International Journal of Contemporary Issues in Social Sciences
Volume 3, Issue 2, 2024 ISSN(P):2959-3808 | 2959-2461

UNVEILING BRAIN DRAIN, REMITTANCES INFLOWS & ECONOMIC GROWTH NEXUS IN ASIA AT AGGREGATED AND DISAGGREGATED LEVEL

Salman Moazam[1], Asma Awan[*2]

[1,*2]School of Economics, University of the Punjab, Lahore, Pakistan

[1]salmanmoazamm@gmail.com; [*2]asma.eco@pu.edu.pk

Corresponding Author: *

Received: 12 May, 2024 **Revised:** 09 June, 2024 **Accepted:** 20 June, 2024 **Published:** 30 June, 2024

ABSTRACT

A massive increase in brain drain has been observed in recent decades which in turn has multifaceted implications for economic growth. In fact brain drain is an emerging issue in developing countries (in general) and in Asia (in particular). On one side, it hinders economic growth by causing human capital loss. Conversely, it may result in higher remittance inflows that can potentially accelerate economic growth. The complexity of mutual association among brain drain, remittances and economic growth in turn demands more rigorous research. Using balanced panel dataset of 26 Asian economies, this study has analyzed the simultaneous long run relationship among brain drain, inflows of remittances and economic growth from 1996 to 2022 at aggregated and disaggregated level. In addition to pre-estimation tests, the study uses the panel unit root test to guarantee the stationarity of the variables. To estimate simultaneous model comprising of three structural equations, the study uses the Panel 2SLS estimation method after confirming simultaneity, over-identification and other pre-requisites. Furthermore, the study has also constructed index of standard of living, institutional quality, social safety nets, demographic characteristics and infrastructure to make a comprehensive analysis on subject matter. For index construction, PCA method is utilized. The empirical results reveal a bidirectional association between brain drain and remittance inflow in all panels of Asia except low-income economies. The remittances and economic growth also show a bidirectional relationship in Asia (overall), low-middle, and high-income economies. Whereas, low-income and upper- middle-income economies show a unidirectional relationship. The findings also reveal the significant impact of brain drain on remittances at all income levels. The social safety nets, higher living standards, and better institutional quality reduces brain drain, whereas, unemployment and gender inequality increases it. The remittances inflows, labor, capital, and human development are the primary drivers of economic growth along foreign direct investment and institutional quality. Addressing the brain drain, boosting remittance inflows, and fostering economic growth at all income levels require targeted investments in infrastructure, education, jobs, living conditions, governance, and social safety nets.

Key Words: Brain Drain, Remittance inflows, Economic growth, Panel 2SLS, Asia
JEL Codes: C23, F22, O47, C33, O53

1. INTRODUCTION

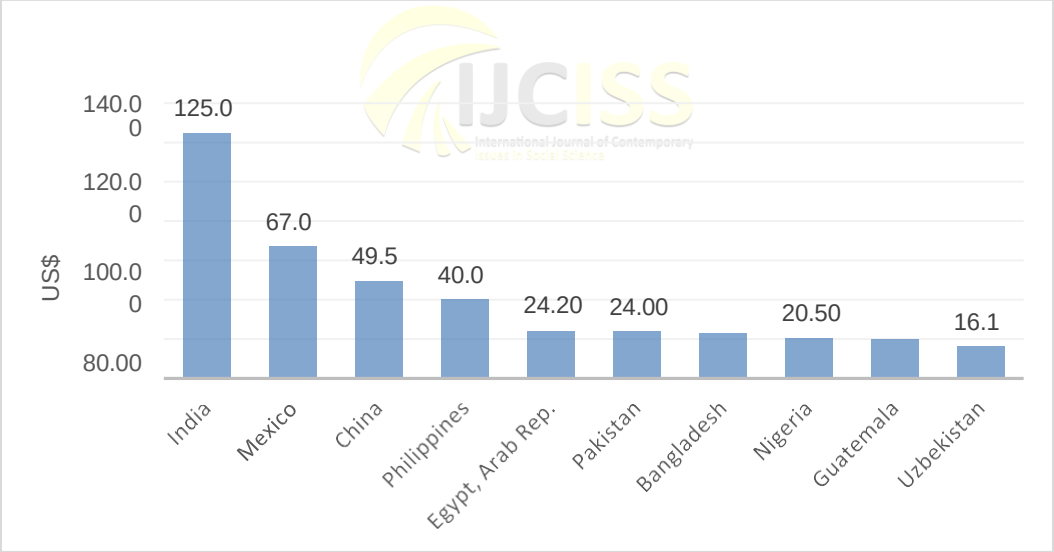
In this globalized world, developing countries are experiencing a rapid increase in skilled workforce migration to developed economies. This international migration raises a debate about the benefits and costs of skilled individual migration. Global remittances, a crucial source of financial support for developing countries, are considering the ultimate benefit of this human capital flight. Conversely, the high cost of this migration is the loss of skillful and competent human capital, which is vital for economic growth and development. For many decades, Asian countries have faced significant challenges due to the phenomenon known as brain drain or human capital flight, which is the migration of people, the most experienced and competent workforce, from developing economies

to developed economies where they believe that they will get better returns of their skills and education.

Over the past fifty years, international migration has risen from 84 million to 281 million from 1970 to 2023. By 2023, approximately 281 million individuals, about 2.6 per cent of the world's population, lived outside their home countries. This shows an increase of 128 million compared to 1990 when the estimated figure was 153 million, and even more than three times as compared to 1970, when the estimated figure was 84 million (World Bank, 2024). The funds for Peace, World Bank Official Boundaries illustrated phenomenon of brain drain worldwide using the brain drain index. The index ranges from 0 to 10. The index values shows that Africa is the region most affected by skilled workforce loss, but African countries are not among the top remittances- receiving countries. The Asian economies are also suffering greatly from human capital flight, with a significant number of countries showing the higher index values including: Pakistan 5.9, Afghanistan 8, Bangladesh 6.7, Myanmar 6.4, Nepal 6.1, Syria 8.1, Georgia 5.8, Yemen 6.7, Sri Lanka 6.6, and India with an index value of 5.2. Besides suffering from brain drain, these Asian economies are also among the top remittances receiving economies. Hence, the ultimate focus of this study is on Asian countries.

According to the World Bank, the estimated amount of money sent back home by migrants working abroad increased to $794 billion in 2022 globally. In 2023, the top five remittance- receiving countries among Asian economies were India with remittance inflows of 125 billion USD, Mexico with 67 billion USD, China with 50 billion USD, Philippines with 40 billion USD, and Egypt with the remittance inflows of 24 billion USD. India has been the largest recipient of remittance inflows since 2008 (World Bank, 2023). This trend is illustrated in Figure 1.

Figure 1: Top Remittance Recipient Countries (2023)



Source: Data extracted from the International Organization for Migration (IOM)

These remittances can play a crucial role in compensating the skilled workforce loss. In this world of globalization, remittances are considered a significant and primary means of the international flow of resources, specifically financial resources from developed to developing nations, which can play a role in improving the living standard of the family left behind in the source country. Weil (2010) defined economic growth as the rise of the country's living standard over time. These remittances can increase the standard of living of the migrant families, which can collectively improve the standard of living of the whole nation. Brain drain is becoming a significant aspect of globalization due to the critical role that human capital can play in enhancing economic growth. It is becoming a vast and complex phenomenon. Every region needs highly skilled professionals, particularly those

trained as technicians, engineers, and healthcare workers, to contribute to the economic growth and development of the home country. Hence, brain drain is considered detrimental to Asian economies and can cause a significant loss of competent human capital. On the other hand, it benefits destination countries. The developing countries have invested in the education and training of their skilled workforce. However, this investment is wasted when these individuals move abroad without contributing to the economic growth of their home country. It can also cause a decline in innovation and productivity of the home country's economy. The host country directly gets advantages from these skilled laborers without bearing the expense of their education and training. Hence resulting in increasing inequality at the international level. But at the same time, the negative effect of human capital flight can be counterbalanced through remittances, which can play a crucial role in enhancing economic growth by providing financial support and filling the foreign reserve gap. In recent years, the remittances sent by migrants have exceeded the Official Development Assistance (ODA) received by many Asian countries. This shift highlights the growing importance of remittances as a financial resource for these nations. The simultaneous occurrence of brain drain and remittances creates a complex dynamic and it is crucial to understand the nexus among brain drain, remittances inflows and economic growth. The brain drain significantly impact economics growth, simultaneously economics growth can also significantly impact brain drain. Similarly, both remittances and economic growth can also significantly impact each other.

The significance of this research lies in its ability to present fresh empirical evidence pertaining to simultaneous association among brain drain, remittance inflows and economic growth using structural equation model in Asia. By examining the effects of brain drain, remittance inflows and their association with economic growth, the study tries to fill a notable gap in the existing literature.

The primary objective of this study is to provide empirical estimates on subject matter at aggregated and disaggregated level of Asia from 1996-2022 using structural equation model. The Asian economies are disaggregated based on income levels as [(low-income economies (LIEs), lower-middle-income economies (LMIEs), upper-middle-income economies (UMIEs), and high- income economies (HIEs)] to analyze the association across diverse economic landscapes.

This study is organized as following introduction section 2 provides insight into the previous literature on subject matter including theoretical and empirical aspects and literature gap. Section
3 provides the conceptual framework. Section 4 reports the data, simultaneous model and methodology. Section 5 reports and discusses the estimation results. Lastly, section 6 provides the conclusion, policy recommendations and future prospects.

