

A Gravity Model Analysis of International Migration from Sri Lanka to South-East Asian and European Countries

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Abstract

Since the 1970s, the Middle East region has dominated the foreign employment market of Sri Lanka. However, Sri Lankan migrants have been paying more attention on moving to South-East Asian and European countries as noted in recent decades. In Sri Lanka, there is a substantial lacuna on the macroeconomic studies related to migration although international migration has a significant impact on economic indicators. As a contribution to reduce this gap, this study examines the macroeconomic determinants of international labor migration from Sri Lanka to South-east Asian and European countries using the gravity model of migration. As, in presence of heteroscedasticity, linear estimators result in inconsistency in estimated coefficients unless we use robust standard errors, Poisson Pseudo Maximum Likelihood estimation technique was used to find the determinants using panel data over the period of 2007 to 2015. Destination-year fixed effects were used to capture unobserved time-variant and time-invariant variables as well as to account for the multilateral resistance. Results reveal that GDP per capita and unemployment rate of Sri Lanka are the push factors which force people to move from Sri Lanka while the destination countries' population and dependency ratio are the pull factors which attract migrants towards the destination. Moreover, the population of Sri Lanka and poverty headcount ratio were also found as significant determinants of international migration.

Keywords: *Gravity model, Labour migration, Poisson pseudo maximum likelihood estimation technique, South-East Asian and European countries*

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INTRODUCTION

As elucidated by Perruchoud and Redpath-Cross (2011), labor migration is defined as movement of persons from one country to another (international migration), or within their own country of residence (internal migration) in search of better employment opportunities. Since the latter part of 1990s, policy makers and other related parties have been paying special attention and putting greater emphasis on issues pertaining to international migration, and especially to the international mobility of both skilled and unskilled workers. According to the United Nations (2017), at least, 258 million people of the world have moved to a country from their own country of birth recording an increase of 49% since 2000. Moreover, 3.4% of the world's inhabitants today are international migrants according to new figures released by the United Nations (2017).

When Sri Lanka is concerned, international labor migration has grown in importance for the last three decades and the numbers have increased more than tenfold during the same period. The total number of out migrants of Sri Lanka on employment abroad at present is estimated to be 212,162 (males 66%, females 34%) (Sri Lanka Bureau of Foreign Employment [SLBFE], 2017).

Foreign employment has become the second largest source of foreign exchange in the Sri Lankan economy during the past few years (SLBFE, 2017). Since the 1970's, during which the labor migration was formalized, foreign employment has generated a considerable inflow of remittance to the country while reducing the pressure on youth arising as a result of unemployment. During the year 2016, the contribution to the GDP from workers' remittances is 8.2% (SLBFE, 2017).

SLBFE (2016) shows that, although continuously Saudi Arabia has secured a significant high share of workers, in the recent past, there has been a decline in the rate of growth in the departures and new destinations have become more lucrative especially for semi-skilled workers. Countries like Maldives, Cyprus, South Korea, Singapore and Malaysia are becoming more attractive destinations as a result of better pay and better working conditions.

International labor migration has thus become an important and stable source of foreign currency inflow to the country reducing the pressure on authorities on account of the unemployment issue in the country.

Migration to South-East Asian and European Countries

International migration flows have increased in magnitude and complexity over the past few decades receiving ever more attention at policy level. It has become progressively significant and a beneficial segment of the socioeconomic structure of Sri Lanka. International migration can give rise to remarkable welfare gains for migrants, to the countries of origin and destination by reducing the poverty levels and enhancing the living

standards (World Bank, 2006). People are in search of different destinations for this purpose. According to Srivastava and Pandey (2017), 1.66% of total Sri Lankan migrations are for South-East Asia and 27.31% to Europe.

The South-East Asia region consists of 10 countries: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. These countries are members of the Association of Southeast Asian Nations (ASEAN) which have experienced dynamic socio-economic developments that bring significant changes to the living conditions and labor productivity. In line with the increasing level of development, urbanization and international migration in the region have increased significantly. As Sugiyarto (2015) points out in his research of internal and international migration in South East Asia, Singapore tops the list with an urbanization rate of 100%. Other countries with high urbanization rates are Brunei and Malaysia, each with more than 70%. On the international front, this region is one of the main sources which provide migrants worldwide. It contributes to more than 215 million people, or 3 percent of the total world population (World Bank, 2011).

Apart from the South – East Asian region, after World War II, Western Europe became one of the main immigration regions of the world (Zaiceva and Zimmermann, 2008). In Western Europe, many countries, especially Italy, Ireland, Portugal and Spain, from which migrants moved out excessively in the past century now act as major destinations, (United Nations, 2008). According to the data provided by the SLBFE (2016) the major destinations of Sri Lankan migrants in Europe are UK, Italy, Cyprus, Greece and Ireland.

Srivastava and Pandey (2017) find that migration of low skilled workers to European Union (EU) countries, especially the United Kingdom, Italy, Germany and Spain, has increased in recent years as a result of labor shortages in these countries. In recent years, the EU Commission has recognized the importance of skilled immigration from non-EU countries, but has so far failed to convince the member states of the need to establish a common European economic immigration policy.

