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Abstract

The main goal of this study is to determine whether big businesses or institutions are a more significant determinant of entrepreneurship. To this end, we compare the effects of big businesses and institutions on entrepreneurship among 33 countries covering lower middle-, upper middle-, and high-income countries during the 2001–2015 period.

We also have three sub-objectives. We examine (i) how the relationship between big business and entrepreneurship changes according to the economic development stage; (ii) how big business affects two different entrepreneurship types; namely, opportunity- and necessity-driven entrepreneurship; and (iii) the role and significance of institutions in these two different entrepreneurship types.

We find that the relationship among entrepreneurship, big business, and economic development is “N-shaped”. In particular, there is a positive relationship between big business and opportunity-driven entrepreneurship in high-income countries. Moreover, government policies among various institutional factors, such as taxes or regulations, are effective for opportunity-driven entrepreneurs, but none of the institutional factors is effective for necessity-driven entrepreneurs.

I. INTRODUCTION

Entrepreneurship has been regarded as a key element of a nation's economic development (Audretsch 2007, Audretsch et al. 2006, North 1990, and Schumpeter 1934). Therefore, it is important to understand the main factors that are driving entrepreneurship. Multiple theories and explanations of determinants of entrepreneurship have been proposed (Carree et al. 2002 and Organisation for Economic Co-operation and Development 1998). Existing studies uncovered explanatory variables that serve as determinants of entrepreneurship; namely, (i) economic factors (e.g., gross domestic product (GDP) and globalization); (ii) institutions (e.g., liberty and fairness); (iii) culture (e.g., social and religious beliefs); (iv) legal systems; and (v) geography (e.g., coastal and temperate zones). Among these determinants, as proposed by Acs et al. (2008), in studying entrepreneurship within or across countries, the broad nexus between entrepreneurship and institutions is a critical area to be studied. Therefore, in this study, we consider institutions to be one of the key factors that determine entrepreneurship.

Meanwhile, the role of big businesses in entrepreneurship has remained unexplored. Historically, large industrial firms have played a leading role in booming global economies and the upgrading industrial structure (Chandler et al. 1999). Increasing returns to the scale of invested resources, particularly those based on economies of scale and the scope of operation, were previously observed in economies that permitted large firms to become engines of technological progress in terms of the capital-intensive technologies of the Second Industrial Revolution (Chandler et al. 1999). As the new technologies related to the Second Industrial Revolution were controlled by large firms, the new industries related to the Third Industrial Revolution were also dominated by them (Chandler et al. 1999). In this respect, growth showed a “path-dependent” tendency. Therefore, it can be inferred that the main players of the Fourth Industrial Revolution are big businesses, especially information technology (IT) conglomerates. Consequently, we consider big businesses as a predictive factor and compare this factor with the spillover effects of institutions since big businesses contain unique information that is commonly related to economic growth (Lee et al. 2013; Chandler 1959, 1977, 1990, 1999; and Schumpeter 1934, 1942).

Scholars seem to agree that the level of entrepreneurial activity systemically varies across countries and over time (Wennekers et al. 2005, Blanchflower 2000, and Rees and Shah 1986). A causal “U-shaped” relationship between the level of self-employment and economic development has been proposed by several studies (Carree et al. 2002, Acs et al. 1994, and Blau 1987). However, most of these studies have not been verified by empirical analysis. In addition, multiple studies only considered developed economies, and thus empirical evidence concerning developing countries remains very limited. This lack of research in this area hampers the effectiveness of related policies.

To address these concerns, we investigate the determinants of entrepreneurship using the

eclectic framework of entrepreneurship (EFE), which was first introduced by Audretsch et al. (2002). We focus on the key factors that are affecting entrepreneurship; namely, big businesses and institutions. In this cross-country analysis, we examine nine variables^① as determinants of entrepreneurship in a sample, including as many as 33 countries covering lower middle-, upper middle-, and high-income economies during the 2001–2015 period.

This study is organized as follows. Section II discusses the relevant literature and presents our hypotheses. Section III describes the research method and the main data used to test our hypotheses. Section IV presents tests of some of the hypotheses that are developed in section II. We mainly focus on answering whether big businesses or institutions are a significant determinant of entrepreneurship. We also have three sub-objectives: (i) how the relationship between big businesses and entrepreneurship changes according to the stage of economic development; (ii) how big businesses affect two different types of entrepreneurship; namely, opportunity and necessity-driven ones; (iii) the roles and significance of institutions in two different types of entrepreneurship. Finally, section V summarizes the key results and presents the contributions of this study.

II. LITERATURE ON THE DETERMINANTS OF ENTREPRENEURSHIP

A. Defining Entrepreneurship

Although a commonly recognized meaning of entrepreneurship is absent, the concept consists of several scopes. The joint characteristics of a variety of definitions include opportunity appreciation, innovation, as well as adventure. One important aspect is the amount to which individuals are forming new firms (Carter et al. 2003). In this study, we define entrepreneurship as new firm formation.

1. Types of Entrepreneurship

In the field of new business endeavors, different types of entrepreneurship can be classified, such as innovators versus imitators (Schumpeter 1934) or entrepreneurs with or without growth aspirations (Autio and Acs 2010).

A classification method that has gained attention in classifying entrepreneur types is to differentiate necessity and opportunity. (Reynolds et al. 2002, Krueger and Brazeal 1994, and Shane et al. 1991). Generally, compared with “necessity entrepreneurs”, opportunity ones are associated with better strategies as well as positive growth prospects. The motivation of entrepreneurs to launch a firm is a vital signal of quality. It is true that opportunity-driven entrepreneurship is better organized, has stronger skills, as well as can make more money than necessity-driven one. Voluntary, opportunity-motivated start-ups last longer, the firms more likely to be innovative, and growth is faster than that of

^① Regarding the institutional variables, there are 12 sub-indexes.

“necessity start-ups” (Baumol et al. 2007). Therefore, our research hypotheses are as follows:

Hypothesis 1: The same determinants will have different effects on opportunity- and necessity-driven entrepreneurship.

B. Determinants of Entrepreneurship

This study explores the determinants of entrepreneurship by employ the EFE first proposed by Audretsch et al. (2002). The core of EFE is to integrate the factors that shape the needs of entrepreneurs on the one hand, and the factors that affect the supply of entrepreneurs on the other. We focus on the key factors that shift the demand and supply sides, such as big businesses and institutions (Box 1).

Box 1: Eclectic Framework of Entrepreneurship

Key factors:

- Presence of big businesses (demand and supply sides)
- Institutions (demand and supply sides)

Demand-side factors:

- Size of a country's market
- Economic development
- Globalization (foreign direct investment, openness)

Supply-side factors:

- Total population
- Population age composition
- Quality of population

Source: Author's creation based on Verheul et al. (2002).

1. Key Factors

a. Presence of Big Businesses

Large industrial enterprises that commercialize new technologies critically affect entrepreneurship by playing a dual role (Chandler et al. 1999), mainly through the barrier effect and the spillover effect.

- Barrier effect.** The presence of large companies can hinder the entry of potential entrants into a market. Precise capabilities create potent barriers to entry, and new entrants in oligopolistic industries are rarely start-up firms. Instead, new entrants are enterprises with capabilities that are comparable to technologically related industries or the same industry in other nations.
- Spillover effect.** The positive spillover effect of big business on entrepreneurship can be divided primarily into three categories; namely, technology transfer, labor mobility, and corporate ventures.

First, large industrial enterprises function as technology transfer agents through diverse diffusion mechanisms, such as joint research and development (R&D) projects, the coproduction of manufactured goods embodying new knowledge, the licensing of technology, and the establishment of manufacturing subsidiaries.

Second, large companies serve as the spawning grounds for founders by recruiting pools for start-ups, sources of executive talent during the scaling period, and last resort acquirers or employers if the new enterprise fails. Labor mobility plays a vital role in transferring knowledge from mature companies to new high-growth firms, especially in high-tech fields (Fujiwara 2017). New firms compensate for their R&D deficiencies through knowledge spillovers (Audretsch and Lehmann 2005). Usually, individuals who were previously employed by large firms tend to launch their own companies in view of predictable new product earnings (Acs and Szerb 2011). Although entrepreneurship has spread globally, its center of excellence is undoubtedly located in Silicon Valley. Silicon Valley has formed a virtuous cycle enterprise ecosystem of "innovation → venture capital → new firm". Giants such as Apple, Facebook, Google, and Intel, were born in this environment. Considering only Google, many companies, such as Twitter and Instagram, were founded by Googlers in Silicon Valley. The term "Googlepreneurs" has been coined.

Table 1: List of Countries with Associated Entrepreneurial Employee Activity, 2015

Economy	Rank	EEA	Economy	Rank	EEA
Norway	1	9.89	United Kingdom	14	4.08
Australia	2	8.52	Poland	15	4.04
Canada	3	7.06	Korea, Republic of	16	2.40
United States	4	6.96	Argentina	17	2.38
Ireland	5	6.60	China, People's Republic of	18	1.36
Israel	6	6.55	Mexico	19	1.17
Switzerland	7	6.49	Spain	20	1.09
Sweden	8	6.36	Greece	21	1.03
Netherlands	9	6.27	Brazil	22	0.99
Belgium	10	6.13	Thailand	23	0.72
Finland	11	5.83	South Africa	24	0.30
Chile	12	5.23	Malaysia	25	0.27
Germany	13	4.51			

EEA = entrepreneurial employee activity.

Note: EEA (% 18–64 population): The proportion of employees participating in entrepreneurial activities, such as developing or launching new products or services, or setting up new business departments

Source: Author's creation based on Global Entrepreneurship Monitor database.

Third, in-house start-up activities within large firms, called “intrapreneurship”, are also an essential aspect of entrepreneurship. Large firms encourage “intrapreneurship” within departments to attain better elasticity and innovation (Urbano et al. 2022, and Stopford and Baden-Fuller 1994). Especially in more developed countries, relatively more entrepreneurs engage in in-house start-up activities. The most consistent way to measure the intrapreneurship level in the economy has been performed by the Global Entrepreneurship Monitor (GEM) (Stam and Stenkula 2017). Intrapreneurship is measured by Entrepreneurial Employee Activity (EEA), that is, entrepreneurial activities within a company. Table 1 shows that in more developed countries, such as Norway, Australia, and Canada, relatively more entrepreneurs engage in in-house start-up activities. Therefore, this study will address the following research questions:

RQ 1-1: Does presence of big businesses matter for entrepreneurship?

RQ 1-2: If so, do big businesses play a positive or negative role in entrepreneurship?

