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Content

Does forward looking Taylor rule forecast Indian data well?

Taniya Ghosh and Prashant Mehul Parab[1]

Abstract

Forward looking Taylor rule bodes well for many inflation targeting economies. This paper looks at forecast accuracy and predictive efficiency of a forward looking Taylor rule for India especially after its adoption of flexible inflation targeting in 2015. Our analysis shows that a forward looking Taylor rule fits well for India, especially when augmented using an external benchmark like the exchange rate or the US monetary policy. Using generalized method of moments (GMM) technique a la Clarida et al (1998), we analyze the forecasting efficiency of the Taylor rule using three interest rates namely, weighted average call money rate (WACMR), 91-day treasury bills rate and 364-day treasury bills rate. The 364-day treasury bills rate provides the best estimate of Taylor rule. It is the only interest rate that is significantly influenced by the output gap. Reserve Bank of India (RBI) follows a forward looking Taylor rule during normal times. It deviates from the rule during crises as it did for Asian and global financial crises.

Keywords: Monetary policy, Monetary policy reaction function, Taylor Rule
JEL Classification: E31, E52, E58

1. Introduction

Since the seminal publication by Kydland and Prescott (1977), the debate on rule-based vs. discretionary monetary policy has held a significant importance in monetary policy debates. Taylor (1993), a strong supporter of rule based policy provided a simple interest rate rule which is shown to be followed by many central banks directly or indirectly. In a series of seminal papers, Clarida, Gali and Gertler (1998, 1999, 2000), CGG henceforth, developed rules for optimal monetary policy.

[1] Indira Gandhi Institute of Development Research (IGIDR), India

Corresponding Author:
Taniya Ghosh, Indira Gandhi Institute of Development Research (IGIDR), Gen. A. K. Vaidya Marg, Filmcity Road Mumbai, 400065, India.
Email: taniya@igidr.ac.in

One of those papers was an empirical analysis of different monetary policy rules for the US. Similar analysis was conducted for India by Virmani (2004), Patra and Kapur (2012), Patra et al (2014), etc. This paper is another attempt to contribute to this stream of literature for the Indian economy using the recent data. Owing to the fact that an economy is too complex, a central banker's role is much more challenging than just implementing a standard rule. In fact, the central bank relies on a number of macroeconomic models for its monetary policy decisions. However, it is mainly the rule-based policies, on whose basis the empirical assessments of a central bank's monetary policies are done. Taylor rule is one such rule. As a matter of fact, empirically, the Taylor rule has been very successful in understanding the interest rate setting behavior of many central banks. Moreover, there are several other arguments in favor of rule-based policies such as, it overcomes the time inconsistency problem of optimal policies; it leads to lower inflation bias and greater economic efficiency due to the reduced uncertainty on future policies; and it is easier to communicate. Overall, following a rule-based policy promotes transparency and accountability of a central bank (Mohanty, 2013).

This paper investigates the role of Taylor rule in the determination of Indian interest rates for the period dating from April 1995 to February 2019. Patra and Kapur (2012) have compared the performance of different rules such as the McCallum rule, the Taylor rule and other hybrid rules in capturing the India's monetary policy conduct for the period 1996-2011. They found that the forward looking rules generally work better. Virmani (2004) has done similar analysis for India for the period 1992-2001 and found that backward-looking McCallum rule outperforms other rules. The disagreement in the conclusions of these two papers captures the changes in monetary policy regimes of RBI during the period of analysis. Specifically, RBI switched to multiple indicator approach in 1998 by widening the list of variables to be considered for monetary policy decisions. Prior to that, RBI only followed a single instrument variable, the growth rate of broad money. Further, with price stability as the primary objective, the RBI gradually transitioned to the overnight interest rate as the operational target, with the Repo rate as the instrument, and formally adopted inflation targeting in 2016.

Hence, it is necessary to reassess the potential of the Taylor rule to explain policy rates with recent data, given the transformation in RBI's policy stance especially after the adoption of inflation targeting framework, the success of which is intrinsically linked to the implementation of the Taylor rule. We conducted a few empirical tests along the lines of CGG (1998) and estimated forecast accuracy of different interest rate rules for India. Incorporating baseline and augmented models of Taylor rule with interest rate smoothing for India, we made an attempt to compare the forecast accuracy across three different interest rates namely 91 day treasury bills, 364 day treasury bills and WACMR. Since 91 day treasury bills and WACMR are short term interest rates, we hypothesize a better forecast accuracy for them. We found that when external benchmarks are taken into consideration like the exchange rate (INR/USD) or the US monetary policy rate as captured by the FED funds rate, the forecast accuracy of interest rates improves. Furthermore, Taylor rule works well in normal periods. It deviates from the target during crises.

In terms of formulating monetary policy decisions, the Central bank reaction function is crucial. However, it is equally important to understand how it has performed in the past and how useful it will be to forecast future policy decisions. Our analysis is important as during this period, the monetary policy in India has undergone a tremendous shift; from following a multiple indicator approach to following a flexible inflation targeting framework. Under the multiple indicator framework, there was no clearly defined anchor whereas under the inflation targeting framework, CPI inflation is defined as the nominal anchor. Our empirical results show that the forecast error is the lowest during the inflation targeting regime. In effect, the forward looking Taylor rule is very effective in forecasting the Indian interest rate during the inflation targeting regime.

2. Model

Interest rate rules:

Following CGG (1998, 1999) we estimate the following simple forward looking Taylor rule for India.

$$r_t^* = r^* + \beta E\{\pi_{t+k}|I_t\} + \gamma E\{x_{t+p}|I_t\} \quad (1)$$

Where, r_t^* is the target nominal short term interest rate for the RBI, r^* is the desired nominal rate. π_{t+k} and x_{t+p} are forward looking inflation rate and output gap, respectively. E is the expectations operator used at time period t and I_t is the information set at time t, that is, the information available at the time of setting interest rate. Unlike CGG, our analysis does not include inflation gap.

Functioning of this rule for an economy depends upon the size and slope of the coefficients β and γ. Equation (1) can be expressed in the form of real rates as follows.

$$rr_t^* = rr^* + (\beta - 1)E\{\pi_{t+k}|I_t\} + \gamma E\{x_{t+p}|I_t\} \quad (2)$$

Where, $rr_t^* = r_t^* - E\{\pi_{t+k}|I_t\}$ is the equilibrium real rate of interest at t. Based on equation (2), the real interest rate depends on how the values of β and γ evolve. Benchmarks of (β=1 and γ=0) help a policymaker to understand the effectiveness of policy rules over time. If $\beta > 1$, interest rate rules tend to be stabilizing. $\beta \leq 1$ implies that the interest rule is accommodating inflation. Similarly, it will be stabilizing (destabilizing) if $\gamma > 0$ ($\gamma \leq 0$).

Interest rate rule mentioned in equation (1) is ridden with strict restrictions. It has the following drawbacks: (1) there is no tendency for the central bank to smoothen interest rates, (2) there is an absence of uncertainty (stochastic element) in the equation, and finally (3) it states that the central bank has a complete control over interest rates. To overcome these issues, CGG have modified the interest rate rules as follows:

$$r_t = \rho r_{t-1} + (1 - \rho) r_t^* \quad (3)$$

Where ρ is the interest rate smoothing parameter. Substituting equations (1) and (2) in (3) gives us the following result;

$$r_t = \rho r_{t-1} + (1 - \rho)(rr^* + (\beta - 1)\pi_{t+k} + \gamma x_{t+p}) + \epsilon_t \quad (4)$$

Where $\epsilon_t = -(1 - \rho)(rr^* - \beta(\pi_{t+k} - E\{\pi_{t+k}|I_t\}) - \gamma(x_{t+p} - E\{x_{t+p}|I_t\})$ is a linear combination of forecast errors.

Additionally, equation (4) is augmented with external variables namely exchange rate ($DLNER$) and federal funds rate (FFR) to incorporate the effect of international financial markets on Indian interest rates. These augmented equations are given below:

$$r_t = \rho r_{t-1} + (1-\rho)(rr^* + (\beta-1)\pi_{t+k} + \gamma x_{t+p} + \delta_1 FFR_t) + \epsilon_t \quad (5)$$

Where$\epsilon_t = -(1-\rho)(rr^* - \beta(\pi_{t+k} - E\{\pi_{t+k}|I_t\}) - \gamma(x_{t+p} - E\{x_{t+p}|I_t\} - \delta_1 FFR_t)$

$$r_t = \rho r_{t-1} + (1-\rho)(rr^* + (\beta-1)\pi_{t+k} + \gamma x_{t+p} + \delta_2 DLNER_t) + \epsilon_t \quad (6)$$

Where $\epsilon_t = -(1-\rho)(rr^* - \beta(\pi_{t+k} - E\{\pi_{t+k}|I_t\}) - \gamma(x_{t+p} - E\{x_{t+p}|I_t\} - \delta_2 DLNER_t)$ which is a linear combination of forecast errors.

3. Methodology and Data

This analysis incorporates GMM technique (Hansen, 1982). This technique does not impose any assumptions on the distribution of error term. There could also be possible endogeneity issues in equation (4). GMM helps to tackle the same by incorporating appropriate instruments and optimal weighting matrix for the error term. Baseline GMM model for the study is given by

$$E[r_t - \rho r_{t-1} + (1-\rho)(rr^* + (\beta-1)\pi_{t+k} + \gamma x_t)]z_t = 0 \quad (7)$$

z_t is a set of instruments used to tackle the endogeneity issues. In case we use more than four instruments for equation (7) – which has four parameters to be estimated, there is a test given by Hansen for over-identification. This test validates the use of instruments for the analysis.

This model is extended using two exogenous variables, namely exchange rate and federal funds rate. The model specification is given by:

$$E[r_t - \rho r_{t-1} + (1-\rho)(rr^* + (\beta-1)\pi_{t+k} + \gamma x_t + \delta_1 FFR_t)]z_t = 0 \quad (8)$$

$$E[r_t - \rho r_{t-1} + (1-\rho)(rr^* + (\beta-1)\pi_{t+k} + \gamma x_t + \delta_2 DLNER_t)]z_t = 0 \quad (9)$$

where DLNER is the differenced logarithm of nominal exchange rate (₹/$) and FFR is federal funds rate.

Data

Our analysis uses monthly data from April 1995 to February 2019. The variables and their nomenclature is given in Table 1 along with the sources.

Table 1: Variables used for analysis

Variable Name	Description	Source
CPI	Inflation based on CPI-Industrial Workers base 2001	EPWRFITS
HP_IIP	Cyclical component of Industrial Production measured using HP filter	IIP obtained from EPWRFITS
IIP_GR	Year-on-year growth rate of IIP	EPWRFITS
WACMR	Weighted average interbank call money rate	EPWRFITS
TBILLS_91	91 day treasury bills rate	EPWRFITS
TBILLS_364	364 day treasury bills rate	EPWRFITS
DLNER	Differenced Logarithm of nominal exchange rate	RBI Database on Indian Economy
FFR	Federal Funds rate	Federal Reserve Economic Database
COMM_GLOB	Global commodity price inflation	IMF IFS

We used three rates of interest to evaluate forecasts and make comparisons about the appropriateness of Taylor rule. Two of them (WACMR and TBILLS_91) are short term interest rates which react immediately to any changes in the policy rate. Third rate used is the one-year treasury bills (TBILLS_364). Rate of inflation is measured using consumer price index for industrial workers. Index of industrial production is used as a proxy for output due to monthly frequency of the data. Output gap is measured using the Hodrick-Prescott filter. Two variables are used as measures of external shocks to interest rate-differenced logarithms of nominal INR/USD exchange rate in logarithms (DLNER) and Federal Funds Rate (FFR).

Current analysis is conducted on a monthly basis for the period between 1995 April to January 2019. Instrumental variables are used for the GMM technique. Descriptive statistics of the variables used for analysis are given in Table 2 and Figure 1. The Jarque-Berra test for normality shows that the variables are not drawn from a normal distribution. Only exchange rate is seen to have an upward trend. It depreciates constantly over the sample period.

All the variables except the interest rates display volatility post global financial crisis. Their volatility is reduced especially after the adoption of inflation targeting regime in 2015. Moreover, the initial stages in the sample show a high movement in some macroeconomic aggregates due to the Asian Financial Crisis.

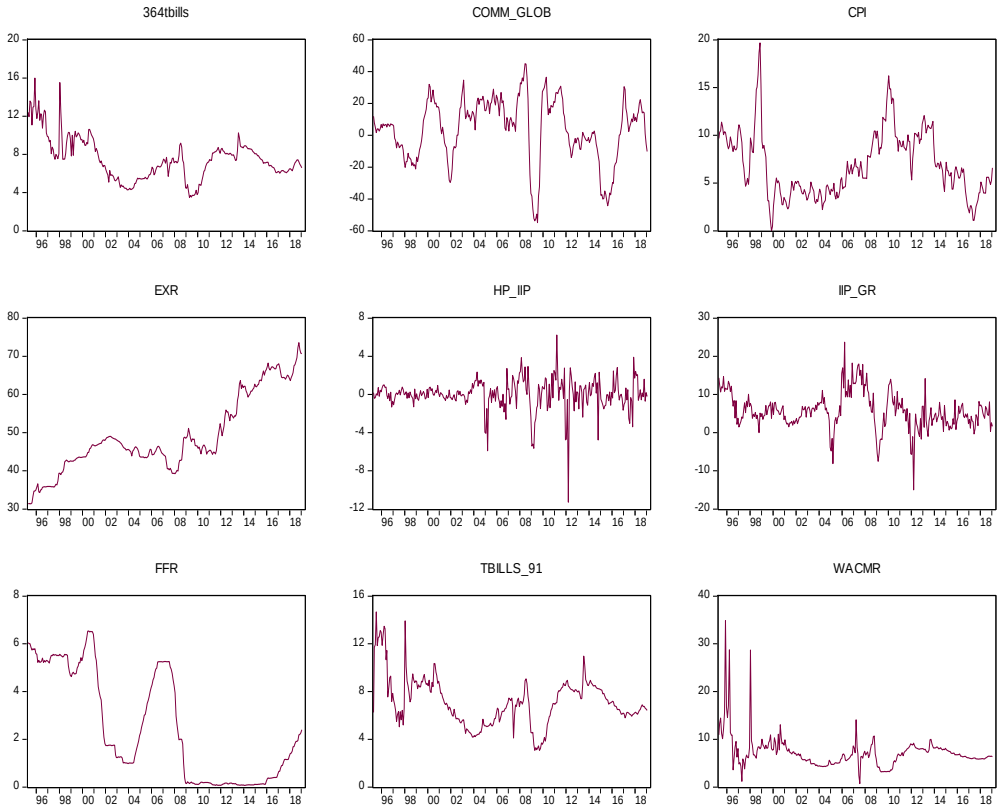
Table 2: Correlation between variables used for analysis

	IIP_GR	DLNER	CPI	WACMR	TBILLS_91	COMM_GLOB	HP_IIP	364TBILLS	FFR
IIP_GR	1								
DLNER	-0.35	1							
CPI	0.04	-0.24	1						
WACMR	0.17	-0.19	0.14	1					
TBILLS_91	0.14	-0.17	0.22	0.80	1				
COMM_GLOB	0.40	-0.26	-0.21	-0.02	-0.01	1			
HP_IIP	0.61	-0.05	0.00	0.06	0.09	0.29	1		
364TBILLS	0.16	-0.30	0.25	0.76	0.93	-0.01	0.09	1	
FFR	0.40	-0.65	-0.07	0.33	0.39	0.18	0.04	0.53	1

Source: FREDSTATS, DBIE RBI, EPWRFITS

Table 2 plots correlation between all the variables used for analysis. All the rates of interest have a high correlation of around 0.8 amongst each other. Exchange rate has a negative correlation with all the variables, the highest being -0.65 with FFR.

