Social Indicators Research (2020) 150:17–44
https://doi.org/10.1007/s11205-020-02288-w

ORIGINAL RESEARCH

Sustainability in Asia: The Roles of Financial Development in Environmental, Social and Governance (ESG) Performance

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Accepted: 3 February 2020 / Published online: 11 February 2020

Abstract

It is increasingly evident that rapid development resulted in habitat loss and environmental degradation. Due mainly to this issue, if unchecked, many countries are susceptible to natural disasters. Financial development has been touted as effective in mitigating environmental risks through its role in providing funds for green technologies development. Nonetheless, evidence regarding the impacts of financial development on environment, social, and governance (ESG) is relatively scant, despite being the central pillars in sustainability management. The main objective of this study is to fill the knowledge gap by examining the connection between financial development and ESG performance in Asia. This study used country-level data for the period between 2013 and 2017. The analyses based on the pooled ordinary least squares technique, the fixed effects regression model, the two-stage least squares method, and the system Generalised Method of Moments estimator show that financial development is positively related to ESG success. Also, additional tests involving the subcomponents of financial sector development (financial markets and financial institutions) show that the finding is consistent and robust under different model specifications. Taken together, financial development is an important catalyst to promote ESG performance in Asia.

Keywords Financial development · Environment · Social and governance · Panel data · Asia

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1 Introduction

Environmental issues, including pollution, ozone layer depletion, and soil erosion grip global attention as never before as their devastating impacts on humans and the ecosystem have become ever more manifest in the recent past. Air pollution, for example, is a matter of deep concern for Asia that it has caused 1.5 million premature deaths every year in South and South-east Asia, as warned by World Health Organisation [WHO] (Taylor 2019). Similar concerns were also reflected in the discussion of climate change. Over the past four decades, the average temperature in Asia–Pacific has been increasing alarmingly and was projected to climb six degrees Celsius by the end of the century, according to the recent estimates by Asia Development Bank (ADB) and the Potsdam Institute for Climate Impact Research (Thin 2017). As rising temperatures boost floods risk with more intense typhoons and rainfalls, there would be far-reaching adverse consequences for societal well-being and economic stability in the region (Prakash 2018), causing damages to homes and losses for businesses.

While the potential threats by climate change around the world underlie pessimism, the increased focus of investors and financiers on the aspects of environment, social, and governance (ESG) nowadays provides cause for optimism (The Hongkong and Shanghai Banking Corporation Limited [HSBC] 2018). ESG awareness begins to entrench in many nations and in response, companies in various parts of the globe have made substantial progress towards achieving sustainability based on ESG frameworks. As highlighted in the Global Sustainable Investment Alliance's [GSIA] (2017) global review, the total assets under management that integrated ESG criteria have increased by 25% since 2014. All of these efforts are important to create a better future, but this transformation seems to be happening slow at pace in Asia. Indicated on the same report, GSIA (2017) further revealed that the proportion of asset values involving ESG investments to the total managed assets in Asia was uneven and insufficient. In particular, the progress that has been accomplished by Asian countries in this regard was only 4.2%, compared to 52.6% in Europe and 37.8% in Canada. So, while other countries have achieved a strong continuous success of ESG, Asia, long a laggard in green investments could derail the pollution-fighting efforts and undermine the prospects for social inclusion.

Both the worsening environmental quality and the low participation from relevant parties in ESG practices alert the public to the need to accelerate sustainable practices. Numerous studies related to climate change which flourished primarily in the late 2000s and 2010s have identified the role of financial development as a possible source of environmental sustainability (e.g. Shahbaz et al. 2016; Tamazian et al. 2009; Yuxiang and Chen 2011). In many ways, financial development is key to mitigating environmental degradation through its core functions: providing funds for the production of environmental-friendly products (Lundgren 2003), research and technological development activities (Switzer 1984), and construction of green facilities (Jalil and Feridun 2011).

Under such conditions as described in those studies that address environmental concerns, the prospect for financial development in society and governance is high. On the one hand, financial development allows parties prioritised a social welfare agenda to gain easier access to funds so they can address a host of social issues such as poverty, inequality, healthcare, and food insecurity. Often, it is of opinion that improvement in financial sectors promotes financial inclusion by enabling poor people to save and invest more properly (Jalilian and Kirkpatrick 2002; Stiglitz 1998). On the other hand, there seems little doubt that the ongoing credit monitoring service and constant performance evaluation review

undertaken by the financial services providers improve governance (Aluko and Ajayi 2018; Levine 2005) and bridge the information asymmetry gap (Jalilian and Kirkpatrick 2002). But, looking beyond this conjecture, empirical evidence suggesting that financial development and ESG performance are related at the country level is nearly unavailable, to the best of our knowledge. Thus, it is high time for this study to bridge the knowledge gap. The main objective of this study is to investigate whether there is a link between financial development and ESG performance for countries of Asia during 2013–2017. Moreover, ESG are three interconnected dimensions of sustainable development (Chartered Financial Analyst Institute 2015) and hence they must be envisaged in an integrated manner.

There is another reason why this study warrants immediate attention. A review of the recent literature on finance underscores the need for a more reliable indicator that necessarily reflects the underlying development of the financial system as a whole. The discussion of meaning for financial development is not lacking in the literature. It is sometimes defined as the ratio of private credit to gross domestic products (GDP) (e.g. Alam et al. 2015; Al-Mulali et al. 2015a, b; Charfeddine and Khediri 2016; Jalil and Feridun 2011) and in other instances, is the market capitalisation (e.g. Abbasi and Riaz 2016; Dasgupta et al. 2001). All of these proxies are the essential defining features for financial development but have come under criticism that they are not comprehensive enough for revealing only one characteristic, that is the size of a country's financial sector. Svirydzenka (2016) argued that in addition to the importance of the financial system's size, it is equally imperative to look into the aspects of financial access and efficiency. This is mainly because obstacles to obtaining financial services, as well as the absence of good management could ultimately derail the financial development process. In the International Monetary Fund (IMF) Staff Discussion Note,[1] Sahay et al. (2015) corroborated that a financial system comprises a wide range of institutions and each of them plays a different role in the economy. For example, in the current dynamic financial system, along with banks serving as lending agents, the capital markets such as stock exchanges and corporate bonds markets represent substantial parts of long term financing sources for businesses. Owing to its multifaceted functions and financial development by definition is to be more comprehensive, the committee proposed and created a financial development index that covers both the financial institutions and the financial markets across three dimensions: depth, access, and efficiency. As detailed in the IMF's methodology paper more specifically, the new broad-based financial development index overcomes the shortcomings of single indicators by summarising the extent of how the financial institutions and the financial markets develop in terms of the "(1) depth—size and liquidity of markets; (2) access—the ability of individuals and companies to access financial services, and (3) efficiency—the ability of institutions to provide financial services at low cost and with sustainable revenues, and the level of activity of capital markets" (Svirydzenka 2016 p. 5). It is believed that this index more accurately captures all of the intended meaning of financial development. Considering the risk of using a crude proxy may give rise to biased interpretations in empirical works that render government policies ineffective, this study, quite different from prior research provides policymakers with empirical evidence and directional insights on the link between the financial system and ESG practices, based on the recently developed financial development index. Also, it appears that this study is likely the first to investigate the differential impacts of financial institutions and financial markets development on ESG performance,

[1] Svirydzenka (2016) explained the methodology underpins the financial development index in detail.

in addition to the aggregate contribution of financial development. Therefore, this study provides a comprehensive assessment focused on how the development of specific segments of the financial system is related to ESG performance.

This study is organised into five sections. After the introductory part, Sect. 2 reviews the previous studies on financial development and ESG practices. Following that, Sect. 3 explains the research methodology while Sect. 4 shows the statistical analysis results. It ends with the conclusion and policy implications in Sect. 5.

2 Literature Review and Hypotheses Development

Climate change is driving headlines as it creates tremendous disruption to social and economic well-being (Hewston 2018; Sengupta and Popovich 2018). Recently, research works on factors affecting environmental health have increased enormously, with the development of the financial system being hailed as one of the catalysts mitigating the accompanying effects of global warming (e.g. Shahbaz et al. 2016; Tamazian et al. 2009; Yuxiang and Chen 2011). Nonetheless, research literature linking financial development to ESG practices have been scant despite the widespread adoption of ESG in portfolio analysis and management nowadays. For this reason, this study focused mainly on earlier studies that validate the relationship between financial development and environmental performance.