RQ 1-3: Will the impacts of big businesses on entrepreneurship vary according to the stage of economic growth?

b. Institutions

The impacts of institutions on the entrepreneurial level are composite and quite contradictory (Verheul et al. 2002). Thus, extant studies exploring the influences of institutions on entrepreneurship have provided conflicting evidence. Moreover, scholars often overestimate the effect of institutions on new firm creation. Studies that examine the role of institutions on entrepreneurship can be divided into two parts. One part focuses on the merits of institutions (Lee and Lee 2018, Baumol 1996, and North, 1990, 1991), whereas the other focuses on the negative role of institutions on entrepreneurship (Xiao and Park 2018, and Freytag and Thurik 2007). The divergence between these two streams is derived from analyses without distinguishing the characteristics of entrepreneurship (Acs 2006). Further, the dynamics of entrepreneurship can differ vastly, depending on the institutional context and stage of economic development (Acs et al. 2008). Several papers illustrated that institutional arrangements, including educational provisions, social security arrangements, and other businesses, may affect various types of entrepreneurial activity either directly or indirectly (Hessels et al. 2008,. and Levie and Autio 2008). The present study will address the following research questions:

RQ 2-1: Are institutions important for entrepreneurship?

RQ 2-2: If so, what types of institutions exert a great effect on entrepreneurship?

RQ 2-3: Will the effect of the institutions on new firm creation differentiate by entrepreneurship type?

2. Demand-Side Factors

When interpreting the level of entrepreneurship, it is necessary to differentiate between supply and demand elements (Blanchflower 2000 and Storey 1994). The need for entrepreneurship is affected

by various elements, containing the size of home market, economic developmental stage, and globalization. These factors influence the variety of market demand and provide opportunities for entrepreneurs.

The first factor that we consider in the current study is economic development. The effects of economic development on new firm formation is uncertain. Several researches propose that economic growth is going together with a decrease in new firm formation (Kuznetz and Murphy 1966, and Schultz 1990). As the economy develops, the majority of the population has the basic skills to find a job, and thus self-employment decreases. Moreover, the increase in per capita income has positively affected self-employment rate in several developed countries since the 1970s (Storey 1999 and Carree et al. 2001). The increase in capital has also led to advanced consumer demand. As such, the demand for various goods increases, and small and medium-sized enterprises (SMEs) become well prepared to supply corresponding goods. Therefore, we hypothesize the following:

Hypothesis 2: Economic development increases opportunity-driven entrepreneurship and reduces necessity-driven one.

Another factor that we consider is globalization (i.e., foreign direct investment [FDI] and trade). The impact of globalization on the level of entrepreneurship can be both negative and positive. Globalization contains the incorporation of global markets and provides opportunities for exploiting scale. Globalization also influences entrepreneurship through the diversity in needs caused by the exposure of people to a range of foreign products. However, the disappearance of barriers leads to an increase in competition and variability in sales. Therefore, our research hypotheses are as follows:

Hypothesis 3: The positive and negative impacts of globalization are offset, so that the overall impact on entrepreneurship is insignificant.

3. Supply-Side Factors

Total supply of entrepreneurs depends on the size and structure of the population, containing total population, age structure, and the quality of population in the labor market.

A large population base indicates that the probability of entrepreneurs to emerge is also high. The population age composition affects new firm formation because the possibility of self-employment differs with age. Reynolds et al. (1999) reported that economies with more individuals between the ages of 25 and 44 exist more in new ventures. In addition, the quality of the population may exert a positive impact on entrepreneurship. For instance, study with a Swedish individual sample indicates that entrepreneurs have achieved a higher educational level than those in the control group (Delmar and Davidsson 2000). Therefore, we hypothesize the following:

Hypothesis 4: A large population base, younger age structure, and higher quality of population have positive effects on entrepreneurship.

C. Theoretical Considerations for Entrepreneurship, Big Businesses, and Economic Development

As proposed by many past studies, entrepreneurial level varies thoroughly across economies and over time (Rees and Shah 1986 and Blanchflower 2000). Porter (1990) and Porter et al. (2002) classified the roles and characteristics of entrepreneurship into three major categories according to a country's economic developmental level: (i) factor-motivated, (2) efficiency-motivated, and (3) innovation-motivated stages. Following the work of Porter (1990), we classify countries into three stages: lower middle-, upper middle-, and high-income countries, according to the gross national income per capita, classified using the World Bank's method.

1. Factor-driven Stage

Description. Economies in this phase strive for low-cost competences in the manufacture of low value-added products.

Technology. Economies in this phase neither form information for innovation nor use knowledge for exporting (Acs and Szerb 2011).

Entrepreneurship. The factor-driven phase is marked by high rates of necessity-driven entrepreneur. In this phase, individual opportunity perception is not supported by strong domestic demand. Moreover, skills are appropriate for only low-skilled or semiskilled jobs, and formal education is limited. In factor-driven countries, most start-ups are initiated because of the lack of employment opportunities, so the share of "necessity start-ups" is high (Acs and Szerb 2011).

Big businesses. The main players in the factor-driven stage are rent-seeking large firms. Institutions set rewards for the rent-seeking manufacturers that provide basic goods. Start-up regulations are cumbersome in most of the poorer countries, thereby forcing entrepreneurs to work in the grey or black economy. Most businesses are not even registered in these factor-driven economies. Nevertheless, even when market failures are severe, entrepreneurs still exist. Definitely, entrepreneurs deal with market failures by using several gap-filling measures. When market and nonmarket failures are prevalent, entrepreneurs are pushed from the formal into the informal division (Acs and Szerb 2011). As institutions strengthen further, productive entrepreneurship slowly takes over and replaces the destructive and unproductive practices (Acs and Szerb 2011).

2. Efficiency-Driven Stage

Description. The secondary industries dominate the efficiency-motivated economy. Turning raw materials into finished goods, manufacturing, processing, and construction all belong to this group. To compete in this efficiency-driven phase, economies must have competent productive performs in big markets, which allow firms to exploit economies of scale.

Technology. Absorbing new technology is increasingly important in the efficiency-motivated phase.

Entrepreneurship. The efficiency-motivated phase is characterized by a decline in the entrepreneurial activity rate, wherein the share of “necessity start-ups” and “opportunity start-ups” decreases (Acs and Szerb 2011). A large proportion of the population in this stage has the basic skills to find a job, and necessity-driven start-ups decreases. In addition, the overall cost of start-ups increases partially because of increased regulation and also of economic requirements, i.e., more serious businesses call for a higher initial investment. These barriers to entry raise the risk of launching a venture, thereby decreasing opportunities for start-ups.

Big business. The majority of the population in this phase prefers being employed by large firms. As this phase offers more job opportunities, the opportunity cost of self-employment as compared to being an employee increases, making starting a new business less attractive (Wennekers et al. 2005). This decreased trend toward business ownership is a general phenomenon (Parker 2004), and all developed countries have gone through this stage of development. However, the so-called “Asian tigers”; namely, the Republic of Korea and Singapore, started this transformation three decades ago. These countries share certain characteristics: big businesses are growing, which increases employment, and FDI—primarily in the traditional manufacturing sectors—provides other employment opportunities (Acs and Szerb 2011).

3. Innovation-Driven Stage

Description. The innovation-driven phase is focused on high value-added sectors where entrepreneurship is deemed important. Therefore, the innovation-driven phase is characterized by an increase in knowledge- and technology-intensive activities, which are considered as key inputs.

Technology. The application and creation of new technology are critical in the innovation-motivated stage.

Entrepreneurship. The innovation-driven phase is characterized by the increasing rate of “opportunity start-ups.”

Big business. In the innovation-driven stage, companies compete with innovation, the failure risk is high, and large firms focus on core competencies and outsourcing businesses that are not competitive or critical to themselves. Moreover, at this time, venture investment ecosystems, such as angel capital, are well formed and can easily provide financing; thus, a person with only a good idea can start a business. In this period, the concentration moves from firms to individuals who have attained new knowledge and have decided to create new firms, based on expected net returns from a new product. Usually, these individuals are former employees of large firms who eventually decided to establish their own companies (Acs and Szerb 2011). Corporate ventures have also increased in this stage. Further, big

firms encourage intrapreneurship within business units to realize more flexibility and innovativeness (Stopford and Baden-Fuller 1994).

To sum up, we hypothesize the followings:

Hypothesis 5: The roles and significance of entrepreneurial activities are likely to change, depending on the stage of economic development.

Hypothesis 6: The roles and significance of large enterprises in entrepreneurship vary, depending on the types of entrepreneurship and the economic developmental stage.

Hypothesis 6-1: Factor-driven stage. As the dominant players are rent-seeking large firms, entrepreneurs are pushed from the formal into the informal division. Therefore, increasing the share of big businesses negatively affects necessity-driven entrepreneurship.

Hypothesis 6-2: Efficiency-driven stage. The increase in the share of big businesses has a negative effect on opportunity-motivated entrepreneurship, but has a positive effect on necessity-motivated entrepreneurship.

Hypothesis 6-3: Innovation-driven stage. The increase in the share of big businesses has a positive effect on opportunity-driven entrepreneurship, but has no direct relationship with necessity-driven entrepreneurship.

Table 2: Relationships among Entrepreneurship, Big Businesses, and Economic Development

	Factor-Driven Stage	Efficiency-Driven Stage	Innovation-Driven Stage
Description	compete through low-cost efficiencies low value-added product	efficient production → exploit economies of scale basic goods and services	high value-added technology-intensive knowledge-intensive
Technology	neither create knowledge for innovation nor use knowledge for exporting	absorb new technology is increasingly important	application and creation of new technology is critical
Entrepreneurship	high rates of self-employed necessity startups ↑	decreasing rate of self-employment necessity startups ↓ opportunity startups ↓	increasing rate of self-employment opportunity startups ↑
Big businesses	rent-seeking large firms entrepreneurs are pushed out of the formal sector into the informal sector	being employed by large firms	large firms concentrate on core competencies and outsourcing corporate ventures ↑

Source: Author's creation based on Porter (1990), Chandler et al. (1999), and Acs and Szerb (2011)

III. METHODOLOGY AND DATA DESCRIPTIONS

A. Measures

1. Measuring Entrepreneurship

The empirical analysis herein draws from data published by the GEM program. The GEM is a multiyear major research project aimed at describing and analyzing entrepreneurial processes within a wide range of countries. The GEM focuses on two objectives: (1) measuring the differences in entrepreneurial activity levels among countries and (2) identifying the policies that may enhance entrepreneurial activity levels (Acs et al. 2004; Porter et al. 2004, 2005; and Minniti et al. 2005). We measured the entrepreneurship level with (1) and the institutional development level with (2).

