MIGRATION, REMITTANCES AND HOUSEHOLD WELFARE: EVIDENCE FROM SRI LANKA

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Abstract

This study attempts to determine the effect of migration and remittances on household welfare in Sri Lanka by using a nationally representative data set collected by the Department of Census and Statistics of Sri Lanka in 2016. As the households that receive remittances are systematically different from those that do not receive remittances, the paper employs the Propensity Score Matching (PSM) technique to avoid any selectivity bias arising from this non-randomness. An aggregate asset index and per capita expenditure were used as welfare measures. Results suggest that household head characteristics, human capital variables and regional characteristics are the main determinants of receiving local and international remittances. Principle Component Analysis (PCA) and factor score analysis suggest that asset indices for productive and consumer assets of international remittance-receiving households are higher than that of the local remittance-receiving households with similar assets. The results of the OLS regression suggest that local and international remittances-receiving households gain higher welfare in terms of the asset index and per capita expenditure. International remittances tend to have a more substantial effect on the welfare of households in Sri Lanka. This study concludes that remittances improve household welfare and recommends that migration should be promoted further.

JEL: *J61*

Keywords*: Asset index, Household welfare, Migration, Ordinary Least Square (OLS), Per Capita Expenditure*

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INTRODUCTION

Migration is an act that affects the welfare of households, the home economy, and the entire economy, especially in the developing world (Azam and Gubert, 2006). Remittances from migration are generated mainly by individuals seeking better economic opportunities beyond their origin for themselves and their families. One of the primary reasons for migration is the economic vulnerability of communities in marginalised and poverty-stricken areas of these countries (Withers, 2019). They tend to diversify their income portfolio to smoothen up the adverse effects generated due to variability in their incomes and to overcome the adverse welfare effects arising from social, economic and institutional constraints. World Bank (2007) also shows that the most successful way to move out of poverty is to diversify the livelihood portfolio beyond employment. It further reveals that if they can diversify income sources, it would be associated with welfare gains and lower poverty for households.

With economic liberalisation and open economic policies introduced in 1977, foreign employment became one of the primary sources of foreign exchange earnings in Sri Lanka. Remittances from migrant workers became an insurance flow for the Sri Lankan economy (Deshingkar, 2006; Gunatilleke et al., 2004) and the leading foreign exchange earner next to the tea sector in Sri Lanka (Eelens and Schampers, 1990). They are much more stable over time than private capital flows (Lueth and Ruiz-Arranz, 2007). For the last two decades, remittances have been much more prominent than Official Development Assistance (International Organisation for Migration, 2019), FDI or foreign aid and all three taken together (Sandaratne, 2014; Arunathilake et al., 2010). At present, remittances have become the largest single source of foreign exchange inflow of Balance of Payments (BOP) in Sri Lanka and workers' remittances as a percentage of GDP have increased from 5.7% from 2001 to 2020 to around 8% from 2001 to 2020 (Central Bank, 2020). Sri Lanka has been a country among South Asian economies, continuously recording more worker remittances than FDI since 1977. While over 50% of remittances come from Middle East Countries, Sri Lankan nationals who work in the USA, Australia, Europe and East Asia send a substantial number of remittances. Remittances also play a significant role in national savings and represent 30% of national savings (Shaw, 2008).

Migration, internally or locally, brings about changes to the origin communities. It has its advantages and disadvantages. For example, de Haas (2006) shows that migration leads to the transfer of capital and acceleration of exposure of traditional communities to rational ideas, modern knowledge, and education, while it also leads to the withdrawal of human capital and the breakdown of traditional stable village communities and regional communities. As a result, village communities become remittance dependents, passive and non-productive. Eelens and Schampers (1990) show that the main reason for migration from rural areas to Middle East (ME) countries as female housemaids is economic considerations as they mostly come from very low-income families. These housemaids who work in ME countries remit their earnings to their homes, contributing

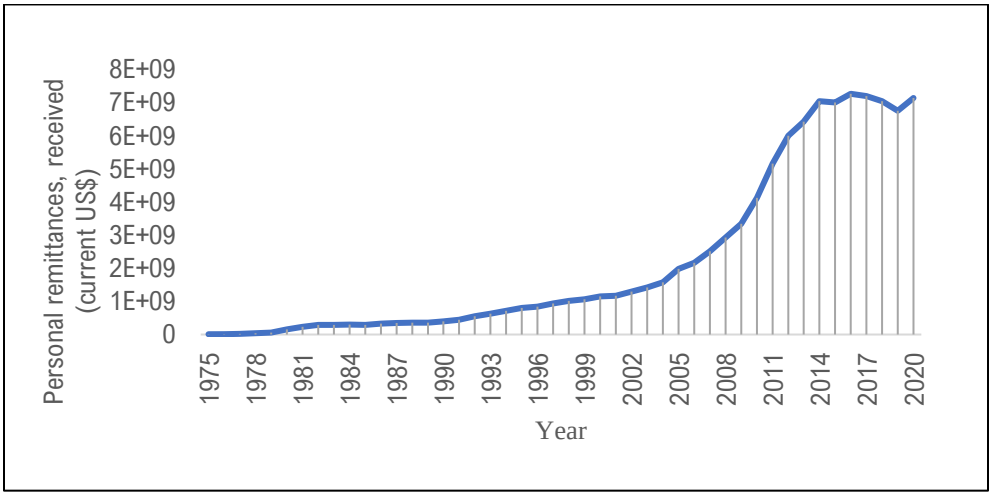
to improving income status and helping them alleviate poverty through relaxing income constraints. It also contributes to reducing the unemployment problem in Sri Lanka. Eelens and Schampers (1990) further raise the fact that allegations about conspicuous consumption of migrants on luxury items, alcohol, and unnecessary purchases while a few make significant contributions to productive investments. They also notice that there are no long-term improvements in family well-being due to remittances, as there is a detrimental effect on children left behind when the mother migrates. A study using data from Sri Lanka integrated survey (1999-2000) and De Silva (2013) found that remittances from females abroad are used for home improvements and acquiring farmland and non-farm assets.