2.1 Financial Development

A financial system can broadly be classified into two sub-components, namely the financial institutions and the financial markets. Each segment plays a unique role in providing various financial services and facilities to lenders, investors, and borrowers. Svirydzenka (2016) pointed out that while banks, being the largest group of financial institutions, are frequently recognised as crucial to meet financial needs, the role of other financial institutions such as investment banks, insurance firms, mutual funds, and pension funds are gaining importance in today's world. On the other hand, the financial markets which include the bond and stock markets are pivotal sectors in many countries, providing alternatives to individuals and businesses to diversify their savings and raise financial capital. As a whole, the financial system tracks financial activities and facilitates the process of funds accumulation and mobilisation between the surplus units and the deficit households, according to Fase and Abma (2003).

Financial development has been under the scrutiny of many policymakers for its pivotal roles that highly influence the way the economy and society progress. In each category, the financial institutions and the financial markets play important parts in a nation, fulfilling distinct but complementary needs. Levine (2005) placed much emphasis on five key functions related to a financial system. First, the financial sector pools savings from surplus households. Second, the financial system creates productive investment opportunities. Third, financial development is linked to an effective monitoring mechanism. Fourth, financial development provides risk-sharing functions, and the fifth benefit is the exchange of goods and services. They are good reflections of an improved financial system.

Scholars of finance have offered several explanations of the importance of financial development within the economy. Sahay et al. (2015) provided insights on how the lack of improvement in financial functions affects financial flows and resource allocations, which in turn hamper economic growth. To the extent that the financial institutions and the

financial markets accumulate savings, among others, McKinnon (1973) and Shaw (1973) suggested that a limited amount of savings due to financial repression, for instance, may cause the ineffectiveness in the allocation of capital to investment activities. Concerning productive investments, financial development can reduce the gap of information asymmetry between lenders and borrowers which in turn leads to more efficient and productive allocation of funds, as explained by Fase and Abma (2003). In this view, a better-developed financial system is believed to increase economic efficiency and improve the quality of life. There is another potential channel through which finance affects the economy and society. For example, Sahay et al. (2015) took this discussion further by highlighting that financial development promotes risk diversification which has a bearing on the ability of firms and households to absorb shocks.

The aforementioned multifunctional roles of the financial system, including savings, investments, transactions, risk diversification, and supervision are adding further complexity to how financial development is measured. This issue is not simple and presents a significant challenge. Sahay et al. (2015) opposed the use of single indicators on the ground that the development of finance is not restricted to the size of the financial sector but should cover a wider area like funding costs and financial provisions. In line with the framework proposed by Čihák et al. (2012), financial development in this study is defined by three key characteristics: (1) depth—size and liquidity of markets; (2) access—increased consumption of financial services and facilities; and (3) efficiency—provisions of financial services at reasonable costs with sustainable revenues.

2.2 Environmental, Social and Governance (ESG) Performance

Investments that integrate ESG factors into the portfolio development and decision-making process is called sustainable investment (de Souza Cunha and Samanez 2013). There are enormous corporate activities related to ESG. Kell (2018) provided several illustrative examples of ESG plans firms may consider, such as the response to environmental degradation, the way to deal with water management, the approach to enhance employees' health and safety, and the strategies to efficiently manage the supply chain.

ESG information is a non-financial metric that is becoming increasingly prominent in many countries (Vives and Wadhwa 2012), being hailed overwhelmingly as the triple-bottom-line approach that promotes economic, ecological, and social-ethical development (Dyllick and Hockerts 2002). Unlike those discussions often be based on environment and social, on the contrary, the debate on responsible investing and governance has drawn less intense public interest. As with environmental and social factors, Busch, Bauer and Orlitzky (2016) highlighted in their study that when discussing ecological and social issues, the governance dimension must be incorporated as a proper governance structure can contribute positively to the profitability of firms and thus promotes more efficient allocation of resources to the ecosystem and society. The following paragraphs briefly review the characteristics of ESG.

As explained by Limkriangkrai et al. (2017), the environmental initiatives refer to duties and responsibilities undertaken by corporations to minimise its environmental impacts through compliance with ecological regulations. The areas of concern are climate change, biodiversity, energy efficiency, water scarcity, pollution, deforestation, and waste management (Chartered Financial Analyst Institute 2008, 2015). In addition, Busch et al. (2016) defined ecological activities as extensive efforts dealing with increased resources productivity, the use of renewable resources, the recycling and reuse initiatives, and the

workability of ecological systems between nations. As concluded by Husted and de Sousa-Filho (2017), the implementation of pollution control measures, investments in eco-efficiency technologies, and support of corporate environmental responsibility policies are important environmental considerations.

Socially desirable actions mean equitable treatment of close stakeholders and protection of the social ecosystem in which the firm operates, according to Limkriangkrai et al. (2017). They are the activities carried out by corporations to address issues concerning both internal and external stakeholders. On the simplest form, they are social welfare pertains to people's rights, well-being, and interest in a community (Sultana, Zulkifli and Zainal 2018), including but not limited to labour standard, gender and diversity, employee engagement, community relations, and human rights (Chartered Financial Analyst Institute 2008, 2015). Other social programmes are activities aim at improving human capital, social capital, and cultural capital (Busch et al. 2016). Traditionally, business corporations have been working to meet the needs of the public for two specific reasons: solidarity and self- interest (Vives and Wadhwa 2012). The latter is based on the concept that improved social conditions could grow the business in return while the former is for mutual support and social harmony. Regardless of the various reasons, it is imperative for firms to look after and take care of society (Lokuwaduge and Heenetigala 2017).

Among the three activities, governance practices, as identified by studies in the past has long since attracted much attention as they are closely connected to investors' needs and interests (Vives and Wadhwa 2012). Sultana et al. (2018) described governance as a means used to resolve conflicts between management staff and shareholders. They are internal controls and risk management, information symmetries and transparency, business ethics, and shareholders rights (Limkriangkrai et al. 2017). With good governance activities, firms are more likely to make sound decisions in the interests of the owners (Husted and de Sousa-Filho 2017).

Firms aligning their operational strategies to ESG considerations undeniably stand to be the biggest beneficiaries as ESG initiatives may not only be financial relevance, but also will create business value (Kell 2018). This is especially the case in today's fast-changing business environment where businesses have to respond to the diverse needs and changing expectations of various parties, including regulators, consumers, and communities on sustainability issues while remaining competitive (Romolini, Fissi and Gori 2014). There are compelling arguments that firms increase their efforts at incorporating the evaluation of ESG risks in pursuit of operation and strategies, as adopting sustainable business practices not only lead to cost reduction (Carroll and Shabana 2010) and better risk-adjusted returns (Vives and Wadhwa 2012), but also to make firms more accountable towards the environment and society in a broader sense (Sultana et al. 2018). Although ESG practices are often related to business goals in the ordinary sense, corporate action that takes on the ESG issues is also a moral imperative (The HSBC 2018). As a whole, regulators and corporations need to take into consideration the demands and needs of ecology, society, and economy in efforts to create a sustainable environment for all stakeholders.

2.3 Financial Development and ESG Performance

2.3.1 Financial Development and Environmental Performance

The literature suggests that financial development fulfils different functions within ESG in many ways. Yuxiang and Chen (2011) classified the impacts of financial development

on environmental performance into four areas: capital, technology, income, and regulation. First, enterprises need additional sources of funding for expansion and hence financial constraint is an impediment to business growth. In this case, the capital accumulation and distribution functions within the financial system will lead to more efficient fund allocation (Levine 1997), resulting in lower financial intermediation costs (Alam et al. 2015). Such reasonable costs of financial transactions improve investment opportunities and this would seem justifiable that a higher level of capital is then channelled to borrowers (Stiglitz and Weiss 1981). Let alone with environmental practices, the ability to access to finance at lower costs makes it possible that corporations will invest in abatement equipment which are important to the production of environmental-friendly products (Lundgren 2003). Tamazian et al. (2009) emphasised in their investigation that a sound and efficient financial sector facilitates investment in low carbon projects, as the findings show that financial development mitigates the potential increase in environmental degradation in Brazil, Russia, India, and China (BRIC) economies.

