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HOW DO INSTITUTIONS SHAPE PRODUCTIVE ENTREPRENEURSHIP ACROSS LEVELS OF ECONOMIC DEVELOPMENT?

A MULTILEVEL ANALYSIS

Kun Fu, José Ernesto Amorós, Erkkö Autio, Donghyun Park, and Yeng-May Tan

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ABSTRACT

We examine the influence of institutional framework conditions on the productivity potential of new entrepreneurial businesses in advanced and developing economies using primary data from the Global Entrepreneurship Monitor from 2006 to 2022. We combine each economy's institutional conditions for entrepreneurship with individual-level data on entrepreneurial activity, productivity, and aspirations. We use three measures to proxy for productive entrepreneurship: new product innovation, export activity, and high-growth expectations. The three institutional conditions examined are business regulations, rule of law, and financial conditions. Using a two-stage Heckman model to control for selection bias, we find that an economy's institutional framework is instrumental in shaping productive entrepreneurship, and the effects are more pronounced in developing economies, with evidence of decreasing returns for advanced economies. The novelty of our analysis is in the use of an extended panel, the use of a multilevel design to appropriately control for individual-level effects, and the exploration of the moderating effect of economic development.

Keywords: productive entrepreneurship, institutional framework conditions, innovation, multilevel analysis

JEL codes: L26, O33, O31, O57

I. INTRODUCTION

Entrepreneurship can be a potent driver of economic growth because of the way it can allocate human, physical, and financial capital to productive uses through experimentation and innovation (Ács, Autio, and Szerb 2014). However, this potential does not materialize automatically, as entrepreneurs can also allocate their human, physical, and financial capital toward unproductive and even destructive uses—that is, uses that will not contribute significantly to economic wellbeing within the economy, and indeed may even deduct from it (Baumol 1990). Consistent with Baumol’s argument, a rapidly increasing stream of empirical studies has highlighted non-trivial effects of economies’ and US states’ institutional framework conditions (IFCs) on the prevalence of productive and unproductive entrepreneurship (Sobel 2008, Autio and Fu 2015, Urbano et al. 2019, Audretsch et al. 2024). This research has reported important effects both for informal institutions (i.e., culture and social norms (Autio, Pathak, and Wennberg 2013), formal institutions such as the rule of law and entry regulations (Klapper, Laeven, and Rajan 2006), and resource-related conditions such as availability of financial capital for entrepreneurs (Chowdhury, Audretsch, and Belitski 2018). However, important open questions remain, particularly concerning the IFC–productive entrepreneurship relationship at different levels of economic development (Neumann 2021). In this paper, we therefore ask: how does an economy’s level of economic development moderate the effect of IFCs on productive entrepreneurship?

Although the evidence regarding the effects of the economy’s IFCs overall as well as the specific effects of individual IFCs on entrepreneurship in advanced economies is extensive and growing, less is known about how IFCs shape entrepreneurship in developing economies. In his relatively recent review, Neumann (2021) observed that most studies of the effects of IFCs had been carried out in developed economies. Although studies have subsequently begun exploring the developing economy context, there remains a dearth of studies that explore how the level of economic development within an economy shapes the effects of IFCs on the quality of entrepreneurship in that economy. In other words, although studies of the relationship within developing economies are increasing in prevalence (e.g., Bruton, Ahlstrom, and Obloj 2008; Autio and Fu 2015; Urbano et al. 2020), a gap remains in terms of studies that explore how an economy’s level of economic development moderates this relationship (Liñán, and F. Rafael Cáceres-Carrasco 2021; Urbano, Orozco, and Turro 2024). This is an important gap, since, if different economic contexts vary in terms of how strongly their IFCs affect the quality of their economy-level resource allocation dynamic, this implies that policymakers should finetune their entrepreneurship policies accordingly. In this study, therefore, we explore how an economy’s level of economic development moderates the relationship between its IFCs and the quality of its entrepreneurial resource allocation dynamic.

Exploring the moderating effect of an economy’s level of economic development on the relationship between its IFCs and productive entrepreneurship is important because of the size of the phenomenon within developing economies. As a rule, developing economies tend to exhibit much higher self-employment rates¹ than advanced economies (Ács 2006, Ács and Amorós 2008, Autio and Fu 2022). Given that there are far more people in

¹ In this study, we analyze data from the Global Entrepreneurship Monitor (GEM), a large share of which represents self-employment activity.

developing and low-income economies engaging in entrepreneurial activities, a more detailed understanding of the moderating effect of the economy's level of economic development should help inform better-adjusted and targeted policy interventions. Prior research has also shown that the factors contributing to entrepreneurial success vary significantly across regions (Wagner and Sternberg 2004; MacMullen, Bagby, and Palich 2008; Aparicio, Audretsch, and Urbano 2021). This again underscores the importance of exploring how the level of an economy's economic development regulates how its IFCs shape productive entrepreneurship.

In this study, we compare the effects of IFCs on productive entrepreneurship between advanced and developing economies using a multilevel research design. Drawing on Global Entrepreneurship Monitor (GEM) data, we generate a new dataset by integrating individual-level entrepreneurial activity data from GEM with economy-level information on business regulations, rule of law, and financial development conditions. To mitigate potential biases inherent in hierarchical data, we employ the two-stage Heckman model (Heckman 1979), which corrects for any biases caused by self-selection of individuals to entrepreneurship. By extending our analysis to 2021, we capture the evolving impact of these conditions on productive entrepreneurship in both advanced and developing economies. In the next section, we review related studies to establish the theoretical basis and set the stage for formulating our hypotheses. We then describe our data and research method. We follow this with a presentation of our findings. The final section discusses and concludes our study.

II. CONCEPTUAL FRAMEWORK

A. Institutional Conditions and Entrepreneurial Behaviors

We define entrepreneurial activity as an individual-driven initiative by means of which individuals create new businesses of which they become owner-managers (Reynolds et al. 2005). Entrepreneurs are individuals who perceive business opportunities, launch new businesses, and undertake risks to optimize returns on their invested resources, including human capital (education, skills, and knowledge), social capital (professional connections, networks, and access to industry experts), and financial capital. When deciding whether to launch their own business, individuals weigh the opportunity costs associated with the allocation of their human, social, and financial capital against alternative occupational pursuits such as salaried employment or entrepreneurship (Ács, Autio, and Szerb 2014).

In addition to considering entrepreneurship as an individual-level initiative, we also view entrepreneurship as primarily an economically motivated activity that seeks to achieve favorable economic outcomes for the individual. The economic freedom theory (Bjørnskov and Foss 2008; Bylund, Klein, and McCaffrey 2024) argues that, when individuals have the freedom to make economic choices regarding the allocation of their time, skills, and resources, this promotes increased prosperity and societal wellbeing. However, this principle may not always be attainable, particularly in developing and low-income economies. Unlike productive and opportunity entrepreneurs in the developed world, who are motivated to innovate and grow their business and often choose self-employment of their own volition to pursue perceived entrepreneurial opportunities, many entrepreneurs in developing economies are forced into self-employment in the absence of alternative,

salaried, employment opportunities (Levie et al. 2014). Consistent with this observation, self-employment rates in low-income economies tend to be associated with lower levels of economic productivity (Margolis 2014).

Institutional theory (North 1990) posits that both formal and informal institutions can have a significant impact on entrepreneurial behaviors and outcomes. Economy-level factors such as the quality of regulations, access to financing, market competition, and cultural attitudes play an important role in how entrepreneurs assess new venture prospects, evaluate risks, and capitalize on the returns generated by their activities. While it is widely agreed that institutional environments influence entrepreneurial decisions (Minniti 2008; Ács, Autio, and Szerb 2014; Levie et al. 2014; Fuentelsaz et al. 2015), some dissenting voices exist, particularly in the context of developing economies. Udimal et al. (2020) found that formal institutions in BRICS economies did not significantly influence the prevalence of either opportunity or necessity entrepreneurship. Amorós, Mandakovic, and Poblete (2019) reported similar findings in their study of Latin American economies. These studies underscore the importance of further and more detailed explorations on how an economy's level of economic development moderates the effectiveness of its entrepreneurship policies.

Received empirical evidence underscores the wide variation in the quality of institutional environments across regions, economies, periods, and stages of economic development (Wagner and Sternberg 2004; Minniti 2008; Amorós et al. 2019). Developing and low-income economies face unique challenges and opportunities in fostering entrepreneurship (Doran, McCarthy, and O'Connor 2018). Weak IFCs that fail to support adequate provision of resources to entrepreneurs and offer limited property protection are often cited as the main barrier to optimal resource allocation and the development of opportunity-driven and formal entrepreneurship in these economies (Bruton, Ketchen, and Ireland 2013; Autio and Fu 2015; Angulo-Guerrero, Pérez-Moreno, and Abad-Guerrero 2017). Therefore, generalizing the impact of IFCs on productive entrepreneurship across developed and developing markets risks masking nuances of their influence on productive entrepreneurship in different economic contexts.

We next consider how the level of an economy's economic development might moderate the effect of three IFCs in particular: business regulations, rule of law, and availability of financing for private businesses.

B. Effect of Institutional Framework Conditions on Productive Entrepreneurship

Received research has highlighted several mechanisms through which IFCs shape entrepreneurial activity (Ács, Autio, and Szerb 2014). First, IFCs influence who chooses to become an entrepreneur (Autio, Pathak, and Wennberg 2013). Individuals with high human capital face greater opportunity costs for the allocation of their human capital toward entrepreneurial opportunity pursuit, so they will be sensitive to economy-level IFCs that shape those trade-offs. Second, IFCs shape the ambition level entrepreneurs set for their ventures once established (Autio and Ács 2010). IFCs may influence trade-offs between, say, in-house production and outsourcing, thereby shaping employment growth expectations in new ventures. Finally, IFCs may influence how well the entrepreneurial business is able to realize its full potential, once the ambition level is set. For example,

economies with better resource-related framework conditions may be better able to supply entrepreneurs with the resources they require. Combined, the multiple effects in different stages of new business development will shape an entrepreneurial resource allocation dynamic, which may or may not contribute to economic growth and development, depending on the quality of its IFCs.