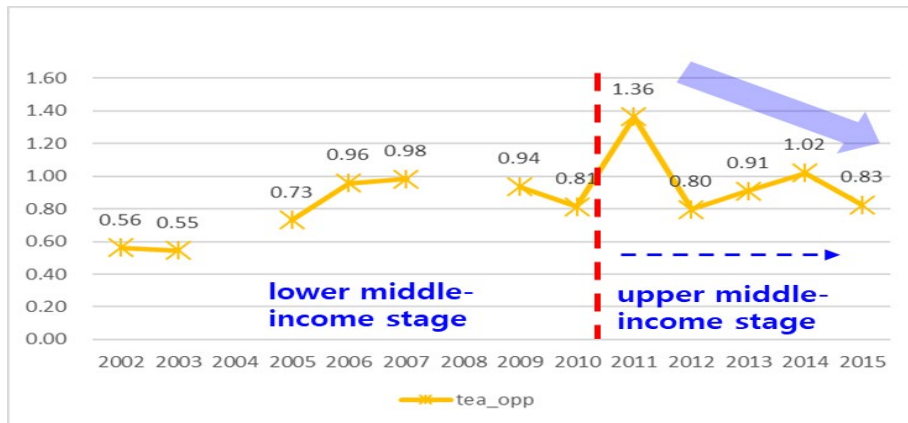
To measure entrepreneurship, we use the GEM total early-stage entrepreneurship activity rate (denoted here as the Total Early-Stage Entrepreneurial Activity [TEA] rate). The overall TEA rate is defined as the share of working-age adults (18–64 years old) in the population who are either involved in launching a business or are owners of firms established in less than 42 months. Further, depending on the motive for starting a business, we classify entrepreneurship as involving opportunity-driven and necessity-driven entrepreneurs. The opportunity-driven early-stage entrepreneur pertains to GEM survey participants who cite their main motivation for starting a business as exploiting a good opportunity, increasing income, or fulfilling personal aims. By contrast, those people who start a business and have no other options for work are denoted as necessity-driven early-stage entrepreneurs. Both groups are defined according to their respective proportions among the working-age adults per 100 involved in a nascent or young firm.

Figures 1A–1D present the dynamics of opportunity-driven entrepreneurship for several countries, such as the People's Republic of China (PRC), Thailand, the Russian Federation, and the United States. The PRC and Thailand, which have transitioned from lower middle-income into upper middle-income countries from 2002 to 2015, exhibited a decrease in the rate of opportunity-driven entrepreneurship after entering the upper middle-income stage.

Moreover, the Russian Federation, an upper middle-income country for the entire study period (Figure 1C) has a relatively lower rate of opportunity-driven entrepreneurship compared to the PRC, Thailand, and the United States. For the United States, which is the representative of high-income countries, the rate of opportunity-driven entrepreneurship is relatively high.

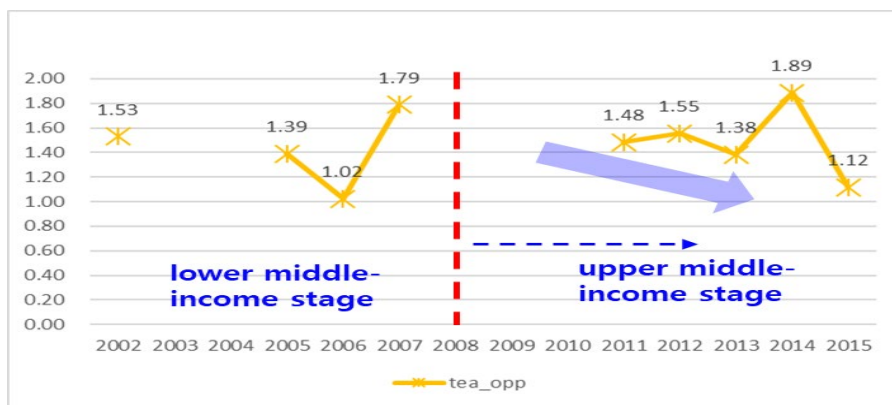
These phenomena support the hypothesis raised in section II; namely, that when one economy transitions from the lower middle-income stage to the upper middle-income stage, the proportion of opportunity-driven entrepreneurship decreases, and when a nation enters the high-income stage, the proportion of opportunity-driven entrepreneurship rises again.

Figure 1A: The Dynamics of Opportunity-Driven Entrepreneurship (People's Republic of China)



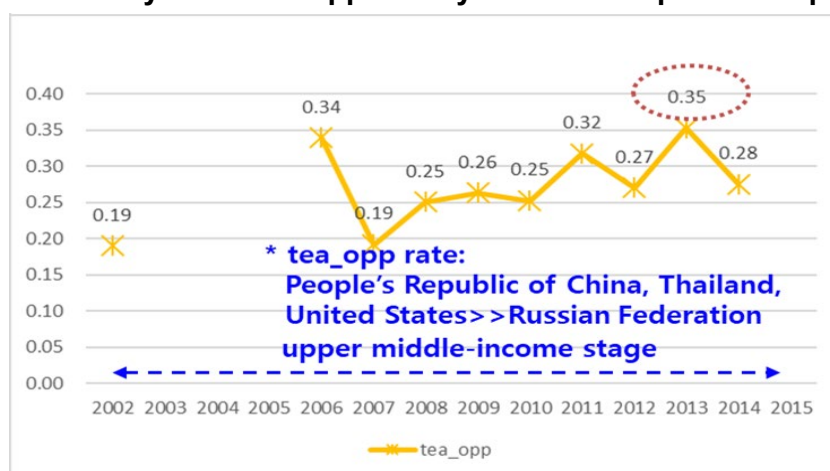
Source: Author's creation based on Global Entrepreneurship Monitor Database.

Figure 1B: The Dynamics of Opportunity-Driven Entrepreneurship (Thailand)



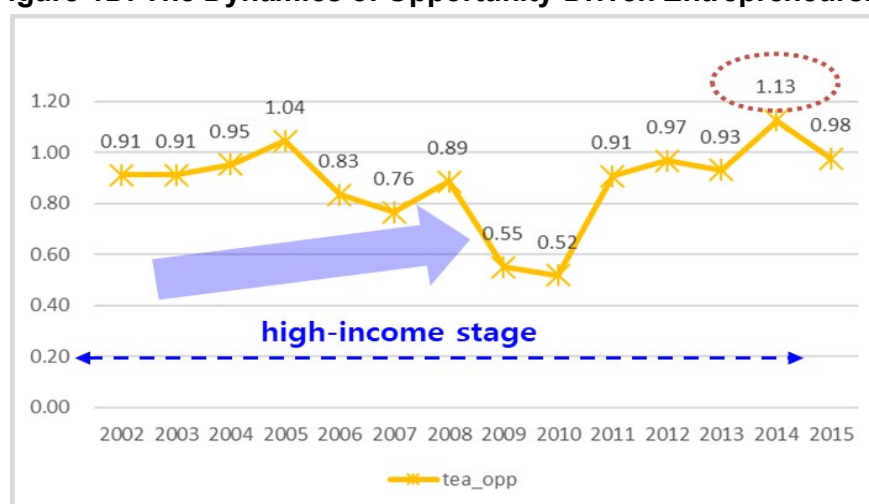
Source: Author's creation based on Global Entrepreneurship Monitor Database.

Figure 1C: The Dynamics of Opportunity-Driven Entrepreneurship (Russian Federation)



Source: Author's creation based on Global Entrepreneurship Monitor Database.

Figure 1D: The Dynamics of Opportunity-Driven Entrepreneurship (United States)

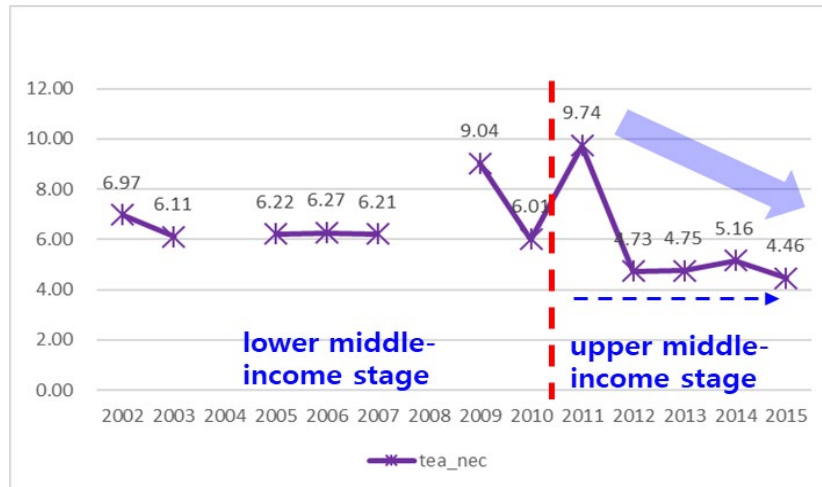


Source: Author's creation based on Global Entrepreneurship Monitor database.

Figures 2A–2D present the dynamics of necessity-driven entrepreneurship. After entering the upper middle-income stage, the PRC and Thailand exhibited lower rates of necessity-driven entrepreneurship. By contrast, the Russian Federation, an upper middle-income country during the entire study period, had a low rate of necessity-driven entrepreneurship relative to the PRC and Thailand. For the United States, the rate of necessity-driven entrepreneurship is quite stable.

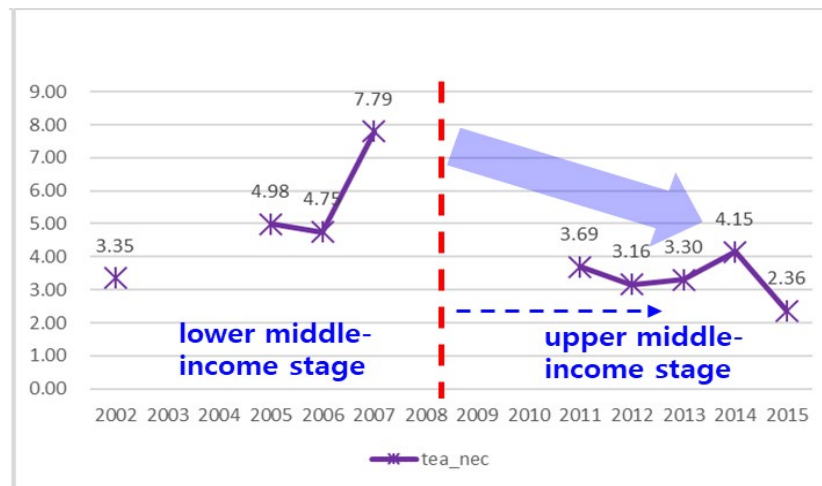
These phenomena also support the hypothesis in section II, which posits that an economy generally has the highest proportion of necessity-driven start-ups in the lower middle-income stage, and that proportion decreases as a country transitions to the upper middle-income stage.

**Figure 2A: The Dynamics of Necessity-Driven Entrepreneurship
(People's Republic of China)**



Source: Author's creation based on Global Entrepreneurship Monitor Database.