There are tremendous arguments however as to whether access to external finance is having an adverse effect on the environment or not. As described by Yuxiang and Chen (2011), the mobilisation of funds from the surplus households to the deficit units accelerates the pace of industrialization where a capital-intensive production process will tend to bring along highly concentrated contaminants, causing concerns about public and environmental health. Their findings, in general, show that easy access to finance at a lower cost speeds up the growth of capital-intensive sectors in China, leading to an increased intensity of pollution discharges. Jensen (1996) added that the financial sector provides funds to finance manufacturing firms' activities which is believed to be responsible for industrial pollution. Using BRIC economies as the sample of their study, Tamazian et al. (2009) reported that the share of industrial output in GDP, being a proxy of production and industrialization has an adverse effect on environment, leading to a higher level of CO_2 emissions. In a similar vein, Sehrawat, Giri and Mohapatra (2015) found that financial deepening encourages more industrial activities in India, creating degradations of the environment.

Second, the environmental effects caused by financial development is through technological improvements. Technological change and financial assistance are considered two critical aspects in addressing sustainability issues (Kumbaroğlu et al. 2008). Quite simply, easy access to finance enables firms to focus more on research and development (R&D) activities (Switzer 1984), which have a bearing on innovative solutions to environmental problems. The financial sector, as pointed out by Tadesse (2005) is especially important for its roles in facilitating the capital accumulation and risk-sharing process. Due in part to these functions, financial development drives technological advancement and innovation, which in turn abates pollution. As a result, countries around the world have the opportunity to adopt new technologies in their operation (Birdsall and Wheeler 1993), such as green production techniques and environmentally friendly facilities (Abbasi and Riaz 2016; Charfeddine and Khediri 2016; Tamazian and Rao 2010). In addition, the widespread availability of funds with reduced costs also helps in financing environmental projects, as stated by Tamazian et al. (2009). Researchers also have conducted an empirical analysis of the relationship between financial development and environmental health. More specifically, their results suggest that the financial development effect on environmental quality is consistent across various countries, such as transnational economies (Tamazian and Rao 2010) and BRIC countries (Tamazian et al. 2009), implying that a well-developed financial system promotes R&D activities, and thereby plays a pivotal role in reducing environmental problems.

There is a doubt however that technologies can be harmful since, when more technological equipment is used, part of the problems is an increased demand in energy (Sadorsky 2010). In line with this and due to their finding that inefficient use of energy deteriorated the level of environmental quality in Pakistan, Shahbaz et al. (2016) strongly recommended energy-efficient technology investments as an effective means to progressively alleviate environmental issues. Yuxiang and Chen (2011) studied provinces of China, over the period 1999–2006 and their results suggest that R&D intensity, especially those energy-intensive technologies increased industrial sulphur dioxide (SO_2) emissions. Likewise, the empirical evidence reported by Zhang (2011) for China shows a positive relationship between financial development and environmental degradation. A similar result was also reported by Al-Mulali et al. (2015a, b) for 23 European countries between 1990 and 2013, where the authors concluded that financial investments in non-environmentally projects likely exacerbate the environmental problems.

The third way in which financial development promotes environmental performance is the income level. A well-functioning financial system plays a pivotal role in economic growth of many countries (Goldsmith 1969; McKinnon 1973; Shaw 1973). King and Levine (1993) reported that financial development influences the economic level by fostering productivity growth. Fung (2009) summarised the main ideas of finance-led growth hypothesis from literature into two channels, namely the total factor productivity and factor accumulation. The former channel is related to financial innovation and technologies that help reduce information asymmetry. Such opportunities will usually result in particularly more effective project monitoring and controlling (Baier et al. 2004). Coupled with improved risk-sharing and lower costs of financial capital due in part to financial liberalisation, the level of investments and economic activities of a nation will increase (Bekaert and Harvey 2000; Bekaert et al. 2002). Whereas, the latter viewpoint claims that an organised financial sector can speed up the income level of a country by effectively mobilising financial resources into productive investments (Bencivenga and Smith 1991; Gurley and Shaw 1955; Xu 2000).

As more and more countries pursue growth in aggregate outputs, Sadorsky (2010) insisted that an increase in demand for energy is propelled by increases in banking and stock market activities which are essential to the economy. Two ways of facilitating such changes were identified by the author, namely consumer spending and corporate investments. Financial development provides businesses and consumers with opportunities to easily access to funding, diversify risk, and enjoy a lower cost of capital. As this trend becomes increasingly more common, consumers will start buying big-ticket items such as automobiles, electronic appliances, and houses while business organizations will consider buying new equipment, machinery, and plant. Activities like these could be disadvantageous to environmental health as they consume energy and then emit CO_2 to the atmosphere. For example, economic activities such as investment, consumption, and government purchase require the use of energy and hence led to an increase in electricity consumption in Europe (Al-Mulali et al. 2015a, b). Sehrawat et al. (2015) offered empirical evidence that finance has led to the growing economic activities in India but unfortunately, it is accompanied by an increase in per capita CO_2.

A contrary point of view shows that however, a well-developed financial system and better economic growth of a country attract foreign direct investment (FDI). In a context such as the presence of more foreign firms, new production techniques and methods characterised as low carbon might be introduced and used in the host countries (Eskeland and Harrison 2003), which eventually result in lower CO_2 emissions (Kumbaroğlu et al. 2008). Jalil and Feridun (2011), based on their findings, suggested the Chinese policymakers to

continue funding the construction of environmental facilities as financial development is important to reduce environmental pollution.

According to Yuxiang and Chen (2011), enterprises which are external funding dependent would be more concerned about the environment if the financial services providers also display environmentally friendly behaviour by integrating ecological standards into the financing approval process. As such, firms are likely to uphold similar principles. This is the fourth reason for the link between financial development and environmental degradation. Similarly, the findings reported in a study by Dasgupta et al. (2001) show that capital markets reacted negatively to the announcement of adverse environmental reported cases, whereas the markets found favour in companies with positive moves for the environment. With their subsequent work, Dasgupta, et al. (2006) demonstrated that Korean firms which violated national environmental laws and regulations experienced lower market valuation. In a nutshell, the financial sector provides incentives for pollution control, which in turn improves environmental quality.

2.3.2 Financial Development and Social Welfare

A pressing question that needs to be addressed at present is whether financial development promotes social welfare likewise. Perhaps, financial development provides a platform for corporations, cooperation, and non-governmental organisations (NGOs) to access to finance more easily and affordably in supporting innovative activities that consider social issues. A wide variety of projects like those concerned with alleviating problems of the most underserved groups, including poverty and malnutrition, demand for continuing financing so as to make meaningful progress in social development. Not only that, when the poor have easier access to financial services, their income level will rise, which in turn help them eradicate problems related to poverty (Jalilian and Kirkpatrick 2002). These might seem sufficient and edifying enough to predict that financial development highly likely affect social well-being.

Consider the benefits from the point of view of social, effective allocation of funds for science and technology studies in areas like health, transportation, and telecommunication infrastructures is a potential solution for social inequality. According to Gates (2018), digital technology used in agribusinesses can improve the livelihood of farmers by linking them to the formal economy. This means that the disadvantaged community will have increased access to opportunities and protections. Other benefits include improved health care services, access to education, and clean water, the author articulated.

The mechanism underlying the link between financial development and social good can be determined by strong economic growth. Studies concerned with overcoming social injustice, poverty reduction, in particular, demonstrate that financial development fosters economic development which is likely to underpin social welfare and care (Beck et al. 2005; Jalilian and Kirkpatrick 2002; Jeanneney and Kpodar 2011). Demirgüç-Kunt and Levine (2009) stated that financial development brings about changes in economy and demand for labour, which have profound effects on income inequality and poverty. The authors made a point that the availability and use of funds by individuals not only have a direct effect that expands the economic opportunities of the poor, but also an indirect effect that creates more job opportunities following a higher nation's economic output. In other words, finance not only stimulates economic growth, but also helps address social issues (Alam et al. 2015). Moreover, Department for International Development [DFID] (n.d.) advocated rapid economic development on the ground that it provides tremendous

opportunities to social, including access to education, vigorous entrepreneurialism, poverty reduction (Beck et al. 2007), and lower inequality (Demirgüç-Kunt and Levine 2009). According to this interpretation, a conducive financial system is poised and able to accelerate the achievement of goals of social welfare-related programmes.

