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Institute of Economic Research
Hitotsubashi University
2-1 Naka, Kunitachi, Tokyo, 186-8603　JAPAN
https://cei.ier.hit-u.ac.jp/English/index.html
Tel:+81-42-580-8405/Fax:+81-42-580-8333

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The Finance–Growth Nexus in Asia: A Meta-Analytic Approach*

Amar Anwar[a, b †] and Ichiro Iwasaki[c ‡]

[a] *Shannon School of Business, Cape Breton University, Sydney, NS, CANADA*

[b] *International SEPT Program, Universität Leipzig, Leipzig, GERMANY*

[c] *Institute of Economic Research, Hitotsubashi University, Tokyo, JAPAN*

Abstract: This paper features a meta-analysis of the effects of financial development and liberalization on macroeconomic growth in Asia. A meta-synthesis of 748 estimates extracted from 75 previous works indicates that the growth-enhancing effect of finance reaches an economically meaningful scale in the region. Synthesis results also reveal that the finance–growth nexus in South Asia is stronger than that in East Asia. Publication selection bias is examined using both linear and nonlinear techniques, and our results show that there is a possibility of publication bias in the literature. After applying advanced and up-to-date meta-analysis methods, we find that the collected estimates contain significant underlying empirical evidence of the impact of finance on economic growth for both Asia and its subregions.

JEL classification numbers: E44, G10, O11, O16, O53

Keywords: financial development, economic growth, meta-analysis, publication selection bias, Asia

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† Amar_Anwar@cbu.ca

‡ Corresponding author: iiwasaki@ier.hit-u.ac.jp; Naka 2-1, Kunitachi, Tokyo 186-8603, JAPAN; Tel: +81-42-580-8366; Fax: + 81-42-580-8333

1. Introduction

Commencing with the pioneering works of Schumpeter (1912), Goldsmith (1959), and McKinnon (1973), among others, there has been significant debate among researchers and policymakers about the impact of financial development and liberalization on economic growth.[1] This debate receives even more attention when a clear distinction from the standpoint of the finance–growth nexus is witnessed by notable economists. As Levine (2003) points out, even Nobel Prize winners are unable to reach a consensus concerning the relationship between finance and growth. For instance, Nobel Laureate Robert Lucas (1988) states that the effect of finance on growth has been "over-stressed," whereas Nobel Prize winner Merton Miller (2012) accentuates the importance of financial deepening by stating that developing countries in Asia and elsewhere need to strengthen their financial markets and institutions that will either substitute for or complement banking products and services.

Sound financial systems play a vital role in augmenting economic growth by connecting savers and borrowers, easing financial operations in international trade and business, and improving financial efficiency (Nazir, Tan, and Nazir, 2021). Financial repression, a scenario where governments excessively control financial institutions, leads to lower investments and reduces economic growth (Goldsmith, 1959); however, the development and liberalization of financial markets and institutions are likely to boost the efficiency of resource allocation, support technological innovation (Levine, 1999), improve labor productivity (Huang and Lin, 2009), and spur country-wide growth. A sound and dynamic banking system also reduces liquidity risk, facilitates portfolio diversification for savers and investors by providing low-cost information (Allen and Ndikumana, 2000), and can make a strong contribution to overall economic development. Likewise, financial depth, liquidity effects, and access to information at a lower cost are the possible outcomes of financial deepening (Dufrénot, Mignon, and Peguin-Feissolle, 2010). Furthermore, these channels are likely to enhance a country's productivity and economic growth (Barajas, Chami, and Yousefi, 2016).

On the contrary, some studies (Lucas, 1988; Stern, 1989; Zang and Kim, 2007) find no evidence of a positive effect of finance on economic growth. Lucas (1988) argues that the role

[1] To specify financial liberalization, various terms such as *finance*, *financial development and liberalization*, *sound financial systems*, or *development and liberalization of financial markets and institutions* have been interchangeably used in the literature; hence, we adopt them in this study.

of sound financial systems is badly overemphasized, and the development of financial institutions has a limiting factor in augmenting economic growth. Stern (1989) also points out that financial deepening may cause a debt crisis that threatens international financial systems and the welfare of developed and developing countries. Among others, Loayza and Rancière (2004) and Rousseau and Wachtel (2011) consider that the development and liberalization of financial markets and institutions may trigger macro-economic volatility and increase speculative attacks on foreign currency, especially in developing countries, thereby leading to a banking crisis. According to Rajan (1994), developing countries lack an insurance industry and are more vulnerable to the risk of bank runs. Further, a lack of liquidity is likely to advance the issue of adverse selection or moral hazard and, as a result, negatively affect the real economy.

Several studies have tested these arguments empirically; however, an agreement has yet to be reached. In fact, McGuire and Conroy (2013) tested the financial innovation model and witnessed that financial innovation increases the value of financial products, enhances the allocation of capital, stimulates the effectiveness of financial organizations, and encourages sound financial system practices. Similarly, by taking data from 125 countries, Estrada, Park, and Ramayandi (2015) confirm that financial development and liberalization have a significant, positive effect on economic growth, and the impact is stronger for developing countries as compared to developed or middle-income countries. Similar results are observed by Huang and Lin (2009), who witnessed a positive effect of finance on economic growth and found a larger effect size in low-income countries than in high-income countries. However, other studies (i.e., Deidda and Fattouh, 2002; Rioja and Valev, 2004) observe no significant relationship between sound financial systems and economic growth in low-income countries, whereas the same nexus is found to be positive and significant in high-income countries.

Studies of Asian economies encounter a similar situation. In fact, as we will report in detail later, the existing literature provides quite mixed evidence of the effects of financial development and liberalization on economic growth in Asia. To make matters worse, as the number of publications increases, the opacity rather expands. Meta-analysis can serve as an effective tool providing a clear path in the face of such uncertain research circumstances (Borenstein *et al*., 2009). In the case of heterogeneous results, meta-analysis presents a quantitative examination of the literature. A meta-analysis synthesizes the results of multiple studies to estimate the true effect of the independent variable on the dependent variable. Meta-analysis is relatively new and quite rare in economics and has recently become an important analysis tool in the field of economics. For example, recent meta-analysis studies have examined the impact of remittances on economic growth (Cazachevici, Havranek, and Horvath, 2020), discount rates to the design of experiments (Matousek, Havranek, and Irsova, 2022), and spot rates on forward rates (Zigraiova *et al.*, 2021). Actually, Anwar and Iwasaki (2022), Ono and Iwasaki (2022), and Iwasaki (2022) successfully present an overall picture of the finance–growth nexus in the Middle East and Africa, Europe, and Latin America and the Caribbean, respectively, through a meta-analysis of the extant literature with ambiguous research contents. Meanwhile, to the best of our knowledge, no meta-analysis focusing on Asia has ever been published.

In this study, by applying the advanced meta-analysis techniques presented by Stanley and Doucouliagos (2012, 2017) and Stanley, Doucouliagos, and Ioannidis (2017) as well as the latest reporting guidelines of meta-analysis as specified by Havránek *et al*. (2020), we re-examine the nexus of financial development and liberalization on economic growth in Asia. The study also compares the impact of financial deepening on economic growth in South Asian and East Asian countries. A meta-synthesis of 748 estimates extracted from 75 previous works indicates that the growth-enhancing effect of finance in Asia reaches an economically meaningful scale. Synthesis results also reveal that the finance–growth nexus in South Asia is stronger than that in East Asia. Both meta-regression analysis (MRA) of literature heterogeneity and test for publication selection bias produced findings compatible with the synthesis results. It is also confirmed that the collected estimates contain genuine empirical evidence of the impact of finance on growth in both Asia and its subregions.

The remainder of this paper is organized as follows. Section 2 reviews related literature and formulates our hypothesis on the finance–growth nexus in Asia. Section 3 presents an overview of the literature selected for meta-analysis and describes the methodologies behind our literature search. Section 4 synthesizes estimates collected from selected studies. Section 5 performs an MRA of heterogeneity across studies and discusses the results. Section 6 assesses publication selection bias and the presence of genuine evidence. The last section concludes the paper.

2. Theoretical Framework and Formulation of Hypotheses

The theoretical framework of the nexus between finance and growth is based on the earlier works of Schumpeter (1912), Gurley and Shaw (1955), and Goldsmith (1959), among others. These studies point out that financial development and liberalization lessen unnecessary restrictions and government controls in the financial sector, encourage domestic savings, reduce market frictions, and boost productivity and economic growth in a country. For instance, Schumpeter (1912) considers that countries with well-developed financial systems are more likely to observe a quick and fair redistribution of resources from less productive to more productive sectors, thereby spurring economic growth. The proposition is that the growth-enhancing effects of financial development and liberalization are in line with the idea that the availability of more funds, the size of the banking system, and the liquidity of stock markets enhance economic growth (Levine, 2003; Law, Azman-Saini, and Ibrahim, 2013). Along these lines, Aghion, Howitt, and Mayer-Foulkes (2005) present an innovation-based growth model that shows that sound financial systems decrease the cost of screening and reduce agency problems, thereby motivating firms to become involved in innovation-related activities.

Though some studies (e.g., Arestis, Chortareas, and Magkonis, 2015; Valickova, Havranek, and Horvath, 2015) have analyzed the effect of financial development on economic growth for cross regions, literature has shown that Asia differs from other regions such as Western Europe or North America, as most countries in Asia have undertaken economic and institutional reforms very late. Also, there prevails a huge heterogeneity in reforming South Asian and East Asian countries.[2] For instance, most countries in East Asia began economic reforms in the late 1970s and 1980s, whereas institutional reforms, deregulation of financial markets, and the introduction of new financial instruments in the financial systems of South Asian countries have taken place in the 1990s (Anwar and Sun, 2011). Furthermore, other events such as the Asian financial crisis of 1997 are unique and seriously affected the region more than elsewhere in the world. Besides, the Asian financial crisis had a much stronger impact on the East and South-East Asian economies than that on South Asia's economy (Anwar and

[2] We use the World Bank regional classification system to define the geographical split between South Asia and East Asia. The classification is available at: https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html.

Cooray, 2012).

Additionally, changes in institutional settings have taken place in the last four decades in most Asian countries, and these reforms have played a vital role in augmenting economic growth in Asia. In this context, literature has shown that achieving financial development and economic development is not plausible without augmenting formal institutions such as the rule of law or regulatory quality. For instance, Haini (2020) examines the role of financial and institutional development on economic growth in the Association of Southeast Asian Nations (ASEAN) economies, and the study finds that economic growth is directly linked to the level of formal institutional quality. In other words, institutional development complements financial institutions and markets. Similar results are found in earlier studies such as Hasan, Wachtel, and Zhou (2009) and Cooray (2012), who observe that institutional development plays a strong role in promoting economic growth in Asia.

Another feature that may be vital and unique to Asia is the attraction of foreign direct investment in the region, mainly from China, Hong Kong, Japan, and India. It has been argued that a higher level of financial development tends to bring greater benefits from foreign direct investment (Anwar and Cooray, 2012). Nevertheless, there is significant heterogeneity in attracting investments between East Asia and South Asia (Anwar and Sun, 2011) and within each subregion. For instance, China, Hong Kong, and Japan have attracted most of the FDI in East Asia, whereas other countries receive a meager amount of foreign investment. Similarly, India is leading in receiving FDI, whereas other countries in South Asia are still struggling to attract financial flows.