As already noted, entrepreneurial activities may be productive, unproductive, and even destructive (e.g., organized crime) (Baumol 1990; Baumol and Strom 2007). Although unproductive entrepreneurship such as low-tech self-employment can make an important contribution toward poverty alleviation and economic self-sufficiency, most governments today have recognized the potency of productive (i.e., innovative, risk-taking, and growth-oriented) entrepreneurship in contributing to economic development and growth. In this paper, we operationalize productive entrepreneurship using three firm-level measures: product innovation activity, export activity, and high-growth expectations. We assume that businesses that innovate products and services that are new to their market will be more productive as a result of the novelty and consequent value added they may be able to generate. Export activity signals that the entrepreneurial venture's products are attractive beyond their immediate local market and competitive against substitutes in other economies. Lastly, high-growth expectations signal the entrepreneurial firm's belief in its capacity and ability to rapidly expand its business, and, therefore, a strong productivity potential.

Next, we elaborate how business regulations, rule of law, and the availability of financing for private businesses shape productive entrepreneurship at different levels of economic development.

C. Business Regulations and Productive Entrepreneurship

Consistent with previous research on the topic (Chowdhury, Audretsch, and Belitski 2018; Audretsch et al. 2024), we argue that an economy's regulatory framework for new business creation will exercise an important effect on productive entrepreneurship. The economy's regulatory framework can be characterized by factors such as regulatory burden, regulatory efficiency, regulatory complexity, and regulatory transparency (Fredström, Peltonen, and Wincent 2020). Advanced economies typically exhibit greater business freedoms, which are supported by permissive regulations for market entry, which lowers the barriers new entrepreneurial businesses face when trying to introduce their competitive offerings to the market (Levie and Autio 2011). In such environments, entrepreneurs are more inclined to invest in innovation and pursue long-term growth strategies, which should lead to higher levels of firm-level productivity.

On the other hand, low-income economies tend to contend with more severe regulatory constraints and bureaucratic hurdles than do advanced economies (de Soto 2000, Acemoglu and Robinson 2012). These may include lengthy and complex registration procedures, high compliance costs, and limited transparency. Because such burdens tend to be particularly pressing in economies with low levels of economic development, we expect that, in developing economies, reductions in regulatory burden will exercise a more significant impact on productive entrepreneurship than in advanced economies.

An additional consideration is that low-income economies typically exhibit higher levels of informal entrepreneurial activity (i.e., entrepreneurs who do not register their businesses), as entrepreneurs try to escape excessive regulatory burdens (Djankov et al. 2002, Autio and Fu 2015). However, doing so also means that informal businesses tend to be less productive and innovative because they do not necessarily enjoy the legal protections (including property protections) that are accorded to registered businesses. This reduces their ability to invest in product and service innovation and business growth. Enhancing business regulations can help mitigate such challenges and encourage the formalization of entrepreneurial ventures, thereby boosting firm-level productivity.

In summary, while we expect enhanced business regulations to positively influence productive entrepreneurship across different levels of economic development, we expect the effect of improved business regulations to be particularly pronounced in developing economies, given their greater regulatory barriers and the potential of improved business regulations to encourage a shift from informal to formal entrepreneurship. Conversely, in advanced economies, where business regulations may already be of reasonably high quality, the marginal effect of further improvements in business regulations should grow increasingly smaller as a function of the economy's economic development. Therefore, we hypothesize:

H1a The quality of business regulations will be positively associated with productive entrepreneurship in both advanced and developing economies.

H1b The positive impact of business regulations on productive entrepreneurship will be stronger in developing economies than in advanced economies.

D. Rule of Law and Productive Entrepreneurship

An economy's rule of law regime is a foundational element of its business environment. A strong rule of law regime fosters trust and confidence among entrepreneurs and encourages entrepreneurs to invest in innovation and growth (Levie and Autio 2011). This is because of several mechanisms. First, a strong rule of law regime reduces transaction costs by strengthening the enforceability of legal contracts. Second, a strong rule of law regime helps guarantee property rights and shield businesses against extortion attempts initiated by corrupt officials. Third, a strong rule of law regime tends to improve the economy's governance regime and institutional quality in general, because citizens have more confidence to challenge ineffective and corrupt officials, and because many institutions depend on a strong rule of law regime to function properly. Therefore, a strong rule of law regime should encourage entrepreneurial risk taking and entice entrepreneurs to invest their human, social, and financial capital to pursue innovation and long-term growth and prosperity (Lee, Peng, and Barney 2007; Armour and Cumming 2008; Acemoglu and Johnson 2012).

Research indicates that property right protection positively influences rates of opportunity-driven entrepreneurship (Autio and Ács 2010; Estrin, Korosteleva, and Mickiewicz 2013; Amorós et al. 2019). Moreover, a robust rule of law regime helps attract domestic and foreign investment, thereby helping provide entrepreneurs with access to resources to start and grow their ventures. Conversely, a weak rule of law regime encourages corruption,

thereby contributing to an unfair business environment that diverts resources from productive uses and discourages merit-based business activities (Murphy, Shleifer, and Vishny 1990; 1993; Bowen and de Clercq 2008).

Because of the multiplicity of the effects of the economy's rule of law regime on other aspects of its institutional framework, we expect the beneficial effect of improvements to the economy's rule of law regime to be particularly strong at low levels of economic development. As an economy's rule of law regime begins to improve, its entrepreneurs will start seeing improvements not only in contract enforceability and property protections but also in other framework conditions and institutional quality in general. Moreover, these effects are likely to be self-reinforcing, with improvements in other elements of the economy's IFCs likely to feed back to its rule of law regime. Therefore, we hypothesize:

H2a The strength of an economy's rule of law regime will be positively associated with productive entrepreneurship in both advanced and developing economies.

H2b Improvements in the economy's rule of law regime will have a stronger positive impact on productive entrepreneurship in developing economies compared with advanced economies.

E. Financial Development and Productive Entrepreneurship

A strong financial system is crucial for productivity growth as it improves resource allocation and fosters technological change (Heil 2018, Levine 2021). Access to financial support, including loans, grants, and equity financing, is essential for boosting productive entrepreneurship because it helps provide the necessary capital for starting and growing a new business and investing in innovation (Afi, Boubaker, and Omri 2022).

We expect improvements in access to finance to have a particularly strong effect on productive entrepreneurship in economies where the level of economic development is low. This is for three reasons. First, in low-income economies, entrepreneurs are less able than those in high-income economies to use their own financial capital such as accumulated savings and personal property to invest in innovation and growth of their businesses. Therefore, entrepreneurs in low-income economies are more dependent on external sources of finance to invest and grow their businesses, and improvements in the supply of funding should therefore translate into advances in productive entrepreneurship particularly rapidly.

Second, investment in innovation and firm growth can significantly increase the entrepreneurial firm's capital intensity, and therefore its financing requirements. This should further reinforce the alacrity with which improvements in the economy's supply of financial capital to entrepreneurs translate into increases in productive entrepreneurship.

Third, as an economy's level of economic development increases, its supply of alternative sources of funding for entrepreneurs tends to grow more diverse and varied. While this broadens the funding options available for entrepreneurs (e.g., self-funding, bank loans, government grants, crowdfunding, and venture capital), it should also tone down the economy-level association between adding new funding sources and productive entrepreneurship. As alternative funding sources become more available, this allows

productive entrepreneurs to better optimize their funding for their own needs, but it does not automatically mean new funding sources will attract new productive entrepreneurs into the market. Conversely, at lower levels of economic development, when the diversity of different funding options available for entrepreneurs is much more limited, improvements in the supply of funding are likely to translate more directly into increases in productive entrepreneurship. Therefore, we hypothesize:

H3a The level of financial development will have a positive influence on productive entrepreneurship in advanced and developing economies alike.

H3b Improvements in financial development will have a stronger positive effect on productive entrepreneurship in developing economies than in advanced economies.

The details of the research design and methods are discussed next.

III. METHODS

We hypothesize that the regulation of new business entry and operation, rule of law, and financial development conditions will influence the productivity potential of new entrepreneurs. We also posit that these relationships are moderated by the economy's level of economic development.

To validate our hypotheses, we combine data describing economy-level IFCs with individual-level data on entrepreneurial activities and aspirations. Our primary dataset is the Global Entrepreneurship Monitor (GEM) dataset (Reynolds et al. 2005). GEM is an annual survey that tracks individual-level entrepreneurial attitudes, activities, and aspirations in participating economies. The GEM dataset is composed of population-representative interviews of at least 2,000 individuals per economy. GEM applies harmonized data collection methods across the participating economies. Over 70% of the data has been collected through telephone surveys. The survey questionnaire is standardized across economies and translated into local languages. In economies where population-representative telephone surveys are not possible, face-to-face interviews are carried out using multistage randomized cluster sampling. Specifically, we use GEM data from 2006 to 2021, the most recent year for which this data is available.

GEM defines entrepreneurship as any attempt to create a new business, by individuals, including self-employment (Reynolds et al. 2005). There are three categories of entrepreneurial business depending on the stage of a firm's development based on GEM's classification. Specifically, GEM defines an individual as a "nascent entrepreneur" if the person is currently trying to start a new business, they have done something tangible over the previous 12 months to start the business, the person would be an owner of the business, and the business has not paid salaries for anyone for longer than the previous 3 months. Similarly, GEM defines an individual as a "new entrepreneur" if the person has paid salaries for someone for longer than the previous 3 months but no longer than 42 months. In this study, we define the businesses started by new entrepreneurs as "baby businesses." Finally, GEM qualifies a person as an "established entrepreneur" if the person meets the above criteria and has paid salaries for someone for longer than 42 months. We refer to businesses started by established entrepreneurs as "established businesses." Our

analyses focused on baby businesses. We excluded nascent and established businesses from our analysis.

For the empirical analysis, our GEM dataset in the sample covers a total of 100,636 (unweighted) interviews among working-age individuals (16–64 years old) who were new entrepreneurs owning and managing a baby business across 102 economies ranging from advanced economies to emerging and developing economies and to underdeveloped economies (IMF 2023), as shown in Table 1.