2.3.3 Financial Development and Governance

The relationship between financial development and governance has been illuminated in prior studies but so far empirical findings in this discipline remain modest. Scanty information can be gleaned from a study by Levine (2005) pertaining to how financial development improves the governance of firms. It has been suggested that financial institutions will undertake preventive measures, such as credit due diligence and analysis, monitoring projects, and exert stronger corporate governance to improve loan asset quality. As a result, a sound financial system stimulates strong corporate governance and brings greater transparency between lenders and borrowers (Alam et al. 2015). The importance of the stock market in tackling asymmetric information and incentive problems has been highlighted by Ho and Njindan Iyke (2017). In their review, the development of the stock market is an effective way to align the different interests of managers and owners, thereby improve corporate governance. In line with this perspective, this study argues that a well-developed financial system not only produces information about investment opportunities, but also creates a mechanism that can monitor agent's actions, thereby minimise principal-agent problems.

In a similar vein, when there is greater financial development, there will be improved access to external financing and consequentially long-term financing in a country will grow. This study holds the view that, at the macro level, a well-developed financial system with diverse capital providers would require the government to effectively safeguard and enforce the rights of the investors, which include investment freedom, voice and accountability, regulatory quality, and property rights freedom. It is believed that with the intense stakeholders' pressure stemmed from a developed financial system, governments and regulators alike would place greater emphasis on the governance aspect at the country level, as a means to protect the interests of investors.

All the arguments described above might result in either increasing ESG practices or just the opposite. Hence, the following hypothesis was formulated to establish the link between financial development and ESG performance.

Hypothesis 1 There is a relationship between financial development and ESG performance.

2.3.4 The Role of Financial Institutions and Financial Markets on ESG Performance

The research literature provides a general mapping of financial development to ESG activities. What emerges over the recent past is the knowledge gap along with the roles that the financial markets and the financial institutions play with respect to sustainability plans. Policymakers have long recognised that market-based financing and institute-based finance play a vital role in economic development of many countries through which the surplus funds flow to units with a shortage of funds. As explained by Coşkun et al. (2017), the capital market provides alternative financing and investment channels for firms, and hence its contributions to aggregate market development are not negligible. As currently seem to be the case, new trends are

developing in terms of the adoption of financing options to fit the diverse corporate needs. Lane (2018) reportedly stressed that cyclical and structural forces could have made the role of banks in financial intermediation less significant nowadays whilst the bond market flourishes for higher debt funding demands. This shift in financing has resulted in players in the financial markets gaining more share by reaching previously banked customers. There are important implications of such deliberation, particularly on corporate activities. It is mindful to take note that the review presented in this section is by no means exhaustive in explaining the comparative merits of the financial markets and the financial institutions in promoting ESG practices.

This study holds the view that development in financial markets and financial institutions could have different, and possibly substantial effects on ESG strategies. According to Duisenberg (2001), both the direct and indirect financing methods are unique with their own comparative advantage. For instance, financing through the banking system is suitable for industries with high information asymmetries between lenders and borrowers while equity financing is a favourable consideration for a more dynamic sector like technology and innovation, given the uncertainties of the economic return. Focusing on the different effects of public and private debt financing, Diamond (1984) and Rajan (1992) provided several reasons why the private debt market (e.g. the bond market) is less efficient in terms of monitoring. As an example, a more concentrated bank debt likely incentivises lenders to monitor the activities of borrowers more closely. As such, it is believed that the bond market has a weak influence on management, thereby ESG activities within the firm are lesser.

With regard to the capital market, Ozturk and Acaravci (2013) summarised comparative benefits stemmed from a well-developed stock market into four categories: (1) lower financing costs; (2) reduced risks; (3) optimal asset and liability structure; and (4) more funds provision. In addition, the stock market has the merits of inducing efficient capital allocation and providing market liquidity (Ho and Njindan Iyke 2017). It is within this context, researchers in the field have identified that financial market development creates the necessary enabling environment. For example, Paramati et al. (2018) and Paramati et al. (2017) explained that if the stock market is efficient, it provides more opportunities for companies to obtain supplementary capital that is important to the clean energy sector., which in turn mitigates high-temperature problems. Likewise, their empirical finding in emerging markets is consistent with their hypothesis.

This study infers argument and conclusion from the discipline of the financial institutions and the financial markets that have exerted an important influence on governments and thereby formulated hypotheses that link the development of financial institutions and financial markets to ESG performance.

Hypothesis 2 There is a relationship between the development of financial institutions and ESG performance.

Hypothesis 3 There is a relationship between the development of financial markets and ESG performance.

3 Methodology and Data

3.1 Data and Variables

While financial development is expected to have impacts on improving ESG achievement, a little is known on this matter due to a lack of prior research. Being one of the first studies that advances the knowledge about the interplay between financial development and ESG performance, this study developed a research model by referring to the academic scrutiny of those relating to the nexus of finance-environment (i.e. Jalil and Feridun 2011; Omri et al. 2015; Tamazian et al. 2009) and finance-poverty (i.e. Jeanneney and Kpodar 2011; Uddin et al. 2014). Their works offer in-depth insights into not only the roles of financial development, but also other potential factors in promoting environmental sustainability and social inclusions which are related to the scope of this study. The data used in this study are ESG scores, the financial development index, economic development, FDI, and trade openness. The definition of key variables and sources of data are presented in Table 1. The measurement of variables is largely consistent with recent researches, notably the studies by Abdouli and Hammami (2018), Abid (2017), and Saud et al. (2019).

Inclusion of countries into the analysis and the total time span were dictated by the availability of annual estimates of all variables identified for this study. Given that data on ESG provided by the Bloomberg terminal first became available since 2013 and the latest update accessible is 2017, the analysis of this study covers 210 observations from 42 countries in Asia between 2013 and 2017. The countries in the sample are Armenia, Azerbaijan, Bahrain, Bangladesh, Bhutan, Brunei, Cambodia, China, Cyprus, Georgia, India, Indonesia, Iran, Israel, Japan, Korea, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Laos, Lebanon, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Oman, Pakistan, Philippines, Qatar, Russia, Saudi Arabia, Singapore, Sri Lanka, Tajikistan, Thailand, Turkey, Turkmenistan, UAE, Uzbekistan, and Vietnam. Afghanistan, Iraq, North Korea, Syria, and Taiwan were excluded from the analysis due to incomplete data.

The ESG score at the country level is the dependent variable for this study. It is an equal-weighted composite index constructed by using a total of 54 key performance indicators (KPIs) representing environment (14 indicators), social (22 indicators), and strategic governance (18 indicators) facing countries. They are important factors identified by Bloomberg that are vital to the sustainability prospects of a country over the long term. The scores are calculated on a yearly basis and range from 0 to 100, with a higher score implying a higher level of a country's support of sustainability practices, according to Williams (2016). The scores calculated are based on the information gathered by the Bloomberg terminal from the World Bank, Heritage Foundation, Economist Intelligence Unit, US Department of Energy, BP Statistical Review, Food and Agriculture Organization of the UN AQUASTAT, and KPMG. More details are presented in Table 1.

Financial development is measured as the financial development index provided by IMF. It takes into account all dynamics of financial development, namely depth, access, and efficiency for both financial institutions and financial markets. As detailed in the working paper by Svirydzenka (2016), the construction of this index is consistent with the matrix of financial system characteristics proposed by Čihák et al. (2012), as follows.

1. Depth of financial institutions: private sector credit to GDP, pension fund assets to GDP, mutual fund assets to GDP, and insurance premiums to GDP.

