



Escaping the Middle Income Trap: Challenges to be Confronted by Asian Economies

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Abstract

Background: Several developing nations that effectively moved from low to middle-income status are subsequently caught within the middle-income trap because of the recurring economic expansion. In this situation, what should policymakers do?

Objective: The article attempted to examine the essential factors that can substantially influence Asian nations' ability to avoid sinking into the middle-income trap. Finally, the research looked at factors that help Asia's high-income countries stop getting into this trap as their economies develop.

Method: The paper examines the elements that are crucial for Asian economies and should deter them from slipping towards the middle-income trap using qualitative as well as quantitative methods. The analysis section consists of two sections, a descriptive analysis of the time patterns of different variables based on nineteen Asian economies from 1990 to 2014, and empirical research using panel regression and a panel probit regression analysis using the countries' income status as a binary variable to devise a possible policy recommendation.

Result: According to studies, technological improvements, infrastructure development, and the demographic dividend are far more essential variables for overcoming the middle-income trap are technical improvements, infrastructure development, as well as the demographic dividend. Furthermore, governments in this area should implement optimal macroeconomic policies in order to promote growth without compromising economic stability.

Conclusion: This study concludes that three main emphasis points should be examined when the middle-income trap needs to get addressed in the Asian region's high-income nations' growth path. They are appropriate R&D investments indicating technical advancement in research and innovation, development and realization of "soft" and "hard" infrastructure, and optimal use of the demographic dividend.

Originality: This manuscript is unique and has not featured in any other journals. Likewise, during development of this paper, no financial support was obtained.

Keywords: GDP, Middle-income trap, infrastructure development, R&D investment, technological progress, demographic dividend, 'soft' and 'hard' infrastructure development, research and innovation, high-growth strategy, trade liberalization

Paper Type: Research Paper

JEL Classification: C33, H54, 011, 014, 025, 03, 031, 041

Introduction

The phrase “middle-income trap” was coined to depict the nuances of national economies’ progress, focusing on countries in East Asia, Latin America, North Africa, the Middle East, North Africa, and Asia. This concept is recently being applied to the analysis of the Chinese situation since the country’s growth rates look to be slowing. Some modest yet rising amount of research has begun to extend its approach across national and sub-national in recent years (Iammarino et al., 2017, 2018)

Although most countries have progressed since the 1950s, many developing economies have not seen sustained GDP growth. Based to World Bank, economically developing nations upgraded to advanced status by 2008 is hardly 13 out of 101. The 13 countries include Equatorial Guinea, Singapore, Japan, Greece, Mauritius, Taiwan, Hong Kong Special Administrative Region (China), China, Spain, Portugal, Korea, Ireland, Israel, and Puerto Rico, with the rest dropping into the “middle-income trap,” defined being countries with steep economic and productivity growth slowdowns. In the 1990s, several countries used trade liberalization to boost GDP, but despite investing the trade gains in research and development (R&D), the R&D spillovers did not help them move up the income scale (World Bank, 2012).

As per the research of Allianz (2021), the shift of Latvia, Hungary, and Romania will continue for several years by 2029, but its EU inclusion will preclude them from plunging into this middle-income trap. On the other hand, Panama, Seychelles, and Kazakhstan can hardly achieve high-income status within the projection period. Unexpectedly, Russia and Turkey may acquire high-income status earlier than projected in the midterm. In addition, their study of protracted trends shows ten nations (Greece, Laos, Bulgaria, Uruguay, Nigeria, Trinidad, Colombia, Slovakia, Croatia, Tobago, and Argentina) as being and would remain throughout this middle-income trap from 1950 to 2029, with a Covid-19 issue or not (Holzhausen & Huang 2021).

Gill and Kharas categorized the middle-income trap in three ways. First, they characterize it as a trap in which countries design growth plans incompatible with their current economic systems. They described two frequent traps: one in which nations become stranded. After all, they cannot replace export demand because, despite having a competitive wage disadvantage, they attempt to continue export-led development driven by labor-intensive manufacturing. The other pitfall is when nations misdiagnose growth and squander fiscal resources on projects that provide poor results. This may be seen in countries that rushed to become “knowledge economies” while lacking appropriate infrastructure. Because of infrastructure impediments such as poor quality education sectors and limited human and venture capital, many nations were unable to exploit innovation as an economic driver (Gill & Kharas, 2015). A 2nd empirical description of the middle-income trap is that numerous countries stay stuck in a small income bracket. The third definition is founded on the conviction as when measured against a standard/benchmark country, usually the United States, middle-income countries do not reflect progress.

Egawa pointed out the middle-income trap as a long-term state of economic stagnation for economically developing countries. Inadequate to emerge, i.e., a condition in which these countries are unable to move their economies from input-driven to productivity-driven growth on time due to their unique social and economic structural characteristics (Egawa, 2013). Ample of the primary argument on middle-income traps concentrated in North Africa, Latin America, East Asia, and, particularly, the Middle East. A decline in China’s economic growth has reignited speculation over how much stimulates middle-income traps and which approaches might be undertaken to assist countries in preventing or surviving them after plunging into one in 2011 (Zhuang, Vandenberg and Huang, 2012). Indeed, some observers argue that China’s competitive edge in a diverse variety of “labor-intensive” manufacturing operations has eroded as the nation’s population ages, dependency rates rise, and labor costs rise, amidst the country’s tendency to keep pace in proficiency as well as technology-intensive establishments improving (Glawe and Wagner 2017). The World Bank (2018) says even though the Indonesian economy is developing

and its status is rising, several factors can trap Indonesia in MIT status. The above time is critical since it will follow Indonesia's restoration from the COVID-19 outbreak or the revival of its economy (Iannone 2021). Fears of a long-term downturn have emerged, including the possibility of the nation becoming stuck in the "middle-income" phase.

