explanation for these discrepant findings is the failure to account for the form of entrepreneurship (i.e. formal, informal). Paralleling van Stel et al. (2007) finding that the effect of education is contingent on the motivation of the activity, we posit that the relationship between education and entrepreneurship is also contingent on the form of the activity. As mentioned earlier, formal entrepreneurial activity provides the entrepreneur with specific benefits. Formal registration supplies the entrepreneur with increased access to finance, foreign markets, contracts, and legal protection. Subsequently, formal registration becomes a key component for growth and expansion (Amin & Okou, 2020).

Education is more likely to result in formal entrepreneurial activity than informal for a number of reasons. First, a minimum level of education is required to navigate the formal registration process. When basic functional skills remain underdeveloped (e.g. literacy, communication), successful registration becomes less likely. This effect is undoubtedly amplified in nations with lengthy registration requirements (Amin & Okou, 2020). Second, education increases the entrepreneur’s recognition of the benefits of formal registration. For example, if the entrepreneur is unaware of what financial options are available, what they provide, and how they can be used, the perceived benefits of formal registration diminish. Lastly, education provides the entrepreneur with a greater opportunity set. Subsequently, it is more likely that a highly educated entrepreneur be interested in growth and expansion, the primary advantage of formal registration.

The arguments presented highlight how education impacts formal entrepreneurial activity. However, it is also possible that highly educated entrepreneurs calculatedly choose to organize informally due to oppressive regulation, taxes, or corruption. On balance, when examining the population of

entrepreneurs in a given nation, we predict that this type of entrepreneur would be in the minority. Subsequently,

H1(a,b): Human Capital (a) positively impacts formal entrepreneurial activity and (b) negatively impacts informal entrepreneurial activity

A critical resource in the supply-side of entrepreneurship is financial capital (Verheul et al., 2002). Access to financial capital provides the entrepreneur with the requisite resources to operate and grow (Linder, Lechner & Pelzel, 2020; Fuertes-Callén, Cuellar-Fernández & Serrano-Cinca, 2022). Previous research identifies insufficient financial capital as a primary explanation as to why emerging businesses fail (e.g. Cole & Sokolyk, 2018). Examining new venture performance, Fuertes-Callén and colleagues (2022) find a positive relationship between financial capital and firm survival. Financial capital provides the ability to stabilize environmental shocks and allow access to capital-intensive strategies.

Ceteris paribus, the more financial capital that is available in the environment the more potential for entrepreneurial activity. Nevertheless, when considering the form of entrepreneurship (i.e. formal, informal), the role of financial capital becomes more nuanced. By definition, formal entrepreneurial activity enjoys access to sources of financial capital not available to informal entrepreneurs. Indeed, a key benefit of formal registration is access to financial capital. With the exception of informal channels, informal entrepreneurs have limited means to raise financial capital (Webb et al., 2009). As such, there is no direct effect of financial capital on informal entrepreneurial activity. Thus,

H2(a): Financial Capital (a) positively impacts formal entrepreneurial activity

Numerous scholars have investigated the relationship between culture and entrepreneurship (Calza, Cannavale & Nadali, 2020; Lounsbury, Cornelissen, Granqvist & Grodal, 2021; Noorderhaven, Thurik, Wennekers & van Stel, 2004; Stephan & Uhlaner, 2010). Wennekers, Thurik, and Uhlaner (2002) suggest that differences in entrepreneurial activity across time are largely driven by economic factors, while differences across countries are driven by institutions and culture. Uhlaner and Thurik (2007) identify entrepreneurial culture as an important factor in new venture creation.