In contrast, remittances of men are channelled more toward housing assets and business ventures. Apart from this, De and Ratha (2012) showed that remittance income positively and significantly affects children's health and education, but not conspicuous consumption or asset accumulation. Foreign Employment Promotion and Welfare Ministry (2013) further strengthens this literature, highlighting that migrant households spend more on food, non-food, durable goods, and housing. Sharma (2011) finds the cumulative effect of migration and remittance to be significantly positive in critical areas such as food consumption, health expenditures, and expenditure on essential non-food goods in Sri Lanka.

Remittances and Household Welfare

The remittances can also be considered a possible replacement or substitute for domestic earnings (Adams, 1989; Barham and Boucher, 1998). Remittances from migrants to Sri Lanka are rising from 2016 to 2019 (Figure 1).

Figure 1: Personal remittances received from abroad in current USD

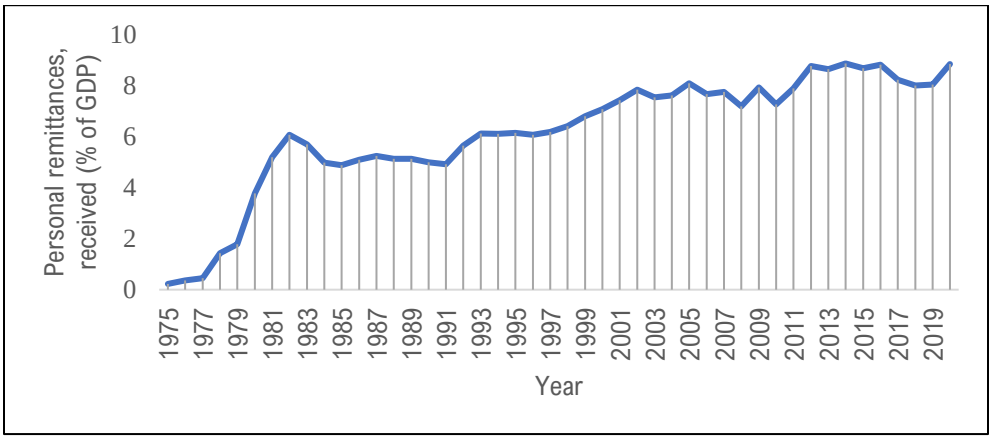


Source:https://data.worldbank.org/indicator/BX.TRF.PWKR.CD.DT?locations=LK

Accessed on 26/07/2021

Together with other South Asian countries such as Bangladesh, India and Pakistan, Sri Lanka is among South Asia's largest recipients of remittances. The impact of remittances on the origin countries is so enormous that remittances contribute more than 40% to the GDP in some countries (World Bank, 2015). The contribution to the GDP of Sri Lanka was around 8.84% in 2020 (Figure 2).

Figure 2: Personal remittances received from abroad as a percentage of GDP



Source: https://data.worldbank.org/indicator/BX.TRF.PWKR.DT.GD.ZS?locations=LK

Accessed on 26/07/2021

Remittances play a significant role in the financial dynamics of origin communities. They help reduce poverty (World Bank, 2007), relax credit constraints, improve living standards, and contribute to developing human capital. Literature also shows that remittances help families maintain or increase expenditure on consumption, housing and small business formation (Lasagabaster et al., 2005). Thus, if migration can bring about a change in the income of households, it may affect the overall well-being of the households of a particular community. Sharma (2011) analyses household well-being in Sri Lanka's western province considering international contract-based migration and finds that various types of expenses *viz* food, non-food, and health expenses have increased significantly among migrant households, while Dharmadasa et al. (2018) find that remittances reduce the incidence of poverty, depth of poverty and severity of poverty. Lasagabaster et al. (2005) further opine that remittances improve household welfare and stimulate local economic development. The results of the empirical exercise carried out by Wadood and Hossain (2017) support that remittances positively affect per capita incomes and, crucially, contribute to a decline in poverty status in Bangladesh.

In a study conducted to find the effect of remittances on household asset accumulation, Ahmed et al. (2016) show that remittances lead to a substantial increase in household assets. Using a panel data set of rural households in Mexico, Chiodi et al. (2012) reveal that migration accelerates productive asset accumulation. However, they find a negative

association between migration and non-productive (durable goods) assets. Adams (1998) shows that the availability of remittance income helps to increase investment in rural assets by raising the marginal propensity to invest for migrant households in Pakistan. The author further highlights that effect of international or external remittances is greater in accumulating rural assets than that of local remittances. The findings of Garip (2014) concerning Thailand suggest that wealthy households lose productive assets with migration because of the reduced labour force available to maintain local economic activities. However, Garip (2014) further shows that migration shows that poor households gain productive assets. Quisumbing and McNiven (2010) find evidence of having a positive effect on housing, consumer durables, nonland assets, total expenditures (per adult equivalent), and educational expenditures, enabling asset accumulation and investment in human capital with the receipt of remittances to households in the Philippines. According to Andersson (2014), remittances positively affect consumer asset accumulation, especially in rural areas in Ethiopia. It is also evident from this study that remittances significantly affect subjective well-being, whereas they have no positive effect on productive asset accumulation. Fatima and Qayyum (2016) and Kangmennaag et al. (2017) also find that remittances significantly affect asset accumulation in Pakistan and Malawi, respectively.

Although the implications of the remittances at the household level represent a way of ensuring household welfare, migration literature highlights that the link between migration and household welfare is complex and mostly context specific. Studies conducted in Sri Lanka, Guatemala and Ghana, have shown that remittances help as an insurance flow for some economies while they have assisted in raising the assets and resilience levels of poor people (Adams, 2006; De and Ratha, 2012; Deshingkar, 2006). However, Ajaero et al. (2017) argue that empirical findings on the impact of migration and remittances on the home country still vary; therefore, the effect of out-migration on household welfare remains an empirical question. They further argue that the answer to the question depends on the specific nature of migration in any given area. In their study, Ahmed et al. (2016) find that the effect of remittances on asset accumulation changes depending on the nature and magnitude of the remittances and the economic and geographical location of the recipient households. The literature also found that migration and remittances, directly and indirectly, impact the population's welfare in migrant-sending countries. It is also evident from the literature that the welfare of the households has been measured using income (expenditure) strategies, poverty, living standard, and expenditure pattern.