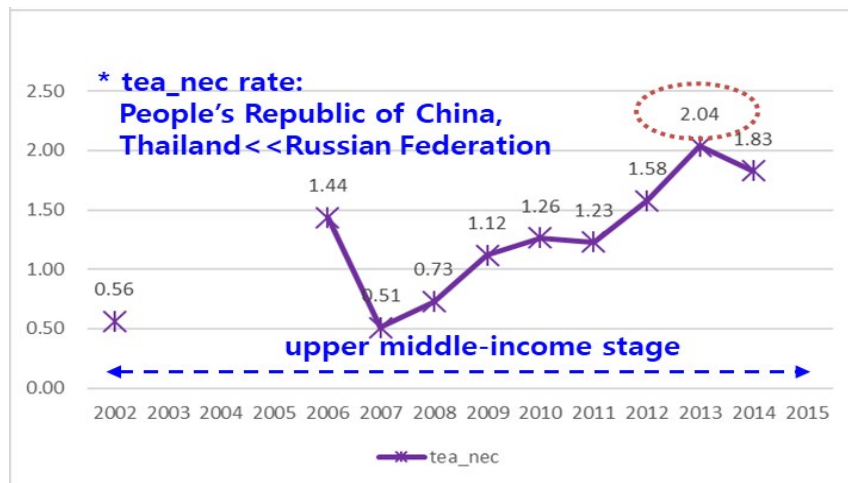
Figure 2B: The Dynamics of Necessity-Driven Entrepreneurship (Thailand)



Source: Author's creation based on Global Entrepreneurship Monitor Database.

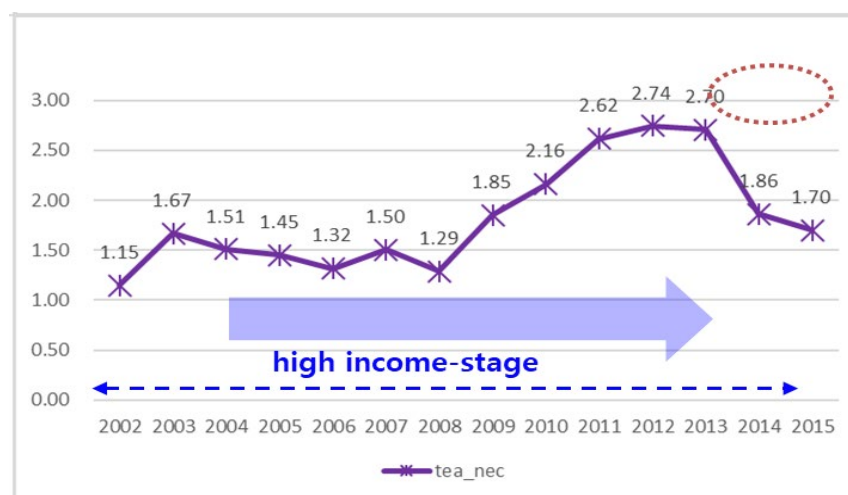
Meanwhile, GEM describes entrepreneurship not only in relation to the formation of new ventures, but also as regards start-ups within existing businesses, such as a spin-offs or other entrepreneurial efforts. The GEM defined this rate as EEA. As shown in Table 1, countries with high EEA levels are all high-income countries. This outcome is also in line with our hypothesis in section II, which suggests that opportunity-driven start-ups and in-house start-up activities are active in high-income countries.

Figure 2C: The Dynamics of Necessity-Driven Entrepreneurship (Russian Federation)



Source: Author's creation based on Global Entrepreneurship Monitor Database.

Figure 2D: The Dynamics of Necessity-Driven Entrepreneurship (United States)



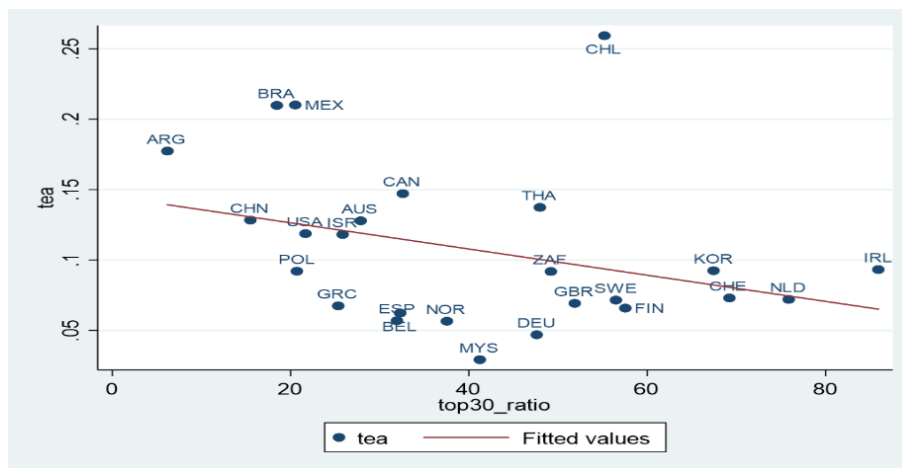
Source: Author's creation based on Global Entrepreneurship Monitor database.

2. Measuring Big Businesses

To measure big businesses, we employ the Osiris database which includes all publicly listed companies, as well as delisted companies and major unlisted companies if they are substantial within their sector. Osiris covers about 70,000 companies across the globe. One of Osiris's main strengths is that it facilitates the comparison of companies using harmonized financial reports. Thus, the firms considered in this work are nonfinancial firms ranked in the top 30 on the basis of the sales in each country annually.

Figure 3 presents the basic and negative relationship between big businesses and entrepreneurship. This outcome generally indicates that countries with a high proportion of large firms have a lower proportion of entrepreneurship. However, note that this result shows a simple relationship between the two under the condition that other variables are not controlled.

Figure 3: The Relationship between Big Businesses and Entrepreneurships, 2015



Source: Author's creation based on Global Entrepreneurship Monitor and Osiris database.

3. Measuring Institutions

To classify policies that may improve entrepreneurship level, we employ the Entrepreneurial Framework Conditions (EFCs) developed by the GEM. The EFCs characterize areas of interest to policy makers who are trying to inspire entrepreneurship. We could treat EFCs as major rules of the game for entrepreneurial activity in any given setting. Thus, changing the EFCs may change the entrepreneurial activity rate (Reynolds et al. 1999). The GEM has proposed nine institutional conditions that enhance or hinder new business creation in a given country. Some of these conditions have sub-indexes (Box 2).

Box 2: Entrepreneurial Framework Conditions

1. Entrepreneurial finance (**Institution1**)
2. Governmental policy
 - (i) Support and relevance (**Institution2**)
 - (ii) Taxes and bureaucracy (**Institution3**)
3. Government entrepreneurship programs (**Institution4**)
4. Entrepreneurial education
 - (i) Entrepreneurial education at school stage (**Institution5**)
 - (ii) Entrepreneurial education at post-school stage (**Institution6**)
5. Research and development transfer (**Institution7**)
6. Commercial and legal infrastructure (**Institution8**)
7. Entry regulation
 - (i) Internal market dynamics (**Institution9**)
 - (ii) Internal market burdens or entry regulation (**Institution10**)
8. Physical infrastructure (**Institution11**)
9. Cultural and social norms (**Institution12**)

Source: Author's creation based on Entrepreneurial Framework Conditions.

<https://www.gemconsortium.org/wiki/1142>

The institutional environment index ranges from 1 to 5, with 1 indicating a very bad environment and 5 indicating a very good environment. This index measures the results of a survey of entrepreneurship experts in each country.

Table 3 shows the average values of entrepreneurship, big businesses, and institutions in each stage of economic development and throughout the study period. As the economy develops, the proportion of large corporations increases, institutions develop, and the TEA rate decreases.

Table 3: Relationships among Entrepreneurships, Presence of Big Businesses, and Institutions at Different Development Levels

	TEA	TEA_nec	TEA_opp	top30_ratio	institution
High income-stage	7.1	1.2	0.6	45.8	2.89
Upper middle-income stage	11.6	3.6	0.8	28.9	2.58
Lower middle-income stage	16.0	6.0	0.9	26.5	2.87
All	8.5	2.0	0.6	40.7	2.80

TEA = Total Early-Stage Entrepreneurial Activity

Source: Author's creation based on Global Entrepreneurship Monitor database.

Table 4 lists 33 countries with their associated TEA/big business/institution levels. First, the mean share of the overall TEA rate is 10.15%. Chile, which has the highest TEA rate, has a share as high as 25.93%. Relatively low shares are found in the Russian Federation, Japan, and Malaysia. Second, the mean share of the top 30 industrial firms' total sales contributes to 40.0% of the GDP. In Ireland, New Zealand, and Singapore, the shares are as high as 85.9%, 75.9%, and 75.3%, respectively. Relatively low shares are found in Turkey and the PRC. Third, the mean share of institutions is 2.86. The top three countries with the highest institutional levels are Switzerland, Singapore, and the Netherlands, and the bottom three countries include South Africa, Greece, and Brazil. Except for the higher proportion of big businesses in more developed countries, we fail to identify any other rules using only raw data.

The following empirical analysis section explores the relationships among big businesses, institutions, and entrepreneurship by controlling the determinants of entrepreneurship. Further, we examine the changing impact of big businesses on entrepreneurship at different stages of economic development.

Table 4: List of Countries with Associated TEA/Big Business/Institution Levels

Country	Year	TEA	TEA_nec	TEA_opp	top30_ratio	institution_v1
Chile	2015	25.93	6.56	1.75	55.2	2.73
Mexico	2015	21.01	3.97	1.66	20.5	2.76
Brazil	2015	20.98	8.99	1.19	18.5	2.22
Argentina	2015	17.74	5.28	1.2	6.2	2.43
New Zealand	2005	17.57	1.27	1.62	75.9	2.76
Canada	2015	14.72	1.99	1.19	32.6	3.09
Thailand	2015	13.74	2.36	1.12	48	2.79
China, People's Republic of	2015	12.84	4.46	0.83	15.5	2.97
Australia	2015	12.79	1.63	1.09	27.9	2.68
United States	2015	11.88	1.7	0.98	21.7	3
Israel	2015	11.82	1.47	0.94	25.8	2.71
Singapore	2014	10.96	1.25	0.92	75.3	3.46
Turkey	2013	9.95	3.01	0.67	18.2	2.89
Saudi Arabia	2010	9.4	0.94	0.84	20.6	2.84
Ireland	2015	9.33	1.8	0.74	85.9	3.09
Korea, Republic of	2015	9.25	2.25	0.69	67.4	2.79
Poland	2015	9.21	2.58	0.64	20.7	2.71
South Africa	2015	9.19	3.05	0.6	49.2	2.42
Switzerland	2015	7.31	0.74	0.62	69.2	3.5
Netherlands	2015	7.21	1.06	0.59	24.7	3.43

Table 4 (continued)

Country	Year	TEA	TEA_nec	TEA_opp	top30_ratio	institution_v1
Sweden	2015	7.16	0.66	0.55	56.5	2.85
United	2015	6.93	1.66	0.52	51.9	2.93

Kingdom						
Greece	2015	6.75	1.5	0.51	25.3	2.27
Finland	2015	6.59	0.99	0.53	57.5	2.94
Belgium	2015	6.24	1.71	0.38	32.3	3
Spain	2015	5.7	1.41	0.42	31.9	2.56
Norway	2015	5.66	0.6	0.46	37.5	2.78
Denmark	2014	5.47	0.3	0.5	44.2	3.24
France	2014	5.34	0.86	0.44	51.5	2.82
Germany	2015	4.7	0.8	0.38	47.6	2.75
Russian Federation	2014	4.69	1.83	0.28	25.4	2.69
Japan	2014	3.83	0.72	0.29	38.1	2.95
Malaysia	2015	2.93	0.4	0.25	41.2	3.28
Average	2015	10.15	2.12	0.77	40.0	2.86

TEA = Total Early-Stage Entrepreneurial Activity.