Table 1: Classification of Economies in Our Dataset by Development Level

Advanced Economies	Emerging, Developing, and Underdeveloped Economies	
Australia	Algeria	Macedonia
Austria	Angola	Madagascar
Belgium	Argentina	Malawi
Canada	Armenia	Malaysia
Croatia	Bangladesh	Mexico
Cyprus	Barbados	Montenegro
Czech Republic	Belarus	Morocco
Denmark	Belize	Namibia
Estonia	Bolivia	Nigeria
Finland	Bosnia & Herzegovina	Pakistan
France	Botswana	Panama
Germany	Brazil	Peru
Greece	Bulgaria	Philippines
Hong Kong, China	Burkina Faso	Poland
Iceland	Cameroon	Qatar
Ireland	Chile	Romania
Israel	China, People's Republic of	Russian Federation
Italy	Colombia	Saudi Arabia
Japan	Costa Rica	Senegal
Republic of Korea	Dominican Republic	Serbia
Latvia	Ecuador	South Africa
Lithuania	Egypt	Sudan
Luxembourg	El Salvador	Suriname
Netherlands	Georgia	Thailand
Norway	Ghana	Togolese Republic
Portugal	Guatemala	Trinidad & Tobago
Singapore	Hungary	Tunisia
Slovak Republic	India	Türkiye
Slovenia	Indonesia	Uganda
Spain	Iran	United Arab Emirates
Sweden	Jamaica	Uruguay
Switzerland	Jordan	Venezuela
United Kingdom	Kazakhstan	Viet Nam
United States	Lebanon	Zambia

Source: Authors.

We combined the GEM data economy-level data from the World Bank, the Worldwide Governance Indicators (WGI), and the Index of Economic Freedom from the Heritage Foundation. To test our hypotheses, we combined GEM data with relevant economy-level descriptors of IFCs that describe the economy's framework conditions for new business registration and operation, rule of law, and availability of financing for private businesses.

A. Variables

We examine the influence of economy-level institutional conditions on the productivity potential of new entrepreneurial businesses in the economy and compare the impact of IFCs on productive entrepreneurship in advanced versus other economies. By productivity potential we refer to the potential ability of entrepreneurial businesses to contribute to total factor productivity (TFP) in the economy. Conceptually, TFP is the amount of economic output that cannot be explained using inputs alone (van Beveren 2012, Gal 2013, Bournakis and Mallick 2018). Thus, at the firm level, it represents the efficiency with which firms use resources to create economic value added. As we cannot directly measure this efficiency, we use firm-level proxies that are indicative of firm-level productivity. Specifically, we measure the firm's product innovation activity, on the assumption that innovative products represent higher firm-level value added. We also measure the firm's export activity, assuming more efficiently produced and more innovative outputs are more competitive outside national borders. Third, we measure the firm's employment growth expectations, on the assumption that more efficient firms will be able to outcompete less efficient ones, which should positively impact their growth expectations. All three measures of firm-level productivity potential were taken from the GEM dataset.

Product innovation is measured by a dummy variable that takes value 1 if at least some customers of the firm consider the firm's product or service as new—that is, not previously available in the market. The variable takes the value 0 if none of the firms' customers consider their product or service as new.

Export activity is measured by a dummy variable that takes value 1 if the firm has customers who live outside of the economy and 0 otherwise.

High-growth expectations are measured using a dummy variable that takes the value 1 if the business expects to employ more than 20 employees in 5 years' time and 0 otherwise.

B. Independent Variables

We examine the impact of a set of economy-level institutional conditions on productive entrepreneurship across economies. The measures of the institutional variables are taken from several different sources.

Business regulation is assessed based on the Business Freedom score from the Index of Economic Freedom of the Heritage Foundation. This score captures the extent to which an economy's regulatory and infrastructure environments influence the efficient establishment and operation of businesses. The index is calculated using equally weighted sub-factors such as access to electricity, business environment risk, regulatory quality, and women's economic inclusion, which collectively impact the ease of starting, operating, and closing a business.

The strength of the economy's **rule of law** is measured using a multi-component variable via principal component analysis. The two components are property rights protection and control of corruption. **Property rights protection** captures the ability of individuals to accumulate private property, secured by laws that are fully enforced by the state. It also assesses the risk that private property will be expropriated, the independence of the

judiciary, and the existence of corruption within the judiciary. We used the index for protection of property rights from the Economic Freedom of the World Index, reported annually by the Fraser Institute (Gwartney et al., 2021). The index ranges from 0 to 10, with higher values indicating stronger property protection. *Control of corruption* captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, and the “capture” of the state by elites and private interests. This variable was measured based on the “control of corruption” component in the WGI. These two components are loaded on one factor with an Eigenvalue over 1. The value of Cronbach's alpha is 0.926, suggesting a high level of internal consistency and reliability of the construct.

The quality of the economy's **financial development** is captured by the private credit ratio, which is measured by the domestic credit for private sectors as a percentage of the economy's gross domestic product (GDP) (Arcanda, Berkes, and Panizza 2012; Dabla-Norris and Srivisal 2013).

C. Moderation Variable

We compare the influences of institutional conditions on productive entrepreneurship between advanced economies and the rest of the economies. To facilitate this comparison, we introduce an **advanced economy** dummy variable in the analyses. We follow the economy classification provided by the World Economic Outlook (WEO). The Country Composition of WEO Groups divides the world into two major groups: advanced economies and emerging and developing economies (IMF 2023). Therefore, the variable has a value of 1 if an economy is classified into the advanced economies and 0 if it is not classified as an advanced economy.

D. Control Variables

We control for different factors at both individual and economy levels of analysis well established in previous studies (Amorós et al. 2019; Mickiewicz, Stephan, and Shami 2021; Kara et al. 2024). At the individual level, we consider the entrepreneur's demographical characteristics including **age**, measured as a continuous variable measured in years. **Sex** is coded as a dummy variable, with a value of 1 for males and 0 for females. **Household income** is measured by a categorical variable with three categories. Value 1 of this variable indicates that the individual's household belongs to the lowest household income tier in the population, value 2 indicates the middle income tier, and value 3 indicates the top income tier. The individual's level of **education** is also captured by a categorical variable with values ranging from 1 to 5. Values 1 to 5, in ascending order, indicate that the individual has received no education (1), primary education (2), a secondary degree (3), post-secondary education (4), and graduate education (5), respectively. The individual's **fear of failure** dummy (1=yes) indicates whether the interviewee has responded affirmatively to the question of whether fear of failure would prevent them from starting a business. The individual's **entrepreneurial self-efficacy** is captured by a dummy variable (1=yes), indicating whether the individual believes they have possessed the necessary skills and knowledge to start a new business.

At the economic level, we control for the annual **rate of business formation**, as the prevalence of business entries within an economy may affect individuals' decisions to engage in entrepreneurial activities. The businesses considered here include both early-stage entrepreneurial ventures and more established firms, and this proxy was taken from the GEM dataset. We also control for the economy's **population size** and **population growth**, which were measured by the total population of the economy (in millions) and the population's annual percentage growth rate. The economy's economic growth rate and overall level of development level have been shown to be positively associated with new firm entries (Kawai and Urata 2002, Lee et al. 2011). We therefore control for the economy's **GDP per capita**, adjusted for purchasing power parity. Given high levels of correlation with some key institutional variables, this was coded into five quintiles, with the lowest quintile as the base. We also control for **GDP growth**, measured by annual GDP growth rate. Both variables are taken from the World Bank data. We also control for time-fixed effects by including **year** dummies in the analysis.

E. Econometric Analyses

We conduct cross-level analyses (economy-level effects on individual-level entrepreneurial behaviors) to estimate the effect of economy-level institutional conditions on the quality of the economy's entrepreneurial resource allocation dynamic. Our data has a hierarchical structure: the individuals are nested within economies. To address potential within-economy interdependence of observations and simultaneously account for individual- and economy-level effects, we employ multilevel modeling techniques to test our hypotheses. This approach aligns with similar studies (Audio, Pathak, and Wennberg 2013; Chowdhury, Audretsch, and Belitski 2018).

To examine the institutional influences on the quality of entrepreneurship, we account for potential unobserved heterogeneity arising from individuals' self-selection into entrepreneurship. This represents a methodological improvement over existing studies (e.g., Chowdhury, Audretsch, and Belitski 2018). We adopt a two-stage Heckman selection model (Heckman 1979) to control any self-selection bias in the estimation. The first-stage selection model estimates the probability of an individual qualifying as an early-stage entrepreneur as a function of individual-level demographics that are commonly associated with entrepreneurial entry, such as age, education, household income, fear of failure, familiarity with other entrepreneurs, and entrepreneurial self-efficacy, while controlling for economy-level factors like population size, population growth, GDP per capita, GDP growth, and key institutional variables including business regulation, rule of law, and financial development conditions. The second-stage model, or the outcome model, estimates the impact of the economy's institutional framework conditions on the productivity potential of its entrepreneurial businesses, while controlling for any unobserved heterogeneity in the self-selection of entrepreneurs (the inverse Mills ratio computed from the first-stage model), in addition to controlling for age, sex, education, household income, fear of failure, business formation rate, GDP per capita, GDP growth, and population size. To facilitate model identification, familiarity ties with other entrepreneurs is excluded from the second-stage outcome model. As shown in the findings section, the coefficients of the inverse Mills ratio are statistically significant across all outcome models. This indicates that the unobserved factors influencing an individual's likelihood of becoming an entrepreneur are correlated

with the unobserved factors affecting the outcome variable, which is the probability of being a productive entrepreneur. This confirms the presence of selection bias and underscores the importance of the Heckman correction—something that previous analyses have overlooked. Failing to account for selection bias would result in biased and inconsistent estimates of the outcome model.

The econometric models are specified as two-level models with random intercepts, which account for the variation in outcome variables across the economies every year. The model specification allows both individual-level and economy-level variables to affect the prevalence of product innovation, export activities, and employment growth expectations of individual entrepreneurs. We use maximum likelihood algorithms to fit the models. In the regression models, the continuous independent variables are all standardized to have a mean of 0 and a standard deviation of 1 for better comparability of the estimated coefficients. The key IFC variables are entered into the regression models separately to avoid potential issues of multicollinearity among the economy-level institutional factors.

IV. FINDINGS

A. Institutional Framework Conditions and Entrepreneurs' Product Innovation Activity

We first analyze the effects of the economy's IFCs on the prevalence of product innovation activities by entrepreneurial businesses in the economy. We found some strong correlations² between different institutional variables (e.g., rule of law and business regulation). Such correlations are expected since the quality of different IFCs tends to covary, and richer economies tend to feature higher-quality institutions. For this reason, we introduce the institutional variables separately in all analyses that follow. In all regressions, we control for GDP per capita to control for the fact that richer economies tend to feature higher-quality institutions. Otherwise, there is little concern regarding multicollinearity among independent variables in the regression analyses.