2. Literature Review

Brain drain is usually considered a curse for the developing home countries and the brain gain for the destination countries. The British Royal Society did the earliest studies on brain drain in the mid-1960s to investigate the emigration of highly skilled and competent workers and its political and social impacts (Melike et al., 2005; Giannoccolo, 2009; Alem, 2016). Giannoccolo (2009) and Adeyemi et al. (2018) stated that brain drain, or human capital flight, is the international migration of highly competent individuals or workforce from low-income countries to more developed economies where they believed the returns of their skills and human capital is higher. Docquier & Rapoport (2012) explained the skilled immigrant as an individual born in a foreign, having an age of 25 or more, and holding a professional or higher academic degree. This international movement of skilled and competent workforce has demographics, sociological, cultural, psychological, and, most importantly, economic dynamics (Melike et al.2005). Studies have also examined brain drain's positive impact on economic growth and argued that skilled migrants raise the economic welfare at origin by sending a relatively large inflow of remittances (Faini, 2006, 2007; Mohamed et al., 2024). Worker remittances are becoming increasingly vital for transferring resources from developed to developing nations, and remittances are considered the second-largest source for developing countries in the form of external funding behind foreign direct investment (FDI). Sometimes, the inflow of remittances is even greater than that of FDI and ODA (Wanner, 2008; Shera & Meyer, 2013). Remittances are the interpersonal transfers between migrants who are residents in a foreign country on a temporary or

permanent basis to their families that remained in their country of origin (Bascom, 1990; Tabit & Moussir, 2016). The rise in brain drain can cause a simultaneous rise in the remittance inflow, ultimately increasing economic growth. Several studies showed that remittances are an essential source of economic growth, and remittances can increase the GDP growth of the source countries (Taylor et al., 1996; Nyamongoa et al., 2012; Shera & Meyer, 2013; Goschin, 2014). International migration may serve as a dynamic force promoting economic growth using remittances. Several studies also showed that the remittance inflow can reduce the economic development of the source country (Chami et al., 2005; Azam, 2014; Chowdhury et al., 2023). Firstly, this negative effect can be due to corruption and poor institutional qualities in many developing nations. Secondly, recipients may perceive the funds as a replacement for labour income, potentially leading to increased leisure activities, which could have adverse effects. Massey and Parrado (1998) also stated it as the dependency syndromes. Alem (2016) described the pull and push theory, also known as Lee's theory of migration, proposeonolod by Everett S. Lee in the 1960s. This theory attempts to explain the factors influencing migration patterns by considering both pull and push factors. Pull factors are the favourable qualities and attractive attributes within a destination country that encourage immigration to a country. Conversely, push factors relate to the negative or discouraging aspects within one's homeland that prompt emigration. (Melike et al., 2005; Docquier & Rapoport, 2012; Ngoma & Ismail, 2013; Farooq, 2017).

Chandavarkar (1980) investigated the various macroeconomic determinants of remittances affecting the inflows of remittances into Yugoslavia, Portugal, Yemen, Turkey, India, and Pakistan from 1973 to 1977, and the study highlighted that stable institutional environment, economic growth, and exchange rate have a positive impact on the remittance inflows. Melike et al. (2005) measured the association among human capital, economic growth, and brain drain across 77 countries from 1990 to 2001. The study found that migration decreases as wages and per capita income rise. Conversely, migration tends to increase when the minimum poverty level and unemployment increase. Chami et al. (2005) investigated the panel data from 1970-1998 for 113 countries using panel OLS estimations and found that remittances hurt economic growth. Faini (2007) empirical results showed that more brain drain results in a smaller flow of remittances, and as skilled migrants do remit less, the negative effect of brain drain cannot be compensated. Shera and Meyer (2013) collected the panel data set of 21 developing countries from 1992–2012 to study the effect of inflows of remittances on economic growth. The findings suggested that remittances positively affect the economic growth. Farooq (2017) used an index of relative push and pull factors to study the emigration of competent workforce from Pakistanis to 27 major destination countries from 1981 to 2016 using panel least squares estimation. The results showed that the relative economic incentives index, relative financial stability index, and relative Standard of living index significantly and positively enhance the emigration of skilled workers from Pakistan to the destination countries. Kousar et al. (2020) also investigated the factors that can affect the human capital flight from Pakistan from 1990 to 2018. The study results show that the country's governance, financial stability, infrastructure, and Standard of living can negatively and significantly affect brain drain. Usman et al. (2022) investigated the association between brain drain and remittance inflow and its impact on the economic growth of Sub-Saharan African countries from 2006 to 2020. The results showed that remittances and trade positively impact economic growth. On the other hand, human capital flight, poverty, inequality, and inflation hurt economic growth. Mohamed et al. (2024) measured the effect of brain drain on economic growth based on data from 140 emerging countries from 2007 to 2022. The study found that brain drain positively impacts economic growth by increasing the inflows of remittances.

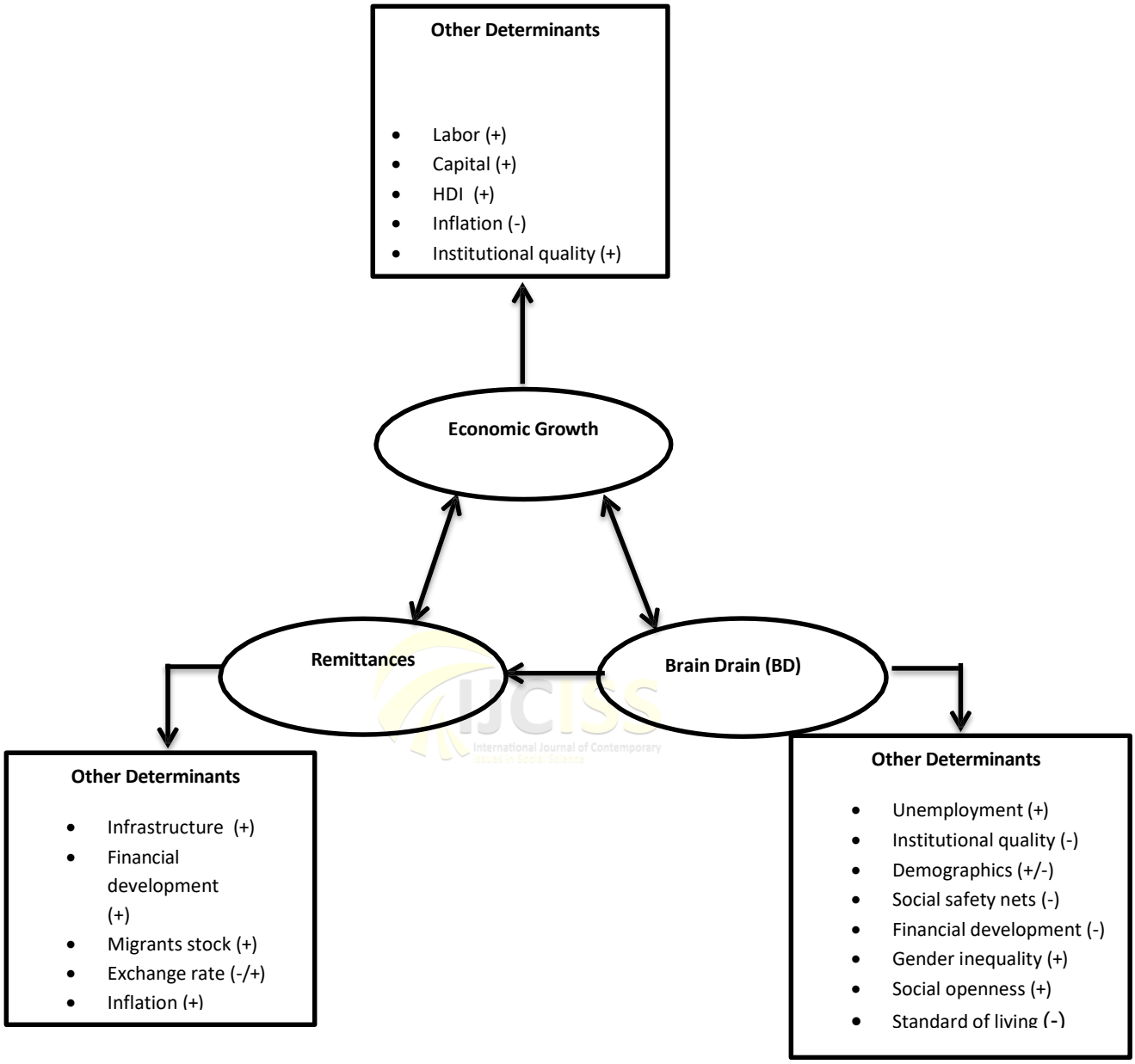
The previous studies has explained the impact of various on brain drain but two of the most important variables has been ignored i.e. gender inequality and social openness. The lack of opportunities for women in their home country, especially in the Asian regions, motivates them to move to other countries where they can utilize their skills better. In addition, social openness can act as a door by providing access to the latest, customized, and interactive information for skilled individuals to migrate. Most studies on brain drain and remittance inflow have been done using a single equation model, but to best of our knowledge, only few studies have used

simultaneous model. This study utilizes a three-equation simultaneous model to investigate the interplay among brain drain, remittance inflow, and economic growth. Moreover, the variables like gender inequality and social openness has also been incorporated as significant determinants of brain drain. This research will be a significant contribution to the existing literature on subject matter.

3. Conceptual Framework

The conceptual framework presented in figure 2 indicates two-way association between brain drain and economic growth as per literature on subject matter. Same is reported in case of economic growth and remittance inflows, whereas, brain drain directly affects remittances and reverse effect is absent. It also shows various determinants that can affect all three core (dependent) variables. The other variables including unemployment rate, gender inequality and social openness can positively impact economic growth. Conversely, the variables including standard if living, social safety nets, institutional quality and financial development can negatively impact economic growth. While demographic characteristics have mixed impact. Laila and Fiaz (2018) empirically revealed that brain drain is positively related to the unemployment rate, and skilled workforce migration increases with the increase in unemployment, whereas, better quality of institutions can play a vital role in minimizing human capital flight (Ngoma & Ismail, 2013). On the other side, the financial development, infrastructure, inflation rate, interest rate and migrant stock positively impact the economic growth. While exchange rate has mixed findings. Niimi & Ozden (2007) and Docquier & Rapoport (2012) showed that the size of the migrant stock can have a significant impact on remittance inflows. According to their finding, more extensive migrant stocks are positively related to higher remittances. Mustafa and Ali (2018) empirically showed that better infrastructure in the home country, such as roads, rail lines, and industrial facilities, can encourages migrants to send more money back home to support their families. Furthermore, a developed financial sector in the home country facilitates remittance inflows by offering efficient channels, diverse services, competitive exchange rates, and investment opportunities for migrants and their families. Several variables including labor, capital, human development, FDI inflows and institutional quality positively impact economics growth. Conversely, inflation rate and unemployment can negatively impact economics growth. Melike et al. (2005) highlighted the importance of human development in promoting economic growth by contributing to a skilled and healthy workforce, which enhances productivity and innovation. Moreover, Usman et al. (2022) empirically proved that inflation hurts economic growth.