Table 1 Definition of variables

Variables	Definition	Source
Dependent variables		
ESG Score (*ESG*)	It provides an overall ESG score for the selected country. It is an equal-weighted composite index constructed by using a total of 54 key factors determined by Bloomberg as important to long term sustainability. There are 14 indicators that represent environment, 22 indicators that are related to social, and 18 indicators that address strategic governance issues. Environmental dimension: It is an overall environmental score for the selected country which covers 14 indicators related to emissions, energy, electricity, biodiversity, and water. They are, for example, carbon intensity, energy intensity, coal reserves, coal consumption, electricity usage, freshwater withdrawals, exploitable water resources, crude oil reserves, and forest area. Social dimension: It is an overall social score for the selected country which covers 22 indicators related to employment, discrimination, health, human welfare, human rights, and defence. The set of indicators includes the share of women employed, unemployment, the infant mortality rate, GINI income inequality, access to electricity, prevalence of HIV, public spending on education, the literacy rate, the human development index, and the poverty ratio. Strategic governance dimension: It is an overall governance score for the selected country which covers 18 indicators. It covers economic freedom, government effectiveness, corruption, infrastructure, politic, and innovation. For example, voice and accountability, labour freedom, regulatory quality, investment freedom, property rights freedom, business freedom, control of corruption, and rule of law.	Bloomberg
Independent variables		
Financial Development Index (*FIND*)	It is an index relies on the performance of financial institutions and markets on the dimensions of depth, access, and efficiency.	IMF
Financial Institution Development (*FINI*)	It is a sub-index relies on the performance of financial institutions on the dimensions of depth, access, and efficiency.	IMF
Financial Market Development (*FINM*)	It is a sub-index relies on the performance of financial markets on the dimensions of depth, access, and efficiency.	IMF
Control variables		
Gross Domestic Products (*GDP*)	It is measured by GDP per capita (PPP constant 2011 international dollar).	The World Bank
Trade Openness (*TRADE*)	It is the total of exports and imports of goods and services measured as a share of GDP.	The World Bank
Foreign Direct Investment (*FDI*)	It is defined as FDI, net inflows (in % of GDP).	The World Bank
TIME	Dummy for year equals one in year of observation, otherwise, equals zero.	Not applicable

2. Access to financial institutions: bank branches per 100,000 adults and ATM per 100,000 adults.
3. Efficiency of financial institutions: net interest margin, lending-deposit spread, non-interest income to total income, overhead costs to total assets, return on assets, and return on equity.
4. Depth of financial markets: stock market capitalisation to GDP, stock traded to GDP, international debt securities of government to GDP, total debt securities of financial corporations to GDP, and total debt securities of nonfinancial corporations to GDP.
5. Access to financial markets: the percent of market capitalisation outside of the top 10 largest companies and the total number of issuers of debt.
6. Efficiency of financial markets: the stock market turnover ratio.

The data is sourced from FinStats, IMF Financial Access Survey, Dealogic corporate debt, and BIS debt securities database. The summary index is constructed following the standard procedure, which includes: (1) normalizing the variables between zero and one; (2) aggregating the normalised scores into the sub-indices; and (3) summing the sub-indices into the final index.

Using a similar approach presented in the existing literature, this study controls for economic development, FDI, and trade openness (e.g. Abbasi and Riaz 2016; Abdouli and Hammami 2018; Abid 2017; Al-Mulali et al. 2015a, b; Charfeddine and Khediri 2016). They are predictors that have received much attention in recent years and their importance for environment and human well-being has been confirmed by several studies mentioned earlier.

A long literature emphasises the importance of economic development in environmental quality and poverty alleviation. World Bank, for example, debated that the rising level of income per capita is beneficial to both the environment and people (Tamazian et al. 2009). According to Shahbaz et al. (2016), economic development improves the standard of living. Possibly, people are more likely to be employed when manufacturing firms ramp up to meet higher demands during economic expansion. In this view, the role of economic development is of some importance for quality of life. On the other hand, an increase in income levels influences environmental quality in a way that economic growth promotes spending on environmentally-friendly technologies (Grossman and Krueger 1995). Nonetheless, the role of economic development in fostering cleaner production initiatives has evoked criticisms. Georgescu-Roegen (1971) and Daly (1977), for instance, pointed out that as income increases so does demand for goods consumption and production, which altogether potentially cause pollutions. Due to these conflicting ideas, it is not clear how economic development affects ESG performance.

This study followed Abid (2017) and Abdouli and Hammami (2018) who included trade openness proxied by per capita sum of trade of goods and services in their studies on the finance-environment nexus. Despite the numerous studies on trade openness and ESG, they show inclusive evidence. On the one hand, trade openness is expected to cause higher energy consumption which in turn leads to air pollutions (Ang 2009). On the other hand, trade openness is supposed to stimulate non-polluted industries (Al-Mulali et al. 2015a, b) and speed up the adoption of green technologies that are beneficial to the ecosystem (Dogan and Turkekul 2016). With respect to social well-being, it is possible that trade openness spurs additional job opportunities at the local level. The increased employment also means a higher level of household income which likely promotes social progress.

The existing studies in the environmental quality literature generally employ FDI as an economic openness indicator (Chua 1999; Jalil and Feridun 2011). Consistent with previous works, per capita FDI inflows are postulated to curb poverty and improve environmental health through "the transfer of know-how, technological innovation, the reduction of poverty, the payment of a relatively higher salary and contribution to creating jobs and boosting exports" (Abid 2017, p. 184). This study holds the view that foreign investors are very concerned about sustainability, transparency, and governance. Therefore, the presence of foreign investing firms is believed to pressure local governments to pay greater attention to ESG issues.

3.2 Econometric Methods

The relationship between financial development and ESG performance was tested mainly using the panel data methodology. This approach not only contains more degrees of freedom, but also solves the omitted variables problem (Hsiao et al. 1995). This study adopted similar approaches proposed in more recent studies, notably by Ganda (2019) to test the relationship. They are the static models and the dynamic regression. The general static panel model is written as follows.

$$ESG_{i,t} \equiv \sigma_0 + \sigma_1 FIND_{i,t} + \sigma_2 GDP_{i,t} + \sigma_3 TRADE_{i,t} + \sigma_4 FDI_{i,t} + \sum_{b=5}^{8} \sigma_b TIME_t + \varepsilon_{it}$$

where $i = 1, 2, 3\ldots 42$; $t = 1, 2, 3, 4$ and 5, *ESG* is the ESG scores for the *i*th country at the time *t*, and α is the intercept. The explanatory variable is the financial development index (*FIND*) while the control variables are GDP per capita (PPP constant 2011 international dollar) (*GDP*), trade openness (*TRADE*), net inflows of FDI, in % of GDP (*FDI*), and time dummies. ε_{it} is the disturbance term measured as $\varepsilon_{it} = \mu_i + v_{it}$, where μ_i denotes the unobservable individual effect and v_{it} is the remainder disturbance. As a robustness check, the same regression models were repeated with alternative variables of interest, namely the financial institutions development index (*FINI*) and the financial markets development index (*FINM*) respectively. Moreover, this step is vital as it reveals the differential impacts of both indexes on ESG performance in Asia.

This study used the pooled ordinary least squares (OLS) and the fixed effects models as the baseline models. In addition, the two-stage least squares fixed effect framework (2SLS) was performed in this study to address simultaneity issues. If this problem is not properly taken into account, the statistical results will be biased and inconsistent. According to Wooldridge (2012), the 2SLS procedure has its advantages that it recognises the endogenous component by modifying the set of moment conditions in the estimations of the parameter, controls country heterogeneity, and isolate specification errors, so that the results are more consistent with highly accurate standard errors.

This study used the system Generalised Method of Moments (GMM) estimator to examine the interplay between financial development and ESG. This method is preferable as it allows for serial correlation of random errors and heterogeneity which in turn provide further efficiency gain in the estimation (Arellano and Bover 1995).

The general dynamic linear model is depicted as follows.

$$ESG_{i,t} \equiv \sigma_0 + \sigma_1 ESG_{i,t-1} + \sigma_2 FIND_{i,t} + \sigma_3 GDP_{i,t} + \sigma_4 TRADE_{i,t} + \sigma_5 FDI_{i,t} \sum_{b=6}^{9} \sigma_b TIME_t + \varepsilon_{it}$$

where all definitions of variables remain the same. $ESG_{i,\ t-1}$ is the 1-year lagged value of the dependent variable. The inclusion of this variable is to capture the persistence of *ESG* in the model. An in-depth discussion of the GMM estimator is available in the study by Arellano and Bover (1995).

