



# An Evaluation of the Determinants of Workers' Remittances: Evidence from Sri Lanka

Thilak Ranjeewa Priyadarshana

Department of Foreign Remittances Facilitation, Central Bank of Sri Lanka, Colombo, Sri Lanka

## Email address:

[priyadarshana@cbsl.lk](mailto:priyadarshana@cbsl.lk)

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**Abstract:** Workers' remittance inflows have historically been a driving force of the Sri Lankan economy. However, the inflow of workers' remittances contracted significantly in 2021 reflecting the implications of the COVID-19 pandemic and the increased tendency to remit money through informal channels. At the same time, the external sector continues to show the significant vulnerabilities making numerous challenges for the economy. In this context, promoting workers' remittance inflows to the country is imperative to overcome the heightened external shocks. Also, the importance of workers' remittances as a steady source of foreign exchange in Sri Lanka has grown among the researchers and the policy makers. In this backdrop, this study aims to examine the macroeconomic determinants of inflow of workers' remittances in the context of Sri Lanka. The Johansen Cointegration Technique and the Vector Error Correction Model (VECM) specified under Vector Auto Regression (VAR) framework were used to estimate the model. The annual data on related macroeconomic variables for the period 1986-2019 were used to conduct the analysis. The results of the study found that the depreciation of domestic currency appeared to be positively correlated with the inflows of workers' remittance in both long run and short run in Sri Lanka. Moreover, annual departures for migration, domestic deposit rate and world oil prices showed a positive influence on the inflow of workers' remittances in the long run. The overall outcomes of the study suggest that altruistic and investment motives are considered to be the driving forces for remitting money to Sri Lanka.

**Keywords:** Remittance, Migration, Exchange Rate, Vector Error Correction, Sri Lanka

## 1. Introduction

Worker migration and their remittance inflows have historically been a driving force of the Sri Lankan economy [2, 22, 42, 47]. The average workers' remittance inflows from Sri Lankan foreign employees amounted to around US dollars 7 billion over the last five years (2016-2020), being a major financing source in the trade deficit. As a percentage of the country's Gross Domestic Product (GDP), workers' remittance inflows, on average, accounted for about 8.4 per cent during the same period of 2016-2020. The Sri Lankan overseas migrant workers, which accounted for around 10 per cent of the country's labour force or around 815,000 people<sup>1</sup> by end 2021, has mainly contributed to maintain such remittance inflows to Sri Lanka. Inflow of workers'

remittances grew steadily from US dollars 1.2 billion in 2000 to US dollars 7.2 billion in 2016, recording an average growth of 31 per cent per annum over the last 16 years ending 2016. By end of 2020, workers' remittance inflows to Sri Lanka stood at US dollars 7.1 billion recording a marginal decline when compared to the end of 2016.

Reflecting the global economic setback caused by the COVID-19 pandemic<sup>2</sup> [13, 44], workers' remittance inflows to the country exhibited a declining trend during 2021 and beyond. Significant drop in total number of departures for foreign employment, the vulnerability in departures of migrant workers, restrictions on mobility faced by migrant employees, returning some migrant workers from countries affected by the pandemic and job terminations together with high tendency to move towards informal channels for remittances mainly

<sup>1</sup> Total number of overseas migrant workers was estimated based on the census conducted in December 2021 by SLBFE and arrivals in 2021 & 2022.

<sup>2</sup> The economic cost of COVID-19 is expected to reach between US dollars 5.8 trillion to US dollars 8.8 trillion globally, accounting for almost 6.4–9.7% of global GDP [10].

attributable for declining the remittance inflows to the country [49, 10]. With the impact of the pandemic and the country's heightened vulnerabilities in the external sector [23], the fall in workers' remittance inflows exerted further pressure on the foreign exchange market, which is already hit by low export earnings, rising import expenditure, halted tourism earnings and high foreign debt repayments. The declining trend in remittance inflows also made an additional pressure on the Sri Lankan rupee, given the scarcity of dollars in the market in the backdrop of historically low level of international reserves [44]. Therefore, workers' remittances have become much crucial in improving the current account, and in the consequent buildup of foreign exchange in the country. As per the market behaviour, it was also observed wide exchange rate disparities in the market creating severe market distortions and thereby causing significant uncertainties among market participants. This situation influenced to motivate migrant workers to use informal channels to remit a part of their money to Sri Lanka, which adversely impacted on the remittance inflows and the balance of payments of the country.

The current developments in the sector prompted policy makers to encourage the understanding and enhance the remittances through formal channels. As a result, workers' remittances have currently, gained increasing interest among the researchers and the policy makers. For instances, the Government and the Central Bank of Sri Lanka (CBSL) have taken several policy adjustments pertaining to the foreign exchange market to attract workers' remittances while enhancing departures for foreign employments [8]. In this background, this study aims to improve the understanding on the factors influencing on workers' remittance inflows to the country and to provide an overview on the current trends in Sri Lankan's labour migration and their remittance inflows.

The rest of the paper is structured as follows. Section two provides the overview of labour migration and inflow of workers' remittances in Sri Lanka. Section three discusses the review of recent literature. Section four provides the theoretical background related to the determinants of workers' remittances. Section five outlines the sources of data and methodology used in this study. Section six presents the research findings. Section seven outlines the conclusion including the policy implications.

## 2. Overview of Labour Migration and Inflow of Workers' Remittances in Sri Lanka

### 2.1. Labour Migration

As per the literature, it is believed that departures for foreign employments by Sri Lankans began in the 1960s at a small-scale level [11, 40]. Since then, annual departures for foreign employment increased significantly [30, 33]. Departures for foreign employments increased from 14,456 in 1986 to a significant level of 300,703 in 2014 before declining to 53,875 and 122,264, respectively in 2020 and

2021. In the beginning years, most of the migrants have left for industrial countries in Europe and North America for professional level employments such as doctors, engineers and accountants etc. However, it was begun to change the migration dynamics in Sri Lanka significantly after the 1970s mainly reflecting the higher demand for less-skilled workers from the middle East countries in line with the Gulf boom [48, 12, 3, 30]. At the same time, demand for migrant workers increased in the South East Asia and the Far East Asia in the mid-1980s with the rapid economic growth and slow population growth witnessed in the countries of these regions.

Nevertheless, a significant drop in total number of departures for foreign employment was reported in 2020 with the cessation of new departures for foreign employment due to the spread of the COVID-19 pandemic. As a result, total departures for foreign employment declined to 53,875 in 2020 from 203,087 recorded in 2019 (Table 1). Returning some migrant workers from the countries affected by the COVID-19 pandemic and the job terminations of some workers abroad also affected to decrease the number of migrant workers for foreign employment. Further, declining in number of total migrants due to the difficulty of obtaining passports and other facilities with travel restrictions and economic hardships faced by Sri Lankan worker's destination countries were adversely impacted on the labour migration in 2020.

*Table 1. Departures for Foreign Employment during 1986-2021.*

Year	Male		Female		Total
	No	%	No	%	
1986	11,023	76.3	3,433	23.8	14,456
1990	15,377	36.1	27,248	63.9	42,625
1995	46,021	26.7	126,468	73.3	172,489
1997	37,552	25.0	112,731	75.0	150,283
2000	59,793	32.8	122,395	67.2	182,188
2005	93,896	40.6	137,394	59.4	231,290
2010	136,850	51.2	130,657	48.8	267,507
2015	172,788	65.6	90,655	34.4	263,443
2020	32,589	60.5	21,286	39.5	53,875
2021	81,110	66.3	41,154	33.7	122,264

Source: Information Technology Division-SLBFE.