All descriptive observations and formal quantitative studies endorse the concept of middle-income traps. Within those contexts, establishing a country in the middle-income trap entails first calculating (relative) income per capita.

World Bank's most apparent method for classification is to split nations into income groups based on their exact "gross national income (GNI) per capita." In 2021, it defined "lower-middle-income countries as those with a GNI per capita of \$1,036 to \$4,045; upper-middle-income countries as those with a GNI per capita of \$4,046 to \$12,535; and high-income countries as those with a GNI per capita of \$12,695 or more". These rankings are updated regularly based on inflation and currency rate movements (primarily to determine each country's credit eligibility). Therefore, a nation may revert to mid- status although it reaches high standing today yet lacks to advance at the estimated growth for the said group about a prolonged amount of time. This has happened on several occasions. On the other side, the categorization is primarily based on absolute values. All application of constant-time criteria indicates the position of a country is unaltered by the status of outside countries. As a result, the percentage of countries in each category has no specified arrangement.

A relative measure is an alternate technique for determining income categories. For example, a "Catch-Up Index (CUI)" is expressed as the percentage of a nation's per capita GDP equal to that of the United States. CUIs exceeding 55 rates are seen in "high-income countries," 20 to 55 percentage in "middle-income countries," and fewer than 20 percent in "low-income economies" (Agenor 2017; Athukorala and Woo 2011).

Both approaches have the issue of relying on relatively arbitrary assumptions to determine thresholds (Agenor 2017). The first metric has been used in most contemporary publications (particularly descriptive investigations), partly due to data availability. The important element to remember is being a high achiever is a continuing process. Never sufficient simply develop with increased speeds for longer timeframes; progress must be faster than in high-income countries.

Prior tactics are no longer successful at delivering an equal pace of economic growth when the global, institutional, and structural contexts change. When the current order persists, and emerging competitive segments of the economy are denied a seat at the table, shifting gets vastly more challenging. Numerous middle-income nations render either of two mistakes: those who attach to earlier successful policies for too long, or they leave industry sectors that could have also constituted the basis for one's specialization procedure too soon (Felipe 2012). Precision and a seamless transition are two crucial factors.

More recently, a study on the Schumpeterian roots of middle-income traps focuses on these institutional factors needed to help an economy shift toward a new development path (Aghion & Bircan 2017). Vivarelli (2016) emphasized this further.

After a systematic review of relevant literature, I conclude that as traditional sources of economic development decline, governments should reevaluate their strategy. Middle-income nations must identify production, modernization, and effectiveness drivers while also bolstering overall economic underpinnings that support and maintain development. It isn't easy to achieve high-income levels, and there is a good chance that growth may slow down along the road. On the other hand, stagnation is not unavoidable. Middle-income nations must be patient to achieve the conversion maturely, elude traps, and encourage innovative prospects, either low-wage nations with older sectors or rich countries with groundbreaking, high-tech sectors.

A rising number of studies and analyses have attempted to explain that comparatively few middle-income countries have achieved a maximum level of development, as well as the government and

private sector feasible options available to assist them. On the other hand, analyses vary widely and frequently produce contradictory results. To this end, this study utilized the term differently than other contributors in their writings. This study attempted to identify the elements that have contributed to and continue to assist Asian economies in avoiding and/or surpassing the middle-income trap and investigate the factors that will assist Asia's middle-income economies in avoiding and/or overcoming the middle-income trap. It will also look into whether technological improvements and infrastructure investment become more vital in helping Asian nations transcend the middle-income trap. The relevant literature focuses on the various policies that prosperous countries have implemented. In the meantime, the literature also discusses how other countries have failed to fill the per capita income disparity with prosperous economies in terms of understanding a middle-income trap and achieving effective transitions toward higher-income economies. Most of the literature has a qualitative approach, so this paper tries a quantitative take on the issue to analyze the impact variables that can alter in trying to evade this trap. Readers will better understand this, how so many nations are entangled in it, and the key hurdles involved in escaping it. The paper is intentionally brief in length and plain in language, with policy solutions as its concern. More research and investigations will be necessary in the coming days to comprehend and examine it thoroughly.

The study is organized as follows. Section II assesses theoretical and empirical literature relevant to this study to provide a theoretical basis. In Section III, I outline the methodology adopted for this investigation. Section IV presents the findings and the data analysis. Lastly, Section V concludes the study.

Review of Literature

Theoretical Review

This section discusses different theoretical approaches to the middle-income trap in detail. Even though countries with varying stages of growth and income levels require different policies for economic take-offs, Kim and Lee (2009) found that literature had previously missed out on crucial long-run growth impact variables such as technology and tertiary education. They concluded that while lower-income countries need primary and secondary education policies, upper-middle and higher-income countries should adopt post-secondary curriculum and R&D expenditure policies.

Likewise, the insurance sector is critical in assisting nations with overcoming the middle-income trap. Robust insurance markets across several countries seamlessly moved toward a high-income status (Holzhausen & Jelila 2021). The overall efficiency of such a business climate, its governance, and creativity hubs are all factors to weigh. Notably, Agenor and Canuto (2017) explore the impact of connectivity for finance upon entrepreneurship and productivity. Agenor described the lessons from the 13 countries that moved from medium to higher-income economies. These economies followed three significant steps, i.e., the governments act promptly and wisely, acquire foreign technology, and make use of cheap labor to promote innovation. To do that, the government must timely execute public policies focused on expanding connectivity to sophisticated infrastructure, strengthening property ownership protection, as well as reallocating workers across sectors by the reformation of labor markets (Agenor, Canuto, & Jelenic, 2012).

Larson and colleagues concluded that slow growth could be expected when there is the absence of four rudimentary ingredients of growth; policies that strongly stabilize macroeconomic issues, transparency of governance and minimum distortion through policies, investment in education and human capital, and finally, building open and competitive economies are crucial to enhancing productivity which in turn buttresses, enhances and preserves long-run growth (Larson, Loayza, & Woolcock, 2016). It's worth mentioning during this point that, as per Doner and Schneider (2016), existing middle-income traps seem particularly challenging because of politics dedicated to serving proper public intervention.