Figure 1: Variables used for analysis



Source: FREDSTATS, DBIE RBI, EPWRFITS

4. Empirical Analysis:

Unit root tests are conducted on all the seasonally adjusted variables. The results are given in Table A1 in appendix. Only the exchange rate is non-stationary at levels. We have used first differenced variable of the same. The rest of the variables are stationary at 1% or 5% levels of significance. We analyze equations (4)-(9) for three different rates of interest. Table 3 gives the results of the same. GMM analysis requires the use of instruments that are uncorrelated with the error terms. Based on CGG (2000), the instruments used for the analysis are 1-6, 9^{th} and 12^{th} lags of CPI inflation, global commodity price inflation and output gap; 1^{st}, 6^{th}, 9^{th} and 12^{th} lags of interest rate and 1^{st} lag of external variable (exchange rate or federal funds rate). Hansen test gives results for over-identification of instruments used for analysis. A rejection of null hypothesis suggests that the instruments are over-identified in that model.

Panels A, B and C give the results of equations 4, 5 and 6 respectively. P-values of Hansen's J-test suggest that the instruments are valid and not over-identified. ρ is the coefficient of one period lagged interest rates. It is known as the smoothing parameter. A significantly high value of ρ (around 0.85 to 0.9) for almost all the short term interest rates except for WACMR in the baseline equation and the augmented equation with federal funds rate, is in line with reaction functions of all the countries used in CGG (1998)[1].

β is the coefficient of forward looking inflation rate. We have assumed full information rational expectations and incorporated one year ahead realized inflation as inflation expectations variable. A positive and significant value of β implies that the RBI strives to maintain a positive real rate of interest. The weightage given to inflation however, is low in comparison to lagged interest rates. γ is the coefficient of output gap (HP_IIP). A lower coefficient of inflation expectations signifies that not enough emphasis has been laid on it. The lack of any nominal anchor during multiple indicator approach regime can be attributed to this accommodative nature of RBI.

Output gap has a significant influence only on 364-day treasury bills. 364-day treasury bills have been majorly influenced by domestic fundamentals, particularly by the output gap. Weightage given to output gap is higher than that of inflation. It signifies that over time, the Reserve Bank of India gives significant importance to output stabilization along with maintaining price stability. International factors like exchange rate and federal funds rate influence only short term interest rates.

We also incorporate analysis of forecast accuracy and efficiency of Taylor rule in India. Last two columns of Table 3 give root mean squared error (RMSE) and Theil inequality coefficient (THEIL). Lower values of both indicate better forecasts. 364-day treasury bills with federal funds rate as an external indicator yield better forecasts with respect to India. Among short term interest rates, the 91-day treasury bills yield better forecasts than WACMR. All the results highlight the importance of an external shock in formulating Taylor rule for Indian economy.

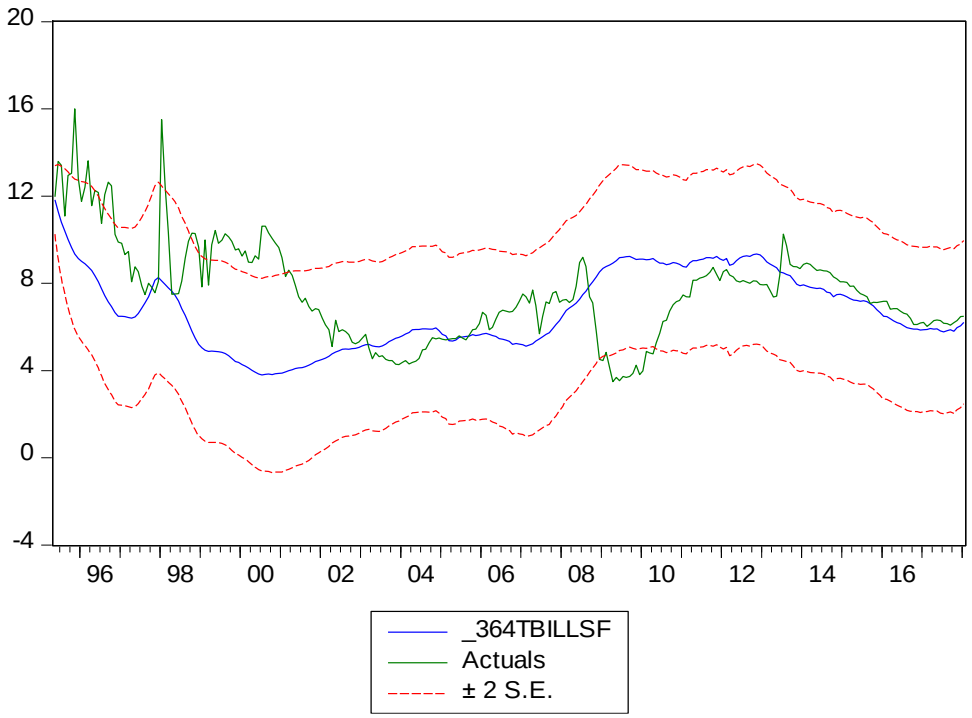
[1] Countries used in Clarida et al 1998 are Germany, Japan, US, UK, France and Italy.

Table 3: GMM estimation results and forecast accuracy

	ρ	β	γ	δ_1	δ_2	HANSEN J (p-value)	RMSE	THEIL
Panel A: Original Closed Economy Model								
TBILLS_91	0.85***	0.26**	0.08			0.96	2.34	0.17
	(0.00)	(0.04)	(0.71)					
WACMR	0.52***	-0.09	0.16			0.89	3.25	0.22
	(0.00)	(0.34)	(0.37)					
364_TBILLS	0.91***	0.31***	0.50*			0.92	1.91	0.13
	(0.00)	(0.00)	(0.07)					
Panel B: Model with Fed Funds Rate								
TBILLS_91	0.89***	0.32**	0.27	-0.55**		0.98	2.35	0.17
	(0.00)	(0.01)	(0.29)	(0.02)				
WACMR	0.51***	0.13	0.04	0.22**		0.96	3.23	0.22
	(0.00)	(0.17)	(0.81)	(0.04)				
364_TBILLS	0.91***	0.25**	0.42*	0.20		0.94	1.77	0.12
	(0.00)	(0.02)	(0.07)	(0.23)				
Panel C: Model with Nominal Exchange Rate								
TBILLS_91	0.85***	0.32***	0.15		27.37	0.96	2.11	0.15
	(0.00)	(0.01)	(0.49)		(0.33)			
WACMR	0.84***	0.38*	0.18		40.08	0.97	3.30	0.22
	(0.00)	(0.07)	(0.60)		(0.25)			
364_TBILLS	0.91***	0.29***	0.52**		60.55	0.77	1.81	0.12
	(0.00)	(0.01)	(0.04)		(0.14)			

Figure 2 presents graphs of 364-day treasury bills rate for the model with federal funds rate as given in panel B. These graphs show that a forward looking Taylor rule is well-functioning during normal times. Forecast errors are the least for 3 years pre-2008 crisis and for inflation targeting period. The divergence between the actual interest rate and its forecast is very high in the beginning of the sample till 2001 and from the end of 2008 until the end of 2011. Indian policy makers deviate from the Taylor rule during crisis periods as seen for the cases of Asian financial crisis and global financial crisis. Moreover, the forecasted interest rate is extremely close to the actual interest rate after India adopted inflation targeting. This result is consistent across the different models used in panels A-C and is robust to the use of different interest rates. We provide the results for the original model (panel A) in Figures A1-A3 in the appendix and for the model with nominal exchange rate (panel C) in Figures A4-A6 in the appendix. Forecast results of WACMR and 91-day treasury bills of panel B are given in figures A7 and A8 in the appendix.

Figure 2: Forecast and Actuals for 364 days Treasury Bills



Source: Author's Calculations

5. Conclusion

Rules vs discretion is a long standing debate in monetary policy. Bernanke (2003) suggests that both extremes have their own pros and cons and hence suggests a middle path of constrained discretion. Taylor (1993), a strong proponent of interest rate rules, has given a simple rule to be followed by a central bank. This paper tests forecast accuracy of one such forward looking Taylor rule with regards to the Indian scenario. Using two short term and one medium term interest rates, we tested for forecast accuracy of the aforementioned interest rates using generalized method of moment technique.

Forward looking Taylor rules work well for India during normal times. Deviation occurs during crises periods. Given that multiple indicator approach was implemented for a major part of the period of analysis, inflation stabilization has not been given greater importance. Output gap has a significant influence on 364-day treasury bills than on short term interest rates. Forecasts of 364-day treasury bills are more accurate and have a smaller Theil inequality coefficient as compared to short term interest rates. Of the external shocks, federal funds rate is a better predictor than exchange rate while forecasting interest rates.

In conclusion, a forward looking Taylor rule works well for India during normal times. Adding an external benchmark like a federal funds rate helps to improve forecast accuracy of the same. Especially after the adoption of inflation targeting strategies, Taylor rule seems to be working better for India. A rule based monetary policy like flexible inflation targeting supports better forecasting of interest rates.

This analysis can further be extended by modeling different types of monetary policy rules for India in lines of Patra and Kapur (2012) to model the rules better during crises periods. Use of survey data or market based data for inflation expectations could yield better results. Current analysis does not incorporate the same due to lack of long time series data.

Appendix

Table A1 – Augmented Dickey Fuller Test

	I(0)	*I(1)*
iip_gr	0.00***	
exr	0.47	0.00***
cpi	0.03**	
wacmr	0.00***	
tbills_91	0.00***	
comm_glob	0.02**	
hp_iip	0.00***	
364tbills	0.03**	
ffr	0.00***	