Table 2 shows the results of economy-level IFCs on product innovation activity in baby businesses. Model 1 is the baseline model, including only the control variables. Models 2, 3, and 4 test the influences of the economy's institutional conditions on the likelihood of baby businesses' product innovation.

² Descriptive statistics and correlations are available on request.

Table 2: Effects of Institutional Framework Conditions on Entrepreneurs' Product Innovation Activity

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Advanced Economy (yes=1)	0.092 (0.107)	0.098 (0.107)	-0.015 (0.115)	0.009 (0.109)	0.218+ (0.114)	0.315** (0.113)	0.023 (0.104)
Business Regulation		-0.034 (0.047)			0.065 (0.066)		
Rule of Law			0.187** (0.069)			0.518*** (0.090)	
Financial Development				0.137*** (0.041)			0.352*** (0.061)
Advanced Economy x Business					-0.260** (0.085)		
Advanced Economy x Rule of Law						-0.744*** (0.106)	
Advanced Economy x Financial							-0.416*** (0.070)
Inverse Mills Ratio	4.403*** (0.464)	4.414*** (0.465)	4.356*** (0.464)	4.398*** (0.464)	4.419*** (0.465)	4.367*** (0.464)	4.394*** (0.464)
Sex (Male=1, Female=0)	-0.074*** (0.021)	-0.075*** (0.021)	-0.074*** (0.021)	-0.074*** (0.021)	-0.075*** (0.021)	-0.074*** (0.021)	-0.074*** (0.021)
Age	-0.056*** (0.011)	-0.056*** (0.011)	-0.057*** (0.011)	-0.057*** (0.011)	-0.056*** (0.011)	-0.057*** (0.011)	-0.057*** (0.011)
Income1 (middle 33% tier)	-0.068* (0.032)	-0.068* (0.032)	-0.067* (0.032)	-0.068* (0.032)	-0.068* (0.032)	-0.067* (0.032)	-0.067* (0.032)
Income2 (upper 33% tier)	-0.099* (0.038)	-0.099** (0.039)	-0.098* (0.038)	-0.099* (0.038)	-0.099** (0.039)	-0.098* (0.039)	-0.099* (0.038)
Education1 (some secondary)	0.056 (0.042)	0.056 (0.042)	0.056 (0.042)	0.056 (0.042)	0.055 (0.042)	0.054 (0.042)	0.055 (0.042)
Education2 (secondary)	0.163*** (0.039)	0.163*** (0.039)	0.163*** (0.039)	0.162*** (0.039)	0.162*** (0.039)	0.162*** (0.039)	0.161*** (0.039)
Education3 (post-secondary)	0.310*** (0.045)	0.310*** (0.045)	0.310*** (0.045)	0.309*** (0.045)	0.310*** (0.045)	0.308*** (0.045)	0.307*** (0.045)
Education4 (graduate experience)	0.455*** (0.052)	0.455*** (0.052)	0.455*** (0.052)	0.454*** (0.052)	0.454*** (0.052)	0.453*** (0.052)	0.453*** (0.052)
Fear of Failure (yes=1)	0.116*** (0.029)	0.116*** (0.029)	0.116*** (0.029)	0.116*** (0.029)	0.116*** (0.029)	0.115*** (0.029)	0.115*** (0.029)
Self-Efficacy (yes=1)	-0.135** (0.046)	-0.136** (0.046)	-0.132** (0.046)	-0.134** (0.046)	-0.136** (0.046)	-0.133** (0.046)	-0.133** (0.046)
Rate of Business	-0.343*** (0.053)	-0.347*** (0.053)	-0.330*** (0.054)	-0.343*** (0.052)	-0.321*** (0.053)	-0.299*** (0.055)	-0.308*** (0.050)
Population Size	0.089** (0.032)	0.086** (0.031)	0.108** (0.033)	0.057+ (0.034)	0.108*** (0.032)	0.143*** (0.034)	0.071* (0.033)
Population Growth (%)	0.128*** (0.039)	0.124** (0.038)	0.153*** (0.040)	0.132*** (0.038)	0.130*** (0.038)	0.179*** (0.033)	0.141*** (0.034)
GDP Development Stage (2nd quintile)	0.030 (0.114)	0.036 (0.117)	-0.029 (0.108)	0.003 (0.112)	-0.001 (0.119)	-0.204+ (0.109)	-0.036 (0.110)
GDP Development Stage (3rd quintile)	-0.013 (0.151)	0.006 (0.154)	-0.090 (0.149)	-0.065 (0.149)	-0.018 (0.155)	-0.333* (0.151)	-0.093 (0.145)
GDP Development Stage (4th quintile)	0.014 (0.141)	0.052 (0.156)	-0.197 (0.159)	-0.080 (0.140)	0.116 (0.152)	-0.203 (0.148)	-0.025 (0.139)
GDP Development Stage (5th quintile)	-0.042 (0.133)	0.004 (0.154)	-0.349* (0.168)	-0.177 (0.135)	0.082 (0.148)	-0.211 (0.153)	-0.104 (0.131)
GDP Growth (%)	0.165*** (0.043)	0.162*** (0.044)	0.161*** (0.043)	0.180*** (0.043)	0.162*** (0.044)	0.149*** (0.041)	0.148*** (0.042)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Var(_cons[economy-year])	0.637*** (0.052)	0.637*** (0.052)	0.626*** (0.051)	0.625*** (0.051)	0.631*** (0.052)	0.588*** (0.049)	0.599*** (0.051)

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Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	1.640*** (0.371)	1.622*** (0.372)	1.820*** (0.376)	1.747*** (0.368)	1.609*** (0.373)	1.992*** (0.381)	1.857*** (0.370)
Observations	98,350	98,350	98,350	98,350	98,350	98,350	98,350
Number of Groups	791	791	791	791	791	791	791
Log Likelihood	-65771	-65771	-65771	-65771	-65771	-65771	-65771

GDP = gross domestic product.

Robust standard errors in parentheses; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$.

Source: Authors' calculations.

As shown in Model 2 of Table 2 the impact of business regulation does not show any significant effect on the likelihood of an entrepreneur's product innovation activities, which is contrary to our expectations. This is likely because the variance in the outcome variable has been largely captured by the economy's income-level dummy variable.

Models 3 and 4 of Table 2 show that better rule of law and financial development conditions tend to lead to a higher likelihood of product innovation for entrepreneurs regardless of the development level of the economy. An economy's rule of law capturing the effectiveness of an economy's institutions in property rights protection and control of corruption shows a strong positive association with the likelihood of product innovation of baby businesses (1.87, $p < 0.01$). Similarly, we find that economy-level financial development, measured by the private credit ratio, has a positive impact on baby businesses' product innovation (0.137, $p < 0.001$), even after controlling for the economy's development level. This suggests that, in economies where private credit is more widely available, entrepreneurs are more likely to innovate. These results strongly support our hypotheses 2a and 3a, which posit that stronger rule of law and financial institutions are positively associated with the productivity potential of an economy's entrepreneurial resource allocation dynamics.

We then examine whether the effects of institutional conditions on entrepreneurs' product innovation differ between advanced economies and the rest of the world. To avoid multicollinearity, we test the interaction terms between the advanced economy dummy variable and the three institutional variables separately in Models 5, 6, and 7 in Table 2. The results indicate a consistent pattern that the impacts of business regulation (-0.26, $p < 0.01$), rule of law (-0.744, $p < 0.001$), and financial development (-0.416, $p < 0.001$) on entrepreneurs' product innovation are stronger in the rest of the economies than in advanced economies, consistent with our hypotheses 1b, 2b, and 3b.

B. Institutional Framework Conditions and Entrepreneurs' Export Activity

Model 1 in Table 3 serves as the baseline model, including only the control variables. Models 2, 3, and 4 are the main effect models. We observe across the main effect models that entrepreneurs from advanced economies demonstrate a higher likelihood of engaging in export activities compared with those from the rest of the world. The coefficients for the advanced economy dummy variable are 0.709 ($p < 0.001$), 0.708 ($p < 0.001$), and 0.681 ($p < 0.001$) in Models 2, 3, and 4, respectively.

Table 3: Effects of Institutional Framework Conditions on Entrepreneurs' Export Activity