With the gradual opening up of migrant source countries, a notable increase in migrant registration was observed in the recent months in 2021, resulting of 122,264 annual departures for foreign employment in 2021. In line with these improvements, departures for foreign employments are expected to be recovered in 2022 and beyond.

In terms of gender composition of labour migration, the female participation rose significantly from 23.8 per cent in 1986 to a peak level of 75.0 per cent in 1997, largely reflecting the increase in female migration to Middle East countries for employments as housemaids [30]. Since 1998, it is observed that the share of male migrants gradually rose from 33.7 per cent to 66.3 per cent in 2021. This was mainly due to the government efforts of encouraging migration of skilled workers and providing more

opportunities for men to become skilled and migrate as semi-skilled and skilled workers [46].

With regard to the manpower level, nearly three fourths of female migrant workers are concentrated in the housemaid category, while 15 per cent and the residual of 12 per cent of

female workers are, respectively in the low skilled category and other categories (Table 2). In contrast, 46 per cent and 34 per cent of male workers, respectively are employed in the skilled category and low skilled categories.

*Table 2. Migrant Workers by, Manpower Levels & Sex 2020.*

Manpower Level	Numbers			Percentage (%)		
	Males	Female	Total	Males	Females	Total
Professional Level	2,714	240.00	2,954	8.3	1.1	5.5
Middle Level	1,318	180	1,498	4.0	0.9	2.8
Clerical & Related	2,097	396	2,493	6.4	1.9	4.6
Skilled	14,880	1,853	16,733	45.7	8.7	31.1
Semi - Skilled	665	NIL	665	2.0	NIL	1.2
Low - Skilled	10,915	3,146	14,061	33.5	14.8	26.1
Housemaid	NIL	15,471	15,471	NIL	72.7	28.7
Total	32,589	21,286	53,875	100.0	100.0	100.0

Source: Sri Lanka Bureau of Foreign Employment.

In terms of the age-wise migrant workers, around 20 per cent (larger portion) of male migrant workers are in the age group of 25-29 years, whereas most of the female workers (27%) are

employed in age category of over 50 years (Table 3). Of the total migrant workers, around 80-85 per cent of migrant workers are in the Middle East countries [46, 21, 33] (Table 4).

*Table 3. Migrant Workers by Manpower Levels & Sex 2020.*

Age Group	Numbers			Percentage (%)		
	Males	Female	Total	Males	Females	Total
<=19	119	26.00	145	0.4	0.1	0.3
20 - 24	3,204	612.00	3,816	9.8	2.9	7.1
25 - 29	6,564	1,530	8,094	20.1	7.2	15.0
30 - 34	5,636	2,083	7,719	17.3	9.8	14.3
35 - 39	5,498	3,177	8,675	16.9	14.9	16.1
40 - 44	4,644	4,057	8,701	14.3	19.1	16.2
45 - 49	3,044	4,110	7,154	9.3	19.3	13.3
>=50	3880	5,691	9,571	11.9	26.7	17.8
Total	32,589	21,286	53,875	100.0	100.0	100.0

Source: Sri Lanka Bureau of Foreign Employment.

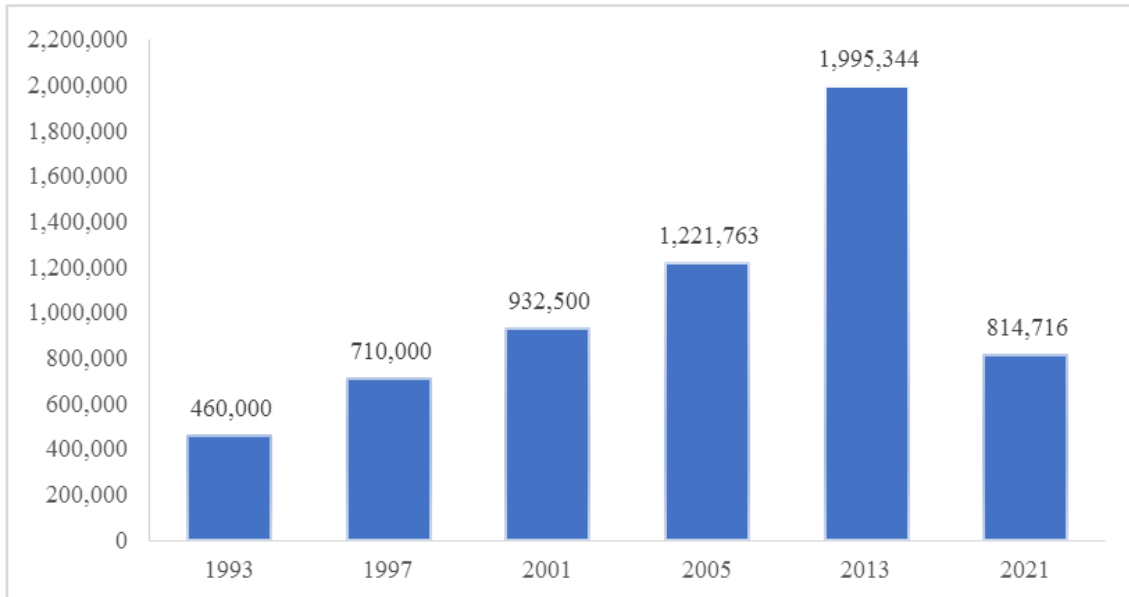
*Table 4. Migrant Workers by, Region.*

Region / Country	2019						2020					
	Number			Percentage (%)			Number			Percentage (%)		
	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total
Middle East	97,741	74,680	172,421	79.9	92.4	84.9	24,821	19,235	44,056	76.2	90.4	81.8
Saudi Arabia	21,110	14,305	35,415	17.3	17.7	17.4	6,305	3,102	9,407	19.3	14.6	17.5
Kuwait	13,053	30,020	43,073	10.7	37.1	21.2	2,436	5,604	8,040	7.5	26.3	14.9
United Arab Emirates	20,447	12,413	32,860	16.7	15.4	16.2	5,128	5,586	10,714	15.7	26.2	19.9
Qatar	36,208	4,575	40,783	29.6	5.7	20.1	8,886	803	9,689	27.3	3.8	18.0
Lebanon	302	1,600	1,902	0.2	2.0	0.9	93	445	538	0.3	2.1	1.0
Jordan	1,699	2,912	4,611	1.4	3.6	2.3	282	673	955	0.9	3.2	1.8
Oman	2,704	6,312	9,016	2.2	7.8	4.4	868	1,855	2,723	2.7	8.7	5.1
Baharain	1,642	1,375	3,017	1.3	1.7	1.5	494	556	1,050	1.5	2.6	1.9
Other Middle East	576	1,168	1,744	0.5	1.4	0.9	329	611	940	1.0	2.9	1.7
Europe	2,767	2,370	5,137	2.3	2.9	2.5	1,501	776	2,277	4.6	3.6	4.2
Italy	36	36	72	0.0	0.0	0.0	10	14	24	0.0	0.1	0.0
Cyprus	434	1,987	2,421	0.4	2.5	1.2	165	623	788	0.5	2.9	1.5
Other Europe	2,297	347	2,644	1.9	0.4	1.3	1,326	139	1,465	4.1	0.7	2.7
Asia	19,347	3,512	22,859	15.8	4.3	11.3	5,436	1,187	6,623	16.7	5.6	12.3
Maldives	7,136	631	7,767	5.8	0.8	3.8	2,202	199	2,401	6.8	0.9	4.5
Singapore	866	1,258	2,124	0.7	1.6	1.0	346	417	763	1.1	2.0	1.4
South Korea	6,166	41	6,207	5.0	0.1	3.1	1,275	17	1,292	3.9	0.1	2.4
Other Asia	5,179	1,582	6,761	4.2	2.0	3.3	1,613	554	2,167	4.9	2.6	4.0
Other	2,402	268	2,670	2.0	0.3	1.3	831	88	919	2.5	0.4	1.7
Total	122,257	80,830	203,087	100.0	100.0	100.0	32,589	21,286	53,875	100.0	100.0	100.0

Source: Sri Lanka Bureau of Foreign Employment.