Most nations falling off or in threat of becoming stuck on slow development trends possess poorer foundations than their better counterparts (Charron & Lapuente, 2014).

Asian Development Bank analyzed the evidence on how increasing female labor force participation (FLFP) can foster economic prosperity. It suggests that since diminishing the health and gender gap did not move the global average FLFP, reforming policies that promote skill development via vocational training and ensuring a female-friendly, flexible, secure work environment. Proper implementation of these criteria will lead to economic growth by closing the gap between male and female labor force participation (Asian Development Bank, 2015). Gill and Kharas (2015) proposed six assertions to guide policymaking that facilitate many nations to liberate from this trap. Two of them were: (1) Increasing competitiveness through increasing access to global markets and investing in developing new ideas and innovations; (2) considering the demographic of the middle-income trap. They also underlined the importance of additional capital investments and how to use R&D to promote technology across the country. Many middle-income countries expect a population as a growing share of the total workforce enters the labor force, lowering the age dependence ratio. If female labor force participation boosts, this dividend might increase even more, and policies that aim for enough job creation and demographic dividend maximization should be adapted.

Ohno (2009) and Garrett (2004) used an observational method to define this middle-income trap. They emphasized the need for middle-income nations to ascend the rankings, describing this trap as concentrating on development tactics with natural constraints, such as natural resource-based growth or Foreign direct investment. He promotes a dynamic industrial strategy based on effective government collaboration and strong commercial alliances that contribute to economic success. Under this paradigm, the middle-income trap emphasizes the microeconomic roots of growth. The importance of a government-led industrial strategy is emphasized. Garrett's approach appears to be a little different. Still, he highlights the significance of technical advancement and the obstacles that globalism and trade deregulation may offer, particularly in middle-income nations seeking success. Structures based on economic systems could be critical elements of productivity gains. However, once the early benefits of restructuring the working population from small-scale agriculture to larger-scale manufacturing and utilities have worn off, new sources of growth will be required.

Most recently, Ye and Robertson (2016) present a criterion for detecting middle-income trap nations due to the time-series like random patterns as well as nonlinear effects. However, their method necessitates a former characterization as to what comprises a middle-income economy, whereby the findings are sensitive. Gill and Kharas also used a descriptive method to explain the middle-income trap. First, they identify it as a trap in which governments construct growth plans incompatible with their current economic systems. They described two frequent traps: one in which nations become stranded because they are unable to replace export demand because, despite having a competitive wage disadvantage, they attempt to continue export-led development that is driven by labor-intensive manufacturing. The other pitfall is when nations misdiagnose growth and squander fiscal resources on projects that provide poor results. Such a condition may be seen in countries that rushed to become "knowledge economies" while lacking appropriate infrastructure. Because of infrastructure impediments such as poor quality education sectors and limited human and venture capital, many nations could not exploit innovation as an economic driver (Gill & Kharas, 2015).

Empirical Review

Several empirical studies concerning middle-income traps utilize descriptive as well as systematic econometric analyses to explore a topic. Different literature provides more formal economic evaluations of how and when a nation falls locked inside this middle-income trap. The primary purpose was to find statistically significant splits and critical points within time analysis on per capita production and maybe even rate of development among nations using econometric approaches and

any basic parameters. Eichengreen et al. (2014) used a Chow test to look for structural cracks in a set of previous rapid-growing middle economies. As a result of this evidence, a big group comprising middle economies/nations appears to be on the verge of sliding towards a trap. Felipe et al. (2012) took a different technique. From 1950 to 2010, they divided absolute Gross Domestic Product per capita into four categories. Furthermore, based on disaggregated trade data, they discovered that countries ensnared in the trap all had lower levels of sophistication and diversification in their exports.

Abundant data support the increasing richness and complexity of industrial output as a pivotal task for human resources, and shifts, including innovation as a significant force behind total productivity, are substantial. Gill & Kharas presented this trap in three ways: as have said, one is based around a theoretical definition, but the second and third are affirmed with empirical definitions. A second empirical description of the middle-income trap is the reality, as several nations persist in a confined income bracket over longer durations (Gill & Kharas 2015). It says that the middle-income trap focuses on observations that many countries remain in a narrow income band over an extended period by Gill & Kharas. In contrast, the third empirical definition is constructed on how the middle-income countries do not reflect advancement that approaches an economy set as a standard/benchmark country, typically the United States.

The trap's second empirical explanation is established upon this view as several nations spend lengthy periods in a small income range. Spence (2011) provides the best explanation for this. Only a few countries have attained per capita levels of income since 1975. Felipe (2012) devised a variation of Spence's analysis. It distinguishes two middle-income zones, with one nation being locked either it stays in the first for upwards of 28 years and the 2nd over much farther than 14 years. Thirty-five middle economies, out of 52 nations assessed, are trapped. Spence and Felipe's heuristic bands of income levels indicate where middle-income countries may become stranded. Others have used econometric methods. Eichengreen et al. investigate how middle-income nations are particularly prone that experiencing economic downturn than other countries. They also stress the significance of progressing up the technological ladder to avoid a secular decline. Its conclusion is those nations may see their decline around fewer income categories than initially expected, with this deceleration occurring in phases instead of all at once (Eichengreen; Barry & Kwanho, 2013). It stresses the need to progress on the technological scale in preventing a temporal decline.

Aiyar employs a related method, although their hypothetical for evaluating a slower growth differs from Eichengreen's (Aiyar, 2013). The predictions of a Solow growth model are used by Aiyar et al. They study 123 occurrences of economic slowdowns dating back to 1960 as well as discover how middle economies experience more downturns than developed or low economies. We noted how the determining parameters on economic slowdowns varied with middle-income countries and the entire study. Nations with an inadequate development framework, poor connectivity, and confined regional integration are more inclined to witness downturns, especially middle-income nations. This discourse supports the idea that fear of economic slowdowns has been particularly intense in middle-income countries.