Source: Author's Calculations

Figure A1 – Panel A Forecast and Actuals for 91-day treasury bills

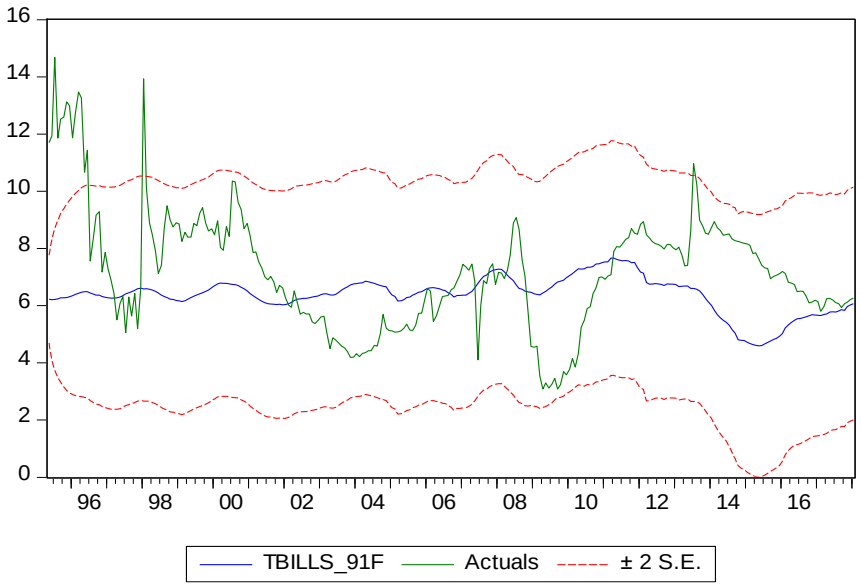


Figure A2 – Panel A Forecast and Actuals for WACMR

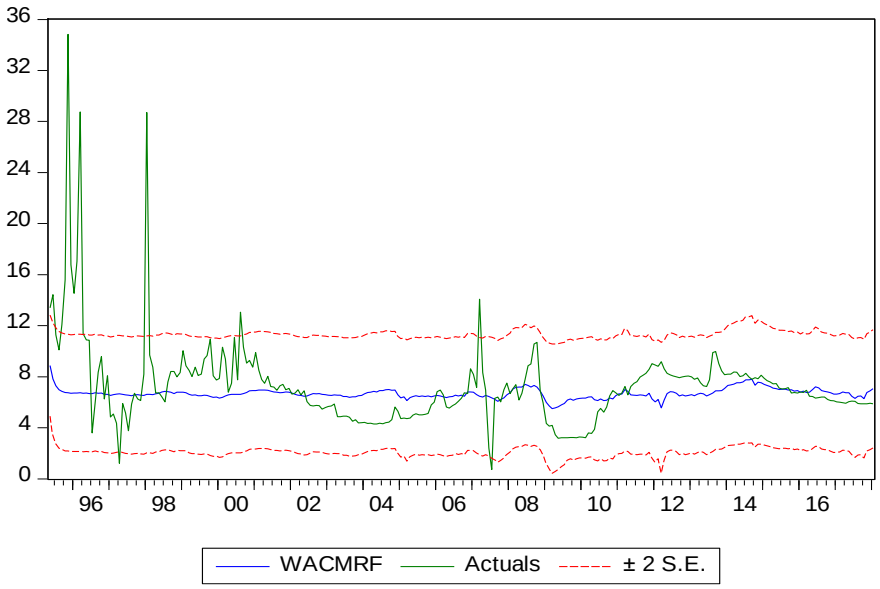


Figure A3 – Panel A Forecast and Actuals for 364-day treasury bills

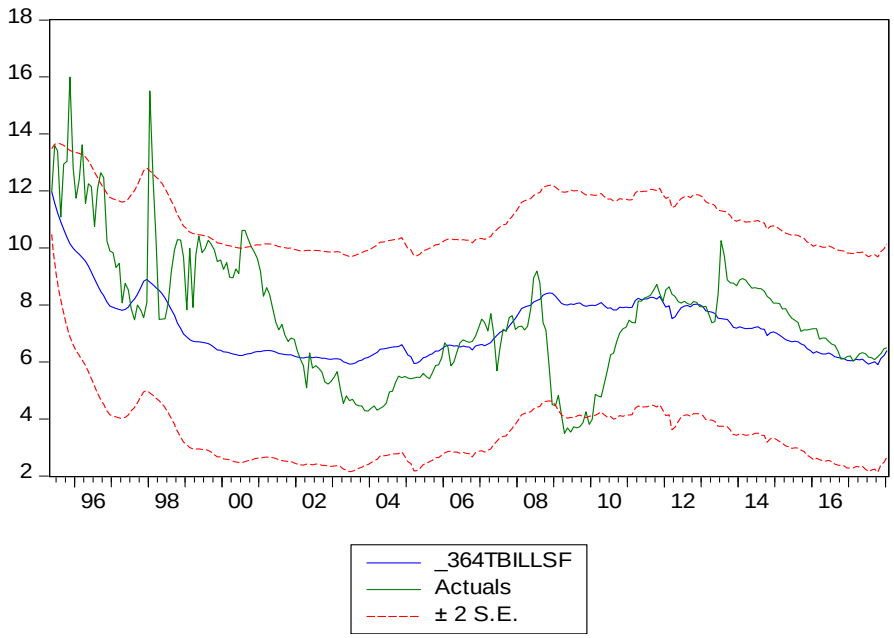


Figure A4 – Panel C Forecast and Actuals for 91 day treA4asury bills

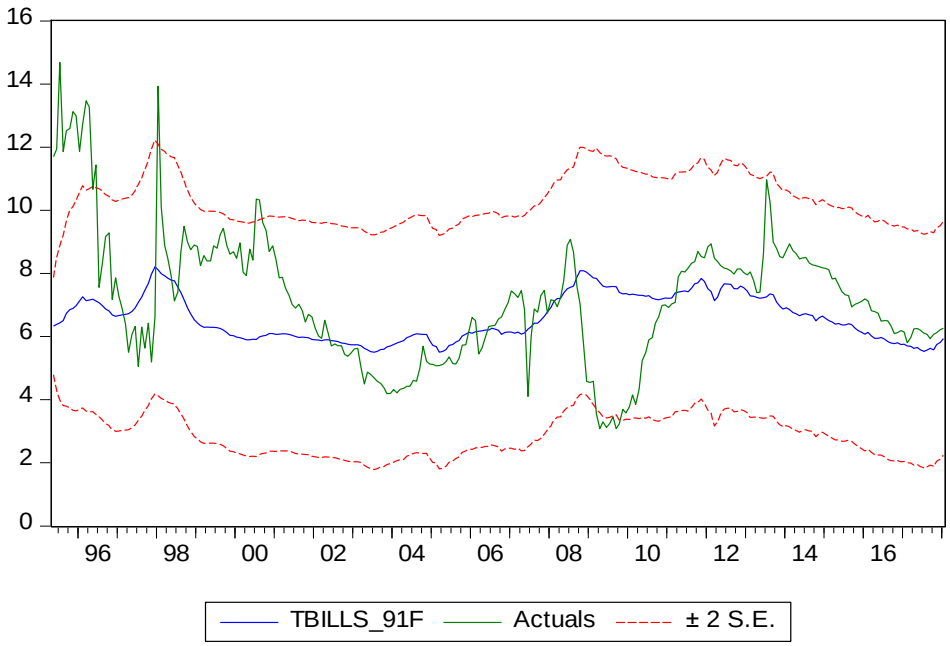


Figure A5 – Panel C Forecast and Actuals for WACMR

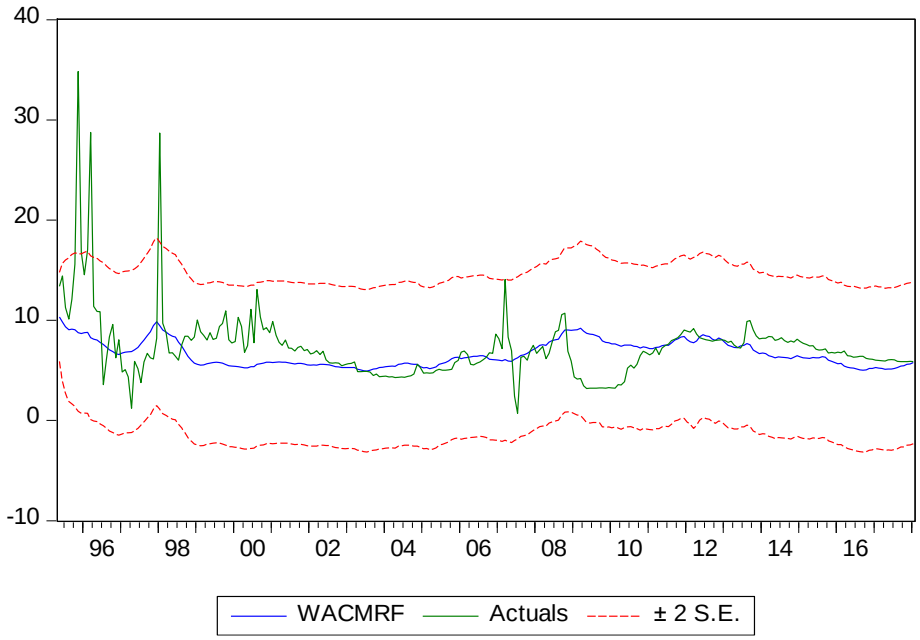


Figure A6 – Panel C Forecast and Actuals for 364 day treasury bills

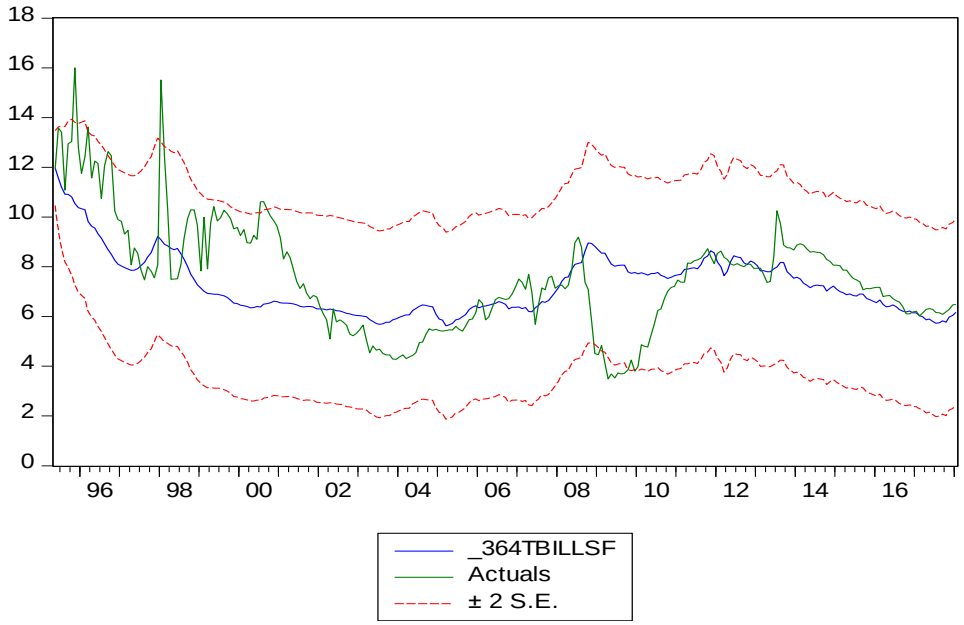


Figure A7 – Panel B Forecast and Actuals for 91 days Treasury Bills

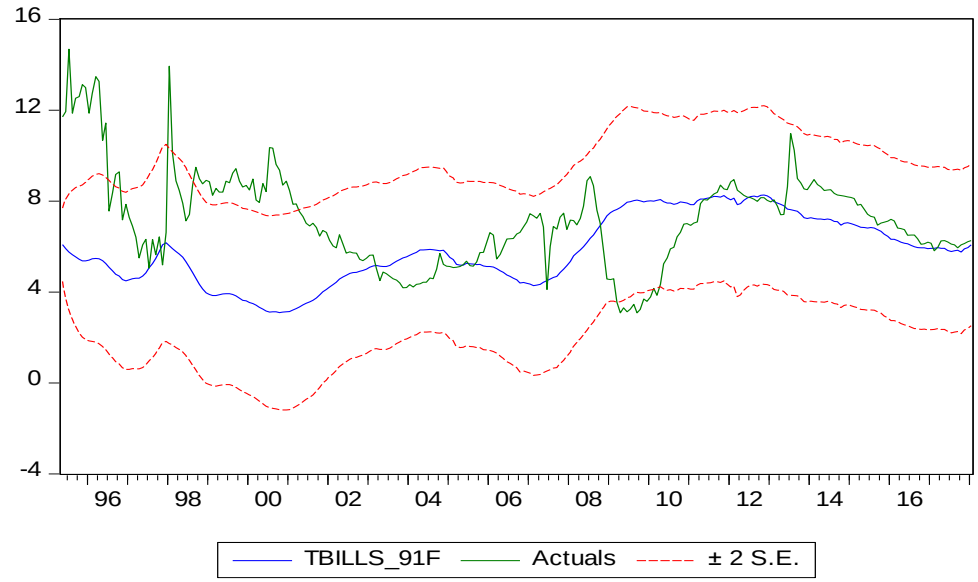
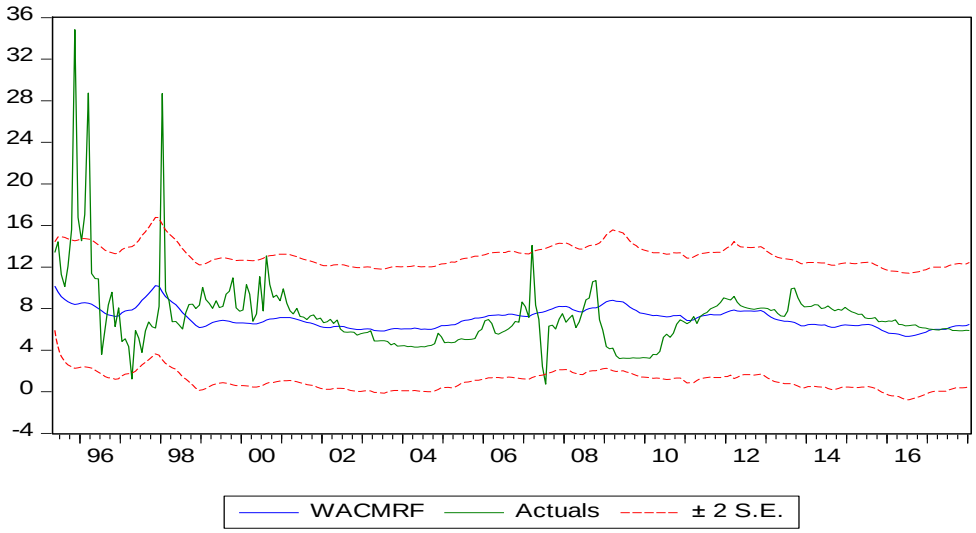


Figure A8 – Panel B Forecast and Actuals for WACMR



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Impact of Currency Depreciation on Growth, Exports and Industrialization: Evidence from Sri Lanka

Sanika Sulochani Ramanayake[1]

Abstract

The present article focuses specifically on smart exchange rate policy and export oriented industrialization process to sustain growth in Sri Lanka. There is an extensive debate on the impact of currency depreciation (devaluation / undervaluation) on growth and exports; some scholars have argued that depreciation positively affects growth (especially in developing economies), but others contend that depreciation negatively affects growth in the long run. This paper discusses the existing literature on currency depreciation on growth and exports. Study argues that too much depreciation in the long-run causes declining growth process and exports in Sri Lanka. At the same time, long-run depreciation negates industrialization process. Furthermore, this study found that long-run depreciation caused the decline in Foreign Direct Investment, lead to the increase inflation and was therefore, harmful for country's social welfare. Findings of this study suggest Sri Lanka should focus on export-based industrialization process to overcome current situation and sustain economic growth. In like manner, these implications are also suitable for most of the other developing countries.

Keywords: Currency depreciation, Economic Growth, Exports, Industrialization, Sri Lanka

1. Introduction

Sri Lanka is a Lower Middle-Income country with a GDP per capita of USD 4,073 (2017) and a total population of 21.4 million people. Following 30 years of civil war that ended in 2009, Sri Lanka's economy grew at an average 5.8 percent during the period of 2010-2017. However, there were some significant

[1] Corresponding Author
Senior Lecturer, Department of Social Statistics, University of Kelaniya, Sri Lanka.

E-mail: sulochani00@gmail.com / sulochani00@kln.ac.lk

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signs of a growth slowdown in the last few years in many sectors. The economy is estimated to have grown by 3.6 percent in the first half of 2018, following a sixteen-year low growth rate of 3.3 percent in 2017. Moreover, the Sri Lankan Rupee depreciated by 5.6 percent against the USD by the end of August 2018 and depreciated even further during September to November 2018. The World Bank in Sri Lanka (2017) and the Central Bank of Sri Lanka together with the government argued extensively that this happened due to the global financial conditions. Notwithstanding, this depreciation pattern is not unusual for the Sri Lankan economy and it started long ago. However, since mid-2015 the Rupee depreciation was significant, and it was significantly depreciated until November 2018. This considerable depreciation causes diverse socio economic problems in Sri Lanka. Therein, this paper aims to analyse the current conditions in-depth and offer some policy suggestions to overcome the situation.

With regard to the exchange rate undervaluation, the existing literature delineates a clear debate on undervaluation and growth phenomena. Some scholars argue that undervaluation has positive effects on growth (especially in developing economies), while others criticize the effects of undervaluation on growth. In particular, Rodrik (2008) found that undervaluation of the currency stimulates economic growth, more in developing countries than in developed economies. Moreover, Rodrik (2009) argued that real undervaluation promotes economic growth, increases the profitability of the tradable sector, and leads to an expansion of the share of tradeable in domestic value added.

However, recently there has also been criticism on undervaluation. According to Williamson (2012), more undervalued currencies may hurt economic growth.[1] Eichengreen et al. (2013) argued that undervaluation is detrimental because it causes a slowdown of growth since undervalued real exchange rates provide a disincentive for technological advancement. Moreover, as Aguirre and Calderonn (2005) explain, while large undervaluation hurts growth, small or moderate undervaluation enhances growth. Furthermore, Haddad and Pancaro (2010) also explained that real undervaluation works only for low-

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income countries and only in the medium-term.[1] According to Pettinger (2011), a falling exchange rate can be beneficial if the economy is uncompetitive and stuck in a recession. Ramanayake and Lee (2018) explained that undervaluation or depreciation has different impacts for different countries depending on in terms of the things they export. They significantly proved that undervaluation is beneficial for manufactures export producing countries; thus overvaluation can be beneficial for mineral export producing countries. Therefore, whether it is beneficial or harmful to have undervaluation in the exchange rate is still debatable.

In general, when currency depreciates, the prices of domestically-produced goods decline relative to international prices. The exporting firms become more competitive and exports increase. If the growth of exports is significant, then production and employment also expand and the entire economy accelerates. For that reason, countries sometimes try to depreciate their currencies with the expectation of an export boom and economic growth.[2] However, this does not take place all the time, and may sometimes lead to a boom or at other times may cause a recession.