Source: Author's creation based on Global Entrepreneurship Monitor and Osiris database.

B. Methodology

The basic approach adopted in our cross-country entrepreneurship study involves the estimation of the following model:

$$Entrepreneurship_{it} = \alpha + \beta_0 Key'_{it} + \underbrace{\beta_1 Demand'_{it} + \beta_2 Supply'_{it}}_{\text{The } EFE} + \rho_{it}$$

While i denotes the country, t indexes time, and $Entrepreneurship'_{it}$ is a measure of entrepreneurial activity (i.e., nascent entrepreneurship, necessity-driven entrepreneurship, or opportunity-driven entrepreneurship) in country i at time t . Key'_{it} is a vector of the key factors affecting the demand and supply sides (i.e., presence of big businesses and institutions) in country i at time t . $Demand'_{it}$ is a vector of demand-side determinants of entrepreneurship, i.e., the size of the home market, economic development, and globalization (i.e., FDI and openness) level of country i at time t . $Supply'_{it}$ is a vector of the supply-side factors determining entrepreneurship, i.e., the total population, population age composition, and quality of the population of country i at time t . $Demand'_{it}$ and $Supply'_{it}$ are the vectors of the control variables, which are consistent with the *EFE* and are assumed to increase the accuracy of the parameter estimates and decrease bias. ρ_{it} is the error term.

In this study, fixed effect (FE) estimations are conducted. As stated by Islam (1995), the issue of omitted variable bias can be mitigated by using FE panel estimation (Lee et al. 2013).

C. Data and Sample

Table 5 provides the definitions of the variables, including the dependent variables, big business variable, institutional variables, basic control variables, and developmental stage dummy variables. The descriptive statistics and data sources are reported in Table 6.

Table 5: Variable Definitions

Variable	Description	Variable Definition
Dependent Variable		
TEA	Entrepreneurship	Total early-stage entrepreneurial activity rate
TEA_nec	Entrepreneurship	Necessity-driven early-stage entrepreneur
TEA_opp	Entrepreneurship	Opportunity-driven early-stage entrepreneur
Firm Variable		
top30_ratio	Large enterprises	The ratio of top30 nonfinancial companies' total sales to GDP (%)
Basic Control Variables		
Demand-side factors		
gdp	Size of a country's home market	Log value of GDP (constant, year 2010)
gdppercapita	Economic development	Log value of GDP per capita (constant, year 2010)
globalization	Integration of world markets	
-openness	Trade	Trade (% of GDP)
-fdi	Foreign direct investment	Foreign direct investment, net inflows (% of GDP)
Supply-side factors		
pop_total	Total population	Log value of total population
agestructure	Age structure of the population	The ratio of working-age population (population ages 15–64) to the nonworking-age population (%)
edu_tertiary	Quality of population	School enrollment, tertiary (% gross)

Table 5 (continued)

Variable	Description	Variable Definition
Institutional Variables^a		
institution_v1	Composite institutional development index	Weighted average of institutional variables
institution_v2	Composite institutional development index	Simple average of institution variables
instituion1	Entrepreneurial finance	The availability of financial resources equity and debt for SMEs
instituion2	Government policy: support and relevance	The extent to which public policies support entrepreneurship—entrepreneurship as a relevant economic issue
instituion3	Government policy: taxes and bureaucracy	The extent to which public policies support entrepreneurship. Taxes or regulations are either size-neutral or encourage new SMEs
instituion4	Government entrepreneurship programs	The presence and quality of programs directly assisting SMEs at all levels of government.
instituion5	Entrepreneurial education: entrepreneurial education at school stage	The extent to which training in creating or managing SMEs is incorporated within the education and training system at primary and secondary levels.
instituion6	Entrepreneurial education: entrepreneurial education at post school stage	The extent to which training in creating or managing SMEs is incorporated within the education and training system in higher education such as vocational, college, and business schools.

Table 5 (continued)

Variable	Description	Variable Definition
Institutional Variables		
instituion7	Research and development transfer	The extent to which national research and development will lead to new commercial opportunities and is available to SMEs.
instituion8	Commercial and legal infrastructure	The presence of property rights, commercial, accounting, and other legal and assessment services and institutions that support SMEs.
instituion9	Entry regulation: internal market dynamics	The level of change in markets from year to year.
instituion10	Entry regulation: internal market burdens or entry regulation	The extent to which new firms are free to enter existing markets.
instituion11	Physical infrastructure	Ease of access to physical resources—communication, utilities, transport, land, or space—at a price that does not discriminate against SMEs.
instituion12	Cultural and social norms	The extent to which social and cultural norms encourage or allow actions leading to new business methods or activities that can potentially increase personal wealth and income.

Table 5 (continued)

Variable	Description	Variable Definition
Dummy Variables		
high	Dummy for countries in the high-income stage	Dummy for Argentina (2013), Australia, Belgium, Canada, Chile (2012–2015), Denmark, Finland, France, Germany, Greece, Ireland, Israel, Japan, New Zealand, Netherlands, Norway, Poland (2008–2015), Saudi Arabia, Singapore, Republic of Korea, Spain, Sweden, Switzerland, United Kingdom, and United States
um	Dummy for countries in the upper middle-income stage	Dummy for Argentina (2001–2012), Brazil, Chile (2001–2011), People's Republic of China (2010–2015), Malaysia, Mexico, Poland (2001–2007), Russian Federation, South Africa (2004–2015), Thailand (2008–2015), and Turkey
lm	Dummy for countries in the lower middle-income stage	Dummy for Brazil (2003), People's Republic of China (2001–2009), South Africa (2001–2003), and Thailand (2001–2007)

GDP = gross domestic product, SMEs = small and medium-sized enterprises, TEA = Total Early-Stage Entrepreneurial Activity.

^a The definition and classification of the institution are quoted from the Global Entrepreneurship Monitor.

Sources: Author's creation based on Global Entrepreneurship Monitor, Osiris, and World Development Indicators database.

Table 6: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.	Source
TEA	388	0.09	0.05	0.01	0.27	GEM
TEA_nec	363	0.02	0.02	0.00	0.10	
TEA_opp	363	0.01	0.00	0.00	0.02	
top30_ratio	489	40.35	21.33	6.18	101.73	Osiris
gdp	495	6.58	1.12	4.77	9.72	WDI
gdppercapita	495	10.07	0.84	7.55	11.43	
openness	494	85.42	65.46	19.80	439.66	
fdi	495	4.81	8.40	-5.68	86.59	
pop_total	495	17.21	1.37	15.17	21.04	
agestructure	495	2.08	0.35	1.48	3.71	
edu_tertiary	385	61.80	21.07	9.79	122.40	
institution_v1	328	2.86	0.29	2.06	3.70	GEM
institution_v2	328	2.80	0.28	2.04	3.58	
institution1	351	2.73	0.48	1.57	4.30	
institution2	351	2.72	0.47	1.37	3.96	
institution3	351	2.47	0.57	1.22	4.14	
institution4	351	2.75	0.46	1.42	3.71	
institution5	351	2.10	0.36	1.34	3.10	
institution6	329	2.82	0.35	1.89	3.89	
institution7	351	2.54	0.37	1.70	3.73	
institution8	351	3.17	0.40	1.94	4.21	
institution9	351	2.91	0.52	1.83	4.40	
institution10	351	2.70	0.36	1.86	3.88	
institution11	351	3.89	0.45	2.74	4.82	
institution12	350	2.89	0.47	1.74	4.59	

GEM = Global Entrepreneurship Monitor, Max. = maximum, Min. = minimum, Obs. = Observation, Std. Dev. = standard deviation, TEA = Total Early-Stage Entrepreneurial Activity, WDI = World Development Indicators.

Sources: Author's creation based on Global Entrepreneurship Monitor, Osiris, and World Development Indicators database.

IV. EMPIRICAL RESULTS

A. The Relationship between Big Businesses and Entrepreneurship

First, the benchmark model shows the essential relationship between big businesses and entrepreneurship. We specify the following relationship:

1. Benchmark Model

$$\begin{aligned} entrepreneurship = f(& top30_ratio, \\ & gdp, gdppercapita, openness, fdi \\ & pop_total, agestructure, edu_tertiary) \end{aligned}$$

entrepreneurship: *TEA*

where *TEA* is the dependent variable used to measure entrepreneurship. Entrepreneurship is also measured by the opportunity-driven early-stage entrepreneurial activity (*TEA_opp*) rate and the necessity-driven early-stage entrepreneurial activity (*TEA_nec*) rate.

Regarding the demand-side factors, we consider the *GDP* to represent the size of a country's home market. We also use the GDP per capita (*gdppercapita*) to assess the economic development levels. Further, to capture a country's integration into world markets, which we refer to as globalization, we include the trade level (*openness*, the percentage of a country's exports and imports of goods and services relative to its GDP) and FDI (*fdi*, the percentage of a country's net inflow of foreign capital relative to its GDP) in the equation.

Regarding the supply-side factors, we use the total population (*pop_total*) of a country to capture the overall supply of potential entrepreneurs. The age structure of the population (*agestructure*) influences entrepreneurship because the likelihood of becoming an entrepreneur varies with age. The quality of the population (*edu_tertiary*, a country's gross tertiary enrollment rate) may also have a positive effect on entrepreneurship.

In contrast to the existing models in the literature, a key feature of our model is the inclusion of the big business variable as a regressor. Big businesses are measured by the ratio of the top 30 nonfinancial companies' total sales to the GDP (*top30_ratio*).

In column (1) of Table 7, the result is represented by the estimates of the overall *TEA* rate of entrepreneurship and the *top30_ratio* of big businesses on the basis of an FE model. Moreover, the demand- and supply-side factors are controlled separately in the robustness check shown in columns (2) and (3) of Table 7, respectively.