The third definition is based on the fact that middle-income nations do not represent progress being assessed against standard nations, often America (Gill & Kharas, 2015). Yet another description of said middle-income trap has been the lack of merging to a comparable advanced country, notably America. Rosenblatt (2013) is an excellent example. They established a set of benchmarks based on a nation's GDP per capita compared to the United States and assessed the likelihood of a country moving up a category. The researcher concludes the possibility of middle-income nations migrating toward a higher income group is low; in other words, evidence of a middle-income trap in which intersection with the US comes to a halt.

Agenor and Canuto come to the same conclusion. They compared GDP per capita to the US back to 1960 in an identical metric of comparative wealth in 2008. Many countries in Latin America and the

Middle East got stuck at middle-income levels for four or five decades, providing convincing factual support for the concept of a middle-income trap. Indeed, out of 101 middle-income countries in 1960, approximately 13 became high-income countries by 2008, based on per capita income levels relative to the United States (Agenor & Canuto, 2012). Compared to medium and high-income countries, “escapees” had risen fast in the bottom income classes (Bulman & Nguyen 2014). Low inflation, rapid advanced industrial growth, less inequity, increased knowledge, or more exporters all seem to be attributes that might explain why certain nations expand more than others.

Competence in governmental matters enables infrastructural development (Crescenzi et al., 2016), more efficient allocation of assets, and innovative thinking (Donges & Silva, 2017). Bayoumi et al. (1996) concluded through their econometric model that outlay, commerce, research, and innovation could increase total factor productivity by importing from knowledge enriched countries to boost economic growth. More recently, Storper (2018) argues that many European Union regions that had previously seen considerably large GDP are now unable to progress to the next developmental level due to enhanced cross-border economic dispersion and political division. Likewise, formerly prosperous regions have experienced protracted phases of comparative fiscal contraction, with GDP per capita falling below the overall EU baseline. The economic and financial crisis that began in 2008 worsened this trend, as productivity stagnation and downsizing have been the norm in many economies (European Commission 2017b). Probably these are the primary grounds for how nations remain locked in the middle-income trap rather than progressing to high-income status.

The primary research questions of this study are: what are the key factors by which high-income countries of Asia have avoided the middle-income trap? Do technological progress and infrastructural development matter more towards escaping the middle-income trap in Asian nations? What factors help Asia’s middle-income economies avoid falling into the middle-income trap and/or overcoming it?

Research Methods

Data and Statistical Software

The study used secondary data from two sources to complete its descriptive as well as quantitative analysis. They are: ‘World development indicators’ and ‘UNDP database.’ The collection of 33 Asian nations constructed a panel dataset for quantitative analysis over 25 years (1990 to 2014). Stata 13 software was used to carry out the econometric exercise.

Methodological Framework

This study examines the prospect of Asian economies to understand their ability to escape and/or avoid the middle-income trap. The phrase “middle-income trap,” comparing the consistent pattern seen in the Middle East regions as well as Latin America towards the possibility of a slowdown in East Asia’s growing economies, is coined by Homi Kharas and Indermit Gill. The middle-income trap is where an economy experiences a growth slowdown after reaching the middle-income level. In literature, these growth slowdowns are characterized by the exhaustion of transferable unskilled labor, which results in a fall in factor productivity gains led to the influx of extra workers from agriculture towards commerce, as well as catching up in terms of technology. Thus, middle-income nations are pressured betwixt low-wage poor-country rivals who lead in mature sectors and advanced nation inventors who rule in fields with rapid technological progress. Unless new sources of economic growth are found, the country will remain stuck in the middle-income bracket. With this background, the study empirically explored the major sources of growth in Asian high-income economies, which had driven their shift through low to high-income generating paths. This study attempted to estimate the long run relationship between economic growth, R & D expenditure, human capital, and age dependency ratio using 25 years of panel data while controlling for physical capital and macroeconomic factors. The econometric analysis of

this paper can be broken down into two sections. Firstly, the study performed a ‘panel estimation’ to currently explore the major variables contributing to accelerating economic growth in Asian countries. The econometric model analysis used to achieve this estimation is,

$$l_gdp_{it} = \beta_0 + \beta_1 ag_dp_{it} + \beta_2 elec_acc_{it} + \beta_3 infl_{it} + \beta_4 RD_{it} + \beta_5 gfcf_{it} + \beta_6 nersc_{it} + flfp_{it} + e_{it} \dots\dots(1)$$

Secondly, a ‘panel probit regression’ was executed to probe into the growth accelerating factors in Asian economies, to explore which factors played an active role in overcoming the middle-income trap in advanced/developed nations of Asia. The paper used the following model to estimate probit regression,

$$high_inc_D = \alpha_0 + \alpha_1 ag_dp_{it} + \alpha_2 elec_acc_{it} + \alpha_3 infl_{it} + \alpha_4 RD_{it} + \alpha_5 gfcf_{it} + e_{it} \dots\dots\dots(2)$$

In equation (1) and (2), $i = 1, 2, \dots, N$ denotes cross-sectional units and $t = 1, 2, \dots, T$ denotes its time periods. Here, in the model (1), l_gdp_{it} denotes the per capita current GDP which had been used as a proxy of economic growth whereas in the model (2), $high_inc_D$ symbolizes the high-income dummy which takes value ‘1’ if a country is a high income and ‘0’ otherwise. Besides, in both the models, ag_dep_{it} represents the age dependency ratio (%), $elec_acc_{it}$ represents the electricity access (%), $infl_{it}$ denotes consumer price inflation, RD_{it} denotes GDP share of R & D expenditure, $gfcf_{it}$ denotes GDP share of gross fixed capital formation, net secondary enrollment rate (%) and female labor force participation are symbolized by $nersc_{it}$ and $flfp_{it}$ respectively. Finally, e_{it} stands for the stochastic error terms in both models.