It was also observed that the level of financial deepening is significantly lower in some Asian economies as compared to other countries; hence, its impact on economic growth is also lower in these countries. For example, Sharma and Kautish (2020) note that, until the 1990s, the share of bank credit to the private sector in India, Pakistan, and Bangladesh was less than half that of some major, high-income countries of Asia. In addition, government policies created to encourage commercial banks, leasing institutions, and other financial corporations (i.e., house-building finance corporations that assist customers from South Asian countries such as India, Pakistan, or Bangladesh) to invest in the country generally have a positive and statistically significant impact on economic growth in the region (Nazir, Tan, and Nazir, 2021).

In light of the above discussions, we formulate our first hypothesis:

Hypothesis 1: *The impact of financial development and liberalization on economic growth in Asia is positive and economically meaningful.*

To attain long-term economic growth, some studies conclude that financial deepening is required and embedded within a sound institutional framework. For instance, Arestis and Demetriades (1999) and Demetriades and Andrianova (2004) argue that institutional quality factors—such as political stability, government effectiveness, accountability, and rule of law—play a vital role in spurring growth. These researchers believe that countries with a financial system embedded in a sound institutional framework experience economic growth. The growth-enhancing effect of finance largely depends upon the efficiency of the institutions (Al-Yousif, 2002). It is also argued that a certain level of institutional quality is required before financial development and liberalization can have a meaningful impact on growth. Therefore, financial development and liberalization are more likely to have a stronger impact on growth in countries with sound political stability and efficient rule of law. In other words, "better finance, more growth" is a more accurate proposition than "more finance, more growth" (Law, Azman-Saini, and Ibrahim, 2013).

Though South Asian countries have embarked on a series of structural adjustments and economic reforms in financial sectors (i.e., Sri Lanka in the 1970s; Bangladesh and Pakistan in the 1980s; India, Nepal, and Bhutan in the 1990s), Bangladesh, Nepal, Pakistan, and Sri Lanka have experienced political turmoil for many years following deregulation (ben Gamra, 2009; Anwar and Cooray, 2012). Nevertheless, as previously mentioned, over the last two decades, South Asian economies have achieved more macroeconomic stability, the escalation of bank privatization, rural modernization, and prudent fiscal and external borrowing policies (Habibullah, 1999).

In addition, South Asian economies are better able to handle financial crises as compared to those in other regions. For example, ben Gamra (2009) and Anwar and Cooray (2012) note that the Asian financial crisis dented East Asian countries more seriously than South Asian ones. In addition, over the last few decades, most South Asian economies have witnessed the creation of efficient and stable financial institutions, regulatory and legal reforms (particularly in the financial systems), and technological upgrades (Sahoo, 2014)—all market-based financial deepening with a positive impact on the region's economic development. Besides, government interventions or state controls in financial markets are common in some East Asian countries such as China (Guariglia and Poncet, 2008). On the other hand, the theory of convergence concludes that when a country is in transition, a relatively low capital–labor ratio is likely to bring higher rates of return on capital (Aiyar, 2001). As a result, a country will enjoy faster growth than that of other countries that are relatively richer, as well as a high capital–labor ratio and low rates of return on capital. In the light of the above discussion, we formulate our second hypothesis:

Hypothesis 2: *The finance–growth nexus in South Asia is stronger than that in East Asia.*

In the following sections, we will organize and perform a meta-analysis of the previous literature to test the hypotheses proposed in this section.

3. Data

To find relevant studies that empirically examine the impact of financial development and liberalization on economic growth in Asia, we use EconLit and academic press websites.[3] In utilizing these electronic databases, we carry out an AND search of paper titles, using "*finance*," "*financial*," and "*growth*" as keywords. This title search yields nearly 2,900 hits in EconLit and more than 610 additional hits from academic press websites. We closely examine the content of each study to determine whether it features Asian countries and, if so, whether it includes estimates that could be used in our meta-analysis. The literature for this study has been selected based on the following four criteria: First, we only include studies that are written in English. This allows authors to cross-check papers and corresponding coding. Second, the encompassed literature contains econometric estimates of the nexus and supplies enough information to obtain the t-statistic and degrees of freedom. Third, we incorporate unpublished studies (i.e., working papers) and journal articles. If a working paper is subsequently published in a journal or book, we drop estimates from the working paper. One may argue that unpublished studies should be excluded from analysis as these works have not been gone through the review process. However, Stanley and Doucouliagos (2012) suggest including these studies because such

[3] The following academic press websites are used in this literature search: Emerald Insight, Oxford University Press, Sage Journals, Science Direct, Springer Link, Taylor and Francis Online, and Wiley Online Library. The search of academic press websites is conducted for the most recent studies, published since January 2021, to supplement the results of the EconLit search. The final literature search was conducted in April 2022.

efforts examine new research questions, employ newer data, and use modernized estimation techniques. Stanley (2008) also argues that excluding unpublished studies may yield biased and inferior estimates.

The criteria above allow us to narrow the list to a total of 75 works.[4] For this present study, we adopt an eclectic coding rule in which we do not necessarily limit the selection to one estimate per study. Instead, multiple estimates are collected from these 75 studies, if and only if we recognize notable differences from the viewpoints of empirical methodology, target area, data type, regression equation, estimation period, estimator, the composition of independent variables, and so forth.

Table 1 shows a breakdown of these 75 works by study type. Of the 75 selected studies, eight cover countries in the whole of Asia, 25 focus on East Asia, and 46 deal with South Asia; four studies empirically analyze both East and South Asia. We can confirm a large surge of studies on this topic in recent years, with 32 of the 75 selected works being published between 2015 and 2021. This fact is regarded as a condition favorable for grasping the true impact of finance on growth in Asia using meta-analysis methods, due to notable recent advancements in econometric methods.

According to **Table 1**, the 75 selected studies cover a period of 69 years, from 1950 through 2018. Studies focused on Asia as a whole feature a shorter observation period than those of other works; there are no remarkable differences between studies of East Asia and South Asia from this perspective. A series of financial variables, pioneered in studies such as Beck, Levine, and Loayza (2000) and Levine, Loayza, and Beck (2000), which have become standard empirical methodologies in the field, are utilized proactively in studies of Asian economies. Actually, the 75 selected studies report estimates based on nine variables concerning the level of financial development (FD) including: (1) financial depth, (2) private credit to GDP, (3) bank credit to GDP, (4) private credit to domestic credit, (5) market capitalization, (6) stock market activity, (7) turnover ratio, (8) comprehensive FD index, and (9) other FD indexes. These papers also provide estimates concerning the degree of financial liberalization (FL) consisting of five variables: (1) capital account openness, (2) financial market liberalization, (3) stock market

[4] **Appendix Table A1** lists 75 papers selected for meta-analysis in order of the publication year and based on the literature selection procedure described in the previous section. See **Appendix 2** for the bibliography of these 75 articles.

liberalization, (4) comprehensive FL index, and (5) other FL indexes.

As shown in **Table 1**, the mean and median of estimates per study are 10.0 and 4, respectively. Of the 748 collected estimates, 321 are extracted from studies of East Asia and 267 from studies of South Asia, with the remaining 160 estimates from studies of the whole of Asia. This condition is advantageous for testing both hypotheses regarding the effect size of finance on growth in Asia and the differences between East and South Asia from this perspective.

Selected studies may have used different econometric models (e.g., log–log, log–linear, linear–log, etc.), and estimates are not comparable; therefore, we utilize the partial correlation coefficient (PCC) to synthesize and compare estimates derived from the selected studies. The PCC is a unitless measure of the association between the dependent and independent variable under discussion. When t_k and df_k denote the t value and the degree of freedom of the k-th estimate, respectively, the PCC is calculated with the following equation:

$$r_k = \frac{t_k}{\sqrt{t_k^2 + df_k}}. \quad (1)$$

The standard error (SE_k) of r_k is given by $\sqrt{(1 - r_k^2)/df_k}$. Hereafter, k denotes the total number of collected estimates (k = 1, 2, …, k).

Table 2 shows the descriptive statistics of the collected estimates, the results of the t mean comparison test, and the Shapiro–Wilk normality test by study type, while **Figure 1** shows the corresponding kernel density estimations. As shown in **Table 1**, both the mean and median for all studies are positive, and according to the t-test, the null hypothesis that the mean is zero is rejected at the 1 percent statistical significance level. In addition, Panel (a) of **Figure 1** shows a kernel density estimation markedly biased in the positive direction. These results suggest that the empirical results reported in the 75 selected studies, as a whole, demonstrate that financial development and liberalization do contribute to economic growth in Asia—a finding that is in agreement with Hypothesis 1. Furthermore, the mean and median of collected estimates for studies of South Asia account for 0.177 and 0.201, respectively, greatly exceeding those same measures for studies of East Asia (0.069 and 0.072, respectively). Panel (b) of **Figure 1** indicates that this large difference is closely related to a stronger bias toward the positive side in the empirical evidence of South Asia but not East Asia. These findings are also consistent with Hypothesis 2.

4. Meta-Synthesis

We synthesize PCCs using the meta fixed-effect model and meta random-effects model. According to the Cochran Q test of homogeneity and I^2 and H^2 heterogeneity measures, we adopt the synthesized effect size of one of these two models. In addition to this traditional synthesis method, we also utilize the unrestricted weighted least squares weighted average (UWA) approach proposed by Stanley and Doucouliagos (2017) and Stanley, Doucouliagos, and Ioannidis (2017) as a new synthesis method. The UWA is less subject to influence from excess heterogeneity than the fixed-effect model. The UWA method is regarded as the synthesized effect size, which is a point estimate obtained from a regression that takes the standardized effect size as the dependent variable and the estimation precision as the independent variable. Specifically, as shown in Eq. (2), we include estimates without the intercept term, the coefficient "α" is utilized as the synthesized value of the PCCs, and ε_k is a residual term:

$$t_k = \alpha(1/SE_k) + \varepsilon_k. \qquad (2)$$

Theoretically, α in Eq. (2) is consistent with the estimate of the meta fixed-effect model.

Furthermore, Stanley, Doucouliagos, and Ioannidis (2017) propose conducting a UWA of estimates, the statistical power of which exceeds the threshold of 0.80; they call this estimation method the weighted average of the adequately powered (WAAP). They state that the WAAP synthesis has less publication selection bias than does the traditional random-effects model. We adopt the WAAP estimate as the best synthesis value whenever it is available. Otherwise, the traditional synthesized effect size is used as the second-best reference value.