The United Kingdom is one of the EU countries before BREXIT that has already implemented a policy in order attract such migrants from the new Eastern member states and non-EU countries under its Managed Migration policies and Highly Skilled Migrant Program (Ruhs and Martin, 2008). The common problem encountered in gathering information about emigrants to this region is the irregular migration. According to Wickramasekara (2002), the major reasons behind irregular migration flows are the restriction of emigration at source, and the restrictions on immigration at destination. Major destinations for Sri Lankan irregular migrants are Greece, France, Italy, the United Kingdom and Canada (UNODC, 2012). Therefore, the actual number of migrants to these countries are always higher than the available number. Thus, the importance of labor migration increases day by day and it has become one of the driving forces in growth of

the Sri Lankan economy. Therefore, from the policy perspective, analysis of migration flows would make it possible for the source region as well as for the destination region to clearly identify main determinants behind international migration and understand the potential effects on labor market and economic development. It was revealed that there is a lacuna in empirical evidence on determinants of international migration in Sri Lanka. Thus, this paper intends to explore the determinants of international migration from Sri Lanka and contributes to the available literature by empirically estimating the determinants of migration using push and pull factors together in one model. The estimation is done using nine years data from 2007 to 2015 and by applying the Extended Gravity Model. We assure that results presented in the paper will be helpful for the policy makers to develop better migration policies.

The study is divided into several sections: Section 2 presents the review of literature, Section 3 presents the methodology providing a detailed discussion on type of data, data analysis and selection of the econometric model. Section 4 explores the factors influencing international migration by estimating the econometric models and providing justifications to deviations from the expected results by means of descriptive presentation of the data, while the last section provides conclusions, recommendations and policy implications.

REVIEW OF LITERATURE

Determinants of International Migration

It was obvious from the literature that researchers have used several categories of determinants in realizing the reasons behind international migration. Most of the literature suggests that economic factors are the largest motivators which drive people in making the decision to migrate (Lowell, 2009). Although social and cultural factors also play a significant role in determining the international migration process, comparatively a few studies have focused on social and cultural factors (Hoffmeyer-Zlotnik, 2007 and Deaux, 2006). Geographical factors, development indices of both source and destination countries, role of admission policies; the country's integration into the global economy and gender equality are also found to be determinants of international migration.

Starting from the most initial research, in 1932, Sir John Hicks argued that differences in net economic advantages, mainly differences in wages, are the main causes of migration. Borjas (2015) disclosed the fact that workers tend to calculate the value of the opportunities available in each of the alternative labor markets, find the net value of the cost of making the move, and then choose the option which maximizes the net present value of lifetime income when making the decision to migration. Some authors argue that Push-Pull factors of migration are the most renowned causes of migration (Jayawardhana and Jayathilaka, 2009) where push factors are the factors which drive people to leave their

country, and the pull factors are the factors that attract them to a new country. Some of the most commonly known push factors of migration are economic, social, and political hardships in the origin country, while the pull factors include the comparative advantages in the richer countries' economic and social policies. Therefore, in Sri Lanka, it could be assumed that a combination of push and pull factors may have affected the size and direction of migration flows of the country.

Kim and Cohen (2010) investigated non-economic variables such as life expectancy, Infant Mortality Rate (IMR), and Potential Support Ratio (PSR) as proxies for economic or living conditions of countries as the economic and demographic factors are closely related to one another. According to Mayda (2005) economic and non-economic determinants that affect international migration are; per worker GDP of destination country, distance between the source and host country and share of the young population of origin country. Cuaresma *et al.*, (2013) reveal that per capita GDP of destination and origin countries, the populations of both countries, the distance between the countries as well as colonial relationships, common language and contiguity are some important determinants of global bilateral migration flows.

In the case of Sri Lanka, there are a few studies regarding the determinants of international migration and almost all of them have been conducted using micro level factors. For example, studies like Dharmadasa and De Zoyza (2014), Manel (2015), Manel and Perera (2017) and Dharmadasa and Rathnayake (2017) highlight that household size is a major determinant of migration. Apart from household size, ethnicity (Manel, 2015; Manel and Perera 2017) and level of education (Manel and Perera, 2017) are also shown to be the determinants of migration. However, according to the best of our knowledge based on the available literature, studies to find out the macroeconomic determinants of international migration to South-east Asian and European countries using gravity model are lacking in Sri Lanka.

METHODOLOGY

Data

Panel data from a recent decade, year 2007 to 2015, were used to identify the significant macroeconomic determinants of international labor migration by applying the Gravity model. The most recent decade was selected with the intention of realizing the recent pattern of migration of our country. All the data pertaining to the variables were gathered from secondary data sources. Labor departures to nine countries namely Brunei, Malaysia, Singapore, Thailand, Cyprus, Greece, Italy, UK, Ireland were collected from Annual Reports of SLBFE issued in each considered year mainly focusing on the data availability. These ten countries were considered as destination countries and Sri Lanka was considered as the origin country.

Distance (in kilometers) between capital cities of the countries considered in the study was collected from the CEPII’s database. Data related to the populations of countries, unemployment rates, GDP per capita and the dependency ratio were collected from the World Bank’s World Development Indicators. Some data such as poverty headcount ratios were collected from the Department of Census and Statistics of Sri Lanka.

Data Analysis

The general objective of the paper is to find the determinants of international migration to South-East Asian and European countries. In estimating the macroeconomic determinants of international migration, many researchers have used the Gravity Model which is widely used in studies related international trade.

In most cases, an extended version of the model has been employed depending on the context as the results, it yields, are easier to interpret and recent developments in panel-data analysis enable estimation based on the model (Kim and Cohen, 2010). Moreover, it has high explanatory power (Lewer and Van den Berg, 2008). The gravity model was originally introduced to explain the trade flows in two countries (Tinbergen, 1962) and it has been well-proved as a robust ex-post methodology in that aspect. However, the use of gravity models in migration studies is limited in comparison to studies related to trade and investment. For example, Lewer and Van den Berg (2008) applied this model to analyze various facets of international labor migration.

Theoretical Consideration

Simply, the gravity model views that international migration is determined by the sizes of the populations of destination and origin and the distance between origin and destination. Gravity models are one of the macro models under the interaction models.

