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The Resurgence of Income Inequality in Asia-Pacific: The Role of Trade Openness, Educational Attainment and Institutional Quality

(Kebangkitan Ketaksamaan Pendapatan di Asia-Pasifik: Peranan Keterbukaan Perdagangan, Pencapaian Pendidikan dan Kualiti Institusi)

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ABSTRACT

Within-country inequality is on the rise in many Asian countries despite rapid educational expansion, poverty reduction and export-driven macroeconomic growth. This trend raises questions about the role and effectiveness of governments in redistributing income and wealth. Therefore, our study re-examines the effects of trade openness and educational attainment on income inequality while additionally investigating the role of governance on several dimensions. The study is conducted on nineteen Asian economies for the period 1990-2019. Methodologically, we follow Generalised Methods of Moments using dynamic panel procedures to improve previous efforts to examine the trade-inequality relationship. We hypothesize that good institutions can generate better distributional outcomes in terms of foreign trade and educational attainment. To test this, aggregate measures of institutions on five dimensions of governance - government stability, corruption, law and order, democratic accountability, and bureaucratic quality are incorporated into the empirical model. Our empirical results reveal that controlling for the country's income level, increasing trade openness and overall improvements in institutional quality contribute to reducing income inequality in the Asia-Pacific region. However, educational attainment has an inequality-widening effect during our period of study. We conclude by discussing other possible explanations for rising inequality in the region, and in that context, the role of public policy in ensuring equitable distributions.

Keywords: Trade openness; educational attainment; institutional quality; income inequality; Asia-Pacific
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ABSTRAK

Ketidaksamaan dalam negara semakin meningkat di kebanyakan negara Asia disebalik perkembangan pesat pendidikan, pengurangan kemiskinan dan pertumbuhan makroekonomi yang dipacu eksport. Aliran ini menimbulkan persoalan tentang peranan dan keberkesanan kerajaan dalam mengagihkan semula pendapatan dan kekayaan. Oleh itu, kajian kami mengkaji semula kesan keterbukaan perdagangan dan pencapaian pendidikan ke atas ketidaksamaan pendapatan di samping menyiasat peranan tadbir urus dalam beberapa dimensi. Kajian ini dijalankan ke atas sembilan belas ekonomi Asia bagi tempoh 1990-2019. Dari segi metodologi, kami mengikuti Kaedah Dinamik Panel Momen Teritlak (GMM) menggunakan prosedur panel dinamik untuk menambah baik usaha terdahulu untuk mengkaji hubungan ketidaksamaan perdagangan. Kami membuat hipotesis bahawa institusi yang baik boleh menghasilkan agihan yang lebih baik dari segi perdagangan asing dan pencapaian pendidikan. Untuk menguji ini, ukuran agregat institusi pada lima dimensi tadbir urus - kestabilan kerajaan, rasuah, undang-undang dan ketenteraman, akauntabiliti demokrasi, dan kualiti birokrasi dimasukkan ke dalam model empirikal. Keputusan empirikal kami mendedahkan bahawa mengawal tahap pendapatan negara, meningkatkan keterbukaan perdagangan dan penambahbaikan keseluruhan dalam kualiti institusi menyumbang kepada pengurangan ketidaksamaan pendapatan di rantau Asia-Pasifik. Walau bagaimanapun, pencapaian pendidikan mempunyai kesan meluaskan ketidaksamaan semasa tempoh kajian. Kami membuat kesimpulan dengan membincangkan penjelasan lain yang mungkin meningkatkan ketidaksamaan di rantau ini, dan dalam konteks itu, peranan dasar awam dalam memastikan pengagihan yang saksama.

Kata kunci: Keterbukaan perdagangan; pencapaian pendidikan; kualiti institusi; ketidaksamaan pendapatan; Asia Pasifik

INTRODUCTION

Over the past few decades, miraculous growth in many Asian countries has been associated with widening gaps in income and wealth (Zhuang et al. 2014). The expansion of trade across Asia has been identified as a critical driver of rising prosperity. Researchers suggest that economic integration in the region leads to trade openness, which spurs growth at the expense of income inequality (Dorn et al. 2022; Akyuz et al. 2022). Greater economic integration allows countries to participate in a global production network and take advantage of a broad market base (Kwok & Koh 2017). However, greater competition also increases the returns to skills and thus increases the rich-poor income gap (Zhuang et al. 2014).

In the past, East Asian countries experienced rapid economic expansion with redistribution, which the World Bank (1993) famously described as "egalitarian growth". However, with globalization, many countries in the region have deviated from this so-called Asiatic model of development. Despite low initial levels, inequality is on the rise in Korea and Taiwan. In Southeast Asia (e.g. Thailand, Malaysia and Indonesia), inequality has risen in conjunction with economic liberalization. China has also experienced a sharp rise in inequality despite the reduction in mass poverty (Jomo 2003). Even in advanced economies such as Australia, inequality has been increasing in all states and territories since the early 1980s (Kennedy et al. 2017). These trends have worsened following the Covid-19 pandemic. A recent policy publication by the United Nations Development Program (Kidd et al. 2022) therefore highlights the pressing issue of high-income inequality in Asia Pacific.

The recent rise in inequality in countries in the Asia-Pacific region is puzzling given heavy public investment in human development (Asadullah et al. 2021). There is a long-held expectation of a virtuous circle between economic growth and, say, educational progress. Higher-income countries tend to benefit from quality institutions that discourage rent-seeking activities and in turn incentivize human capital development through educational attainment. This leads to higher labor productivity and increases the country's living standards. However, how this affects income distribution is unclear. While the existing literature recognizes education as a critical determinant of inequality, there are competing channels that often may conflict with each other.

A seminal research work by Knight and Sabot (1983) points out two opposing effects between education expansion and income inequality: the 'composition effect' and 'compression effect'. 'Composition effect' posits the impact of increasing the labour force's education composition on income inequality in the early stages of economic development. As most of the country's labour force may not possess basic or primary education, the 'composition effect' describes how better education attainment can produce a wage premium and worsen inequality. Over time, the 'compression effect' will take over and reduce income inequality as fewer uneducated people remain in the workforce in line with the educational Kuznets curve. These ideas are further evidenced in recent studies by Moyo et al. (2022) and Ferreira et al. (2022).