However, there is a considerable dearth of micro-level quantitative studies in finding the effect of migration and remittances on household welfare in Sri Lanka. Therefore, this study attempts to measure the effect of migration and remittances on household welfare. Compared to previous studies, this study has unique features. First and foremost, it uses an asset index strategy to see the long-term welfare impact of migration using a recent

micro-level data set. Second, it separately compares the welfare implications of internal (local) and international remittances.

DATA AND METHODOLOGY

Data

Data for this study come from the household income and expenditure survey (HIES) conducted by the Department of Census and Statistics in 2016 (Department of Census and Statistics, 2017). It is a comprehensive survey which collects detailed information on a wide range of topics such as income, expenditure, demographic characteristics of households, education, health, remittances and transfers and assets. HIES provides information on the household members and who usually lives in the household, but it collects no information on migrant members. The only information available is whether the households receive remittances and where the remittances are coming from. The survey collected information on remittances for the last 12 calendar months. The data set provides information related to the rural, urban and estate sectors of Sri Lanka separately. The data set comprises 21,756 households and is represented at the national level for rural, urban, and estate sectors. The rural sector comprises 17,394 households, the urban sector comprises 3,429, and the estate sector comprises 933 households. The data include 17,453 non-migrant households (80.22%) and 4,303 migrant households (19.78%). Out of migrant households, 1,789 households (41.57%) receive no remittances, 1,329 households (30.88%) receive internal remittances, and 1,091 households (25.35%) receive international remittances. Only 94 (2.18%) households receive international and local remittances. Only the subsample of migrant households (4,303) with at least one local or international migrant was used in this study. It could also be noted that some households receive remittances without migrants. These households were not included in the study as they may create issues when analysing the data. Table 1 shows the number of households that receive remittances either from local migrants or from international migrants. It is evident from Table 1 that the number of households that receive remittances is highest in the urban sector as a percentage, and estate sector households receive more remittances from local migrants.

Table 1: Number of households receiving remittances in each sector

Sector	Number of households	Receipt of local remittances		Receipt of international remittances	
		%	Number	%	Number
Urban	554	21.12	117	43.68	242
Rural	3519	33.65	1184	25.91	912
Estate	230	53.04	122	13.48	31

Source: Author's calculations based on data

Each household was considered the unit of analysis. This is important due to several reasons. In fact, New Economics of Labour Migration (NELM) highlights that decision to migrate is a collective decision made by the total household. Apart from this, the migrants have an interfamilial relationship with the household members left behind in the origin communities. Due to these family ties, the migrant tends to send remittances home. It is also a fact that the decision to send remittances is affected by household conditions. Most of the migrants are not permanent migrants. Therefore, the migrants are bound to send the remittances home and the amount of remittances sent is affected by the condition of receiving households. It is also noted that some migrants do not send remittances. They accumulate their remittances, and on their return home, they bring the remittances (savings) home. However, the data provide information on remittances yearly; therefore, it is assumed that the household has exactly received the amounts reported in the survey.

Empirical Strategy

This study used an approach similar to that of Ajaero et al. (2017). In doing so, several econometric challenges were addressed. HIES data set consists of both remittance-receiving households (local and international) and non-receiving households. Direct comparison of these two groups of households will produce biased results as remittance-receiving households and non-receiving households could systematically differ from each other in many observable and unobservable characteristics that might be correlated with the outcome variable. Further, As the remittances are not randomly assigned, confounding factors could influence the probability of receiving remittances and the outcome of interest. There are several methods, including difference-in-difference estimation (DID), instrumental variable approach (IV), and propensity score matching (PSM) approach to avoid these problems. However, the DID method cannot be used because HIES consists of cross-sectional data. Due to the limitation of data, finding a good instrumental variable is also tricky. Therefore, the propensity score matching (PSM) approach was used to address potential bias arising from unobserved heterogeneity (Wadood and Hussain, 2017). The advantage of this approach is that it allows us to compare households that receive remittances with otherwise similar households that do not receive remittances to mitigate the self-selection bias.

The households from the treatment group (remittance-receiving) are matched with households from the control group (non-receiving) with similar propensity scores. The propensity score is calculated using a probit model subject to all the observable covariates that may determine receiving remittances.

The goal is to estimate the causal treatment effect as follow:

$$\tau_i = Y_{i1} - Y_{i0} \quad \text{.......} (1)$$

where Y_{i1} and Y_{i0} are the outcome respectively for a household with and without treatment. Consider D = {0,1} to be a binary indicator where D = 1 if a household receives

remittances and D = 0 otherwise. The average treatment effect (ATE) can be estimated through:

$$\tau_{ATE} = E[Y_i|D_i = 1] - E[Y_i|D_i = 0] \quad \ldots\ldots (2)$$

Here, ATE is the average difference between treated households (treated households are those who receive remittances) and non-treated households in our study. However, these measures do not reflect the true impact of treatment if we have selection into treatment and if other factors are related to treatment and certain omitted variables that affect the outcome variable.

However, the problem is that we can observe the outcome variable under either treatment or control for each household, but never at the same time. Therefore, instead of ATE, the average treatment effect on the treated (ATT) was used, defined by:

$$ATT = E[Y^1|D = 1] - E[Y^0|D = 1] \quad \ldots\ldots (3)$$

where $E[Y^1|D = 1]$ is never observed. Replacing $E[Y^0|D = 1]$ by the expected value of $E[Y^0|D = 0]$ which is observable in ATE, would not give an accurate estimate as long as $Y^0$for the treated and the comparison group systematically differ. The true parameter is only identified if:

$$[E|Y^0|\, D = 1] - E|Y^0|D = 0] = 0 \quad \ldots\ldots (4)$$

A matching approach, which enables matching treated households with non-treated households with similar characteristics as possible was used to decrease the bias error of self-selection. This matching is made based on an index, the propensity score, summarising the pre-treatment characteristics of each household. The propensity score is the probability of assignment into treatment, p(X), conditional on a set of pre-treatment characteristics, X, so that:

$$p(X) = Pr\ Pr\ [X] = E[D|X] \quad \ldots\ldots (5)$$

Because the propensity score p(X) is a continuous variable, it is more or less difficult to find matches with the same propensity score. For that reason, many matching techniques have been developed to match the households based on their estimated propensity score, including nearest neighbour matching, calliper and radius matching, and kernel matching.

