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Necessary conditions for establishing an international financial center in Asia

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Abstract: Establishing an international financial center appears to be an important goal of many governments in emerging markets in Asia to support national economic growth. The establishment of such a center requires a multifaceted approach in which theoretical and practical aspects are important to consider. This study is conducted to examine and identify the necessary conditions leading to the establishment of a center in the Asian region. We identify 14 determinants in the current literature. We then construct 16,384 models to consider the relevance and importance of each of these 14 determinants in the context of the Asian region. The Bayesian averaging of classical estimates (BACE) is used with a sample of 35 Asian countries in this paper. Findings from our paper indicate that emerging and developing countries in the Asian region should focus on the following fundamental determinants: freedom to trade internationally, market size, higher education and training, and the size of the government. Policy implications are offered based on our findings.

Subjects: Development Policy; Economics and Development; Business, Management and Accounting

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PUBLIC INTEREST STATEMENT

Emerging cities such as Ho Chi Minh City (Vietnam), Putrajaya (Malaysia) and many other metropolises in the region have put great efforts to attract finance and service industries. These cities have also emerged as competitors to other Asian cities such as Hong Kong, Singapore, and Shanghai in becoming the international financial centers (IFC). However, studies with a focus on identifying necessary conditions for a city to become an IFC are limited, in particular for the Asian region.

The establishment of such a center requires a multifaceted approach in which theoretical and practical aspects are important to consider. Findings from our paper indicate that emerging and developing countries in the Asian region should focus on the following determinants as the necessary conditions for the establishment of an IFC: (i) freedom to trade internationally; (ii) market size; (iii) higher education and training; and (iv) the size of the government.

Keywords: freedom to trade; market size; higher education and training; government size; Bayesian averaging of classical estimates; Asian region

1. Introduction

In 1966, in his book *World Cities*, Peter Hall not only provided a clear concept of international financial centers but also classified cities based on their economic indicators. This analysis explained the term "international financial center" (IFC), or "global financial center" (GFC), which are used interchangeably in this paper, by providing assessments on many aspects, such as the ease of entering the market, trade liberalization, trade volume, higher education and training, living standards, social security, and the business environment. Since it was first introduced in the 1970s and 1980s, the concept of a world city has gradually extended to one of a global financial center. Sassen (1994) theorized global cities as transnational specialized sites for global finance and third-party services. Thrift (1994) attributed the durability and persistence of global financial centers to their locational characteristics, viewing the establishment of GFCs as for generating, capturing, and transferring the immense amounts of monetary information interlocked in it every day. Similarly, Leyshon (1997) argued that political economic stability and geographical factors mostly explain clustering in a modern monetary and financial system. The author also emphasized the importance of socioeconomic factors in the formation and success of financial networks. Top-notch financial cities such as London, New York, and Tokyo are more likely to become control centers or leading locations for global capital flows and other financial services. Accompanied by the emergence of many IFCs and globalization, promoting cities' attractiveness for inward investment is considered a vital advantage in achieving desirable outcomes for a host country, such as creating more jobs and improving standards of living. Additionally, countries with IFCs become interlocked with international financial currents and attractive to more high technologies in terms of foreign direct investment. As a consequence, competition between cities is not a new concept, and it has become more intensive and widespread than ever.

In Europe, London has been demonstrated to be an irreplaceable city in comparison to Paris and Frankfurt since its first emergence as a significant city in the sixteenth century. In Asia, competition has also been intense between Singapore, Hong Kong, and Tokyo. Ho Chi Minh City in Vietnam, Putrajaya in Malaysia, and many other metropolises in the region have attracted financial and service industries, such as telecommunication. These cities have made a significant contribution to the gross national product. These cities have also emerged as competitors to other Asian cities, such as Hong Kong, Singapore, and Shanghai in becoming regional financial centers.

However, studies with a focus on identifying necessary conditions for a city to become a GFC are limited, in particular on the Asian region. The lack of empirical studies and analyses makes it difficult for emerging cities to develop sensible policies to achieve their ambition of becoming a GFC. As such, this study is conducted to examine the key determinants of a GFC so that emerging metropolises in the Asian region can target policies formulated and implemented to achieve their ambition.

The paper is structured as follows. Following this Introduction, relevant literature and related empirical studies are discussed in Section 2. Section 3 discusses the method and data used in this study. Empirical findings are presented and discussed in Section 4, followed by conclusions and policy implications in Section 5.

2. Literature review

No consensus has yet been reached on the critical determinants for becoming an international or GFC. The rapid advancement of telecommunication enables the globalization process to eliminate geographic distance in international financial transactions. As such, the second strand of research on the role of IFCs is its ability to advance the entire financial system and hence the economy of the country where it is located through competition over IFC. Studies in this strand concentrate on

the emergence of competition between cities in promoting themselves as a lucrative place for inward investment. The literature also mentions many competitive advantages associated with financial agglomeration. Davis (1990) discussed competition between countries promoting their IFC as an inevitable outcome of the globalization process. He implied that the increasing return to scale of financial market services is emblematic of IFCs. O'Brien (1992) agreed on the necessity of an IFC in the financial concentration process. He argued that the impact of the telecommunication revolution on global centralization created a paradox between the durability and persistence of IFCs. On the one hand, information networks shrink the world in the dimension of space and time, which hurts local monopolies and improves financial market integration. On the other hand, because financial markets are more integrated, electronic linkages render moot the requirement for traditional concentration on firms and practitioners. He concluded that wholesale and retail markets arise concurrently and result in a more integrated and extensive financial market. From a different perspective, the competitive advantages of attracting foreign capital inflows to an IFC are well elucidated in many earlier studies. Consistent with this idea, Falzon (2001) emphasized the role of IFC in enhancing the financial infrastructure and capabilities of the country where it occurs. Additionally, countries with major financial centers have competitive advantages over those without them. The financial concentration benefits host countries by granting them global in terms of economic efficiency. As articulated by Shin and Timberlake (2000), these IFCs are important nodes meant to complete the conduit through which international flows of money are concentrated.