In model (1), the coefficients of interest for the study are β_1 , β_4 and β_6 whereas in the model (2) the paper endeavors to specify the growth generating factors (of model 1) that contributed to the advanced economies most towards escaping middle-income trap.

Estimation Challenges and Remedies

The estimation procedure mentioned above may suffer from several technical challenges in the way to obtaining proper estimates which are both theoretically and technically justified. However, to overcome those challenges and implement viable remedies authors had to go through several diagnostic tests before and after the estimation.

Autocorrelation and Heteroskedasticity test

As per literature suggests, for macro panels a major problem to be resolved is the problem of cross-sectional dependence that may result from the existence of common shocks. And as this study deals with a panel dataset of 25 years which is to some extent a considerably long time period, it seems highly important to test cross-sectional dependence in the dataset for the sake of unbiased estimation. The study tested the cross-sectional dependence using the ‘Significance test of pairwise covariance’ along with the ‘Wooldridge Test’. The hypothesis of the ‘Pairwise covariance test’ can be stated as follows,

$$H_0 : P_{ij} = P_{ji} = Cov(\hat{\epsilon}_{it}, \hat{\epsilon}_{jt}) = 0 \text{ for all } t; i \neq j$$

$$H_1 : P_{ij} = P_{ji} = Cov(\hat{\epsilon}_{it}, \hat{\epsilon}_{jt}) \neq 0 \text{ for all } t; i \neq j$$

Besides, for correcting heteroskedasticity problems the whole estimation process used the ‘White Robust Standard Error’. However, it is also to be mentioned that, ‘Random effects estimation’ on panel data, to some degree, tackles the complications that arise from the presence of autocorrelation and heteroskedasticity in data.

Hausman test

Since the study attempted to use panel estimation techniques to devise its conclusion on its research interest, it is crucial to identify the model that best fits the data. Therefore, under the panel estimation technique, once the pre-estimation diagnostic tests are done primary query revolves around the

decision to be taken between fixed effects and random effects estimation. Theoretically, the ‘Fixed effects model’ controls invariant differences between the cross-sectional entities for all time. Whereas the ‘Random effects model’ considers the variation across entities to be random and uncorrelated with the independent variable of the model. This study performed the popular ‘Hausman test’ to inspect which of the two models, ‘Fixed effects model’ and ‘Random effects model’, is more appropriate. This assumption can be sorely tested in the following manner,

H_0 : The coefficients yielded by two estimation processes (fe , re) do not differ significantly.

H_1 : The coefficients of two estimation processes (fe , re) differ significantly and ‘Fixed effects model’ is preferred.

Brush-Pegan Lagrange Multiplier test

Along with the ‘Hausman test’, the paper also carried out the ‘Brush-Pegan Lagrange Multiplier (BPLM) test’ to determine whether ‘Pooled OLS estimation’ or ‘Random effects estimation’ should be appropriate. And the hypothesis can be tested as follows,

H_0 : $var(ui) = 0$

H_1 : $var(ui) \neq 0$

In this test, rejecting the null hypothesis implies that ‘Pooled OLS estimation’ should not be an appropriate model (given that it assumes an error structure $\sigma^2 I_{NT}$) for the provided dataset.

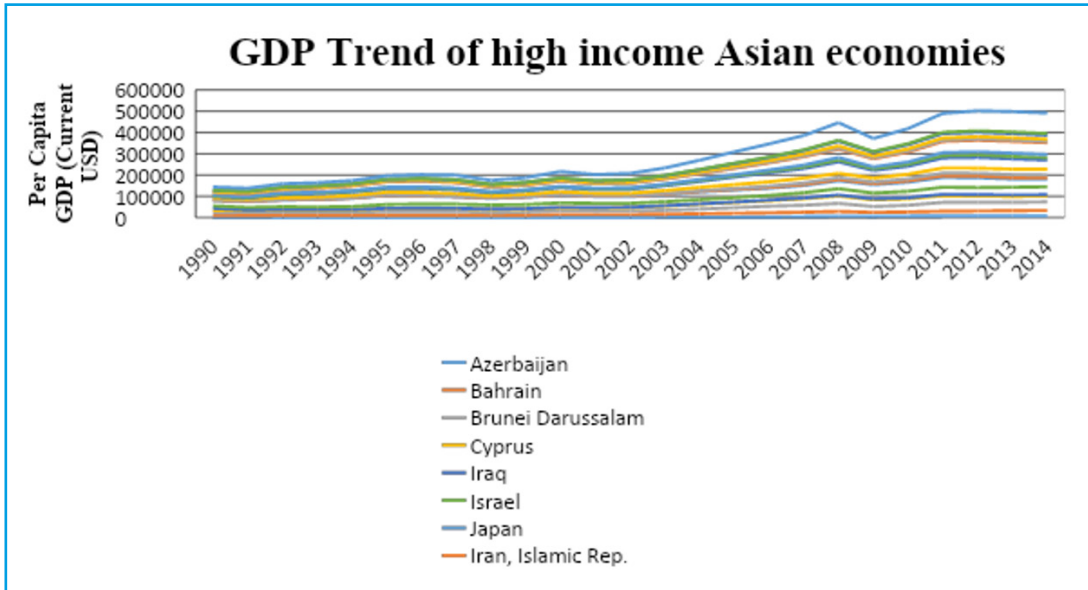
Descriptive Analysis: An overview on Asian economies

The Asian region, being part of the globe’s quickest developing regions, experiencing significant improvement in a number of areas of economic development over recent decades. Many countries like Russia, the East Asian Tigers (South Korea, Hong Kong, Singapore, Taiwan), China, and Middle Eastern countries have moved from middle to high-income status. In contrast, most countries are still struggling to avoid the potential challenges of getting trapped in middle income. As per the substantial evidence, growth slowdowns have been a prevalent scenario in many economies of this region which are labor abundant. On the other hand, some economies differ in their transition from middle income to high-income status as an economy despite having similar economic resources. For example, South Korea’s notable shift from middle to high-income status could shed light on the issue. Both South Korea and Indonesia attained similar prosperity in the 1960s; however, South Korea timely tackled structural limitations and infrastructural issues to move from middle to high income.