Column (a) of **Table 3** reports synthesis results using a meta fixed-effect model and a meta random-effects model, while Column (b) reports the heterogeneity test and measures. As shown in Column (b), in all four cases, the Cochran Q test of homogeneity rejects the null hypothesis at a 1 percent significance level, and the I^2 and H^2 statistics indicate the presence of heterogeneity among the selected studies. Accordingly, we adopt the estimates of the random-effects model reported in Column (a) as reference values obtained from the traditional synthesis method. In Column (c) of **Table 3**, the results of the new synthesis approach using Eq. (2) are given. Although the UWA synthesis generated the same point estimate as to the transitional fixed-effect model, the t value of the former notably falls below that of the latter, thereby suggesting that the UWA method is less influenced by excess heterogeneity than the traditional model. In addition, three of the four cases successfully synthesized collected estimates using the WAAP method with adequately powered estimates. Hence, we adopt the WAAP estimates of 0.098, 0.294, and 0.103 as the best synthesis values for all studies, studies of the whole of Asia, and studies of South Asia, respectively. With regard to the studies of East Asia, the random-effects estimate of 0.065 is used as the reference synthesis value.

According to the standards of Doucouliagos (2011) regarding the evaluation of PCCs in macroeconomics research,[5] the WAAP synthesis value of 0.098 for all studies implies that the growth-enhancing effects of financial development and liberalization in Asia are small. Furthermore, using all estimates, the random-effects synthesis value of 0.137 suggests that the impact of finance on growth in the Asian region largely exceeds the "small" scale threshold. In this regard, the WAAP synthesized effect size of 0.294 for studies of the whole of Asia is noteworthy because it reaches the "medium" scale threshold. In sum, these synthesis results uniformly support Hypothesis 1.

The random-effects synthesis value of 0.065 for studies of East Asia implies that, in East Asia, financial development and liberalization contribute to economic growth only weakly, while the WAAP synthesized effect size of 0.103 for studies of South Asia implies that South Asian countries enjoy economically significant growth effects from the development and liberalization of their financial systems. These results jointly verify Hypothesis 2.

As discussed above, the meta-synthesis results are highly consistent with our expectations; however, these findings fail to take into account differences in study conditions across selected research works. Therefore, we need to check the robustness of the synthesis results reported in this section by testing whether they are replicable when various aspects of heterogeneity in the literature are controlled simultaneously. In the next section, we will address this issue through a multivariate MRA.

[5] Regarding the evaluation criteria of the correlation coefficient, Cohen (1988) suggests using the values of 0.10, 0.30, and 0.50 as cutoffs to distinguish a small effect, medium effect, and large effect, respectively. However, his criteria set with a zero-order correlation are somewhat strict in economics research in which a large number of control variables are usually employed in empirical analysis. Therefore, Doucouliagos (2011) proposes 0.104, 0.226, and 0.386 to be the lowest thresholds of small, medium, and large effects, respectively, as the new general standard in macroeconomic research (ibid., Table 3, p. 11).

5. Meta-Regression Analysis

We conduct an MRA to explore factors causing heterogeneity between selected studies. More concretely, we estimate the following meta-regression model:

$$y_k = \beta_0 + \sum_{n=1}^{N-1} \beta_n x_{kn} + \beta_N se_k + e_k, \qquad (3)$$

where y_k is the PCC (i.e., r_k) of the k-th estimate, β_0 is the constant, x_{kn} denotes a meta-independent variable that captures the relevant characteristics of an empirical study and explains its systematic variation from other empirical results in the literature, se_k is the standard error of the PCC, β_n denotes the meta-regression coefficient to be estimated, and e_k is the meta-regression disturbance term. We estimate Eq. (3) to identify the effects of literature heterogeneity on the empirical results of selected studies. We take the PCCs of the collected estimates as the dependent variable, while initially employing a total of 36 variables as meta-independent variables. These consist of variables that capture differences in the number and composition of countries studied, estimation period, data type, estimator, types of economic growth variables, attributes of financial variables, and selection of control variables. This is in addition to variables of the study area that aim to test Hypotheses 2 and standard errors of PCCs. **Table 4** lists the names, definitions, and descriptive statistics of these 36 meta-independent variables.

5.1 Bayesian model averaging and weighted-average least squares

To tackle issues of model uncertainty and multicollinearity that may arise from the use of a set of moderators, we first conduct a Bayesian model averaging (BMA) analysis and a weighted-average least squares (WALS) estimation with all of the meta-independent variables. As Polák (2019) and Havranek and Sokolova (2020) argue, MRA involves the issue of model uncertainty, in the sense that the true model cannot be identified in advance. In addition, there is a high risk that the simultaneous estimation of multiple meta-independent variables could lead to multicollinearity. Following recent meta-studies (e.g., Bajzik *et al.*, 2020; Zigraiova *et al.*, 2021; Anwar and Mang, 2022), we employed BMA using the prior dilution that addresses model uncertainty and collinearity among variables (George, 2010). In this BMA procedure, weights are applied that are derived from the posterior model probabilities (PMPs). In fact, the PMPs determine how well the model fits the data. Models with the best fit relative to model size yield the highest PMPs. Posterior inclusion probabilities (PIPs) are calculated for each of the explanatory variables in BMA. Accordingly, we estimate the PIP and *t* value of each meta-independent variable using the BMA and WALS estimators, respectively, adopting a policy of employing variables for which the estimates have a PIP of 0.50 or more in the BMA analysis and a *t* value of 1.96 or more in the WALS estimation as selected moderators in Eq. (3). Recent meta-studies, such as Ugur, Churchill, and Luong (2020) and Anwar and Mang (2022), argue that WALS is theoretically superior to BMA, given that it performs model selection linearly rather than exponentially (Magnus, Powell, and Prüfer, 2010; De Luca and Magnus, 2011). Additionally, WALS is preferred over BMA, as it requires less-complex computations and is based on a transparent definition of prior ignorance.

Table 5 shows the results, and **Figure 2** shows the details of model inclusion in the BMA process. According to this selection process, the ten variables from time-series data to financial crisis highlighted with shading in **Table 5** are identified as robust moderators against model uncertainty and multicollinearity.[6] Our result that the finance–growth nexus is positive in Asia matches those of earlier meta-studies by Arestis, Chortareas, and Magkonis (2015) and Valickova, Havranek, and Horvath (2015), who examine the same association for worldwide datasets. Our results are also aligned with the earlier conclusion of Anwar and Iwasaki (2022), who find that market capitalization plays a significant role in enhancing economic growth in the Middle East and African countries. However, some authors (for instance, Chung, Sun, and Vo, 2019) find that financial liberalization and deepening of the financial system lead to technological deepening, which is more vital than a country's market capitalization. Nevertheless, most studies argue that market capitalization channels funds from savers to investors, and such financial flows are required to promote a banking sector that ultimately triggers economic growth. For instance, Liu and Zhang (2020) investigate the FD–growth nexus in Asia and find that a country's market capitalization significantly promotes the banking sector

[6] Estimation results of the model with all moderators are reported in **Appendix Table A2**. As shown in this table, the combinations of statistically significant meta-independent variables differ greatly from those in **Table 6**, implying that the MRA, without the selection of moderators, is likely to be strongly affected by the problems of model uncertainly and multicollinearity in the case of this study The variables of East Asia and South Asia also show inconsistent estimates as compared to those in **Table 6**, thereby indicating that the non-selection of moderators may lead to a false conclusion.

and economic growth.

However, unlike earlier results (e.g., Valickova, Havranek, and Horvath, 2015), our MRA results do not support the idea that stock market liberalization has a larger impact on spurring economic growth in Asian countries. The same is true for the case of capital account openness, where the effect size is found to be smaller than those of other financial factors in most cases. The possible explanation is that the impact of FD on growth varies across regions, and the effect largely depends on the different stages of the real economy (i.e., the nexus is stronger in the presence of a higher level of financial development). On the other hand, despite infrastructural and administrative reforms, the development of Asian stocks and bond markets has remained very slow (Estrada, Park, and Ramayandi, 2015; Sharma and Kautish, 2020), although, in recent years, the central banks of Asian countries have restructured their banking sectors and stock markets. As a result, Asian countries have witnessed upward movement in stock and bond market developments; nevertheless, the long-term association between financial development and economic growth is insignificant, as the negative shocks are more significant than the positive shocks (Sharma and Kautish, 2020).[7]

5.2 Robust analysis: meta-regression analysis

As a robust analysis, following the procedures of Iwasaki, Ma, and Mizobata (2020, 2022), we perform an MRA using the following five estimators: (1) the cluster-robust weighted least squares (WLS), which clusters collected estimates by study, computes robust standard errors, and is weighted by the inverse of the standard error (1/*SE*) as a measure of estimate precision; (2) cluster-robust WLS weighed by the degrees of freedom (*d.f.*) to account for sample-size differences among the studies; (3) cluster-robust WLS weighed by the inverse of the number of estimates in each study (1/*EST*) to avoid domination of the results by studies with large numbers of estimates; (4) the multi-level mixed-effects RLM estimator; and (5) the cluster-robust random-effects panel GLS estimator.[8]

[7] Of 48 countries in Asia, 8 do not have stock markets. Also, the stock markets of several countries are not developed (Estrada, Park, and Ramayandi, 2010), resulting in uncertainty in the monetary systems and economic growth.

[8] In addition to using these five estimators, many of the previous studies conduct meta-regression analyses using the cluster-robust fixed-effects panel estimator. However, to test Hypothesis 2, we need estimates of target area variables that are free from within-study variations. For this reason, we do not

We also estimate Eq. (3) with three key regressors of East Asia, South Asia, and *SE* and the above-mentioned ten selected moderators on the left-hand side using five different estimators. The estimation results are displayed in **Table 6**. As shown in this table, estimates are sensitive to the choice of estimator; therefore, we assume that the meta-independent variables that are statistically significant and have the same sign in at least three of five models constitute robust estimates. From this standpoint, we confirm that the variables of East Asia and South Asia are both estimated to be robust with a negative coefficient, taking the whole of Asia as the reference category. It is also revealed that the coefficient of East Asia always falls below that of South Asia in all five models with a range between 0.002 and 0.053.[9] These results indicate that the estimates of financial variables reported in studies of the whole of Asia show a larger effect size on economic growth than those of East and South Asia, on average; at the same time, studies of South Asia tend to report a bigger impact of finance on growth than studies of East Asia, *ceteris paribus*. In sum, the estimation results in **Table 6** correspond with the meta-synthesis results reported in the previous section, thereby, strongly supporting Hypothesis 2. We also find that, except for financial crisis, the reported estimates of the FD–growth nexus are weakly dependent on the set of control variables included in individual studies. For instance, studies that control for macroeconomic stability, trade openness, and investment tend to report negligible effects, whereas studies that controlled for financial crises exhibit larger effects. Our results are in line with the findings of earlier studies such as Anwar and Cooray (2012), who observe that the Asian financial crisis had a much stronger impact on Asian economies than on the rest of the world.

6. Test of Publication Selection Bias

In the final stage of meta-analysis, we examine publication selection bias using a funnel plot, by conducting a goodness-of-fit test of proportional distribution and by performing an MRA test procedure consisting of a funnel-asymmetry test (FAT), a precision-effect test (PET), and a precision-effect estimate with standard error (PEESE), which are proposed by Stanley and Doucouliagos (2012) and have been used widely in recent meta-studies.

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perform any estimations using a panel fixed-effects model.

[9] The Wald test confirms that the difference between these two estimates is statistically significantly different from zero at the 5% level.