We revisit previous studies on classifying financial centers and the determinants of a GFC. Khoury (1989) put more emphasis on political and geographical factors in boosting international trade and investment inflow, saying that the size of the host country is also crucial in enlarging the trade volume of international business and securing importance of the geopolitics. Some studies were conducted to identify what enabled London to become a GFC. Neal and Quinn (2001) attributed London's status to an effective monitoring and enforcement mechanism, which was developed by London-based merchants in the seventeenth century. Additionally, the network between counterparties is maintained by British bankers. Neal (1990) pointed to the liquidity of the British government open market operation following the Glorious Revolution in 1688.

Furthermore, Carlos and Neal (2011) attributed the irresistible position of London for foreign and domestic investment to the early establishment of the Bank of England in 1694. Historical records found that London was the first industrial city engaging in large volumes of foreign trade, which gives rise to trade credit for foreign and domestic merchants. Focusing on more recent studies, Clark (2002) attributed the success of London as a leading center to the development of an ecosystem, third-party services, legal consultants, and auditing. Faulconbridge (2004) believed that the revolution in telecommunication, an effective tax system, trading history, the number of head offices and international banks, financial services, and institutional link led to the current position of London. Cassis (2006) mentioned that efficient regulation in the United States induces the growth of the eurodollar in the currency market in London in the 1950s. Budd (1995) and Clark (2001) indicated the decrease in restrictive regulations in the financial market as a lubricant in the emergence of mutual fund and pension fund activities. Moreover, the UK Financial Securities Act of 1986 ("the Big Bang") marked the development of private transactions in the UK.

Several studies attempted to identify the determinants that make a city attractive enough to become an IFC. Wojcik (2009) paid attention to the importance of financial interrelations and concentration over the convenience of transferable information in financial centers. Martin (1999) strengthened the role of physical distance in conditioning a cluster of financial activities, emphasizing financial information as crucial in ensuring international business functionality. Zhao et al. (2004) empirically explained that the clustering of international third-party services is the key factor contributing to the formation of a global city. The geographic agglomeration of a major city is the effective way to address the information problem raised by a booming financial telecommunication network.

Few empirical studies consider the formation and the determinants of a GFC. Tey (2004) took into consideration many indices that might explain being a GFC, dividing a city's traits into five categories: (51) business environment (e.g., macroeconomic conditions, tax system), (2) financial sector development (availability of financial instruments, stock market and currency market trade volume, the degree of financial liberalization), (3) infrastructure (means of transportation, building, transport system), (4) human capital (higher education training, human development and social security), and (5) reputation (attractiveness).

Similarly, Yildirim and Mullineux (2015) employed a data set on 200 senior managers about weighting the competitiveness of Istanbul on a Likert scale from 1 to 5. Using factor analysis, they used 19 indices collected from a questionnaire and divided them into two criteria, competitiveness and infrastructure. The respondents are confident about Istanbul's foresight in being an IFC based on current economic condition and business location factors. Kayral and Karan (2012) used a quantile regression to filter out indices on 10 variables that affect an international center ranking reported by the Z/Yen corporation. None of their variables of interest is significant. Moosa et al. (2016) performed extensive work on IFCs using all potential variables in conjunction with the extreme bound analysis method. Their work identified only two variables that statistically support their assumptions, including a global competitiveness index by the World Economic Forum and a high cost of occupancy. Eichengreen and Shah (2020) considered the latest studies and the most comprehensive work so far on the issue. Employing mostly a set of variables used by Kayral and Karan (2012) and Moosa et al. (2016), they found that, in addition to size, protection of property rights, transparency in financial market mechanisms, and trade openness, the advancement in technology is also an essential element in the process of economic growth and development of the rest of the others industrialized countries.

3. Methodology and data

3.1. Estimation technique

Because our main interest is the factors that affect the formation of IFCs, our dependent variable GFC_{it} takes binary values that denote whether country i has an IFC in year t. The equation is as follows:

$$GFC_{it} = \alpha_i + \sum_{l=0}^{T} x_{i,t}\delta_{i,t} + \in_{it}$$

where $i \in (1, \ldots, N)$ and $t \in (1, \ldots, T)$, x_{it} is the $k \times 1$ dimension vector that can explain the establishment of an IFC of country i in period t. $\in_{it}$ is the error term. α_i is the individual fixed effects corresponding to country i. We also control for the financial crash event in 2008 using a dummy variable, denoted as *Crisis*.

We compiled a dataset on 14 determinants widely used in the literature on GFCs, such as Kayral and Karan (2012), Moosa et al. (2016), and Eichengreen and Shah (2020), though only a subset is included in the final model. Among the 14 available determinants taken into consideration, there are 2^{14} models, or 16,384 different models, indicated by statistical theory. One of these 16,384 models might be the best model. Our first step is to set out selected criteria for model selection. The second step is examining all the models and determining the typical pattern. Based on our criteria and statistical inferences, the remaining step is to select the best model. We have four criteria, proposed in Ca'Zorzi et al. (2012), for model selection.

Criterion 1 We accept all models that yield the correct sign of their coefficients as expected or significantly statistical regressors (determinants). Sequentially, among these selected models, we choose the model(s) which have the largest numbers of regressors (determinants).

Criterion 2: We accept all models that yield the correct sign of their coefficients as expected and significantly statistical regressors. The model with the largest number of determinants is then selected among these models.