Equally the evidence on the effect of institutional quality is mixed in the literature and has prompted renewed interest in understanding the role of governments in redistributing wealth. Moreover, while it is true that governments play a pertinent role in ensuring a more equitable society, there is also an equality-efficiency trade-off (Koh et al. 2020). Therefore, governments often have to choose how much inequality they are willing to accept, given the social and economic costs. Some economists consider inequality as a necessary albeit transitory price to pay for a growing developing economy. Others disagree on egalitarian ground, that income should be distributed based on needs, correcting to an extent the workings of the invisible hand, to ensure fairness and social justice. As a result, the government's public policy in income redistribution has been subjected to many debates (Koh et al. 2016).

Lastly, the association between trade openness, educational attainment and institutional quality on income inequality is complex as it may have causation in both directions. It is probable that low institutional quality increases raises educational inequality (Chani et al. 2014) and, in turn, income inequality (Kouadio & Gakpa 2022), reducing the country's ability to trade (Jaumotte et al. 2008). However, the reverse is also possible, whereby inequality affects institutional quality and trade openness when wealthy bureaucrats take control of institutions to serve their interests. This gives rise to endogeneity concerns in the empirical modelling of the data. We apply the System Generalised Methods of Moment (System GMM) to address this potential problem.

Our research objective is it investigate the impact of trade openness, educational development and institutional quality on a panel of Asian-Pacific countries. We focus on Asia Pacific because the region experienced increased trade openness alongside rising inequality. Since there is no agreement on the best indicator of institutional quality, our study utilizes a holistic measure that covers five subjective measures from an established database. The contribution of this paper is as follows. First, the current literature on trade openness and inequality gives mixed results. Literature is either based on a large panel of developing countries (Meschi & Vivarelli 2009) and investigates primarily Latin America or the African region (Lustig et al. 2013) or looks at the growth-inequality relationship (Lim & McNelis 2016). In addition, studies that rely on institutional quality tend to examine the links between

institutions and poverty (Hasan et al. 2006; Tebaldi & Mohan 2010) or institutions and growth (Glaeser et al. 2004). Educational attainment plays a crucial role in fostering growth and reducing income inequality; however, recent studies that investigate the effect of trade on income inequality (Agyei & Idan 2022: Dorn et al. 2022) do not specifically examine the role of education. Hence, it is vital to understand the effect of increased trade, educational attainment, and the quality of institutions on income inequality in different countries and regions since cultural and regional dissimilarities might correlate with the above variables of interest.

Secondly, the majority of past studies have relied on the panel regression method. The inclusion of lagged inequality (dependent variable) creates a concern that the estimates may not be consistent. The GMM methodology followed in this paper employing dynamic panel procedures will refine earlier efforts to examine the model in the following ways. Estimations using panel data allow us to take advantage of the time series and cross-sectional nature of the dynamic linkages between trade openness, educational attainment, institutional quality and income inequality. Furthermore, the panel estimator is able to manage the endogeneity of lagged inequality and the possibility of endogeneity for all independent variables.

The rest of the paper is organized as follows. The following sections provide the related works of literature followed by a methodology and data and a discussion of empirical findings. We conclude by emphasizing the role of public policy in ensuring more equitable income distribution.

LITERATURE REVIEW

In this section, we offer an overview of the main debates in the academic literature as well as evidence on the effect of trade openness on income inequality. We also consider studies examining the role of institutional quality and human capital development.

According to early works by Dollar and Kraay (2001), higher trade activities lead to a smaller rich-poor gap. They found that economic integration increased income and reduced poverty in most developing countries, mainly because poor households can increase their production and income. Avalos and Savvides (2006) conducted a comparative study between Latin America and East Asia on the relationship between technological change, trade openness, labour supply, and wage inequality in the manufacturing sector. They observed that trade openness leads to smaller inequality in both regions. Lu and Cai (2011) found that trade openness has significantly affected China's level of inequality. Provinces with capital- and land-intensive industries tend to record more equal incomes than those that depend on labour-intensive industries. Khan et al. (2021) reveal that trade openness may not narrow the income gap in the short run but may improve inequality concerns in the long run. Trade openness, together with investment in the level of capital stock accompanying labour and capital mobility, reduces income inequality.

Several studies provide opposing views and suggest other mechanisms that may lead to widening income gaps. Bergh and Nilsson (2010) utilize a panel fixed effects model to examine whether openness will lead to higher inequality. They find that policies encouraging trade openness have increased income inequality amongst developed countries. When a dynamic model is used to estimate the equation, the authors found that trade openness and financial development jointly increase inequality. While these theoretical developments have contributed to the overall knowledge of the impact of trade on inequality, they do not move away from the idea that more openness tends to increase income inequality (Neckerman & Torche 2007; Richardson 1995). Using India as a case study, Daumal (2013) found that the country's trade openness has unduly worsened state-level inequality, mainly because different states receive different amounts of FDI inflows. In determining the effect of trade openness on wage inequality, Helpman et al. (2010; 2012) proposed that inequality increases as firms pay higher wages to workers when they trade. Hence, trade openness may initially increase wage inequality but later decrease as the economy trades more. Additionally, Furusawa et al. (2020) indicate that trade openness increases the income gap as skilled workers in top exporting firms earn higher wages after trade openness, while unskilled workers tend to lose as their firms may be hurt by intense competition.

Finally, trade openness may affect inequality differently depending on country categorization or factor endowments (Bazillier et al. 2021; Xiong 2020). Xiong (2020) notes that more capital-intensive regions encounter a higher income gap; however, regions with intensive skills and technology are more likely to have a narrower income gap. According to Spilimbergo et al. (1999), inequality in high-income countries (which are skill intensive) reduces with more trade and increases inequality in developing countries (which are land and capital-intensive). Additionally, Alderson and Nielsen (2002) suggest that the variations in inequality among industrial countries, in the long run, can be partially attributed to FDI outflow and higher imports from developing countries which produces widening income gaps between skilled and less skilled workers. A recent study by Huang et al. (2022) argues that the disagreements in prior literature are somewhat explained by the diverse development level of the chosen countries and how the researchers handle the endogeneity issue. By considering endogeneity concerns, Huang et al. (2022) find a negative trade-inequality relationship in high- and middle-income countries but an insignificant impact in low-income countries.

Additionally, Dollar and Kraay (2003) posit that institutional quality determines whether countries trade more or grow faster. Rothstein and Teorell (2008) found that dysfunctional institutions often cause many economic problems. Although a country's productivity level and current physical capital are essential in promoting economic development, it ultimately rests on how effective government institutions are in implementing these policies. Kouadio and Gakpa (2022) demonstrate that petty corruption, sounder bureaucratic quality, and a more efficient judicial system are growth fundamentals, narrowing the income gap. Similar results were found by Szczepaniak et al. (2022) during the Period Reformasi in Indonesia. Blancheton and Chhorn (2021) explain that higher public spending increases the income gap at the initial level of institutional development. However, higher public spending will reduce the gap once its institutional quality improves in the longer term.