On the other hand, despite having similar structural weaknesses, Indonesia has not been able to sustain economic growth. Thailand attained its middle-income status due to its growth spurt in 1962. However, its growth rate has been highly unstable since then. This approximate twenty-year span of being a middle-income country puts Thailand at risk of being trapped in this status as it is experiencing slow progress with low R&D investment and middle per capita income. Bangladesh’s economic growth is largely based on its RMG sector in the Southern region. As it prepares the final product of a value chain, any shock to this sector will affect growth, so the export basket must be diversified to avoid being trapped. India’s per capita income was \$375 in 1990, which has increased by five folds mainly due to growth input from its IT sector, but India still has not transitioned to high-income status. However, it has a much higher chance of transitioning as it has diversified its export revenue source, which now consists of freelancing and medical services.

Robertson & Ye (2013) defined the Middle Income Trap (MIT) as the countries whose forecasts are stationary within the middle-income band and cannot move to the high-income status. Based on this definition, using an ADF test, they concluded that 19 countries exhibit being trapped. Of those MITs, the Asian countries were Thailand, Jordan, Iran, Iraq, Turkey, Lebanon, and Indonesia.

Figure 1: GDP Trend of high-income Asian economies



The above graph (Fig.1) shows trends in GDP of high-income Asian countries. It can be observed that they exhibit very similar trends, their GDP is fluctuating in the same way. From this, it can be gathered that they passed through some definite development stages. For example, China, Japan Qatar, and Korea. The next graph (fig. 2) shows that the high-income Asian countries such as Korea, Singapore, Japan, China, and Russia have drastically raised their R&D expenditure. This has given them the benefit of being known as the high-income countries.

Figure 2: Trend in the GDP share of R&D expenditure in leading economies of the Asian region

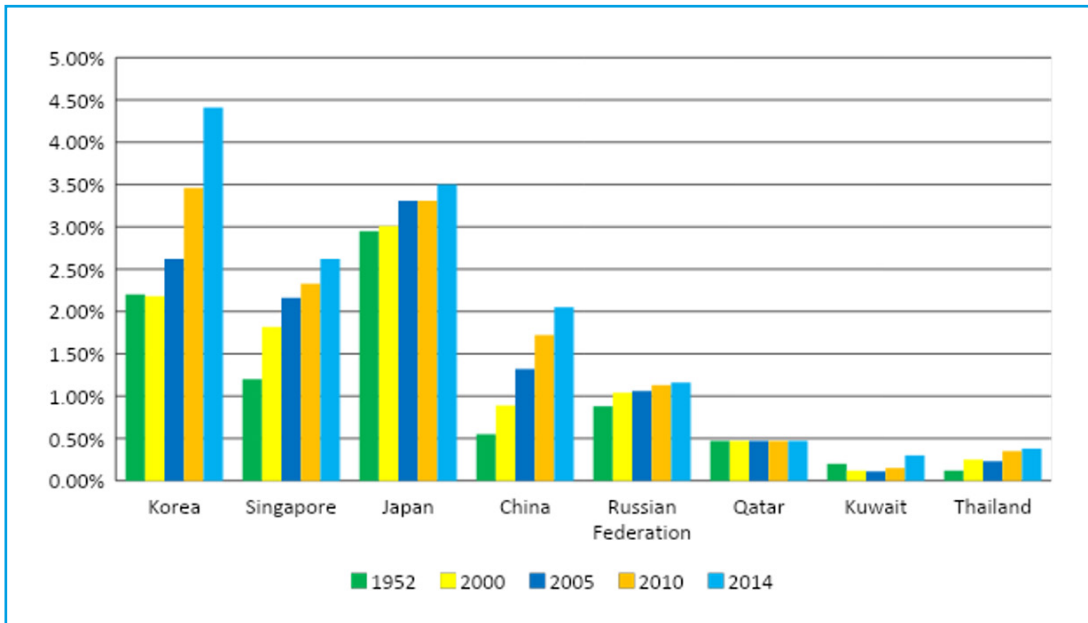
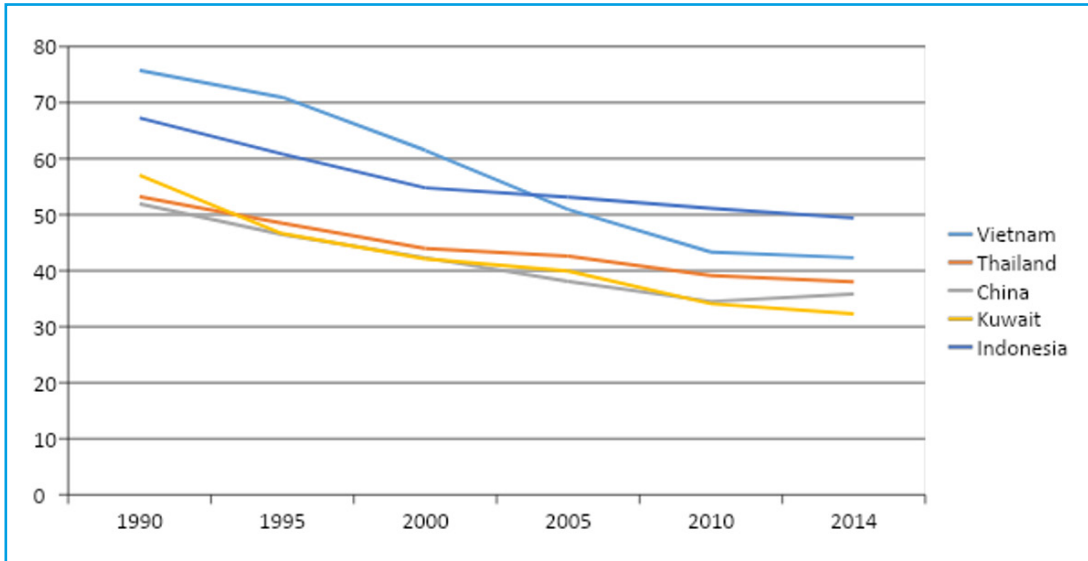