Gravity models were initially based on Newton’s law of gravity and according to this law, the gravitational force is directly proportional to the masses of the objects and indirectly proportional to the distance between them.

As the initial step, Zipf (1946) used this equation to model migration replacing gravitational force with migrant flow from region *i* to region *j* and masses with populations of two regions.

The mathematical form of the gravity model is as follows;

$$M_{ij} = k \times \frac{P_i^\alpha \times P_j^\beta}{D_{ij}^\gamma}; i \neq j \dots\dots\dots(1)$$

Where; *M_{ij}* denotes the number of migrants from origin *i* to destination *j*, *P_i* denotes population of origin, *P_j* denotes population of destination, *D_{ij}* refers to distance between *origin* and *destination*, and *k* denotes a gravitational constant.

It predicts that, when all other things being constant, highly populated countries send more emigrants to destinations than countries with small populations, and that less populated countries attract more immigrants. The greater the distance between the origin and destination countries, the smaller will be the migration predicted.

Gravity models are estimated using natural logarithms, denoted by “log”. If we take the above equation in its logarithm forms;

$$\log M_{ij} = \beta_0 \log(k) + \alpha \log(P_i) + \beta \log(P_j) + x \log(D_{ij}) + \varepsilon_{ij} \dots \dots \dots (2)$$

α, β, x - Elasticities

ε_{ij} - Random Error

There are additional factors that can affect migration flows. Owing to this reason, gravity models are modified and extended by including variables related to different pull and push factors of migration. Some of such variables are better economic opportunities in the destination country, safer conditions, and higher political freedom (Ramos, 2016). In 1966, Lowry extended this basic gravity model to the following form including push and pull factors. As a result, currently the following extended model is used by almost all the researchers (see Karemera *et al.*, 2000).

$$\log M_{ij} = \beta_0 + \beta_1 \log(P_i) + \beta_2 \log(P_j) + \beta_3 \log(D_{ij}) + \beta_4 (X_i) + \beta_5 (X_j) + \varepsilon_{ij} \dots (3)$$

X_i – Explanatory variables describing different features of the origin (i.e. push factors)

X_j - Explanatory variables describing different features of the destination (i.e. pull factors)

This model is also confronted with its criticisms and most of the researchers are concerned with its use as a predictive tool. Redding and Venables (2004) show that gravity model estimates are likely to be biased by standard error clustering when some variables in the model apply to only one of the two countries in each observation. According to Feenstra (2004) this biases can be eliminated by adding fixed effects to the model.

As per Ramos (2016), the primary concern in estimating the gravity models within the context of migration analysis is the limited availability of bilateral migration data; however, the situation has changed now and the concerns have been shifted towards the issues like multilateral resistance to migration, negative migration flows and the frequent presence of zero values. Our study does not find any issues related to negative zero migration flows as we consider only the migration flow from Sri Lanka to selected counties.

If negative values of migration flows occur, the procedure proposed by Beine and Parsons (2015) could be adopted or simply those values are excluded. On the other hand, if zero values of net migration flows are present, Ramos (2016) shows that the researchers omit those values or arbitrarily add a very small positive value, may be 0.5 or 1, to make sure

that logarithm is defined correctly. However, this procedure could be problematic as we are unable to take relevant information on both countries considered. Adding a positive number also would be problematic as it adds a small variation to the data set and it may sometimes lead to a big variation in results. As a solution to this issue we can use the selection model proposed by Heckman (1979). The main difficulty the researchers face with Heckman's procedure is how to find an instrument which explains absence of flows and is not related to size of the migration flow. By considering all these factors and depending on the unavailability of proper instruments, negative values and zero values in our data set, we use Poisson Pseudo Maximum Likelihood Estimation Technique in estimating the gravity model.

Estimation of the Gravity Model: Poisson Pseudo Maximum Likelihood Estimation Technique (PPML)

As Silva and Tenreyro (2006) points out, the log-linearization of the gravity equation changes the property of the error term, thus leading to inefficient estimations in the presence of heteroscedasticity.

According to Gomez -Herrera (2013), if the data are homoscedastic, the variance and the expected value of the error term are constant and if they are not, the expected value of the error term is heteroscedasticity and a function of the regressors. The author further states that the conditional distribution of the dependent variable is then altered and OLS estimation is inconsistent. According to Gomez -Herrera (2013), heteroscedasticity does not affect the parameter estimates and therefore the coefficients should still be unbiased, but the problem explained by him is that it biases the variance of the estimated parameters and, as a result, the t-values cannot be trusted. Hence, the recent literature suggested that nonlinear estimation techniques and two parts models have been used to estimate the gravity equation. Gomez-Herrera (2013) further points out that Nonlinear Least Squares (NLS), Feasible Generalized Least Squares (FGLS), the Heckman sample selection model and Gamma and Poisson Pseudo Maximum Likelihood (GPML and PPML) are the most frequently used methods among nonlinear estimation methods. Poisson Pseudo Maximum Likelihood technique estimates Poisson regression by pseudo maximum likelihood estimator.

The difference between estimates of PPML and Poisson regression is that PPML uses the method proposed by Silva and Tenreyro (2010) to identify and drop regressors that may cause the non-existence of the (pseudo) maximum likelihood estimates. PPML estimator is similar to GPML estimator and the only difference between these two is that the PPML assigns the same weight to all observations (Gomez-Herrera, 2013).

Using the PPML estimator, we can avoid the problem of log-linearization which leads to inconsistent estimates in the presence of heteroscedasticity (Silva and Tenreyro, 2006). In recent work in trade literature, Fally (2015) shows that gravity equations estimated

using the Poisson Pseudo-Maximum Likelihood estimator with origin and destination are fully consistent with the structural constraints imposed to account for multilateral resistance factors.