The study used the nearest neighbour matching (NN) approach. Under this approach, a controlled household is matched with a treated household based on the closest propensity score, and the advantage of NN matching is that all units are matched. Here, the number of matching partners in NN matching can also be varied to match a treated household with the n closest neighbours. Therefore, this study used one-to-one nearest neighbour (NN) matching with replacement, which increases the matching quality and reduces bias. (Caliendo and Kopeinig 2008).

This study estimated the average treatment effect on the treated (ATT), which measures the impact of local and international remittances on asset indices and per capita expenditure of households with migrant family members. The following variables are used in this study (Table 2).

Table 2: The variable definitions

Variable	Measurement scales
Age of head of household	Number
Age square	Number
Gender of the household head	Dummy 1=male, 0= female
Head of household married	Dummy 1=married, 0= otherwise
Head of the household has no formal education	Dummy1=no formal education, 0= otherwise
Head of the household has primary education	Dummy 1=primary education, 0= otherwise
Head of the household has secondary education	Dummy 1=secondary education, 0= otherwise
Head of the household has tertiary education	Dummy 1= tertiary education,0= otherwise
Head of household is a government employee	Dummy 1= government employee, 0= otherwise
Head of household semi-government employee	Dummy 1= semi-government employee, 0= otherwise
Head of household private sector employee	Dummy 1= private sector employee, 0= otherwise
Old dependents (above 65 years of age)	Number
Young dependents (below 15 years of age)	Number
Household size	Number
Number of members over age 15 with no education	Number
Members over age 15 with grade 1-5 education	Number
Members over age 15 with grade 6-11 education	Number
Members over age 15 with A/L education	Number
Members over age 15 with above A/L education	Number
Ownership of livestock	Dummy 1=owned, 0= otherwise
Ownership of agricultural lands	Dummy 1=owned, 0= otherwise
Urban household	Dummy 1=urban, 0= otherwise
Rural household	Dummy 1=rural, 0= otherwise
Estate household	Dummy 1=estate, 0= otherwise
Receipt of local remittances	Dummy 1=receive, 0= otherwise
Receipt of international remittances	Dummy 1=receive, 0= otherwise

Two dependent variables were used to assess the impact of household welfare remittances. Those are the asset index and per capita expenditure. The consumer asset index, productive asset index, and aggregate asset index were created using asset ownership variables (Table 3) which were derived from the HEIS data set (Ajaero et al., 2017).

Asset indices according to Filmer and Scott (2008) in the basic form is shown below:

$$A_i = b_1.a_{1i} + b_2.a_{2i} + \ldots + b_k.a_{ki} \quad \ldots\ldots (6)$$

where,

A_i = asset index of household *i*

$a_{1i}, a_{2i} \ldots a_{ki}$ = k indicators of asset ownership variables (such as radio, television)

b_1, b_2, b_3 = weights to be used in aggregating the asset indicators into an index

Table 3: Variables in the asset index

Variable	
Productive assets	**Consumer assets**
Ownership of agricultural lands Ownership of houses Ownership of animals	Radio, TV, VCD, sewing machine, Washing-machine, Fridge, Cookers, Electric-fans, Telephone, Telephone-mobile, Computers, Camera, Motor-bicycle, Three-wheeler, Motor-Car-Van, Bus-Lorry, Tractor-2-wheel, Tractor-4-wheel, Knapsack-sprayer, Threshers

In calculating each asset index, principal component analysis (PCA) was used to determine the weights as a factor score for each asset variable. The first component to be extracted from each asset variable is the linear index or efficient component because it has the most information about the variable. Therefore, in this study, the scoring factors of the first principal components (efficient components) were used for constructing the asset indices using the asset index formula by Filmer and Scott (2008).

The factor score of each asset variable was divided by the variable's standard deviation to determine the relative contribution of each of the asset variables on household welfare, thus.

$$I = \frac{f_i}{s_i} \quad \ldots\ldots (7)$$

where,

I = relative contribution of each asset variable on household welfare

f_i = factor score of i^{th} variable (from the PCA)

s_i = standard deviation of i^{th} variable

Finally, separate OLS regressions we run taking the aggregate asset index and the log per capita expenditure as dependent variables. The impact of remittances on the aggregate asset index or the log per capita income was captured using the receipt of remittances as independent variables.

The model is specified as follows:

$$Y_i=\beta_0 + \beta_i X_i + \gamma_i LR_i + \delta_i IR_i + \varepsilon_i \quad \text{..... (8)}$$

where,

Y_i = Aggregate asset index and log of per capita expenditure

β_0 = Constant

$\beta_i, \gamma_i, \delta_i$ = Coefficients to be estimated

X_i = Vector of observable variables affecting the welfare

LR_i = Receipt of local remittances (1=receive local remittances, 0=otherwise)

IR_i = Receipt of local remittances (1=receive international remittances, 0=otherwise)

ε_i = Error term

RESULTS AND DISCUSSION

Table 4 shows the summary statistics of variables of the subsample of 4,303 migrant households used in the study. These statistics reveal that the mean age of the head of the migrant household is 51 years. Table 4 further reveals that the majority of household heads are males. Most household heads have primary and secondary education.

Most of the heads in migrant households are married, and the majority of them are government employees. The household size ranges from three to 18 members, and the mean value of household size is around four. The number of young dependents ranges from zero to six, while the number of old dependents ranges from zero to seven.