A funnel plot is a scatter plot with the effect size (in the case of this paper, the PCC) on the horizontal axis and the precision of the estimate (the inverse of the standard error $1/SE$) on the vertical axis. In the absence of publication selection bias, effect sizes reported by independent studies vary randomly and symmetrically around the true effect size. Moreover, according to statistical theory, the dispersion of effect sizes is negatively correlated with the precision of the estimate. Therefore, the shape of the plot should look like an inverted funnel. On the contrary, if the funnel plot is not symmetrical but rather is deflected to one side, then an arbitrary manipulation of the study area in question is suspected. In other words, the estimates in favor of a specific conclusion (i.e., estimates with an expected sign) are published more frequently.

The goodness-of-fit test examines the proportional distribution of the reported estimates. The test is performed based on either the assumption that the true effect size is zero or the assumption that the selected meta-synthesis value approximates the true effect. By conducting this univariate test, we inspect whether the estimates in question are distributed evenly around the true effect size.

The FAT–PET–PEESE procedure has been developed to test publication selection bias and the presence of genuine evidence in a more rigid manner: FAT can be performed by regressing the t value of the k-th estimate on the inverse of the standard error ($1/SE$) using the next equation, (4), thereby testing the null hypothesis that the intercept term γ_0 is equal to zero:

$$t_k = \gamma_0 + \gamma_1(1/SE_k) + v_k, \qquad (4)$$

where v_k is the error term. When the intercept term γ_0 is statistically significantly different from zero, we can interpret that the distribution of the effect sizes is asymmetrical.

Even if there is publication selection bias, a genuine effect may exist in the available empirical evidence. Stanley and Doucouliagos (2012) propose examining this possibility by testing the null hypothesis that the coefficient γ_1 is equal to zero in Eq. (4). The rejection of the null hypothesis implies the presence of genuine empirical evidence. γ_1 is the coefficient of precision; therefore, it is called a PET.

Moreover, Stanley and Doucouliagos (2012) also state that an estimate of the publication selection–adjusted effect size can be obtained by estimating the following equation (5), which has no intercept. If the null hypothesis of $\gamma_1 = 0$ is rejected, then the non-zero true effect actually exists in the literature, and the coefficient γ_1 can be regarded as its estimate.

$$t_k = \gamma_0 SE_k + \gamma_1 (1/SE_k) + v_k \qquad (5)$$

This is the PEESE approach.[10]

To test the robustness of the regression coefficients obtained from the above FAT–PET–PEESE procedure, we estimate Eqs. (4) and (5) using not only the unrestricted WLS estimator, but also the WLS estimator with bootstrapped standard errors, the cluster-robust WLS estimator, and the unbalanced panel estimator for a robustness check. In addition to these four models, we also run an instrumental variable (IV) estimation with the inverse of the square root of the number of observations used as an instrument of the standard error, because "the standard error can be endogenous if some method choices affect both the estimate and the standard error. Moreover, the standard error is estimated, which causes attenuation bias in meta-analysis" (Cazachevici, Havranek, and Horvath, 2020, p. 5).

Figure 3 presents a funnel plot. Panel (a) of the figure shows that the estimates extracted from all 75 selected studies form a distribution with an inversed funnel shape, suggesting that strong manipulation in the publication selection of empirical evidence is unlikely to exist in the literature. This judgement is not significantly affected by the assumption that the true effect is zero or that it is close to the selected synthesis value. The same observation can be garnered from Panels (c) and (d) in the cases of studies of East Asia and South Asia, respectively, while Panel (b) indicates that the reported estimates in studies of Asia as a whole tend to be biased to the positive side.

To support the findings obtained from the funnel plots in **Figure 3**, we further examine whether the collected estimates are distributed proportionally around the true effect but not through a goodness-of-fit test. As shown in **Table 7**, the number of positive and negative estimates among those collected from all studies would be 524:224. This rejects the null hypothesis that the true effect size is zero. The same information is also illustrated by the dotted line in **Figure 3**. Furthermore, the selected synthesis value, as depicted by the solid line in

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[10] We can see that the coefficient γ_1 in Eq. (5) may become the estimate of the publication bias–adjusted effect size in light of the fact that the following equation is obtained when both sides of Eq. (5) are multiplied by the standard error:

$$\text{Effect size}_k = \gamma_0 SE_k^2 + \gamma_1 + w_k. \quad (5b)$$

When directly estimating Eq. (5b), the WLS method, with $1/SE_k^2$ as the analytical weight, is used.

Figure 3, approximates the true effect; in this case, the collected estimates would be distributed more evenly (418:330) on the left and right sides of the threshold of 0.098. Nevertheless, the null hypothesis is again rejected ($z = 7.825$, $p = 0.000$). Similar test results are found in nearly all cases except for studies of East Asia under the assumption that the true effect size takes the random-effect synthesis value of 0.065.

As seen above, a visual examination using a funnel plot in **Figure 3** and the univariate test in **Table 7** produced mutually contradictory results. Therefore, we will rely on the FAT–PET–PEESE procedure for a final judgment, as it is methodologically stricter. Results using estimates collected from all studies are shown in **Table 8**. As reported in Panel (a) of the table, in four of the five models, FAT rejects the null hypothesis that the intercept (γ_0) is zero. This suggests that publication selection bias in this research domain could be highly likely, in line with the goodness-of-fit test results in **Table 7**. However, even if publication selection bias is involved, the collected estimates could contain genuine empirical evidence. Panel (a) of **Table 8** shows that the null hypothesis that the coefficient (γ_1) of the inverse of the standard error ($1/SE$) is zero is rejected in three models and, accordingly, proves that the collected estimates do contain empirical evidence regarding the true effect size. Further, the results of the PEESE approach in Panel (b) show that, in all five models, the coefficients (γ_1) of $1/SE$ are estimated to be statistically significant, meaning that the true value should be in a range of 0.0921 to 0.1281 in terms of the PCC. From these results, we judge that the effects of financial development and liberalization on economic growth in Asia as measured by the PCC are positive, with an economically meaningful scale in line with Hypothesis 1.

We also attempt the above FAT–PET–PEESE procedure separately by study type. **Table 9** summarizes the results together with those for all studies mentioned above. As reported in this table, FAT identifies publication selection bias in two of the three cases. PET suggests the presence of genuine empirical evidence in all three cases, and the PEESE approach produces a publication selection–adjusted effect size that is statistically significantly different from zero for all three study types. The PEESE-generated values shown in the right-most column in **Table 9** well conform to the meta-synthesis results as described in Section 4, thereby reconfirming that the financial systems in South Asia tend to outperform those in East Asia in terms of the growth-enhancing impact, as predicted in Hypothesis 2.[11]

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[11] As **Table 9** shows, it is noteworthy that, in most cases, the publication selection bias–adjusted effect

Furthermore, recent meta-studies such as Bajzik *et al*. (2020) and Zigraiova *et al*. (2021) argue that the FAT–PET–PEESE approach implicitly assumes that publication selection bias is linearly proportional to the size of the standard error, which might not be practical in some cases. To deal with the possible nonlinear relationship between the two, some advanced techniques have been developed recently (Iwasaki, 2022). They include the "Top 10" approach proposed by Stanley, Jarrell, and Doucouliagos (2010), who suggest that discarding 90% of the published findings greatly reduces publication selection bias and is often more efficient than conventional summary statistics; the selection model, developed by Andrews and Kasy (2019), which tests for publication selection bias using the conditional probability of publication as a function of a study's results; the endogenous kinked model, innovated by Bom and Rachinger (2019), which presents a piecewise linear meta-regression of estimates of their standard errors, with a kink at the cutoff value of the standard error below which publication selection is unlikely; and the *p*-uniform method, introduced by van Aert and van Assen (2012), which is grounded on the statistical theory that the distribution of *p*-values is uniform conditional on the population effect size. In this paper, we apply these four techniques to provide alternative estimates of the publication selection bias–corrected effect size and compare them with the WAAP and PEESE estimates for a robustness check.

Table 10 shows alternative estimations of the publication selection bias–corrected effect size using four advanced techniques that address the possible nonlinear relationship between publication selection bias and the standard error. We find that, overall, these results also back up the findings obtained from the above FAT–PET–PEESE procedure.

7. Conclusion

This paper carries out the first comprehensive meta-analysis of the effects of financial development and liberalization on macroeconomic growth in Asia. To date, the existing literature provides very mixed evidence; consequently, the overall situation is extremely equivocal in the region. The meta-analysis contained in this paper, using a total of 748 estimates

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sizes generated by the PEESE method are much closer to the WAAP synthesis values than to the random-effects values reported in **Table 3**. These results support the statement by Stanley, Doucouliagos, and Ioannidis (2017) that, as compared with the traditional random-effects model, the WAAP is a more effective synthesis approach in the presence of publication selection bias.

extracted from 75 previous works, gives a definite picture of this topic. That is, the meta-synthesis of collected estimates indicates that financial development and liberalization are highly likely to promote economic growth in Asia, and these policy measures tend to have a meaningful impact in real life. The synthesis results also reveal that South Asia enjoys a larger effect of finance on growth than does East Asia. Both the multivariate MRA that deals with heterogeneity across studies and the test for publication selection bias produced findings that are highly compatible with the synthesis results. Furthermore, the estimates of the selected moderators obtained from our MRA indicate that the expansion of market capitalization, which attracts more liquidity and channels funds from savers to lenders at low costs, is positively related to the effect size of finance on growth in Asia. On the other hand, we ascertain that stock market and financial market liberalization tend to show smaller impacts on economic growth in the region as compared to other financial variables. Finally, we confirm that the collected estimates contain genuine empirical evidence of the finance–growth nexus in Asia and its subregions.

Based on the results obtained from the meta-analysis in this paper, we recommend that policymakers of East Asian and South Asian economies strengthen their stock markets and banking sectors simultaneously. We also advise policymakers in these regions to eradicate stock market barriers and espouse measures to advance their stock markets at international standard levels. There is certainly a dire need to develop efficient stock markets that may avoid the risks of asymmetric information problems and distinguish good borrowers from bad ones. As stated in the earlier literature (e.g., Qayyum and Mohsin, 2005; Yu, Fung, and Tam, 2010; Bhunia and Das, 2012), there is a significant gap in the process of integrating Asian financial markets with the world; as a result, globalization, technological advancements, and financial market integration have aggravated equity markets in Asian countries. Therefore, our advice for officials is to adequately integrate the region's financial markets with those of the rest of the world. In this regard, improving financial infrastructure—such as the process of trading and modes of payment, clearing, settlement, and custodian systems—may facilitate the movement of capital and savings and, more likely, reinforce financial intermediation. To achieve regional economic development, political support, greater financial collaboration, and integration are required. As capital formation positively indicates the effect size of the finance–growth nexus, we urge countries in the region to focus on the innovation and development of new financial services, such as FinTech, to foster financial sector competitiveness by opening markets and increasing the usage of new technology in the financial sector.

Although, as the results of meta-analysis in this paper prove, the overall impact of financial development and liberalization on economic growth is positive in Asian countries, it is argued that the effect size of stock markets and financial markets may adversely affect the finance–growth nexus in the region. These results support the argument of ben Gamra (2009), that liberalization of stock and financial markets may be sources of financial instability when information asymmetries and distortions in the markets are widespread. Instead, improved information generates transparency, lowers costs, leads to better resource allocations, and enhances economic stability (Stiglitz, 2000). Sadly, information asymmetries are prevalent in most financial markets of developing countries (Furman and Stiglitz, 1998), leading to enhanced credit market costs and amplified distrust between borrowers and lenders (Capasso, 2004). Therefore, we recommend that policymakers of Asian countries remove friction and impediments in financial markets that encourage the free transfer of resources and the process of capital accumulation. The free-market mechanism of stock markets is likely to allocate resources effectively to investors, including state-owned enterprises.