Considering these factors and since the PPML estimator is becoming increasingly available using standard statistical software packages, the reviewed literature suggests that it should be a valuable tool for econometric analysis of the gravity model as the PPML method itself estimates the parameters with robust standard errors.

When estimating the gravity model in linearized by transforming into logarithm, we have to make sure and keep in our minds that the error term is also in logarithms. The mean of log of error term depends on higher moments of error term, thus including its variance. If the error term is heteroskedastic, which means that if the error term does not have a constant variance which is highly probable in practice, then the expected value of the error term depends on one or more of the explanatory variables because it includes the variance term. This leads to cause inconsistency in the estimated coefficients which have been logarithmically transformed.

A completely different estimation methodology is required to adopt if heteroscedasticity is presence under the assumption of a multiplicative error term in the original nonlinear gravity model specification. As a solution to this problem Silva and Tenreyro (2006) show that the PPML estimator provides reliable and consistent estimates of the original nonlinear form of gravity model even under weak assumptions if the correct set of explanatory variables has been used. If it is estimated in such a manner, it would exactly be equivalent to running a type of nonlinear least squares on the original equation. The necessary requirement that should be fulfilled is that the data are distributed as Poisson; our estimator is a pseudo-maximum likelihood estimator. On the other hand, one should keep in mind that, although Poisson is more commonly used as an estimator when dealing with count data, it could also be applied in nonlinear models such as the gravity model.

Moreover, logarithmic transformation can cause troubles when dealing with zero migrant flows. In checking the heteroscedasticity, therefore, we used Breusch-Pagan/Cook-Weisberg test.

Ramos (2016) states that multilateral resistance to migration which is related to the influence of third countries in determining migration flows between two particular countries should be considered when modeling migration. If it is not considered, the influence of alternative destinations could bias the results of analysis. One of the possible solutions to overcome this problem is to include origin-year dummies or destination-year dummies. Inclusion of these different types of fixed-effects also helps to reduce other potential negative effects, such as the omitted variable bias.

Beine and Parsons (2015) investigated climatic factors as determinants of international migration and used dummies to represent fixed effects to capture destination specific

The gravity model presumed a (mechanical) direct relationship between migration and the size of population of destination and origin regions, as well as an inverse relationship between migration and distance (Borjas,2015). Therefore, the coefficient for distance should have a negative value.

When the population is concerned, the higher the population the higher will be the potential stock of migrants, *ceteris paribus* (Rotte and Vogler, 1998). Similarly, larger the population in the destination country, larger will be the labor market for immigrants (Lewer and Van den Berg, 2008). Therefore, the sign of the coefficient for population in the destination country is expected to be positive. Coefficient of the GDP per capita in the origin is expected to have a negative value while the coefficient of the destination is expected to have a positive value.

Jennissen (2003) describes that unemployment has a negative effect on net international migration. A rise in the unemployment rates of the origin will increase emigration and a rise in the unemployment rate of the destination will reduce migration towards the destination. Thus, the coefficients of origin and destination are expected to have positive and negative values, respectively.

Age dependency ratio is the ratio between the number of dependents (people younger than 15 or older than 64) and the number of the working-age population (those age 15-64). Low dependency ratio implies that more adults of working age are available. Increased dependency ratio has negative impacts on the growth of the economy resulting in lower productivity in the country (Lainton, 2011). Therefore, coefficients are expected to have a positive value due to the fact that higher dependency ratio in a destination country will tend to encourage immigration. Coefficient of poverty headcount ratio is expected to have a negative value referring that larger the percentage of people below the poverty line lesser will be the emigration.

RESULTS AND DISCUSSION

This section presents the results and discussion of the study. First we checked the presence of heteroscedasticity using Breusch-Pagan / Cook-Weisberg test. Result of the Breusch-Pagan / Cook-Weisberg test for was turned out as follows,

Ho: Constant variance

Variables: fitted values of Migrant Flow

$\chi^2(1) = 36.79$ $\text{Prob} > \chi^2 = 0.0000$

The test checks the null hypothesis that all the error variances are constant versus the alternative; error variances are not constant. A large chi-square value indicates that heteroscedasticity is present. The results of the test suggest that heteroscedasticity is present in the data. Therefore, estimation of the model through OLS technique leads to

biased and inconsistent estimates. Therefore, the analysis was done using PPML estimation technique following Silva and Tenreyro (2006). The results of the parameter estimate of Gravity Model using PPML technique is shown in the table.

Table 1: Determinants of Migration- Results of Estimates of Gravity Model

	(1)	(2)
Population of destination (in logs)	-0.4300***	0.4500 *
Population of origin (in logs)	-22.2700	-436.3900***
Distance between origin and destination (in logs)	-1.9800**	0.9900
GDP per Capita of destination	-0.0000	-0.0000
Unemployment rate of destination	0.0200	-0.1900
Dependency ratio of destination	0.0500	0.0032*
GDP per capita of origin	0.0600	0.0200***
Unemployment rate of origin	0.0007	9.2900***
Poverty headcount ratio of origin	-0.0200	-0.8000***
Constant	399.9666	7239.7510***
N	90	90
R-squared	0.1320	0.9350
Destination-year fixed effects	No	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Author Constructed

According to the results of applying the PPML technique to the extended gravity equation without fixed effects as shown in the first column, only the population of the destination country and distance between the 2 countries were found to be significant under 1% and 5% significant levels respectively. When considering the signs of coefficients, distance has recorded expected negative sign whereas the sign for the destination population is also negative opposing the theory.