Criterion 3 We accept the model with the lowest Schwarz information criterion (SIC) or Bayesian information criterion (BIC), which measures the goodness of fit.

Criterion 4 We accept the model with the lowest Akaike information criterion (AIC), which measures the goodness of fit.

The first criterion ensures the minimum potential exposure to omitted variables hazards based on parsimony. The other three criteria are associated with statistical inferences. Also, our analysis is extended using the Bayesian averaging of classical estimates (BACE), which is discussed in detail below.

3.2. The Bayesian averaging of classical estimates model

The establishment of a GFC requires advancements in many aspects that are not comprehensively developed and grounded in theory. As such, previous empirical studies provide a limited number of determinants. Previous studies appear to use an arbitrary combination of determinants. In response to this limited number of determinants, Moosa et al. (2016) introduced extreme bounds analysis to identify "robust" empirical linkage between country specifics and the establishment of a GFC. Briefly, the extreme bound analysis conditions are too difficult to satisfy when the number of potential variables (determinants) becomes significant. More specifically, if one regression yields an insignificant or opposite sign of the estimated coefficient β_z, then the element is considered "unreliable." This problem was addressed by Granger and Uhlig (1990). Many methods have been developed and widely applied in addressing model uncertainty. The advantages of using BACE are clearly outlined in Sala-i-Martin et al. (2004). The criteria, as mentioned above, allow us to filter out the subset of predetermined models. We cannot guarantee that one of the preferred models is the best model. To be more accurate, BACE involves the prior probabilities of the model and averages them based on the posterior probabilities deduced. The process allows us to address the model uncertainty and predictors formally and explicitly (Ca'Zorzi et al., 2012).

The posterior probabilities of model M_j, therefore, can be calculated as follows:

$$P(M_j|y) = \frac{\mathrm{l_y(M_j).P(M_j)}}{\sum_{i=1}^{2^K} l_y(M_i)P(M_i)}$$

where $l_y(M_j)$ denotes the likelihood of model j as the best model given the data y with several potential candidate predictors K. We are left only with the determination of the prior beliefs of the model, $P(M_j)$. The BACE method requires us to define one prior hyper-parameter: the model size expectation k. Sala-i-Martin et al. (2004) suggested using a prior mean of the model size, k, for each predictor, and the probability of being included in the best model is represented as $\frac{k}{K}$. The posterior probability is the function of the goodness of fit, which is deflated by the number of variables included in the model—in sum, using one best model whose highest posterior probability seems to yield less reliable predictive ability than model averaging. On that basis, we recommend using $P(M_j|y)$ as the weight.

3.3. Data

The dependent variable (the establishment of a GFC) is a binary variable, in which 1 is used when a country has a financial center in the current year, and 0 otherwise. Recognition as if GFC is defined by a global financial center index (GFCI) published by the Z/Yen Group. The GFCI report first appeared in March 2007 and is published in a half-year frequency. The GFCI is constructed using two sources of data: instrumental variables collected from many reliable sources and survey data collected from an online questionnaire since 2007. To be included on the list of GFCs, a city must

have at least five responses to the question "Are there any financial center that might become significantly more important over the next two years." The respondents must be reputable people. The dataset consists of 35 Asian countries.

Data on independent variables are computed from many sources, including the World Bank, the Fraser Institute, and the World Economic Forum. The value of explanatory variables ranges from 1 (lowest quality) to 10 (highest quality). Data on explanatory variables are available only at the country level. We compile our dataset with filtering based on 14 potential determinants of GFC status most commonly used in previous literature. These determinants are developed based on combinations of many sub-indicators on a scale from 1 to 10. For example, *sound money* has four distinct dimensions, including: money growth, inflation, inflation in the most recent year, and freedom to own a foreign bank account. We consider it appropriate to use these multidimensional indicators for the following reasons. First, the paper uses the BACE method. The disadvantage of the BACE method is its computational burden (Magnus et al., 2010). If we have 50 independent variables, which are presumably determinants of the formation of a GFC, then calculations will be very time consuming. Second, the indicators used in the paper are multidimensional indices, which have a high degree of representativeness. There are trade-offs between hazards omitted and the robustness of predictions. The list of variables, sources of data, expected signs and definitions are summarized in Table 1. All signs of regressors (determinants) should positively correlate to the dependent variables. Descriptive statistics on 14 variables are presented in Table 2.

4. Global financial centers in Asia: Characteristics and empirical findings

4.1. Characteristics of selected Asian Global Financial Centers

Table 3 lists the top 10 global financial centers in the Asian region. China has three GFCs in this list whereas Australia and Japan have two each.

Hong Kong and Singapore are the two premier Asian cities, which surpassed the top-ranked Tokyo since 2018, thanks to their reputation for efficiency and transparency in handling financial services. Hong Kong gained superior expertise in international financial services and its strategic position in the first few decades after the conclusion of World War II. The success of *laissez faire* economic policy, often described as "free interventionism," is considered fundamental to Hong Kong's outstanding growth. Based on a deep understanding of trade liberalization, the British colonial government optimally restricted exchange controls and lowered trading barriers to international capital flows. Therefore, it has no central bank or monetary policy. Three colonial banks minted currency against deposits of British pounds, which created soundness for multinational corporations as well as domestic manufacturers. Moreover, the trusted local institutions comprehensively based on the English legal framework are also advantageous for financial operations. The exclusion of larger authorized and foreign bank branches created a prominent link between the local and foreign banking sectors. Singapore's largely analogous conditions also extensively focus on transparency in doing business and trade liberalization. After it ceased to be a British colony, Singapore rapidly became a significant entrepôt in trading and naval operations because of its strategic position. These historical trade flows laid a firm foundation for further enhancement of financial services and trading activities, such as money exchange and shipping insurance (Cassis, 2006).