Figure 2: Brain Drain, Remittances Inflows and Economic Growth Conceptual Framework



4. Data, Simultaneous Model and Methodology

4.1 Data

Using balanced panel data from 1996-2022 this study provides empirical estimates on subject matter in Asia at aggregated and disaggregated level by income[1]. The low-income economies are Syria and Yemen. The panel of lower-middle-income economies includes Bangladesh, Cambodia, Bhutan, India, Mongolia, Nepal, Pakistan, Philippines, Sri Lanka, Tajikistan, Uzbekistan, and Vietnam. The panel of upper-middle-income economies includes Armenia, China, Georgia, Indonesia, Malaysia, Maldives, Thailand, and Turkey. The countries included in the panel of high- income economies are Cyprus, Japan, Oman, and Qatar.

The three dependent variables in this study are brain drain, remittances inflows and economic growth which is measured by net migration rate, personal remittances received (% of GDP) and GDP per capita (constant 2015 US$, in the log) respectively. Several studies have used the net migration rate as a proxy for the brain drain [(Melike et al., 2005); (Adeyemi, 2018)]. The remittance inflows are commonly measured by Personal remittances

received (% of GDP) [(Docquier, 2001); (Fayissa & Nsiah, 2010); (Ghosh, 2014); (Tabit & Moussir, 2016); (Meyer & Shera, 2016)]. The GDP per capita (constant US$) is used to measure economic growth by Sethi et al., 2020 among others. This study has also constructed five indices given multidimensional nature of variables using principal component method. Those variables includes institutional quality[2], standard of living[3], demographic characteristics[4], social safety nets[5], and infrastructure[6]. The detailed description of all variables is given in Table 1.

[1] According to the World Bank FY24 income classification, low-income economies have a GNI per capita of ($1135 or less in 2023), and lower-middle-income economies have a GNI per capita between ($1136 and $4465), upper-middle-income economies have a GNI per capita between ($4466 and $13845). High-income economies have a GNI per capita between ($13846 and more).

[2] It includes Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence/Terrorism, Regulatory Quality, Rule of Law and Voice and Accountability.

[3] Standard of living index includes Current health expenditure (% of GDP), People using safely managed sanitation services (% of population), People using safely managed drinking water services (% of population), Current education expenditure, total (% of total expenditure in public Institutions) and Households and NPISHs Final consumption expenditure (annual % growth).

[4] Demographic characteristics includes Population ages 25-29, male (% of male population); Population ages 25-29, female (% of female population); Urban population (% of total population); Labor force with advanced education (% of total working-age population with advanced education); and Population growth (annual %).

[5] Social Safety Nets includes Compensation of employees (% of expense), Grants and other revenue (% of income), Subsidies and other transfers (% of cost) and Insurance and financial services as a percentage of service imports.

[6] Infrastructure index includes Access to electricity (% of population), Physicians (per 1,000 people), Energy use (kg of oil equivalent per capita), Total natural resource rents (% of GDP) and Mobile cellular subscriptions (per 100 people).

Table 1: Description of Variables

	Variables	Symbols	Proxies	Units	Sources
Dependent Variables	Brain Drain	BD_{it}	The net rate of migration	%	Migration Data Portal
	Remittances	Rem_{it}	Personal remittances received (% of GDP)	%	WDI
	Economic Growth	$lngdp_{it}$	GDP per capita (constant 2015 US$, in log)	%	IMF
Explanatory Variables	Unemployment	$Unemp_{it}$	Unemployment, total (% of the total labor force)	%	WDI
	Institutional Quality	IQI_{it}	Institutional quality index	Index 0-1	WGI
	Financial Development	$lnFD_{it}$	Financial development index (log form)	Index 0-1	IMF
	Standard of Living	SOL_{it}	Standard of living index	Index 0-1	WDI
	Demographic characteristics	Dem_{it}	Demographic characteristics index	Index 0-1	WDI
	Social Safety nets	$Snet_{it}$	Social safety nets index	Index 0-1	WDI
	Gender Inequality	engender	Gender inequality index (in log)	Index 0-1	Human Development Report
	Social Openness	un_{it}	Globalization index (in log)	Score 0-100	Dreher's Dataset
	Infrastructure	$Infra_{it}$	Infrastructure index	Index 0-1	WDI
	Migrant stock	MS_{it}	International migrant stock (% of population)	%	WDI
	Exchange rate	$Exrate_{it}$	Domestic Currency per U.S. Dollar, Period Average	Numbers	IFS
	Inflation	Inf_{it}	GDP Deflator (Annual %)	%	WDI
	Interest rate	$Interest_{s}$	Real Interest rate (%)	%	WDI
	Labor	Lab_{it}	Labor force participation rate, total (% of total population ages 15+)	%	WDI
	Capital	Cap_{it}	Gross fixed capital formation (% of GDP)	%	WDI
	Human Development	HDI_{it}	Human development index	Index 0-1	Human Development Report
	FDI inflow	FDI_{it}	FDI net inflow (% of GDP)	Percentage %	WDI

Note: To take the log in case of negative values, a scale of 10 has been added to all index values.

4.2 Simultaneous Model

The study has utilized a simultaneous model comprising of three structural equations to analyze the nexus among brain drain, remittance inflows and economic growth at aggregated and disaggregated levels of Asia. The simultaneous model is reported as follows.

$$BD1_{it} = a_1 + a_3 lngdp_{it} + B_1 Unemp_{it} + B_2 IQI_{it} + B_3 lnFD_{it} + B_4 SOL_{it} + B_5 Dem_{it} + B_6 Snet_{it} + B_7 lnGender_{it} + B_8 lnSO_{it} + e1_{it} \quad \textbf{(Eq. 1)}$$

$$Rem2_{it} = a_2 + a_1 BD_{it} + a_3 lngdp_{it} + B_3 lnFD_{it} + B_8 Infra_{it} + B_{10} MS_{it} + B_{11} Exrate_{it} + B_{12} Inf_{it} + B_{13} Interest_{it} + e2_{it} \quad \textbf{(Eq. 2)}$$

$$lngdp3_{it} = a_{30} + a_1 BD_{it} + a_2 Rem_{it} + B_1 Unemp_{it} + B_2 IQI_{it} + B_{12} Inf_{it} + B_{14} Lab_{it} + B_{15} Cap_{it} + B_{16} HDI_{it} + B_{17} FDI_{it} + e3_{it} \quad \textbf{(Eq. 3)}$$

Where $\alpha's$ shows the dependent variables**,** $B's$ shows the independent variables**,** i = number of cross sections as i = 1,2,…,N and t = number of time periods as t = 1,2,…,T

The first structural equation is of brain drain and its determinants. Variables such as unemployment, gender inequality, and social openness can cause an increase in brain drain as per theoretical and empirical assertions. Macroeconomic variables like institutional quality, financial development, standard of living, and social safety nets can play a vital role in mitigating it. The factors of economic growth and demographic characteristics exhibit mixed effects; these can either increase or decrease brain drain. The second structural equation focuses on the determinants of remittance inflows. Economic growth, infrastructure, financial development, migrant stock, inflation, and interest rates can contribute positively to remittance inflows. While on the other hand, brain drain and exchange rate have mixed impacts on the inflows of remittances. The third equation examines the main drivers of economic growth. Variables such as remittances, labor, capital, human development, and foreign direct investment can positively contribute to economic growth. Conversely, inflation and unemployment can hurt economic growth. However, brain drain and the quality of institutions have a mixed impact on economic growth.

4.3 Methodology

This study uses several pre-estimation tests to ensure the reliability of the data and model. The study uses a cross-sectional dependency test to determine the presence of cross-sectional dependency and to decide between the first-generation and second-generation panel unit root test. The second-generation unit root test will be appropriate if cross-section dependency is present in the panel data. Otherwise, the first-generation panel unit root test will be appropriate. To ensure the stationarity of the data, the study uses the first-generation panel unit root tests, such as the Im, Pesaran, and Shin (IPS) test and the Fisher-Augmented Dickey-Fuller (F-ADF) test and the second-generation panel unit root tests includes Cross-section Im, Pesaran, and Shin (CIPS) test and the Cross-section Augmented Dickey-Fuller (CADF). The study also uses the Ramsey RESET test to ensure that the regression model does not contain any specification errors, omitted variables and incorrect functional form. Moreover, the study uses Variance Inflation Factor (VIF) to check the correlation among all the explanatory variables, known as multicollinearity test. Based on the existence of simultaneity, the over identification of the model verified by both order and rank condition, the study uses the estimation technique of Panel Two-Sage Least Squares (2SLS) to empirically analyze all the five panels. Moreover, the study also uses some post-estimation tests like the Cragg-Donald wald test for weak identification and the Sargan over identification test to ensure the validity of the instruments and reliability of empirical estimates.

5 Results and Discussions

Before presenting empirical results, table 2 reports descriptive statistics, table 3 reports correlation results, table 4 reports panel unit root results and table 5 reports VIF results respectively. The results are reported in case of five panels including Asia (aggregated), LIEs (low- income economies), LMIEs (lower-middle-income economies), UMIEs (upper-middle-income economies) and HIEs (high-income economies).

Table 2: Summary Statistics

	Asia		LIEs		LMIEs		UMIEs		UIEs	
Variables	**Mean**	**S.D**	**Mean**	**S.D**	**Mean**	**S.D**	**Mean**	**S.D**	**Mean**	**S.D**
BDit	0.54	10.33	-1.55	1.87	-2.27	7.365	-0.13	7.36	11.39	20.48
Remit	4.90	6.99	5.80	6.55	7.28	5.252	3.26	5.25	0 .55	0.81
Lngdpit	8.11	1.23	7.27	0 .38	7.27	0.624	8.46	0.62	10.35	0.43
Unempit	5.08	4.19	10.60	4.10	3.69	5.293	6.39	5.29	3.87	2.65
IQIit	9.84	0.96	9.71	0 .44	10.02	1.005	9.75	1.00	9.55	0.88
SOLit	9.90	0.91	8.86	0 .19	10.12	0 .929	9.93	0 .92	9.69	0.78
Demoit	10.09	0.89	9.96	0 .64	10.05	1.293	10.24	1.29	9.98	0.60
Snetsit	9.90	0.83	9.64	0 .33	9.80	0 .472	9.75	0 .47	10.60	1.53
Lngenderit	10.89	0.40	10.46	0.27	10.77	0.290	10.02	0.29	10.21	0.60
lnFDit	10.07	0.59	10.24	1.00	10.23	0.554	10.00	0.55	10.61	0.30
lnSOit	3.84	0.57	3.79	0 .10	3.75	0.716	3.83	0.71	4.19	0.14
Infrait	9.97	0.90	9.44	0 .15	9.79	1.209	10.20	1.20	10.32	0.96
Exrateit	804.49	3021.63	98.50	92.38	1134.56	2839.29	879.61	2839.29	17.03	36.18
Infit	7.11	11.73	12.75	13.93	8.06	12.991	7.26	12.99	1.15	12.43
Interestit	404.73	2580.07	-18.92	50.02	874.17	8.341	5.62	8.34	6.45	16.65
MSit	15.25	24.57	7.86	6.81	14.53	25.035	16.73	25.03	18.12	32.07
Labit	52.40	41.22	43.21	5.60	47.09	15.252	59.64	15.25	58.45	22.87
Capit	24.67	9.58	12.36	7.26	26.10	7.517	26.45	7.51	22.94	7.00
HDIit	0.67	0.12	0.52	0 .08	0.60	0.069	0 .72	0.06	0.84	0.05
FDIit	3.06	3.77	0 .77	2.62	2.76	2.890	3.72	2.89	3.77	5.29

Note: Author's estimates using STATA 17.0 and S.D shows standard deviation values.