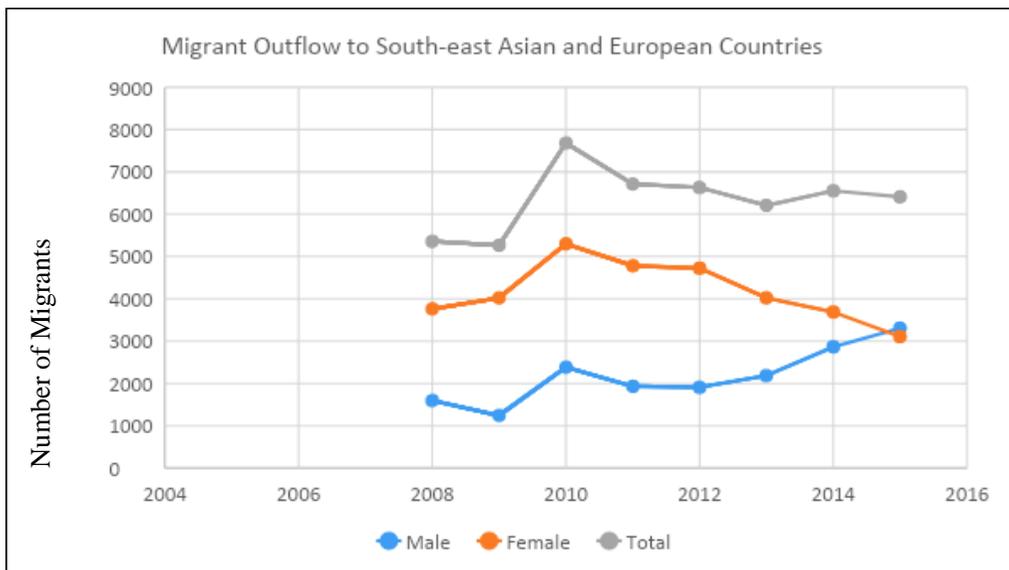
Here, the R^2 takes a very low value as 0.1320 whereas in the 2nd method (column 2) it takes a very higher value as 0.9350. It depicts that a higher proportion of the variance in the dependent variable in the 2nd method is predicted by the independent variable.

In the second column we have implemented the PPML technique to extend the gravity model with fixed effects. The application of year dummies helps in picking up any variation in the outcome that happens over time and that is not attributed to the other explanatory variables. As per the results, six variables namely destination population, origin population, dependency ratio of destination, GDP per capita of origin,

unemployment rate and poverty rate of origin turned out to be significant. Destination population and dependency ratio were significant under 10% significance level whereas origin population, GDP per capita of origin, unemployment rate in origin and poverty head count ratio in origin were significant under 1% significance level. The expected signs for coefficients resulted for the destination population, dependency ratio, unemployment rate and poverty rate of origin. The signs of coefficients of origin population, and GDP per capita of origin are contradictory to expectation in the theory. Since some predictors have deviated from the expectation, we used descriptive techniques to further justify our findings. Accordingly, the literature suggests that the population of both origin and destination should have positive coefficients. Since the population reflects the labor force in a country, it is agreed that with the increment of population migration also increases.

Our results suggest that migration decreases with the increase in population in Sri Lanka. It is evident and well-known fact that Sri Lanka is recognized as a country where female migration is higher. Therefore, it could be expected that reduction in female migration could result in the drop of total migration. What is argued is clear from Figure 1 that total departures to selected countries have reduced after the year 2010.

Figure 1: Migrant Flow from Sri Lanka to the selected Countries



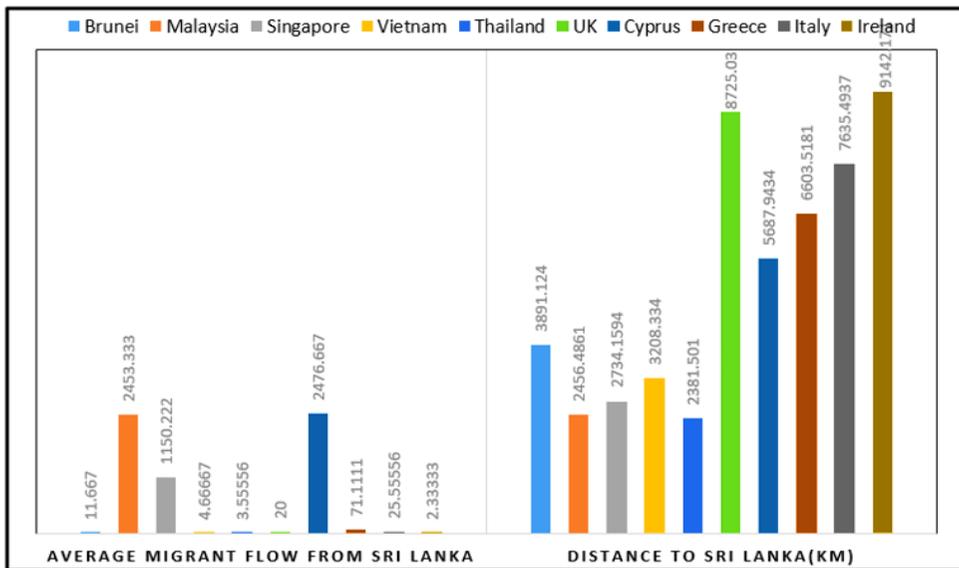
Source: Author Constructed

If we carefully observe the male and female migration patterns, we can see that male migration has increased while female migration has reduced over the years. Since female migration is dominant in our country, the reason behind the reduction of migration with increase in population of our country could be the reduction in female migration.