Figure 3: Decreasing trend in age dependency ratio of growing economies of Asia



From the above graph (Fig. 3), it is seen that the five countries: Vietnam, Thailand, China, Kuwait, and Indonesia have downward sloping which implies they have had demographic transitions from 1990 to 2014, that is, the proportion of their non-working population is diminishing. Then according to the theory of demographic transitions, these countries have reaped the benefits of demographic dividend since the working-age population is increasing. From this descriptive analysis, it can be summed up that high-income countries have avoided the middle-income trap by high R&D expenditure and demographic dividend, which has insulated them from shocks to economies.

Empirical Analysis and Result

Tables 1 and 2 represent the results of the econometric exercises performed throughout the study. As per mentioned in the methodology section of the paper, several diagnostic tests were carried out to reach the estimation stage of the analysis. And thus the following tables represent the results of the tests concerning cross-sectional dependence and model selection,

Table 1: Wooldridge test for serial correlation

Wooldridge test for serial correlation in panel data	
Ho: No first-order autocorrelation	
F (1, 32)	94.766***
Probability > F	0.000

Table 2: Breusch Pagan-LM test for ‘Random effects’

Breusch Pagan Lagrange Multiplier test for ‘Random effects’	
Ho: Variances are homoscedastic	
Chi 2	2802.98***
Probability > Chi 2	0.000

Tables 1 and 2 show the results of the ‘Wooldridge test’ and ‘Brush Pegan Lagrange Multiplier (BPLM) test,’ which shows that the P-values are lower than 1% implying we can reject the ‘Null Hypothesis’ since there is an autocorrelation or serial correlation as in dataset under analysis. A dataset may not have any autocorrelation and serial correlation as a whole.

Table 3 depicts the results of the regression analysis (along with the expected sign of the variables) the paper dealt with, which were performed using the model (1) mentioned in section (4). This study considered the regression of the GDP (per capita) log on several variables that affect growth. These variables are age dependency ratio, electricity access, inflation, GDP share of R&D expenditure, net enrollment rates, GDP share of gross fixed capital formation, and female labor force participation rate. Primarily, we ran general ‘Fixed effects’ and ‘Random effects’ regression, showing the results in columns (3) and (4).

The coefficients reveal unexpected signs associated with very high standard error values along with the indication of insignificance, as evidenced by the findings of the primary ‘Fixed effects’ and ‘Random effects’ estimations. We can consider these facts as classic symptoms of endogeneity problems in our model (Model 1). Besides, we can also justify this presence of endogeneity because there may exist bi-directional causal relationships between/among our variables of consideration. More specifically, it is not unlikely that an increase in net enrollment rates of an economy can derive higher female labor force participation or vice versa.

Table 3: Estimation results of ‘Panel regression’ on Asian economies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
LogGDP (current)		Expected sign	Fixed Effect estimation	Random Effect estimation	Fixed Effect estimation	Random Effect estimation	GMM estimation
l_gdp							0.878***
L1		+	N/A	N/A	N/A	N/A	(0.076)
Age dependency ratio		-	0.234 (1.789)	-0.156*** (0.347)	-0.036*** (0.002)	-0.037*** (0.002)	-0.011*** (0.001)
Electricity Access		+	-0.098 (0.435)	0.226 (0.549)	0.016*** (0.004)	0.016*** (0.004)	0.001** (0.002)
Inflation (consumer price)		-	-0.768** (.9983)	-0.353 (0.781)	-0.0002*** (0.00005)	-0.0002*** (0.00005)	-0.002*** (0.001)
R&D expenditure		+	-0.354* (.451)	-0.255* (0.052)	0.225*** (0.048)	0.240*** (0.047)	0.061*** (0.036)
GFCF		+	0.654 (0.007)	-0.806* (0.003)	0.007*** (0.002)	0.007** (0.002)	0.001** (0.001)
Net enrollment rate		+	-0.654 (0.897)	0.156 (0.278)	0.014*** (0.002)	0.013*** (0.002)	0.003** (0.001)
Female labor force participation rate		+	-0.975 (.781)	-0.534 (0.642)	N/A	N/A	0.004*** (0.001)
constant		+/-		8.20** (0.678)	7.316 (0.421)	7.426 (0.429)	1.6*** (0.351)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
LogGDP (current)	Expected sign	Fixed Effect estimation	Random Effect estimation	Fixed Effect estimation	Random Effect estimation	GMM estimation
Number of observations	N/A	825	825	825	825	759
Number of groups	N/A	33	33	33	33	33

However, considering the endogeneity problem in our model, we performed the same regression analysis by dropping the variable, ‘female labor force participation.’ And the results of our regression are shown in columns (5) and (6) of Table 3. In this case, we can see our results are quite convincing as well as encouraging. But given that we have effective results with expected signs with all the variables associated with satisfactory levels of significance, analysis encounters a further question about the choice between ‘Fixed effects estimation’ or ‘Random effects estimation.’ However, to answer this question, the analysis proceeds with the popular ‘Hausman specification test’ mentioned earlier. The ‘Hausman specification test’ outcome is shown in Table 4. It is clear as we may reject our ‘Null Hypothesis’ and conclude that ‘Random effects estimation’ is better suited for the model under consideration.