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APPENDIX 1

See Table A1 and Table A2.

APPENDIX 2

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Table 1. Overview of collected estimates

Study type	Number of studies[a]	Estimation period covered	Number of collected estimates (K)	Average number of estimates per study	Median number of estimates per study
All studies	75	1950-2018	748	10.0	4
Studies of the whole of Asia	8	1975-2017	160	20.0	5
Studies of East Asia	25	1950-2016	321	14.3	7
Studies of South Asia[b]	46	1950-2018	267	6.1	4

Notes:

[a] Four studies provide estimates both for East Asia and South Asia.

[b] Includes Inner Asia

Table 2. Descriptive statistics of the partial correlation coefficients, *t*-test, and Shapiro–Wilk normality test of collected estimates

Study type	*K*	Mean	Median	S.D.	Max.	Min.	Kurtosis	Skewness	*t*- test[a]	Shapiro-Wilk normality test (z)[b]
All studies	748	0.140	0.167	0.311	0.896	-0.910	3.208	-0.225	12.269 ***	3.534 †††
Studies of the whole of Asia	160	0.218	0.259	0.306	0.833	-0.456	2.594	-0.087	9.017 ***	2.916 †††
Studies of East Asia	321	0.069	0.072	0.304	0.896	-0.910	3.282	-0.185	4.093 ***	1.954 ††
Studies of South Asia	267	0.177	0.201	0.307	0.893	-0.796	3.595	-0.404	9.430 ***	3.231 †††

Notes:

[a] ***: Null hypothesis that the mean is zero is rejected at the 1% level.

[b] †††: Null hypothesis of normal distribution is rejected at the 1% level; ††: at the 5% level.

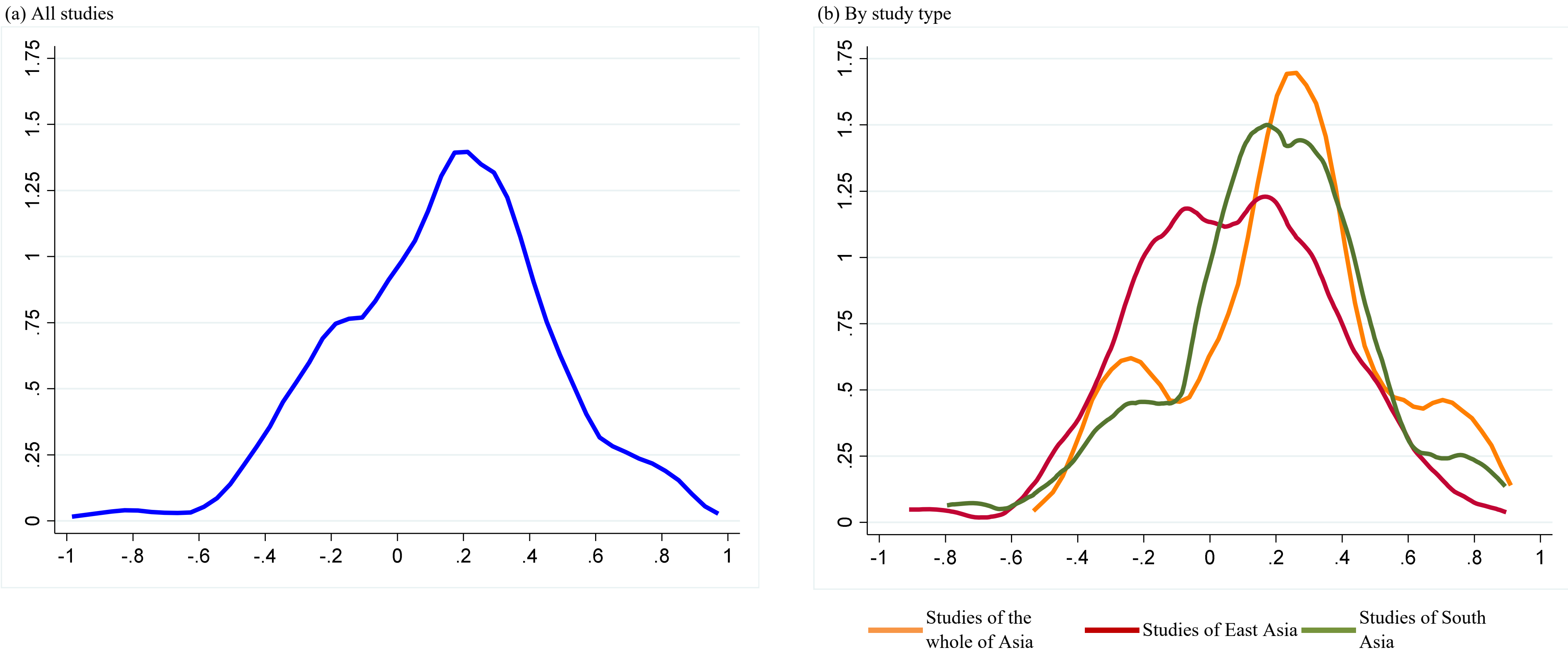

Figure 1. Kernel density estimation of the collected estimates

Notes: The vertical axis is the kernel density. The horizontal axis is the partial correlation coefficient of the collected estimates. See Table 2 for the descriptive statistics of the collected estimates.

Table 3. Synthesis of collected estimates

Study type	Number of estimates (K)	(a) Traditional synthesis: Fixed-effect model (z value)[a]	(a) Traditional synthesis: Random-effects model (z value)[a]	(b) Heterogeneity test and measures: Cochran Q test of homogeneity (p value)[b]	(b) Heterogeneity test and measures: I^2 statistic[c]	(b) Heterogeneity test and measures: H^2 statistic[d]	(c) Unrestricted weighted least squares average (UWA): UWA of all estimates (t value)[a, e]	(c) UWA: Number of adequately powered estimates[f]	(c) UWA: WAAP (weighted average of adequately powered estimates) (t value)[a]	(c) UWA: Median S.E. of estimates	(c) UWA: Median statistical power
All studies	748	0.110 *** (42.54)	0.137 *** (12.13)	10801.19 *** (0.00)	94.40	17.86	0.110 *** (11.19)	25	**0.098** *** **(15.67)**	0.086	0.245
Studies of the whole of Asia	160	0.233 *** (43.32)	0.220 *** (9.08)	3145.34 *** (0.00)	95.00	95.00	0.233 *** (9.74)	70	**0.294** *** **(7.91)**	0.085	0.780
Studies of East Asia	321	0.053 *** (15.87)	**0.065** *** **(3.98)**	4748.66 *** (0.00)	95.44	21.93	0.053 *** (4.12)	0	- (-)	0.079	0.099
Studies of South Asia	267	0.145 *** (23.01)	0.174 *** (9.14)	2058.88 *** (0.00)	88.25	8.51	0.145 *** (8.27)	4	**0.103** *** **(10.50)**	0.132	0.193

Notes: *** denotes statistical significance at the 1% level. Selected synthesis values are emphasized in bold.

[a] Null hypothesis: The synthesized effect size is zero.

[b] Null hypothesis: Effect sizes are homogeneous.

[c] Ranges between 0 and 100% with larger scores indicating heterogeneity

[d] Takes zero in the case of homogeneity

[e] Synthesis method advocated by Stanley and Doucouliagos (2017) and Stanley et al. (2017)

[f] Denotes the number of estimates with a statistical power of 0.80 or more that is computed in reference to the UWA of all collected estimates

Table 4. Names, definitions, and descriptive statistics of meta-independent variables

Variable name	Definition	Descriptive statistics		
		Mean	Median	S.D.
Whole of Asia	1 = if target region is the whole of Asia, 0 = otherwise	0.214	0	0.410
East Asia	1 = if target region is East Asia, 0 = otherwise	0.429	0	0.495
South Asia	1 = if target region is South and Inner Asia, 0 = otherwise	0.357	0	0.479
Number of target countries	Total number of target countries	3.634	1	6.318
Share of developed countries	Share of developed countries in all target countries	0.133	0	0.295
Average year of estimation	Average year of estimation period	1995.062	1994.5	7.855
Length of estimation	Years of estimation period	25.996	23	11.649
Panel data	1 = if panel data is employed for empirical analysis, 0 = otherwise	0.643	1	0.479
Cross-sectional data	1 = if cross-sectional data is employed for empirical analysis, 0 = otherwise	0.016	0	0.126
Time-series data	1 = if time-series data is employed for empirical analysis, 0 = otherwise	0.341	0	0.474
Non-OLS	1 = if an estimator other than OLS is used for estimation, 0 = otherwise	0.713	1	0.453
OLS	1 = if an OLS estimator is used for estimation, 0 = otherwise	0.287	0	0.453
GDP car capita	1 = if the unit of the growth variable is real GDP per capita, 0 = otherwise	0.742	1	0.438
Real GDP	1 = if the unit of the growth variable is real GDP, 0 = otherwise	0.207	0	0.406
Nominal GDP	1 = if the unit of the growth variable is nominal GDP, 0 = otherwise	0.051	0	0.220
Private credit to GDP	1 = if the financial variable is the ratio of private credit to GDP, 0 = otherwise	0.223	0	0.417
Financial depth	1 = if the financial variable captures the degree of financial depth, 0 = otherwise	0.112	0	0.316
Bank credit to GDP	1 = if the financial variable is the ratio of bank credit to GDP, 0 = otherwise	0.090	0	0.286
Private credit to domestic credit	1 = if the financial variable is the ratio of private credit to domestic credit, 0 = otherwise	0.009	0	0.096
Market capitalization	1 = if the financial variable captures the degree of market capitalization, 0 = otherwise	0.107	0	0.309
Stock market activity	1 = if the financial variable captures the degree of stock market activity, 0 = otherwise	0.090	0	0.286
Turnover ratio	1 = if the financial variable is the turnover ratio, 0 = otherwise	0.057	0	0.233
Comprehensive FD index	1 = if the financial variable is the comprehensive financial development index, 0 = otherwise	0.143	0	0.350
Other FD variables	1 = if a variable is used other than private credit to GDP and the above financial development variables, 0 = otherwise	0.040	0	0.196
Capital account openness	1 = if the financial variable captures the degree of capital account openness, 0 = otherwise	0.045	0	0.208
Financial market liberalization	1 = if the financial variable captures the degree of financial market liberalization, 0 = otherwise	0.031	0	0.173
Stock market liberalization	1 = if the financial variable captures the degree of stock market liberalization, 0 = otherwise	0.040	0	0.196
Comprehensive FL index	1 = if the financial variable is the comprehensive financial liberalization index, 0 = otherwise	0.004	0	0.063
Other FL variables	1 = if a variable is used other than the above financial liberalization variables, 0 = otherwise	0.008	0	0.089
Lagged	1 = if the financial variable is lagged, 0 = otherwise	0.119	0	0.324
With intercepted variable	1 = if the financial variable is estimated with an intercepted variable(s), 0 = otherwise	0.099	0	0.299
Macroeconomic stability	1 = if estimation simultaneously controls for macroeconomic stability, 0 = otherwise	0.215	0	0.411
Trade openness	1 = if estimation simultaneously controls for trade openness, 0 = otherwise	0.493	0	0.500
Investment	1 = if estimation simultaneously controls for investment including capital formation, 0 = otherwise	0.404	0	0.491
Financial crisis	1 = if estimation simultaneously controls for financial crisis, 0 = otherwise	0.175	0	0.380
SE	Standard error of the partial correlation coefficient	0.103	0.086	0.053

Note: The variables of the whole of Asia, panel data, non-OLS, GDP per capita, and private credit to GDP are used as default categories.