Therefore, it is still debatable whether long-run currency depreciation is beneficial or harmful to Sri Lanka. However, declining trends in GDP growth and export growth and many other economic indicators evidenced that excess depreciation in the long-run is not the solution for Sri Lanka. In other words, depreciating the Rupee in the long-run and excessive depreciation is not conducive to sustain growth for a country like Sri Lanka. However, the existing study by Madurapperuma (2018) found that real exchange rate volatility exerts significant negative effects on Sri Lankan exports in short run and in the long run. Therefore, this study mainly argues about the issue of currency depreciation on growth and exports in Sri Lanka, and provide some

[1] According to Haddad and Pancaro (2010), a stable and undervalued real exchange rate can be a key element in promoting economic growth in low-income countries; but maintaining this policy for too long may have significant adverse consequences. Moreover, a stable real exchange rate is a necessary condition for developing countries to achieve sustained economic growth, but only large fluctuations matter for exports (Haddad and Pancaro 2010).

[2] British can be a good example in 1992 they showed an economic growth after depreciation of pounds. However, a depreciating currency does not necessarily cause an economic boom. In fact, the economy can go into a steep recession; example is case of Indonesia after depreciation of Rupee in 1997, country faced a recession in 1998 (Banda 2016).

policy implications to sustain growth. Furthermore, the study predicts that Sri Lankan economy is going to be hit by a significant recession in the near future; unless they manage and control the exchange rate in smarter ways.

Whether or not depreciation causes economic expansion in a country depends on several factors. Firstly, the country's export basket matters; Sri Lanka's main exports are manufacture industry-based Textiles and Clothing (TandC). Further, it is highly dependent on imported raw materials. Therefore, when the currency depreciates, the cost of production increases and the exports become more competitive. However, this can be changed by increasing the domestic market for TandC. Thus, this is a long process which might sometimes be impossible due to the lack of domestic producers of TandC. Secondly, the country's extensive foreign debt (in foreign currencies) matters; given that the value of its international debt (expressed in domestic currency) increases as soon as the currency depreciates. As an example, if the Rupee depreciated by 20 percent, then the value of international debts immediately increases by 20 percent making it very difficult for governments, firms, and households to pay back their debts. Sometimes even firms (and possibly governments) may go bankrupt. Then the country faces a recession. The current situation in Sri Lanka is the best example for that and in the near future Sri Lanka has to expect a visible recession. Thirdly, depreciation causes high inflation; if the country is highly import-oriented (such as food and fuels) then depreciation can create high inflation. Usually, after depreciation the prices of these imported products increase and thus, people cannot stop purchasing them. High inflation causes a financially unstable environment, uncertainty and decline in growth. Inflation also creates political unrest as people cannot afford essential goods and often initiate public protests against the government, and therein lead to the decline in social welfare.

This paper is organized as follows: section 2 provides the theoretical framework and hypothesis, while the section 3 discusses the current situation in Sri Lanka with reference to the Economic indicators related to the context. Section 4 presents the actual situation in relation to Sri Lankan exports and economic growth with long-run Rupee depreciation with some evidence. Finally, section 5 concludes the paper by providing policy suggestions to overcome this situation and to sustain growth in Sri Lanka.

2. Theoretical Framework and Hypothesis

Manufacturing or manufacture export-based growth is popular with East Asian miracle and East Asian Tigers namely South Korea, Singapore, Taiwan and Hong Kong. However, Nobel Laureate Joseph Stiglitz argued at the WIDER Development Conference in 2018, that

'*manufacturing export led growth will have the impact that it had in China and East Asia; but what does the demise of the manufacturing-based export-led growth model mean for a country like Sri Lanka and that is trying to push the pace of structural change*'.

Yet, the answer for this question is not found.

With regard to exchange rate undervaluation, the existing literature attributes a clear debate on undervaluation and growth phenomena. Some critics argue that undervaluation has positive effects on growth (especially in developing economies), while others criticize undervaluation effects on growth. In particular, Rodrik (2008) found that undervaluation of the currency stimulates economic growth, more in developing countries than developed economies. Moreover, Rodrik (2009) argued that real undervaluation promotes economic growth, increases the profitability of the tradable sector, and leads to an expansion of the share of tradable in domestic value added. He claimed that the tradable sector in developing countries can be much smaller because it suffers more than the non-tradable sector from institutional weaknesses and market failures. Likewise, a real exchange rate undervaluation works as a second best policy to compensate for the negative effects of these distortions by enhancing the sector's profitability. Further Rodrik explained that this higher profitability promotes investment in tradable sector which can expands and promotes economic growth.

Some existing literature explain that a county's exchange rate policy have significant impact on growth. Recently there has also been criticism on currency (exchange rate) depreciation, devaluation, or undervaluation. According to Williamson (2012), more undervalued currencies may hurt economic growth.[1] Eichengreen et al. (2013) argued that undervaluation is

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detrimental because it causes a slowdown of growth since undervalued real exchange rates provide a disincentive to move up the technology ladder. Moreover, as Aguirre and Calderonn (2005) explain that while large undervaluation hurts growth; small or moderate undervaluation enhances growth. Furthermore, Haddad and Pancaro (2010) also explained that real undervaluation works only for low-income countries and only in the medium-term.[1] According to Pettinger (2011), a falling exchange rate can be beneficial if the economy is uncompetitive and stuck in a recession. Ramanayake and Lee (2018) explained that it depends on what they export; according to their findings undervaluation is beneficial for manufacture exporting countries; thus overvaluation can be beneficial for mineral exporting countries.

Sri Lanka has a long run trend in Rupee depreciation. However, since 2015 depreciation has become significant, meaning that the percentage of depreciation is higher than the earlier periods. There are several binding factors for the Rupee depreciation linked to the Sri Lankan government and its expectations; such as changes in global market and market inflation, fluctuations in the interest rate, balance of payment, the amount of government debt, and political instability and international confidence. However, the frequently raised concerns over the currency depreciation can be listed as; global market conditions in relation to the US dollar, lack of Central Bank reserves (in terms of US dollars), repayment of foreign debt, increase in domestic prices of imports and the resulting increase in local inflation, and finally the reduction in trade-competitiveness in international trade and the adverse impact on living standards.

In reality, Rupee depreciation will only benefit a small section of the country and will not be the best option for the majority of the people. Sri Lanka is not yet an export-oriented country and the domestic market is larger than the export market (it is more than twice the size of the export sector). Banda (2016) explained that within these kinds of conditions, currency devaluation creates a worse situation for consumers.

[1] According to Haddad and Pancaro (2010), a stable and undervalued real exchange rate can be a key element in promoting economic growth in low-income countries; but maintaining this policy for too long may have significant adverse consequences. Moreover a stable real exchange rate is a necessary condition for developing countries to achieve sustained economic growth, but only large fluctuations matter for exports (Haddad and Pancaro 2010)

Outcomes of devaluation

The most common outcome of depreciation is that it makes exports more competitive and cheaper to foreign buyers. This will increase demand for exports and usually discourage imports, as it will become more expensive. This helps to reduce demand for imports. At the same time, devaluation could cause economic growth with thriving exports, reduce imports, and reduce the current account deficit. However, those conditions are not applicable for many countries including Sri Lanka as explained in the main literature review. Furthermore, there are a few more outcomes of devaluation as explained by the existing literature.

- **Capital Investment**: the impact of currency depreciation in delaying the capital investment process. To invest in capital goods country needs dollars. Therefore, investors need a significant number of local currencies to buy dollars. Therefore, the investors tend to delay the investment process or cancel it (Lee and Ramanayake 2018). Developing countries need capital investment as the capital investment process a wide technological transformation. Through technological transformation a country can increase its productivity, skill development, and also its profit. Therefore, capital investment has direct and indirect impacts on growth. Hence, developing countries must invest in capital for sustain their economies.

- **Inflation**: The relationship between exchange rate and inflation is explained by Dornbusch (1987) for the first time. The exchange rate-inflation relationship has a vital importance, especially in emerging economies and there is a very close relationship between the exchange rate and inflation (Monfared and Akın 2017). Inflation takes place when your central bank prints more money than the country produces goods, which means that for each produced good there is more money in the economy. This leads to a higher price of each good, or in other words, to inflation. Dornbusch (1976) explained that the exchange rate fluctuations can significantly affect the general level of the prices. According to Dornbusch (1976), the exchange rate changes can affect the inflation rate through three different channels. Firstly, the exchange rate changes experienced in an open economy affect the relative prices between domestic and foreign goods, as a result, the total demand and indirect inflation rate are affected by net exports. Secondly, the changes in the

exchange rate directly affect the prices of the imported final goods in terms of national currencies. Consequently, it directly affects the Consumer Prices Index Ultimately, the inflation rate is affected by the prices of imported final goods, and this effect is usually realized in a shorter period than the indirect effect of the net exports. Thirdly, the changes in exchange rate affect nominal wages through the impact of imported middle prices in terms of national currency on the Consumer Prices Index. When these two effects are combined, the inflation rate is affected by the cost of domestic products. Furthermore, given the role of the exchange rate in the inflation targeting strategy asset price, the exchange rate is a future and anticipating variable. Therefore, it contributes to the creation of expectations that have a significant place in the monetary policy (Dornbusch 1976).

- **FDI**: There are many debates on currency exchange rate and FDI. Foreign direct investments (FDI) have become an integral part of almost every economy all over the world. However, whether the exchange rate uncertainty is a determinant of FDI inflows is still a debatable issue in developing countries. Some developing countries tend to depreciate currencies to attract more FDI. One of the best examples for this is China. Many economists argue that the devaluation of the Yuan (Renminbi) and the policy of pegging the Yuan to the dollar helped improve China's competitiveness and thereby to attract more FDI (Yuqing 2006).[1] However, the existing research indicates that currency depreciation will not increase FDI inflow of some countries. Razafimahefa and Hamori (2005) explained that depreciation of the host country currency invites an inflow of FDI. Furthermore, currency instability caused the decline of FDI inflow in many African countries (Reinhart and Rogoff 2003).

- **Investment Returns**: Investment companies need to pay dividends in the currency of their local market, which would necessitate the conversion of the cash you receive from dividends (or sales) of the investment into US dollars. When the exchange rate between the foreign currency of an

[1] Yuqing (2006) examined the context of Japanese FDI for nine Chinese manufacturing sectors from 1981 to 2002 and his empirical results explained that the real exchange rate between the Yuan and Yen is one of the significant variables determining Japanese direct investment in China.

international investment and the US dollar changes, it can increase or reduce your investment return. Therefore, if the exchange rate changes significantly between the time you buy and the time you sell, it can sometimes turn a positive return on the investment itself into a loss for the investment in total, or vice versa (Banda 2016).

Industrialization, Trade, and Growth

Growth, trade, and industrialization are highly inter-connected. Wong and Yip (1999) explained that the pattern of trade and growth will be affected by external growth; if it remains diversified under trade, its growth can keep in pace with the rest of the world. If the growth rate of the rest of the world is higher than a certain limit, the economy cannot catch up and will eventually produce agriculture only. Helleiner (1992) explained that the developing country's domestic industrial sector[1] affects its chances of industrializing far enough to engage in substantial export trade. He mentioned examples of Brazilian civil aircraft, Korean semi-conductors, and the automobile industry and volume contributes for a better appreciation of the actual problems and constraints of industrialization and growth in developing countries. Furthermore, Chenery et al. (1986) argued that large developing countries with industrialization have common features of the process of development. He explained that the transformation of the structure of production is one of the key factors, in which the industrial sectors typically grow more rapidly than agriculture.

Postwar Sri Lanka evidenced more growth in non-tradeable sectors, but not with the export based growth. Table 1 indicates that the transformation of export in selected countries since 2000 to 2017. Table indicates that the Sri Lankan merchandise export grew only 5.9 percent for the past seventeen years. Furthermore, export share as GDP shows negative growth since 2000 to 2017, recording a -17.09% decline. Share of manufacture (as a % of GDP) grew only 3.47% in Sri Lanka at the same period. Moreover, South Asian countries including Sri Lanka, India and Bangladesh show slow process of industrialization (evident by manufacture share of GDP data in Table 1).

[1] As examples oligopolistic markets, the position of foreign enterprises, and the acquisition of modern technologies

Table 1: Transformation of Exports (2000-2017)

Country	Merchandise Exports Billion US$		Merchandise Exports difference	Exports as a Share of GDP (%)		Export share difference (%)	Share of Manufacture (% of GDP)		Manufactured share difference
	Merchandise Exports (2000) Billion US$	Merchandise Exports (2017) Billion US$	(2000-2017)	2000	2017	(2000-2017)	(2000)	(2017)	(2000-2017)
Korea	172.27	573.69	401.42	35.01	43.09	8.08	26.01	27.57	1.56
Sri Lanka	5.43	11.33	5.9	39.02	21.93	-17.09	15.05	18.52	3.47
China	249.20	2263.33	2014.13	20.89	19.76	-1.14	31.98	29.34	-2.64
Bangladesh	6.39	35.96	29.57	12.34	15.04	2.69	14.04	17.30	3.26
India	42.38	298.38	256	13.13	18.87	5.73	16.55	15.00	-1.55

Hypothesis

In this study my main hypothesis is to identify, whether Rupee depreciation (devaluation or undervaluation) is beneficial to the economic growth of Sri Lanka? According to Central Bank data for the first quarter of 2018, Sri Lankan exports have increased by 7.7% during the first quarter of 2018 (2989 million US dollars in comparison 2774 million US dollars during the same frame last year). Moreover, imports have also increased by 13.1 percent (5971 million US dollars during first quarter of 2018). Therefore, the depreciation of the currency does not seem a good solution to limit or control imports in Sri Lanka. My second hypothesis is to identify, whether Rupee depreciation really helps to boost export industries and export growth in Sri Lanka? Thirdly, to identify how depreciation causes for industrialized process in Sri Lanka?