In line with the annual departures for foreign employments, the stock of the Sri Lankan migrant overseas has increased significantly over the years largely contributing to the inflow of foreign remittances to the

country [42]. For instance, stock of the migrant workers remained nearly 40,000 in the early 1980s [48] has reached around 2.0 million by 2013 before declining to 814,716 in 2021 (Figure 1).



Source: Wickramasekara, P., (2010), Sri Lanka Bureau of Foreign Employment, Central Bank of Sri Lanka and Author's own estimation

**Figure 1.** Sri Lankan Migrant Stock Overseas.

## 2.2. Developments in Workers' Remittance Inflows

Workers' remittances are a significant source in the country's balance of payments, and it has been the single largest inflow of foreign exchange to the country during the past decades, ahead of apparel exports and tourist earnings [8, 12, 27, 32]. For instance, inflow of workers' remittances, on average, have covered around 80 per cent of the annual trade deficit over the decades. In 2020, workers' remittances exceeded the trade deficit, accounting for around 118 per cent. The inflow of workers' remittances is highly important for Sri Lanka as remittances have no import content involved unlike many merchandise export categories. Therefore, steady flow of these non-debt creating remittance inflows brings many macroeconomic and socioeconomic benefits to the economy. These benefits include, reducing of the current account deficit of the balance of payments (BOP), facilitating to economic growth, increasing the inflows of foreign exchange to the banking system improving forex liquidity, alleviation of poverty, income disparities and regional disparities, and reducing the fiscal burden on social security payments.

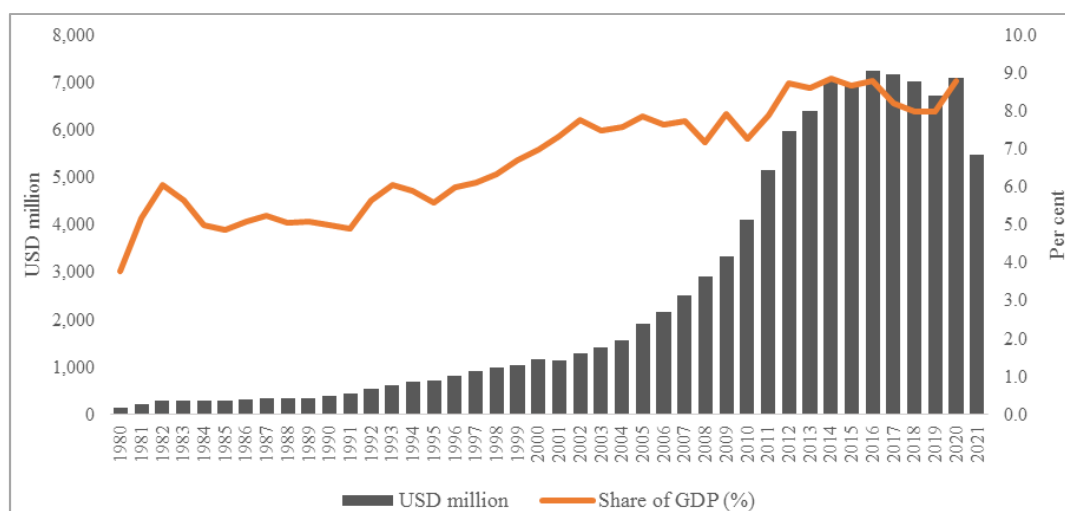
Total amount of workers' remittances rose from US dollars 152.0 million in 1980 to US dollars 7.2 billion in 2016 before declining to US dollars 5.5 billion in 2021. As a percentage of country's GDP, workers' remittances increased from 3.8 per cent of GDP in 1980 to 8.8 per cent of GDP in 2020, recording an average of 8.5 per cent during 2011-2020 (Figure 2). However, workers'

remittance inflows to Sri Lanka declined by 22.7 per cent (US dollars 1.6 billion) to US dollars 5.5 billion (6.5 per cent of GDP) in 2021 from US dollars 7.1 billion recorded in 2020<sup>3</sup>. Economic difficulties faced by countries of destination due to spread of the COVID-19 pandemic, relatively lower levels of migration witnessed in the recent years and the increased tendency to send money through informal channels seem to be the key underpinning factors for this declining trend during 2021<sup>4</sup>. This declining trend in workers' remittances would be challenging for maintaining liquidity and stability in the financial system, particularly in the context of limited access to foreign exchange inflows from other sources including foreign borrowings. In this background, the Government and the Central Bank are currently taking numerous measures to encourage the inflow of workers' remittances in recent months to ease the pressure on the domestic foreign exchange market [25].

Of the total remittance inflows in 2019 and 2020, about 52 per cent are from the Middle East countries, 19 per cent from European Union and 12 per cent from Far East Asia (Table 5).

<sup>3</sup> The World Bank has predicted that the remittance flows to South Asia would decline by around 11 per cent in 2021 [10].

<sup>4</sup> In terms of the literature on the context of informal channels usage in Sri Lanka, Dr. Jayamaha (2006) has highlighted that around 30–40 per cent of remittances is transferred through the informal channels in Sri Lanka. Moreover, previous study [27] has mentioned that unrecorded remittances are highly volatile and could have reached as much as 45 per cent of total private remittances in Sri Lanka.



Source: Central Bank of Sri Lanka

Figure 2. Inflow of Workers' Remittances in Sri Lanka.

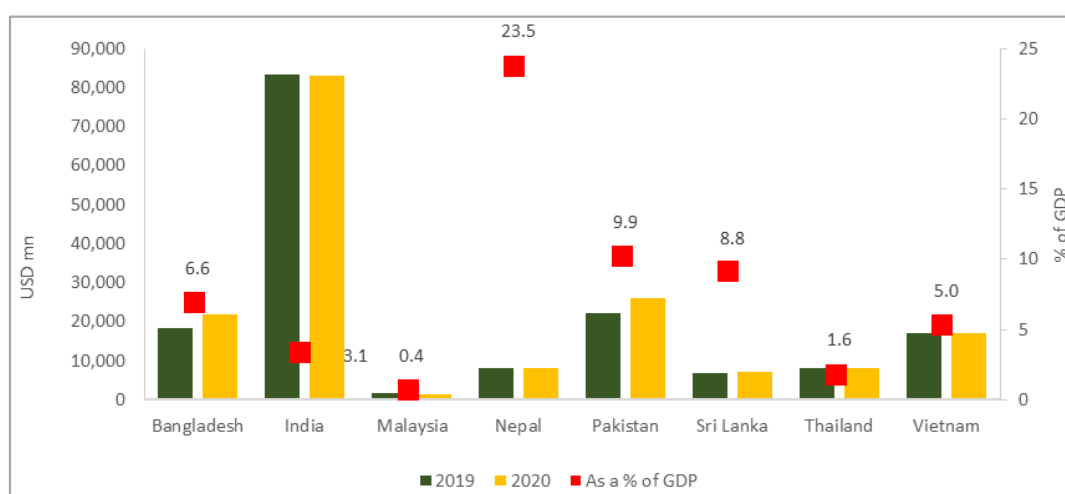
Table 5. Workers' Remittances by, Region.