The reduction in female migration may be due to the fact that various regulatory measures (which are shown below) taken by the SLBFE to reduce the female migration on the influence of social cost may have been impacted on the decrease of the female migration. Those measures are;

1. *Increasing the lower limit of age of females leaving for domestic sector employment with effect from 14.02.2011.*
2. *National Vocational Qualification Level III qualification has been made compulsory for employment as Domestic Housekeeping Assistants in K.S.A, Hong Kong with effect from 14.08.2013.*
3. *Requirement of a Family Background Report (FBR) for all female migrant workers has been made compulsory to ensure that they do not have children under five years*

Figure 2: Distances and Average Migrant Flows from Sri Lanka to the selected Countries

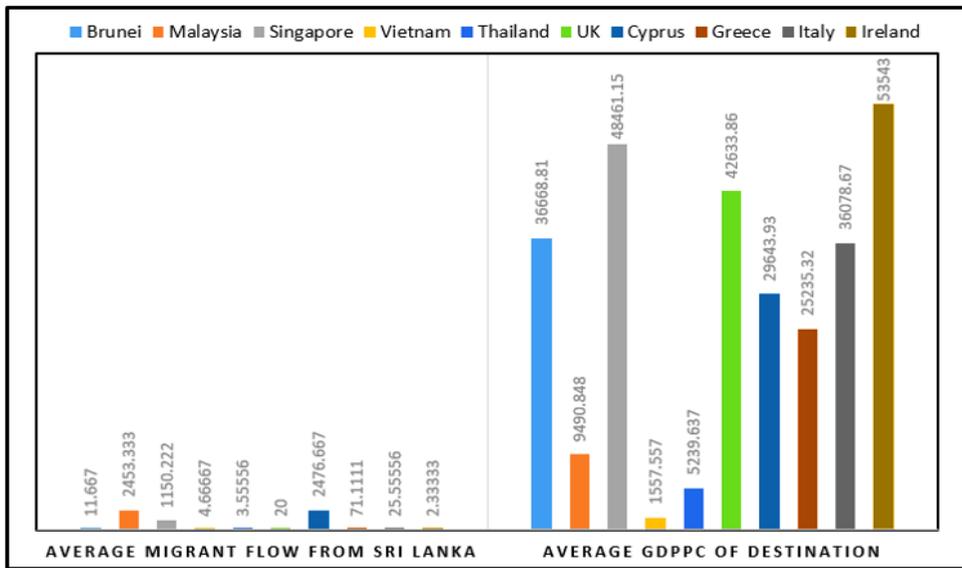


Source: Author Constructed

According to the results presented in Table 1, coefficient of distance was negative in one model and positive in the other model with and without fixed effects respectively. In the presence of fixed effects, the estimated coefficient is not significant although it has positive sign. Mayda (2010) discloses that higher geographic distance between the two countries implies higher travel costs for the initial move as well as for visits back home. In addition, the further away the origin and destination economies are from one another, the more costly it is to acquire information about the foreign labor. As the signs of estimated coefficients are in two directions, we descriptively looked at the data set using

the Figure 2. It is clear from Figure 2 that the closer countries to Sri Lanka are Malaysia, Vietnam and Thailand and therefore, migration is expected to be higher to such countries. However, this assumption is true only for Malaysia and Vietnam. But for Brunei, Thailand and Vietnam it is the opposite. Also for Cyprus which is a very distant country, the migrant flow takes a higher value. The major reason for higher migration flows to Cyprus is the relative income gap between Sri Lanka and Cyprus (Gregoriou *et al.*, 2010). Therefore, we can conclude that, in our research, the distance is an insignificant variable in projecting migration for these countries. As Wickramasekara (2011) found out, Sri Lanka incurs the lowest costs of migration, probably reflecting an effective migration administration system. On the other hand, Cyprus is considered to be a country where the migrants earn higher income (See Figure 3).

Figure 3: Average GDP per capita of destination and average migrant flows from Sri Lanka to the selected Countries



Source: Author Constructed

According to the research carried out by Rotte and Vogler in 1998 in finding the determinants of international migration from developing countries to Germany, among the explanatory variables, distance was insignificant for African countries with a positive sign implying that results are context specific.

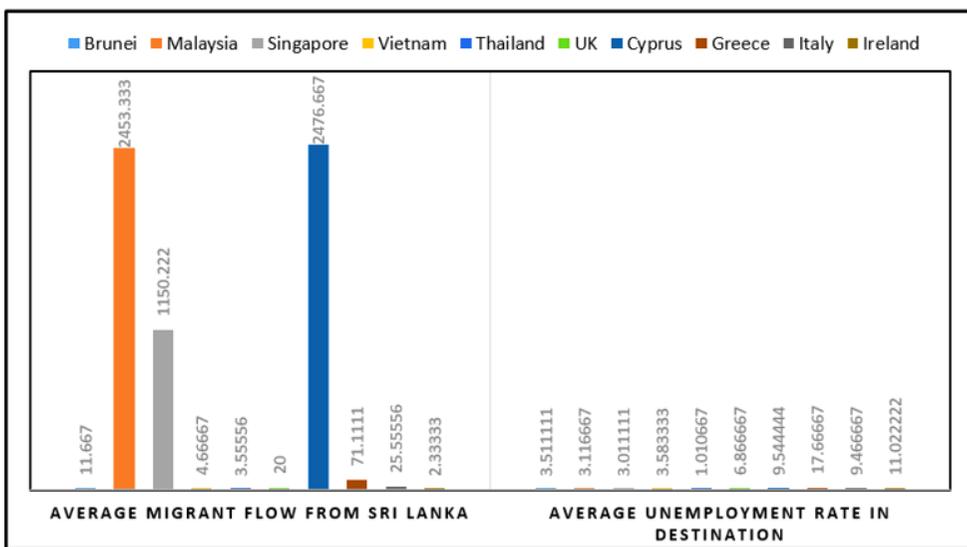
From the estimates of the gravity model, it was found that the coefficient of GDPPC of destination is insignificant and negative. As depicted by figure 3, Ireland, Singapore and the UK claim higher GDP per capita. Therefore, we would expect a higher migrant flow to these countries. However, the results suggest that this claim is true only for Singapore.