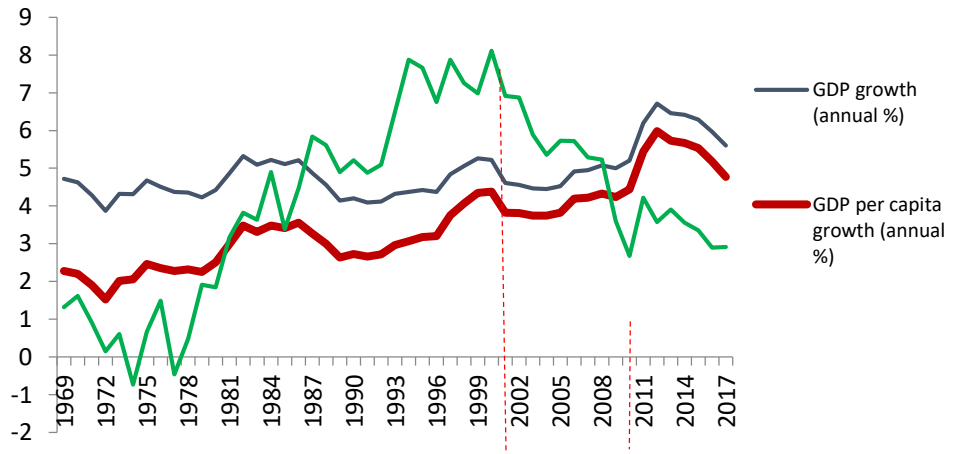
The question is whether we can improve Sri Lanka's Ease of Doing Business Ranking (111) closer to high rankings of Singapore (2), South Korea (4) and Hong-Kong (5) or Thailand (24) and Malaysia (26) that were parallel to Sri Lanka in terms of economic development, three to four decades before. In open economies, as countries trade, the BOP is the result of the difference of the competitiveness of the macroeconomic variables between the country and other countries. Even advanced market economies, with Balance of Payment (BOP) surpluses, continue to impose economic reforms to improve their productivity/competitiveness further to survive in the competitive global economy. Therefore, low productivity is the fundamental problem for a country like Sri Lanka. The competitiveness comes from the productivity which results in comparative advantages. The countries with higher productivity and competitiveness can export more goods and services. At the same time, limiting imports and attracting more foreign investments will help generate balance of payment surpluses. Therefore, market forces in foreign exchange are driven by the macroeconomic competition between the country and foreign countries which is reflected in the BOP of the country. Likewise, Sri Lanka needs to not only devaluate the currency in long-run, but also to increase the productivity through a proper industrialization process to compete with global market competition in order to win this problem.

3. Current situation in Sri Lankan Economic indicators.

Sri Lankan Human development Index (HDI) is higher among the other South Asian countries. The United Nations Development Programme (UNDP) explained that Sri Lanka's HDI value is 0.77 in 2017, which categorized as a country with a high human development. Furthermore, it explained that positioning HDI at the 76th place out of 189 countries and Sri Lanka's Gross National Income (per capita) increased by about 215.8 percent between 1990 and 2017. However, when we compare the income of GDP per capita data in the same period it increased only 9 times for a 27 year period.[1] Therefore, structural reform is really necessary for Sri Lanka and its enterprises for sustained growth.

Figure 1 shows, GDP, GDP per capita and export growth in Sri Lanka since 1960s. This indicates that slow growth process of Sri Lankan GDP during the past 57 year period. Furthermore, after 2013 there is a clear decline of GDP and GDP per capita growth. In addition, from this time period onwards, Sri Lankan Rupee started to depreciate more (latter part if this paper discusses this issue deeply). At the same time, this figure evidenced huge export growth decline in Sri Lanka which started in 2001.

Figure 1: GDP, GDP per capita and Export Growth

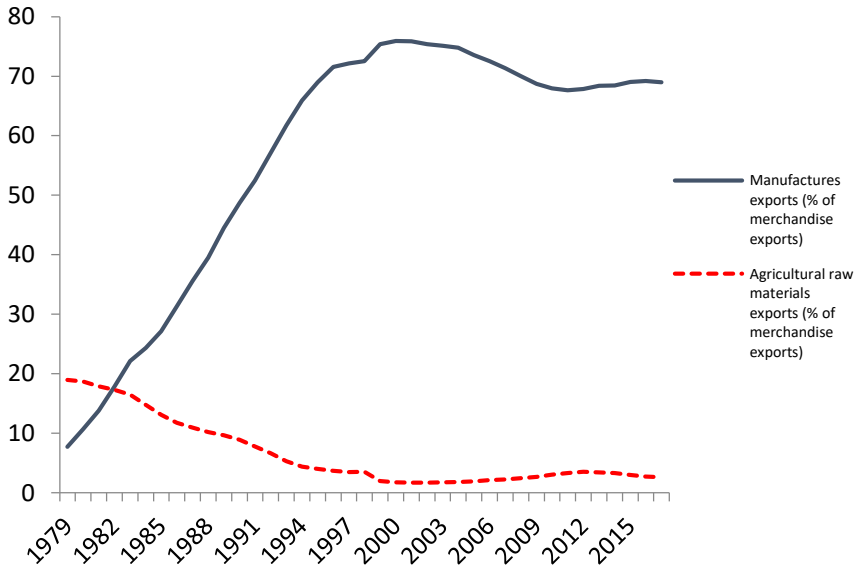


Source: Using World Bank WDI data created by the Author
Figures in ten years moving average, data from 1960-2017

[1] GDP per capita current US$ 464 in 1990 and 4065 in 2017, according to World bank WDI online data

The major export earning industry in Sri Lanka is Textiles and Clothing (TandC) industry since 1980s (Ramanayake and Wijetunga 2018). The TandC quota removal with Multi Fiber Agreement (MFA) significantly affected this decline for Sri Lanka and many other TandC export developing countries in the world. Figure 1 indicates another huge export decline in 2009 due to the tail end of t the civil war. It is very hard for a country like Sri Lanka to rise with boosting exports without a proper industrialization plan. The government of Sri Lanka is under the impression that exchange rate depreciation is the best solution for boosting exports. However, currency depreciation or undervaluation cannot help to boost exports, as it even causes further decline of whole the economic system.

Figure 2: Manufacture exports and Agricultural exports



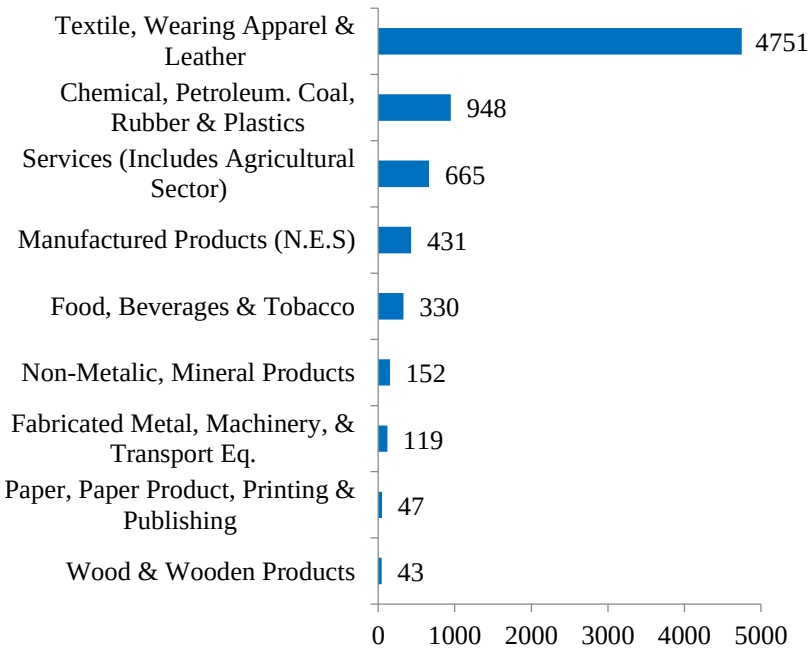
Source: Using World Bank WDI data created by the Author
Figures in five years moving average, data from 1975-2017

Figure 2 indicates manufacture and agriculture exports between 1979 and 2017 in Sri Lanka. That indicates that manufacture exports started to decline consistently since 2000 and it declined to 68 percent in 2017 (it was 75 percent in 1999 and 76 percent in 2000; after 2000 it started to decline gradually). Furthermore, in 1962 Agriculture exports was 19 percent and it declines into 2.6 percent in 2017.

However, Sri Lanka is a tropical country with a climate blessed for agricultural crops, and the ability to grow rice trice a year along with various other numerous agricultural corps. However, the agricultural sector is declining drastically. Nevertheless, we cannot omit the support of agricultural exports to the Sri Lankan GDP. Therefore, the country should focus on a new innovation and new technology based agricultural sector development process with the support of government intervention. Furthermore, this can help the domestic demand for agricultural crops and ban some imported agricultural products. This will help control imports and the outflow of US dollars.

Figure 3 illustrates that textile, wearing-apparel and leather is the largest export enterprise in 2016, recording an amount of US$ 4751 million. Since 1980s this was the largest export contribution in Sri Lanka. The chemical, petroleum, coal, rubber and plastics enterprise (US$ 948 million.) comes in second place, while the services (includes agricultural sector) come third (US$ 665 million.). As is evidenced, the main exports in Sri Lanka are still primary industries for the past 40 to 50 decades. Therefore, an industrial revolution focusing on exports is needed for further growth.

Figure 3: Export Performance in 2016

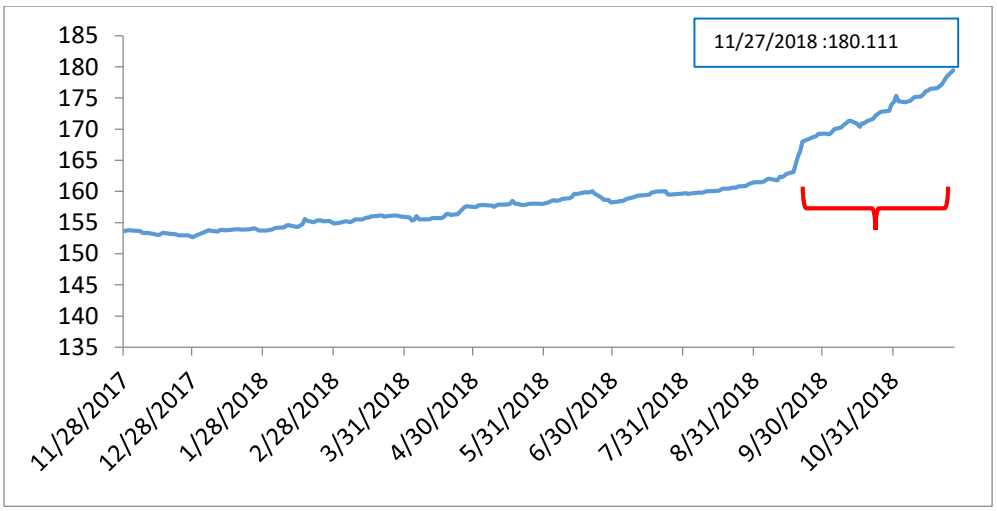


Source: Using Board of Investment Sri Lankan Data created by the Author

Exchange Rate behavior in Sri Lanka

Exchange rate has been discussed recently in the Sri Lankan context in relation to the current situation of the Sri Lankan Rupee and its depreciation patterns. Central Bank of Sri Lanka (CBSL) announced that Sri Lanka has adopted a floating exchange rate system since 2001 which allowed an independent adjustment of the exchange rate according to the market forces of demand and supply. However, the government has claimed that the reason for the rapid depreciation of the Rupee is the strengthening of the US economy and the US dollar. While in general analysts have been fully aware from about this conditions year ago, that the US economy has been gradually strengthening and that the US dollar would be stronger from about mid-2018 onwards, the Sri Lankan government and the Central Bank did not prepare for those challenges against dollar conditions. As a consequence the Rupee was affected by high depreciation against the US dollar. However, the Sri Lankan government and the Central Bank blamed for US dollar situation. However, this is not the real situation. Knowledgeable analysts explained that such contentions are highly amateurish and not tenable, particularly in the context of the Sri Lankan Rupee even depreciating against the Bangladeshi, Zimbabwean and Ethiopian currencies. Figure 4 indicates the exchange rate movement within the period of a year. As it is evident, since August the depreciation is significant and increased rapidly.

Figure 4: Exchange rate Movement – Rupees per USD



Source: Using Central Bank data created by the Author

Furthermore, table 2 presents the Sri Lankan Rupee depreciation history from 1976 to September 2018. The governmental policy enactments directly affected the currency exchange rate in Sri Lanka. According to the data, during President Mahinda Rajapaksa's nine years in office, the Rupee depreciation was only 2.8% per year- the lowest by far after economic liberalisation in 1977. Nevertheless, between 2015 to 2018, it was recorded at 9.1 percent for 3.7 years respectively. In terms of foreign reserves, experts said that high depreciation was caused by the lack of reserves in the Central Bank of Sri Lanka.

Table 2: Sri Lankan Rupee Depreciation history up to 21 September 2018

Year end	Foreign Reserves (USD m)	Rupee year end rate against USD	Depreciation / (Appreciation) for period %	Average year-on-year Depreciation
1976	94	8.83	-	
1986	363	28.52	223.0%	12.4% per year for 10 years
1996	1937	56.71	98.8%	7.1% per year for 10 years
2005	2735	102.12	80.0%	6.0% per year for 9 years
2006	2837	107.71	5.5%	
2007	3508	108.72	0.9%	
2008	2560	113.14	4.1%	
2009	5357	114.38	1.1%	
2010	7196	110.95	3.0%	2.8% per year for 9 years
2011	6749	113.90	2.6%	
2012	7105	127.16	11.6%	
2013	7495	130.75	2.8%	
2014	8208	131.05	0.2%	
2015	7303	144.06	9.9%	
2016	6019	149.80	4.0%	9.1% per year for 3.7 years
2017	7958	152.85	2.0%	
2018-09-21	8400 (E)	170.65	11.7	

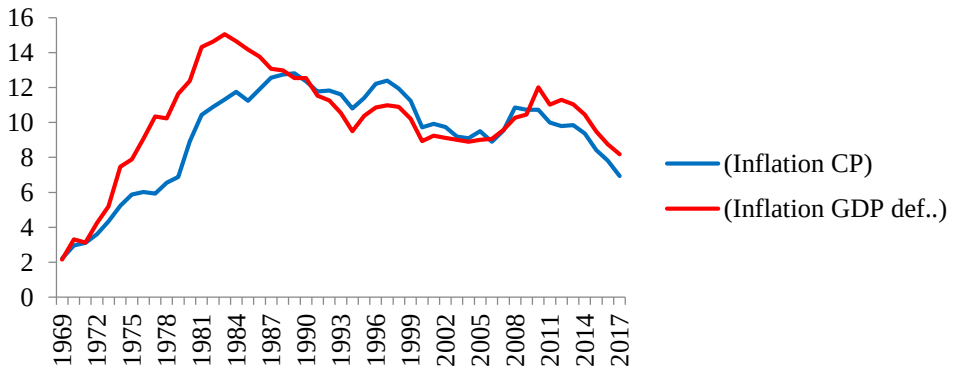
Source: Central Bank of Sri Lanka (2018)

According to the statistics in Table 2 there were US$ 94 million reserves in 1976, which increased to US$ 8208 million in 2014. However, it started to decline since in 2015 and reached US$ 6019 million in 2016. At the same time, Table 2 indicates that in 1977, the Sri Lankan Rupee suffered a depreciation of a devastating 12.4% per year for 10 years from 1977 to 1986. At the same time, data indicates that the period from 2006 to 2014 was the Sri Lankan Rupee's most stable era in recent history. Somehow, again after 2015 the Rupee stared to depreciate in higher percentages, and between August 2018 and November, it met with an even worse scenario. Therefore, it is very clear that since 2015, reckless policies adopted by the present authorities have seriously affected the current situation in Sri Lanka Rupee today.