In an effort to identify the specific mechanisms involved, Freytag and Thurik (2007) and Wennekers (2006) identify three distinct explanations. The first posits an aggregate psychological trait of the population. The argument provided within this stream of literature is that the more individuals in the society possess entrepreneurial traits (e.g. need for achievement), the more entrepreneurial activity

(Uhlener & Thurik, 2007). The second approach focuses on the degree of legitimacy. This perspective suggests that as entrepreneurship becomes more socially accepted and desired, catalyzing mechanisms emerge, including formal entrepreneurial education, increased media attention, and government incentives (Meek et al., 2010; Lounsbury et al., 2021). Lastly, the third approach asserts that as a nation becomes less entrepreneurial, entrepreneurs become dissatisfied with conventional organizations and subsequently seek self-employment (Baum et al., 1993; Noorderhaven et al., 2004). For the purposes of this paper, we focus on the mechanisms identified in prior literature (e.g., Fayolle & Gailly, 2015; Meek et al., 2010). Specifically, as the degree to which a country's residents admire entrepreneurial ability increases, legitimacy is established. This legitimacy, in turn, results in a greater supply of entrepreneurs. Thus, favorable entrepreneurial attitudes should positively impact both formal and informal entrepreneurial activity. The relative advantages of formal and informal entrepreneurship operate largely independent of the entrepreneurial attitudes. As such,

H3(a,b): Favorable attitudes toward entrepreneurship positively impact both (a) formal and (b) informal entrepreneurial activity

Demand-side Determinants

The demand side of entrepreneurship captures the extent to which the environment provides opportunities for entrepreneurial activity. Verheul et al. (2002) identify several demand-side catalysts including technological and economic development. Audrestch et al. assert “technological advancements create opportunities for entrepreneurial ventures through new ideas or new application processes” (2007: 9). Technological developments provide entrepreneurial opportunities through a variety of channels. First, improvements in technology offer small firms access to inexpensive capital goods, reduced barriers to entry (e.g. economies of scale), and low-cost specialization (Verheul et al., 2002; Elia, Margherita & Passiante, 2020). Second, technology allows important information to be easily accessed and distributed (Ribeiro-Navarrete, Saura & Palacios-Marqués, 2021), thereby promoting entrepreneurial ventures. The emergence of a knowledge-based economy will strengthen this association. Thurik concludes, “the resurgence of small businesses is largely a consequence of new technological opportunities enabled by the information-technology revolution” (2008: 6). Third, technological developments give rise to new products and services. Subsequently, as new markets develop, entrepreneurial activity increases to meet demand. Lastly, as technology increases the speed of innovation and transformation, small new firms are, arguably, better positioned to adapt than larger more established firms, hindered by core rigidities or competency traps (Levinthal, 1991).

The opportunities created by technological development generate a demand for both formal and informal entrepreneurship. Due to their access to formal capital, ability to leverage assets, and contracting capabilities, formal entrepreneurs are uniquely positioned to take advantage of new and rapidly changing markets. Indeed, formal entrepreneurial opportunities, created by technological advances, continue to play a prominent role in venture capital investing (Metrick & Yasuda, 2021). Technological developments also promote informal entrepreneurship. As new technology and products develop and skills and knowledge spill over, informal entrepreneurs respond to the opportunities not captured through formal channels. One example of this form of entrepreneurship is services to remove software constraints on mobile devices. Research investigating informal entrepreneurship in developing nations highlights the importance of technology in overcoming limited education, reduced physical infrastructure, and incomplete and imperfect market information (London & Hart, 2004).

H4(a,b): Technology positively impacts both (a) formal and (b) informal entrepreneurial activity

The stage of economic development has also been shown to influence entrepreneurship. However, scholars remain divided with respect to the direction of the effect. Prior work has posited a negative relationship between economic development and entrepreneurial activity (Naudé, 2013; Prieger, Bampoky, Blanco & Liu 2016). This stream of literature suggests that as nations become wealthier, the opportunity cost of self-employment attenuates entrepreneurship. In contrast, others argue economic development leads to the creation of new industries and subsequent entrepreneurial activity (Dhaliwal, 2016; Toma, Grigore & Marinescu, 2014). In an effort to reconcile the contrasting findings, some work proposes a curvilinear relationship (van Stel et al, 2009).