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Advanced Economy (yes=1)	0.720*** (0.156)	0.709*** (0.159)	0.708*** (0.158)	0.681*** (0.159)	1.018*** (0.148)	0.990*** (0.151)	0.681*** (0.157)
Business Regulation		0.100+ (0.061)			0.352*** (0.077)		
Rule of Law			0.022 (0.077)			0.310** (0.095)	
Financial Development				0.063 (0.050)			0.196** (0.076)
Advanced Economy x Business					-0.706*** (0.127)		
Advanced Economy x Rule of Law						-0.686*** (0.131)	
Advanced Economy x Financial							-0.265** (0.100)
Inverse Mills Ratio	4.100*** (0.597)	4.074*** (0.597)	4.096*** (0.598)	4.098*** (0.597)	4.083*** (0.597)	4.101*** (0.598)	4.092*** (0.597)
Sex (Male=1, Female=0)	0.155*** (0.026)	0.155*** (0.026)	0.155*** (0.026)	0.155*** (0.026)	0.155*** (0.026)	0.155*** (0.026)	0.155*** (0.026)
Age	-0.046*** (0.013)	-0.047*** (0.013)	-0.046*** (0.013)	-0.046*** (0.013)	-0.046*** (0.013)	-0.046*** (0.013)	-0.046*** (0.013)
Income1 (middle 33% tier)	0.019 (0.040)	0.019 (0.040)	0.019 (0.040)	0.019 (0.040)	0.019 (0.040)	0.019 (0.040)	0.019 (0.040)
Income2 (upper 33% tier)	0.242*** (0.041)	0.242*** (0.041)	0.242*** (0.041)	0.242*** (0.041)	0.243*** (0.041)	0.242*** (0.041)	0.242*** (0.041)
Education1 (some secondary)	0.103+ (0.059)	0.103+ (0.059)	0.103+ (0.059)	0.103+ (0.059)	0.101+ (0.059)	0.102+ (0.059)	0.103+ (0.059)
Education2 (secondary)	0.259*** (0.055)	0.259*** (0.055)	0.259*** (0.055)	0.259*** (0.055)	0.257*** (0.055)	0.258*** (0.055)	0.258*** (0.055)
Education3 (post-secondary)	0.399*** (0.061)	0.398*** (0.061)	0.399*** (0.061)	0.398*** (0.061)	0.396*** (0.061)	0.397*** (0.061)	0.397*** (0.061)
Education4 (graduate experience)	0.532*** (0.068)	0.532*** (0.068)	0.532*** (0.068)	0.531*** (0.068)	0.530*** (0.068)	0.530*** (0.068)	0.531*** (0.068)
Fear of Failure (yes=1)	0.107*** (0.032)	0.106** (0.032)	0.106*** (0.032)	0.106** (0.032)	0.106** (0.032)	0.106** (0.032)	0.106** (0.032)
Self-Efficacy (yes=1)	-0.187*** (0.056)	-0.184** (0.056)	-0.186*** (0.056)	-0.186*** (0.056)	-0.185** (0.056)	-0.187*** (0.056)	-0.185** (0.056)
Rate of Business	-0.589*** (0.065)	-0.578*** (0.065)	-0.587*** (0.065)	-0.588*** (0.065)	-0.511*** (0.065)	-0.552*** (0.065)	-0.564*** (0.066)
Population Size	-0.318*** (0.040)	-0.308*** (0.040)	-0.316*** (0.042)	-0.332*** (0.042)	-0.252*** (0.041)	-0.288*** (0.042)	-0.326*** (0.042)
Population Growth (%)	0.008 (0.035)	0.025 (0.036)	0.011 (0.038)	0.010 (0.035)	0.031 (0.036)	0.021 (0.037)	0.011 (0.034)
GDP Development Stage (2nd quintile)	-0.143 (0.123)	-0.162 (0.123)	-0.149 (0.124)	-0.154 (0.123)	-0.255* (0.122)	-0.298* (0.123)	-0.176 (0.122)
GDP Development Stage (3rd quintile)	0.074 (0.176)	0.017 (0.177)	0.065 (0.179)	0.052 (0.177)	-0.029 (0.171)	-0.130 (0.171)	0.040 (0.174)
GDP Development Stage (4th quintile)	-0.276 (0.188)	-0.399* (0.196)	-0.303 (0.211)	-0.320+ (0.192)	-0.176 (0.198)	-0.240 (0.206)	-0.272 (0.192)
GDP Development Stage (5th quintile)	0.285 (0.203)	0.146 (0.211)	0.248 (0.249)	0.228 (0.205)	0.398+ (0.209)	0.452+ (0.243)	0.286 (0.204)
GDP Growth (%)	0.094* (0.042)	0.101* (0.042)	0.093* (0.042)	0.099* (0.042)	0.103* (0.042)	0.090* (0.040)	0.082+ (0.043)

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Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Var(_cons[economy-year])	0.952*** (0.074)	0.947*** (0.073)	0.952*** (0.074)	0.949*** (0.074)	0.900*** (0.069)	0.913*** (0.073)	0.939*** (0.073)
Constant	5.193*** (0.508)	5.257*** (0.510)	5.216*** (0.507)	5.237*** (0.510)	5.195*** (0.509)	5.313*** (0.515)	5.297*** (0.510)
Observations	86,164	86,164	86,164	86,164	86,164	86,164	86,164
Number of Groups	788	788	788	788	788	788	788
Log Likelihood	-51371	-51371	-51371	-51371	-51371	-51371	-51371

GDP = gross domestic product.

Robust standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

Source: Authors' calculations.

We do not find any significant main effect of our proxies for rule of law and financial institutions on export activity in baby businesses. However, there is a positive effect of business regulation on the likelihood of baby businesses engaging in export activities (0.1, p<0.1 in Model 2). Thus, hypothesis 1a is supported: economies with more efficient business regulations are likely to feature more entrepreneurial businesses engaged in export activity.

Regarding the differential effects of institutional variables between advanced economies and the rest of the economies, we find that all three institutional conditions exhibit consistently stronger effects in driving entrepreneurs' export activities in non-advanced economies than in advanced economies. This supports all three hypotheses 1b, 2b, and 3b regarding the interaction effects between an economy's development level and institutional conditions. This is evident from the coefficients of the interaction terms: -0.706 (p<0.001), -0.686 (p<0.001), and -0.265 (p<0.01) in Models 5, 6, and 7 in Table 3, respectively.

C. Institutional Framework Conditions and Entrepreneurs' Employment Growth Expectations

Table 4 shows the effect of the economy's IFCs on its entrepreneurs' high-growth expectations. The high-growth expectation is measured with a dummy indicating whether the business expects to employ 20 or more employees in 5 years' time, which is quite a high bar. As expected, the results of Model 2 show that the quality of economy's business regulations is positively associated (0.116, p<0.1) with the likelihood of an entrepreneur having high growth expectations in employment. For the other two sets of IFCs—rule of law and financial institutions—virtually no association is found with the high employment growth expectations of baby businesses. This set of analyses, therefore, provides support for hypothesis 1a but fails to support hypotheses 2a and 3a.

Table 4: Effects of Institutional Framework Conditions on Entrepreneurs' High-Growth Expectations

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Advanced Economy (yes=1)	-0.498*** (0.136)	-0.528*** (0.141)	-0.438** (0.137)	-0.530*** (0.141)	-0.399** (0.148)	-0.224 (0.142)	-0.514*** (0.137)
Business Regulation		0.116+ (0.063)			0.212* (0.085)		
Rule of Law			-0.094 (0.063)			0.077 (0.081)	
Financial Development				0.052 (0.046)			0.137* (0.069)
Advanced Economy x Business					-0.250* (0.124)		
Advanced Economy x Rule of Law						-0.412*** (0.119)	
Advanced Economy x Financial							-0.171+ (0.089)
Inverse Mills Ratio	6.617*** (0.961)	6.494*** (0.968)	6.699*** (0.968)	6.608*** (0.961)	6.505*** (0.968)	6.711*** (0.968)	6.599*** (0.961)
Sex (Male=1, Female=0)	0.488*** (0.046)	0.489*** (0.046)	0.487*** (0.046)	0.488*** (0.046)	0.489*** (0.046)	0.487*** (0.046)	0.488*** (0.046)
Age	-0.010 (0.024)	-0.012 (0.024)	-0.009 (0.024)	-0.011 (0.024)	-0.012 (0.024)	-0.009 (0.024)	-0.011 (0.024)
Income1 (middle 33% tier)	0.101 (0.070)	0.102 (0.070)	0.101 (0.070)	0.101 (0.070)	0.102 (0.070)	0.101 (0.070)	0.101 (0.070)
Income2 (upper 33% tier)	0.500*** (0.065)	0.502*** (0.065)	0.498*** (0.065)	0.500*** (0.065)	0.503*** (0.065)	0.499*** (0.065)	0.500*** (0.065)
Education1 (some secondary)	0.108 (0.094)	0.106 (0.094)	0.108 (0.094)	0.107 (0.094)	0.103 (0.094)	0.105 (0.094)	0.104 (0.094)
Education2 (secondary)	0.264** (0.086)	0.262** (0.086)	0.265** (0.086)	0.263** (0.086)	0.259** (0.086)	0.262** (0.086)	0.260** (0.086)
Education3 (post-secondary)	0.467*** (0.095)	0.464*** (0.095)	0.467*** (0.095)	0.465*** (0.095)	0.462*** (0.095)	0.464*** (0.095)	0.462*** (0.095)
Education4 (graduate experience)	0.712*** (0.106)	0.710*** (0.106)	0.712*** (0.106)	0.710*** (0.106)	0.708*** (0.106)	0.708*** (0.106)	0.708*** (0.106)
Fear of Failure (yes=1)	-0.058 (0.048)	-0.060 (0.047)	-0.057 (0.048)	-0.058 (0.048)	-0.060 (0.047)	-0.058 (0.048)	-0.059 (0.048)
Self-Efficacy (yes=1)	-0.178+ (0.098)	-0.169+ (0.098)	-0.184+ (0.099)	-0.177+ (0.098)	-0.170+ (0.098)	-0.184+ (0.098)	-0.175+ (0.098)
Rate of Business	-0.491*** (0.069)	-0.474*** (0.070)	-0.499*** (0.070)	-0.491*** (0.069)	-0.449*** (0.071)	-0.484*** (0.070)	-0.477*** (0.070)
Population Size	0.008 (0.039)	0.017 (0.039)	-0.001 (0.040)	-0.006 (0.041)	0.040 (0.041)	0.020 (0.039)	0.001 (0.040)
Population Growth (%)	0.020 (0.039)	0.038 (0.042)	0.009 (0.039)	0.022 (0.039)	0.044 (0.042)	0.018 (0.035)	0.024 (0.036)
GDP Development Stage (2nd quintile)	0.527*** (0.114)	0.506*** (0.113)	0.561*** (0.117)	0.515*** (0.113)	0.472*** (0.114)	0.455*** (0.122)	0.495*** (0.113)
GDP Development Stage (3rd quintile)	0.593*** (0.172)	0.539** (0.176)	0.632*** (0.173)	0.572*** (0.173)	0.507** (0.175)	0.484** (0.176)	0.557** (0.171)
GDP Development Stage (4th quintile)	0.760*** (0.179)	0.647*** (0.191)	0.860*** (0.190)	0.723*** (0.178)	0.699*** (0.189)	0.842*** (0.186)	0.743*** (0.177)
GDP Development Stage (5th quintile)	1.064*** (0.177)	0.922*** (0.195)	1.211*** (0.204)	1.013*** (0.177)	0.986*** (0.193)	1.271*** (0.197)	1.038*** (0.175)
GDP Growth (%)	0.117* (0.056)	0.129* (0.057)	0.117* (0.055)	0.122* (0.056)	0.128* (0.058)	0.107+ (0.055)	0.107+ (0.056)

Continued on the next page

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Var(_cons[ctryyr])	0.682*** (0.057)	0.674*** (0.056)	0.677*** (0.056)	0.681*** (0.057)	0.666*** (0.056)	0.658*** (0.057)	0.674*** (0.057)
Constant	0.056 (0.735)	0.051 (0.734)	0.013 (0.734)	0.092 (0.735)	0.048 (0.734)	0.122 (0.732)	0.134 (0.735)
Observations	100,636	100,636	100,636	100,636	100,636	100,636	100,636
Number of Groups	791	791	791	791	791	791	791
Log Likelihood	10890	10890	10890	10890	10890	10890	10890

GDP = gross domestic product.