Inflation

Generally high inflation causes negative social and political consequences. Maintaining price stability or controlling inflation is an important objective for any economy including Sri Lanka. However, neglected or disorganized economic policies can bring conditions such as high inflation and unstable price stability in Sri Lanka. Those misleading policies decidedly affected the Sri Lankan people and their lifestyle. Figure 5 indicates the Sri Lankan inflation behaviors since 1960-2017 in two different measurements (inflation measured by Consumer Price Index and inflation measured by GDP deflator). According to the World Bank in Sri Lanka (2017), inflation reached 6.5 percent in 2017-, its highest levels since 2014.

Figure 5: Inflation from 1960-2017 (10 years Moving average)



Source: Using World Bank WDI data created by the Author

When it comes to inflation in 2018, it increased to 2.1 percent in May 2018 from 1.6 percent in April according to the Department of Census and Statistics (DCS) Sri Lanka.[1] However, in reality, prices of many necessary goods (consumer goods) are comparatively higher in Sri Lanka. Here, I would like to compare Sri Lankan prices with Indian prices. I have experienced living in Mumbai for the past two years and Mumbai was named as one of the most expensive cities for living among other Indian cities. Therefore, Table 4 displays the prices of selected Indian consumer goods, in order to compare with Sri Lankan prices. Furthermore, if you buy a cake in Sri Lanka, you have to pay 35 percent of tax on it. However, Sri Lankan wages do not increase accordingly. Thus, the authorities (including Central Bank of Sri Lanka) using their statistics emphasized that inflation is low in Sri Lanka. Thus, in reality people (middle class and poor) are suffering here in Sri Lanka when living their daily life with their children.

Table 4: Price comparison with India and Sri Lanka (November 2018)

Good	Indian Price for 1 Kg (LKR)	Sri Lankan Price for 1 Kg (LKR)
Potato	Rs. 45.00 (INR 20.00)	Rs.120.00 or 140.00
Onion	Rs. 40.00 (INR 18.00)	Rs.100.00 or 120.00
Carrot	Rs. 175.00 (INR 80.00)	Rs.320.00 or 350.00
Beans	Rs.132.00 (INR 60.00)	Rs.200.00 or more
Cauliflower	Rs.220.00 (INR 100.00)	Rs.500.00 or more

Sources: These prices are using by Author's own experience of living in Mumbai for 2 years from 2016-2017), display average price through a year.
**Those Sri Lankan prices are not in the super market. They are very simple grocery shop prices or Sri Lanka Satosa prices. Supermarket prices are even higher than these numbers.*

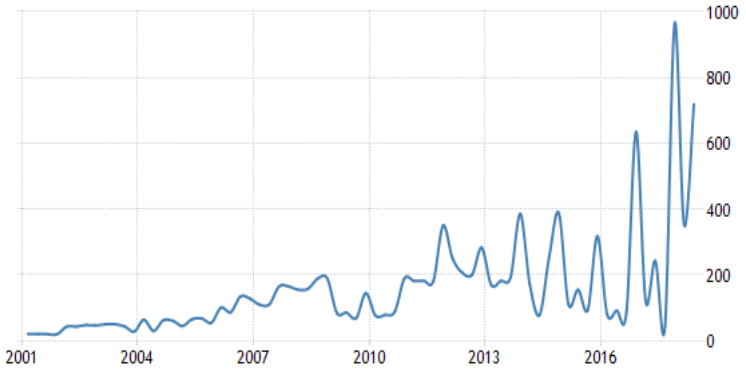
FDI

In 2017, Sri Lanka received 1.6 percent of FDI inflows as a percentage of GDP. However, FDI inflows show some increase in 2018. FDI inflow was 1.1 percent in 2000 and 0.07 percent in 1980. According to the statistics, the total amount of FDI inflow was US$ 1374894657 in 2017 which can be compared to the recorded US$ 43010507.3 in 1980. There is a significant growth in FDI

[1] Inflation, measured as the change in the National Consumer Price Index (NCPI, 2013=100).

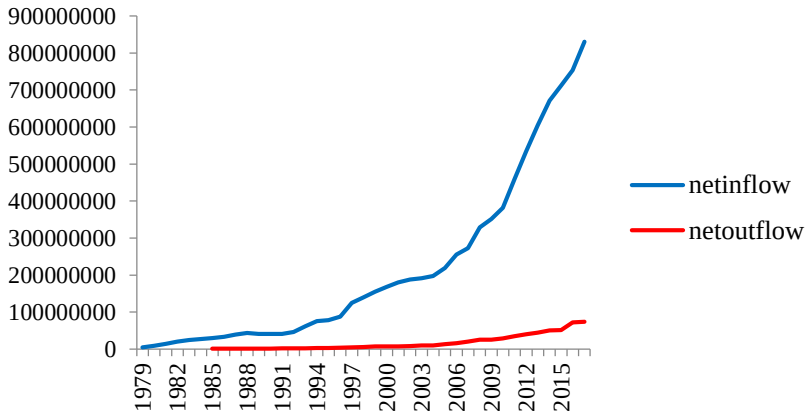
inflow to Sri Lanka between 1980 to 2017 and it is US$ 1331884149. Figure 6 indicates the Sri Lankan Foreign Direct Investment (Net Inflows) from 2001 to 2018, and the figure indicates that there was a significant increase in FDI inflow. China has been the top source of FDI into Sri Lanka since 2013. The Sri Lanka Chinese Business Cooperation Council (SLCBCC) has played an active role in directing Chinese investment to Sri Lanka. According to the Ministry of Development Strategies and International Trade, China (including Hong Kong) accounted for 35 percent of FDI into Sri Lanka in 2017, India was 16.4 percent, and Singapore was 9.3 percent respectively. Netherlands, United Kingdom, Japan, Malaysia, Sweden, and Australia are the other countries in the list of top 10 of FDI inflows into Sri Lanka. Furthermore, Figure 7 indicates the comparison of FDI net inflow and net outflow from 1979-2017. The main puzzle is where these FDI are directed or how they are implemented; whether, these FDI help the development of the industrial or manufacturing sector is still unsolved puzzle. According to the statistics shared by Ministry of Development Strategies and International Trade, a larger share of FDI inflows into manufacturing and services sectors and this amount was recorded as US$ 397 million in 2017. Furthermore, the second largest share of FDI inflows are directed into infrastructure and utilities sectors and it was recorded at US$ 352.5 million in 2017. Even though China is the largest FDI donor to Sri Lanka, the analysis highlights that investment from China is relatively low as a percentage of GDP.

Figure 6: Sri Lanka Foreign Direct Investment - Net Inflows from 2001 to 2018



Source: Central Bank of Sri Lanka

Figure 7: Comparison of FDI net inflow and net outflow (current USD) from 1979-2017

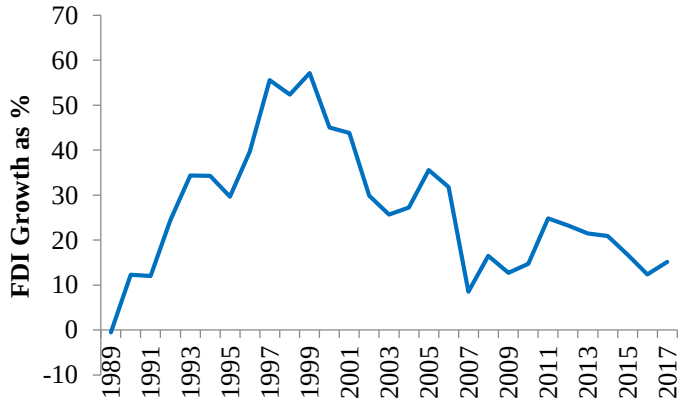


Source: Using World Bank WDI data created by the Author

Figures in 10 years moving average

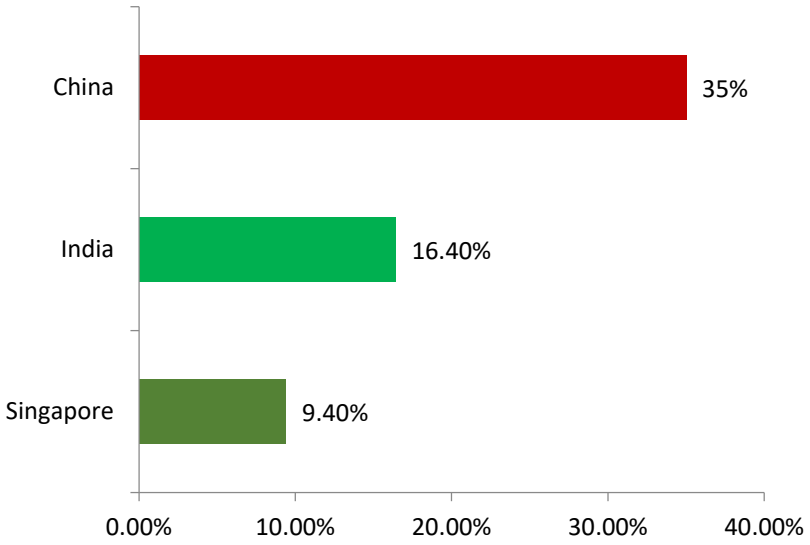
However, Figure 7 delineates that there is a significant increase in Sri Lankan FDI outflow particularly since 2000. As a country we have to pay attention to this FDI outflow, understanding its causes and ways to control it. This FDI outflow increased since 2000s and it is continuing even at present. On the contrary, if we derive a figure for growth of FDI, the figure indicates a declining trend (See Figure 8).

Figure 8: Growth of FDI net inflow



Source: Using World Bank WDI data created by the Author

Figure 9: Share of FDI by country in 2017



Source: Using The Ministry of Development Strategies and International Trade statistics created by the Author

Figure 9 illustrates that China accounted for the largest share (35%) of total FDI inflows to Sri Lanka in 2017, which is in sharp contrast to the negative growth rate of FDI inflows from many other Asian countries. It must be noted that India and Singapore have recorded first and second highest FDI growth rates in 2017. Yet the volume of FDI from those countries remained significantly lower than that from China. The rest of the FDI flows was recorded to be from Netherlands, Britain, Japan, Malaysia, Sweden, and Australia in 2017. Figure 9 illustrates that China accounted for the largest share (35%) of total FDI inflows to Sri Lanka in 2017, in sharp contrast to the negative growth rate of FDI inflows from many other Asian countries. It must be noted that the India and Singapore have recorded first and second highest FDI growth rates in 2017, it recorded as 16.4% and 9.40% respectively. Yet the volume of FDI from those countries remained significantly lower than that from China. Reset of the FDI flow from Netherlands, Britain, Japan, Malaysia, Sweden, and Australia in 2017. The Chinese FDI flows were mostly directed towards infrastructure development. Mainly those FDIs were invested in transportation, power and energy development in Sri Lanka. According to the statistics, the largest amount was invested in the Norochcholai coal power plant project (spent around $ 450 million).

A major development project in the transport sector was the Colombo-Katunayake Expressway, funded by $ 248.2 million of Chinese investment while the Hambantota seaport (around $ 461 million) and Mattala airport ($ 210 million) were built to advance the maritime and aviation sectors. Another important project was the Exclusive Economic Zone in Mirigama (in Sri Lanka's Western Province, near Colombo). Colombo Port City development project is another major Chinese investment project in Sri Lanka.

As is made evident, most of the FDI flows were directed towards infrastructure and facility development, thus, FDIs in industrial sector, knowledge development or skilled labour development sectors are very small. Therefore, Sri Lanka needs to focus on more innovative ways to bring FDI into the country. Focusing on integrating highly technically and scientifically educated people into the workforce are important. Furthermore, Sri Lanka has to focus on large scale manufacturing industries with high technology, while emphasizing on comparative advantage. Furthermore, agricultural sector in Sri Lanka with its ability to grow rice trice a year cannot be neglected. Therefore, implementation of new technological innovations using FDI and foreign technology into the agricultural development is needed. Rethinking trade policy, improving logistics and trade facilitation, promoting investments, boosting innovation by way of competitive product can be implemented for the development of FDI and growth in Sri Lanka.

4. What's really happened to Sri Lankan export market with Rupee **depreciation? Whether export boom or recession?**

Normally after currency depreciation, the overseas demand increases given that locally produced goods and services are attractive to foreigners and are comparatively cheap. At the same time, imported goods and services price will increase after depreciation of local currencies. However, as evidenced in the context of Sri Lanka, export growth has a declining trend in the long-run (see Figure 1). If we take a closer look at the export behavior since 2015, it is declining dramatically. The demand pull factor or the exchange rate depreciation is active, but export boom is not taking place. The main cause for this is industrial behavior in Sri Lanka. Sri Lankan main exports are TandC, and some agricultural exports. We don't have industrial exports to compete with the market competition. Even with the TandC industry, adding-up

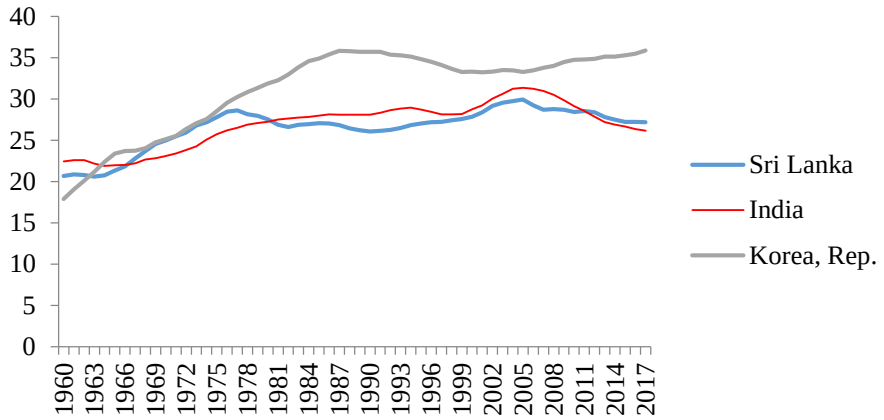
problem[1] matters for most of the developing countries like Sri Lanka (Lee and Ramanayake 2017). Furthermore, existing empirical analysis indicates that real exchange rate volatility have significant negative impacts on Sri Lankan exports both in the short-run and the long-run (Madurapperuma 2018).

Figure 10 indicates the industrial contribution as a percentage of GDP in Sri Lanka, India and South Korea. Industrial contribution to GDP has been declining consistently in Sri Lanka since 2000s. Therefore, Sri Lanka should focus on export based industries with new technology and technological innovations to uplift the recent economic conditions. According to the statistics there are around 1,000,000 enterprises. However, 90 percent among them are micro enterprises. There is a lacuna of sufficient medium sized companies in Sri Lanka. Therefore, with the government support, encouraging SMEs for export based industrial product must be implemented for Sri Lankan growth. Moreover, we can encourage female labour force participation for industrial sectors, where currently, we only use 35 percent of female labour.