Several studies have examined how political institutions in different regimes (authoritarian versus democratic) affect inequality (Lin & Fu 2016). Since democracy is a system through which the people choose the country's heads of government, it helps promote wealth redistribution and narrows the income gap. Muller (1988) argued that democratic institutions could cause a continuous shrinking in income inequality undeterred by economic growth. He further stated that wide income distribution gaps would eventually cause an authoritative rule to take over the democratic institutions. The study found a significant negative correlation between government stability and income inequality. The way out of this cycle is through deliberate redistributive efforts undertaken by a political party that can hold office for an extended period. Reenock et al. (2007) argued that when citizens are deprived of their basic needs, they will protest and threaten the democratic regime. Malesky et al. (2011) studied the income distribution patterns of two non-democratic countries, China and Vietnam. Both countries exhibit different income inequality trends. In Vietnam, the governing institutions encourage more comprehensive and competitive policy-making partnerships and emphasize more restrictions on executive decision-making than in China. As a result, the leaders are more prone to equalizing transfers amongst Vietnamese provinces. However, Bahamonde & Trasberg (2021) assert that a higher income gap is associated with democratization and democratic rule pertaining to high state capacity.

Savoia et al. (2010) stated that the existing levels of inequality might determine institutional quality. They argued that unfair income distribution leads to the creation of weak institutions. As a result, weak institutional quality sometimes causes poverty to remain (Tebaldi & Mohan 2010). Similarly, Acemoglu and Robinson (2006) identified each country's institutional factors as the primary cause of slower growth. While inequality reinforces weak institutions, the direction of causality has yet to be determined. Chong and Gradstein (2007) established the causality relationship using a dynamic GMM approach. They then utilized the vector autoregression (VAR) methodology to break down the significance of each type of causality. Their results suggest a reinforcing link between the quality of institutions and the income gap. Meanwhile, there is also a lack of consensus about the measurement of institutional or governance quality, as described by previous studies (Lee & Jais 2020).

Numerous studies provide mixed views on the education-inequality nexus (Ismail & Yussof 2010; Yang & Qiu 2016; Lee & Lee 2018; Menezes Filho & Kirschbaum 2019). Controlling for the heterogeneity and endogeneity of the data, Coady and Dizioli (2018) found that education will have an inequality-reducing effect on emerging economies. However, as countries advance, this observed effect will reduce. Checchi (2000) contends that through education, individuals could acquire new skills, increase productivity, and possibly move toward well-paid jobs. As a result, improving access to education tends to increase the income of the lowest economic strata and reduce the income gap (Checchi 2000). Ferreira, Firpo & Messina (2022) demonstrate that higher educational attainment renders an increased supply of skilled labour and narrows the labour earnings inequality amongst the working-age population. Abrigo et al. (2018) further reiterate that spending on human capital development reduces inequality by improving labour income for low-income earners. Winters and Chiodi (2011) disclose that higher educational attainment allows structural transformation in which workers shift from agricultural to non-agricultural employment, increasing workers' earnings and lowering inequality levels.

Conversely, Khusaini et al. (2020) did not find evidence of an educational Kuznets curve using provincial data from Indonesia, while some studies find a positive association between education and income inequality (Dabla-Norris et al. 2015; Gregorio & Lee 2002; Gould & Hijzen 2017). Kafaei and Dorostkar (2007) show that higher inequality in education might worsen income distribution. Similar results are revealed by Jun et al. (2009) and Lin (2007), which argue that reducing training disparity gives rise to a smaller income gap. Oliver-Márquez et al. (2021) contend that at an initial low level of financial knowledge, an increase in such knowledge might narrow the income gap. Nevertheless, this redistributive effect may dissipate or reverse up to a certain level.

Seminal work by Knight and Sabot (1983) uses the 'composition and compression effects' to illustrate the two opposing impacts of education on income inequality. The composition effect denotes the effect of a revolution in the educational breakdown of the labour force on income inequality. Principally, the 'composition effect'

refers to higher education inequality in the nation, increasing the income gap as the wage accelerates with higher educational attainment. However, over time, the compression effect indicates that income inequality will, in due course, diminish as fewer uneducated people remain. Moyo et al. (2022), Ferreira et al. (2022) reveal similar conclusions. However, Digdowiseiso (2009), Park (1996) and Ram (1984) find an insignificant education-inequality nexus.

Three main ideas follow from our discussion in this section. First, there is strong support for the importance of trade openness, regardless of whether the impact of trade on inequality is positive or negative, mainly because trade openness promotes a country's economic growth. The impact of trade openness on inequality is divided into three different strands. In the first strand, trade openness will reduce inequality, whereas, in the second strand, trade openness will increase income inequality. In the third strand, the impact of trade on income inequality is mixed or country dependent. In addition, our review of studies related to the role of institutions and education suggests that policy and regulatory imperative alongside human capital investment can reduce inequality and achieve more inclusive growth.

DATA AND METHODOLOGY

The empirical paper relies on annual data from 1990-2019 for a balanced panel of 19 economies in Asia-Pacific. The period is chosen for the following reasons. First, the 1990s coincide well with the emergence of Asia-Pacific, characterized by its rapid development and increasing openness shown through the number of intra-regional trade agreements signed. The openness of the chosen economies during this period was also observed by Jaumotte et al. (2013). Second, the data for this period is available for the countries in the dataset. The model specification has the following form:

$$I_{it} = \beta_0 + \beta_1 I_{it-1} + \beta_2 Trade_{it} + \beta_3 IQ_{it} + \beta_4 H_{it} + \beta_5 GDPpercapita_{it} + \varepsilon_{it} \quad (1)$$

where subscript $_i$ and $_t$ are country and time indexes.
I_{it} is the commonly used measure of the Gini index for country i, and I_{it-1} is its lagged value[1],
$Trade_{it}$ consists of trade openness as a percentage of gross domestic product (GDP),
IQ_{it} is a composite measure of institutional quality represented by the aggregated value of five subjective measures of institutional quality (bureaucracy quality, government stability, law and order, democratic accountability and corruption.
H_{it} represents educational attainment and
$GDPpercapita_{it}$ represents the country's level of economic growth and development.

The analysis was also conducted separately for all five subjective measures of institutional quality to understand the individual governance indicators' effect on income inequality. A country's institutional factor plays an important role in determining income inequality. Thus, even if trade openness aggravates the level of inequality in the economy, governments can intervene through appropriate public policies such as employment, labour and education policies so that the benefits of trade can be shared.