As it is known that human capital characteristics drive migration, it is noteworthy to look at them closely. Accordingly, Table 4 suggests that more household members are educated. Approximately two members have obtained advanced level education or above that level. As indicated in Table 4, some migrant households own livestock, while many have agricultural lands. As a percentage, 89.2% of them own agricultural lands. Most rural households have more migrants than urban and estate households.

The PSM technique allows for the comparison of two outcomes simultaneously. Therefore, this study first looked at the impact of remittances on welfare gains and then looked at the impact of international remittances on welfare gains.

Table 4: Socio-economic characteristics of migrant households (summery statistics)

Variable	Mean	Std Dev	Minimum	Maximum
Characteristics of Household head				
Age	51.85	13.83	14	98
Househols head has no formal education	0.04	0.19	0	1
Househols head has primary education	0.79	0.41	0	1
Househols head has secondary education	0.75	0.43	0	1
Househols head has tertiary education	0.02	0.15	0	1
Gender	0.51	0.50	0	1
Marital status	0.82	0.38	0	1
Government employee	0.54	0.50	0	1
Semi government employee	0.01	0.10	0	1
Private sector employee	0.00	0.03	0	1
Household characteristics				
Number of young dependents	0.99	1.04	0	6
Number of old dependents	1.60	0.80	0	7
Household size	3.58	1.56	1	13
Human capital characteristics				
Members over age 15 with no education	0.09	0.32	0	3
Members over age 15with grade 1-5 education	0.40	0.67	0	4
Members over age 15 with grade 6-11 education	1.50	1.16	0	8
Members over age 15 with A/L education	1.88	1.04	1	8
Members over age 15 with above A/L Education	1.69	0.94	1	8
Wealth				
Ownership of livestock	0.11	0.31	0	1
Ownership of agricultural lands	0.89	0.31	0	1
Regional Characteristics				
Urban	0.13	0.33	0	1
Rural	0.82	0.39	0	1
Estate	0.05	0.22	0	1
Receiving remittances	0.53	0.50	0	1
Monthly per capita expenditure	195.83	206.97	21.04	3921.4
Aggregate asset index	0.11	0.86	-1.62	2.51

Determinants of Receipt Remittances by Households (Probit Specification)

As suggested by the model statistics in Table 5, the overall models are significant at a 5% level. The models, therefore, were fitted with the data. Some similarities and contrasts concerning the receipt of remittances by migrants' households could be seen.

Receipt of remittances and educational attainment by household members are interlinked phenomena. Apparently, in most cases, they are positively related, implying that remittances improve the educational levels of the household members. On the other hand, the education level of the parents or the household heads is expected to affect the decision to migrate and, subsequently, the sending of remittances home.

The education level of the other members is also expected to drive the migration. It is expected that the migration of more people will lead to more inflow of remittances. The results further suggest that the propensity to receive local remittances is greater in households where the household head has a tertiary education while being a male household head reduces the receipt of remittances from both local and international migration. Generally, more educated parents or household heads know the benefits of education and the wage earned by the educated. Therefore, they encourage their children to be educated and make them aware of investing in the education of household members by sending remittances home.

It is well-known that a country like Sri Lanka has a dominant male society, and the principal male substantially influences household decision-making. Accordingly, our results reveal that male-headed households have less propensity to receive remittances. In most households, the head is the primary income earner. If he receives sufficient income, he may not try to diversify his income portfolio. On the other hand, migrants also may not try to send remittances home.

In most cases, international unskilled migration occurs to Middle East countries, and many are female migrants. As most of these female migrants are from rural and estate areas and most probably come from low-income families, the female migrants send remittances to their origin households. The household head being a government employee increases the propensity to receive international remittances, and being a private sector employee increases the propensity to receive local remittances.

The number of dependents is positively significant for the probability of receiving remittances. When there are more dependents, the family must take care of them, increasing the need for more income. Therefore, the probability of receipt of local remittances is higher with a greater number of dependents.

The household size has a negative and significant impact on receiving local remittances. This is an unexpected outcome because increasing the number of members living in a family increases the total household income requirement.

Table 5: Results of probit regressions for receiving of remittances

Variable	Receipt of Local Remittances		Receipt of international Remittances	
	Coefficient	**t value**	**Coefficient**	**t value**
Characteristics of household head				
Age of head of household	-0.0106	-1.03	0.0080	0.74
Age squared	-0.0002 *	1.83	-0.0001	-1.43
Head of the household head has no formal education	-0.1159	-0.74	0.0194	0.11
Head of the household head has a primary education	0.0102	0.13	-0.0192	-0.23
Head of the household head has tertiary education	0.1421 **	1.98	-0.1357	-0.83
Gender of the head of household	-0.4241***	-7.67	-0.1241**	-2.13
Marital status of the household head	0.0741	1.19	0.1212 *	1.81
Head of household government employee	-0.0609	-1.27	0.3771***	7.46
Head of household semi-government employee	-0.1619	-0.75	0.2044	0.99
Head of household private sector employee	0.2906*	0.51	-0.4048	-0.58
Household characteristics				
Number of young dependents	0.2353***	4.65	0.0425*	0.82
Number of old dependents	0.0128*	3.32	0.1537 ***	3.68
Household size	-0.1736 ***	-3.81	0.0443*	0.94
Human capital characteristics				
Members over age 15 with no education	0.1323	1.28	-0.0938	-0.86
Members over age 15 with grade 1-5 education	0.0872	1.31	0.0240	0.36
Members over age 15 with grade 6-11 education	0.0594	1.27	0.0048	0.10
Members over age 15 with A/L education	0.1161**	1.90	0.0466*	0.74
Members over age 15 with above A/L education	0.0226*	0.46	-0.2060***	-4.04
Wealth				
Ownership of livestock	0.1651**	2.38	0.3599***	5.34
Ownership of agricultural lands	-0.0640	-0.89	-0.0518	-0.70
Region Characteristics				
Urban	-0.8568 ***	-7.43	1.0479 ***	8.11
Rural	-0.4478 ***	-4.41	0.5653 **	4.70
Number of observations	4,303		4,303	
LR $chi^2(22)$	297.92		353.08	
Prob > chi^2	0.0000		0.0000	
Pseudo R^2	0.0545		0.0697	
Log pseudolikelihood	-2582.0353		-2355.9743	

Note: *** significant at 1% ** significant at 5%, * significant at 10%

According to the human capital variables, the number of members over age 15 with Advanced Level and above A/L education is positively significant for the probability of

receiving local remittances. However, with an increase in the number of members with tertiary education, the propensity to receive remittances reduces as they are likely to get employment opportunities.