Although empirical findings are mixed, the extant literature identifies how economic development influences opportunities for entrepreneurship. Specifically, as nations become wealthier, “the demand for a variety of products and services increase... small firms are well equipped to supply these new and specialized goods.” (Verheul et al., 2002: 22). Similar to technological development, economic development impacts entrepreneurial activity by creating new demand for varied products and services. When considering the role of economic development in formal and informal entrepreneurship, the motivations of the entrepreneur become particularly relevant. Previous research documents a significant relationship between opportunity entrepreneurship and levels of economic development (Acs, 2006). Given the unique benefits of formal entrepreneurship, opportunity entrepreneurs are more likely to choose formal channels.

H5(a,b) : Stage of economic development (a) positively impacts formal entrepreneurial activity and (b) negatively impacts informal entrepreneurial activity

METHODS

Sample

To empirically examine the proposed hypotheses, we used cross-national longitudinal data from 2006-2022. Data were collected from multiple independent sources. Cases with missing data on the dependent variables were removed from the sample resulting in an unbalanced panel of 79 countries and 460 observations. Of these, 31 are developed countries (39%). Human capital data were obtained from the Human Development Reports published by the United Nations. Data regarding financial capital and technological development were obtained from the Global Competitiveness Reports, a combination of archival and survey data published annually by the World Economic Forum. Data on the stage of economic development were obtained from the World Bank Group Development Indicators database. Working population and formal entrepreneurship were obtained from the World Bank Group Entrepreneurship Survey (WBGES). Lastly, estimates of favorable entrepreneurial attitudes as well as total entrepreneurial activity were obtained from the Global Entrepreneurship Monitor (GEM), an ongoing survey of entrepreneurial activity around the world.

Measures

Dependent Variables. Two dependent variables are used in this study. To capture formal venture creation, we relied on the WBGES data measuring the number of newly registered businesses. It is important to note the WBGES data, by definition, does not capture informal entrepreneurial activity, “counting only economic units of the formal sector incorporated as a legal entity and registered in a public registry, which is capable, in its own right, of incurring liabilities and of engaging in economic activities and transactions with other entities” (Klapper et al. 2007: 4).

Capturing informal entrepreneurship is more challenging but can be done using a method developed by Dau and Cuervo-Cazurra (2014) and utilized by many others since then (e.g., Wei, Su, Ahlstrom & Wu, 2023). This is done by calculating the difference between total entrepreneurship and formal entrepreneurship. Total entrepreneurship is available from the Global Entrepreneurship Monitor (GEM) dataset, calculated as the ratio of the total number of new businesses to the working population. This measure includes businesses that are registered and those that are not. In contrast, the WBGES data includes only registered businesses, and, when

calculated as a ratio to the working population, can be subtracted from the same ratio in GEM data, yielding a measure of informal new businesses (e.g., total – formal = informal). The measure of informal entrepreneurship is thus the ratio of unregistered new businesses per 100 working population.

Independent & Control Variables. Key constructs within the supply-side determinants of entrepreneurship include human capital, financial capital, and societal attitudes towards entrepreneurship. Human capital is operationalized by the Human Development Index as the expected number of years of formal schooling a new school-aged child will receive if current enrollment trends continue. Countries range from about 5 to 23 years on this index. Financial capital is captured by the World Economic Forum's measure of ease of access to loans. This survey question measures the ease of obtaining a loan in each country. Values range from 1-very difficult to 7- very easy. Data on entrepreneurial attitudes were obtained from the GEM database. Specifically, the percentage (0 to 100) of the working population that agree that in their country, successful entrepreneurs receive high status.

On the demand-side, technological development is operationalized by the technological readiness index of the Global Competitiveness Reports. The technological readiness index measures the level of technology available to firms. Examples of index components include availability of the latest technologies, FDI and technology transfer, and broadband subscribers. To evaluate the stage of economic development we utilize the per capita gross domestic product (GDP) adjusted for purchasing power parity (PPP). It is an excellent indicator of overall levels of national economic status. This measure is similar to nominal GDP per capita but is adjusted for each country's current cost of living.