Our sample includes Australia, New Zealand, Southeast Asia economies (namely Brunei, Indonesia, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam), South Asian economies (Bangladesh, India, Pakistan and Sri Lanka) and East Asian economies (China, Hong Kong, Japan, Mongolia and Republic of Korea). These economies represent Asia-Pacific because they have experienced trade openness and rising inequality over the past two decades. Unfortunately, we exclude several countries from the region due to the unavailability of inequality or institutional quality data. The list of excluded countries is listed in Appendix 1.

The dependent variable, the Gini coefficient, retrieved from the Standardized World Income Inequality Database or SWIID database (Solt 2020), is the preferred choice by recent studies (Kouadio & Gakpa 2022). The values of the Gini coefficient vary between 0 (complete equality) and 100 (complete inequality). The SWIID offers coverage of income inequality data across years as the dataset uses a customized multiple-imputation algorithm to provide improved estimates for missing data.

The primary variable used to measure trade openness is obtained from the World Bank's World Development Indicators (WDI) database. This commonly used proxy measures the country's actual exposure to trade exchanges. Here, trade openness is computed as the sum of imports and exports of goods and services as a percentage of GDP. Higher values indicate that the country is more open to trade.

Institutional quality data is obtained from the International Country Risk Guide (ICRG), whereby a numerical value is assigned to a pre-set group of risk components. The ICRG dataset is popularly in political science literature to measure institutional quality (Borner et al. 2004; Gradstein 2007). Our study follows the data aggregation method suggested by Chong and Gradstein (2007). The authors represented institutional quality as a single composite index established from five variables – bureaucratic quality, corruption, democratic accountability, government stability, and law and order. We provide the definitions of the five variables in Appendix 2. Since institutional change occurs slowly over time, this simple aggregation would reduce the risk of multicollinearity between the variables (Perera & Lee 2013). In all cases, higher values indicate better institutional quality.

Another variable of interest is educational attainment, whereby estimates of educational attainment for the population between '15 and 64 years old' is available from the updated version of the Barro-Lee dataset available from https://barrolee.github.io/BarroLeeDataSet/BLv3.html. The percentage of completed secondary education was chosen as a suitable proxy since most of the countries under study have the provision of publicly funded primary and middle-level secondary education, which means at least nine years of education. In addition, investment in secondary education will spur economic development compared to universal primary education alone.

We added GDP per capita (constant 2015 US$) as a control variable to the model since a common perception is that high-income countries will have good institutions and better governance policies. The GDP per capita estimates are extracted from the World Bank's WDI database. All values are transformed into natural logarithms. Data are also averaged into six-time periods, whereby t1 captures the period from 1990 to 1994, t2 captures the period from 1995 to 1999, t3 captures the period from 2000 to 2004, t4 captures the period from 2005 to 2009, t5 captures the period from 2010 to 2014 and t6 captures the period from 2015 to 2019.

SYSTEM GENERALISED METHOD OF MOMENTS

There are several potential problems with panel data set estimations. First, there is a possibility that the current values of our dependent variable- Gini will be influenced by its past, current or future values. As such, the lagged values of Gini are included in the model to avoid biases related to omitting specific individual effects. The use of a lagged dependent variable in the equation may give rise to the problem of autocorrelation. Autocorrelation occurs because the error in one period may affect the error term in succeeding or other time periods.

Second, since panel data combines both time series and cross-sectional data, it is likely to introduce heteroscedasticity and autocorrelation into the model as the countries in our sample differ in socioeconomic and political conditions. The presence of heteroscedasticity can invalidate the statistical results as it causes standard errors to be biased, reporting values either above or below the actual population variance.

Additionally, previous studies have established that institutions play a vital role in explaining income inequality across countries. However, inequality and institutions have causation in both directions. While greater openness is associated with better institutions (Do & Levchenko 2009), there is still disagreement concerning how it affects income distribution. The failure to consider the reverse causation often results in overestimation. The expected endogeneity nature of the model could lead to a correlation between regressor and error in first differences (Baloch et al. 2018). As a result, OLS estimation may be biased and inconsistent. In addition, using lagged dependent variables is also problematic in the case of "small T and large N" as it causes dynamic panel bias (Nickell 1981).

The GMM technique can be used to resolve the above-mentioned problems (Arellano & Bond 1991; Blundell & Bond 1998). The use of the fixed effects estimator was not considered in this study since equation 1 contains a lagged endogenous variable (Gini). Moreover, fixed effects estimators utilize only the variation within countries and ignore cross-sectional variation in the data. The intuition behind the GMM method is the use of internal instruments (lagged levels and lagged differences) to take advantage of the orthogonal condition that exists between lagged values of the dependent variable and the error term. The estimation is consistent and efficient in the presence of heteroscedasticity.

We rely on a two-step System GMM procedure (Windmeijer 2005) and incorporate lagged levels and differences between two periods as instruments for present endogenous values. The consistency of the estimator is tested using two specification tests as advanced by Arellano and Bond (1991). The first test is Sargan's (1958) test of overidentifying restrictions. The Sargan test checks whether the residuals from the main regression are correlated with the instruments. The null hypothesis examines whether the instruments as a whole are exogenous or uncorrelated with the error term. If one fails to reject the null hypothesis, we can safely conclude that the model is valid.

The second specification test checks whether the error term is serially correlated. In this test, the study aims to investigate whether the differenced error term of the regression is first-order serially correlated and second-order serially correlated. The test for first-order serial correlation or AR(1) usually rejects the null. This is expected since $\Delta\varepsilon_{it} = \varepsilon_{it} - \varepsilon_{i,t-1}$ and $\Delta\varepsilon_{i,t-1} = \varepsilon_{i,t-1} - \varepsilon_{i,t-2}$ both have $\varepsilon_{i,t-1}$. Nevertheless, the test for second-order serial correlation or AR(2) is more important as it will detect autocorrelation in the levels equation. This test indicates that the GMM estimator is consistent without second-order serial correlation of the first-differenced equation's error term.

SUMMARY STATISTICS

The summary statistics of the variables used in our study are presented in Table 1 below. The overall mean of the trade openness ratio is 97.12. Educational attainment proxied by the percentage of adults (aged 15-64) with at least completed secondary education in the region constituted about 27.87%. The institutional quality is measured by a single 50-point composite index as discussed earlier, which is, on average 21.39 out of 100.