Table 2 shows that the high-income economies have the highest and positive mean value of brain drain i.e. 11.39 %, and a high variability is demonstrated by the high value of standard deviation i.e. 20.48 %. In contrast, LMI countries show a mean of -2.27 %, with a standard deviation of 7.365 %, indicating that brain drain is more consistent in LMIEs. Remittances inflows are higher in LMIEs, shown by the mean value of 7.28 % of GDP, reflecting the importance of remittances for these economies. The variability of remittances in this panel is indicated by a standard deviation 5.252 % of GDP. On the other hand, high-income countries show the lowest remittances, with a mean of 0.55 % of GDP. As the literature suggests, economic growth increases with income level; the high-income economies show the highest mean of 10.35 and the lowest variability with a standard deviation of 0.43. These summary statistics highlight the disparities and variability in economic and social indicators across different income groups in Asia and the diverse experiences of countries within each category.

Table 3: Correlation Results

	Asia	LIEs	LMIEs	UMIEs	HIEs
Equation 1 (Brain Drain)					
BDit	1.000	1.000	1.000	1.000	1.000
Unempit	0.213	0.100	-0.118	0.118	0.478
IQIit	0.119	-0.661	-0.186	-0.186	-0.566
SOLit	0.067	0.077	0.332	0.332	0.107
Demoit	-0.070	-0.289	-0.127	0.127	-0.041
Snetsit	0.321	-0.177	-0.077	-0.077	-0.290
lnFDit	0.193	0.219	-0.290	-0.290	-0.054
Lngenderit	0.064	0.511	0.194	0.194	0.602

lnSOit	0.116	0.266	-0.025	-0.025	0.099
Equation 2 (Remittances Inflows)					
Remit	1.000	1.000	1.000	1.000	1.000
lnFDit	-0.141	0.044	0.103	0.319	0.074
Infit	0.016	0.238	0.032	0.071	-0.171
Interestit	0.256	-0.237	0.259	0.455	-0.315
Exrateit	-0.052	0.656	0.105	-0.097	0.120
Infrait	0.215	0.131	0.496	0.438	0.231
MSit	0.128	0.538	0.071	0.236	0.156
Equation 3 (Economic Growth)					
lngdpit	1.000	1.000	1.000	1.000	1.000
Labit	-0.123	0.206	-0.048	0.586	0.586
Capit	-0.090	0.237	0.304	0.231	0.231
FDIit	0.135	-0.552	0.198	-0.226	-0.226
HDIit	0.838	0.345	0.818	0.308	0.308
IQI it	-0.136	-0.825	-0.006	0.913	0.913
Infit	-0.210	-0.577	-0.060	-0.192	-0.192
Unempit	-0.052	0.360	-0.271	-0.537	-0.537

The correlation results for all three equations i.e. brain drain, remittances, and economic growth, indicates the variation in relationship of variables across panels. There is a positive association between brain drain and unemployment across all panels except the LMIEs. The standard of living and social safety nets are also negatively correlated with brain drain, indicating that a better standard of living, including sanitation, drinking water, education, and health, and better social safety nets in the home country can reduce the brain drain. The gender inequality and social openness, one of the most focused variables in this study, are positively correlated with brain drain across all panels. A positive correlation exists between financial development, infrastructure and remittances inflows across all income. Inflation also shows a positive correlation with remittance inflows across all panels except HIEs, with a negative correlation of -0.171. The positive correlation value in most panels shows that higher inflation in the home country can enhance the inflow of remittances. Because the skilled migrants have to maintain the purchasing power of their families at home. Similarly, labor and capital are positively correlated with economic growth in most of the panels, and human development is positively correlated with economic growth across all five panels, highlighting the importance of these factors of production in enhancing economic growth.

Table 4: Panel Unit Root Test Results for Asia

			First Generation Test				Second Generation Test			
Variables	**CD (p)**	**CD Status**	**IPS**		**FADF**		**CIPS**		**CADF**	
			I(0)	**I(1)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**
BDit	0.243	Independent	-0.480	-9.735**	71.06**	----				
Remit	0.000	Dependent					-2.974*	----	-2.807*	----
lngdpit	0.000	Dependent					-1.736	-3.663*	-2.402	-2.971*

Unempit	0.183	Independent	-0.753	-11.26*	79.17*	----				
IQIit	0.121	Independent	-1.622	-11.75*	79.62*	----				
SOLit	0.000	Dependent					-0.716	-3.634*	-2.198	-3.187*
Demoit	0.000	Dependent					-1.122	-3.060*	-4.016*	----
Snetsit	0.000	Dependent					-1.636	-4.301*	-1.605	-3.515*
lngenderit	0.000	Dependent					-2.608	-5.256*	-2.206	-3.721*
lnFDit	0.000	Dependent					-3.184*	----	-2.646**	----
lnSOit	0.000	Dependent					-3.054*	----	-2.240	-3.657*
Infrait	0.000	Dependent					-2.018	-4.638*	-2.366	-3.580*
Exrateit	0.000	Dependent					-3.175*	----	-2.618**	----
Infit	0.000	Dependent					-3.662*	----	-2.736*	----
Interestit	0.000	Dependent					-3.047*	----	-2.216	-4.728*
Labit	0.011	Dependent					-3.006*	----	-2.824*	----
Capit	0.001	Dependent					-3.166*	----	-2.890*	----
HDIit	0.000	Dependent					-3.806*	----	-3.019*	----
FDIit	0.000	Dependent					-3.649*	----	-2.814*	----
MSit	0.001	Dependent					-1.872	-2.816*	-2.143	-2.817*

The panel unit root test results for aggregated Asia indicate that all variables are stationary at the level I(0) or the first difference I(1). The cross sectional dependence test probability values are also reported as CD (p). Given cross sectional dependency, second generation panel unit root test is applied. Detailed results of the panel unit root tests based on income level are reported in annexure.

Table 5: Variance Inflation Factor Test Results

VIF Values						
	Variables	**Asia**	**LIEs**	**LMIEs**	**UMIEs**	**HIEs**
	Lngdpit	1.49	5.60	1.79	2.06	1.62
	Unempit	1.09	3.35	1.42	1.32	2.06
	IQIit	1.53	5.62	1.65	3.90	5.31
	SOLit	1.42	4.55	1.58	2.28	3.11

Equation 1 (Brain drain)	**Demoit**	1.15	3.17	1.16	1.95	1.03
	Snetsit	1.31	3.10	1.50	2.38	8.11
	Lngenderit	1.63	2.80	1.95	3.07	3.49
	LnSOit	1.09	8.22	1.28	1.23	3.29
	lnFDit	1.45	1.76	1.66	2.53	2.06
Equation 2 (Remittances inflows)	**BDit**	1.70	1.63	1.50	2.45	3.40
	Lngdpit	1.67	3.74	1.33	1.97	9.82
	Infrait	1.11	2.05	1.26	1.89	2.05
	lnFDit	1.19	1.30	1.25	1.22	3.62
	Exrateit	1.04	3.19	1.09	1.35	1.70
	Interestit	1.07	5.40	1.33	1.85	8.91
	Infit	1.08	2.88	1.20	1.30	5.27
	MSit	1.27	2.67	1.16	1.71	9.09
Equation 3 (Economic growth)	**BDit**	1.28	2.32	1.37	1.70	2.49
	Remit	1.19	4.48	1.40	2.47	2.96
	Labit	1.17	1.99	1.22	1.46	1.89
	Capit	1.15	1.50	1.24	1.37	1.54
	HDIit	1.31	5.21	1.47	1.11	2.24
	FDIit	1.10	4.45	1.16	1.44	2.33
	Umempit	1.18	3.90	1.37	1.63	2.61
	Infit	1.06	2.65	1.14	1.07	1.35
	IQIit	1.07	9.96	1.39	1.45	4.08

Note: Author's estimates using STATA 17.0

The VIF value less than ten shows absence of multicollinearity. The Ramsey RESET test has also ensured that model is not suffering from the problem of omitted variables and specification errors. The identification status has been checked by both order and rank conditions. All equations are over-identified. Given limited space, results pertaining to pre-requisites are not reported here. However, results can be retrieved from authors on request. The empirical estimates of panel 2SLS are reported in table 6.