4.2. Empirical findings

Our literature review indicates that 14 determinants are essential for the establishment of an IFC. With various combinations among these 14 determinants, statistical theory states that 2^{14} models, which are 16,384 models, could be created. Figure 1 presents the distribution/histogram of all estimated coefficients obtained from 16,384 models using the 14 determinants. The estimated coefficients for some of these models might not be statistically significant. However, the most critical aspect of the histograms is to provide readers with the first glance of the contributions of estimated coefficients from 14 determinants in the establishment of a GFC when we run 16,384

Table 1. Definition of variables, data sources, and expected signs

Variable	Definition	Source	Expected sign
Global Financial Center	Dependent variable take a binary value, with 1 denoting countries with a financial center.	Z/Yen Corporation	None
Size of government	The average of government consumption, transfers and subsidies, and government investment. This variable is measured on a scale of 0 to 10.	Fraser Institute	Positive (+)
The legal system and property rights	The average of judicial independence, impartial courts, protection of property rights, military subordination to the rule of law and politics, the integrity of the legal system, legal enforcement of a contract, regulatory restrictions on sales and property, reliability of the police, and the business cost of crime. This variable is measured on a scale of 0 to 10.	Fraser Institute	Positive (+)
Sound money	The average of money growth standard deviation of inflation, inflation in the most recent year, and freedom to own foreign currency bank accounts. This variable is measured on a scale of 0 to 10.	Fraser Institute	Positive (+)
Freedom to trade internationally	The average of tariffs, regulatory trade barriers, black market exchange rate, and controls on the movement of capital and people. This variable is measured on a scale of 0 to 10.	Fraser Institute	Positive (+)
Business sophistication	This variable takes into account the local supplier quality and quantity, state of cluster development, nature of competitive advancement, the sophistication of the production process, and value chain breadth. This variable is measured on a scale of 0 to 10.	World Economic Forum	Positive (+)
Financial market development	This variable takes into account the efficiency of the financial market and trustworthiness and confidence. This variable is measured on a scale of 0 to 10.	World Economic Forum	Positive (+)

(*Continued*)

Table 1. (*Continued*)

Variable	Definition	Source	Expected sign
Goods market efficiency	This variable takes into account the competition and quality of demand. This variable is measured on a scale of 0 to 10.	World Economic Forum	Positive (+)
Higher education and training	This variable takes into account the quantity of education, quality of education, and job training. This variable is measured on a scale of 0 to 10.	World Economic Forum	Positive (+)
Infrastructure	This variable takes into account the transportation infrastructure and electricity and telephony infrastructure. This variable is measured on a scale of 0 to 10.	World Economic Forum	Positive (+)
Institution	This variable takes into account the credibility, efficiency of public and private institution. This variable is measured on a scale of 0 to 10.	World Economic Forum	Positive (+)
Labor market efficiency	This variable takes into account the flexibility and efficient use of talent. This variable is measured on a scale of 0 to 10.	World Economic Forum	Positive (+)
Market size	This variable takes into account the domestic and foreign market size. This variable is measured on a scale of 0 to 10.	World Economic Forum	Positive (+)
Technological readiness	This variable takes into account of the technology adoption and use of information and communications technology. This variable is measured on a scale of 0 to 10.	World Economic Forum	Positive (+)
Population density	This variable is computed by taking the number of people per kilometer square of land area.	World Bank	Ambiguous (±)

models. The 14 histograms are each associated with these 14 determinants. For example, the histogram of the "market size" plots all estimated coefficients on the market size in all the models.

Table 4 presents our findings for 16,384 models, in which only 13 models satisfy Criterion 1, indicating that the estimated coefficients for all the models must satisfy two requirements. First, the estimated coefficients have correct signs as expected or are statistically significant. Second, the relevant models must have the largest number of determinants. Our analysis indicates that the largest number of determinants is six, and only 13 of the 16,384 models satisfy the requirements. Two determinants, *Financial market development* and *Population density*, are not reported

Table 2. Descriptive statistics on 14 potential determinants of global financial centers in Asian countries