This study assumes that financial development is endogenously determined by ESG scores. There are increasing numbers of financial institutions and corporations integrate sustainability into their core business operation and this strategy could have an impact on financial development. More recently, the financial institutions and the financial markets begin to look into sustainability issues and integrate their evaluation into their lending and investment processes (Weber, 2014). It is believed that increased involvement in ESG-related programmes of a country attracts capital inflows which translates into better financial development. ESG may have consequences for financial development and hence they are endogenous - financial development may lead to better ESG scores, while the latter may itself attract fund inflows and lead to further financial development. Even though the nature of these relationships is still open to question, given a lack of empirical evidence, financial development is considered as an endogenous variable in this study.

4 Results and Discussions

4.1 Descriptive Study

Summary statistics of the Asian countries in *ESG*, *FIND*, *FINI*, *FINM*, *GDP*, *TRADE*, and *FDI* are reported in Table 2. The mean value for *ESG* is 39.73 and the standard deviation is 8.85 ($min = 20.41$, $max = 58.39$), indicating that the ESG performance in Asian countries is relatively weak in general.

The average financial development index is 0.37 with a minimum of 0.07 and a maximum of 0.88. On its sub-components, Table 2 reports that financial institutions development index has a higher mean value of 0.45 with a range of 0.14 and 0.94. On the contrary, the financial markets development index has a lower mean of 0.28 ($SD = 0.25$, $min = 0.15$, $max = 0.88$), showing that the financial institutions system is better developed than that of financial markets in this comparison.

On average, the sample countries record *GDP* of 23,088.08 with a range of 1757.02 and 118,117.80. Turning to *TRADE*, it takes a value between 25.31 and 365.69 (mean = 89.56, $SD = 54.23$) while *FDI* has a mean score of 3.83 ($SD = 6.88$, $min = -37.17$, $max = 48.55$).

Table 2 Descriptive statistics of variables

Variables	Mean	SD	Minimum	Maximum
ESG	39.73	8.85	20.41	58.39
FIND	0.37	0.20	0.07	0.88
FINI	0.45	0.17	0.14	0.94
FINM	0.28	0.25	0.15	0.88
GDP	23088.08	25003.08	1757.02	118117.80
TRADE	89.56	54.23	25.31	365.69
FDI	3.83	6.88	− 37.17	48.55

4.2 Correlation and Multicollinearity Analyses

Pearson correlation analysis was carried out to study the strength and direction of the linear relationships between key variables identified for this study and Table 3 summarises the results. As tabulated, *FIND* has a significant and positive correlation to *ESG*, $r = 0.82$, $p < 0.01$. This finding indicates that a positive linear relationship exists between financial development and ESG performance in Asia. In other words, countries with better-developed financial systems tend to have higher ESG achievements.

In the same way, *GDP* is positively related to *ESG*, significant at the 0.01 level. This result implies that when the economy of a nation is more developed, the ESG score is better. There are, however nonsignificant positive correlations between *TRADE* and *ESG* and between *FDI* and *ESG*.

This study used the pairwise correlation to detect multicollinearity. Based on the results of correlations between each variable, it is observed in Table 3 that multicollinearity is unlikely to be a severe problem in the estimation of regression models as the correlation coefficients between the explanatory variables are well below the threshold value of 0.70. In addition, the evaluation of the variance inflation factor (VIF) pertaining to all variables shows that there are no serious multicollinearity issues observed in the data. In this study, the maximum VIF value is 2.26 (mean = 1.69) and it is not above the cut-off point of 10. Overall, the low VIF values, together with the acceptable range of correlation coefficients reported in this study indicate that multicollinearity problems are unlikely to bias the statistical findings.

4.3 Aggregate Financial Development Index and ESG Performance

In addition to correlation analysis, this study performed multiple regression tests to examine how much financial development impacts ESG scores. The control variables are per capita GDP, trade openness, and per capita FDI, of which have been identified as important variables that contribute to environmental quality in prior studies (e.g. Abdouli and Hammami 2018; Abid 2017; Jalil and Feridun 2011; Shahbaz et al. 2016; Tamazian et al. 2009). Four estimations were performed in this study, namely the methods of pooled OLS, the fixed effects, the 2SLS, and the system GMM. The results discussion is primarily based on the system GMM as it takes into account the endogeneity problems of variables. It should be noted that, to the best knowledge of the authors, no similar evidence has been reported in the literature and hence this study compares the findings with empirical research in the

Table 3 Correlation analysis and variance inflation factor (VIF)

	ESG	*FIND*	*GDP*	*TRADE*	*FDI*
ESG	1.00				
FIND	0.82***	1.00			
GDP	0.63***	0.65***	1.00		
TRADE	0.08	0.16	0.26***	1.00	
FDI	0.01	−0.01	0.026	0.17***	1.00
VIF		2.07	2.26	1.64	1.49

*, **, ***indicate significance at the 10%, 5%, and 1% respectively. The mean of VIF is 1.69

domains of environment and standard of living specifically. For simplicity of presentation, the time effects estimates were excluded from the table.

This study first presents the baseline results of estimation from the pooled OLS approach, which ignores the nested data structure and assumes that all independent variables in the regression models are exogenous. Results of the pooled OLS method in Table 4 show that there is a collective significant relationship between *FIND*, *GDP*, *TRADE*, *FDI* and *ESG* ($R^2 = 0.68$). Overall, 68% of the variation in *ESG* is explained by the independent and all control variables aforementioned. As expected, the *FIND* coefficient presents a positive sign ($\beta = 0.84$, $t = 11.83$), significant at the 0.01 level. This result suggests that countries with a highly developed financial system have a better ESG score.

To control country heterogeneity, the panel regression without instruments, that is the fixed effects model was performed in this study. The within R^2 is 0.17. Pertaining to the coefficient of financial development, the fixed effects regression demonstrates very similar results. As reported in the same table under the fixed effects estimation method, *FIND* has a positive effect on *ESG* ($\beta = 0.31$, $t = 2.58$) with 5% significance. This indicates that financial development is important to ESG practices.

The best way to deal with endogeneity concerns is through the instrumental variables techniques. Therefore, this study employed the 2SLS within estimator and the system GMM procedure. Column (3) and column (4) provide the 2SLS and the GMM estimates, in addition to the diagnostic test results. On the validity of lagged variables as instruments,

Table 4 Financial development and ESG score

Variables	OLS (1)		Fixed Effects (2)		2SLS (3)		System GMM (4)	
	Coef.	*t*-value	Coef.	*t*-value	Coef.	*t*-value	Coef.	*t*-value
Constant	3.15 (0.12)	27.09***	3.21 (0.27)	11.83***	3.21 (0.27)	11.97***	2.41 (0.21)	11.23***
ESG_{t-1}							0.29 (0.05)	5.96***
FIND	0.84 (0.07)	11.83***	0.31 (0.12)	2.58**	0.31 (0.12)	2.63***	0.16 (0.05)	3.19***
GDP	0.02 (0.01)	1.99**	0.05 (0.02)	2.24**	0.05 (0.02)	2.25**	0.02 (0.01)	3.42***
TRADE	−0.05 (0.01)	−3.00***	−0.02 (0.02)	−1.02	−0.02 (0.02)	−1.02	−0.01 (0.01)	−0.70
FDI	0.06 (0.03)	1.87*	0.01 (0.02)	0.30	0.01 (0.01)	0.29	−0.01 (0.01)	−1.43
Time effect	Yes		Yes		Yes		Yes	
R^2	0.68		0.17		0.17			
Sargan–Hansen stat.					0.987			
Hansen *J* stat.							10.64	
AR(2)							−1.47	
# of countries	42		42		42		42	
# of observations	210		210		210		162	

*, **, ***indicate significance at the 10%, 5%, and 1% respectively. Standard errors are in the parentheses. Regressions in column (1), (2) and (3) used robust standard errors. For simplicity of presentation, the time effects estimates were excluded from the table

the Hansen-Sargan test and Hansen-*J* test of over-identifying restrictions suggest that the instrumental variables are not correlated with the residuals in the 2SLS and the GMM estimators. In column (4), the statistic of AR(2) is insignificant and this result suggests that the errors exhibit no second-order serial correlation.

The regression results using the 2SLS estimator show that the coefficient of *FIND* remains positive and statistically significant at the 0.01 level ($\beta = 0.31$, $t = 2.63$). Likewise, the dynamic model's result confirms those reported from the pooled OLS, the fixed effects, and the 2SLS models that financial development is significantly related to ESG performance ($\beta = 0.16$, $t = 3.19$, $p < 0.01$). In a similar way, this result implies that financial development is positively related to ESG success in Asia.