Table 6: Relative contribution of household assets to household asset index (Factor score/ Standard deviation)

Variable	Factor score	Receipt of Local Remittances		Receipt of International remittances	
		Mean	Std. Dev	Mean	Std. Dev
Productive assets					
Ownership of agricultural lands	0.1030	0.8602	0.3469	0.8810	0.3239
Ownership of houses	0.1001	0.8039	0.3972	0.8253	0.3799
Ownership of animals	0.0196	0.0836	0.2769	0.1401	0.3472
Consumer assets					
Radio	0.0542	0.6402	0.4801	0.5949	0.4911
TV	0.0927	0.8932	0.3090	0.8954	0.3062
VCD	0.0832	0.4153	0.4930	0.4397	0.4966
Sewing machine	0.1163	0.4153	0.4930	0.3949	0.4890
Washing machine	0.1602	0.1694	0.3752	0.3232	0.4679
Fridge	0.2012	0.5566	0.4970	0.6236	0.4847
Cookers	0.1669	0.5474	0.4979	0.6363	0.4813
Electric fans	0.1309	0.5861	0.4927	0.7376	0.4402
Telephone	0.0956	0.2874	0.4527	0.3063	0.4612
Telephone-mobile	0.0590	0.9002	0.2998	0.9494	0.2193
Computers	0.1403	0.1778	0.3825	0.2911	0.4545
Camera	0.0932	0.0513	0.2207	0.1089	0.3116
Motor-bicycle	0.0753	0.3352	0.4722	0.3122	0.4636
Three-wheeler	0.0294	0.1476	0.3548	0.1122	0.3158
Motor-Car-Van	0.0903	0.0604	0.2384	0.0717	0.2581
Bus-Lorry	0.0247	0.0148	0.1206	0.0177	0.1320
Tractor-2-wheel	0.0111	0.0162	0.1261	0.0152	0.1224
Tractor-4-wheel	0.0201	0.0035	0.0592	0.0042	0.0648
Knapsack-sprayer	0.0092	0.0330	0.1788	0.0194	0.1380
Threshers	0.0080	0.0014	0.0375	0.0008	0.0290

Ownership of livestock is positively affected by the probability of receiving local remittances. Our results further highlight that propensity to receive international remittances is greater for urban and rural households than for estate households. In contrast, the propensity to receive local remittances is lower for them. This might be

because of the regional disparities due to economic and social factors. People in urban areas have more opportunities and facilities to go abroad than people in rural areas.

The factor scores and standard deviation of the variables owned by households that were used in the asset indices computation are shown in Table 6. Here, PCA is used to create two types of separate asset indices for consumer assets and productive assets. Those scoring factors from the PCA of the twenty-three variables were used as weights for the asset data.

Table 6 shows the factor scores of each asset variable divided by the variables' standard deviation for all households and by remittance status. It is to generate the relative contribution of each of the asset variables to household welfare in the study area. The mean value of the index is zero, and the standard deviation is 0.91. Since all the asset variables are dichotomous, it takes only the values 0 or 1. The weights have a straightforward interpretation: a move from zero to one, change the asset index by the factor score of each asset divided by its standard deviation or f_i/s_i. Therefore, this study defines the asset index as the sum of the factor score of each property.

According to Table 7, a local remittance-receiving household with agricultural land has an asset index higher by 0.30 than another local remittance-receiving household without agricultural land. In contrast, an international remittance-receiving household owing agricultural land raises the household's asset index by 0.3178 more than a household with no agricultural land. A local remittance-receiving household that owns houses has an asset index higher by 0.2520 than one that does not, while an international remittance-receiving household owing houses raises the household's asset index by 0.2635. At the same time, a local remittance-receiving household that owns animals raises the asset index by 0.0708, and international remittance-receiving households owing houses raise the household's asset index by 0.0564. Those values in local and international remittance-receiving households are higher than those without remittances. Also, a local remittance-receiving household that owns radios and TVs raised the asset index to 0.1129 and 0.3000, respectively, than another local remittance-receiving household without them, while international remittance-receiving household owing radio; TVs raised the asset index to 0.1103 and 0.3027 respectively than one that does not.

Furthermore, a local remittance-receiving household with a motor car or van-like vehicle raises the household asset index by 0.3786 to another local remittance-receiving household without those vehicles. In contrast, an international household that owes a motor car or van-like vehicle raises the household's asset index by 0.3496 more than one that does not. Generally, all households possessing agricultural lands, houses, television, sewing machine, fridge, cookers, electric fans, mobile phones, motor bicycles, three-wheeler, tractors 2-wheel, and knapsack sprayers raises a household asset index compared to another international remittance-receiving households that lacks these assets. Moreover, the asset index for those assets in international remittance-receiving

households is higher than the local ones with similar assets. Furthermore, most asset indices for those assets in international and local remittance-receiving households are higher than the non-remittance-receiving households with similar assets.