Region	2015	2016	2017	2018	2019	2020	2020
USD million							% of GDP
Middle East	3,769	3,889	3,711	3,592	3,459	3,673	51.7
European Union	1,222	1,282	1,311	1,312	1,263	1,350	19.0
Far East Asia	698	739	824	849	826	870	12.3
Europe – Other	307	333	330	309	282	305	4.3
North America	209	210	208	182	161	178	2.5
South East Asia	391	398	394	407	376	408	5.8
Australia and New Zealand	161	174	172	154	175	178	2.5
South Asia	98	109	107	154	134	114	1.6
South and Central America	63	51	50	35	27	21	0.3
Other	63	58	57	21	13	7	0.1
Total	6,980	7,242	7,164	7,015	6,717	7,104	100

Source: Central Bank of Sri Lanka.

India is the top recipient of remittances globally although, the share of remittances is only 3 per cent of GDP in comparison to the size of its economy [5]. Pakistan, Bangladesh, Nepal, and Sri Lanka featured in the list of top

50 recipients of remittance inflows in the world [25]. The significance of remittances in these economies ranged from about 13 per cent for Pakistan to 6–8 per cent of GDP for Bangladesh & Sri Lanka (Figure 3).



Source: World Bank (2021) and Central Bank of Sri Lanka

Figure 3. Workers' Remittances by, country (As a% of GDP).

### 3. Review of Recent Literature

Rahman *et al.* (2019), analyses the effect of exchange rate and overseas employment on remittances in Bangladesh using vector error correction model. They suggest that there is a significant effect of the exchange rate and overseas employment on workers' remittances in Bangladesh. These outcomes indicate that the depreciation of the domestic currency causes remittances to increase while an increase in overseas employment effects on increasing inflow of workers' remittances. In this study, deposit interest rate and global oil price are considered as control variables. Employing ARDL approach to cointegration, Bhatt *et al.* (2021), examine the impact of the exchange rate and the outflow of worker migration on the workers' remittances in Nepal. The study is conducted using annual data from 1994 to 2020 and the outcomes of the study reveals that the exchange rate and outflow of migrant workers significantly and positively influence the remittance inflows into Nepal in both long term and short run. Sikandar *et al.* (2019), examine the impact of exchange rate uncertainty on the inflow of remittances using Empirical Bayesian approach in Pakistan for the period from 1973 to 2012. They point out that there is a negative impact of exchange rate uncertainty on the inflow of remittances, highlighting the importance of curtailing volatility of exchange rates to ascertain regular inflow of remittances. Elkhider *et al.* (2006), conduct a study to identify the macroeconomic determinants of migrant remittances in the context of Morocco using the techniques of co-integration and the error correction model (ECM) between remittances and related variables (agricultural GDP, and the exchange rate). The study suggests a long run relationship between workers' remittances and related variables. Accordingly, the exchange rate shows a negative effect on remittances, while agricultural GDP exhibit a positive influence on workers' remittances. Employing a VAR model, Henry *et al.* (2009), explore the motives of migrants in sending remittances to Jamaica. The respective outcomes highlight that there is a combination of altruistic and self-interest/investment motive for sending remittances to Jamaica. Colombage, (2010) analyses the effects of international migration on the macroeconomic variables in Sri Lanka. Using the cointegration tests and impulse response functions, he reveals that inflows of workers' remittance have a positive impact on the country's national savings, domestic investment, and the real GDP, highlighting the important contribution of workers' remittances to sustainable growth in the economy over the long run. Barua *et al.* (2007), investigate the macroeconomic determinants of inflow of workers' remittances in Bangladesh using a balanced panel data set of bilateral remittance flows from ten major host countries during 1993 -2005. The study points out that the income differential between host and home country is positively correlated with the inflow of remittances, while the

inflation differential between home and host country is negatively correlated. This suggests that higher inflation in home country relative to host country may exert some negative effect on workers' remittances. Moreover, they reveal that the depreciation of domestic currency has a positively relationship to the flow of workers' remittances in Bangladesh. Meanwhile, Abbas, (2020), conducts a study to explore the asymmetric impact of change in oil prices on workers' remittance inflows in Pakistan using time series data over the period 1980-2018. Advanced panel nonlinear Pooled Mean Group (PMG) model is used to analyze the result of this study. The study reveals that there is a significant positive effect of crude oil prices on remittance inflows in the long run, whereas in the short run it was found an insignificant effect on remittance inflows. The IMF working paper, (2011) investigates the determinants of remittances into Togo by utilizing a panel regression of the growth of remittances on changes in the bilateral exchange rate, real GDP growth, unemployment rate in remitting countries, and interest rate differential between Togo and other remaining countries. This IMF study suggests that the remittance growth decline with an appreciation of the domestic currency, while it increases with higher GDP growth and lower unemployment rate in the remaining country. Adding another study to literature, Schiopu and Siegfried, (2006) examine the importance of altruistic and investment motives in remitting money using a new panel data set of bilateral flows from selected countries in the European neighboring countries. They find that altruism is important motive for remittance inflows as the GDP differential between host and home countries is positively correlated with the average remittance per migrant. However, the study reveals insignificant results on interest rate differential between the countries indicating a weak investment motive. Also, they find that migrants' skills raise remittances, while a large informal economy in the sending country depresses official remittance flows. Laniran and Addeniyi, (2015) also analyse the determinants of remittances in Nigeria using annual data from 1980 to 2013. The study is conducted using a vector auto regression model with a granger causality tests. They point out remittance receipts in Nigeria are largely influenced by portfolio options rather than altruism as remittance inflows are positively correlated with differentials in exchange rate, deposit rate and interest rate. A study conducted by Pant and Budha, (2016) reveals that the depreciation of Nepalese currency and economic activity of host countries positively impact on the remittance inflows in Nepal. Moreover, they find that the cyclical component of the remittance inflows is positively affected by nominal exchange rate, and economic activity of India, the Gulf nations and advanced economies. In order to ascertain the outcomes, they use empirical strategies including OLS, Engle-Granger cointegration test and FM-OLS based on the monthly data for the period 2006-2015. Assaf and Malki, (2014) explore the key macroeconomic determinants that affect workers'

remittance inflows to Jordan using annual data for the period 1972-2009. In this case, the study employs the ARDL and VECM approaches to find the long-run and the short-run relationships. The empirical results of the study reveal that macroeconomic factors of host countries are much more significant than home country macroeconomic factors. This reflects the fact that workers' remittance inflows to Jordan are most likely to be influenced by external factors rather than internal factors. Accordingly, the results of the study indicate that remittances flow to Jordan is cointegrated with the level of income in Jordan, level of income and exchange rates in the host countries. ADBI working paper conducted by Yoshino *et al.* (2019), investigated the determinants of international remittance in selected middle-income countries in the Asia and Pacific region (2002-2015) by employing a panel data analysis technique. The study finds that the per capita gross domestic product growth in origin countries and wage growth rate in destination countries are positively correlated with remittance inflows, respectively in these countries. In addition, they reveal the positive impacts of real effective exchange rate, the level of education, trade openness, and political stability on remittance inflows. However, the study suggests the negative correlation between net foreign direct investment (FDI) inflows and remittance inflows, highlighting the paradigm shift of acquiring foreign capital in middle-income countries from remittance.