Furthermore, remittances by Sri Lankan labour workers play another important role in the Sri Lankan economy; and it helps gain more US dollars to Sri Lanka (Ramanayake and Wijetunga 2018a). It is the second largest dollar earning industry in Sri Lanka and it contributed to the GDP by 8.6 percent in 2017. However, recent studies have found that in 2018, Sri Lankan remittances have decreased compared to 2017 (Ratnasabapathy 2018). One reason for this decline can be the new tax policies introduced by the current government (Prime Minister Ranil Wickramasinghes'). To increase the remittances, the government should provide more benefits for them without charging taxes. Thus in Sri Lanka, all the foreign workers have to pay some fee when they are passing through Sri Lankan airport. Those are absurd policies targeting the innocent workers in Sri Lanka. It is necessary to mention that the custom officers and the airport officers request bribes from the labourers (especially from Sri Lankan housekeepers arriving from the Middle East). Government should control these types of activities and punish them accordingly.

[1] See Lee and Ramanayake (2017) for details of an adding up-problem.

Figure 10: Industry, value added (% of GDP) Selected countries



Source: Using World Bank WDI data created by the Author
**Figures are in Five year Moving average*

5. Conclusions

In the long-run, the Sri Lankan Rupee has a depreciating trend and the amount of depreciation changes from time to time. Rupee depreciation over the past six months against the US dollar was significant. Particularly, since beginning of 2018 depreciation is much higher than the historic annual average of the last couple of decades. However, during the last three months (from August to October 2018) Sri Lanka's currency has depreciated rapidly and thus, adding new records to the Sri Lankan history of depreciation. Moreover, this (rising exchange rate depreciation) became an unidentified fear and a crisis for all Sri Lankans, traders and business people.

This highly depreciative and unstable exchange rate is a big threat to the Sri Lankan economy. It impedes all investors (both local and foreign), entrepreneurs, as well as stakeholder's decisions. Therefore, they react to this dilemma by controlling or blocking the investment process. Furthermore, this situation significantly affects the international trade, particularly in the export market. Generally, a stable exchange rate reduces transaction costs, uncertainty in international trade, and thereby stimulates trade. Export growth is named as one of the most significant variables in macroeconomics to sustain growth (Ramanayake and Lee

2015). Even though the Sri Lankan government has positive expectations to boom exports through currency depreciation, it is not happening due to many reasons. One reason is that the export quantity is not improving. At the same time, the share of imported intermediates of the main export firms (textiles and clothing) are greater than 30 percent. Therefore, the effect of real exchange rates on export participation fades; secondly, export diversification is not happening, as we are still dependent on the main TandC and some primary export industries (such as gem and Jewels, rubber, tea, coconuts, etc.); thirdly, the decline of capital investments due to Rupee depreciation. Capital investors need lot of Rupee to invest in capital goods. To buy capital investing goods or import capital tools they need dollars and to buy dollars they need a lot of Rupee. Therefore, capital investment is simply not happening, or is delayed or has a slow process in comparison to other periods; Finally, due to high inflation foreign investors refuse to come to Sri Lanka. Inflation and high living cost, higher wage rates cause investment outflow from Sri Lanka to cheaper countries such as Bangladesh, Myanmar and some African countries. Therefore, in line with the empirical studies conducted by Madurapperuma (2018)[1], theoretical findings of this study explained that the situation in Sri Lanka can be improved by maintaining a stable competitive real exchange rate.

For a small economy like Sri Lanka, changes in the exchange rate can have high influence on prices. The level of inflation is very high and it directly affects people and their welfare. Another significant point for inflation is that the Central Bank prints more money than the country's production. As an example, India able to control inflation because of diligent management of macroeconomic policies of the Reserve Bank of India (RBI) by the current governor Dr. Rajen. While, Sri Lankan Central Bank corruption in February 2015 significantly affected the country and its people. However, the government has still been unable to punish the responsible people for that. One of the main outcomes of this corruption is the increase of taxes by the government to earn money for government expenditures. The Sri Lankan government was unable to pay government workers salaries; therefore, they

[1] Madurapperuma (2018) used cointegration, vector error correction model (VECM) and GARCH techniques for the data set from 2000-2015.

tried to earn money by increasing taxes (As an example 35 percent of cake tax in Sri Lanka).

Policy suggestions

- Sri Lanka should implement smart exchange rate policies. Such like, not only depreciation in long-run, but also some time appreciation (overvaluation) could be effective. This will help to maintain the national account stability, growth of exports, GDP, investment, and international competition without falling into the foreign exchange bottleneck.
- By introducing 'Export-Push' packages (using trade and exchange rate policies), the export volume, export diversification, public and private investment, and FDI can be increased.
- Central Bank of Sri Lanka's role is important and it is necessary to revisit its policies such as inflation targeting, taxation, investment, and stabilizing the Rupee.
- To promote exports and export-based industrial development well-designed government actions (industrial policies) are needed. This can improve economic outcomes. Through the increase of RandD expenditure (Research and Development), innovation system policy management, and supporting SMEs (small and medium enterprises) will help to boost export performance of Sri Lanka. Moreover, as Lee and Mathews (2012) introduced, the upgrading of new industries and introducing new industries in Sri Lanka is necessary.
- Not only the government sector but also the private sector has a central role to play in formulating and implementing industrial policy.
- Sri Lanka is blessed to grow agricultural crops (particularly rice) trice a year, blessed to have a good climate and soil for agriculture. Therefore, we are unable to ignore the agricultural sector. New technology and technological innovations should be implement for the agricultural sector development. This agriculture development plan must target domestic consumption, which means provide sufficient agricultural products for domestic consumption at better prices. This would control and reduce agrarian imports and dollar outflow for agrarian products.

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Is money relevant for determining output and prices? - An empirical analysis of six countries

Taniya Ghosh[1] and Vipul Gupta [2]

Abstract

An important policy question is whether the policy decisions can be based on models that do not include monetary aggregates. Practical considerations suggest that money should be included in the policy rule of the central bank. One such consideration is the fact that the central bank usually does not have contemporaneous information on inflation and output, but it has information about money stock. Money will help the monetary authority to directly determine the crucial variables. This paper investigates the relationship between money-output and money-prices and also examines whether the Divisia monetary aggregates better explains this relationship in comparison to simple sum monetary aggregates. Six countries such as the Euro area, India, Israel, Poland, the UK and the US were included for the analysis. The study finds that there is a high pairwise correlation between money-output and money-prices. The Johansen co-integration test confirms the existence of co-integrating relations between the variables used in our analysis. Further, the vector error correction model (VECM) is used to ascertain the short run and long run dynamics of the variables. We find that in the VECM model, the disequilibrium gets restored in the subsequent periods. Hence, money has a predictive power in determining output and prices. The Granger causality test confirms that the existence of causality between money-output and money-prices. Hence, our study shows that the money matters, especially the Divisia money as it gives a stronger and stable relationship between money-output and money-prices.

Keywords: Correlation, Cointegration, Divisia, Granger causality, monetary aggregates, real output, prices

Jel Classification: C32, E52, E51

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[1] Indira Gandhi Institute of Development Research (IGIDR), India

[2] Gokhale Institute of Politics and Economics (GIPE), Shivajinagar, Pune

Corresponding Author

Taniya Ghosh,Indira Gandhi Institute of Development Research (IGIDR), Gen. A. K. Vaidya Marg, Filmcity Road, Mumbai, 400065, India

Email: taniya@igidr.ac.in

1. Introduction

The role of money and its effects on the business cycles has been one of the important research areas in the modern macroeconomic theory. More than fifty years ago, Friedman and Schwartz (1963a) found that money affects output and prices and is a key instrument to drive the engine of growth. However, the current debates on the monetary stance consider money as a sideshow. It is believed that the real factors affect the output. Real factors are determined primarily by the interest rate.

Money is an important variable because it affects the liquidity in the economy. It is used for transactional purposes and speculative purposes. This motivates us to investigate its effects on macroeconomic variables such as output and prices. According to the quantity theory of money, a rise in money supply will lead to an increase in output in the short run. In the long run, only the price level rises as output would fall back. The close association between money and output was disregarded by Keynes who believed that monetary policy based on quantity theory of money fails when the economy is facing severe shortage in (aggregate) demand. Moreover, the rampant financial innovations only added fuel to the ongoing debate. It generated new instruments to be used for transactional purposes and made the measure of money using simple sums unreliable. Soon, the interest rate replaced money as the more appropriate monetary policy instrument. The use of such models that make no reference to any monetary aggregates has been common and standard.

The literature on aggregation-theoretic Divisia monetary aggregates, questioned the interest rate playing a leading role in monetary policy with money relegated to play a minor role. They argue that it is more appropriate for the components of money aggregates to be assigned a weight based on their degree of "moneyness". The reason that the weights of each asset are important is because the simple sum money aggregates imply that each asset is a perfect substitute for all other assets in the index. This is problematic because it is contrary to empirical evidence and as a result simple sum aggregates fail to capture pure substitution effects across assets. The failure of simple sum aggregates to capture these substitution effects is important as it implies that there has been some change in the sub-utility function pertaining to monetary services and, potentially, the instability of money demand that has been observed empirically.

An alternative to the simple sum indices are the 'Divisia monetary aggregates' derived by Barnett (1980) in which the components of the monetary aggregate are weighted by their expenditure share. In contrast to the simple sum aggregates, the Divisia aggregates are derived from micro-theoretic foundations and are also consistent with the index number and aggregation theory.

Hence, the question is, once money is brought into the economy, what is the relation between money and economic activity? The aim of the paper is to analyze the short term and long term relationship between money-output and money- prices, and in regards to this, compare the role of Divisia monetary aggregates vis-a-vis the simple sum aggregates (like M1 and M3). The main findings of the paper confirm the existence of a short run and a long run relationship between money-output and money-prices especially when Divisia money is used.

The paper is divided into three sections. The first section gives the literature used to support the hypothesis. The second section gives the variables, data specifications and methodology followed in the paper. The third section gives a country-wise analysis on the results for the US, the UK, Israel, India, the Euro area and Poland, along with a short synopsis on the economic history and monetary policy regime followed in these countries. The last section provides the concluding remarks.

2. Literature Review

The literature suggests the use of monetary aggregates in monetary policy to achieve price stability and output stability. There is a wide variety of monetary aggregates available such as the simple sum aggregates M1 and M3 and Divisia monetary aggregates. It is shown that accurate measurement of money can help solve many empirical puzzles like the price puzzle, exchange rate puzzle and forward discount puzzle. The exchange rate puzzle occurs when a contractionary monetary policy leads to an impact depreciation of domestic currency instead of an impact appreciation as predicted by theory. Moreover, if it does appreciate for a prolonged period of time, it leads to the violation of the uncovered interest parity condition also known as delayed overshooting. The price puzzle occurs when a contractionary monetary policy leads to an increase in prices rather than a decrease. Hence, the underlying fundamentals, such as interest rates, may not explain precisely the short-term volatility of

output, prices and exchange rate. Belongia (1996) re-examined such puzzling results from the monetary literature and found that many puzzles exist only when the simple sum aggregates are used and they disappear when Divisia monetary aggregates are used. Hence, it is natural to ask questions like whether Divisia aggregates assess the link between money, prices and exchange rate better or whether forecasting of the inflation rates using the Divisia aggregates produce better policy results. . The recent empirical work has shown a weakened relationship between money-output and money-pricey using the simple sum aggregates. We hypothesize that, due to financial innovations, the definition of money has evolved over time, reflecting the importance of the Divisia aggregates in answering some of the questions asked above.

Friedman and Schwartz (1963a) established a fairly close connection between the monetary changes during the course of the business cycle and the changes in the associated movements in output. The method used is to calculate the correlation between the logarithmic differences of the money stock (M1 and M2) which is equivalent to using the percentage rate of change from one unit to the next. They explain the different channels through which there is change in money- (a) high powered money, (b) the currency-deposits ratio (division of public's wealth between currency and deposits), (c) the reserve-deposit ratio (relation between deposits and the amount of high-powered money). With the rising advent of the relationship between money and output, Lucas (1970) formulated a dynamic stochastic general equilibrium model which explained the linkages among money, output and prices through mathematical equations. He concludes that there exists a strong relationship between money, output and prices.

Belongia and Ireland (2015) also established correlations similar to Friedman and Schwartz. They found correlations between the cyclical components of output and prices contemporaneously and when money is lagged from one to sixteen quarters. The correlations are always larger for Divisia than the simple sum aggregates. In the 1970s, monetary theory gained pace and was able explain the fluctuations in the business cycles. Monetary policy formed a key policy instrument to achieve price stability. Milton Friedman explained his phrase - "inflation is always and everywhere a monetary phenomenon". In the 1980s however, money demand function became unstable and the relation between money and prices started to weaken. The weakening of the money

demand function can be seen due to the numerous financial innovations taking place in the economy and arrival of new financial instruments. The difficulty in establishing the relationship between money, output and prices is noticed due to the inability in constructing accurate measures of flows of monetary services.

Estrella and Mishkin (1996) found that the monetary policy such as nominal income targeting is feasible when M2 is used as the instrument. They argued that it is possible to target the nominal income with a monetary aggregate as an instrument only if the relationship between money and income is strong and stable over time. To establish the link between money and income they compute a Granger Sims causality statistic for a three variables VAR having nominal growth, inflation and growth in the monetary base, with a break in the data for the years 1979-80. They found that the lags of M2 do not explain inflation.However, lags in both inflation and nominal growth help explain money growth. The stability of the money demand is always in question in the monetary analysis. In order to produce the stable money demand equation, they adjust the money growth variable by adding to it the expected change in velocity. A similar analysis is done for Germany for the time period 1970-1990 and the results were consistent with the US.

Hendrickson (2013) also suggests that the existence of the stable money demand function is necessary for money to have predictable effect on economic variables. He uses the "co-integration principle" to examine the stability of money demand for three separate samples. The use of separate samples is motivated by the fact that financial innovation can alter the relationship. He finds that the Divisia aggregates resulted in stable money demand equation. Due to the fact that the three variables in the system, nominal income, price level and (each of) Divisia aggregate have unit roots are difference stationary and are co-integrated. Hendrickson also estimates a vector error correction model (VECM). The results from the Granger Causality test provide evidence in favour of Divisia aggregates. Castlenuovo (2012) finds short run reactions of output to an increase in monetary aggregates to be significantly positive and smooth in a variety of VAR models using the US data.

Woodford (2008) argued that the monetary aggregates cannot determine changes in price level. He contends that the literature has not provided

satisfactory micro-foundations for why money should be a good proxy for asset price variation. Nelson (2002) answering Woodford's view, supports the hypothesis that the money growth is a determinant of prices in the long run. He also finds that for the U.S. and the U.K, the lagged values of real monetary base have a significant impact on the price when included with the interest rate as an explanatory variable.