Name	SoG	LS	SM	FoT	BS	FMD	GME	HET	INF	INS	LME	MS	TR	PD
Armenia	8.133	5.689	9.285	7.790	5.077	5.294	5.848	5.600	4.946	5.287	6.445	3.806	4.699	4.628
Australia	7.037	8.060	9.433	7.573	6.769	7.887	7.131	8.016	7.853	7.722	6.853	7.274	7.760	1.076
Azerbaijan	4.733	5.667	6.886	6.740	5.611	5.459	5.984	5.591	5.649	5.708	6.779	5.156	5.382	4.712
Bangladesh	8.268	2.999	6.713	6.075	4.978	5.564	5.707	3.960	3.425	4.411	5.532	6.370	3.677	7.050
Brunei	4.792	5.438	8.487	7.384	5.485	5.860	5.962	6.128	6.117	6.696	7.077	3.641	5.545	4.321
Bhutan	6.905	6.566	6.863	6.411	5.203	5.227	5.733	5.235	5.026	6.554	6.740	2.642	4.157	2.909
China	4.545	5.898	8.173	6.672	6.204	5.733	6.262	6.054	6.312	5.963	6.505	9.739	4.975	4.967
Cyprus	7.260	6.318	9.064	8.154	6.223	6.151	6.844	6.895	6.894	6.453	6.457	4.274	6.527	4.799
Georgia	7.269	5.947	8.934	8.572	5.194	5.751	6.225	5.662	5.894	5.951	6.617	4.481	5.149	4.190
Hong Kong	8.515	8.118	9.406	9.394	7.305	8.208	7.880	7.425	9.126	7.926	7.920	6.784	8.286	8.821
Indonesia	8.087	4.359	8.676	6.988	6.331	6.161	6.423	6.052	5.386	5.713	5.855	7.668	4.867	4.914
India	8.046	5.442	7.062	6.029	6.336	6.675	6.212	5.675	5.120	5.816	5.881	8.798	4.453	6.045
Israel	6.268	5.995	9.262	8.186	7.070	7.131	6.497	7.196	6.901	6.559	6.584	6.272	7.585	5.892
Japan	6.080	7.515	9.718	7.586	8.062	6.767	7.230	7.425	8.336	7.389	6.944	8.430	7.476	5.858
Kazakhstan	7.186	5.687	8.452	5.901	5.251	5.221	6.016	6.109	5.327	5.457	6.899	5.986	5.344	1.819
Kyrgyzstan	7.348	4.332	8.473	6.837	4.644	5.070	5.536	5.444	3.811	4.430	5.973	3.701	3.885	3.378
Cambodia	8.146	4.412	9.308	7.324	5.015	5.268	5.930	4.107	4.215	4.946	6.600	4.608	4.147	4.420
Korea, Rep.	6.819	6.554	9.564	7.585	6.998	5.982	6.810	7.597	8.097	5.954	6.193	7.635	7.576	6.243
Lao PDR	6.640	5.844	7.306	6.994	5.455	5.677	6.210	5.141	4.873	5.653	6.515	4.206	4.321	3.320
Sri Lanka	7.376	5.034	7.006	6.536	6.269	6.115	6.340	5.964	5.545	5.727	5.189	5.531	4.639	5.788
Myanmar	6.169	3.307	5.909	4.506	4.358	4.192	5.302	3.787	3.705	4.479	6.035	5.132	3.209	4.363
Mongolia	7.505	5.565	8.241	6.851	4.616	4.654	5.696	5.809	3.731	4.705	6.432	3.649	4.892	0.592
Malaysia	5.937	5.704	7.543	7.493	6.986	7.389	7.144	6.528	7.162	6.890	6.777	6.656	6.056	4.471
Nepal	7.507	3.935	6.470	6.536	4.920	5.599	5.593	4.492	3.366	4.907	5.421	4.634	3.958	5.234
New Zealand	6.529	8.681	9.566	8.654	6.573	7.811	7.333	7.773	6.831	8.213	7.298	5.428	7.376	2.822

(*Continued*)

Table 2. (*Continued*)

Name	SoG	LS	SM	FoT	BS	FMD	GME	HET	INF	INS	LME	MS	TR	PD
Pakistan	7.680	3.568	6.180	6.084	5.452	5.765	5.704	4.195	4.176	4.853	5.077	6.580	4.110	5.481
Philippines	8.404	4.382	8.932	6.910	5.959	5.929	5.877	6.146	4.533	5.022	5.783	6.751	5.004	5.778
Qatar	5.793	6.301	8.348	7.712	7.024	7.013	7.232	6.917	7.078	7.794	6.975	5.587	6.823	5.112
Saudi Arabia	4.832	5.269	8.248	6.602	6.667	6.442	6.855	6.552	7.076	7.197	6.196	7.192	6.298	2.589
Singapore	7.422	8.302	9.342	9.279	7.250	8.195	8.007	8.247	8.852	8.436	8.139	6.485	8.202	8.899
Thailand	6.999	5.184	7.384	6.947	6.019	6.254	6.387	6.067	6.287	5.440	6.427	6.684	5.238	4.885
Tajikistan	5.653	5.106	7.873	6.113	5.036	4.795	5.545	5.140	4.001	5.646	6.285	3.731	3.858	4.024
Turkey	6.861	5.202	8.418	7.311	5.897	5.854	6.266	5.927	5.799	5.397	5.221	7.314	5.531	4.570
Vietnam	6.198	5.468	6.095	6.208	5.342	5.590	5.976	5.261	4.961	5.312	6.417	6.645	4.794	5.664
UAE	6.471	5.922	8.500	8.177	7.264	6.973	7.613	7.073	8.642	7.886	7.225	6.531	7.455	4.746

Note:SoG: Size of government; LS: Legal property rights; SM: Sound money; FoT: Freedom to trade internationally; BS: Business sophistication; FMD: Financial market development; GME: Goods market efficiency; HET: Higher education and training; INF: Infrastructure; INS: Institutions; LME: Labor market efficiency; MS: Market size; TR: Technological readiness; and PD: Population density.

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Table 3. Top 10 Global Financial Centers in Asia

Country	Global Financial Center	Global Financial Center Index (GFCI)
Hong Kong	Hong Kong	744
Singapore	Singapore	742
Japan	Tokyo	725
China	Shanghai	711
Australia	Sydney	707
China	Beijing	703
Australia	Melbourne	696
United Arab Emirates	Dubai	691
China	Shenzhen	689
Japan	Osaka	688

Notes:GFCI is the half-year published index which is calculated using two primary sources: survey data and instrument variables. GFCI contains the assessment of many financial centers on different aspects.