Robust standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

Source: Authors' calculations.

As we found in the product innovation and export analyses previously, results shown in Models 5, 6, and 7 indicate a consistent pattern in the interaction effect between the advanced economy dummy and the institutional variables. Specifically, economies' business regulations (-0.25, p<0.05), rule of law (-0.412, p<0.001) and financial development (-0.171, p<0.1) tend to have a stronger impact on the likelihood of an entrepreneur having high-growth expectations in less advanced income economies than in the advanced economies. These results, again, provide consistent and strong support for hypotheses 1b, 2b, and 3b.

D. Economic Meaning and Significance of the Effects

Our statistical models employed logistic regressions, with coefficients representing changes in log odds. A 1-unit increase in an independent variable results in a change in the log of the odds ratio $\log(p/1-p)$ or $\text{logit}(p)$.³ To better understand and intuitively interpret the interaction effects between the IFCs and the advanced economy dummy, we obtained the coefficients in probability scale by calculating the *average marginal effects*⁴ of the predictors.

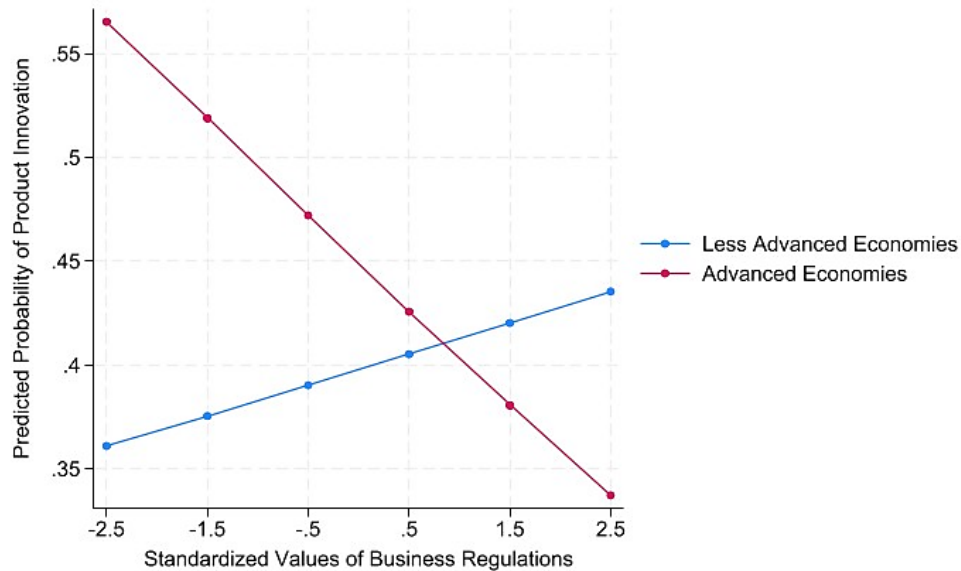
Marginal Effects of Business Regulations

In less advanced economies, as business regulation standardized values increase from -2.5 to 2.5, product innovation probability rises from 36.10% to 43.55%, with incremental increases of 1.45 to 1.52 percentage points per standard deviation. For example, a business regulation score change from 35 to 48 raises product innovation likelihood by 1.45 percentage points (see Figure 1).

³ "P" is the probability of "success" (dependent variable takes value "1"), such as an entrepreneurial business engaging in exporting activities, or being innovative, or having high-growth expectations; "1-p" is the probability of failing to do so (dependent variable takes value "0").

⁴ The average marginal effect is the average value of the predicted effects evaluated at each observation in the sample. Full marginal effects data available on request.

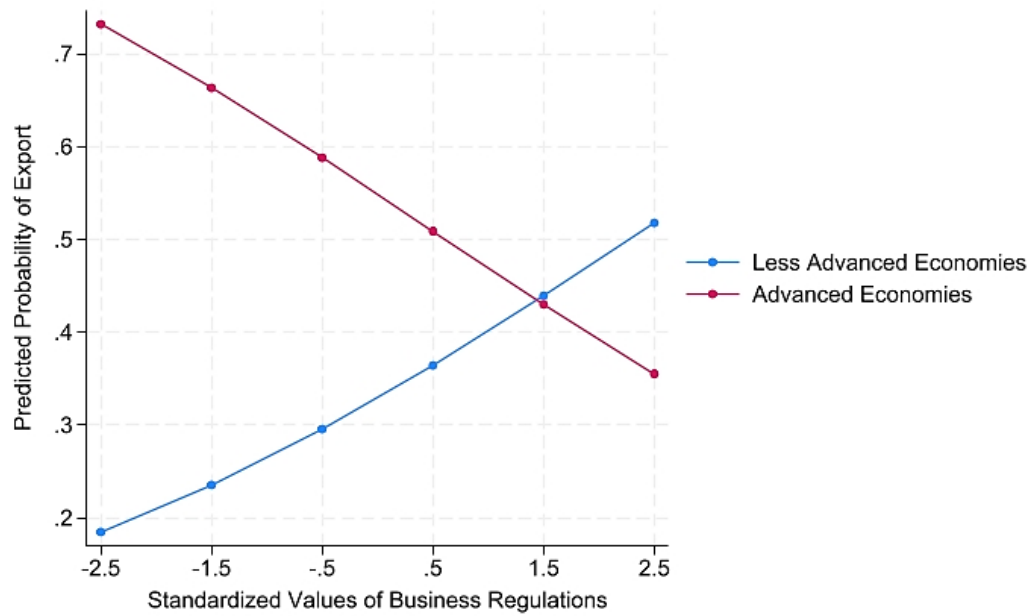
Figure 1: Predicted Probability of Product Innovation at Different Levels of Business Regulations in Advanced and Less Advanced Economies



Source: Authors' calculations.

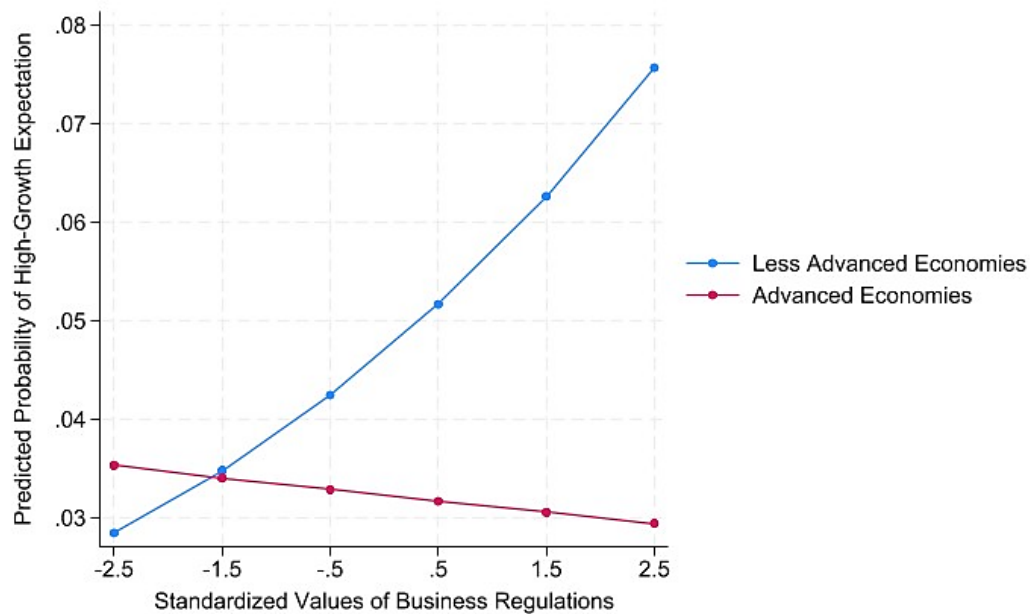
Conversely, in advanced economies, product innovation probability decreases from 56.53% to 33.73%, with reductions of 4–5 percentage points per unit increase. A score increase from 75 to 89 reduces product innovation likelihood by 4.52 percentage points. Export activity in less advanced economies shows stronger effects, rising from 18.48% to 51.76%, with marginal effects of 5–8 percentage points. In advanced economies, export probability decreases from 73.17% to 35.50%, with negative effects ranging from –6.85% to –7.89% (see Figure 2). High-growth expectations show smaller magnitudes: in less advanced economies, probabilities rise from 2.85% to 7.57%, while advanced economies show minimal decreases, from 3.53% to 2.95% (see Figure 3).

Figure 2: Predicted Probability of Export at Different Levels of Business Regulations in Advanced and Less Advanced Economies



Source: Authors' calculations.

Figure 3: Predicted Probability of High-Growth Expectations at Different Levels of Business Regulations in Advanced and Less Advanced Economies

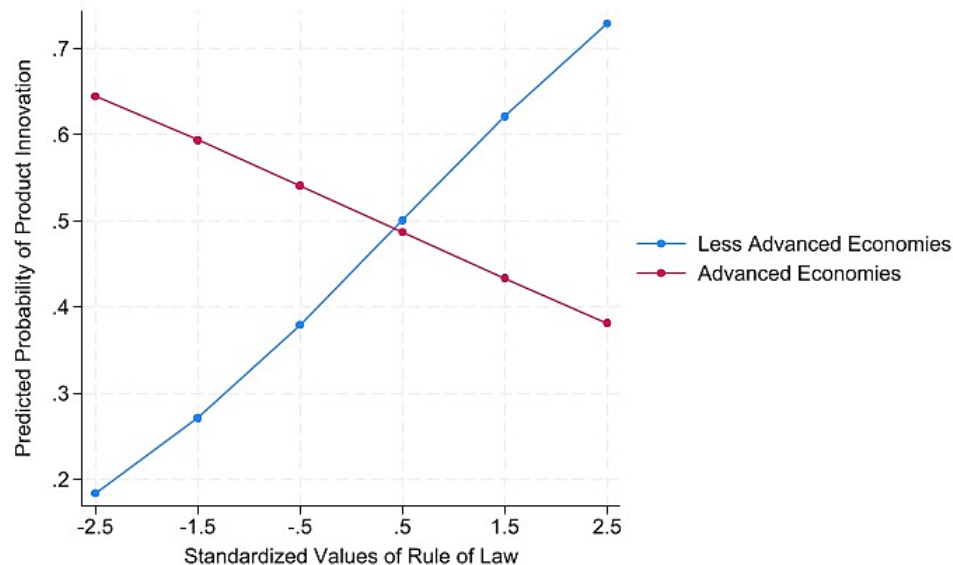


Source: Authors' calculations.