## 4. Theoretical Background

### 4.1. Theoretical Concepts on Workers' Remittances

Workers' remittances, generally defined as transferring money in the form of either cash or goods by migrant workers to their families [36, 22, 50]. Transfer of such workers' remittances are generally analyzed based on two broader approaches, namely altruism approach and portfolio approach [7, 6, 10]. Altruism refers to a migrant worker's genuine care for improving the living standard of their families and therefore, this encourages them to send money for their home countries [18, 17, 41]. In the Altruism approach, the level of remittance inflows and migrant worker's income positively correlated whereas the level of remittance inflows negatively correlated to the income of the household in the home country. For instant, Laniran and Adeniyi (2015), predict that a 1 per cent increase in the migrant's income associated with a 1 per cent decrease in the recipient's income result to increase transfer by 1 per cent. Supporting to this argument, the IMF working paper, (2011) highlights that remittances aim to support recipients on their daily expenditure and/or compensate them for catastrophic cases in the home country under the altruistic approach. Therefore, remittances negatively correlated with economic conditions such as real GDP, employment etc. in the home country. Altruism approach deals with the variables relating to household income, family status, education level of migrant worker, marital status of migrant worker and length

of stay in the host country etc.

The portfolio approach is the investment motive of the migrant worker to remit intending to invest in the assets at the home country in future inheritance to take advantage of high returns [18, 6, 28, 9, 14, 24]. In this approach, it is viewed that remittances are considered as capital flows and its related variables are typically showed the macroeconomic nature (GDP of both home and host countries, inflation rate differential, interest rate differential and exchange rate etc).

### 4.2. Determinants of Workers' Remittances

The level of workers' remittance inflows through formal channels historically depends on several factors [6, 38]. Different analyses have highlighted various macroeconomic variables as important factors influencing on the level of workers' remittances. Major variables include; economic growth and the level of economic development in the home and host countries, salary levels in the host country, exchange rate premium, interest rate differential, inflation rate, migrants' qualification, the share of the informal economy, lower remittance costs, domestic production in the home country, the efficiency of the banking system, real gains and total number of migrants in the host country, political stability, global oil prices, consistent government policy and financial intermediation, large share of female employments, a high ratio of older citizens, lowest illiteracy rates, portfolio diversification opportunities etc. To simplify the study, four key variables namely, exchange rate in the home country, annual departures for foreign employment (migrant workers), domestic interest rate and global oil prices among the large set of variables used in the literature are employed for this analysis. The relationship between these selected macroeconomic determinants and the level of workers' remittances is described in the below section, highlighting the evidence given in the literature.

The exchange rate can have both a positive and negative effect on the level of workers' remittance inflows [39]. The negative and positive economic relationships between the level of remittances and the exchange rate can be recognized through substitution effect and wealth effects [7]. When the currency of the home country depreciates, migrant workers can think that their purchasing power of goods will increase in the home country as the amount of local currency exchanged for foreign currency increases. As a result, the goods in the home country become less expensive for migrant and they tend to send smaller amount of money compared to the level sent previously for consumptions to their families. This enables migrant workers to substitute some goods in their home country for more expensive goods in the host country, is called as the substitution effect of exchange rate depreciation, which is indicated the negative effect of exchange rate on remittances. Some studies in the literature argue that an increase in the price of goods and services in the home country due to depreciation of its currency could cause migrant workers to reduce their remittances. On the other hand, depreciation of the exchange

rate in the home country encourages migrant workers to accumulate more wealth by sending more money for making excess expenditure and investing [50]. This reflects the positive impact of exchange rate depreciation on workers' remittances, called as the wealth effect of exchange rate depreciation.

In the literature it is generally believe that the increase in the number of migrant workers aboard is directly correlated with the level of remittance inflows [6]. Taking into consideration of this argument, annual departures for foreign employment (migrant workers) were used as a variable in determining the level of remittance inflows to Sri Lanka in this study. Similar argument has shown in a study conducted by Rahman *et al.* 2019. An IMF working paper also highlights that there is a close links between remittances and the aggregate stock of migrants based on the findings of Browne and Mineshima, (2007).

Crude oil is an important input of the domestic manufacturing process in the migrant exporting countries. Hence, increasing prices cause to enhance the domestic cost of living by increasing cost of production and price level [1]. This increasing cost of living in the home country and thereby reducing domestic purchasing power will increase the workers' remittance inflows through altruism motive approach. On the other hand, increasing oil prices in the host country will enhance their investment and productivity activities resulting a higher demand for migrant workers and thereby enhancing remittance inflows to the home country. This implies that there is a positive correlation between crude oil prices and workers' remittance inflows.

This study uses the country's deposit interest rate as a key macroeconomic variable. This is used based on the classic theory of savings, which explains the law of supply and quantity theory of money as highlighted by Laniran *et al.* (2015). Moreover, historical evidence suggests that discretionary<sup>5</sup> remittance inflows are determined primarily by the difference between real domestic interest rate and real foreign interest rate [45]. This implies that a migrant worker remits his part of savings to the home country where real interest rate in the home country is greater than the real interest in the host country.

#### 4.3. Theoretical Framework

Based on the altruism approach and portfolio approach discussed in the above, a simple remittance determination model was formulated as a theoretical framework to describe the relationship between macroeconomic variables and the remittance inflows to Sri Lanka. Based on the above approaches and the existing literature, the related variables in the model of this study were considered. Moreover, the theoretical framework developed by McCracken *et al.* (2016) based on the works done by Schiopu and Siegfried (2006)

[37]; Docquier and Report (2006) was used to show the behaviour of remittances to changes in the macroeconomic variables considered in the model. In this case, it is considered that the migrant has two countries namely home country  $j$  and host country  $i$ , and two periods as first period consumption ( $C_1^i$ ) and second period consumption ( $C_2^i$ ) of the migrant in the host country. Based on these arguments, the utility of the migrant is equal to the total of utility from first period consumption plus second period consumption of the migrant in the host country  $i$  and his/her family's consumption ( $C_1^j$ ) in the home country.

Accordingly, utility function of the migrant can be represented as follows.

$$U = u(C_1^j + \beta E[u(C_2^i) + \mu u(C_1^j)]) \quad (1)$$

Where  $\beta \in [0,1]$  is the discount factor,  $E[u(C_2^i)]$  is the expected utility from the second period consumption of the migrant in the host country and  $\mu \in [0,1]$  is the degree of altruism.

The consumption of the household depends on the income and the remittances received by the migrant. Accordingly, income of the migrant workers in the host country  $i$  is the  $I^i$  and it is equal to amount of expenditure incurred on the first period consumption of the migrant in the host country ( $C_1^i$ ), savings ( $S$ ) and remittances received to the home country ( $M^{ij}$ ). Accordingly, income of a migrant in the host country is explained by the following equation.

$$I^i = C_1^i + S + \alpha M^{ij} \quad (2)$$

where,  $\alpha \geq 1$  represents the cost associated with sending remittances to home country. Therefore, amount of spend by the migrant is equal to  $\alpha(M^{ij})$ .

Further, consumption of the migrant's family is equal to the income in home country  $I^j$  and remittances received to home country ( $M^{ij}$ ) for its first period consumption.

$$C_1^j = I^j + M^{ij} \quad (3)$$

where,  $I^j$  is earnings in the home country and  $M^{ij}$  is remittances to home country for its first period consumption.

In addition to consumption and sending remittances, the choice of asset allocation by the migrant and thereby allocation of savings between home country assets ( $A^j$ ) and host country assets ( $A^i$ ) to maximize the return of the portfolio need to be considered based on self-interest motive. Returns from both assets are summarised by the following equation.

$$[(R^i A^i) + (R^j A^j)] \quad (4)$$

where,  $R^i > 0$  is rate of return in host country,  $A^i$  is the amount of investment of host country,  $R^j > 0$  is the rate of return in home country and  $A^j$  is the amount of investment of the home country. Combination of above developed utility equation (1) and the asst allocation equation (4) describes the total remittances to home country as shown in the following equation.