In general, the results pertaining to the positive link between financial development and ESG performance remain consistent across different estimation approaches. This means that financial development is the driving force of ESG performance in Asia, lending support to Hypothesis 1. This empirical evidence is consistent with the environmental research findings. For example, Al-Mulali et al. (2015b) reported that financial development is beneficial to environmental quality in a panel study of 129 countries. They argued that the availability of funds may result in more energy efficient and related investments which thereby reduce environmental damage. Other similar findings reported in the past include those of Jalil and Feridun (2011) in China, Paramati et al. (2018) in the European Union, the G20, and OECD countries, and Adams and Klobodu (2018) in 26 Sub-Sahara African countries.

Comparing with other available studies on income levels and income distributions, this study shows consistency with Donou-Adonsou and Sylwester's (2016) empirical evidence that bank credit reduced poverty in a panel of 71 developing countries. Likewise, Jeanneney and Kpodar (2011) found a positive relationship between financial development and poverty; and they emphasised that improvement in financial intermediation with greater savings opportunities and credit facilities is particularly essential to physical and human capital investments. In the case of Bangladesh, financial development helps to reduce poverty through its role in promoting people access to finance (Uddin et al. 2014). A more recent empirical example of this is Sehrawat et al. (2015) who reported similar findings for a panel of 11 South Asian developing countries.

Regarding the impacts of control variables, economic development seems to have a positive impact on ESG performance across the different estimation approaches. This result is consistent with the finding revealed by Donou-Adonsou and Sylwester (2016) that per capita income reduces poverty in developing countries. This is in contrast to most environmental studies, which GDP was reported to be positively related to environmental degradation (Abid 2017; Al-Mulali et al. 2015a, b; Sehrawat et al. 2015; Tamazian and Rao 2010).

In the pooled OLS model, the negative sign of *TRADE* indicates that trade openness has a negative relationship with ESG performance. This finding is in line with prior studies in respect of the environmental performance, such as Ang (2009), Grossman and Krueger (1995), and Cole and Elliott (2003) which evidenced that environment quality deteriorates when there is a more liberalised trade sector. When the analysis was re-run using alternative regression specifications, the sign of the coefficient on *TRADE* remains but statistically insignificant under the fixed effects, the 2SLS and the system GMM estimators. Given that instrumental variable approaches are asymptotically more efficient than OLS; it is therefore concluded that trade openness does not have an impact on ESG performance. As a matter of fact, the empirical evidence supporting the interplay between trade and environmental adversity has been mixed. It has been reported that trade openness improves environmental quality in South Africa (Shahbaz et al. 2016) and in the United States of America

(Dogan and Turkekul 2016) while it has no impact on pollution in low-income countries (Al-Mulali et al. 2015a, b) and MENA nations (Abdouli and Hammami 2018).

FDI is found to have no significant relationship with *ESG* in the fixed effects, the 2SLS and the system GMM models respectively. In contrast with the expectation of this study and others, FDI inflows do not have a significant effect on ESG performance. For example, empirical works by Tamazian et al. (2009) and Tamazian and Rao (2010) show that global flows of FDI promote R&D activities, leading to better energy efficiency and environmental health. Likewise, foreign firms use cleaner types of energy and hence are more energy efficient (Eskeland and Harrison 2003). Only under the pooled OLS model, the coefficient of *FDI* is positive and significant, $\beta = 0.06$, $t = 1.87$, $p < 0.10$.

4.4 Additional Tests: Sectoral Financial Development and ESG Performance

This study differs from existing studies on the nexus of finance-environment and -poverty that it examined both the impacts of financial institutions and financial markets development on ESG score. It is believed that this investigation is important to show how the performance of particular segments of the financial system is connected to ESG performance in Asia. The same regressions were repeated with the financial institutions development index and the financial markets development index as alternative measures for financial development.

Results pertaining to the regression models employed for testing Hypothesis 2 are presented in Table 5. Column (1) and column (2) display that *FINI* and other predictors explain 60% and 16% of the variance under the pooled OLS and the fixed effects estimators. In Table 5, a positive and statistically significant effect of financial institutions development on ESG performance is reported under the pooled OLS and the fixed effects models respectively. This implies that financial institution development is an important factor influencing the ESG score in Asia.

In both regressions with instrumental variables—the 2SLS and the system GMM techniques, all diagnostic tests—the statistics for the Sargan-Hansen test, the Hansen *J*-test and the Arellano-Bond test show that the models with financial institutions development as the variable of interest is properly specified. Hence, it is concluded that the overidentifying restrictions are valid and there is no second-order autocorrelation. Regarding the sign and significance of *FINI* in the models, the coefficients of *FINI* carry the predicted positive signs even after controlling for endogeneity with instrumental variables under the 2SLS and the GMM approaches. These findings suggest that financial institutions development promotes ESG achievement. Hypothesis 2 is hence, supported. Often, when more funding opportunities are available for businesses, researchers, and organizations, they are more likely to sign up for ESG-related projects. This finding echoes empirical results in the case of China that financial development, proxied bank credits helps the poor through its growth-effects (Ho and Njindan Iyke 2017). On environmental quality, Saidi and Mbarek (2017) concluded that financial intermediation through the banking system improves environmental quality in 19 emerging economies. Similarly, financial institutions development reduces environmental degradation in a panel of 129 countries (Al-Mulali et al. 2015a, b) and 59 Belt and Road Initiative (BRI) countries (Saud et al. 2019).

The results for control variables are relatively similar to that of the model presented earlier. Among all control variables, per capita GDP maintains its positive impact on ESG performance while *TRADE* and *FDI* are found to be statistically insignificant in most cases.

Table 5 Financial institutions development and ESG scores

Variables	OLS (1)		Fixed Effects (2)		2SLS (3)		System GMM (4)	
	Coef.	*t*-value	Coef.	*t*-value	Coef.	*t*-value	Coef.	*t*-value
Constant	2.91 (0.12)	23.69***	3.23 (0.27)	11.90***	3.23 (0.28)	11.74***	1.28 (0.15)	8.75***
ESG_{t-1}							0.41 (0.03)	13.10***
FINI	0.764 (0.07)	10.39***	0.26 (0.13)	2.01*	0.27 (0.13)	2.01**	0.28 (0.07)	
GDP	0.05 (0.01)	4.82**	0.05 (0.02)	2.21**	0.05 (0.02)	2.23**	0.03 (0.01)	
TRADE	−0.06 (0.02)	−3.33***	−0.03 (0.02)	−1.06	−0.03 (0.02)	−1.04	0.01 (0.01)	0.37
FDI	0.05 (0.03)	1.83*	0.01 (0.01)	0.31	0.01 (0.02)	0.32	0.01 (0.01)	0.52
Time Effect	Yes		Yes		Yes		Yes	
R^2	0.60		0.16		0.17			
Sargan–Hansen stat.					3.16			
Hansen *J* stat.							9.32	
AR(2)							−1.47	
# of countries	42		42		42		42	
# of observations	210		210		210		162	

*, **, ***indicate significance at the 10%, 5%, and 1% respectively. Standard errors are in the parentheses. Regressions in column (1), (2) and (3) used robust standard errors. For simplicity of presentation, the time effects estimates were excluded from the table

Hypothesis 3 postulates that financial markets development has a positive impact on ESG performance in Asia. As seen in Table 6, all the diagnostic tests associated with instrumental variables approaches – the Sargan–Hansen and Hansen *J*-test for overidentification, and Arellano-Bond test for the existence of the second-order autocorrelation hint that the model is well-specified as the statistics are statistically insignificant.

The coefficients of *FINM* are positive and significant across various estimators which indicate that better-developed financial markets lead to higher achievement of ESG in Asia. This result confirms the finding by Paramati et al. (2018) that more efficient capital markets promote better environmental performance. The work by Dasgupta et al. (2001) on the roles of capital markets in developing countries is particularly insightful and relevant: stock markets react favourably to the announcement of explicit recognition of corporate's outstanding environmental achievement, acting as a mechanism that disciplines firms lacking pollution control plans. Therefore, the financial markets, if properly informed, will pressure the firms and countries to improve their ESG performance.