Marginal Effects of Rule of Law

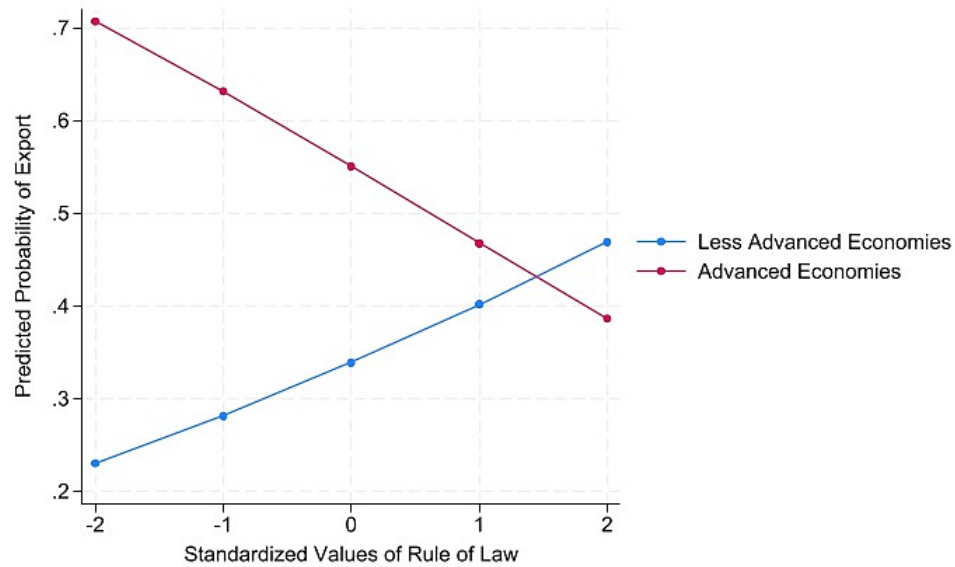
Product innovation probability in less advanced economies increases from 18% to 73% as rule of law improves, with marginal effects peaking at 12.07 percentage points. Advanced economies show a decline from 64.44% to 38.14%, with consistent negative effects of approximately 5 percentage points (see Figure 4). Export activities in less advanced economies rise from 23% to 47%, with marginal effects reaching 6.7 percentage points. Advanced economies show a sharp decline from 70.67% to 38.64%, with stable negative effects of about 8 percentage points (see Figure 5). High-growth expectations show minimal effects: less advanced economies experience 0.3 percentage point increases per standard deviation improvement, while advanced economies show 1–2 percentage point reductions (see Figure 6).

Figure 4: Predicted Probability of Product Innovation at Different Levels of Rule of Law in Advanced and Less Advanced Economies



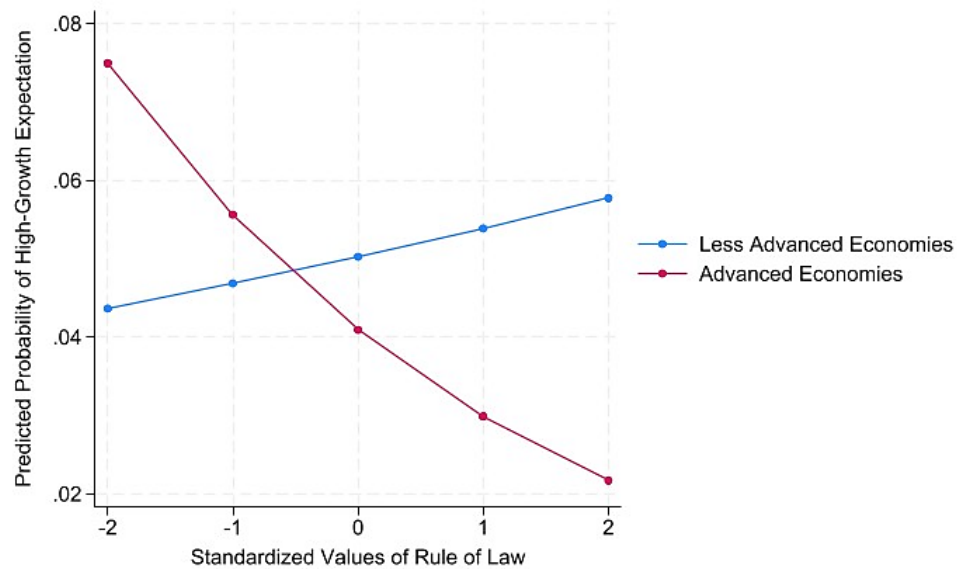
Source: Authors' calculations.

Figure 5: Predicted Probability of Export at Different Levels of Rule of Law in Advanced and Less Advanced Economies



Source: Authors' calculations.

Figure 6: Predicted Probability of High-Growth Expectations at Different Levels of Rule of Law in Advanced and Less Advanced Economies

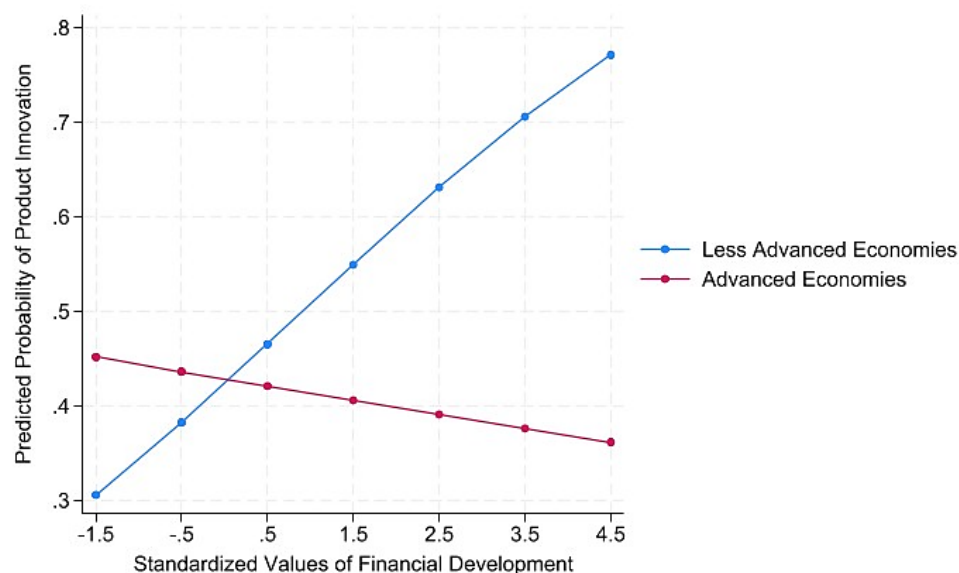


Source: Authors' calculations.

Marginal Effects of Financial Development

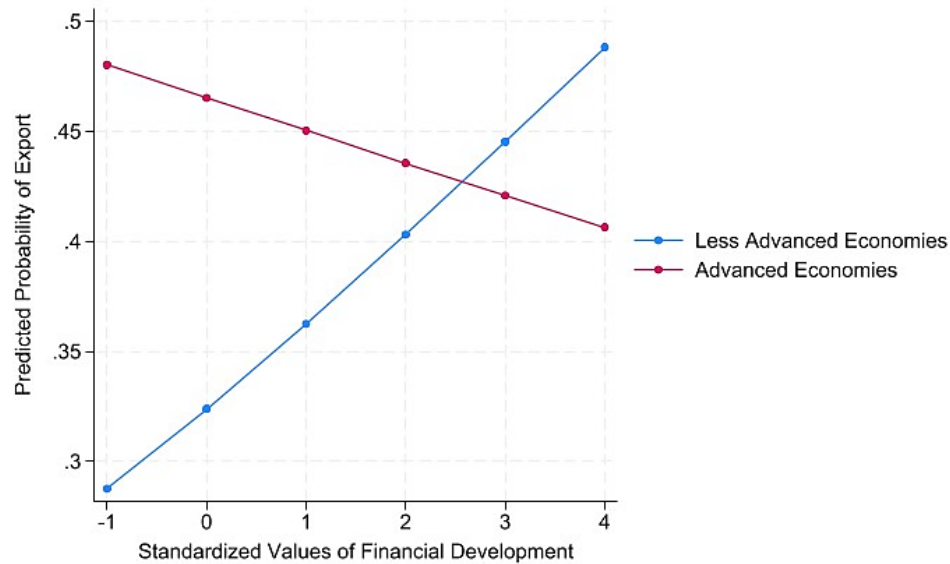
In less advanced economies, product innovation probability increases from 30.59% to 77.13% as financial development improves, with marginal effects peaking at 8.44% when the private credit ratio increases from 102% to 152% of GDP (see Figure 7). Advanced economies show a decline from 45.17% to 36.17%, with consistent negative effects of approximately 1.5 percentage points. Export activities in less advanced economies rise from 28.76% to 48.83%, with marginal effects growing from 3.63% to 4.30% (see Figure 8). Advanced economies show a decline from 48.02% to 40.64%, with negative effects of approximately 1.5 percentage points. High-growth expectations demonstrate modest effects: less advanced economies show increases from 4% to 8%, while advanced economies experience minimal declines from 3.1% to 2.63% (see Figure 9).

Figure 7: Predicted Probability of Product Innovation at Different Levels of Financial Development in Advanced and Less Advanced Economies



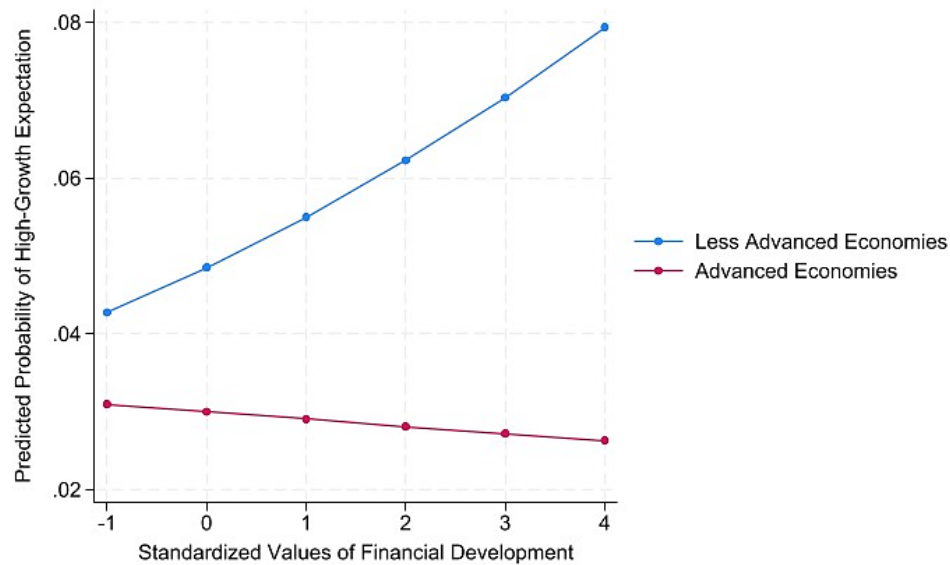
Source: Authors' calculations.