<sup>5</sup> This is the remittance inflows over and above the fixed amount sent either through formal and informal channels for the purpose of using to basic needs of their families.



$$WRS_{ij} = (M^{ij}) (I^i, I^j, \alpha) + A^j(R^i, R^j, \rho) \quad (5)$$

where,  $\rho$  is the probability, which used to calculate the return from home country assets ( $\rho R^j$ ), greater than the host country assets ( $\rho R^j > R^i$ )

Based on the above arguments, a simple model can be derived to show how remittances respond to changes in the macroeconomic variables. The relevant model including the vector of other determining variable/s ( $W^j$ ), is shown in equation (6).

$$WRS_{ij} = f(I^i, I^j, R^i, R^j, W^j, \alpha, \rho) \quad (6)$$

Higher income in the host country increases the remittances to home country. Reflecting this argument, an increase in global oil prices in the host country (used as a proxy for economic activity in host countries [16]) results in higher remittances to home country as highlighted in the equation (6). Higher rate of return in the home country also positively impacts on remittance inflows to the home country indicating the positive impact between deposits interest rate and remittance inflows. Moreover, depreciation of the domestic currency causes remittances to increase to the domestic country based on the argument of depreciation the exchange rate in the home country encourages migrant workers to accumulate more wealth by sending more money for investment and expenses indicating self-interest motive [35, 31]. The remittance inflow also increases with an increase in workers outflow [7, 31].

## 5. Data and Methodology

### 5.1. Choice of Methodology

The aim of this study is to examine the macroeconomic determinants of workers' remittance inflows to Sri Lanka. The model attempts to determine both long run and short run effects at the same, detecting cointegrating vectors. For this purpose, it is believed that using a VECM approach specified under the VAR framework with cointegration technique more appropriate for this study. Existing rich literature on the utilization of this technique also induced the author to use this method [35, 15, 26, 29]. Huang and Vargas-Silva (2005) have also highlighted that the vector error correction model (VECM) is robust enough to deal with endogeneity challenges among macroeconomic determinates and remittance inflows [20]. On the other hand, using the OLS approach is prone to endogeneity problems.

### 5.2. Data Description

The study is carried out using annual time series data on selected macroeconomic variables (Table 6) for Sri Lanka covering the period from 1986 to 2019. The main data sources are Annual Reports of the Central Bank of Sri Lanka (CBSL), Sri Lanka Bureau of Foreign Employment [43] and the information obtained from Macrotrends web-site. All variables used in the study are transformed into their natural logs with the view of eliminating serial correlations and multicollinearity issues.

Table 6. Details of Variables.

Variables	Definition of the Variable	Data Source/s
Workers' Remittance Inflows (WRS)	The amount of money sent to the home country by its citizens working abroad	CBSL
Migrant Worker Outflows (MWS)	The annual outflow of migrant workers	SLBFE
Exchange Rate (EXR)	Average Nominal Exchange Rate of Sri Lanka Rupees to US Dollars	CBSL
Global Oil Prices (GOP)	Crude Oil Price (Average closing price) in USD per barrel	Macrotrends
Deposit Interest Rate (SDR)	Saving Deposit Rate (Maximum Value of the given range)	CBSL

### 5.3. Model Specification

In terms of the model specification, the study specifies the following model (7) based on the equation (6) described in the section 4.3. This model facilitates to finding the impacts of changing macroeconomic determinates of worker remittance flows to Sri Lanka.

$$WRS_t = \alpha_0 + \alpha_1 MWS_t + \alpha_2 EXR_t + \alpha_3 GOP_t + \alpha_4 SDR_t + \mu_{1t} \quad (7)$$

where,  $WRS_t$  is the worker remittance inflows at time  $t$ ,  $MWS_t$  is the migrant worker outflow at time  $t$ ,  $EXR_t$  is the nominal exchange rate at time  $t$ ,  $GOP_t$  is the global oil prices at time  $t$ ,  $SDR_t$  is the saving deposit rate at time  $t$  and  $\mu_{1t}$  represents the error term of the model. In the model,  $WRS_t$  is used as the dependent variable, while all other variables represent the independent variables. In this model, all

variables are expected to have a positive correlation with worker remittance inflows.

Following the Johansen and Juselius (1990/1991), the mathematical growth equation (7) is expressed in its log form and specified in the VAR model for multivariate cointegration test as follows:

$$\ln WRS_t = \alpha_0 + \alpha_1 \ln MWS_t + \alpha_2 \ln EXR_t + \alpha_3 \ln GOP_t + \alpha_4 \ln SDR_t + \alpha_4 \quad (8)$$

The equation (8) is now rewritten in a VECM form as follows.

$$\Delta \ln WRS_t = \alpha_1 \Delta \ln MWS_{t-1} + \alpha_2 \Delta \ln EXR_{t-1} + \alpha_3 \Delta \ln GOP_{t-1} + \alpha_4 \Delta \ln SDR_{t-1} + \xi_{t-1} + \mu_{1t} \quad (9)$$

where,  $\Delta$  represents the difference operator and  $\xi_{t-1}$  represents the lagged value of the Error Correction Term (ECT) derived

from long run cointegration vector. This allows to determine the short run dynamics of the growth model.

#### 5.4. Econometric Procedures

Several statistical methods and econometrics tests were carried out to estimate both the long run and short run relationships among the variables of the specified two models.

##### 5.4.1. Unit Root Tests

In order to test the cointegration among variables, it is required to check the stationarity of each variable as a preliminary step [34]. Augmented Dickey-Fuller (ADF) (1979) and Phillip-Perron (PP) (1988) unit root tests were carried out to find the stationarity of the time series data. It is observed that these two procedures are well established to determine the characteristics of individual series of the variables as per the literature [34] ADF and PP test are also considered as unique tools in dealing with serial correlation and heteroskedasticity in errors and they correct for serial correlation heteroskedasticity in the errors by directly modifying the test statistics.

$$\begin{aligned}\Delta Y_t &= \alpha_1 + P_1 e_1 + \sum_{i=0}^n \beta_i \Delta Y_{t-i} + \sum_{i=0}^n \delta_i \Delta X_{t-i} + \sum_{i=0}^n \gamma_i Z_{t-i} \\ \Delta X_t &= \alpha_2 + P_2 e_{i-1} + \sum_{i=0}^n \beta_i \Delta Y_{t-i} + \sum_{i=0}^n \delta_i \Delta X_{t-i} + \sum_{i=0}^n \gamma_i Z_{t-i}\end{aligned}\quad (10)$$

where,  $\alpha_1$  and  $\alpha_2$  are constant. The cointegration rank in VECM determines the number of distinct cointegrating vectors. The Error Correction Term (ECT) shows the speed of adjustment of the state of the equilibrium and it is

##### 5.4.2. Johansen and Juselius Cointegration Test

After determining the stationarity of each variable, the Johansen test of multivariate cointegration method, which was developed by Johansen (1991) and Juselius (1990) was applied to test the possibility of having cointegration among 1(I) variables. Testing of the cointegration facilitates to ascertain a stable long run association between the variables. The Johansen cointegration tests are likelihood ratio tests and there are two different test statistics to determine the number of cointegration vectors, including the Trace test and Maximum Eigenvalue test [19].