The value for GDP per capita, on average, is US$14,398. Our dependent variable, the Gini coefficient measured by a single standardized Gini variable, is 37.19 out of 100. Variables with the highest min-max difference (min is 17.38 and max is 425.16) and standard deviation (90.92) is trade openness. Variables with the lowest min-max difference (min is 0.4 and max is 4) and standard deviation (0.93) is bureaucracy quality.

The results of the correlation matrix are reported in Table 2. All correlation coefficients are not exceeding 0.8, indicating that the variables are not highly correlated. Variables with the highest correlation are institutional quality and GDP per capita with 0.76, while those with the lowest correlation are trade openness and educational attainment with 0.16.

RESULTS

As discussed in the previous section, we rely on System GMM rather than pooled OLS for this analysis to overcome issues related to heteroscedasticity and autocorrelation. The results of Arellano- Bover System GMM (SGMM) are shown in Table 3. The first model measures the effect of trade openness, institutional quality as a composite variable, educational attainment, and GDP per capita on income inequality. Models (2) to (6) measure the same variables of interest but Institutional Quality is further separated into five different dimensions in order to understand the partial effects of the variables. The consistency of the estimator is tested using two tests: Sargan's test, which checks whether the residuals from the main regression are correlated with the instruments, and AR(2), a specification test that looks at whether the error term is serially correlated.

The Sargan test of overidentifying restrictions is a good indicator to test whether the lagged values of independent variables are valid instruments in the equation. If the Sargan test fails to reject the null hypothesis, the lagged variables used as instruments are valid. The p-values of the Sargan test that lie between 0.573-0.688 substantiate the instruments used in the models. The AR(2) results find insufficient evidence to reject the conjecture of no second-order serial correlation in the residuals of the first-differenced equations. The results confirm the validity of the instruments.

Table 3 reports the impact of trade openness, educational attainment and overall institutional quality controlling for the country's income on income inequality in column (1). In the subsequent step, we perform the analysis separately for each dimension of institutional quality (columns 2-6). The empirical results in all columns of Table 3 indicate that the lagged income inequality is statistically significant at the 1 percent level, which validates that our dynamic system GMM is an appropriate estimator. The present level of income inequality is influenced by the past values of inequality. The results in columns (1) to (6) show that trade openness has a statistically significant and negative effect on income inequality across all models.

TABLE 1. Summary statistics

Variable	Mean	Std Dev.	Min	Max	N
Income inequality	37.19	5.58	27	48.8	109
Trade openness	97.12	90.92	17.38	425.16	114
Educational attainment	27.87	14.28	0.56	62.62	114
Institutional quality	21.39	4.38	9.68	30.62	114
GDP per capita	14,398	16,871	195	58,946	114
Bureaucracy quality	2.65	0.93	0.4	4	114
Government stability	8.11	1.76	3.48	11.5	114
Law and Order	4.03	1.21	1.15	6	114
Democratic accountability	3.56	1.78	0	6	114
Corruption	3.04	1.18	1	6	114

TABLE 2. Correlation matrix

	Gini	Institutional quality	Trade openness	Educational attainment	GDP per capita
Gini	1				
Institutional quality	-0.37	1			
Trade openness	0.23	0.22	1		
Educational attainment	-0.2	0.41	0.16	1	
GDP per capita	-0.41	0.76	0.37	0.5	1

TABLE 3. Impact of trade openness, institutional quality, and educational attainment on income inequality: System GMM estimates for 19 Asia-Pacific countries

	M1	M2	M3	M4	M5	M6
Income inequality (t-1)	**0.680*** **	**0.718*** **	**0.697*** **	**0.727*** **	**0.711*** **	**0.723*** **
	(0.034)	(0.025)	(0.024)	(0.019)	(0.015)	(0.025)
Trade openness	**-0.018*** **	**-0.024*** **	-0.025***	-0.024***	-0.024***	-0.021***
	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)	(0.006)
Educational attainment	**0.028*** **	**0.033*** **	**0.034*** **	**0.031*** **	**0.031*** **	**0.026*** **
	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)	(0.006)
Institutional quality	**-0.028***					
	(0.017)					
GDP per capita	**-0.033*** **	**-0.030*** **	**-0.034*** **	**-0.030*** **	**-0.031*** **	**-0.029*** **
	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.003)
Bureaucracy Quality		-0.009				
		(0.012)				
Government Stability			-0.012*			
			(0.007)			
Law and Order				0.000		
				(0.008)		
Democratic Accountability					0.003	
					(0.002)	
Corruption						0.001
						(0.011)
Constant	1.530***	1.302***	1.433***	1.267***	1.326***	1.279***
	(0.174)	(0.087)	(0.104)	(0.078)	(0.041)	(0.086)
Observations	90	90	90	90	90	90
AR(2)	0.892	0.810	0.869	0.841	0.883	0.886
Sargan test	0.688	0.573	0.602	0.603	0.587	0.5869
# of groups	19	19	19	19	19	0.001
# of instruments	18	18	18	18	18	(0.011)

Note: Standard errors are reported in parentheses
***, **, and * shows significance at 1%, 5% and 10% levels.
The p-value of AR (2) and Sargan test is reported here.

When we separate the regression into each institutional proxy in models (2) to (6), out of five institutional variables, four are insignificant, except for government stability, which is significant at the 10 percent level. The significance of the coefficient of government stability suggests that citizens' confidence in the government's ability to implement declared programs works best to reduce the income gap.

It is important to further analyse the possible reasons why trade openness does not increase income inequality contrary to earlier studies. In this section, we offer several possibilities. We analyse the effects of introducing interaction terms to our baseline model (see Appendix 3). We compare the results of interacting institutional quality*trade (M2) and institutional quality*educational attainment (M3) with our main model to investigate the possibility that trade openness reduced inequality only in a group of well-governed countries. The empirical results in M2 reveal that controlling for the country's income level, increasing trade openness has paradoxically increased income inequality in Asia Pacific, in the presence of good institutions. It appears that improvements to institutional quality play a limited role in reducing inequality when it comes to distributing gains from trade. We observe similar and consistent findings in M3 when we interact trade openness with educational attainment. Findings show that an income inequality widening effect with greater trade openness and educational attainment.

Another related possibility is that the current findings are driven exclusively by a sub-group of advanced economies which exhibit low inequality

and good institutional quality. To test this, we drop four countries, i.e., New Zealand, Australia, Japan and South Korea from the empirical analysis. The signs and significance of our main variables of interest- trade openness and educational attainment did not change; however, the sign and significance of institutional quality changed whereby better institutions seemed to promote greater income inequality. Although not reported here, the results are available upon request.