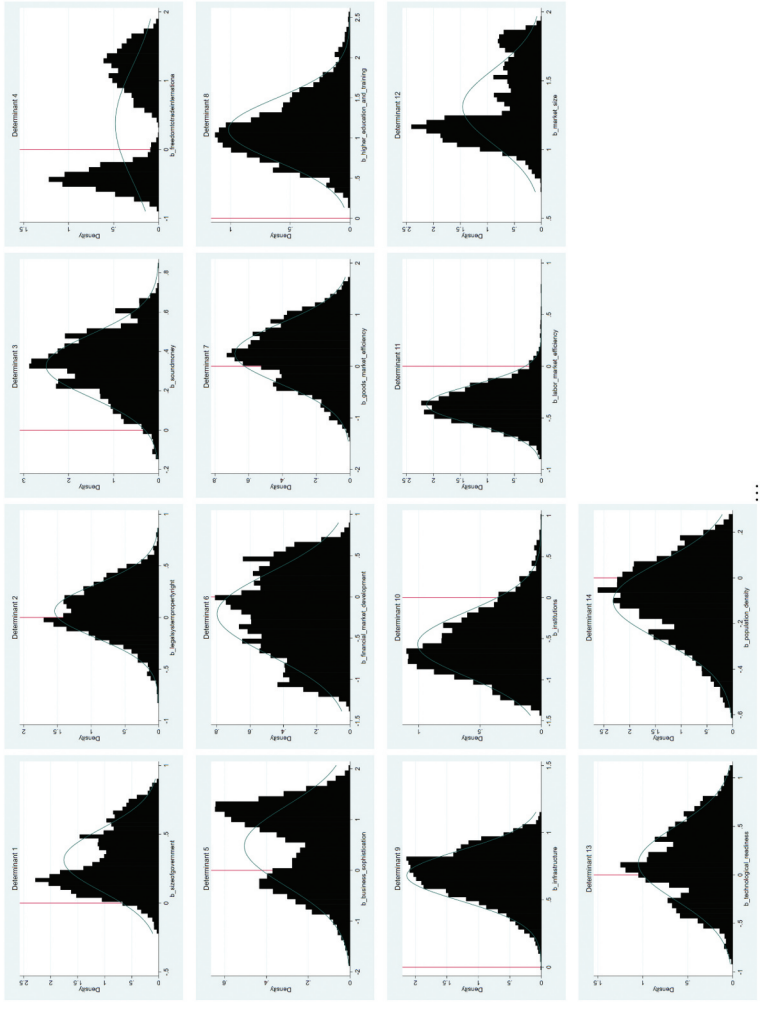

Figure 1. Histogram of the estimated coefficient of 14 determinants from 16,834 models.

Notes: Estimated coefficients of the determinants, which are distributed mostly on the right-hand side of zero are expected to have a positive and significant impact on the formation of a global financial center.

because they do not satisfy either of these requirements. *Crisis* is a dummy variable, not a determinant.

We now turn our attention to models that satisfy Criteria 2, 3, and 4. Criterion 2 indicates that the selected model must satisfy the two requirements at the same time: the estimated coefficients have the correct signs as expected, and the estimated coefficients are statistically significant. Only one model, Model 14, satisfies these requirements, and the findings for it are presented in Table 5.

Table 5 also presents findings from Model 15, which satisfies Criterion 3, the model with the lowest SIC value; Model 15 has only four determinants. Model 16 (which has the lowest Akaike information criterion [AIC] value), satisfies Criterion 4 and is also presented in Table 5; it has nine determinants. Empirical findings from our new BACE method are also shown in Table 5.

Among the 14 potential determinants to the formation of an IFC, four determinants have the highest frequency: market size, size of the government, higher education and training, the freedom to trade internationally.

Our empirical analysis proposes that many models could be taken into account to identify fundamental determinants for the formation of an IFC. Our analysis is then extended to use the BACE method, which averages all the possible models, with the results in the last column in Table 5. Our findings from this method confirm a positive and significant contribution to the establishment of an IFC based on the five determinants: freedom to trade internationally, market size, higher education and training, size of the government, and population density. The first three of them are also supported by findings from Model 15 (using the BIC-based criterion) and Model 16 (using the AIC-based criterion). The other two determinants, the size of the government and population density, are supported only by Model 16. *Population density* is not supported by any of the 14 models. Because of the size of their land and population, it is difficult to focus on population density across countries—for example, population density should not be compared between Europe and Asia. As a result, we consider it appropriate to focus on four critical determinants: freedom to trade internationally, market size, higher education and training, and the size of the government.

5. Conclusions and policy implications

The importance and contribution of the GFCs to economic growth are well recognized. Developing and emerging markets make great efforts to form a GFC in the belief that its presence will enhance and improve economic growth and development in the country. In the Asian region, one of the most dynamic and successful economic regions in the world, many emerging markets—such as Vietnam, Thailand, and Indonesia—have promoted policies that support the establishment of a GFC as a main city in the country. However, evidence-based policies appear to be insufficient. This study is conducted to examine and identify the necessary conditions that lead to the successful establishment of a GFC in the Asian region. Fourteen determinants have been identified from theories and empirical studies on the issue of a GFC. Four criteria have been developed and adopted to consider 16,384 models combining these 14 determinants. The BACE approach is used in this paper. Our findings indicate that, to ensure the successful establishment of a GFC, emerging and developing countries in the Asian region must consider four necessary conditions: freedom to trade internationally, market size, higher education and training, and the size of the government. We caution that these necessary conditions are identified from a theory-based list of determinants as necessary for the establishment of a GFC. However, these conditions are not sufficient. Although important, these conditions cannot ensure the successful establishment of a GFC in emerging markets in the Asian region. Specific circumstances in a country should be carefully considered to identify the advantages and disadvantages of each of these necessary conditions.