Figure 8: Predicted Probability of Export at Different Levels of Financial Development in Advanced and Less Advanced Economies



Source: Authors' calculations.

Figure 9: Predicted Probability of High-Growth Expectations at Different Levels of Financial Development in Advanced and Less Advanced Economies



Source: Authors' calculations.

Overall, IFCs demonstrate stronger effects in less advanced economies, particularly for product innovation and exports, while growth expectations exhibit lower sensitivity to IFCs across levels of economic development.

V. DISCUSSION

Our work was prompted by the observation that, while evidence demonstrates strong associations between economy-level IFCs and productive entrepreneurship, there have been few explorations of how the economy's level of economic development moderates this relationship. Of the few extant studies, none has employed multilevel designs that control for potential bias caused by an individual's self-selection into entrepreneurship, thereby incurring the risk of reporting biased findings. To our knowledge, ours is the first study to employ a multilevel design with appropriate self-selection controls to provide a more robust analysis of the moderating relationship. The statistical significance of the inverse Mills ratios underscores the necessity of our approach by showing that individuals with different personal characteristics (e.g., education) face different personal trade-offs, meaning that economy-level IFCs shape different individuals' entrepreneurial choices in different ways.

We know that formal institutions' importance in shaping productive entrepreneurship varies across economies (Bruton, Ahlstrom, and Li 2010). Our comparative analysis provides detailed insight into how institutional conditions affect productive entrepreneurship across economic contexts. We investigated direct effects of three IFCs—business regulations, rule of law, and financial development—on productive entrepreneurship across levels of economic development. We hypothesized that entrepreneurs in advanced economies were generally more productive than those in less advanced economies, and that stronger institutions contributed positively to productive entrepreneurship across all economic development levels. Our analysis supported these hypotheses, consistent with previous studies, while contributing through a longer dataset and more recent individual-level data.

We explored the interaction effect between economic development levels and IFCs on productive entrepreneurship, hypothesizing that developing economies should benefit more from IFC improvements, while advanced economies should experience diminishing returns. For business registrations, we argued that this effect operated through the formal–informal entrepreneur ratio. For rule of law, we posited stronger effects at low development levels owing to direct property protection impacts and a positive influence on overall institutional quality. For funding availability, we suggested advanced economies would see diminishing returns as entrepreneurs focused more on optimizing funding sources rather than initial acquisition.

Our analysis consistently supported the moderating effect of economic development levels on IFC–productive entrepreneurship relationships. All three IFCs showed negative moderation effects for product innovation, export activity, and high-growth expectations, with most effects statistically significant and practically meaningful. When analyzing economies together and introducing IFC variables in isolation, we found positive associations with product innovation only for rule of law and financial development. However, when introducing both IFC and moderation variables, the direct IFC effect

became positive and significant while the moderation variable showed negative significance, indicating diminishing returns at higher levels of economic development.

Our work enhances previous empirical approaches using similar data (Boudreaux, Nikolaev, and Klein 2019; Mickiewicz, Stephan, and Shami 2021; de Melo et al. 2022; Bendig et al. 2024). Using GEM data from 2006–2021 and employing a two-stage Heckman model, we address calls for longitudinal and comparative analyses covering broader timeframes and economies (Chowdhury, Audretsch, and Belitski 2018; Kara et al. 2024).

A. Theoretical Implications

Our findings reinforce institutional theory (North 1990) and align with research showing that solid IFCs foster high-quality ventures (Ács, Autio, and Szerb 2014). Better rule of law and financial development increase product innovation likelihood regardless of development level, supporting the notion that better institutions enhance entrepreneurial activities (Mickiewicz, Stephan, and Shami 2021). The effects are more robust in developing economies, consistent with recent research (Urbano, Orozco, and Turro 2024) and Djankov et al.'s (2002) argument that regulatory constraints disproportionately affect smaller firms in developing economies.

Regarding export activities, advanced economy entrepreneurs show higher engagement, with efficient business regulations promoting export activity. Institutional conditions exert stronger effects in lower-income economies, confirming our hypothesis regarding development level moderation (Aparicio, Audretsch, and Urbano 2021). For high-growth employment expectations, business regulations show positive associations, with institutional conditions, particularly rule of law, playing vital roles in less advanced economies. Financial development benefits entrepreneurs mainly in developing economies, where financial frictions are more acute (Fuentelsaz, González, and Maicas 2021). Our findings add to evidence that institutional context matters for productive entrepreneurship, demonstrating for the first time a decreasing returns effect in developing economies, where institutional voids may act as critical barriers to productive entrepreneurship (Autio et al. 2014).⁵

B. Policy Implications for Enhancing Productive Entrepreneurship

Understanding formal institutions holds vital policy implications across economic contexts. Key recommendations include:

- *Strengthening legal frameworks*: Enhancing the rule of law in developing economies is essential for fostering trust, improving property rights protection, and reducing corruption (Chowdhury, Audretsch, and Belitski 2018).
- *Simplifying business regulations*: Advanced economies should balance regulation and

⁵ A number of studies in the field of institutional economics on general institutional influences on entrepreneurship already existed, but these mostly did not specifically explore effects on productive entrepreneurship (Djankov et al. 2002, 2003).

business freedom, while developing economies should prioritize reducing bureaucratic hurdles to facilitate formal sector transition.

- *Improving access to finance*: Developing economies should implement microfinance initiatives and financial literacy programs, while advanced economies focus on venture capital access (de Melo et al. 2022).
- *Fostering innovation through research and development incentives*: Advanced economies may benefit from supporting high-tech startups while developing nations prioritize sectors addressing local needs (Amorós, Poblete, and Mandakovic 2019).
- *Building entrepreneurial networks*: Connecting entrepreneurs with mentors, investors, and industry experts enhances resource accessibility, particularly important in developing economies where informal networks dominate (Kara et al. 2024).

C. Limitations

Although we used a more advanced econometric design and a longer and broader panel, our analysis is not without limitations. First, while we established correlations between IFCs and productive entrepreneurship, we could not fully explore additional causal mechanisms. Our research theorized different causal pathways—such as formal–informal sector substitution, multiplicative effects on institutional quality, and shifts from market entry to optimization as financial alternatives increase. Additional empirical data should be used to further validate these theoretical mechanisms. Second, the study’s analysis does not account for the varying costs and difficulties involved in improving institutional conditions across different economic contexts. While our analysis shows that IFC improvements have stronger effects in less developed economies, it does not consider that implementing institutional reforms may be more challenging and costly in these economies. This limitation makes it difficult to make fully informed policy recommendations, as policymakers need to weigh not just the potential benefits of institutional improvements but also the realistic costs and feasibility of achieving such improvements in their economies. Finally, although GEM data is considered a reliable source of entrepreneurship dynamics across economies, it employs a cross-sectional panel design at the economy level. Unlike in the Panel Study of Entrepreneurial Dynamics, it is not an individual-level panel dataset, so we were not able to follow individuals over time to explore time-varying effects.

D. Further Research

The findings of this study open several avenues for future research that could enrich our understanding of how IFCs impact entrepreneurial activities. One potential research direction could involve a deeper exploration of the differential impacts of other IFCs on productive entrepreneurship in different economic contexts to establish a more nuanced understanding of how the effect of different IFCs varies during economic development. Relatedly, it would be interesting to explore whether there is a “natural order” in which IFCs should be addressed for optimal development, or whether there are substitution or reinforcing effects across IFCs (e.g., rule of law and absence of corruption and quality of political institutions). Investigating the lag effects of policy reforms on product innovation and export activities could shed light on the temporal dynamics and sustainability of such

interventions. Additionally, examining the role of emerging financial technologies and digital tools in bridging the financial development gap could provide valuable information on new avenues for supporting entrepreneurial activities. Finally, qualitative studies across regions with differing institutional qualities could provide insight into how specific regulatory policies or legal structures facilitate or hinder productive entrepreneurship (Puffer, McCarthy, and Boisot 2010).

VI. CONCLUSION

In conclusion, our study demonstrates the critical role of institutional frameworks in fostering entrepreneurial productivity, particularly in developing economies. Our findings emphasize that institutional improvements yield greater returns in lower-income economies, suggesting policymakers should prioritize institutional reforms to enhance innovation, export activities, and high-growth ventures in these contexts.

The research carries significant theoretical implications, highlighting the need to explore how institutional factors interact with cultural dimensions in shaping entrepreneurial behavior (Webb, Khoury, and Hitt 2020). The prevalence of necessity-driven and informal entrepreneurship in less developed economies warrants further investigation into these complex mechanisms (Amorós et al. 2019; Fredström, Peltonen, and Wincent 2020). Future research should examine the longitudinal effects of institutional reforms on entrepreneurial outcomes (Urbano et al. 2019) and investigate the interplay between formal and informal institutions across different economic contexts.

For policymakers, our findings underscore the importance of adopting nuanced approaches tailored to specific institutional challenges in both developed and developing economies. Such targeted interventions can create environments that foster innovation and growth, ultimately contributing to broader economic development goals.

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How Do Institutions Shape Productive Entrepreneurship Across Levels of Economic Development?

A Multilevel Analysis

This paper examines the influence of each economy's institutional framework conditions on the productivity potential of new entrepreneurial businesses using primary data from the Global Entrepreneurship Monitor from 2006 to 2022. It finds that an economy's institutional framework is instrumental in shaping productive entrepreneurship, and the effects are more pronounced in developing economies, with evidence of decreasing returns for advanced economies. The novelty of the analysis is in the use of an extended panel, the use of a multilevel design to appropriately control for individual-level effects, and the exploration of the moderating effect of economic development.

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