Table 6: Panel 2SLS Results in Asia (Aggregated)

Equation 1 (Brain Drain)										
Variables	**Asia**		**LIEs**		**LMIEs**		**UMIEs**		**HIEs**	
	Coefficients (p-values)	**S.E**	**Coefficients** (p-values)	**S.E**	**Coefficients** (p-values)	**S.E**	**Coefficients** (p-values)	**S.E**	**Coefficients** (p-values)	**S.E**
Lngdpit	5.469* (0.000)	0.321	0.929 (0.346)	0 .985	-1.202* (0.000)	0.309	-8.512* (0.000)	0.910	76.514* (0.000)	18.51
Unempit	0.381* (0.000)	0 .067	0.155* (0.015)	0 .063	-0.004 (0.944)	0 .059	0.321* (0.000)	0 .080	0.186 (0.746)	0.573
SOLit	-1.313* (0.000)	0.349	3.265* (0.041)	1.596	-1.259* (0.000)	0 .167	-3.117* (0.000)	0 .598	-13.31* (0.000)	3.775
Snetsit	2.738* (0.000)	0 .376	-0.247 (0.748)	0 .769	-0.321 (0.179)	0 .239	-6.456* (0.000)	1.219	-5.259* (0.000)	1.279
Demoit	-1.313 (0.434)	0 .326	-1.266* (0.002)	0 .400	-0.716* (0.000)	0 .202	0 .674 (0.093)	0.401	-11.19* (0.000)	3.188
lngenderit	9.245* (0.000)	0 .873	0 .553 (0.767)	1.871	1.783* (0.004)	0.618	7.500* (0.001)	2.267	5.252 (0.576)	9.393
LnSOit	0.031 (0.978)	0 .493	6.352 (0.111)	3.985	0.415 (0.085)	0.241	1.206 (0.034)*	0 .570	63.111* (0.013)	25.28
LnFDit	0.031 (0.954)	0 .548	0.230 (0.218)	0.187	-1.108* (0.000)	0. .300	-0.266 (0.802)	1.065	-22.040 (0.129)	14.51
IQIit	1.816* (0.000)	0 .349	-4.152* (0.002)	1.325	-0.881* (0.000)	0.154	-2.306* (0.002)	0 .726	-21.568* (0.000)	1.279
Constant	-63.03 (0.000)	5.897	-87.869 (0.000)	22.83	4.821 (0.238)	4.083	-19.69 (0.137)	13.24	-675.15 (0.000)	121.87
Obs	**702**		**54**		**324**		**216**		**108**	
R^2	**0.51**		**0.69**		**0.41**		**0.46**		**0.72**	
F (prob.)	**0.000**		**0.000**		**0.000**		**0.000**		**0.000**	
Equation 2 (Remittances Inflow)										
Variables	**Asia**		**LIEs**		**LMIEs**		**UMIEs**		**HIEs**	
	Coefficients (p-values)	**S.E**	**Coefficients** (p-values)	**S.E**	**Coefficients** (p-values)	**S.E**	**Coefficients** (p-values)	**S.E**	**Coefficients** (p-values)	**S.E**
BDit	0.093 (0.115)	0.059	-2.304* (0.000)	0.510	-1.402* (0.000)	0.345	-0.571* (0.000)	0.073	-0.125* (0.000)	0.028
Lngdpit	-1.065* (0.001)	0 .312	6.417* (0.050)	3.279	5.357* (0.000)	0 .774	1.120 (0.125)	0 .730	-8.626* (0.000)	1.547

LnFDit	-0.138 (0.748)	0 .430	0 .466 (0.497)	0 .687	4.749* (0.000)	0 .850	2.281* (0.000)	0.530	10.213* (0.000)	1.273
Infrait	1.722* (0.000)	0 .280	1.157 (0.839)	5.702	7.665* (0.000)	0.720	1.066* (0.001)	0.321	0.391 (0.147)	0.270
Infit	0.037 (0.078)	0 .021	0.194* (0.008)	0.073	0.194* (0.000)	0.041	0.032 (0.182)	0 .024	-0.0901* (0.009)	0.034
Interestit	0.0005* (0.000)	0.000	-0.026 (0.350)	0.028	0 .0004* (0.002)	0.0001	0.104* (0.024)	0 .046	-0.0204 (0.588)	0.037
Exrateit	-0.0002* (0.006)	0 .000	0.031* (0.007)	0 .011	0.000 (0.861)	0 .0001	-0.0003* (0.003)	0.000	0.003 (0.605)	0 .006
MSit	0.009 (0.466)	0 .012	0.226* (0.000)	0 .144	0.066* (0.000)	0 .016	0.032* (0.034)	0.015	0.170* (0.000)	0 .022
Constant	-3.662 (0.254)	3.212	39.19 (0.419)	48.45	-101.86 (0.000)	8.828	-20.049 (0.012)	8.009	108.48 (0.000)	16.762
Obs	**702**		**54**		**324**		**216**		**108**	
R^2	**0.24**		**0.90**		**0.40**		**0.54**		**0.70**	
F (prob.)	**0.000**		**0.000**		**0.000**		**0.000**		**0.000**	
Equation 3 (Economic Growth)										
Variables	**Asia**		**LIEs**		**LMIEs**		**UMIEs**		**HIEs**	
	Coefficients (p-values)	**S.E**	**Coefficients** (p-values)	**S.E**	**Coefficients** (p-values)	**S.E**	**Coefficients** (p-values)	**S.E**	**Coefficients** (p-values)	**S.E**
BDit	0.049* (0.000)	0.003	-0.005 (0.785)	0 .01	-0.038* (0.001)	0.011	0.038* (0.000)	0.006	0 .009* (0.000)	0.001
Remit	0.018* (0.031)	0 .008	-0.010 (0.190)	0 .00	-0.035* (0.000)	0.003	0.045* (0.000)	0.011	0.128* (0.002)	0.040
Labit	-0.001* (0.022)	0 .000	0.003 (0.386)	0.004	-0.0008* (0.006)	0.000	0.007* (0.000)	0 .001	0.0002* (0.002)	0.000
Capit	-0.003 (0.137)	0 .002	0.009* (0.002)	0.002	0.003* (0.045)	0 .001	0.0005 (0.845)	0.002	0.001 (0.729)	0.002
HDIit	7.106* (0.000)	0.206	1.613* (0.005)	0.577	6.318* (0.000)	0.212	5.259* (0.000)	0 .289	0.080* (0.000)	0.411
Unempit	-0 .014* (0.013)	0 .005	0.023* (0.007)	0.008	-0.053* (0.000)	0.007	-0.003 (0.442)	0 .005	-0.002 (0.785)	0.008
Infit	-0.004* (0.013)	0 .021	-0.006* (0.003)	0.002	-0.016* (0.000)	0.001	0.008* (0.000)	0.001	0.001 (0.275)	0.001
FDIit	0.031* (0.000)	0 .001	0.014* (0.316)	0.013	0.004 (0.304)	0 .004	0.013 (0.132)	0.008	-0.006 (0.116)	0 .004

IQIit	-0.209* (0.000)	0 .005	-0.802* (0.000)	0 .134	-0.171* (0.000)	0.018	0.163* (0.000)	0.026	0.360* (0.000)	0.033
Constant	5.661 (0.000)	0 .288	13.82 (0.000)	1.338	5.205 (0.000)	.0.223	6.863 (0.000)	0.337	6.849 (0.000)	0.237
Obs	**702**		**54**		**324**		**216**		**108**	
R^2	**0.83**		**0.89**		**0.80**		**0.79**		**0.90**	
F (prob.)	**0.000**		**0.000**		**0.000**		**0.000**		**0.000**	

Notes: Author's estimates using STATA 17.0 and "*" shows that variable is significant.

The panel 2SLS results reported in the table 6 shows bidirectional relationship between brain drain and economic growth across all panels except for low-income economies during reference period. Similarly, a bidirectional long run association between remittances and economic growth is observed in the Asia (overall) and low-middle and high-income panels. In contrast, a unidirectional relationship is observed in low-income and upper-middle-income economies, showing that in LIEs, only economic growth affects remittances while in UMIEs remittances affect economic growth. Furthermore, the study sheds light on the significant impact of brain drain on remittance inflows across all income levels. The significance of bi-directional relationship among variables in turn justifies formulation of simultaneous model.

In Brain drain equation, the number of significant variables varies across all five panels. Six out of nine variables are statistically significant in the aggregated Asia panel. In LIEs, four variables are significant. In LMIEs, six variables are statistically significant. In UMIEs, seven explanatory variables are statistically significant. In HIEs, six variables are statistically significant. The economic growth shows a positive and significant relationship with brain drain in Asia

(coefficient = 5.469, p = 0.000) and in HIEs (coefficient: 76.514, p = 0.000), indicating that a one percent increase in economic growth, on average, has caused the brain drain to increase by 5.469 and 76.514 units respectively in Asia and HIEs. This is because the literature suggests that economic growth increases migration. The higher income levels of the migrants in turn can facilitate migration. In contrast, it has a negative relationship in case of LMIEs (coefficient = - 1.202, p = 0.000) and UMIEs (coefficient = -8.512, p = 0.000), suggesting that economic growth has reduced the incentive to migrate to other countries by creating opportunities for the individual at their home countries. Meanwhile, economic growth is not significant (p = 0.346) in LIEs. We found mixed evidences pertaining to relationship between economic growth and brain drain. The empirical findings are consistent with theoretical assertions. The estimation results also show that unemployment is positively and significantly associated with brain drain in Asia (coefficient= 0.381, p = 0.000), LIEs (0.155, p = 0.015), and UMIEs (0.321, p = 0.000), indicating that higher unemployment in the home country has motivated skilled individuals to move abroad in search of better opportunities during reference period. These empirical findings are consistent with the conclusions from **Laila and Fiaz (2018),** who empirically proved a positive association between the unemployment rate and brain drain. However, in LMIEs and HIEs, unemployment is not significant (p-values = 0.944 and 0.746, respectively). The standard of living has a negative relationship with brain drain in Asia (coefficient= -1.313, p = 0.000) and UMIEs (coefficient = - 3.117, p = 0.000), indicating that a better standard of living, including sanitation, drinking water, education, and health, and better social safety nets in the home country has reduced the brain drain. In LIEs, it is positively significant (coefficient = 3.265, p = 0.041). In LMIEs, it is also negatively significant (coefficient = -1.259, p = 0.000), showing that better living standards has reduced migration. Social safety nets shows a positive relationship with brain drain in Asia (coefficient =

- 2.738, p = 0.000), indicating that better social safety nets might encourage migration by providing a safety cushion to migrate. In UMIEs, they have a negative relationship (coefficient = -6.456, p = 0.000), suggesting that more robust social safety in the home country can reduce the need for skilled individuals to migrate. Social safety nets in LIEs and LMIEs are insignificant (p-values: 0.748 and 0.179, respectively). In HIEs, they are also negatively significant (coefficient = -5.259, p = 0.000), indicating the importance of social safety nets in reducing economic growth. **Farooq's (2017)** findings are also consistent with the findings of our study**,** revealing that poor standard of living and social safety nets can drive brain drain. Demographic characteristics are not significant in Asia (p = 0.434) but show a negative relationship in LIEs (coefficient = -1.266, p = 0.002) and LMIEs (coefficient: -0.716, p = 0.000), suggesting that unfavorable demographics in the home country can drive migration and can cause the loss of human capital. Because the Asian economies are unable to fulfill the job needs of the increasing young population. In UMIEs, they are not significant (p = 0.093), while in HIEs, they have a significant negative relationship (coefficient =

-11.19, p = 0.000). Gender inequality shows a positive relationship with brain drain in Asia (coefficient: 9.245, p = 0.000), indicating that higher gender inequality leads to more migration. It is not

significant in LIEs (p = 0.767) but positively significant in LMIEs (coefficient = 1.783, p = 0.004) and UMIEs (coefficient = 7.500, p = 0.001). These indicate fewer opportunities for women in their home countries motivate them to move abroad. It is insignificant where they can work with males and effectively utilize their skills, but in HIEs, it is trivial (p = 0.576). Institutional quality positively correlates with brain drain in Asia (coefficient = 1.816, p = 0.000), indicating that better institutions might encourage migration by facilitating the whole process. It is negatively significant in LIEs (coefficient = -4.152, p = 0.002) and LMIEs (coefficient = -0.881, p = 0.000), suggesting that better institutional quality can reduce migration by building the trust of the skilled migrants into the institutional system of the country. In UMIEs, it is negatively significant (coefficient = - 2.306, p = 0.002), and in HIEs, it is strongly negative (coefficient = -21.568, p = 0.000). **Kousar et al.'s 2020** findings also revealed the same results that better-quality institutions can be vital in minimizing human capital flight.