Table 7: top30_ratio_all, top30_ratio_demand, top30_ratio_supply

	(1) FE	(2) FE	(3) FE
	TEA	TEA	TEA
top30_ratio	-0.001** (-2.575)	-0.0004* (-1.835)	-0.001*** (-2.681)
gdp	-0.317 (-0.683)	0.117*** (4.469)	
gdppercapita	0.317 (0.681)	-0.087** (-2.585)	
openness	0.00003 (0.175)	0.00004 (0.326)	
fdi	-0.000 (-0.102)	-0.00004 (-0.213)	
pop_total	0.415 (0.879)		0.094** (2.230)
agestructure	0.041* (1.851)		0.039** (2.216)
edu_tertiary	0.001*** (2.618)		0.001*** (2.944)
_cons	-8.256 (-0.848)	0.194 (1.039)	-1.635** (-2.276)
Obs.	304	385	304
R ² (within)	0.13	0.11	0.12

T-values are in brackets.

*** p<0.01, ** p<0.05, * p<0.1.

FE = fixed effect, TEA = Total Early-Stage Entrepreneurial Activity.

These results reveal the negative and significant coefficients of the variables of large firms. These outcomes are consistent with the phenomenon presented in Figure 3, indicating that a basic and negative relationship exists between big businesses and entrepreneurship. Thus, countries with a high proportion of large firms have a lower proportion of entrepreneurship. However, notably, this finding is obtained without considering each country's stage of economic development. The other control variables, such as the GDP per capita, FDI, level of the total population, and tertiary enrollment rate, tend to show normal signs and levels of significance.

2. Reduced Model

$$entrepreneurship = f(top30_ratio, \\ gdppercapita, openness, fdi, pop_total, edu_tertiary)$$

entrepreneurship: TEA

Table 8 presents a reduced model and shows the empirical analysis results obtained by retaining two of each of the demand-side (*gdppercapita* and globalization (*openness* and *fdi*) and supply-side (*pop_total* and *edu_tertiary*) factors in addition to the key variable (*top30_ratio*). The

main results are consistent with those of the benchmark model. The coefficients of large firms are stable at about -0.01 across all models. As the results of the main variables remain the same, the analysis proceeds with the reduced model in the content presented below.

Table 8: top30_ratio

	(1) FE
	TEA
top30_ratio	-0.001** (-2.245)
gdppercapita	0.014 (0.954)
openness	-0.0001 (-0.439)
fdi	-0.00004 (-0.214)
pop_total	0.087* (1.936)
edu_tertiary	0.001*** (2.739)
_cons	-1.576** (-2.148)
Obs.	304
R ² (within)	0.11

T-values are in brackets

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

FE = fixed effect, TEA = Total Early-Stage Entrepreneurial Activity.

B. The Relationship between Big Businesses and Entrepreneurship Types

$$entrepreneurship = f(\text{top30_ratio},$$

$$\text{gdppercapita}, \text{openness}, \text{fdi}, \text{pop_total}, \text{edu_tertiary})$$

entrepreneurship: TEA; TEA_opp; TEA_nec

In this section, we estimate the equations for different types of entrepreneurship to distinguish between opportunity-driven and necessity-driven entrepreneurship.

Table 9: TEA, TEA_opp, TEA_nec

	(1) FE	(2) FE	(3) FE
	TEA	TEA_opp	TEA_nec
top30_ratio	-0.001** (-2.245)	-0.0002* (-1.654)	-0.00003 (-1.091)
gdppercapita	0.014 (0.954)	0.003*** (2.750)	-0.019*** (-3.519)
openness	-0.0001 (-0.439)	-0.0001 (-0.542)	0.000 (0.483)
fdi	-0.00004	-0.0002	-0.000

	(-0.214)	(-0.097)	(-0.598)
pop_total	0.087*	0.008**	0.033*
	(1.936)	(2.120)	(1.941)
edu_tertiary	0.001***	0.001***	0.000**
	(2.739)	(3.046)	(2.322)
_cons	-1.576**	-0.165***	-0.363
	(-2.148)	(-2.710)	(-1.328)
Obs.	304	288	288
R ² (within)	0.11	0.19	0.08

T-values are in brackets.

*** p<0.01, ** p<0.05, * p<0.1.

FE = fixed effect, TEA = Total Early-Stage Entrepreneurial Activity.

The equation is estimated with three different *TEA* indexes (namely, *TEA*, *TEA_opp*, and *TEA_nec*) as measures of entrepreneurship. The results of the three estimated equations are presented in Table 9. Column (1) shows the outcome with the determinants of the overall TEA rate, which is consistent with those in Tables 7–8. Regarding opportunity-driven entrepreneurship, column (2) shows a negative relationship with big businesses. Regarding necessity entrepreneurship, column (3) shows that the coefficient of large enterprises is nonsignificant. Thus far, the regression results show that the increasing shares of large firms have a negative effect on overall and opportunity-driven entrepreneurship and no impact on necessity-driven entrepreneurship. Overall, the presence of big businesses is negatively related to new firm formation.

C. Spillover Effects of Big Businesses vs. Institutions on Different Types of Entrepreneurship

$$entrepreneurship = f(top30_ratio, institution,$$

$$gdppercapita, openness, fdi, pop_total, edu_tertiary)$$

entrepreneurship: *TEA*; *TEA_opp*; *TEA_nec*

In this section, we further investigate the relationships among big businesses, various aspects of the institutional environment, and entrepreneurship. We employ 12 *EFCs* proposed by the GEM as measures of the entrepreneurship-related institutional variables. In addition, two composite institutional variables are created with simple and weighted averages.

The regression results are shown in Tables 10A–10E and are based on FE estimators. The coefficients of big businesses are all negative and significant. These estimation results confirmed the previous outcomes.

Tables 10A–10E and Appendix Tables A1–A2 present the results obtained after we add

the various types of institutions into separate models. We fail to identify an association between higher levels of overall institutions and higher levels of new business creation activities regardless of the type. Of the 12 types of institutions, only *institutions 2, 3, and 12* have a positive and significant impact on opportunity-driven entrepreneurship. Therefore, among the entrepreneurship revitalization institutional settings, government policies, such as taxes and regulations, support entrepreneurs, and positive social perceptions towards entrepreneurs have a positive effect on new firm formation. Tables 10A and 10D–10E indicate that institutions have no effect on necessity-driven entrepreneurship. Thus, revitalizing entrepreneurship activities by simply improving entrepreneurship-related institutions is difficult, especially necessity-driven entrepreneurship.

Combined with the results shown in Tables 7–9, these outcomes imply that, first, when the stages of economic development are not considered, big businesses usually have a negative spillover effect on nascent entrepreneurship. Big businesses have a negative effect on opportunity-driven entrepreneurship and no effect on necessity-driven entrepreneurship. Second, three types of institutions (*institutions 2, 3, and 12*) have a positive effect on opportunity-driven entrepreneurship. In contrast, none of the 12 types of institutions affect necessity-driven entrepreneurship.

Table 10A: institution_v1~2, TEA_opp, TEA_nec

	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE
	TEA	TEA	TEA_opp	TEA_opp	TEA_nec	TEA_nec
top30_ratio	-0.0005** (-2.083)	-0.0005** (-2.066)	-0.00003 (-1.571)	-0.00003 (-1.556)	-0.0001 (-1.387)	-0.0001 (-1.392)
institution_v1	0.013 (1.389)		0.001 (1.162)		-0.001 (-0.259)	
institution_v2		0.013 (1.301)		0.001 (1.104)		-0.001 (-0.295)
gdppercapita	0.002 (0.122)	0.003 (0.168)	0.003** (2.208)	0.003** (2.252)	-0.025*** (-4.801)	-0.025*** (-4.819)
openness	-0.0001 (-0.442)	-0.0001 (-0.440)	-0.00001 (-0.888)	-0.00001 (-0.888)	0.00005 (0.893)	0.0001 (0.898)
fdi	-0.00003 (-0.128)	-0.00002 (-0.083)	0.000 (0.306)	0.000 (0.342)	-0.0001 (-0.718)	-0.0001 (-0.723)
pop_total	0.097** (1.988)	0.097** (1.977)	0.005 (1.145)	0.005 (1.137)	0.033** (2.083)	0.033** (2.085)
edu_tertiary	0.001*** (3.842)	0.001*** (3.808)	0.0001*** (3.602)	0.0001*** (3.577)	0.0002*** (2.921)	0.0002*** (2.932)
_cons	-1.674** (-2.114)	-1.670** (-2.108)	-0.107 (-1.643)	-0.107 (-1.638)	-0.313 (-1.206)	-0.313 (-1.208)
Obs.	258	258	258	258	258	258
R ² (within)	0.175	0.174	0.205	0.204	0.142	0.142

T-values are in brackets.

*** p<0.01, ** p<0.05, * p<0.1.

FE = fixed effect, TEA = Total Early-Stage Entrepreneurial Activity.

Table 10B: institution1~6, TEA_opp

	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE
	TEA_opp	TEA_opp	TEA_opp	TEA_opp	TEA_opp	TEA_opp
top30_ratio	-0.00003 (-1.489)	-0.00003 (-1.368)	-0.00003 (-1.452)	-0.00003 (-1.563)	-0.00003 (-1.562)	-0.00003 (-1.566)
institution1	0.0005 (1.035)					
institution2		0.001* (1.902)				
institution3			0.001** (2.382)			
institution4				0.0005 (0.897)		
institution5					-0.00003 (-0.064)	
institution6						-0.0001 (-0.145)
gdppercapita	0.003** (2.011)	0.003** (2.019)	0.003** (2.232)	0.003** (2.313)	0.003** (2.549)	0.003** (2.531)
openness	-0.00001 (-0.903)	-0.00001 (-0.948)	-0.00002 (-1.174)	-0.00001 (-0.898)	-0.00001 (-0.843)	-0.00001 (-0.841)
fdi	0.000 (0.297)	0.000 (0.419)	0.000 (0.426)	0.000 (0.424)	0.00001 (0.490)	0.00001 (0.488)
pop_total	0.006 (1.529)	0.006 (1.505)	0.005 (1.274)	0.005 (1.321)	0.005 (1.345)	0.005 (1.313)
edu_tertiary	0.0001*** (3.577)	0.0001*** (3.246)	0.0001*** (3.542)	0.0001*** (3.337)	0.0001*** (3.401)	0.0001*** (3.421)
_cons	-0.131** (-2.019)	-0.126** (-1.984)	-0.112* (-1.773)	-0.117* (-1.825)	-0.120* (-1.871)	-0.119* (-1.839)
Obs.	259	259	259	259	259	259
R ² (within)	0.208	0.217	0.224	0.207	0.204	0.204

T-values are in brackets.

*** p<0.01, ** p<0.05, * p<0.1.

FE = fixed effect, TEA = Total Early-Stage Entrepreneurial Activity.