##### 5.4.3. Vector Error Correction Model (VECM)

The cointegration test suggests that there is a long run relationship between the variables in the model. Once examined the cointegrating relationship between series, the short run causal relationship of the cointegrated series is determined by estimating a VECM. The variables in VECM are expressed in the first difference and the general regression equation of VECM takes the following form.

expected to be negative and significant. A negative and significant coefficient of the ECT indicates that there exists a stable long run relationship between series caused by any short run fluctuations among the variables.

## 6. Empirical Result

### 6.1. Result of Unit Root Tests

Table 7. Details of the Unit Root Tests.

Variable	Lag Length	ADF Test Statistics		PP Test Statistics	
		At Level	At First Difference	At Level	At First Difference
lnWRS	2	-2.182123	-8.480952*	-1.628858	-8.822971*
lnMWS	2	-1.909671	-7.484201*	-1.679833	-8.178019*
lnEXR	2	-1.666585	-5.185268*	-1.700939	-5.208207*
lnGOP	2	-1.752356	-5.488420*	-1.834755	-5.517800*
lnSDR	2	-3.792242	-4.912727*	-2.604018	-6.096038*
Critical Values					
1% Critical Value		-4.273277	-4.273277	-4.262735	-4.273277
5% Critical Value		-3.557759	-3.557759	-3.552973	-3.557759
10% Critical Value		-3.212361	-3.212361	-3.209642	-3.212361

Source: Author's Calculation by using EViews 12. \* Indicates significance at 1%, 5%, 10%.

As most of the time series data are non-stationary<sup>6</sup>, the unit root tests were carried out for each variable prior to determining the cointegrations among such variables. The results of the verification of stationarity of all variables are summarized in Table 7. At the level of unit root test, all the variables except one (SDR) have a unit root as the p values of those variables are higher than the critical values at 5% significance level. However, the results clearly indicate that all variables are stationary at first difference level. Also, these outcomes indicate that the null hypothesis of

having unit root is rejected. Accordingly, data has stationarity at 1<sup>st</sup> difference level indicating the mean and variance of the variable are constant over time. Therefore, all variables are integrated into order 1, I (1). Achieving such econometric requirement implies that there is a long run equilibrium relationship among the series without having spurious regressions and it is more appropriate to apply cointegration and VECM techniques to estimate the specified model in the study.

### 6.2. Selection of Optimal Lag Order

The Akaike Information Criterion (AIC), Final Predictor

6 Non-stationary variables may tend to provide spurious regression results without any economic meaning (Priyadarshana, 2019 and Attapattu 2018).

Error (FPE) and Sequential Modified LR tests were carried out to select the optimal lag length for the study. Based on the results of these tests, it was selected 2 as an appropriate lag length for estimation the specified model. Choosing of this correct lag order of 2 is consistent with the findings and the arguments made by Assaf *et al.* (2014) and Priyadarshana, (2019). They highlight that the selection of lag 2 is more appropriate for the studies conducting with annual data and short data observations. For instance, this study has been conducted using annual data and 41 observations with five parameters.

### 6.3. Empirical Results

#### 6.3.1. Results of the Cointegration Tests

Assuming a linear deterministic trend, the long run effect

of the change in macroeconomic variables on inflow of workers' remittances was estimated using a cointegration method as discussed in the above section. In this case, two cointegration rank tests namely, Trace statistics and Maximum Eigen Value statistics were carried out using EViews 12. These two statistics respectively, suggest that there exist three and one long run cointegration equations (equilibrium relationships) at 5% significant level (Tables 8 and 9). This implies the rejection of null hypothesis of no-cointegration among the related variables. No-cointegration among the variables clearly suggest that there exists a stable long run relationship between workers' remittance inflow and macroeconomic determinants in this model.

Table 8. Result of the Trace Test.

Cointegration Relations	Eigen Value	Trace Statistics	Critical Value at 5% level	Probability Value**
<b>Null Hypothesis</b>				
None *	0.773513	106.9272	69.81889	0.0000
At most 1 *	0.579851	60.89009	47.85613	0.0019
At most 2 *	0.468293	34.00854	29.79707	0.0154
At most 3	0.270263	14.42701	15.49471	0.0719
At most 4 *	0.139565	4.659828	3.841465	0.0309
Trace test indicates 3 cointegrating eqn(s) at the 0.05 level				
*Denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Table 9. Result of the Maximum Eigen Value Test.

Cointegration Relations	Eigen Value	Max-Eigen Statistic	Critical Value at 5% level	Probability Value**
<b>Null Hypothesis</b>				
None *	0.773513	46.03706	33.87687	0.0011
At most 1	0.579851	26.88155	27.58434	0.0613
At most 2	0.468293	19.58152	21.13162	0.0812
At most 3	0.270263	9.767186	14.2646	0.2277
At most 4 *	0.139565	4.659828	3.841465	0.0309
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
*Denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

#### 6.3.2. Result of the Long Run Relationship

In view of the co-integration results, there exist a clear stable long-run association between the independent variables and the dependent variable in the model. Accordingly, the causal long run relationship between the variables was examined using the VECM specification and the estimated corresponding long run results are tabulated in Table 10.

Table 10. Estimated long run Cointegration Coefficients.

Regressor	Coefficient	Standard Error	T Ratio
lnWRS	1		
lnMWS	0.370411	(0.24043)	[1.67059] **
lnGOP	1.185588	(0.27098)	[4.37511] *
lnXRATE	1.379774	(0.66152)	[2.08577] *
lnSDR	0.229721	(0.05503)	[4.17414] *

Source: Author's Calculation by using EViews 12. The symbols of \* and \*\* shows significance at 5% and 10% levels, respectively.

As per the normalised cointegrating results, the long run coefficient of the exchange rate is positive and statistically

significant at 5% level. This implies that the exchange rate of Sri Lanka positively and significantly influences on the remittance inflows to the country in the long run. The positive correlations between the exchange rate and the remittance inflows have been confirmed by the many previous studies in the global [4, 7, 51, 39]. In this model, the long run coefficient of the exchange rate is higher than that of the departures for foreign employment, indicating the importance of maintaining a stable exchange rate environment in the country. The increase in departures for foreign employment (workers outflow) found to be positively significant at 10% level. This implies that the growing migrant workers significantly contribute for maintaining the stability of the remittance inflows to the country [7]. Global oil prices showed a positive and statistically significant (at 5% level) correlation to the inflow of workers' remittances, providing an indication of altruism motive. The conclusion revealed on the exchange rate and the departures for foreign employment is consistent with the outcomes revealed by Rahman *et al.* (2019). For instance, one previous study has

suggested that the 1% increase in the exchange rate (depreciation), overseas employment and global oil prices, respectively cause to increase the inflow of workers' remittances by 1.2478%, 0.386% and 1.128%, respectively [35]. In contrast finding made by Rahman and others, this study showed a positive and significant correlation between deposit interest rate and inflow of workers' remittances, providing an indication of the investment motive.

### 6.3.3. Results of the Short Run Relationship

The short run results of the VECM are reported in Table 11. The coefficient of the error correction term (ECMt-1) is significant with negative sign. This further confirms that there exist long run cointegration relationships between the variables in the model. The coefficient of the ECMt-1 reflects the speed of adjustment parameters from the short run period

to long run period. For instance, ECTt-1 value of -0.06403 implies that the inflow of workers' remittances is corrected from the short run towards long run equilibrium by about 6.4% annually. In the other words, it takes approximately more than fifteen months ( $1/0.06403 = 15.6$ ) to eliminate the dis-equilibrium.

The short run coefficients of the migrant workers and the exchange rate also showed the positive and significant correlations to the inflow of workers' remittances, respectively in the first and second lag levels. This implies that the inflow of workers' remittances is significantly explained by the migrant workers and the exchange rate even in the short run. In contrast to the long-run relationship, deposit interest rate in the short run showed a statistically significant negative effect on workers' remittance in the two-lag level.