Our findings broadly support the work of other studies linking Stolper–Samuelson theorem with trade models according to which, trade openness raises the price of abundant factors relative to the price of scarce factors as trade bolsters the production and exports of abundant factor-intensive commodities. As a result, the production of scarce factor-intensive commodities lowers because of increased imports. Over time, this may reduce the income gap within the nation especially between skilled and unskilled workers. Moreover, increasing economic growth in the Asia-Pacific region provides a mechanism through which trade narrows inequality by advancing initial income and successive growth (Chakrabarti 2000; Roser & Cuaresma 2016; Khoso et al. 2021).

The negative and significant effect of GDP per capita on income equality in all models suggests that economic growth will likely increase incomes for the entire society, including the poor (Adams 2003). Nissim (2007) explains that economic growth raises the capital stock, and thus, workers are propelled to better job opportunities with higher wages; hence the income distribution becomes more equalized. We further observe the impact of educational attainment on income inequality, whereby the coefficient of educational attainment in all models is positive and highly significant at the 1 percent level. These findings are in line with the composition effect delineated by Knight and Sabot's (1983) seminal work. The authors suggest that in the initial level of development when fewer people are educated, higher education will increase income inequality. Additionally, Lam et al. (2015) argue that higher returns to higher education impede the realization of income equality. Similar results were revealed by Castelló-Climent and Doménech (2021). Our result is reinforced by the upward trend of income inequality notwithstanding the increased access to education worldwide. Although not reported here, a further step in the analysis is to look for the composition effect in our group of countries. The result is obtained by replacing our proxy variable (i.e. the percentage of completed secondary education) with the percentage of completed tertiary education among the working-age population. Although we are unable to show the possibility of a compression effect taking place since the results were insignificant, the education attainment sign reversed.

DISCUSSION

UNDERSTANDING INEQUALITY IN ASIA-PACIFIC COUNTRIES

How should we interpret the paradoxical result of rising income inequality in our sample at a time of increasing trade liberalization and educational attainment? Given that public policy regimes and market conditions are very different across countries and regions, we recognize heterogeneity in the relationship between trade openness, educational attainment and inequality in our sample countries. In this section, therefore, we present further descriptive evidence to help interpret our earlier results based on region-wide GMM estimates. To better understand the inequality time trend, pace and its change over time, we separated each country's Gini coefficient by region. In addition to country-specific inequality trends, we present the average for Southeast Asia economies, South Asian economies, Australasia and East Asian economies in Figure 1.

Figure 1 confirms some form of clustering in inequality trends. While rising, they have been quite different across the regions in the past three decades. South Asia's average Gini coefficient increased from approximately 36.4 to 41 during 1990-2019. We observe somewhat similar trends in Southeast Asia. In Southeast Asia, inequality exhibited an increasing trend, especially prior to Asian Financial Crisis and Global Financial Crisis, but income gaps modestly reduced in the past decade. Among Southeast Asian countries, Indonesia and the Philippines recorded very high inequality levels. Other than China and Hong Kong, the level of income inequality in East Asian and Australian economies (Japan, South Korea, Mongolia, Australia and New Zealand) were kept under control and at modest levels.

Based on the trends observed in Figure 1, we hypothesize considerable sub-regional variations of drivers of inequality. For instance, South Asian countries have started with relatively lower GDP per capita and have poorer institutional quality yet go through a sustained period of economic growth. On the other hand, Southeast Asia economies have benefited from the Asiatic growth model with sustained GDP growth in the 1970s and 1980s with more equal incomes and better institutional quality. To unpack the variation in inequality by past level of education, trade and governance-related developments, we re-examine the data next using bivariate scatter plots.