Table 10C: institution7~12, TEA_opp

	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE
	TEA_opp	TEA_opp	TEA_opp	TEA_opp	TEA_opp	TEA_opp
top30_ratio	-0.00003 (-1.561)	-0.00003 (-1.558)	-0.00003 (-1.606)	-0.00003 (-1.572)	-0.00003 (-1.506)	-0.00003 (-1.527)
institution7	0.0001 (0.110)					
institution8		0.0001 (0.125)				
institution9			-0.0004 (-0.805)			
institution10				-0.0004 (-0.762)		
institution11					-0.0003 (-0.507)	
institution12						0.001** (2.540)
gdppercapita	0.003** (2.523)	0.003** (2.481)	0.003** (2.433)	0.003*** (2.632)	0.003*** (2.600)	0.003** (2.135)
openness	-0.00001 (-0.868)	-0.00001 (-0.868)	-0.00001 (-0.841)	-0.00001 (-0.740)	-0.00001 (-0.721)	-0.00001 (-0.893)
fdi	0.000 (0.474)	0.000 (0.472)	0.000 (0.344)	0.00001 (0.571)	0.00001 (0.585)	0.000 (0.413)
pop_total	0.005 (1.347)	0.005 (1.326)	0.006 (1.524)	0.005 (1.177)	0.005 (1.338)	0.002 (0.403)
edu_tertiary	0.0001*** (3.427)	0.0001*** (3.405)	0.0001*** (3.482)	0.0001*** (3.294)	0.0001*** (3.311)	0.0001*** (3.929)
_cons	-0.120* (-1.873)	-0.122* (-1.828)	-0.135** (-2.021)	-0.110* (-1.686)	-0.119* (-1.862)	-0.056 (-0.831)
Obs.	259	259	259	259	259	258
R ² (within)	0.204	0.204	0.206	0.206	0.205	0.222

T-values are in brackets.

*** p<0.01, ** p<0.05, * p<0.1.

FE = fixed effect, TEA = Total Early-Stage Entrepreneurial Activity.

Table 10D: institution1~6, TEA_nec

	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE
	TEA_nec	TEA_nec	TEA_nec	TEA_nec	TEA_nec	TEA_nec
top30_ratio	-0.0001 (-1.384)	-0.0001 (-1.384)	-0.0001 (-1.370)	-0.0001 (-1.340)	-0.0001 (-1.353)	-0.0001 (-1.331)
institution1	-0.001 (-0.700)					
institution2		-0.001 (-0.520)				
institution3			-0.001 (-0.652)			
institution4				-0.001 (-0.719)		
institution5					-0.001 (-0.245)	
institution6						0.0004 (0.187)
gdppercapita	-0.024*** (-4.498)	-0.025*** (-4.803)	-0.025*** (-4.956)	-0.025*** (-4.834)	-0.025*** (-5.054)	-0.026*** (-5.028)
openness	0.00004 (0.802)	0.00004 (0.797)	0.00005 (0.854)	0.00004 (0.804)	0.00004 (0.802)	0.00004 (0.751)
fdi	-0.00005 (-0.589)	-0.0001 (-0.704)	-0.0001 (-0.706)	-0.0001 (-0.673)	-0.0001 (-0.713)	-0.0001 (-0.725)
pop_total	0.034** (2.102)	0.035** (2.242)	0.036** (2.315)	0.036** (2.312)	0.036** (2.300)	0.036** (2.296)
edu_tertiary	0.0002*** (2.728)	0.0002*** (2.985)	0.0002*** (2.927)	0.0003*** (3.002)	0.0002*** (2.904)	0.0002*** (2.950)
_cons	-0.323 (-1.258)	-0.346 (-1.362)	-0.361 (-1.423)	-0.362 (-1.428)	-0.356 (-1.401)	-0.359 (-1.404)
Obs.	259	259	259	259	259	259
R ² (within)	0.144	0.143	0.144	0.144	0.143	0.143

T-values are in brackets

*** p<0.01, ** p<0.05, * p<0.1.

FE = fixed effect, TEA = Total Early-Stage Entrepreneurial Activity.

Table 10E: institution7~12, TEA_nec

	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE
	TEA_nec	TEA_nec	TEA_nec	TEA_nec	TEA_nec	TEA_nec
top30_ratio	-0.0001 (-1.331)	-0.0001 (-1.317)	-0.0001 (-1.397)	-0.0001 (-1.331)	-0.0001 (-1.250)	-0.0001 (-1.373)
institution7	0.001 (0.330)					
institution8		0.001 (0.547)				
institution9			-0.002 (-1.134)			
institution10				0.002 (0.936)		
institution11					-0.002 (-0.814)	
institution12						0.0002 (0.096)
gdppercapita	-0.026*** (-5.095)	-0.026*** (-5.103)	-0.026*** (-5.206)	-0.026*** (-5.177)	-0.025*** (-4.923)	-0.025*** (-4.977)
openness	0.00004 (0.726)	0.00004 (0.731)	0.00004 (0.806)	0.00003 (0.630)	0.0001 (0.943)	0.00005 (0.860)
fdi	-0.0001 (-0.753)	-0.0001 (-0.776)	-0.0001 (-0.908)	-0.0001 (-0.827)	-0.00004 (-0.533)	-0.0001 (-0.757)
pop_total	0.036** (2.304)	0.038** (2.354)	0.041** (2.531)	0.039** (2.430)	0.036** (2.284)	0.033** (1.974)
edu_tertiary	0.0002*** (2.961)	0.0003*** (2.996)	0.0003*** (3.032)	0.0003*** (3.052)	0.0002*** (2.791)	0.0003*** (2.948)
_cons	-0.357 (-1.405)	-0.394 (-1.490)	-0.435* (-1.654)	-0.400 (-1.551)	-0.350 (-1.380)	-0.304 (-1.117)
Obs.	259	259	259	259	259	258
R ² (within)	0.143	0.144	0.147	0.146	0.145	0.141

T-values are in brackets.

“***” for p<0.01, “**” for p<0.05, “*” for p<0.1.

FE = fixed effect, TEA = Total Early-Stage Entrepreneurial Activity.

D. Big Business Spillover Effects According to the Entrepreneurship Type and Stage of Economic Development

$$entrepreneurship = f(top30_ratio, stage, top30_ratio * stage, \\ gdppercapita, openness, fdi, pop_total, edu_tertiary)$$

entrepreneurship: TEA; TEA_opp; TEA_nec

This section presents an analysis performed to determine whether the big business spillover effects on entrepreneurship differ across countries in different stages of economic development. We investigate the differences in big business spillover effects among high-, upper middle-, and lower middle-income nations by introducing interaction terms between the big business variables and developmental stage country dummy variables and controlling for the income level.

The results of the regressions predicting a country's proportion of different types of new ventures are shown in Table 11. First, in the lower middle-income stage, the coefficients of the interaction terms (*top30_ratio_lm*) between the big business and lower middle-income dummy variables are significantly positive, as shown in columns (5) and (6). Thus, in countries in the lower middle-income stage, the proportion of necessity-motivated new ventures is influenced positively by the top 30 nonfinancial firms' total sales to the GDP. Second, in countries in the upper middle-income stage, the proportion of opportunity- and necessity-motivated new ventures is negatively influenced by the top 30 nonfinancial firms' total sales to the GDP as shown in columns (4) and (9).^② Third, in high-income economies, the regression results shown in columns (7) and (8) indicate that, if the relative presence of big businesses increases, opportunity-driven entrepreneurship increases.

This finding is quite interesting compared to the earlier findings as we introduce interaction terms and confirm that the effects of big businesses on entrepreneurship vary with the stage of economic development. These results exactly support our main hypothesis. First, in the early stage of economic development, growth in the relative presence of big businesses is accompanied by an increase in the growth rate of necessity-driven entrepreneurship. Second, when countries progress to the upper middle-income stage, both necessity- and opportunity-driven entrepreneurship decrease as the proportion of big businesses in the economy increases. Third, in high-income economies, if the relative presence of big businesses increases,

^② A negative relationship between big businesses and entrepreneurship does not necessarily lead to negative results. For example, the decline in necessity-driven entrepreneurship is interpreted as a good phenomenon in some ways.

opportunity-driven entrepreneurship increases. As the economy grows, an "N-shaped" overall relationship between big businesses and entrepreneurship is observed.

We should interpret these results carefully. The existence of large corporations in one country seemingly negatively affects the creation of new companies, but this outcome occurs in a situation that does not consider the types of entrepreneurship and stages of economic development. If these factors are not considered, people tend to believe the notion that the larger the share of the economy of large corporations in a country, the lower the level of entrepreneurial activity.

However, when considering the stage of economic development, the situation is different. Most people do not have the ability to find a job in a large company in the early stages of economic development, and thus they are forced to start a business, which, in turn, is a necessity-driven start-up. Moreover, during this time, these necessity-driven start-ups are driven by large corporations to start businesses in informal markets. As the economy develops to the upper middle-income stage, people's skills also improve, thereby allowing them to find jobs at large companies, representing a circumstance that reduces the level of necessity-driven entrepreneurship. During this period, people prefer to work in large companies as the cost of starting a business increases, thereby reducing the level of opportunity-driven start-ups. As the economy subsequently enters the high-income stage, capital becomes abundant such that one can start a business with only good ideas. Therefore, the presence of opportunity-driven start-ups increases. Large firms' failure risks, such as R&D and product risk, are high (Lin et al. 2013); thus, large firms attempt to outsource some services to other companies. This endeavor also acts as an opportunity for companies in that field, and thus increases the creation of new companies.