In examining differences in entrepreneurial activity across nations, it is important to control for variance in total working population. As such, we included the WDI data on the working population, ages 15-64, as a covariate in the models. Definitions and calculations of all study variables are summarized in Table 1.

Table 1

Definitions and Calculations of Study Variables				
Variable	Type	Definition	Calculation	Source
Formal Entrepreneurship DV		# of new registered businesses	# of new registered businesses \ 10,000	World Bank Group Entrepreneurship Survey (WBGES)
Informal Entrepreneurship DV		# of new unregistered businesses per 100 population	total new businesses per 100 working population - total new registered businesses per 100 working population	GEM and WBGES
Human Capital	IV	number of years of schooling that a child of school entrance age can expect to receive if prevailing patterns of age-specific enrollment rates persist throughout the child's life	as defined ranges from 5 to 23 years	HDI, Human Development Index - UN
Financial Capital	IV	ease of access to loans	1-7 Likert scale	Global Competitiveness Reports - World Economic Forum
Entrepreneurial Attitudes	IV	percentage of 18-64 population who agree with the statement that in their country, successful entrepreneurs receive high status	as defined	Global Entrepreneurship Monitor (GEM)
Technology Development	IV	the level of technology available to firms	technological readiness index is a component of scores, including availability of the latest technologies, FDI and technology transfer, and broadband subscribers	Global Competitiveness Reports - World Economic Forum
Stage of Development	IV	gross domestic product (GDP) at purchasing power parity (PPP) per capita	the PPP value of all final goods and services produced within an economy in a given year, divided by the average (or mid-year) population for the same year	World Bank Group, World Development Indicators database
Working Population	Control	adult population ages (15-64)	adult population / 1,000,000	World Bank Group Entrepreneurship Survey (WBGES)

ANALYSIS

To examine the determinants of formal and informal entrepreneurship, we developed two separate models due to having two distinct types of measure. For formal entrepreneurship, which is a count measure with potential for overdispersion, we chose to use random effects Poisson regression with robust standard errors, clustered by country. While negative binomial is another valid option for this type of data, we note that Poisson is more commonly used (Park, Howard & Gomulya, 2018) as it has been found to better address overdispersion (Allison & Waterman, 2002). For our analysis of informal entrepreneurship, we chose random effects OLS with robust standard errors, clustered by country. This choice is ideal for panel data with a continuous dependent variable. For both models, Hausman tests indicated a preference for random effects over fixed effects, which is also more consistent with our theorizing about between group effects (Certo, Withers & Semadeni, 2017).

Table 2

Descriptive Statistics and Correlation Matrix

Variable	Mean	s.d.	1	2	3	4	5	6	7
1. Working Population (/1MM)	37.57	104.73							
2. Human Capital	15.11	2.36	-0.26						
3. Financial Capital	3.37	0.95	0.03	0.09					
4. Attitudes	69.57	10.76	-0.06	-0.16	0.08				
5. Technology	4.57	0.99	-0.26	0.67	0.40	-0.06			
6. Stage Development (GDP PPP per capita/10,000)	2.87	1.96	-0.22	0.46	0.42	0.01	0.79		
7. Formal Activity (Foundings/10,000)	6.64	10.86	0.16	0.10	0.04	0.09	0.09	-0.03	
8. Informal Activity	3.83	2.73	0.12	-0.41	-0.14	0.25	-0.50	-0.45	-0.01

Note: n=460; Correlation coefficients > |.08| are significant at 5% level.

RESULTS

Descriptive statistics and correlations are presented in Table 2. Results of formal (model 1) and informal (model 2) entrepreneurship are presented in Table 3.