First, a well-defined strategy, step-by-step framework, clear foresight, and a practical institutional framework need to be established, with a focus on these necessary conditions. In the

Table 4. Determinants and estimated coefficients under Criterion 1

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13
Dependent var	GFC	GFC	GFC	GFC	GFC	GFC	GFC	GFC	GFC	GFC	GFC	GFC	GFC
Size of government	-	0.340**	0.367*	0.158	0.0841	0.459*	0.289	0.298	0.591***	0.501**	0.362*	0.176	0.146
		(2.59)	(2.26)	(1.07)	(0.53)	(2.39)	(1.73)	(1.76)	(3.40)	(2.67)	(2.20)	(1.16)	(0.97)
Legal property rights	0.0142	-	-	-	-	-	0.0247	-	0.0227	0.0546	0.0634	0.195	0.104
	(0.09)						(0.16)		(0.15)	(0.37)	(0.42)	(1.35)	(0.69)
Sound money	0.432**	-	0.288	0.619***	0.472***	0.472***	0.329*	0.341*	-	0.455**	0.397**	0.579***	0.462***
	(3.18)		(1.86)	(5.24)	(3.64)	(3.64)	(2.31)	(2.34)		(3.06)	(2.80)	(4.62)	(3.51)
Freedom to trade	0.609*	-	-	-	0.782***	0.434	0.560*	0.536*	0.564*	-	-	-	0.629**
	(2.49)				(3.42)	(1.88)	(2.38)	(2.18)	(2.33)				(2.66)
Business sophistication	-	0.171	-	0.258	-	-	-	-	-	-	-	0.00277	-
		(0.66)		(0.96)								(0.01)	
Goods market efficiency	0.0127	0.711	0.0767	-	-	-	-	0.113	-	-	0.349	0.664	0.301
	(0.04)	(1.74)	(0.25)					(0.36)			(1.19)	(1.82)	(1.01)
Education and training	-	-	0.755*	-	-	0.483	-	-	-	-	-	-	-
			(2.40)			(1.91)							
Infra structure	-	-	-	-	-	0.507*	0.349	-	0.403*	0.561**	-	-	-
						(2.57)	(1.86)		(2.13)	(2.93)			
Institutions	-	0.235	-	0.241	0.0829	-	-	-	-	-	-	-	-
		(1.00)		(1.12)	(0.45)								
Labor market efficiency	-	0.0776	-	0.100	0.0172	-	-	-	-	-	-	-	-
		(0.39)		(0.48)	(0.07)								

(*Continued*)

Table 4. (*Continued*)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13
Market size													
	(8.72)	(7.88)	(8.26)	(7.90)	(8.92)	(8.20)	(8.80)	(8.58)	(8.28)	(8.24)	(8.61)	(8.01)	(8.81)
Techno logical readiness	0.207	-	0.191	-	-	0.0774	0.408*	0.390	0.348	0.181	0.493*	-	-
	(1.15)		(0.85)			(0.35)	(2.07)	(1.95)	(1.69)	(0.82)	(2.48)		
Crisis	−0.932*	−1.034*	−0.828	−0.929*	−1.057*	−0.948*	−0.970*	−0.964*	−0.960*	−0.822	−0.845	−1.013*	−1.114*
	(−2.06)	(−2.54)	(−1.91)	(−2.18)	(−2.37)	(−2.06)	(−2.09)	(−2.12)	(−2.09)	(−1.78)	(−1.85)	(−2.21)	(−2.41)
_cons	−16.61***	−15.47***	−17.81***	−15.91***	−18.33***	−20.45***	−18.70***	−19.13***	−20.07***	−18.59***	−17.98***	−17.89***	−19.31***
	(−7.81)	(−6.79)	(−6.76)	(−7.30)	(−7.23)	(−7.18)	(−7.68)	(−6.99)	(−7.44)	(−7.17)	(−6.80)	(−7.23)	(−7.30)
N	346	346	346	346	346	346	346	346	346	346	346	346	346

Notes:Mixed-effects probit model on 14 determinants. t-statistics are reported in parentheses. *, **, and *** coefficient is significant at 5 percent, 1 percent, and 0.1 percent.

Two determinants (*Financial market development* and *Population density*) are not reported because they do not have correct signs as expected or statistical significance in any models. *Crisis* is a dummy variable in the model.

Criterion 1 accepts all models with the correct sign as expected or statistically significant regressors (determinants). Then, among these accepted models, we select the models with the largest number of determinants. In this analysis, the largest number of determinants is 6, and 13 models with different combinations of 14 determinants satisfy Criterion 1.

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Table 5. Determinants and their estimated coefficients using Criteria 2, 3, and 4 and the Bayesian model of estimation (BACE)

	Model 14 (Criterion 2)	Model 15 (Criterion 3 using BIC or SIC)	Model 16 (Criterion 4 using AIC)	BACE
Dependent var.	IFC	IFC	IFC	IFC
Size of government	0.483**		0.717**	0.0455**
	(2.61)		(3.12)	(2.90)
Legal property rights				−0.00771
				(−0.42)
Sound money	0.310*			0.00262
	(2.06)			(0.26)
Freedom to trade internationally	0.372	1.356***	1.370***	0.128***
	(1.68)	(4.66)	(4.39)	(4.20)
Business sophistication				−0.00281
				(−0.19)
Financial market development		−1.182***	−0.702*	−0.00496
		(−4.50)	(−2.39)	(−0.32)
Goods market efficiency				−0.00849
				(−0.30)
Higher education and training		1.381***	1.435***	0.130***
		(4.84)	(3.74)	(4.47)
Infrastructure	0.349		0.861**	0.00310
	(1.86)		(3.24)	(0.24)
Institutions			−0.660	−0.0000256
			(−1.76)	(−0.00)
Labor market efficiency			−0.704*	−0.00162
			(−2.12)	(−0.16)
Market size	1.130***	1.763***	1.757***	0.196***
	(8.08)	(7.35)	(7.26)	(14.94)
Technological readiness				−0.00282
				(−0.22)
Population density			−0.438**	−0.0394***
			(−3.15)	(−3.54)
Crisis	−0.970*	−0.596	−0.743	−0.0315
	(−2.13)	(−1.31)	(−1.52)	(−0.53)
_cons	−20.82***	−22.13***	−25.15***	−2.441***
	(−7.23)	(−7.65)	(−6.72)	(−12.38)
N		346	346	346

Notes:Mixed effect probit model estimation on 14 determinants. Robust t statistics are in parentheses. For Model 14, all the variables are significant at 10 percent. *Crisis* is a control variable.