Table 5. Meta-regression analysis for the selection of moderators

Estimator	Bayesian model averaging (BMA)			Weighted-average least squares (WALS)		
Meta-independent variables/Model	[1]			[2]		
	Post mean	Post S.D.	PIP	Coef.	S.E.	*t*
Key regressors						
East Asia	-0.2221	0.0671	0.99	-0.2229	0.0631	-3.53
South Asia	-0.1727	0.0734	0.91	-0.1982	0.0646	-3.07
SE	-0.0077	0.0693	0.04	-0.1086	0.2860	-0.38
Moderators to be selected						
Number of target countries	-0.0001	0.0007	0.04	0.0000	0.0025	0.00
Share of developed countries	-0.0027	0.0162	0.05	-0.0720	0.0521	-1.38
Average year of estimation	-0.0006	0.0018	0.14	-0.0046	0.0023	-1.99
Length of estimation	0.0000	0.0003	0.03	-0.0023	0.0019	-1.22
Cross-sectional data	0.0009	0.0151	0.03	0.0274	0.0840	0.33
Time-series data	0.1726	0.0478	0.97	0.2104	0.0551	3.82
OLS	0.0677	0.0345	0.86	0.0685	0.0233	2.94
Real GDP	-0.0015	0.0099	0.04	-0.0368	0.0346	-1.06
Nominal GDP	-0.0045	0.0234	0.06	-0.0928	0.0599	-1.55
Financial depth	0.0309	0.0467	0.36	0.0512	0.0367	1.39
Bank credit to GDP	-0.0043	0.0190	0.07	-0.0400	0.0412	-0.97
Private credit to domestic credit	0.0003	0.0173	0.03	-0.0204	0.1035	-0.20
Market capitalization	0.1719	0.0386	1.00	0.1310	0.0403	3.25
Stock market activity	0.0085	0.0268	0.12	0.0220	0.0415	0.53
Turnover ratio	-0.1927	0.0689	0.95	-0.1835	0.0528	-3.48
Comprehensive FD index	-0.0128	0.0304	0.19	-0.0571	0.0389	-1.47
Other FD variables	-0.1125	0.0882	0.69	-0.1302	0.0548	-2.38
Capital account openness	-0.4000	0.0555	1.00	-0.3395	0.0552	-6.15
Financial market liberalization	-0.3432	0.0689	1.00	-0.2798	0.0629	-4.45
Stock market liberalization	-0.3232	0.0663	1.00	-0.2967	0.0596	-4.98
Comprehensive FL index	-0.0006	0.0266	0.03	-0.0332	0.1485	-0.22
Other FL variables	0.0148	0.0600	0.08	0.1388	0.1059	1.31
Lagged	-0.1398	0.0484	0.95	-0.0992	0.0364	-2.73
With intercepted variable	0.0102	0.0282	0.15	0.0654	0.0352	1.86
Macroeconomic stability	-0.0003	0.0050	0.03	-0.0031	0.0265	-0.12
Trade openness	0.0004	0.0054	0.03	0.0358	0.0246	1.46
Investment	0.0008	0.0063	0.04	0.0450	0.0250	1.80
Financial crisis	0.2055	0.0579	0.99	0.1670	0.0566	2.95
K		748			748	

Notes: See Table 4 for the definitions and descriptive statistics of meta-independent variables. The estimate of the intercept is omitted. S.D., PIP, and S.E. denote standard deviation, posterior inclusion probability, and standard errors, respectively.

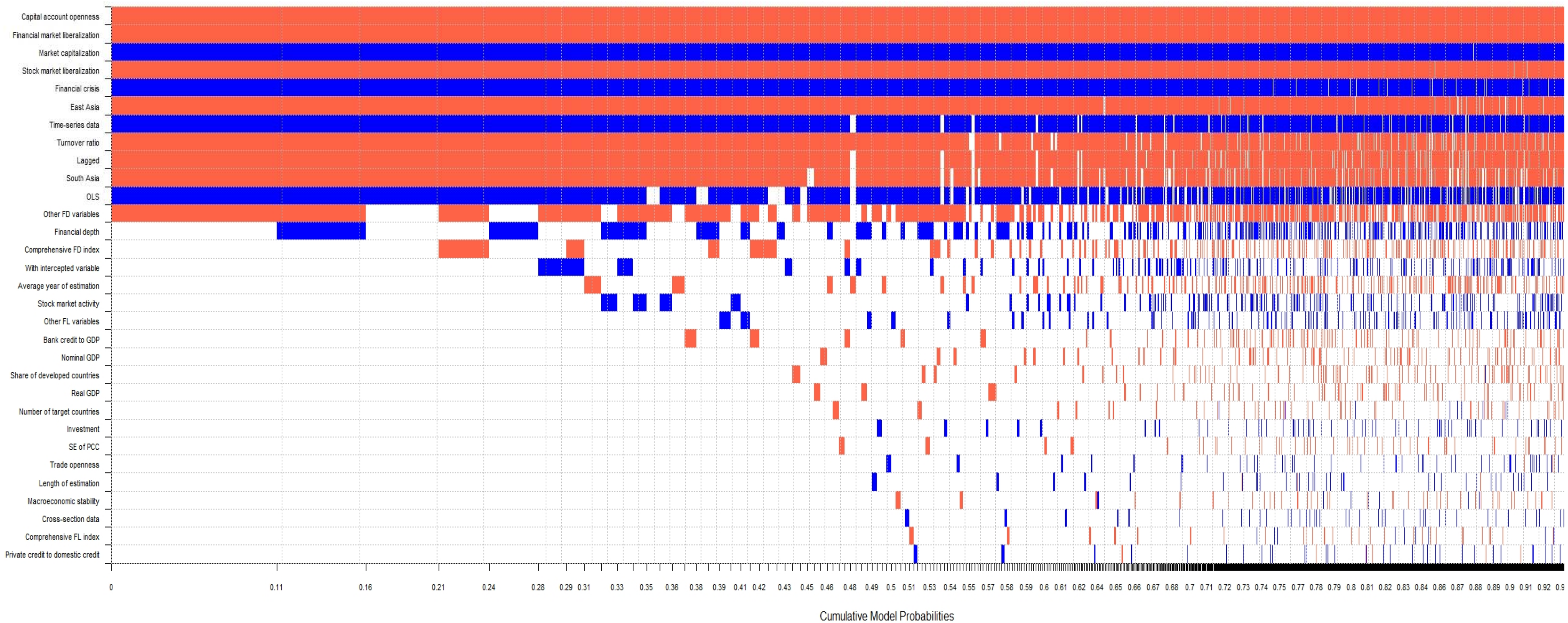

Figure 2. Model inclusion in Bayesian model averaging (*K* = 748)

Notes: The response variable is the effect of financial development on economic growth as measured by the partial correlation coefficient. Here, columns show regression models in individual studies; variables are sorted by PIPs in descending order. A darker blue (red) color depicts a positive (negative) impact of the explanatory variable on the response variable. No color means that the variable is not included in the model. The horizontal axis measures the cumulative PMP for the best 50,000 models. Estimates are weighted by the inverse variance. The vertical axis shows the list of explanatory variables, and the descriptions of these variables are presented in Table 4.

Table 6. Meta-regression analysis with selected moderators

Estimator (Analytical weight in brackets)	Cluster-robust WLS [1/*SE*]	Cluster-robust WLS [*d.f.*]	Cluster-robust WLS [1/*EST*]	Multi-level mixed-effects RML	Cluster-robust random-effects panel GLS
Meta-independent variable (Default)/Model	[1]	[2]	[3]	[4]	[5] [a]
Target region (Whole of Asia)					
East Asia	-0.1962 **	-0.1185 *	-0.1302 **	-0.1552 *	-0.1566 *
	(0.079)	(0.062)	(0.055)	(0.086)	(0.086)
South Asia	-0.1436 *	-0.0781	-0.1285 **	-0.1395 *	-0.1406 *
	(0.074)	(0.060)	(0.052)	(0.079)	(0.079)
Selected moderators	(0.053)	(0.040)	(0.002)	(0.016)	(0.016)
Time-series data	0.2149 **	0.1872 **	0.2022 **	0.1861 *	0.1865 *
	(0.084)	(0.083)	(0.083)	(0.097)	(0.097)
OLS	0.0687 **	0.0401 *	0.2211 ***	0.0678 **	0.0687 **
	(0.029)	(0.020)	(0.059)	(0.027)	(0.028)
Market capitalization	0.1972 **	0.2121 ***	0.0312	0.2091 **	0.2089 **
	(0.086)	(0.070)	(0.067)	(0.101)	(0.102)
Turnover ratio	-0.1667 **	-0.0202	-0.3304	-0.2490 **	-0.2480 **
	(0.073)	(0.078)	(0.227)	(0.114)	(0.115)
Other FD variables	-0.2021 ***	-0.2146 ***	0.0858	-0.1625 ***	-0.1621 ***
	(0.027)	(0.022)	(0.200)	(0.037)	(0.037)
Capital account openness	-0.4223 **	-0.3439 **	-0.0755	-0.5067 ***	-0.5044 ***
	(0.176)	(0.166)	(0.101)	(0.173)	(0.175)
Financial market liberalization	-0.3648 ***	-0.2576 ***	-0.2140 ***	-0.4103 ***	-0.4089 ***
	(0.079)	(0.087)	(0.049)	(0.079)	(0.080)
Stock market liberalization	-0.2839	-0.1520	-0.1044	-0.4692 ***	-0.4675 ***
	(0.190)	(0.174)	(0.070)	(0.121)	(0.123)
Lagged	-0.1470 *	-0.1162	-0.1750 **	-0.1345 *	-0.1349 *
	(0.074)	(0.092)	(0.076)	(0.077)	(0.077)
Financial crisis	0.2536 ***	0.2172 ***	0.1200 ***	0.0988	0.1012
	(0.073)	(0.073)	(0.044)	(0.074)	(0.075)
SE	-0.35240	-0.34033	-0.34055	-0.72907	-0.71851
	(0.5078)	(0.4814)	(0.6439)	(0.9727)	(0.9712)
Intercept	0.23011 **	0.15605 **	0.21000 ***	0.32244 ***	0.32112 ***
	(0.0926)	(0.0686)	(0.0572)	(0.0954)	(0.0958)
K	748	748	748	748	748
R^2	0.297	0.310	0.162	-	0.158

Notes: Figures in parentheses beneath the regression coefficients are robust standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Selected moderators denote meta-independent variables having a PIP of 0.50 or more in the Bayesian model averaging estimation and a p value of 0.10 or less in the frequentist check OLS estimation as reported in Table 5. See Table 4 for the definitions and descriptive statistics of meta-independent variables.