Table 3

Results for Formal and Informal Entrepreneurship		
Variables	Model 1 ^a	Model 2 ^b
Working Population (/1MM)	0.005 (0.331)	0.003 (0.324)
Human Capital	0.085 (0.006)	-0.191 (0.073)
Financial Capital	0.102 (0.004)	-0.091 (0.138)
Attitudes	-0.001 (0.450)	0.013 (0.174)
Technology	0.263 (0.000)	-0.028 (0.448)
Stage Development (GDP PPP per capita/10,000)	-0.083 (0.207)	-0.248 (0.017)
Constant	-1.2067 (0.151)	7.002 (0.001)
Wald chi2	251.78	17.78
Observations/groups	460/79	460/79

Note: p-values in parentheses.

a Poisson random effects model predicting Formal Activity. Robust standard errors clustered by nation.

b OLS random effects model predicting Informal Activity. Robust standard errors clustered by nation.

In support of H1a, model 1 provides evidence that human capital has a positive effect on formal entrepreneurship ($\beta=0.085$, $p=0.006$). Results for informal entrepreneurship (model 2) marginally support H1b's assertion that human capital has a negative impact on informal entrepreneurship ($\beta=-0.191$, $p=0.073$).

Consistent with H2a, we see a significant and positive relationship between financial capital and formal entrepreneurial activity ($\beta=0.102$, $p=0.004$). As

anticipated, there was no observed effect of financial capital on informal entrepreneurship. Contrary to H3a and H3b, we did not find evidence to suggest that positive attitudes towards entrepreneurship are related to either formal ($\beta=-0.001$, $p=0.450$) or informal ($\beta=0.013$, $p=0.174$) entrepreneurship.

H4a is strongly supported by our finding that technology development is highly predictive of formal entrepreneurial activity ($\beta=0.263$, $p<0.001$). However, we did not find a significant relationship between technology and informal entrepreneurship ($\beta=-0.028$, $p=0.448$). These findings point to interesting possibilities for future research and the impact of technological development on different types of entrepreneurship.

Contrary to H5a the stage of economic development did not impact formal venture creation ($\beta=-0.083$, $p=0.207$). However, we did find significant support for H5b as the stage of economic development of a country was indeed negatively related to informal entrepreneurial activity ($\beta=-0.248$, $p=0.017$). A summary of the hypotheses can be seen in table 4.

Table 4

Summary of Hypotheses			
Hypothesis	Formal (a)		Informal (b)
1 - Human Capital	Supported	+	Marginally Supported -
2 - Financial Capital	Supported	+	
3 - Attitudes	Not Supported		Not Supported
4 - Technology	Supported	+	Not Supported
5 - Stage of Development	Not Supported		Supported -

DISCUSSION

In investigating both supply-side and demand-side antecedents of entrepreneurial activity, we find that the impact of entrepreneurial determinants on entrepreneurial activity depends greatly on the form of entrepreneurship being considered. For formal entrepreneurship, meaning officially registered new businesses, nations possessing higher levels of human capital, financial capital, and technological development enjoy increased levels of formal entrepreneurial activity. In contrast, our study reveals a very different set of relationships for informal entrepreneurship – those businesses that are not formally registered. We found evidence to suggest that human capital and economic development exert a negative influence on

informal entrepreneurial activity. Our hypothesis 3, that predicted a relationship between attitudes towards entrepreneurship and entrepreneurial activity, was our only hypothesis with no support. One possibility for this unexpected result is that the GEM measure of entrepreneurial attitude is more focused on the social acceptability of entrepreneurs, compared to other measures that emphasize favorability. It could be that merely acknowledging that entrepreneurship is socially acceptable is not a strong enough attitude to drive interest in pursuing entrepreneurship, in contrast to attitudes of it being favorable and desirable, which might indeed drive such intentions.

Interestingly, both of our hypotheses that predicted positive influences on informal entrepreneurship were not supported. This is in sharp contrast to our findings regarding formal entrepreneurship where three of the four received strong support. Yet, this combination of findings strongly indicates there are clear differences in the factors that drive formal versus informal entrepreneurial activity. Overall, our findings paint an intriguing picture of the rise of formal entrepreneurship coming at the cost of informal entrepreneurship. For example, with human capital, we see that the very educational attainment of a nation's citizens that promotes formal entrepreneurship also led to a decline in informal entrepreneurship.