In the remittances inflows equation, the number of significant variables also varies across the five panels of Asia during reference period. Four out of eight variables are statistically significant in the aggregated Asia panel. In LIEs, five variables are statistically significant. In LMIEs, seven variables are significant. In UMIEs, six variables are significant. In HIEs, five variables are significant. Economic growth has a significant negative relationship with remittances in Asia (coefficient = -1.065, p = 0.001). In LIEs, it is positively significant (coefficient: 6.417, p
= 0.050), suggesting that higher economic growth is associated with higher remittance inflows. In LMIEs and UMIEs, economic growth shows positive relationships (coefficients = 5.357, p = 0.000 and 1.120, p = 0.125, respectively), indicating that economic growth supports remittance flows. Financial development is not significant in Asia (p = 0.748). Still, it shows a positive relationship with the inflows of the remittances in LMIEs (coefficient = 4.749, p = 0.000), UMIEs (coefficient
= 2.281, p = 0.000), and HIEs (coefficient = 10.213, p = 0.000), highlighting the role of financial development in attracting remittances. In LIEs, it is not significant (p = 0.497). Infrastructure is significantly and positively impacting remittance inflows in LMIEs (coefficient = 7.665, p = 0.000), indicating that better infrastructure supports remittance inflows in that economy, and it can also act as an incentive for the skilled migrants to invest money in their home country. In Asia, it is also positive (coefficient = 1.722, p = 0.000), suggesting that improved infrastructure facilitates remittance transfers. **Ojapinwa and Victor's (2012)** empirical finding also showed that improved infrastructure in the home country can enhance remittance inflows. In LIEs, it is not significant (p
= 0.839), and in UMIEs, it is positively significant (coefficient = 1.066, p = 0.001). In HIEs, it is not significant (p = 0.147). Inflation shows a positive relationship with remittances in Asia (coefficient: 0.037, p = 0.078) and LIEs (coefficient = 0.194, p = 0.008), indicating that higher inflation may lead to higher remittances as migrants try to help their family at home to survive with the increasing Inflation and to maintain their purchasing power. **Tabit and Moussir (2016)** findings reported the same results. In LMIEs, it is positively significant (coefficient = 0.194, p = 0.000), while in UMIEs, it is not significant (p = 0.182). In HIEs, it is negatively significant (coefficient = -0.0901, p = 0.009). Interest rates are significantly favorable in Asia (coefficient = 0.0005, p = 0.000), indicating that higher interest rates in the home country relative to the destination country might attract remittances. In LIEs, it is not significant (p = 0.350), while in LMIEs, it is positive (coefficient = 0.0004, p = 0.002). In UMIEs, it is positively significant (coefficient = 0.104, p = 0.024), and in HIEs, it is insignificant (p = 0.588). Exchange rates show a negative relationship with remittances in Asia (coefficient = -0.0002, p = 0.006), indicating that a more robust local currency reduces remittances. Because a similar amount of foreign currency is converted to a smaller amount of local currency. Hence, the incentives for the migrants to send remittances back home are reduced. In LIEs, it is positively significant (coefficient = 0.031, p = 0.007). These findings are also consistent with the conclusions from **Chandavarkar (1980)**, who represented the positive impact of the exchange rate on remittance inflows. In LMIEs, it is not significant (p = 0.861), while in UMIEs, it is negatively significant (coefficient = -0.0003, p = 0.003). In HIEs, it is not significant (p = 0.605). Migrant stocks show a positive relationship with remittances in Asia (coefficient = 0.009, p = 0.466), which indicates that a higher proportion of migrants abroad can lead to

more remittances. In LIEs, it is positively significant (coefficient = 0.226, p = 0.000), suggesting that migrant numbers are the vital driver of remittances. In LMIEs, it is positively significant (coefficient = 0.066, p = 0.000), while in UMIEs, it is positively significant (coefficient = 0.032, p = 0.034). In HIEs, it is positively significant (coefficient = 0.170, p = 0.000).

In the economic growth equation, the number of significant variables also varies across the five panels. Eight out of nine variables are statistically significant in the aggregated Asia panel. In LIEs, six variables are significant. In LMIEs, eight out of nine variables are significant. In UMIEs, six variables are significant. In HIEs, five variables are significant. The estimation results shows that brain drain has a mixed relationship with economic growth. In Asia, it shows a positive but insignificant relationship (coefficient = 0.093, p = 0.115), while in LIEs, it is negatively significant (coefficient = -2.304, p = 0.000). In LMIEs and UMIEs, it is negatively significant (coefficients =
-1.402, p = 0.000 and -0.571, p = 0.000, respectively), suggests that brain drain negatively impacts economic growth by causing the loss of the skilled and educated human capital, which is very vital for the future development plans of the economy. **Adeyemi et al.'s (2018)** findings also concur with this study's findings that brain drain hurts economic growth. In HIEs, it is negatively significant (coefficient = -0.125, p = 0.000). Remittances show a positive relationship with economic growth in Asia (coefficient = 0.018, p = 0.031), which indicates that remittances can contribute positively to the economy. **Usman et al. (2022)** reported the same results, stating that remittances can play an important role in filling the foreign reserve gap and enhancing the economic prosperity of one's country. In LIEs, it is not significant (p = 0.190). At the same time, in LMIEs, it is negatively significant (coefficient = -0.035, p = 0.000), suggesting that increased remittance inflows can also create the dependency syndrome and reduce the number of working hours in the migrant's country of origin. In UMIEs, it is positively significant (coefficient = 0.045, p = 0.000), and in HIEs, it is strongly positive (coefficient = 0.128, p = 0.002). Labor force participation negatively correlates with economic growth in Asia (coefficient = -0.001, p = 0.022), suggesting that higher labor force participation might not necessarily lead to economic growth. According to the literature, most of the labor in the developing Asian economy is unskilled, and these economies are not using this labor with the right type of capital and in the right place. In LIEs, it is not significant (p = 0.386), while in LMIEs, it is negatively significant (coefficient = - 0.0008, p = 0.006). In UMIEs, it is positively significant (coefficient = 0.007, p = 0.000), indicating the role of labor as a critical factor of production, which can play a major role in enhancing economic growth. The capital formation shows a positive relationship with economic growth in LIEs (coefficient = 0.009, p = 0.002), indicating that capital investment is crucial for economic growth in lower-income economies. In Asia, capital is not significant (p = 0.137). In LMIEs, it is positively significant (coefficient = 0.003, p = 0.045), while in UMIEs and HIEs, it is not significant (p = 0.845, 0.729). Human development is positively correlated with economic growth across all five panels. This shows the importance of human capital in enhancing economic growth. In Asia, the coefficient is 7.106 (p = 0.000), indicating that improvements in human development can strongly boost economic growth. This same pattern also holds in LIEs (coefficient = 1.613, p = 0.005), LMIEs (coefficient = 6.318, p = 0.000), UMIEs (coefficient = 5.259, p = 0.000), and HIEs (coefficient = 0.080, p = 0.000). **Melike et al.'s (2005)** findings also stated consistent results; their finding revealed the importance of human development in promoting economic growth and reported that unemployment could hinder economic growth. The results show that unemployment significantly hurts economic growth in LMIEs (coefficient = -0.053, p = 0.000) and Asia (coefficient = -0.014, p = 0.013), highlighting that high Unemployment can reduce economic growth. In LIEs, it is positively significant (coefficient = 0.023, p = 0.007). It is insignificant in UMIEs and HIEs (p = 0.442, 0.785). The results indicate that Inflation can negatively affect economic growth in Asia (coefficient = -0.004, p = 0.013), indicating that higher Inflation can hinder economic growth by reducing the purchasing power of the individual and ultimately reducing their living standard. These empirical findings are also similar to those of **Usman et al. (2022)**, which prove that Inflation negatively impacts economic growth. In LIEs and LMIEs, it is negatively significant (coefficient = -0.006, p = 0.003) (coefficient = -0.016, p = 0.000). In UMIEs, it is positively significant (coefficient =

0.008, p = 0.000), and in HIEs, it is insignificant (p = 0.275). The results show that foreign direct investment positively correlates with Asian economic growth (coefficient = 0.031, p = 0.000), indicating that higher FDI supports economic growth. In LIEs, it is not significant (p = 0.316). It is insignificant in LMIEs and UMIEs (p-values: 0.304 and 0.132, respectively). In HIEs, it is not significant (p = 0.116). The results also suggest that institutional quality positively affects economic growth in Asia (coefficient = -0.209, p = 0.000), indicating that better institutions can support economic growth and development. In LIEs, it is negatively significant (coefficient = -0.802, p = 0.000), while in LMIEs, it is negatively significant (coefficient = -0.171, p = 0.000). In UMIEs, it is positively significant (coefficient: =0.163, p = 0.000), and in HIEs, it is positively significant (coefficient = 0.360, p = 0.000).

Moreover, the summary statistics also indicate reasonable R-square value for goodness of fit and highly significant F-statistics p-values for overall significance of the model. The post estimation results of instrument validity and Sargan over-identification are reported in table 7 and table 8 respectively.