[a] Breusch-Pagan LM test for random effects: $\chi^2 = 6.05$, $p = 0.0070$

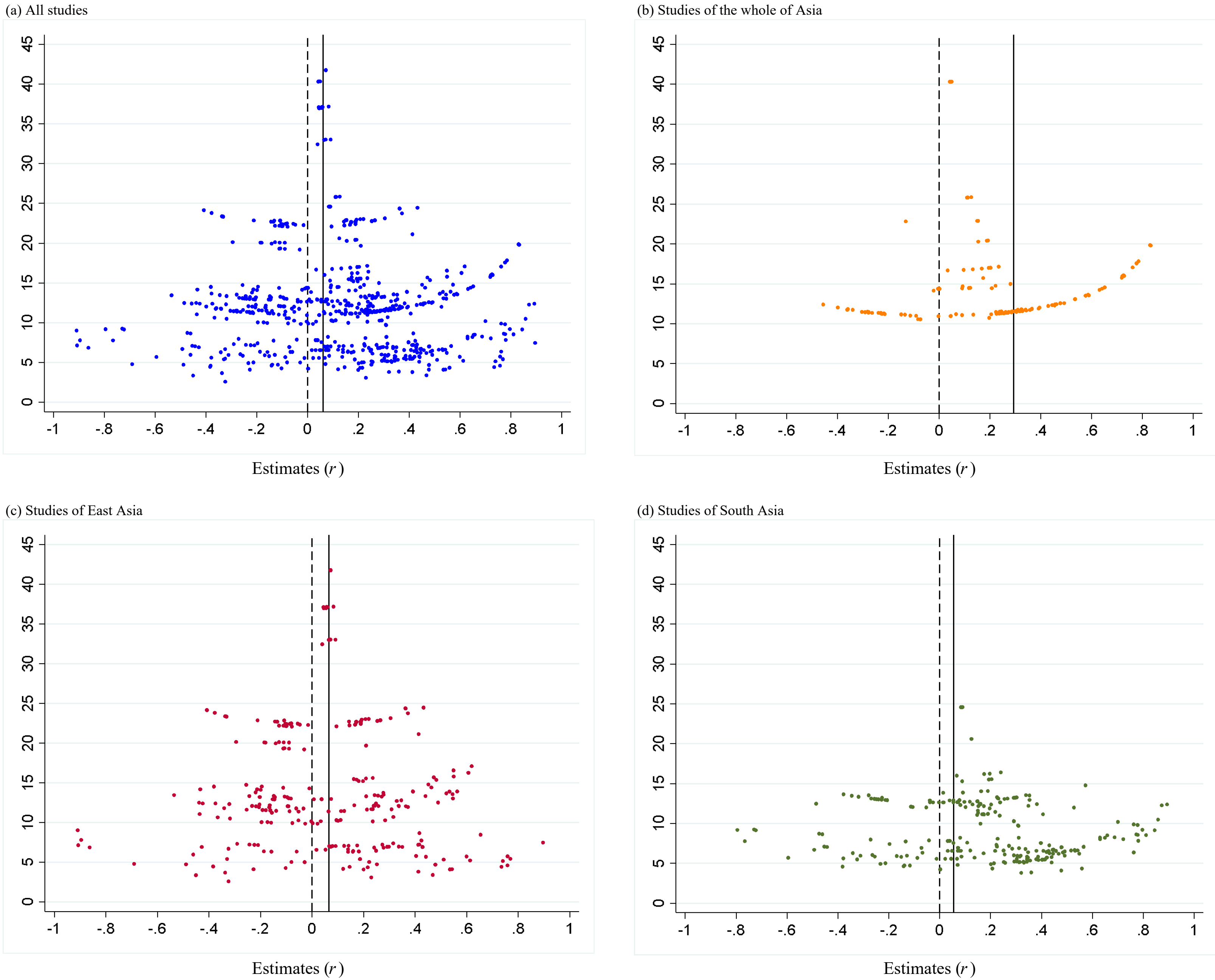

Figure 3. Funnel plot of partial correlation coefficients

Note: Solid line indicates the selected synthesis value as reported in Table 3.

Table 7. Univariate test of publication selection bias

Study type	Number of estimates (K)	Under the assumption that the true effect size is zero			Under the assumption that the true effect size is the selected synthesis value (x)		
		Number of estimates		Goodness-of-fit z test (p value)[a]	Number of estimates		Goodness-of-fit z test (p value)[b]
		PCC_k<0	PCC_k>0		PCC_k<x	PCC_k>x	
All studies	748	224	524	10.969 *** (0.000)	330	418	7.825 *** (0.000)
Studies of the whole of Asia	160	35	125	0.294 *** (0.000)	97	63	-2.688 *** (0.007)
Studies of East Asia	321	133	188	3.070 *** (0.002)	153	168	0.837 (0.403)
Studies of South Asia	267	56	211	9.486 *** (0.000)	102	165	3.856 *** (0.000)

Notes:
[a] Null hypothesis: The ratio of the positive to negative values is 50:50.
[b] Null hypothesis: The ratio of estimates below x versus those over x is 50:50.
*** denotes statistical significance at the 1% level.

Table 8. Meta-regression analysis of publication selection: All studies

(a) FAT–PET test (Equation: $t = \gamma_0 + \gamma_1(1/SE) + v$)

Estimator	Unrestricted WLS	WLS with bootstrapped standard errors	Cluster-robust WLS	Cluster-robust fixed-effects panel LSDV	IV
Model	[1]	[2]	[3]	[4] [a]	[5]
Intercept (FAT: H_0: $\gamma_0 = 0$)	0.8844 ***	0.8844 ***	0.8844 ***	-0.9016	1.3717 ***
	(0.201)	(0.207)	(0.260)	(0.553)	(0.340)
$1/SE$ (PET: H_0: $\gamma_1 = 0$)	0.0550 ***	0.0550 ***	0.0550	0.1985 ***	0.0158
	(0.018)	(0.017)	(0.037)	(0.043)	(0.025)
K	748	748	748	748	748
R^2	0.0097	0.0097	0.0097	0.0097	0.0250

(b) PEESE approach (Equation: $t = \gamma_0 SE + \gamma_1(1/SE) + v$)

Estimator	Unrestricted WLS	WLS with bootstrapped standard errors	Cluster-robust WLS	Random-effects panel ML	IV
Model	[6]	[7]	[8]	[9]	[10]
SE	3.5364 ***	3.5364 ***	0.1498 **	1.0541	-25.3274 ***
	(0.970)	(1.019)	(1.504)	(2.012)	(6.196)
$1/SE$ (H_0: $\gamma_1 = 0$)	0.0921 ***	0.0921 ***	0.0921 **	0.1104 ***	0.1281 ***
	(0.014)	(0.013)	(0.038)	(0.020)	(0.021)
K	748	748	748	748	748
R^2	0.1498	0.1498	0.1498	-	-

Notes: Figures in parentheses beneath the regression coefficients are standard errors. Models [3], [4], and [8] report standard errors clustered by study. Models [5] and [10] use the inverse of the square root of the number of observations as an instrument of the standard error. *** and ** denote statistical significance at the 1% and 5% levels, respectively.

[a] Hausman test: $\chi^2 = 0.0097$, $p = 0.0005$

Table 9. Summary of publication selection bias test

Study type	Number of estimates (K)	Test results[a]		
		Funnel asymmetry test (FAT) (H_0: $\gamma_0 = 0$)	Precision-effect test (PET) (H_0: $\gamma_1 = 0$)	Precision-effect estimate with standard error (PEESE) (H_0: $\gamma_1 = 0$)[b]
All studies	748	**Rejected**	**Rejected**	**Rejected (0.0921/0.1281)**
Studies of the whole of Asia	160	Not rejected	**Rejected**	**Rejected (0.2618/0.2760)**
Studies of East Asia	321	Not rejected	**Rejected**	**Rejected (0.0463)**
Studies of South Asia	257	**Rejected**	**Rejected**	**Rejected (0.1030/0.1231)**

Notes:

[a] The null hypothesis is rejected when two or three models show a statistically significant estimate. Otherwise not rejected.

[b] Figures in parentheses are PSB-adjusted estimates. If two estimates are reported, the left and right figures denote the minimum and maximu estimates, respectively.

Table 10. Alternative estimates of publication selection bias–corrected effect size

(a) All studies

Method	Top 10[a]	Selection model[b]	Endogeneous kinked model[c]	*p* -uniform[d]
Model	[1]	[2]	[3]	[4]
Publication selection bias–corrected effect size	0.0593 **	0.0950 *	0.0550 ***	0.0875 ***
	(0.024)	(0.028)	(0.020)	(0.003)
K	73	748	748	748

(b) Studies of the whole of Asia

Method	Top 10[a]	Selection model[b]	Endogeneous kinked model[c]	*p* -uniform[d]
Model	[1]	[2]	[3]	[4]
Publication selection bias–corrected effect size	0.2825 ***	0.1560	0.2338 ***	0.1768 ***
	(0.084)	(0.044)	(0.073)	(0.006)
K	16	160	160	160

(c) Studies of East Asia

Method	Top 10[a]	Selection model[b]	Endogeneous kinked model[c]	*p* -uniform[d]
Model	[1]	[2]	[3]	[4]
Publication selection bias–corrected effect size	0.0393	0.0520	0.0396	0.0477 ***
	(0.044)	(0.037)	(0.026)	(0.003)
K	31	321	321	321

(d) Studies of South Asia

Method	Top 10[a]	Selection model[b]	Endogeneous kinked model[c]	*p* -uniform[d]
Model	[1]	[2]	[3]	[4]
Publication selection bias–corrected effect size	0.0942 *	0.0350 *	0.0426	0.1226 ***
	(0.047)	(0.062)	(0.046)	(0.007)
K	26	267	267	267

Notes: Figures in parentheses are standard errors. *** denotes that the coefficient is statistically significantly different from zero at the 1% level.