Table 4: The Hausman test

The Hausman test	
Ho: Difference in coefficients not symmetric	
Chi 2 (6)	116.04***
Probability > Chi 2	0.000

The results (Column 6) of our ‘Random effects estimation’ reveal that our focus variable ‘GDP share of R&D expenditure’ is positively significant at 1% level of significance. A coefficient value of 0.240 implies a 1 unit increase in ‘GDP share R&D expenditure’ results in a .24% increase in per capita GDP of the economy on an average, holding all other things constant. Besides, our other variable of interest, ‘age dependency ratio’ is negatively significant with a coefficient value of 0.037 which illustrates that 1 unit decrease in ‘age dependency ratio’ results in a .037% increase in per capita GDP of the economy on an average holding all other things constant. In addition, other variables named ‘electricity access,’ ‘gross fixed capital formation,’ and ‘net enrollment rate’ are positively significant, implying that they have a significant contribution to a country’s economic growth. An important negative sign of the variable ‘inflation (consumer price)’ depicts the trade-off between GDP and inflation in any economy, which is also backed by a wide range of macroeconomic theories.

However, we continue with a ‘Generalized method of moments (GMM) estimation,’ which is widely accepted for its ability to tackle the endogeneity problem in the model. Column (7) of Table (3) represents the results of GMM estimation where we included the variable ‘female labor force participation’ along with all other variables we considered in the model (1). Here, our major variable of interest, ‘GDP share of R&D expenditure,’ is highly positively significant at a 1% significance level. It has a coefficient value of 0.061, implying that a 1 unit rise in ‘GDP share R&D expenditure’ is associated with a .061% rise in per capita GDP of the economy on an average, holding all other things constant. Moreover, results also reveal that a 1 unit decline in ‘age dependency ratio’ results in a .011% increase in per capita GDP of the economy on an average, holding all other things constant. Finally, the results show that our other concern variable, the ‘female labor force participation rate,’ is positively significant at the 1% significant level. It demonstrates that a 1-unit boost in the ‘female labor

force participation rate’ is associated with a 0.04 percent increase in the economy’s per capita GDP on average when all other variables are held constant. Furthermore, all other considered variables are significant with their expected signs. The findings of the GMM estimation also reveal that the GDP share of R&D expenditure, female labor force participation, and the age dependency ratio contribute the most to Asian nations’ economic growth.

Table (5) represents the ‘Panel Probit’ regression results. Results reveal that the ‘Age dependency ratio,’ ‘Electricity Access’ and ‘R&D expenditure’ affect the probability of becoming a high-income nation for middle-income or low-income countries.

Table 5: Estimation results of ‘Panel Probit regression’ on economies of Asia

High-income dummy	Coefficients (Standard Error)
Age dependency ratio	-0.534*** (0.061)
Electricity Access	0.680*** (0.107)
Inflation (consumer price)	-0.076 (0.05)
R&D expenditure	0.446*** (1.236)
GFCF	-0.035 (0.051)
Constant	-40.714 (11.322)
Number of observations	825
Number of groups	33

More briefly, a decrease in the age dependency ratio by one unit holding all other things constant, will increase the probability of a country being high income by 0.534 units. In addition, increasing the access to electricity (a proxy of infrastructure) by one unit while holding all other things constant will increase the probability of a country being high income by 0.680 units. Finally, a rise in the GDP share of R&D expenditure by one unit holding all other things constant, will increase the probability of a country being high income by 0.446 units. Therefore, our analysis of ‘Panel Probit’ regression sums up that the high-income countries of Asia had escaped the middle-income trap using their increased emphasis on demographic structure associated with higher R&D expenditure (% of GDP) and improved infrastructure.

Conclusion

The paper attempted to examine the essential factors that can substantially influence Asian nations’ capacity to prevent them from falling into a middle-income trap. Aside from it, the research looked at the role of technological advancement along with infrastructure development in escaping Asia’s middle-income trap. Finally, this paper delves into what factors allowed Asia’s high-income countries to avoid sliding into the trap amid their economic progress. The quantitative approach and qualitative studies conclude that three main emphasis points should be considered when any Asian region’s high-income nations will avoid falling into the middle-income trap. They are enough R&D investments indicating technical advancement in research and innovation, creation and implementation of “soft”

and “hard” infrastructure, and optimal use of the demographic dividend. The article makes additional policy recommendations based on the above findings and the three key emphasis points outlined above. Asian economies must examine variables such as human capital investment and female labor force participation. Other variables include the fact that, because expansionary policies drive GDP away from its natural pace, policymakers must be cautious in ensuring that the goal of escaping the middle-income trap doesn’t clash well to maintain macroeconomic stability.

The study does have certain limitations. The use of relative vs absolute income, or applying exact income criteria to determine both top and lower bounds defining middle-income status, might lead to inconsistent outcomes. The study combines empirical analysis with panel regression and a panel probit regression analysis as a binary variable to provide a feasible policy proposal. The conclusions reached may differ from those derived using other approaches. We can include other relevant variables such as low-cost labor and international trade to examine the impact more closely.

This study employs cross-country growth regressions with data ranging from 1990 to 2014, limiting their historical relevance. In the same way, there is no time-based definition of a trap. Besides taking a descriptive analysis of the time patterns of different variables based on nineteen Asian economies from 1990 to 2014, we can include other diverse countries. As a result, a growing number of researchers should try to address these concerns with greater precision in the following days.

In a nutshell, the criteria used are frequently arbitrary, and methodological and definitional choices appear to be influenced by the study’s goals or the peculiarities of the countries or areas under consideration. Some empirical and descriptive research is hampered by the “trap” literary works, which are subsequently burdened by a lack of scientific and conceptual consensus.

Conflict of Interest

This article has no conflicts of interest.

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