Table 7: Instrument Validity Test Results

Aggregated Asia			
	BD	**Rem**	**Economic Growth**
Cragg-Donald Wald F statistics	1628.667	105.783	49.335
Stock-Yogo weak I.D. test critical values			
10% maximal IV size	16.38	7.03	17.03
15% maximal IV size	8.96	4.58	7.59
20% maximal IV size	6.66	3.95	4.75
25% maximal IV size	5.53	3.63	3.93

Note: Author's estimates using STATA 17.0.

Given that all the Stock-Yogo weak identification test critical values are less than the Cragg- Donald Wald F-statistics, we reject the null hypothesis (instruments are weak), indicating that the instruments are vital. Consequently, all the instruments used in the study are valid. Similar tests on other disaggregated panels yield consistent results, confirming the instrument's validity across all five panels. This study also employs the Sargan over-identification test to check the instruments validity. The respective results are reported in table 8.

Table 8: Sargan Over-Identification Test Results

Equations	**Prob. values**
Brain Drain Instrument	0.134
Remittances inflows Instrument	0.276
Economic Growth Instrument	0.236

Note: Author's estimates using STATA 17.0

The results shows insignificant p-values for all instruments at aggregated and disaggregated levels, indicating that the instruments are valid. So, the study has accepted the null hypothesis, confirming that the instruments are appropriately specified and uncorrelated with the error terms. Therefore empirical results can be used for policy inferences with precision.

6 Conclusion and Recommendations

This study empirically examines the simultaneous relationship among brain drain, remittances, and economic growth in Asia (overall) and in LIEs, LMIEs, UMIEs and HIEs of Asia from 1996 to 2022 using annual balanced panel data. The simultaneous model of three structural equations is utilized to unveil empirical relationship of variables. The study employs a panel unit root test to ensure the stationarity of the variables and various other pre-estimation tests has been employed. The choice of first and second generation panel unit root test is dictated by presence or absence of cross sectional dependence. The Panel 2SLS estimation technique is used to addresses endogeneity issues. The empirical findings supports significant bidirectional relationship between brain drain and economic growth across all panels except for low-income economies. Similarly, a bidirectional relationship

between remittances and economic growth is observed in the aggregated Asia and low-middle and high-income panels. In contrast, a unidirectional relationship is observed in low-income and upper-middle-income economies. Furthermore, the study sheds light on the significant impact of brain drain on remittance inflows across all income levels. The findings reveal that higher gender inequality and unemployment rates significantly increases brain drain, while improved living standards, better institutional quality, and social safety nets mitigate it. Conversely, financial development and infrastructure are crucial for enhancing remittance inflows. Economic growth is mainly driven by human development, labor, capital, and remittances, with institutional quality and foreign direct investment playing critical roles. The findings of post estimation tests also confirms reliability of the empirical estimates.

In the light of empirical findings, it is strongly recommended that Asian economies must invest in infrastructure, financial development and education to create local opportunities, reduce migration, and attract remittances. These economies need to implement job creation programs and vocational training to lower unemployment, with an ultimate focus on women to ensure equal opportunities for both males and females so that these economies can overcome gender inequality. Moreover, these economies must enhance access to essential and primary healthcare and education to raise the public's living standard. They should focus on increasing social safety nets. Better access to these services can make staying in the country more attractive. Lastly, these economies also need to control the dependency syndrome problem resulting from larger inflows of remittances.

This study is limited in terms of using the net migration rate (immigration - emigration rate) as the proxy of brain drain. It is believed that the only emigration rate can be a better representation of brain drain but due to the non-availability of the data on emigration rate, the study uses net migration rate to approximate brain drain. Secondly, this research includes static model on subject matter, whereas, in future dynamic model can be used to draw more concrete inferences.

No funding/grant has been taken for this research.

References

Alleyne, D., Kirton, C., & Figueroa, M. (2008). Macroeconomic determinants of migrant remittances to Caribbean countries: panel unit roots and cointegration. *˜the Journal of Developing Areas*, *41*(2), 137–153. https://doi.org/10.1353/jda.2008.0015

Azam, M. (2015). The role of migrant workers remittances in fostering economic growth. *International Journal of Social Economics*, *42*(8), 690–705. https://doi.org/10.1108/ijse- 11-2013-0255

Beine, M., Docquier, F., & Rapoport, H. (2001). Brain drain and economic growth: theory and evidence. *Journal of Development Economics*, *64*(1), 275–289. https://doi.org/10.1016/s0304-3878(00)00133-4

Beine, M., Docquier, F., & Rapoport, H. (2008b). Brain drain and human capital formation in developing countries: winners and losers. *˜the Economic Journal/Economic Journal*, *118*(528), 631–652. https://doi.org/10.1111/j.1468-0297.2008.02135.

Bildirici, M., Orcan, M., Sunal, S., & Aykac, E. (2005). Determinants of Human Capital Theory, Growth and Brain Drain: An Econometric Analysis for 77 Countries. *Applied Econometrics and International Development. 5*(2), 110–140. Retrieved from https://www.usc.es/economet/reviews/aeid526.pdf

Bollard, A., McKenzie, D., Morten, M., & Rapoport, H. (2011). Remittances and the brain drain revisited: the microdata show that more educated migrants remit more. *˜the World Bank Economic Review*, *25*(1), 132–156. https://doi.org/10.1093/wber/lhr013

Chowdhury, E. K., Dhar, B. K., & Gazi, M. I. (2022). Impact of Remittance on Economic Progress: Evidence from Low-Income Asian Frontier Countries. *Journal of the Knowledge Economy*, *14*(1), 382–407. https://doi.org/10.1007/s13132-022-00898-y

Chami, R., Fullenkamp, C., & Jahjah, S. (2005). Are immigrant remittance flows a source of capital for development? *IMF Staff Papers*, *52*(1), 55–81. https://doi.org/10.2307/30035948

Cinar, D., & Docquier, F. (2004). Brain drain and Remittances: implications for the source country. *Brussels Economic Review*, *47*(1), 103–118. Retrieved from https://dial.uclouvain.be/pr/boreal/object/boreal:96552

De La Croix, D., Docquier, F., & Schiff, M. (2014). Brain drain and economic performance in small island developing states. In *Population Economics* (pp.

123–144). https://doi.org/10.1007/978-3-319-04078-3_6

Docquier, F., & Rapoport, H. (2012). Globalization, brain drain, and development. *Journal of Economic Literature*, *50*(3), 681–730. https://doi.org/10.1257/jel.50.3.681

Farooq, S., & Ahmad, E. (2017). Brain Drain from Pakistan: An Empirical Analysis. *Forman Journal of Economic Studies*, *00*, 55–81. https://doi.org/10.32368/fjes.20170003

Faini, R. (2007). Remittances and the brain drain: Do more skilled migrants remit more? *˜the World Bank Economic Review*, *21*(2), 177–191. https://doi.org/10.1093/wber/lhm006

Farooq, S., & Ahmad, E. (2017b). Brain Drain from Pakistan: An Empirical Analysis. *Forman Journal of Economic Studies*, *00*, 55–81. https://doi.org/10.32368/fjes.20170003

Faini, R. (2007b). Remittances and the brain drain: Do more skilled migrants remit more? *˜the World Bank Economic Review*, *21*(2), 177–191. https://doi.org/10.1093/wber/lhm006

Fayissa, B., & Nsiah, C. (2010). The impact of remittances on economic growth and development in Africa. *˜the American Economist/˜the American Economist*, *55*(2), 92–103. https://doi.org/10.1177/056943451005500210

Goschin, Z. (2014). Remittances as an Economic Development Factor. Empirical Evidence from the CEE Countries. *Procedia Economics and Finance*, *10*, 54–60. https://doi.org/10.1016/s2212-5671 (14)00277-9

Grubel, H. G., & Scott, A. D. (1967). Determinants of migration: the highly skilled*. *International Migration*, *5*(2), 127–139. https://doi.org/10.1111/j.1468-2435.1967.tb00758.x

Giannoccolo, P. (2009). The Brain Drain: A survey of the literature. *Social Science Research Network*. https://doi.org/10.2139/ssrn.1374329

Human flight and brain drain by country, around the world | TheGlobalEconomy.com. (n.d.). TheGlobalEconomy.com.https://www.theglobaleconomy.com/rankings/human_flight_brain_drain_index/

Haque, N. U., & Kim, S. (1995). "Human Capital Flight": Impact of migration on income and growth. *Staff Papers - International Monetary Fund*, *42*(3), 577. https://doi.org/10.2307/3867533

Imai, K. S., Gaiha, R., Ali, A., & Kaicker, N. (2014). Remittances, growth and poverty: New evidence from Asian countries. *Journal of Policy Modeling*, *36*(3), 524–538. https://doi.org/10.1016/j.jpolmod.2014.01.009

Kazlauskienė, A., & Rinkevičius, L. (2006). Lithuanian "Brain Drain" Causes: Push and Pull Factors. *THE ECONOMIC CONDITIONS OF ENTERPRISE FUNCTIONING*, *46*(1), 27– 37. https://doi.org/10.5755/j01.ee.46.1.11366

Khan, M. A., Fatima, Z., & Fatima, S. (2022). Revisiting the gravity model of migration. *Foreign Trade Review*, *58*(2), 329–349. https://doi.org/10.1177/00157325221088707

Kousar, S., Ahmed, F., & Bukhari, S. a. A. (2020). Macroeconomic Determinants of Brain Drain in the Era of Globalization: Evidence from Pakistan. *Liberal Arts & Social Sciences International Journal*, *4*(2), 24–41. https://doi.org/10.47264/idea.lassij/4.2.3

Li, X., McHale, J., & Zhou, X. (2016). Does brain drain lead to institutional gain? *World Economy*, *40*(7), 1454–1472. https://doi.org/10.1111/twec.12407

Meyer, D., & Shera, A. (2017c). The impact of remittances on economic growth: An econometric model. *Economia*, *18*(2), 147–155. https://doi.org/10.1016/j.econ.2016.06.001

Mustafa, K. (2018). The macroeconomic determinants of remittances in Pakistan. *International Journal of Business Management and Finance Research*, *1*(1), 1–8. https://doi.org/10.53935/2641-5313.v1i1.25

Mountford, A. (1997). Can a brain drain be good for growth in the source economy? *Journal of Development Economics*, *53*(2), 287–303. https://doi.org/10.1016/s0304-3878 (97)00021-7

Manzoor, W., Safdar, N., & Mahmood, H. Z. (2021). A gravity model analysis of international migration from BRIC to OECD countries using the Poisson Pseudo-maximum Likelihood Approach. *Heliyon*, *7*(6), e07357. https://doi.org/10.1016/j.heliyon.2021.e07357