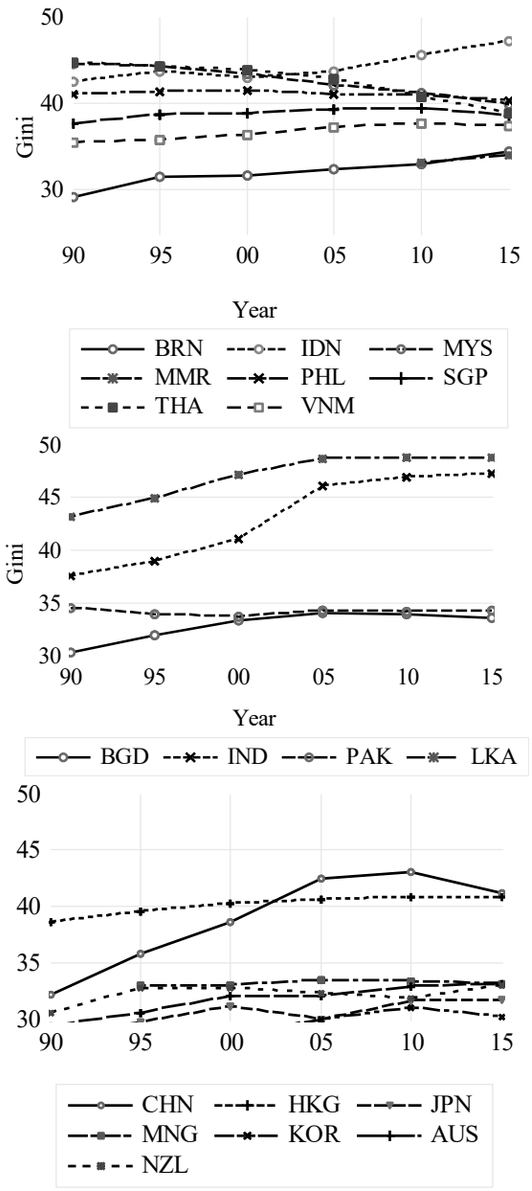


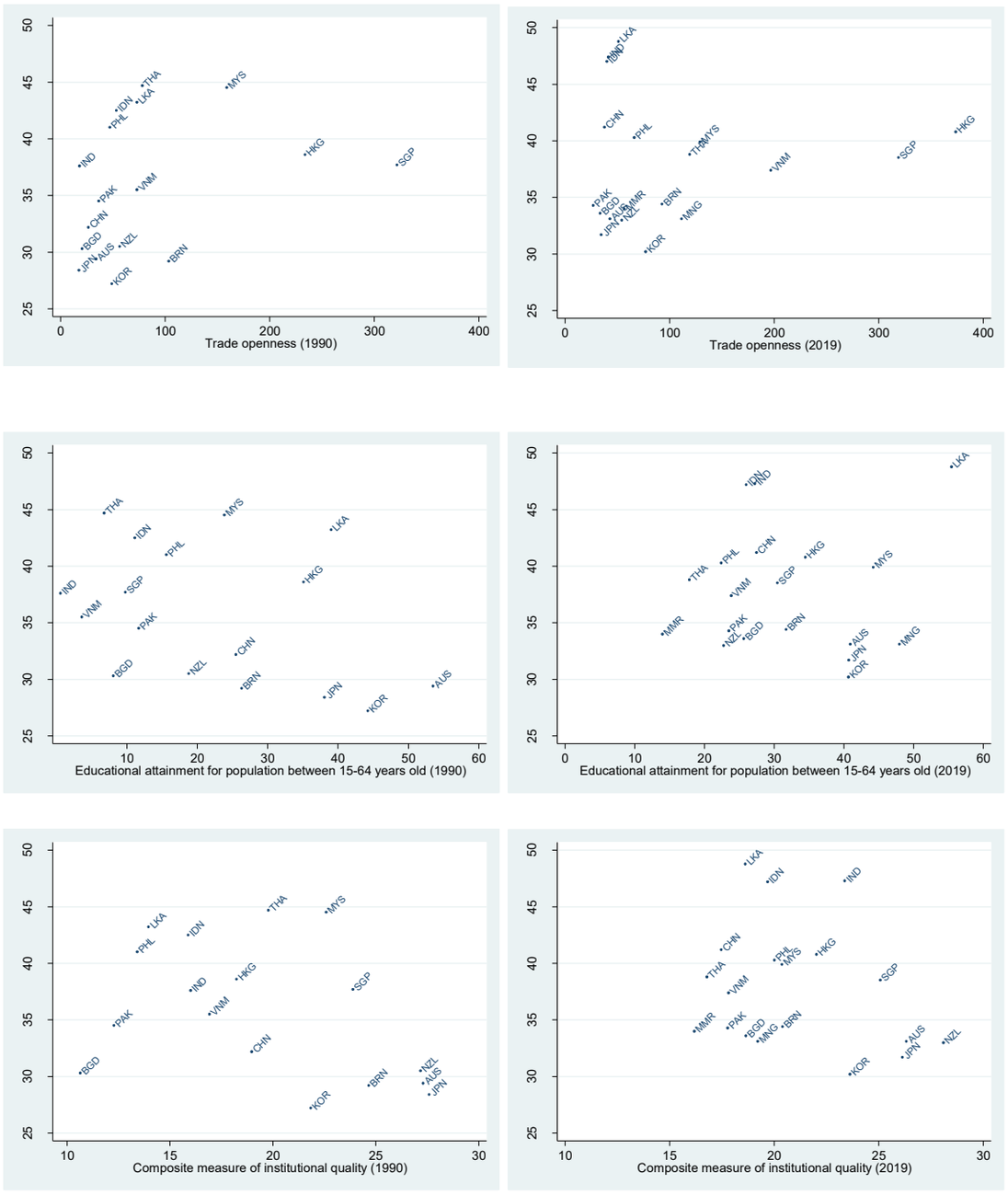
FIGURE 1. Inequality trends by regional cluster

Figure 2 shows that the more developed Southeast and East Asian countries, for instance, Malaysia, Singapore, Hong Kong, South Korea, Japan, and Australia may be outliers as they exhibit a positive relationship between trade openness and income inequality. The diverse economic performances and degree of trade openness might have explained our trade openness-inequality puzzling phenomena. For instance, a country with better institutional quality, high trade openness and a good educational system like Singapore displays higher income inequality while another country such as the Philippines, which is weaker in almost all aspects has shown a reduction in income inequality over time. This phenomenon could not be easily explained using panel data analysis and calls for future research on country-specific studies to understand the macro findings.

Furthermore, while there are many drivers of inequality, part of the answer to the puzzle of rising inequality despite increasing trade openness and educational attainment can be found in Kanbur et al. (2014) and Chongvilaivan (2014). Accordingly, there are three main drivers of inequality in Asia: *structural, proximate, and policy*. Structural drivers of inequality are partly aggravated by globalization which promotes greater trade openness and financial liberalization. With globalization, the traditional Stolper–Samuelson approach predicts that different countries' products are substitutes for each other. This situation contributes to a higher demand for labour-intensive products in developing countries. Since developing countries are labour-abundant, trade openness will increase the demand for labour-intensive products, contributing to higher wages for unskilled labour. As a result, trade openness reduces inequality in these developing countries.

At the same time, educational attainment is an important proximate factor driving inequality. From the trends shown in figure 2, we can infer that the continuous education expansion in some Asia-Pacific economies does not inevitably reduce a nation's income inequality. The plots reveal that in some countries, for instance, Malaysia, Thailand, the Philippines and Singapore, educational expansion reduces income inequality over the two periods. Conversely, countries such as Indonesia, India, China, Bangladesh, Brunei, and Sri Lanka have experienced an improvement in educational attainment but a trade-off of worsening income gaps. Lustig (2009) posits that a fall in the wage gap between high- and low-skilled workers may explain the diminishing income inequality. Additionally, Bertocchi and Dimico (2014) contend that higher inequality is mainly due to unequal educational attainment.

In the year 2000, most world leaders adopted the Millennium Development Goals (MDGs). Despite efforts to increase access to education in Asia-Pacific regions, regional variations exist in MDGs progress, especially in educational achievement. The Asia and Pacific region successfully shrunk extreme poverty by about half prior to the 2015 deadline and achieved gender parity in primary and secondary education (Brooks et al. 2013). However, there are substantial disparities in trends across countries. Asadullah and Savoia (2018) elucidate that the challenge of weak national-level governance could unriddle such disparities. As such, to shrink the income inequality in society, it is essential to have good governance and effective institutions since it is impossible to eradicate poverty without resolving the prevailing income inequality issues. For instance, South-East Asia has realized the level of quality education required by 2030 (Verma, 2018). However, the



*The list of country abbreviations is available in Appendix 1.

FIGURE 2. Correlations between income inequality with trade openness, educational attainment, and institutional quality 1990 vs. 2019

progression in South Asia is much slower and below the regional average in access to quality education (Verma 2018). The region is lagging in literacy rates compared to other Asia-Pacific countries (Asadullah et al. 2020). Asadullah et al. (2020) further assert that the low literacy rates could be due to insufficient fiscal spending, and the ineffectiveness of the state in providing public goods may potentially affect educational attainment in the respective regions.

Finally, public policy, for instance, welfare spending on social programs and governance and institutional quality, is a policy driver of inequality. Current literature highlights the role of government in Asia (Nye 2014) as institutional conditions affects the country's income distribution[2]. Borner et al. (2004) further suggest that government policies concerning welfare spending (to improve education, health or infrastructure) indicate the country's institutional background. Their findings

demonstrate that the quality of institutions determines economic development.