Table 7: Contribution of asset variables to household welfare

Variable	Local remittances receiving households	International remittance receiving households	Non- Remittance households
Productive assets			
Ownership of agricultural lands	0.2967	0.3178	0.1689
Ownership of houses	0.2520	0.2635	0.1482
Ownership of Animals	0.0708	0.0564	0.0517
Consumer assets			
Radio	0.1129	0.1103	0.1141
TV	0.3000	0.3027	0.2755
VCD player	0.1687	0.1675	0.1847
Sewing machine	0.2359	0.2377	0.2212
Washing machine	0.4269	0.3424	0.3968
Fridge	0.4048	0.4150	0.4012
Cookers	0.3352	0.3468	0.3405
Electric fans	0.2656	0.2973	0.2712
Telephone	0.2111	0.2072	0.2072
Telephone-mobile	0.1967	0.2689	0.2275
Computers	0.3669	0.3088	0.3369
Camera	0.4223	0.2991	0.3728
Motor-bicycle	0.1594	0.1624	0.1458
Three-wheeler	0.0829	0.0932	0.0806
Motor-Car-Van	0.3786	0.3496	0.3480
Bus-Lorry	0.2051	0.1874	0.1429
Tractor-2-wheel	0.0876	0.0903	0.0871
Tractor-4-wheel	0.3397	0.3101	0.1246
Knapsack-sprayer	0.0517	0.0669	0.0616
Threshers	0.2135	0.2754	0.1624

Result from Propensity Score Matching

Table 8 shows the results of the Nearest-Neighbour (NN) matching estimator. Here, the households were separated according to their probability of receiving local and international remittances, matching the households in the treatment group with similar

households from the control group, and finally calculating the average differences in outcome variables across the two groups. Propensity score analysis was performed with asset indices and per capita expenditure as outcome variables. Separate analyses are performed depending on whether the household is located in an urban, rural, or estate area.

Table 8: Impact of remittances on asset index and per capita expenditure (NN matching estimator)

Dependent Variable	Local remittances		International remittances	
	ATT	t - statistic	ATT	t - statistic
Urban sample				
Consumer asset index	-0.0743	-1.75 *	0.2069	2.02 **
Productive asset index	-0.1078	-1.17	-0.1943	-3.12 **
Aggregate asset index	-0.1931	-0.98	0.1535	1.58
Per capita expenditure	-23.9549	-2.73**	30.1787	1.32
Rural sample				
Consumer asset index	-0.0536	-1.47	0.2318	5.82 ***
Productive asset index	0.0001	0.01	0.0178	0.91
Aggregate asset index	-0.0495	-1.42	0.2214	5.75 ***
per capita expenditure	-23.7488	-2.25**	19.5669	2.47 **
Estate sample				
Consumer asset index	0 .0984	0.72	0.0121	0.06
Productive asset index	0.0201	0.21	0.1509	0.88
Aggregate asset index	0.0958	0.72	0.0396	0.19
Per capita expenditure	-2.0323	-0.10	25.0399	0.80

Note: *, **, *** Denotes significance at 0.01, 0.05 and 0.1 respectively.

Table 8 reports the impact of local and international remittances on the consumer asset index, productive asset index, aggregate asset index, and per capita expenditure. The results suggest that for some matching algorithms, the ATT is positive and significant, which means that remittances account for a positive and statistically significant difference between the treated (local remittance-receiving, international remittance-receiving) and the control groups in terms of consumer asset index, aggregate asset index in urban, rural and estate sectors. For the urban sample, local remittances have a significant negative impact on the consumer asset index and per capita expenditure. However, a significant positive impact of international remittances on the consumer asset index and a negative impact on the productive asset index in urban households were found. Therefore, it implies that local remittance-receiving households in urban households do not have higher-level consumer asset holdings and per capita expenditure than those households

that do not receive local remittances. Although the case concerns local remittance-receiving households, international remittance-receiving households in urban households have a higher level of consumer asset holdings and productive asset holdings than households that do not receive international remittances.

The impact of international remittances on aggregate asset holding and per capita expenditure is positive but not statistically significant in urban households. Therefore, it seems that international remittance-receiving households do not have a higher level of aggregate assets and per capita expenditure than households that do not receive remittances.

For the rural sample, a positive effect of international remittances on the consumer asset index, aggregate asset index, and per capita expenditure was found. Local remittance has a negative effect on expenditure. For the estate sample, no statistically significant impact of local and international remittances on consumer, productive, aggregate asset indices, and per capita expenditure was found.

Remittances and Household Welfare – Results of OLS Regressions

The aggregate asset index and the per capita expenditure were regressed with theselected independent variables to see the effect of remittances on household welfare (Table 9). It reveals that receiving local and international remittances significantly and positively affects household welfare in terms of the aggregate asset index. Results also indicate receiving local and international remittances has a significant and positive effect on log per capita expenditure at a 1% significant level, implying that local and international remittances-receiving households can have higher welfare in terms of the annual log per capita expenditure. A robust effect on asset accumulation indicates that households invest remittance received from migrants in consumer and productive assets.

The findings further suggest that investments in assets through remittances could sustain the quality of life of the recipient households in the long run (Ajaero et al., 2017). Results also reveal that higher education levels (tertiary, advanced level and above) of household heads and other members contribute to increasing household welfare, while living in urban or rural areas compared to estate areas further increases household welfare. When the head of the household does not have a formal education, it negatively affects the asset index and welfare of the household. Those who do not have a good education cannot obtain a good job. Those who do not have a good income will not be able to send more money to their households and will be unable to invest money in buying assets.

According to Table 9, the age of the household head also has a positive and significant effect on household welfare, implying that chances to increase the welfare of the household may be less in the early stages of the household head's life. However, there are more chances of producing more income and attempts to obtain more productive and consumer assets when there is an increased need in the later stage of life.