Malaysia whose GDP per capita is 9490.8480 USD, which is the 3rd lowest GDP per capita among the selected countries, has the highest average migrant flow of 2453 persons/year. Also Cyprus where the GDP per capita is 29643.93 USD which is the 5th highest average GDP per capita, has the highest average migrant flow. Hence, it would be clear that the GDP per capita being insignificant in our research is justifiable. Borja (2015) describes that as workers move to the region that provides the best opportunities, they eliminate regional wage differentials. Since the workers can find the best living conditions, facilities and safety from these countries unlike the middle-east countries, we can assume that people are compelled to forget about the differences in GDP per capita. Following the standard practice in the literature, the immigrant’s income perspectives in the host country are proxied by GDP per capita. Borjas (1989) and Mayda (2010), however, argue that this proxy does not signal the true income opportunities for an immigrant because differences between the GDP per capita in host and source country are affected by differences in skill intensity.

Jennissen (2003) conducted research in realizing the economic determinants of net international migration in Western Europe. The results of this study can be of much importance in order to justify our findings. The study of Jennissen (2003) finds that the coefficients of GDP per capita in Austria, Sweden and Switzerland are not significant

Although the expectation was a significant, positive coefficient value for the variable unemployment rate in destination, the result was insignificant with the expected sign. Therefore, through Figure 4 (below), this scenario is explained.

Figure 4: Average unemployment rate in destination and average migrant flows from Sri Lanka to the selected Countries

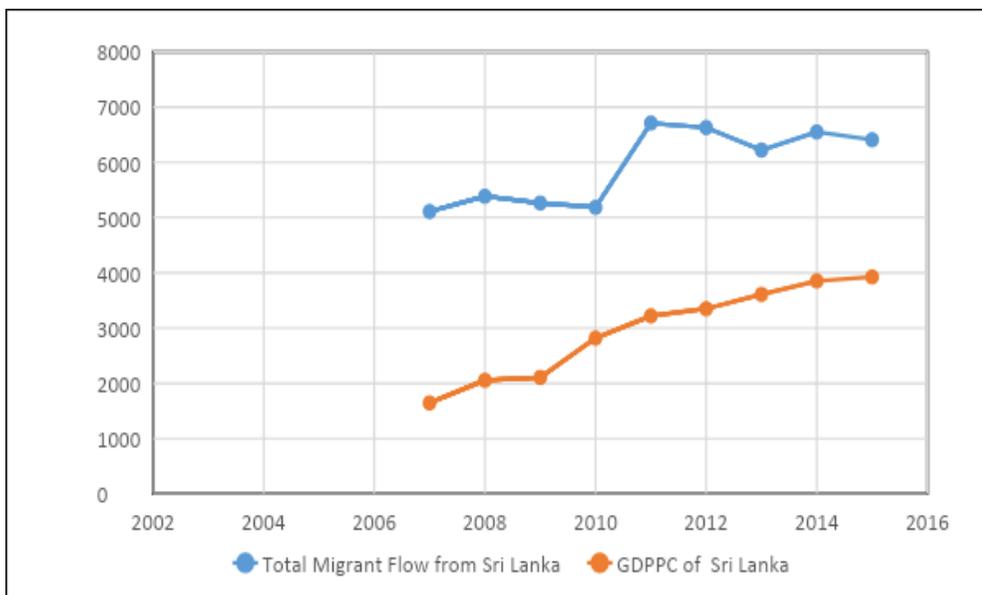


Source: Author Constructed

As the figure shows, Malaysia which holds a lower average unemployment rate (3.1167%) has the 2nd highest average migration flow and Cyprus which has the 3rd highest average unemployment rate of 9.5444% ranks first as the country to which highest average Sri Lankan migration flow is destined. Hence, it is apparent that the unemployment rate in the destination is insignificant when making the decision to migrate to South-Eastern and European countries. Most of the time migrations to these countries occur through direct contacts. The migrants may have either relatives or friends who are dwellers in these countries. Therefore, via their support migrants find occupations and then travel to those countries. According to analyses by Van der Gaag and Van Wissen (1999), unemployment turned out to be the most important economic indicator of international migration in Germany, the Netherlands and the UK. However, Zaiceva and Zimmermann (2008) have found that the unemployment rate does not significantly affect the emigration intentions in Europe. Mitchell and Pain (2003) carried out a research to identify the determinants of international migration into the UK using a panel-based modeling approach. What they found was the unemployment rate of US (the destination country) was insignificant and had positive signs.

After referring to the literature, we expected GDP per capita of Sri Lanka to be a significant variable with a negative coefficient sign. Nevertheless, results of the gravity model revealed that when the GDPPC of our country increases the migration also increases. The variable was significant under 1%, significant level with a positive sign.