Criterion 2 accepts all models with the correct sign as expected and statistically significant regressors (determinants). Only Model 14 satisfies these combined requirements.

Criterion 3 selects the model with the lowest value of the Schwarz information criterion (SIC), Model 15.

Criterion 4 selects the model with the lowest value of the Akaike information criterion (AIC), Model 16.

BACE uses the Bayesian averaging of classical estimates.

context of Vietnam, policymakers should identify the sectors that critical to financial growth and enact proper policies for the enhancement of these sectors. We suggest that Ho Chi Minh City, currently the largest economic and financial center in Vietnam, should be considered for promotion as a GFC. Relevant policies should be formed and implemented. An institutional framework is required. We believe that the establishment of a dedicated institution responsible for the establishment of a GFC is essential.

Second, Ho Chi Minh City needs to attract foreign investors by promoting it as a safe and reliable environment for development. Trade liberalization should be highly promoted and considered primary in the development of the financial market. The business environment should be considered important for doing business in the financial center, as seen in Hong Kong. The government of Hong Kong optimally opts not to interfere in business activities. What is more, newly enacted policies fundamentally favor trade liberalization, which is critical to the prosperity of Hong Kong. Along with the geographical and cultural characteristics, Vietnam is a cosmopolitan country and is accustomed to a variety of religions and cultures over decades. Under French colonial rule, Ho Chi Minh City was a center for financial services and naval operations. This early emerging trade link and strategic position were based on financial services such as insurance. On that basis, policymakers should take advantage of this experience as a solid foundation for future planning.

Third, banking and finance are the lifeblood of the economy and even international trading, though they are not growth sectors. However, banking shapes and contributes to economic activities, building or even developing financial infrastructure and technologies. The government should commence with an understanding of financial services as a means of growth in other industries. For example, in the latest McKinsey report (2017), Ho Chi Minh City is ranked at the bottom among countries in the Asia-Pacific region in terms of the financial development which is measured by three distinct dimensions including investment opportunities, funding at scale and pricing efficiency. The financial market in Vietnam has insufficient diversity based on the following criteria: pricing efficiency, funding at scale, and investment opportunity. Despite the establishment of numerous new small and medium-sized enterprises, the capitalization of Vietnam's stock market in 2019 captured only about 57 percent of the gross domestic product (World Development Indicators, 2019), which is the lowest among all the countries in the Asia-Pacific region. Despite having many deficiencies, Ho Chi Minh City also has offices of many international financial institutions, including leading global banks and insurance companies.

Fourth, Asian financial centers significantly focus on asset management services, which supposedly strengthen individual net worth. Although they have had many setbacks requiring appropriate regulatory reform, such as tax policies and legalization of property rights, those international cities are still apparently lucrative and trustworthy for inward investments as well as mediating global private capital. In Vietnam, asset management services are uncommon at domestic and foreign institutions. More importantly, offering a variety of financial services is vital for asset management services.

Fifth, the size of the capital market, including bonds, stocks, over-the-counter derivatives, and diverse financial instruments, demonstrates the importance and significance of the financial centers, meaning there are sufficient financial instruments and opportunities for foreign investors. In addition to bonds and stocks, the currency market is also important for any GFC. Having a comprehensive and liquid currency market offers numerous investment opportunities for domestic and foreign investors and institutions. The currency market lays a sound foundation for the development of third-party services, such as the notary and insurance. The financial center also facilitates the development of other emerging financial services such as mutual funds and exchanged traded funds. Moreover, the existence of a deep currency and capital market provides a benchmark and resilience for various financial derivatives.

Sixth, we consider that Vietnam has now been integrating closely with the globalization process. As such, the advancement of fintech (financial technology) for the nation is a fundamental and important development for sustainable economic growth and development in the future. The emergence of technology is strongly associated with the long-run target of the Vietnamese government to pursue the target of being a Smart Nation and national digitization, which aim to strengthen financial regulations and reduce bureaucracy. Accordingly, the role of fintech is a crucial element of establishing a financial center.

Lastly, our theoretical and empirical evidence highlights the role of a skilled workforce in supporting the success and the maintenance of the financial center. Human capital enhancement is significant in the advancement of the economy. The technical demands undoubtedly require a large highly skilled workforce and professionals. Ho Chi Minh City has the advantage of being a top-notch city with an agglomeration of major universities and an advanced education system. According to the General Statistics Office, Ho Chi Minh City has an average of 50 college students out of every 1,000 residents, 80 percent of whom come from other provinces. Over the period 2011–2017 and thanks to universal education, the share of unskilled workers decreased from 38.5 percent to 21.9 percent, and the share of the more highly educated workforce grew from 18.9 percent to 25 percent. Though it has made many improvements, the education system in Vietnam is still considered outdated and in need of comprehensive reforms. University curriculums and programs are outdated, unfocused, relatively impractical. As a result, Vietnamese post-graduate students are not equipped with practical skill sets which are ready for employment.

Our study has some limitations. First, we did not capture the physical location and global trading hours in the establishment of a GFC. Second, our analysis largely ignores transnational competition among financial centers, due to the lack of empirical analyses and data on the subject. These shortcomings offer a good starting point for future research on this important and interesting area of research.

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