Table 11. VECM Regression Results of the Growth Model.

Dependent Variable: lnMWs	Coefficient	Standard Error	T Ratio	Probability
CointEq1	-0.06403	(0.02243)	[-2.85431]	0.0098*
lnWRS(-1)	0.23490	(0.20144)	[1.16607]	0.2573
lnWRS(-2)	0.32571	(0.18718)	[1.74005]	0.0972**
lnMWS(-1)	0.08290	(0.03354)	[2.47140]	0.0226*
lnMWS(-2)	0.02972	(0.03484)	[0.85229]	0.4038
lnCOP(-1)	-0.05174	(0.04690)	[-1.10319]	0.2830
lnCOP(-2)	0.01047	(0.04585)	[0.22827]	0.8218
lnXRATE(-1)	0.11737	(0.22740)	[0.51613]	0.6114
lnXRATE(-2)	0.52211	(0.21352)	[2.44522]	0.0239*
lnSDR(-1)	-0.00681	(0.00948)	[-0.71852]	0.4807
lnSDR(-2)	-0.02998	(0.00986)	[-3.04159]	0.0064*
Constant	9.14474	(1.53274)	[5.96626]	
R-squared	0.66383	Log Likelihood	55.55749	
Adj. R-squared	0.49575	Akaike AIC	-2.87467	
Sum squared resid	0.05038	Schwarz SC	-2.36584	
S.E.equation	0.05019	Mean dependent	0.09513	
F-statistic	3.94944	S.D.dependent	0.07067	

Source: Author's Calculation by using EViews 12. The symbols of \* and \*\* indicate significance at 5% and 10% levels, respectively.

Table 12. Causality Wald Tests.

Equation	DF	Chi-square	probability
lnMWS to lnWRS	2	6.14977	0.0462*
lnCOP to lnWRS	2	1.22936	0.5408
lnXrate to lnWRS	2	8.04065	0.0179*
lnSDA to lnWRS	2	9.33946	0.0094*

Source: Author's Calculation by using EViews 12.

\* indicates significance at 5% levels and reject null hypothesis on "no-causality".

### 6.4. Post Estimation Tests

After identifying the cointegration relationship among the variables, selected causality tests were carried out to examine the causal relationships between the independent variables and the dependent variable of worker' remittances. Under the causality tests, the long run causality running from the exogenous variables to the inflow of workers' remittances is confirmed by the given negative sign of the error correction

term and its significant nature, which is highlighted in the above section. The short run causality between all the variables were tested using the Wald test. The respective outcomes of the Wald test are given in the Table 12. In this case, we test whether the exogenous variables individually do not cause the inflow of workers' remittances using the null hypothesis of "no causality" [ $C(4)*D(LNMWS(-1))=C(5)*D(LNMWS(-2))=0$ ] etc. The results of the Wald test revealed that the null hypothesis is rejected for the most variables (the annual migrant workers, the exchange rate and the deposit interest rate), confirming the short run causality running from these variables to the inflow workers' remittances.

In addition to the Wald test, some diagnostic tests were carried out to ensure the validity of the estimated model using EViews 12.<sup>7</sup> The relevant results of the diagnostic tests are tabulated in Table 13. The test for serial correlation (LM

7 All of the tests given by EViews are not available for every specification [User's guide, EViews 12].

test) reveals the insignificant probabilities at 5% level indicating the no serial correlation null hypothesis in the residuals. It confirms that the models used in the study are appropriate to estimate the valid outcomes. The Breusch Pagan-Godfrey technique was employed to check the Heteroscedasticity problem. The corresponding results of this technique failed to reject the null hypothesis of no heteroscedasticity at 5% significant level, indicating the no heteroscedasticity problem in the models. At the same time,

the normality tests were employed to determine whether residuals are normally distributed with zero mean or not. The insignificant probabilities given by the Jarque-Bera test statistics confirms the normal distribution of residuals, suggesting the validity of the models. In terms of diagnostic statistics, the given R-square and F-statistics, respectively account for 66% and 3.95 suggesting the overall good fit and significance of the model.

*Table 13. Results of Diagnostic Tests.*

Diagnostic Test	Lag Level	Results	
Breusch-Godfrey Serial Correlation LM Test	2	F-Statistics	1.1464
		Probability	(0.3399)
Breush-Pagan-Godfrey Heteroscedasticity	2	F-Statistics	1.1900
		Probability	(0.3703)
Jarque-Bera Normality Test Statistics	2	Jarque-Bera	0.4678
		Probability	(0.7914)

Note: Probabilities of the test statistics are given in the Parenthesis.

## 7. Conclusion

The importance of remittance inflows as a non-debt creating source of foreign exchange in Sri Lanka has increased in the face of the COVID-19 pandemic and the current challenging external sector environment. Emphasizing the necessity of enhancing workers' remittance inflows to the country, this study analyses the empirically long run and short run relationships between remittance inflows to Sri Lanka and the macroeconomic determinants during the period from 1986 to 2019. In the light of the findings, it is revealed that the exchange rate, annual migrant workers, deposit interest rate and global oil prices are important factors in affecting remittance inflows to Sri Lanka. These findings are consistent with the most previous studies as described in the literature.

As per the outcomes, depreciation of the exchange rate cause to attract more remittances to the country indicating the necessity of establishing an appropriate exchange rate policy. However, in the case of Sri Lanka, importing expenditure is higher than the export earnings and therefore, the depreciation of the exchange rate can cause an increase of importing cost. In this context, policy makers need to bear this matter in mind while taking cost effective remittance policies as appropriate. Moreover, a depreciation of the rupee would render remittances more profitable, it is necessary to align the official exchange rate closely with the black-market exchange rate while enhancing the future expectations on the rupee appreciation. Expectation on the rupee appreciation would probably increase inflow of remittances through the official channels. Also, effective policies need to be taken to channel workers' remittances, particularly for investment purposes while providing suitable tax concession and other incentive benefits for remitters. Although recent hike in global oil prices adversely impact on domestic inflation and other macroeconomic variables, it would positively effects on workers' remittance inflows to the country in the long run.

This implies that the stabilization of crude oil prices in the host countries is more important for macroeconomic stability in Sri Lanka, confirming the fact that remittances are likely to be influenced by external factors in addition to domestic factors. This also emphasize the necessity of finding alternative destinations for migrant workers rather than relying upon the Middle Eastern region as these countries are often subjected to economic catastrophes driven by the swings in oil prices and geopolitical tensions. In this context, the policy makers can explore new labour markets in different regions, particularly including advanced economies such as Japan and European countries, which will facilitate to reduce the exposure of Sri Lankan foreign remittances to one single region. Outcomes of the study on labour migration highlight the importance of taking necessary steps to increase the impact of overseas employment. Accordingly, increasing effective and trained migrant workers through investments in competency development through vocational training are necessary for the satisfactory and stable inflow of remittances in Sri Lanka. In addition, attention should be drawn to reduce the remittance cost substantially by promoting financial inclusion, strengthening competition and developing financial infrastructure while making appropriate policies for shifting the larger share of remittances from informal to formal financial channels. Considering the current developments in the external sector, it is necessary to take immediate and appropriate actions to promote the inflow of workers' remittances in Sri Lanka enabling to provide direct benefit to households and to help the economy to withstand the existing economic shocks.

## Declaration

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The views presented in this paper are those of the author and do not necessarily indicate the views of the Central Bank of Sri Lanka.

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