[a] Arithmetic average of the top 10% most precise estimates (Stanley et al., 2010)

[b] Test for publication selection bias using the conditional probability of publication as a function of a study's results (Andrews and Kasy, 2019)

[c] Piecewise linear meta-regression of estimates on their standard errors, with a kink at the cutoff value of the standard error below which publication selection bias is unlikely (Bom and Rachinger, 2019)

[d] Method based on the statistical theory that the distribution of *p* -values is uniform conditional on the population effect size (van Aert and van Assen, 2021)

Appendix Table A1. List of 75 selected studies on finance and growth in Asia for meta-analysis

Author(s) (Publication year)	Target area			Estimation period		Number of collected estimates
	Whole of Asia	East Asia	South and Inner Asia	From	To	
Siddiki (2002)			✓	1975	1995	1
Fuchs-Schundeln and Funke (2003)	✓			1975	2000	14
Christopoulos and Tsionas (2004)			✓	1970	2000	1
Fink, Haiss, and Mantler (2005)		✓		1990	2001	1
Khan, Qayyum, and Sheikh (2005)			✓	1971	2004	2
Lee and Wong (2005)		✓		1965	2002	7
Rousseau and Vuthipadadorn (2005)		✓	✓	1950	2000	30
Habibullah and Eng (2006)	✓			1990	1998	3
Liu and Hsu (2006)		✓		1981	2001	17
Padoan and Mariani (2006)		✓		1960	2001	12
Bussière and Fratzscher (2008)		✓		1980	2002	6
Guaiglia and Poncet (2008)		✓		1989	2003	9
Lee and Shin (2008)	✓			1980	1999	1
Ma and Jalil (2008)		✓	✓	1960	2006	4
Yang and Yi (2008)		✓		1971	2002	3
Gamra (2009)	✓			1980	2002	119
Hasan, Wachtel, and Zhou (2009)		✓		1986	2002	30
Lee and Chang (2009)			✓	1970	2002	11
Lu and Yao (2009)		✓		1991	2001	6
Wadud (2009)			✓	1976	2008	1
Ang (2010)			✓	1966	2005	14
Chang and Huang (2010)		✓		1981	2008	26
Chiou-Wei *et al.* (2010)		✓		1970	2004	7
Dawson (2010)			✓	1960	2002	7
Hou and Cheng (2010)			✓	1971	2007	6
Jalil, Feridun, and Ma (2010)		✓		1977	2006	2
Yao (2010)		✓		2002	2006	16
Anwar and Nguyen (2011)			✓	1997	2006	4
Hassan, Sanchez, and Yu (2011)		✓	✓	1980	2007	6
Jalil and Feridun (2011)			✓	1975	2008	2
Anwar and Cooray (2012)			✓	1970	2009	19
Horng, Chang, and Wu (2012)		✓		1961	2006	1
Zhang, Wang, and Wang (2012)		✓		2001	2006	19
Hye and Wizarat (2013)			✓	1971	2007	2
Narayan and Narayan (2013)	✓			1995	2011	3
Bayar (2014)	✓			1992	2011	7
Jahfer and Inoue (2014)			✓	1996	2011	4
Murthy, Patra, and Samantaraya (2014)			✓	1971	2012	2
Nain and Kamaiah (2014)			✓	1990	2010	1
Peng *et al.* (2014)			✓	1978	2004	3
Sahoo (2014)			✓	1982	2012	16
Shahbaz and Rahman (2014)			✓	1991	2012	2
Sheera and Ashwani (2014)			✓	1999	2009	2
Lenka (2015)			✓	1980	2011	2
Mansury and Sohn (2015)			✓	1994	2007	5
Badeeb, Lean, and Smyth (2016)			✓	1970	2013	4
Nyasha and Odhiambo (2016)		✓		1980	2012	4
Zhang and Bezemer (2016)		✓		1995	2013	12

Table A1 continued.

Author(s) (Publication year)	Target area			Estimation period		Number of collected estimates
	Whole of Asia	East Asia	South and Inner Asia	From	To	
Dai, Delpachitra, and Cottrell (2017)		✓		1980	2012	2
Murari (2017)			✓	1980	2013	8
Ohlan (2017)			✓	1960	2014	2
Soedarmono, Hasan, and Arsyad (2017)			✓	2000	2009	8
Williams (2017)	✓			1982	2011	1
Chung, Sun, and Vo (2019)			✓	1980	2012	30
Eren, Taspinar, and Gokmenoglu (2019)		✓		1971	2015	2
Malarvizhi *et al.* (2019)			✓	1980	2011	9
Mohanty and Bhanumurthy (2019)			✓	1980	2016	4
Naveed and Mahmood (2019)			✓	1972	2010	2
Nawaz, Lahiani, and Roubaud (2019)			✓	1972	2017	2
Wang *et al.* (2019a)			✓	1989	2017	3
Wang *et al.* (2019b)		✓		2007	2016	4
Arif *et al.* (2020)			✓	1980	2018	3
Haini (2020)			✓	1995	2017	8
Hossin (2020)			✓	1980	2014	4
Jehan and Irshad (2020)			✓	1980	2016	4
Lenka and Sharma (2020)			✓	1980	2017	12
Liu and Zhang (2020)		✓		1996	2013	58
Rahman *et al.* (2020)			✓	1980	2017	2
Sharma and Kautish (2020)			✓	1990	2016	4
Verma and Giri (2020)			✓	2000	2017	2
Alhassan, Adamu, and Safiyanu (2021)	✓			1980	2017	12
Muhammad *et al.* (2021)			✓	2000	2016	4
Nazir, Tan, and Nazir (2021)		✓	✓	1970	2016	12
Siddikee and Rahman (2021)			✓	1990	2018	2
Yousaf, Bibi, and Naz (2021)			✓	1972	2016	6

Note: Appendix 2 provides a detailed bibliography of the 72 studies listed in this table.

Appendix Table A2. Meta-regression analysis with all moderators

Estimator (Analytical weight in brackets)	Cluster-robust WLS [1/*SE*]	Cluster-robust WLS [*d.f.*]	Cluster-robust WLS [1/*EST*]	Multi-level mixed-effects RML	Cluster-robust random-effects panel GLS
Meta-independent variable (Default)/Model	[1]	[2]	[3]	[4]	[5] [a]
Target region (Wholeof Asia)					
East Asia	-0.2854 ***	-0.2338 **	-0.2556 ***	-0.1126	-0.1253
	(0.084)	(0.107)	(0.054)	(0.086)	(0.086)
South Asia	-0.2699 ***	-0.2418 **	-0.2218 ***	-0.1265	-0.1357
	(0.094)	(0.110)	(0.068)	(0.107)	(0.108)
Composition of target countries					
Number of target countries	-0.0012	-0.0007	-0.0032	0.0003	0.0002
	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
Share of developed countries	-0.0858	-0.0572	0.1472	-0.1174	-0.1119
	(0.090)	(0.091)	(0.126)	(0.109)	(0.110)
Estimation period					
Average year of estimation	-0.0022	0.0028	-0.0013	-0.0070 *	-0.0066
	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
Length of estimation	0.0000	0.0027	-0.0013	0.0002	0.0002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Data type (Panel data)					
Cross-sectional data	0.0668	0.0942 *	0.0813	0.0515	0.0450
	(0.085)	(0.056)	(0.211)	(0.081)	(0.086)
Time-series data	0.2609 **	0.2449 *	0.2067 **	0.1782	0.1798
	(0.122)	(0.126)	(0.097)	(0.129)	(0.129)
Estimator (Estimators other than OLS)					
OLS	0.0752 **	0.0517 *	0.2495 ***	0.0642 **	0.0683 **
	(0.033)	(0.028)	(0.052)	(0.028)	(0.030)
Unit of growth variable (GDP per capita)					
Real GDP	-0.0689	-0.0780	-0.1470 **	-0.0665	-0.0677
	(0.056)	(0.067)	(0.057)	(0.065)	(0.065)
Nominal GDP	-0.1617	-0.1428	0.1448	-0.0083	-0.0154
	(0.149)	(0.147)	(0.161)	(0.171)	(0.173)
Type of financial variable (Private credit to GDP)					
Financial depth	0.0439	0.0627	0.1769 *	-0.0473	-0.0407
	(0.080)	(0.084)	(0.092)	(0.053)	(0.055)
Bank credit to GDP	-0.1249 **	-0.1339 ***	-0.0355	-0.0901	-0.0885
	(0.060)	(0.049)	(0.070)	(0.085)	(0.085)
Private credit to domestic credit	-0.0029	0.0149	0.0943	-0.0663	-0.0606
	(0.062)	(0.065)	(0.073)	(0.051)	(0.053)
Market capitalization	0.1376 *	0.1275 *	0.1038	0.1765 **	0.1810 **
	(0.081)	(0.072)	(0.082)	(0.072)	(0.075)
Stock market activity	0.0265	0.0551	0.0673	0.0069	0.0092
	(0.087)	(0.082)	(0.090)	(0.112)	(0.114)
Turnover ratio	-0.2055 ***	-0.0854	-0.2855	-0.2724 **	-0.2680 **
	(0.076)	(0.091)	(0.213)	(0.116)	(0.117)
Comprehensive FD index	-0.1750	-0.2411 **	0.1240	-0.1240	-0.1183
	(0.109)	(0.103)	(0.100)	(0.123)	(0.123)
Other FD variables	-0.2615 ***	-0.2992 ***	0.1502	-0.1936 *	-0.1833 *
	(0.063)	(0.061)	(0.191)	(0.100)	(0.104)
Capital account openness	-0.4657 **	-0.4048 **	-0.0645	-0.5257 ***	-0.5173 ***
	(0.194)	(0.192)	(0.103)	(0.185)	(0.191)
Financial market liberalization	-0.4000 ***	-0.3146 ***	-0.2070 *	-0.4389 ***	-0.4331 ***
	(0.087)	(0.104)	(0.111)	(0.074)	(0.076)
Stock market liberalization	-0.3771 **	-0.2673	-0.1830 *	-0.4924 ***	-0.4865 ***
	(0.170)	(0.195)	(0.095)	(0.112)	(0.117)
Comprehensive FL index	-0.0322	0.0209	0.3160 **	-0.0327	-0.0270
	(0.106)	(0.106)	(0.136)	(0.113)	(0.115)
Other FL variables	0.1236	0.1313	0.0162	0.3311 ***	0.3314 ***
	(0.136)	(0.145)	(0.124)	(0.063)	(0.065)
Other characteristics ofthe financial variable					
Lagged	-0.1308	-0.1310	-0.1682 **	-0.1152	-0.1147
	(0.092)	(0.116)	(0.072)	(0.081)	(0.081)
With intercepted variable	0.0367	-0.0022	0.1211 **	-0.0121	-0.0060
	(0.056)	(0.045)	(0.051)	(0.040)	(0.043)
Selection of control variables					
Macroeconomic stability	-0.0260	-0.0277	-0.0295	-0.0145	-0.0164
	(0.040)	(0.031)	(0.044)	(0.040)	(0.042)
Trade openness	0.0195	0.0038	0.0285	-0.0011	-0.0001
	(0.049)	(0.050)	(0.054)	(0.050)	(0.052)
Investment	0.0282	0.0099	0.0907 *	0.0397	0.0457
	(0.042)	(0.042)	(0.051)	(0.045)	(0.047)
Financial crisis	0.1602 **	0.1154 **	0.0731	0.0825	0.0896
	(0.064)	(0.053)	(0.067)	(0.058)	(0.063)
SE	-0.2565	-0.3773	-0.6425	-0.7202	-0.6618
	(0.604)	(0.618)	(0.695)	(1.022)	(1.008)
Intercept	4.8138	-5.3433	2.9255	14.3823 *	13.4861
	(7.633)	(7.397)	(9.069)	(8.272)	(8.497)
K	748	748	748	748	748
R^2	0.356	0.428	0.249	-	0.171

Notes: Figures in parentheses beneath the regression coefficients are robust standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. See Table 4 for the definitions and descriptive statistics of meta-independent variables.

[a] Breusch-Pagan LM test for random effects: $\chi^2 = 3.38$, $p = 0.0331$