POLICY IMPLICATION AND CONCLUSION

In this paper, the recent rising trends in inequality in Asia-Pacific region was re-examined with a focus on trade and educational attainment. In particular, we asked whether good institutions could mitigate the effect of trade. Our results show that, if anything, trade openness leads to lower income inequality in the Asia-Pacific region, and hence, cannot explain the recent rise in inequality in the region. In addition, our findings show consistency in terms of the impact of trade openness on inequality for the full sample in Table 3, whereby greater participation in international trade reduces income inequality, thus supporting the traditional Stolper–Samuelson theorem. In our discussion, we also offered several possibilities why trade openness was not enough to reverse the tide of rising inequality.

The composite index of institutional quality implies that better institutions help promote a more equal income distribution. However, when we split the regression into different dimensions, only government stability significantly affects income inequality, indicating that its ability to implement declared programs plays a crucial role in lessening the income gap. The significance of the composite index captures a more complete formal institutional environment and reflects the importance of various formal and informal institutions that work together in reducing income inequality. Individual governance indicators may not effectively reduce income inequality since citizens often view government policies and institutions as a whole.

Empirical findings suggest that income inequality increases with educational attainment, in line with Knight and Sabot (1983). In one of the earliest literature on income inequality, Kuznets (1955) revealed that income inequality might rise at the early stage owing to the sectoral shifts of workers and other reasons, but it would decline afterward. As revealed in our empirical results, the inequality-widening effect of education may be explained by the 'higher education premium,' i.e., the wage distribution grows with education expansion as more people progressively earn a higher income. The decline in the later stage implies the compression effect of human capital growth as the increased supply of educated workers will reduce the distribution of the wage gap. The possible inverted U-shape Kuznets effect on educational inequality further posits that an increase in secondary education at the initial stage will widen the income gap. However, over time, extensive secondary educated workers play a role in reducing income inequality. Coady and Dizioli (2018) suggest that improving education quality (i.e. skill development) will boost the role of education as a tool to reduce inequality.

In many Asia-Pacific countries, compulsory education has only been limited to the primary level. Universal primary education alone may not be enough to reduce the rich-poor gap. The current Sustainable Development education targets equitable quality education up to the secondary level to promote effective learning. As such, expanding equitable access to secondary or higher levels of education is critical. In many industrialized economies, large segments of the population possess tertiary education, which helps close the income gap and favour equal income. In emerging economies like Malaysia, Myanmar, and Bangladesh, making compulsory schooling up to the secondary level may help close the income gap. Investing in higher education is crucial to resolving the region's skills gap.

At the same time, in many of these countries, the paradoxical link between educational expansion and income inequality could also reflect the fact that schooling expansion did not translate into skills (Asadullah & Chaudhury 2015; Asadullah et al. 2020). High income countries with low inequality in our study also have high equality public education system that benefits citizens across different income groups. In the absence of country level panel data on school quality[3], we have not formally tested for this possibility. Equally, beyond the structural (e.g. trade-openness) and proximate drivers (e.g. education) of inequality, there are likely to be policy-specific differences such as within region differences in redistributive and social safety net mechanisms. This could explain why countries in the developing region of the Asia pacific, educational expansion has not been enough to minimize income inequality. Detailed country case studies can help explore this possibility which is left out for future research.

NOTES

1 In line with papers such as Baloch et al (2018) and Perera & Lee (2013).

2 We found similar conclusions in our earlier results when we removed country outliers from the analysis whereby better institutions promote meritocracy practices leading to a wider income gap.

3 Only a handful of the study countries participate in international assessment of students such as PISA and TIMSS.

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APPENDIX 1

List of Sample Countries	Abbrev.
Australia	AUS
Bangladesh	BGD
Brunei	BRN
China	CHN
Hong Kong	HKG
India	IND
Indonesia	IDN
Japan	JPN
Malaysia	MYS
Mongolia	MNG
Myanmar	MMR
New Zealand	NZL
Pakistan	PAK
Philippines	PHL
Singapore	SGP
South Korea	KOR
Sri Lanka	LKA
Thailand	THA
Vietnam	VNM

List of countries in Asia-Pacific excluded from the study due to data in unavailability:
Afghanistan; American Samoa; Armenia; Azerbaijan; Bhutan; Cambodia; Cook Islands; Democratic People's Republic of Korea; Fiji; French Polynesia; Georgia; Guam; Iran; Kazakhstan; Kiribati; Kyrgyzstan; Lao People's Democratic Republic; Macao, China; Maldives; Marshall Islands; Micronesia; Nauru; Nepal; New Caledonia; Niue; Northern Mariana Islands; Palau; Papua New Guinea; Russian Federation; Samoa; Solomon Islands; Taiwan; Tajikistan; Timor-Leste; Tonga; Turkey; Turkmenistan; Tuvalu; Uzbekistan; Vanuatu.

APPENDIX 2

Subjective measures of institutional quality

Measure	Description
Government stability	Assessment of government's ability to carry out its declared programs and its ability to stay in office. The subcomponents are government unity, legislative strength and popular support.
Corruption	Assessment of corruption within the political system.
Law and Order	Assessment of strength, impartiality of the legal system and popular observance of law.
Bureaucracy Quality	The institutional strength and quality of the bureaucracy.
Democratic Accountability	This is a measure of how responsive government is to its people.

Source: International Country Risk Guide (ICRG)

APPENDIX 3

	M1 (Baseline model)	M2 Interacting Trade*Inst quality	M3 Interacting Trade*Education
Income inequality (t-1)	0.680***	0.686***	0.638***
	-0.034	-0.037	-0.032
Trade Openness	-0.018***	-0.024***	-0.021***
	-0.005	-0.006	-0.006
Educational attainment	0.028***	0.030***	-0.052***
	-0.005	-0.008	-0.017
Institutional Quality	-0.028*	-0.018	-0.282***
	-0.017	-0.02	-0.054
GDP per capita	-0.033***	-0.034***	-0.033***
	-0.002	-0.003	-0.002
Trade Openness*Institutional Quality		0.010**	
		-0.004	
Trade Openness*Educational attainment			0.243***
			-0.046
Constant	1.530***	1.429***	1.710***
	-0.174	-0.195	-0.169
Observations	90	90	90
AR(2)	0.892	0.627	0.7451
Sargan test	0.688	0.823	0.7076
# of groups	19	19	19
# of instruments	18	19	19

Note: Standard errors are reported in parentheses, ***, **, and * shows significance at 1%, 5% and 10% levels.