Figure 5: GDPPC of Sri Lanka and total migrant flow from Sri Lanka to the selected Countries



Source: Author Constructed

When looking at Figure 5, at a glance, it shows that the curve of total migration flow is upward-sloping although there are several fluctuations in the curve. The figure 5 also denotes a directly proportional relationship between the migration flow and GDP per capita of Sri Lanka. Therefore, the positive coefficient which resulted for Sri Lanka's GDP per capita is justifiable. Moreover, this can be explained in another aspect. GDP per capita is a measure of average income per person per year which can be calculated by dividing the GDP by mid-year population. Since employees are categorized according to their skilled level as professional, middle level, clerical and related, skilled, unskilled and housemaids, there is a significant income inequality present in the country according to their wage rate. GDP per capita is constituted with the income of all these six categories. Therefore, considerable increase or decrease in any skilled level can cause significant fluctuations in a country's GDP per capita. For example, if the income of professionals or any other higher wage category increases considerably compared to other categories with low wages, GDP per capita of the country also increases. But, the situation of the poor remains unchanged. Therefore, although the GDP per capita of our country increases, poverty remains the same and ultimately people migrate irrespective of the GDP per capita of our country.

While identifying the determinants of Mexico-US outwards and return migration flows analyzing state-level panel data, Chort and De La Rupelle (2016) found that the GDP per capita at origin has a positive impact on the size of outward migration flows after controlling for other time variant factors at the Mexican state level (violence, climatic shocks) and dyadic factors.

It should be emphasized that mainly the unskilled workers and the housemaids register with the SLBFE while the others tend to find jobs independently using direct channels. Therefore, these workers who migrate independently find job opportunities using direct contacts and do not register with the SLBFE as the existing law that mandates all migrants who go on employment needs registration with SLBFE is not practiced and monitored sufficiently. For example, the SLBFE annual report (cited in Jayawardhana & Jayathilaka, 2009) shows that not a single professional worker has migrated to UK, USA, South Korea, Cyprus, Italy, China and Greece in 2007, and it is a gross underestimation and contrary to the evidence in the foreign employment patterns for professional workers.

Population of the destination country found out to be significant under 10% significance level. The results suggest that an increase in the population in the destination country affects positively on the migration outflow from Sri Lanka. When the population stock in the destination country increases the need for constructions and development of infrastructure also rises causing a higher demand for labor. For example, the situation report on international migration in East and South-East Asia (2008) states that although the growth rate of the population of Malaysia remains relatively high, the country's robust

economy and urbanization have generated a demand for foreign workers that is met by large numbers of both regular and irregular migrants.

Dependency ratios indicate the potential effects of changes in population age structures for social and economic development, pointing out broad trends in social support needs. From our estimates of gravity model, we could find a positive relationship of dependency ratio of destination on the migration from Sri Lanka to the selected countries. Dependency ratio is significant under 10% significance level. With the increment of dependency ratio, productivity of a country reduces (Lainton, 2011). As a result, destination countries encourage immigration to enhance their economic growth.

Unemployment rate in the origin is significant under 1% significance level and shows a positive relationship with the migration from Sri Lanka. It is a fact when the number of employments in the origin country is insufficient, people decide to migrate in search of job opportunities.

Poverty headcount ratio is the percentage of the population living below the national poverty lines. It is significant under 1% significance level and constitutes with a negative coefficient. Generally, it is evident in migration literature that poverty is a push factor of migration. But, according to the results migrant flow from Sri Lanka reduces with the increase in poverty. Although it is evident that poverty can be reduced with the migration due to the impact of remittances (Page and Adams, 2003) if the people are unable to fulfil the initial requirement of migration, cost of moving, then their dream would not come true. Consequently, the migration reduces.

CONCLUSIONS

A large body of literature is devoted to understanding causes of bilateral migration flows. However, analysis of migration flows to countries in South-East Asian and Europe by Sri Lankan has not been carried out. Using a panel data set covering the period of 2007-2015, this study was conducted to find out the macroeconomic determinants of international migration from Sri Lanka to selected ten South-East Asian and European countries.

We used a Gravity Model of migration to find the determinants and the model was estimated using Poisson Pseudo Maximum Likelihood estimator with destination-year fixed effects instead of linear estimators due to the presence of heteroscedasticity.

The findings of the study unveil that GDP per capita and unemployment rate of Sri Lanka are the push factors which force people to move from Sri Lanka while the destination countries' population and dependency ratio are the pull factors which attract migrants towards the destination. Moreover, the population of Sri Lanka and poverty headcount ratio were also discovered as significant under our study. Sign of the coefficient of population and GDP per capita of Sri Lanka deviated from the expected sign and the

variables, GDP per capita of destination, distance between origin and destination and unemployment rate of destination turned out to be insignificant in determining migration to South-East Asian and European countries.

As the results suggest when the population of our country increases the migration to these countries decreases. What could be expected is more migration from our country with the increase in the population. As it is controversial to the general expectation, the government of Sri Lanka has a greater responsibility in creating new job opportunities in the country. When the dependency ratio of the destination country increases labor migration to these countries also increases. This is a huge loss to the source country considering two issues. The first is; as a country we are losing the working-age population from our country. The second is; due to the high skill-demand required by European and South-east Asian countries to immigrate, rather than the Middle-east countries, as a country we are losing the spirit of the country. This can further be elaborated with the GDP per capita of our country. Although the GDP per capita of Sri Lanka increases, people still migrate. These migrants are always compelled to compare the salaries and other benefits they can acquire from these countries with the prevailing salaries and other facilities of Sri Lanka. On the other hand, even if GDP per capita of our country is increasing, it is still below the GDP per capita of the considered countries. If we want to retain these migrants in our country, the government has to provide the salaries and other benefits that these migrants deserve. Conforming to the results with the increase of unemployment rate of origin, migration also increases. If the people are unable to find jobs in their own country most of the time they tend to migrate to these countries in search of job opportunities. If the government wishes to reduce migration of these people it has to provide either new avenues of career or else, they should support in initiating new businesses. With the increase in poverty headcount ratio, Sri Lankans tend to reduce migrating. Usually migration increases with poverty but for these considered countries they have to afford higher migration costs. Owing to that matter the people below the poverty line are unable to immigrate to these countries.

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