Nyamongo, E. M., Misati, R. N., Kipyegon, L., & Ndirangu, L. (2012c). Remittances, financial development and economic growth in Africa. *Journal of Economics and Business*, *64*(3), 240–260. https://doi.org/10.1016/j.jeconbus.2012.01.001

Niimi, Y., Ozden, C., & Schiff, M. (2010). Remittances and the brain drain: Skilled migrants do remit less. *Annals of Economics and Statistics*, (97/98), 123. https://doi.org/10.2307/41219112

Ngoma, A. L., & Ismail, N. W. (2013). The determinants of brain drain in developing countries. *International Journal of Social Economics*, *40*(8), 744–754. https://doi.org/10.1108/ijse- 05-2013-0109

Ngoma, A. L., & Ismail, N. W. (2013b). The determinants of brain drain in developing countries. *International Journal of Social*

Economics, *40*(8), 744–754. https://doi.org/10.1108/ijse- 05-2013-0109

Ontiveros, D. U., & Verardi, V. (2012). Does aid induce brain drain? A panel data analysis. *IZA Journal of Migration*, *1*(1). https://doi.org/10.1186/2193-9039-1-13

Rotte, R., Vogler, M., & Zimmermann, K. F. (1997). South-North Refugee Migration: Lessons for development cooperation. *Review of Development Economics*, *1*(1), 99–115. https://doi.org/10.1111/1467-9361.00008

Shahabadi, A., Salehi, M., & Hosseinidoust, S. E. (2018). The Impact of Competitiveness on Brain Drain, GMM Panel Approach. *Journal of the Knowledge Economy*, *11*(2), 558–573. https://doi.org/10.1007/s13132-018-0556-7

Shahabadi, A., Salehi, M., & Hosseinidoust, S. E. (2018). The Impact of Competitiveness on Brain Drain, GMM Panel Approach. *Journal of the Knowledge Economy*, *11*(2), 558–573. https://doi.org/10.1007/s13132-018-0556-7

Shera, A., & Meyer, D. (2013). Remittances and their impact on Economic Growth. *Periodica Polytechnica. Social and Management Sciences*, *21*(1), 3. https://doi.org/10.3311/ppso.2152

Sutradhar, S. R. (2020). The impact of remittances on economic growth in Bangladesh, India, Pakistan and Sri Lanka. *International Journal of Economic Policy Studies/International Journal of Economic Policy Studies*, *14*(1), 275–295. https://doi.org/10.1007/s42495-020- 00034-1

Tabit, S., & Moussir, C. (2016). Macroeconomic Determinants of Migrants' Remittances: Evidence from a Panel of Developing Countries. *International Journal of Business & Social Research*, *6*(7), 01. https://doi.org/10.18533/ijbsr.v6i7.969

Victor, T. (2012). Determinants of Migrants' Remittances in Nigeria: An Econometrics Analysis. *International Journal O (Humanities and Social Science*. Retrieved from http://www.ijhssnet.com/journals/Vol_2_No_14_ Special_Issue_July_2012/34.pdf

Appendices

Panel Unit Root Test Results (Disaggregated Panels) Table A-1: Panel unit root test results for LIEs

			First Generation Test				Second Generation Test			
Variables	**CD P-value**	**CD Status**	**IPS**		**FADF**		**CIPS**		**CADF**	
			I(0)	**I(1)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**
Low-Income Economies										
BDit	0.917	Independent	-0.468	-1.959**	4.397	11.81*				
Remit	0.475	Independent	-0.725	-4.582*	8.217	34.55*				
lngdpit	0.000	Dependent					-2.521	-4.295*	-6.420*	----
Unempit	0.030	Dependent					-1.201	-4.985*	-0.533	-3.199**
IQIit	0.002	Dependent					-2.705	-4.405*	-3.348*	----
SOLit	0.000	Dependent					0.343	-3.247*	-1.371	-4.711*
Demoit	0.109	Independent	-1.092	-3.070*	6.921	20.20*				
Snetsit	0.013	Dependent					-1.634	-3.964*	-1.369	-4.808*
lngenderit	0.045	Dependent					-3.21*	----	-2.726	-4.873*
lnFDit	0.589	Independent	-2.196	-4.232*	-2.737	-3.98*				
lnSOit	0.000	Dependent					-3.67*	----	-4.182	----
Infrait	0.258	Independent	2.164	-3.225*	1.018	21.24*				
Exrateit	0.003	Dependent					-4.63*	----	-2.321	-3.52**
Infit	0.834	Independent	-2.54*	----	17.13*	----				
Interestit	0.000	Dependent					-2.642	-4.094*	-1.975	-3.461*
Labit	0.05	Dependent					-2.060	-4.401*	-2.267	-3.461*
Capit	0.368	Independent	-1.91*	----	13.87*	----				
FDIit	0.028	Dependent					0.048	-4.922*	0.189	-4.856*
MSit	0.000	Dependent	1.700	-4.740*	-0.137	-3.28**				

Table A-2: Panel unit root test results for LMIEs

			1st Generation Test				2nd Generation Test			
Variables	**CD P-value**	**CD Status**	**IPS**		**FADF**		**CIPS**		**CADF**	
			I(0)	**I(1)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**
Lower Middle-Income Economies										
BDit	0.014	Dependent					-2.263	-4.277*	-2.463	-3.868*
Remit	0.000	Dependent					-3.281*	----	-3.285*	----
lngdpit	0.000	Dependent					-1.345	-3.720*	-2.121	-2.950*
Unempit	0.904	Independent	-0.908	-7.77*	42.54*	----				
IQIit	0.815	Independent	-0.115	-7.52*	25.87	129.8*				
SOLit	0.000	Dependent					-0.799	-3.423*	-1.272	-3.099*
Demoit	0.000	Dependent					-0.600	-3.255*	-3.578*	----
Snetsit	0.007	Dependent					-1.852	-4.990*	-1.778	-3.536*
lngenderit	0.000	Dependent					-2.759	-5.223*	-2.405	-3.308*
lnFDit	0.857	Independent	-5.41*	----	108.4*	----				
lnSOit	0.000	Dependent					-2.254	-5.031*	-1.938	-4.068*
Infrait	0.000	Dependent					-2.703	-4.822*	-3.114*	----
Exrateit	0.000	Dependent					-3.541*	----	-2.876*	----
Infit	0.000	Dependent					-4.016*	----	-3.211*	----
Interestit	0.008	Dependent					-3.337*	----	-2.230	-4.422*
Capit	0.005	Dependent					-2.761	-5.487*	-2.582	-3.757*
HDIit	0.000	Dependent					-3.763*	----	-2.568	-4.811*
FDIit	0.014	Dependent					-3.531*	----	-2.345	-4.079*
MSit	0.008	Dependent					-1.676	-3.270*	-1.636	-3.101*

Table A-3: Panel unit root test results for UMIEs

			1st Generation Test				2nd Generation Test			
Variables	CD P-value	CD Status	IPS		FADF		CIPS		CADF	
			I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
Upper Middle-Income Economies										
BDit	0.499	Independent	-0.480	-5.42*	28.02**	----				
Remit	0.257	Independent	-0.483	-7.06*	21.78	104.7*				
lngdpit	0.000	Dependent					-2.721	-4.418*	-3.489*	----
Unempit	0.423	Independent	0.722	-4.24*	14.63	58.51*				
IQIit	0.730	Independent	-2.193*	----	36.99*	----				
SOLit	0.000	Dependent					-1.617	-4.166*	-2.648	-4.182*
Demoit	0.375	Independent	-5.844*	----	124.75*	----				
Snetsit	0.000	Dependent					-2.330	-4.292*	-1.990	-4.660*
lngenderit	0.000	Dependent					-2.869	-5.901*	-2.288	-4.075*
lnFDit	0.000	Dependent					-3.46*	----	-2.90**	----
lnSOit	0.000	Dependent					-3.03*	----	-2.152	-3.696*
Infrait	0.000	Dependent					-1.931	-5.052*	-1.890	-3.835*
Exrateit	0.004	Dependent					-2.856	-5.342*	-2.526	-3.865*
Interestit	0.000	Dependent					-3.99*	----	-2.87**	----
Labit	0.629	Independent	-0.633	-4.05*	21.011	52.97*				
Capit	0.000	Dependent					-2.383	-4.83*	-2.332	-3.37*
HDIit	0.000	Dependent					-3.90*	----	-3.172*	----
FDIit	0.213	Independent	-3.824*	----	52.43*	----				
MSit	0.003	Dependent					-4.37*	----	-3.688*	----

Table A-4: Panel unit root test results for HIEs

			1st Generation Test				2nd Generation Test			
Variables	**CD P-value**	**CD Status**	**IPS**		**FADF**		**CIPS**		**CADF**	
			I(0)	**I(1)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**
High-Income Economies										
BDit	0.250	Independent	0.746	-3.871*	3.810	35.63*				
Remit	0.000	Dependent					-2.114	-3.13*	-3.17**	----
lngdpit	0.003	Dependent					-1.991	-3.13*	-3.17**	----
Unempit	0.604	Independent	-1.401	-7.131*	16.75**	----				
IQIit	0.043	Dependent					-1.657	-4.03*	-2.032	-4.064*
SOLit	0.698	Independent	-2.58	-4.141*	23.70*	----				
Demoit	0.000	Dependent					-1.055	-3.79*	-4.394*	----
Snetsit	0.000	Dependent					-2.032	-4.38*	0.268	-4.106*
lngenderit	0.000	Dependent					-2.550	-3.78*	-2.638	-3.26**
lnFDit	0.093	Independent	-0.825	-3.831*	11.35	34.64*				
lnSOit	0.000	Dependent					-3.626*	----	-3.429*	----
Infrait	0.000	Dependent					-2.556	-4.83*	-3.28**	----
Exrateit	0.000	Dependent					-2.360	-3.83*	0.156	-2.58*
Infit	0.556	Independent	-2.02**	----	18.95**	----				
Interestit	0.014	Dependent					-4.018*	----	-3.738*	----
Labit	0.793	Independent	0.256	-4.512*	4.933	42.87*				
Capit	0.691	Independent	-2.498*	----	23.13*	----				
HDIit	0.000	Dependent					-4.087*	----	-3.05**	----
FDIit	0.204	Independent	-0.455	-3.615*	8.328	35.51*				
MSit	0.000	Dependent					-3.429*	----	-4.012*	----