Table 9: Results of the OLS regression

	Aggregate Asset Index		Log per capita expenditure	
Variable	**Co-efficient**	**t value**	**Co-efficient**	**t value**
Age	0 .0123 **	2.07	-1.2749	-0.64
Age square	-0.0001	-1.11	0.0173	0.98
Household ead has no formal education	-0.3582 ***	-4.49	-62.3030 ***	-5.08
Household ead has primary education	0.2589 ***	6.09	56.6323 ***	6.77
Household head has tertiary education	0.5048 ***	7.53	158.6038 ***	3.06
Gender	-0.0771 *	-2.46	-5.4968	-0.73
Marital status	0.1683 ***	4.73	16.7004 *	1.69
Government Employee	0 .0631 **	2.33	-2.8946	0.39
Semi government Employee	0.1562	1.19	8.6218	0.33
Private sector employee	-0.3937 **	-2.44	-38.5188	-0.82
Number of young dependent	-0.3127 ***	-11.07	-15.0370 **	-2.47
Number of old dependent	0.0171 ***	0.76	-19.9782 ***	-3.52
Household size	-0.3265 ***	-12.75	-22.4034 ***	-3.89
Members over age 15 with no education	-0.4152 ***	-7.58	-13.5117	-1.57
Members over age 15 with grade 1-5 education	-0.3526 ***	-9.86	-3.9649	-0.56
Members over age 15 with grade 6-11 education	-0.2679 ***	-10.29	-9.0039 *	-1.68
Members over age 15 with A/L education	-0.0765 **	-2.22	5.7541	0.79
Members over age 15 with above A/L	0 .1276 ***	4.56	37.0710 ***	5.51
Ownership of livestock	0.1761 ***	4.75	-23.6855 ***	-4.21
Ownership of agricultural lands	0 .4101 ***	10.63	17.9352 ***	2.60
Urban	0.4406 ***	7.39	38.3773 ***	3.08
Rural	0.2062 ***	3.90	3.7238 ***	0.39
Local remittances	0.0136 ***	0.52	12.6156 ***	1.83
International remittances	0.2334 ***	8.19	29.3770 ***	3.81
Number of observations	4,303		4,303	
F (25, 21730)	101.13		25.27	
Prob > F	0.0000		0.0000	
R-squared	0.3509		0.1611	

Note: *** significant at 1% ** significant at 5%, * significant at 10%

Table 9 further highlights that asset accumulation and education have a positive relationship. In other words, once the level of education increases, it creates more opportunities to gain income. (Ajaero et al., 2017).

The results of the model demonstrate that the gender of the household head is significant and has a negative effect on the welfare of the households. This means that households with male heads have less welfare than their counterpart. The principal male is the income earner of the household in most cases. The females influence household decisions on asset accumulation, children's education and health. This is a generally known fact in a country like Sri Lanka. Therefore, if the household head is a female, one could expect more welfare gains for the household members. The household head's marital status positively affects asset index and household welfare, implying that their responsibilities towards the spouse and children motivate them to earn more and buy assets.

Results reveal that household welfare increases when the head of the household is a government employee. Government employees are more secure in their jobs and have old-aged benefits such as a pension. Moreover, they can relatively easily secure property loans at low-interest rates from banks. Therefore, their ability to accumulate assets is very high.

Young dependents were defined as children belonging to the age category from six to 14 years of age, while old age dependents are household members above 65 years of age in this study. Young dependents aged between six and 14 years who are still schooling could increase demand for family's financial needs, and therefore, the number of children may encourage adults to migrate to earn more income. This is the case with children below age 6 as well. The old dependents are economically inactive people in the household. The older people will have to be taken care of. As a result, the migrants tend to remit more to the origin societies whereby they can utilise remittances in purchasing household assets while spending the remittances on young dependents, and old dependents' needs. The household head must spend a significant portion on children's education, health, and safety. Therefore, having more young dependents may decrease welfare in terms of assets as more money will have to be allocated for children's needs. However, remittances sent by migrants may not be allocated to old dependents as their needs are less than young dependents. Therefore, remittances can be allocated for purchasing more assets so that the welfare of the household increases. Household size has a negative effect on household welfare, meaning that extra household members cause a reduction in the accumulation of assets. With the increase in household members, more money must be allocated for their daily needs.

Household size was used as a significant predictor in the function as it increases the probability of migration, which may affect the probability of receiving remittances. The household size variable captures the impact of family size on household expenditure, which is affected by the receipt of remittances. It could be expected that migration and

receipt of remittances are associated positively with household income as remittances provide economic support for the households. Household size is an essential determinant of the propensity to migrate and receive remittances. Therefore, household welfare should increase with the household size. However, the estimated results suggest that household size negatively affects household welfare in terms of asset accumulation and household expenditure. The poor people migrate more, especially in rural and estate sectors in Sri Lanka. Therefore, they remit to increase the income portfolio. Having more members in the family means more expenditure on day-to-day expenses, especially household consumption. Therefore, welfare gains may be limited with large family sizes. If a household owns livestock or agricultural land, it can be expected that they generate an extra income for the household. As a result, they can accumulate more assets with their increased income due to diversification of the income.

CONCLUSION AND POLICY RECOMMENDATIONS

This study examined how migration remittances affect Sri Lankan households' welfare status using a nationally representative data set collected by the Department of Census and Statistics in Sri Lanka in 2016. An asset index and per capita expenditure to measure household welfare were used. Data were analysed using a propensity score matching technique and OLS regression. PSM was used to avoid selectivity or associated bias because migration decision leads to self-selection bias. The households that receive remittances differ systematically from those that do not receive remittances.

This study used the asset index (productive and consumer assets), which has received relatively little attention in the literature as an indicator of household welfare against income data. The asset index strategy was employed as money from remittances may be used for other activities that do not impact household welfare. It was assumed that an asset derived from migration or remittances invariably contributes to the household's welfare. Apart from the asset index strategy, the predictor variables were regressed with per capita expenditure as the dependent variable and results were compared.

The results reveal that receiving international and local remittances increases household welfare. Receiving local and international remittances significantly and positively affects the aggregate asset index and expenditure. It implies that remittance-receiving households use remittances not only for consumption but also for saving and buying household assets. In other words, local and international remittances-receiving households have higher welfare regarding the asset index and expenditure. The result further suggests that the contribution of asset variables to household welfare varied among the households. It also shows that the asset index and the welfare of international remittance-receiving households are higher than those of the local remittance-receiving households.

The study also finds that the welfare of the households can depend on the location of the households. Households are better off in the urban sector than those in the rural and estate

sector. It is clear from the results that households in urban areas have a larger tendency to asset accumulations and consumption expenditure.

This research uses cross-sectional data. It is better to use panel data consisting of three to five years of data set to avoid biases. It will be able to determine more detailed asset index and per capita expenditure data for urban, rural, and estate sector households in Sri Lanka. Overall, the study's findings are important from the policy perspective because they support a growing view in the literature that migration and remittances help develop welfare in the Sri Lankan economy.

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