Table 11: top30_ratio_high, top30_ratio_um, top30_ratio_lm

	(1) TEA	(2) TEA	(3) TEA	(4) TEA_nec	(5) TEA_nec	(6) TEA_nec	(7) TEA_opp	(8) TEA_opp	(9) TEA_opp
top30_ratio	-0.001 (-1.341)	-0.0014*** (-3.345)	-0.00037* (-1.655)	0.00065** (2.066)	-0.0001 (-0.655)	-0.00004 (-0.464)	-0.00019*** (-2.833)	-0.00011*** (-3.547)	-0.00002 (-1.152)
high	0.022 (0.703)	0.013 (0.662)		0.015 (1.313)	0.001 (0.171)		-0.001 (-0.470)	0.000 (0.209)	
top30_ratio_high	0.001 (0.946)	0.0011*** (2.622)		-0.00069** (-2.242)	0.0001 (0.424)		0.00017** (2.591)	0.0001*** (3.083)	
um	0.009 (0.416)		-0.013 (-0.662)	0.014* (1.680)		-0.001 (-0.171)	-0.001 (-0.826)		-0.0003 (-0.209)
top30_ratio_um	-0.0002 (-0.338)		-0.0011*** (-2.622)	-0.00075*** (-2.981)		-0.0001 (-0.424)	0.00008 (1.399)		-0.0001*** (-3.083)
lm		-0.009 (-0.416)	-0.022 (-0.703)		-0.014* (-1.680)	-0.015 (-1.313)		0.001 (0.826)	0.001 (0.470)
top30_ratio_lm		0.0002 (0.338)	-0.001 (-0.946)		0.001*** (2.981)	0.001** (2.242)		-0.00008 (-1.399)	-0.0002** (-2.591)
gdppercapita	0.014 (0.739)	0.014 (0.739)	0.014 (0.739)	-0.020*** (-2.870)	-0.020*** (-2.870)	-0.020*** (-2.870)	0.004*** (2.675)	0.004*** (2.675)	0.004*** (2.675)
openness	0.000 (0.185)	0.000 (0.185)	0.000 (0.185)	0.000 (0.404)	0.000 (0.404)	0.000 (0.404)	0.000 (0.193)	0.000 (0.193)	0.000 (0.193)
fdi	-0.000 (-0.274)	-0.000 (-0.274)	-0.000 (-0.274)	-0.000 (-0.582)	-0.000 (-0.582)	-0.000 (-0.582)	-0.000 (-0.248)	-0.000 (-0.248)	-0.000 (-0.248)
pop_total	0.104** (2.324)	0.104** (2.324)	0.104** (2.324)	0.037** (2.179)	0.037** (2.179)	0.037** (2.179)	0.008** (2.155)	0.008** (2.155)	0.008** (2.155)
edu_tertiary	0.000 (1.039)	0.000 (1.039)	0.000 (1.039)	0.000* (1.777)	0.000* (1.777)	0.000* (1.777)	0.000 (1.318)	0.000 (1.318)	0.000 (1.318)
_cons	-1.852*** (-2.608)	-1.843*** (-2.605)	-1.830** (-2.587)	-0.438 (-1.619)	-0.424 (-1.574)	-0.423 (-1.570)	-0.169*** (-2.899)	-0.171*** (-2.934)	-0.171*** (-2.929)
Obs.	304	304	304	288	288	288	288	288	288
R-squared	0.199	0.199	0.199	0.125	0.125	0.125	0.284	0.284	0.284

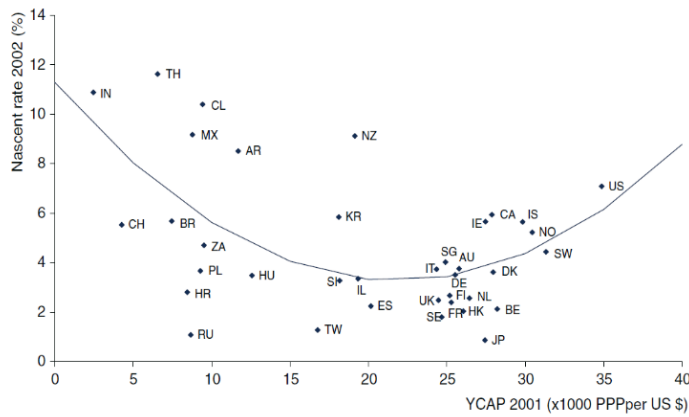
T-values are in brackets.

**** for p<0.01, *** for p<0.05, ** for p<0.1.

TEA = Total Early-Stage Entrepreneurial Activity.

V. SUMMARY AND CONCLUDING REMARKS

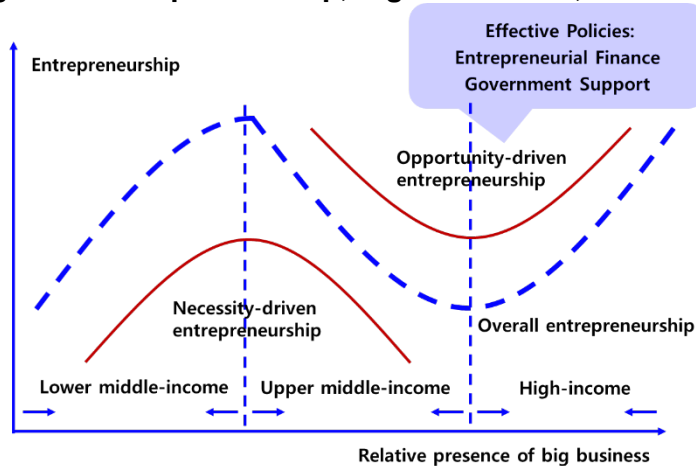
Figure 4: The Relationship between Big Businesses and Entrepreneurships, the "U-Shaped"



PPP = purchasing power parity, YCAP 2001 = constant and per capita income(base year 2001)

Source: Wennekers, Van Wennekers, Thurik, and Reynolds(2005).

Figure 5: Entrepreneurship, Big Businesses, and Economic Development



Source: Author's creation based on empirical results.

In the previous sections, the relationships among big businesses, institutions, and different types of entrepreneurship were empirically examined. The core contributions of this study are as follows.

First, a big business variable is incorporated into research concerning the determinants of entrepreneurship. To date, studies mainly theoretically or empirically analyzed the relationship

between new firm formation and economic development. The study by Wennemers et al. (2005)^③ is representative of such empirical research, as it proved that the per capita income and entrepreneurship exhibit a “U-shaped” relationship, as shown in Figure 4. However, similar to Wennemers et al. (2005), most empirical analyses are cross-sectional studies and even panel-data analyses that cover periods of less than 5 years. In the current study, we examine how the relationship between big businesses and entrepreneurship changes according to the stage of economic development. We believe that this notion is significant because the empirical analysis in this work was attempted for the first time. Moreover, this study examines how big businesses affect different types of entrepreneurship by categorizing entrepreneurship into opportunity- and necessity-driven entrepreneurship. Figure 5 shows a summary of the main conclusions of this study and indicates that the relationships among entrepreneurship, big businesses, and economic growth are “N-shaped”.

Second, we examined the roles and significance of institutions in terms of entrepreneurship. Institutions are deemed to play a positive role in entrepreneurship in many studies. However, here, we found that institutions play a limited role in boosting entrepreneurship. Only government support policies for start-ups play a positive role in entrepreneurship. In addition, how positively start-up activities are perceived by society has a positive effect on entrepreneurship but changing people's perceptions through government policy is difficult and, even if possible, may take a long time. Moreover, these institutions have a positive impact on opportunity-motivated entrepreneurship but have no positive policy effects on necessity-driven entrepreneurship. Therefore, prioritizing government policies to support entrepreneurship is necessary when governments want to provide policy support for entrepreneurship activities and promoting individuals' positive perception of entrepreneurship are effective approaches. However, distinguishing whether a venture is an opportunity- or necessity-driven start-up is necessary when a government prepares to provide policy support for entrepreneurial activities. Moreover, blindly injecting support into a necessity-driven start-up should be avoided.

These results can be viewed as a partial answer to the question of which actors, i.e., big businesses or institutions, are a more important determinant of entrepreneurship, which is our core research question. The answer is that, as the economy develops, large corporations play a more important role in new firm formation, especially the formation of opportunity-driven start-ups.

This study has some limitations. Because of restrictions in the data acquisition, low-income countries are excluded from this study, which may cause some bias toward less-

^③ This had 1,535 citations as of 16 January 2021.

developed countries. Second, we deal with nonfinancial big businesses only. The role of large financial firms, such as banks or securities companies, may have spillover effects also to entrepreneurship, and is possibly different from that of nonfinancial ones. These limitations can be a direction of future research.

APPENDIX
Table A1: institution1~6, TEA

	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE
	TEA	TEA	TEA	TEA	TEA	TEA
top30_ratio	-0.001** (-2.219)	-0.0005** (-2.130)	-0.001** (-2.265)	-0.001** (-2.301)	-0.001** (-2.280)	-0.0005** (-2.079)
institution1	0.009* (1.800)					
institution2		0.011** (1.996)				
institution3			0.008 (1.465)			
institution4				0.004 (0.699)		
institution5					0.003 (0.429)	
institution6						0.001 (0.205)
gdppercapita	-0.003 (-0.162)	-0.001 (-0.089)	0.003 (0.210)	0.004 (0.285)	0.006 (0.392)	0.006 (0.408)
openness	-0.0001 (-0.627)	-0.0001 (-0.699)	-0.0001 (-0.814)	-0.0001 (-0.637)	-0.0001 (-0.641)	-0.0001 (-0.394)
fdi	-0.00003 (-0.118)	0.00003 (0.139)	0.00005 (0.201)	0.00004 (0.148)	0.00004 (0.161)	0.00002 (0.077)
pop_total	0.086* (1.853)	0.075* (1.654)	0.066 (1.450)	0.066 (1.449)	0.068 (1.489)	0.106** (2.197)
edu_tertiary	0.001*** (3.686)	0.001*** (3.218)	0.001*** (3.398)	0.001*** (3.293)	0.001*** (3.377)	0.001*** (3.640)
_cons	-1.412* (-1.899)	-1.231* (-1.688)	-1.110 (-1.518)	-1.120 (-1.524)	-1.163 (-1.584)	-1.841** (-2.349)
Obs.	275	275	275	275	275	259
R ² (within)	0.14	0.14	0.13	0.13	0.13	0.17

T-values are in brackets

*** p<0.01, ** p<0.05, * p<0.1.

FE = fixed effect, TEA = Total Early-Stage Entrepreneurial Activity.

Table A2: institution7~12, TEA

	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE
	TEA	TEA	TEA	TEA	TEA	TEA
top30_ratio	-0.001** (-2.313)	-0.001** (-2.310)	-0.001** (-2.354)	-0.001** (-2.326)	-0.001** (-2.211)	-0.001** (-2.297)
institution7	0.004					

institution8	(0.562)					
		0.003				
institution9		(0.368)				
			-0.003			
institution10			(-0.598)			
				-0.001		
institution11				(-0.093)		
					-0.008	
institution12					(-1.109)	
						0.018***
						(3.346)
gdppercapita	0.006	0.006	0.006	0.007	0.009	-0.001
	(0.386)	(0.368)	(0.379)	(0.444)	(0.566)	(-0.065)
openness	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	(-0.646)	(-0.607)	(-0.571)	(-0.565)	(-0.324)	(-0.582)
fdi	0.00003	0.00003	0.00002	0.00005	0.0001	-0.00001
	(0.104)	(0.134)	(0.087)	(0.192)	(0.431)	(-0.058)
pop_total	0.067	0.071	0.074	0.066	0.069	0.026
	(1.487)	(1.519)	(1.578)	(1.432)	(1.528)	(0.567)
edu_tertiary	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(3.380)	(3.366)	(3.373)	(3.308)	(3.172)	(4.049)
_cons	-1.163	-1.228	-1.257*	-1.138	-1.186	-0.438
	(-1.584)	(-1.610)	(-1.666)	(-1.520)	(-1.618)	(-0.585)
Obs.	275	275	275	275	275	274
R ² (within)	0.13	0.13	0.13	0.13	0.13	0.16

T-values are in brackets

*** p<0.01, ** p<0.05, * p<0.1.

FE = fixed effect, TEA = Total Early-Stage Entrepreneurial Activity.

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