As presented in Table 6, *GDP* is positively related to *ESG* in all the econometric approaches. Regarding the sign and significance of *FDI* in the models, all the regression models show insignificant coefficients of *FDI* while trade openness is significant at the 0.01 level under the pooled OLS method, but not the fixed effects, the 2SLS, and the GMM estimators.

Taking together, the results in Table 5 and Table 6 shows that financial institutions development and financial markets development are important factors in determining the

Table 6 Financial markets development and ESG scores

Variables	OLS (1)		Fixed Effects (2)		2SLS (3)		System GMM (4)	
	Coef.	*t*-value	Coef.	*t*-value	Coef.	*t*-value	Coef.	*t*-value
Constant	3.25 (0.17)	19.57***	3.35 (0.24)	13.98***	3.34 (0.24)	13.70***	2.51 (0.17)	14.68***
ESG_{t-1}							0.27 (0.04)	6.80***
FINM	0.57 (0.05)	10.98***	0.14 (0.06)	2.15**	0.15 (0.07)	2.07**	0.05 (0.02)	2.38***
GDP	0.04 (0.01)	3.64***	0.04 (0.02)	2.13**	0.04 (0.02)	2.12**	0.02 (0.01)	3.18***
TRADE	−0.05 (0.01)	−3.11***	−0.03 (0.03)	−1.11	−0.03 (0.03)	−1.11	−0.01 (0.01)	−0.37
FDI	0.04 (0.04)	0.82	0.01 (0.01)	0.12	0.01 (0.01)	0.13	0.01 (0.01)	0.52
Time effect	Yes		Yes		Yes		Yes	
R^2	0.62		0.15		0.17			
Sargan–Hansen stat.					1.03			
Hansen *J* stat.							8.62	
AR(2)							−1.03	
# of countries	42		42		42		42	
# of observations	210		210		210		162	

*, **, ***indicate significance at the 10%, 5%, and 1% respectively. Standard errors are in the parentheses. Regressions in column (1), (2) and (3) used robust standard errors. For simplicity of presentation, the time effects estimates were excluded from the table

success of ESG in Asia. Even though the financial markets in Asia appear to be relatively less developed than that of financial institutions, as has been described earlier, the net flows of funds through the financial markets such as stock exchanges and corporate debt markets seem to have equally played a pivotal role in promoting ESG programmes. Perhaps, increasing source of financing and enormous mobilisation of financial resources for firms and governments encourage a heightened ESG focus in countries.

5 Conclusion and Policy Implications

Issues pertaining to environmental degradation have received intense attention. Numerous studies have considered how financial development improves environmental health but not much of focus has been given to the impacts of financial development on ESG as a whole. They are the three pillars related to sustainability that warrant close attention. Given this scarcity, this paper attempts to bridge the knowledge gap by examining empirically the relationship between financial development and ESG performance for 42 Asian countries, using country-level data between 2013 and 2017. The econometric methodologies are the pooled OLS regression, the fixed effects approach, the 2SLS model, and the system GMM procedure.

The main finding of this study indicates that financial development is vital for nations to pursue ESG goals in Asia, that is the better the development of the financial system,

the higher the achievement of ESG. The system GMM results with financial development index as a variable of interest are robust to changes in the independent variables, namely the financial institutions development index and the financial markets development index. Thus, both the components of the financial system influence ESG performance.

As discussed earlier, a better-developed financial system in areas of market size, liquidity, accessibility of funds, and costs of financial services determines ESG success. It becomes evident in this study that financial development plays vital roles in allocating capitals for sustainable investments, encouraging managerial monitoring to bridge information asymmetries, and facilitating ESG-related risks and opportunities identification and management. In particular, easy access to finance encourages firms to focus more on research and innovation activities that are crucial to address environmental problems. Not only that, access to financial services at reasonable rates is also acknowledged as a path to promote social inclusion among the poor as it increases their economic opportunities. The rise in the income levels resulting from improved economic activities will eventually enhance their standard of living. Often, a well-developed financial system with sophisticated investors and institutional investors may not only exert considerable influence on regulatory bodies, but also significantly pressure firms to provides robust governance structures. In turn, their effort expended on assessing the strategic governance system and risk management procedures is expected to compel regulatory authorities to assure that robust governance structures are in place so as to effectively safeguard the interests of investors, including investment freedom, voice and accountability, regulatory quality, and property rights freedom.

The agenda for financial development hence should recognise the benefits it delivers in areas of ESG. Building this understanding into the objectives of financial development would thereby make these efforts more effective. Financial development is multi-dimensional and it entails many different kinds of change, activity, initiative, and effort from all parties, including policymakers, regulators, and players in the financial services industry. Addressing ESG issues require sizable and liquid financial systems. Greater transparency in the activities of governments, financial institutions, and financial markets is seemingly a requisite for attracting more foreign capital flows which in turn catalyse ESG transformation. In their quest for more foreign equity funds and international lending, countries need to offer open, credible, and dependable conditions for all potential investors. In particular, regulators need to ensure that the implementation of policies and enforcement of laws are transparent and efficient to boost investors' confidence. At the company level, being informative and making company data readily available to stakeholders would make the entire ESG investment process more reliable for investors. This strengthened business accountability is expected to help potential foreign investors to make more informed financing decisions and thereby stimulate long term investments in ESG ventures. If the degree of transparency is low, investors' and financiers' exposure to risks is increased and it will pose severe barriers to countries in achieving better ESG performance.

Financial institutions and financial markets can serve as effective mechanisms to help finance ESG programmes. To increase odds of success in ESG, it is imperative to make projects relating to ESG more attractive for financiers and investors. At the government level, policymakers need to make public funds available to create and support ESG projects. The launch of these funds is expected to incentivise more firms to embark on ESG programmes. Likewise, governments may introduce joint platforms with banks and non-banking institutions to broaden cooperation and explore opportunities in ESG activities. For instance, governments may co-participate in ESG projects by providing technical assistance and sharing of best practices. Without their commitment, there is little motivation for financial services providers and firms to take risks and invest in ESG projects.

On the other hand, ESG projects investment would be more appealing to enterprises if governments are able to show supports to the programmes from its domestic revenues. To ensure that companies similarly have an interest in achieving ESG goals, governments may scale up private investment into ESG programmes by providing incentives such as tax rebates and lower tax rates to enterprises that adopt ESG practices in their business operations. In addition, governments can also provide interest subsidies on loans for ESG investing. Low financing cost makes ESG-related investment more likely and it could be a strong motivation for them to actively deal with ESG matters.

For the realisation of sustainable goals in ESG, government initiatives are warranted to foster consumers and enterprises access to finance in a more cost-effective manner. By leveraging technology, the rise of fintech solutions may address access to finance for those underserved by formal banking systems, such as small-and-medium enterprises (SMEs), foreign workers, and immigrants. Virtual banking is one fintech innovation that provides a wide array of financial services without physical branches. More importantly, players in the virtual finance industry are able to expand their services to unbanked and provide more easily accessible banking and related services. By incurring lower overhead expenses, virtual banking services come with lower costs. Thus, there can be no doubt that these digital platforms not only serve diverse needs with improved service qualities in the market but also increase access to both lending and borrowing. Nonetheless, the regulatory requirements and frameworks for virtual banking must be restrictive for prudential safeguards, particularly in key areas like licensing requirements, the minimum capital level, leverage ratios, and risk governance.

The development of ESG standards in the marketplace is a necessary precondition for countries to support ESG goals. Policymakers may outline ESG governance frameworks and extend those best practices to players in the financial sector by requiring financial services providers such as banks and insurance firms to integrate ESG in financing and investments decisions. For this purpose, banks and other prospective lenders are encouraged to look to companies' ESG rating and consider that as part of credit evaluation. Likewise, securities and exchange commissions can gradually reinforce regulations on public listed firms to emphasise ESG in their corporate activities. These efforts may be beneficial for ESG-related investing.

Overall, financial development is one that encourages the development of an environment conducive to ESG success. As such, governments need to maintain adequate monitoring and governance systems as to ensure the functioning and development of the financial system.

Acknowledgements We would like to thank Multimedia University, Malaysia for its financial support. In addition, we would like to thank the editor and anonymous reviewers for their insightful comments on the paper.

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