This study provides several contributions to both theory and practice. First, by simultaneously evaluating the supply-side, demand-side, and institutional determinants of entrepreneurship, a clearer picture of entrepreneurial activity emerges. Although prior work, such as Verheul et al. (2002), clearly identifies the importance of a comprehensive analysis, few studies have provided empirical validation. Second, by disentangling the forms of entrepreneurship, we move beyond a unitary conceptualization of the construct and add clarity to the mechanisms involved. Similar to previous research distinguishing between latent and realized entrepreneurship (van Stel et al. 2007), this study identifies how the impact of entrepreneurial determinants is contingent on the form of entrepreneurship being considered. Specifically, entrepreneurial type is one possible explanation for the contradictory findings with respect to the role of human capital and stage of development.

Lastly, this study has important implications for policy. "Improving our understanding of entrepreneurship... is an important pre-requisite to appropriate public policy planning" (Desai, 2009: 10). When making carefully measured decisions regarding the allocation of valuable resources, it is important to know what form (or forms) of entrepreneurial activity are desired. For example, policies that improve education (e.g. funding, curriculum) positively impact formal entrepreneurial activity and negatively impact informal entrepreneurial activity. In contrast, policies and governmental interventions that create and stimulate favorable attitudes towards entrepreneurship might be believed to be crucial but are

shown to have negligible impacts to formal and informal entrepreneurial activity. These asymmetrical effects highlight the importance of unpacking the form of entrepreneurship in making informed, appropriate, and effective policy decisions.

A few limitations of this research merit comment. Data of informal sector activity pose a significant challenge for scholars (Klapper et al., 2007). While there are ways to calculate this type of activity, it is not directly and independently measured in a fully satisfactory manner. Unfortunately, the unofficial nature of informal activity limits frequent and accurate observation. While we employ current best practices in measuring informal entrepreneurship, we acknowledge that future research might benefit from world economic organizations better capturing this important phenomenon. Formal registration data must also be interpreted with caution. Changes in governmental policies and registration requirements may spuriously suggest increases or decreases in formal entrepreneurial activity.

In the interest of parsimony, this study examines how only a select number of resources and opportunities impact both formal and informal entrepreneurship. Nevertheless, the governmental policies identified by Auderstch et al. (2007) and Thurik (2008) play an important role in determining entrepreneurial activity. Additional research is needed to examine how specific governmental policies might interact with the supply-side and demand-side determinants to predict both formal and informal entrepreneurship. Furthermore, although this study briefly explores the relationship between formal/informal and opportunity/necessity entrepreneurship, additional theoretical development examining the specific mechanisms of these interactions is needed. Finally, as with most archival research, arguments of causality rely on a theoretical justification, making it difficult to empirically verify the posited direction of causality.

CONCLUSION

Entrepreneurship remains an area of vital interest for both academics and policy makers. Entrepreneurial activity is associated with important developmental indicators including wealth creation, job creation, innovation, and social welfare (e.g. Decker, et al., 2014; Stoica, et al., 2020; Thurik, 2008). Indeed, “entrepreneurship has become a cornerstone of economic development policies” (Desai, 2009:1). Due to entrepreneurship’s wide-ranging and important effects, a clear understanding of its determinants becomes critical. The extant entrepreneurship literature provides contradictory findings with respect to entrepreneurial catalysts (e.g. Uhlaner & Thurik, 2004, van Stel et al., 2007). In an effort to address this gap, we built on an existing eclectic theory of entrepreneurship (Verheul et al., 2002), to examine how supply-side, demand-side and institutional factors drive the various forms (i.e. formal and informal) of entrepreneurship. By disentangling the form of entrepreneurial activity, a clearer picture of

entrepreneurial determinates emerged. Specifically, these findings suggest a relationship between the various predictors and entrepreneurial activity. In summary, the impact of the determinants of entrepreneurial activity were contingent on which form of entrepreneurship was being considered. Additional research is needed to further unpack the complex, yet consequential phenomenon of formal and informal entrepreneurship at a national level.

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