The "Taylor rule" which is used to determine the interest rate movements does not have a monetary aggregate component in the equation as the empirical results did not provide much support for the inclusion of monetary aggregate. Hafer, Haslag and Jones (2007) used a modified version of the Rudebusch–Svensson (2002) equation by including the monetary aggregate in it. They found a statistically significant relationship between lagged money (M2) and output gap even after the federal funds rate was included. Moreover, to determine whether the inside money or the outside money affect output, they decomposed M2 into its outside money component (the monetary base) and inside money component (the money multiplier). After adding each component to the equation separately, they found that both of them are significant statistically.

Ghosh and Parab (2019) analyzed the time-varying correlation of money and output for the Euro, India, Poland, the UK and the US using the DCC GARCH model. They established a procyclical role of money when money was measured by Divisia monetary aggregates. Such a procyclical nature of association was not robustly observed when simple sum money was used. Barnett, Bhadury and Ghosh (2016) examined the role of monetary policy shocks in explaining the exchange rate fluctuations for India, Poland and the UK for the sample period 2000-15. Using "structural VAR" they find that the exchange rate puzzle is solved when Divisia aggregates are used. Also they found that inclusion of Divisia aggregates provide a better out of sample forecast for the exchange rate for each of these countries. Moreover, Bhadury and Ghosh (2018) found strong causality from Divisia money to the exchange rate for India, Israel, Poland, the UK, and the US.

Existing literature suggests a definite relation between money, output and prices. Lane (2003) empirically shows that the emerging market economies are more exposed to the business shocks than the industrial economies. Finding a stable link between money and prices can help control the

fluctuations in these economies. The monetary authorities can control business cycle fluctuations through controlling prices. The prime instruments in controlling inflation are the money supply and interest rates. The exchange rate can be controlled through intervention and sterilization which ultimately depends on the money.

This motivates us to test empirically the relation between money, output and prices for a more recent sample and for a different set of countries. We check the relationship using both the simple sum aggregates and Divisia aggregates.

3. Data and Methodology

The data for the following variables for the countries US, UK, Poland, India, Israel and Euro area was collected.

1. M1 and M3

2. GDP

3. Divisia

4. Consumer Price Index

5. Inflation

6. Short term Interest Rates

The various time series are used (see table 1) as per their availability. The data was collected from various sources. The series M1 and M3, GDP, CPI, inflation, interest rates for all the countries was taken from the Organization for Economic Cooperation and Development. The Divisia has been obtained from the respective central banks' website of the countries. The data for the Divisia index for India is collected from Ramachandran et. al. (2010).

To check for the linear association between the different macroeconomic variables with monetary aggregates, the correlation coefficients between them are calculated. The significance of the various correlation coefficients is analyzed through the t-test. The null hypothesis is that there is no significant correlation between the variables. The results for all the countries are tabulated in the appendix. The test answers the question: “is the correlation statistically significant among the variables”?

The variables are said to be co-integrated if they are integrated of the same order and some linear combination of the variables is stationary. The co-

integrating relationship signifies the long run equilibrium relationship among the variables. The aim is to establish a long run equilibrium relationship between money-output and money-prices. According to the Granger representation theorem, if there exists a co-integrating relationship between two variables there also exists an error correction model. The restrictions necessary to ensure that the variables are co-integrated guarantees that an error-correction model exists. The variables have an error-correction representation with speed of adjustment coefficients in error-correction model for $I(1)$ variables necessarily implies co-integration. This finding illustrates the Granger representation theorem which states that for any set of $I(1)$ variables, error correction and co-integration are equivalent representations.

We estimate a vector error-correction model (VECM) to test the long run and short run relationship among output, prices, interest rate, and monetary aggregates namely M1, M3 and Divisia. A vector error-correction model is essentially a vector auto-regression (VAR) model except that VECM includes the error-correction terms (ECTs) from the co-integration equation(s). Besides, VECM retains all other benefits of a standard VAR. Like VAR, VECM is also a generalized reduced form which helps detect the statistical relationship among the variables in the system.

The error correction term from the VECM equations gives the speed of adjustment. These terms capture the short run dynamics in the long run equilibrium relationships and the size of the estimated parameters reflects the speed of adjustment. It is in this sense that error-correction models, in general, provide additional channels for capturing a causal relationship. Error correction terms signify how much of the disequilibrium is cleared in one time period.

Since the use of VECM is contingent upon stationarity and existence of co-integrating relationships, we run the augmented Dickey Fuller test to check for the stationarity. To examine the co-integration among the variables, we run Johansen's maximum Eigenvalue test. A series is considered stationary if its mean, variance and co-variances are time-independent.

For the Granger causality test, the given two sets of time series data are x and y. Granger-causality is a method which attempts to determine whether one series is likely to influence change in the other. This is accomplished by taking different lags of one series and the co-integrating vector, and using that to

model the change in the second series. If the lagged terms in the VECM equation are significant, then there is Granger causality.

Granger-causality is normally tested in the context of linear regression models. For illustration, consider a bivariate linear autoregressive model of two variables X_1 and X_2 :

$$X_1(t) = \sum_{j=1}^{p} A_{11} X_1(t-j) + \sum_{j=1}^{p} A_{12} X_2(t-j) + E_1(t)$$

$$X_2(t) = \sum_{j=1}^{p} A_{21} X_1(t-j) + \sum_{j=1}^{p} A_{22} X_2(t-j) + E_2(t)$$

Where *p* is the maximum number of lagged observations included in the model (the model order), the matrix *A* contains the coefficients of the model (i.e., the contributions of each lagged observation to the predicted values of $X_1(t)$ and $X_2(t)$, and E_1 and E_2 are residuals (prediction errors) for each time series. If the variance of E_1 (or E_2) is reduced by the inclusion of the X_2 (or X_1) terms in the first (or second) equation, then it is said that X_2 (or X_1) Granger-causes X_1(or X_2). In other words, X_2 Granger-causes X_1 if the coefficients in A_{12} are jointly significantly different from zero. This can be tested by performing an F-test of the null hypothesis that A_{12} =0, given assumptions of covariance stationary on X_1 and X_2. Essentially, we are trying to determine whether we can say that statistically x provides more information about future values of y than past values of y alone. Under this definition it is clear that we are not trying to prove actual causation, only that the two values are related by some phenomenon. Along those lines, we must also run this model in reverse to verify that that y does not provide information about future values of x. If we find that this is the case, it is likely that there is some exogenous variable, z, which needs to be controlled or could be a better candidate for Granger causation.

4. Results

Table 2-7 gives the results for augmented Dickey Fuller (ADF) test. The null hypothesis is that the series has a unit root i.e. the series is not stationary. We run the ADF test for all the time series variables. Table 8-13 gives the results for the Johansen maximum eigenvalue co-integration test for the US, the UK, Israel, India, the Euro Area and Poland.

The null hypothesis is there is no co-integrating relationship when the rank is equal to zero, one co-integrating relationship when the rank is one and so on. For example, if we reject the hypothesis that the rank is zero and accept the hypothesis that the rank is one then there is one co-integrating relationship.

Table 14-32 gives the results for vector error correction model (VECM) using different monetary aggregates as the measure of money. The VECM gives the short run dynamics between the variables. The error correction term gives how much of the disequilibrium gets restored in one-time period. Also, the significance of the past values in the VECM equations gives the Granger causality results. If the past values of a variable are significant then it implies that the variable Granger causes the variable on the row side.

US: Table 2 gives the results of Augmented Dickey Fuller test for the variables M1, M3, Divisia M3, Divisia M4, GDP, CPI, Inflation and Interest rates. All variables except CPI have a unit root at level and are stationary at first difference. This indicates that all variables except CPI are integrated of order one, hence we can check for co-integrating relationships between them. For further analysis inflation is used than CPI. Table 8 gives the results for Johansen maximum Eigen value test for co-integration. M1, M3, Divisia M3 and Divisia M4 have one co-integrating relationship each with the variables inflation, GDP, interest rates. It implies that there exists a long term relationship between money, output, prices and interest rates for the US economy. Table 14 gives the results for VECM with M1. The ECT terms for the equations GDP and M1 are highly significant and the output shows that interest rate Granger causes GDP and Inflation. Table 15 gives the results for VECM with M3. The ECT terms for the equations GDP and M3 are highly significant and the output shows that GDP Granger causes M3 and interest rate Granger causes inflation. Table 16 gives the results for VECM with Divisia M3. The ECT terms for the equations GDP, Divisia M3 and inflation are significant and the output shows that Divisia M3 Granger causes GDP and GDP Granger causes Divisia indicating a bi-directional causality between the two variables. Interest rate Granger causes Divisia M3 and inflation. Table 17 gives the results for VECM with Divisia M4. The ECT terms for the equations GDP, Divisia M4 and Inflation are significant and the output shows that GDP Granger causes interest rates and interest rates Granger causes GDP, indicating a bi-directional causality between the two variables. Divisia M4 Granger causes inflation. According to the results, it is observed that there

exists Granger causality between Divisia M3, output and prices which is not observed in the simple sum aggregates like M1 and M3. The results from the Granger causality provides evidence that the Divisia index is better than simple sum aggregates in predicting output, prices and interest rates for the U.S economy.

UK: Table 3 gives the results of augmented Dickey Fuller test for the variables M1, M3, Divisia, GDP, CPI, inflation and interest rates. All variables except inflation have a unit root at level and are stationary at first difference. This indicates that all variables except inflation are integrated of order one, hence we can check for co-integrating relationships between them. For further analysis CPI is used. Table 9 gives the results for Johansen maximum Eigen value test for co-integration. There exists a co-integrating relationship when M1 and Divisia are used as the monetary aggregate. It implies that there exists a long term relationship between money, output, prices and interest rates for the UK economy. Table 18 gives the results for VECM with M1. The ECT terms for the equations CPI and M1 are highly significant and the output shows that there exists a bi-directional Granger causality between GDP and interest rates. Also, CPI Granger causes GDP. Table 19 gives the results for VECM with Divisia. The ECT terms for the equations GDP, Divisia and CPI are significant and the result shows that there exists a bi-directional Granger causality between CPI and Divisia, interest rates and GDP. Also, CPI Granger causes GDP. There does not exist a long term relationship between M3, interest rates, output and prices. The results from the Granger causality provides evidence that the Divisia index is better than simple sum aggregates in predicting output, prices and interest rates for the UK economy.

ISRAEL: Table 4 gives the results of augmented Dickey Fuller test for the variables M1, M3, Divisia, GDP, CPI, inflation and interest rates. All variables except inflation have a unit root at level and are stationary at first difference. This indicates that all variables except inflation are integrated of order one. Hence, we can check for co-integrating relationships between them. For further analysis CPI is used. Table 10 gives the results for Johansen maximum Eigen value test for co-integration. There exists a co-integrating relationship when Divisia is used as the monetary aggregate but no such relationship exists when simple sum aggregates are used. It implies that there exists a long term relationship between Divisia money, output, prices and interest rates for the Israeli economy. Table 20 gives the results for VECM with Divisia. The ECT

terms for the equations show that Divisia is significant and the result shows CPI Granger causes GDP, interest rates and Divisia. Also interest rates Granger causes Divisia and CPI. There does not exist any long term relationship between M1 and M3 with interest rates, output and prices. The results from the Granger causality provides evidence that the Divisia index is better than simple sum aggregates in predicting output, prices and interest rates for the Israeli economy.

INDIA: Table 5 gives the results of augmented Dickey Fuller test for the variables M1, M3, DM2, DM3, DL1, GDP, CPI, inflation and interest rates. All variables except inflation have a unit root at level and are stationary at first difference. This indicates that all variables except inflation are integrated of order one, hence we can check for co-integrating relationships between them. For further analysis CPI is used. Table 11 gives the results for Johansen maximum Eigen value test for co-integration. There exists two co-integrating relationships when M1 is used, one co-integrating relationship when M3 is used, and three co-integrating relationships each when DM2 and DM3 are used; two co-integrating relationships are found when DL1 is used. Table 21 gives the results for VECM with M1. The ECT term for the equation M1 is significant. But the results show no evidence of Granger causality. Table 22 gives the results for VECM with M3. The ECT term for the equation M3 is significant. But the results show no evidence of Granger causality. Table 23 gives the results for VECM with DM2. The ECT terms for the equations GDP and DM2 are significant and the output shows that GDP Granger causes DM2.Table 24 gives the results for VECM with DM3. The ECT terms for the equations GDP and DM3 are significant. The output shows that GDP granger causes DM3.Table 25 gives the results for VECM with DL1. The ECT terms for the equations GDP and DL1 are significant. The output shows that GDP Granger causes DL1. The results from the Granger causality provides evidence that the Divisia index is better than simple sum aggregates in predicting output, prices and interest rates for the Indian economy.

EURO AREA: Table 6 gives the results of Augmented Dickey Fuller test for the variables M1, M3, M1 Divisia, M2 Divisia, M3 Divisia, GDP, CPI, inflation and interest rates. All variables except inflation have a unit root at level and are stationary at first difference. This indicates that all variables except inflation are integrated of order one, hence we can check for co-integrating relationships between them. For further analysis CPI is used. Table

12 gives the results for Johansen maximum Eigen value test for co-integration. There exists no co-integrating relationship when M1 is used, one co-integrating relationship when M3 is used, two co-integrating relationship when Divisia M3 is used and no co-integrating relationship when Divisia M1 and Divisia M2 are used. Table 26 gives the results for VECM with M3. The ECT terms for the equation GDP and M3 are significant. CPI Granger causes M3.Also GDP Granger causes interest rates. Table 27 gives the results for VECM when Divisia M3 is used. The ECT terms for the equation GDP and CPI are significant. The results show that Divisia M3 Granger causes CPI, GDP granger causes Divisia M3, interest rate Granger causes Divisia M3 and GDP Granger causes interest rates. The results from the Granger causality provides evidence that the Divisia index is better than the simple sum aggregates in predicting output, prices and interest rates for the Euro area.

POLAND: Table 7 gives the results of augmented Dickey Fuller test for the variables M1, M3, Divisia, GDP, CPI, inflation and interest rates. All variables except inflation have a unit root at level and are stationary at first difference. This indicates that all variables except inflation are integrated of order one, hence we can check for co-integrating relationships between them. For further analysis CPI is used. Table 13 gives the results for Johansen maximum Eigen value test for co-integration. There exists one co-integrating relationship each when M1, M3, DM1, DM2 and DM3 are used. Table 28 gives the results for VECM with M1. The ECT terms for the equation M1, GDP and interest rates are significant. However, the results show no evidence of Granger causality. Table 29 gives the results for VECM with M3. The ECT terms for the equation GDP, CPI and interest rates are significant. Also, GDP Granger causes interest rates and CPI Granger causes M3. Table 30 gives the results for VECM with DM1. The ECT terms for the equation GDP, DM1 and interest rates are significant. CPI Granger causes DM1.Table 31 gives the results for VECM with DM2. The ECT terms for the equation GDP and DM2 are significant. CPI Granger causes DM2.Table 32 gives the results for VECM with DM3. The ECT terms for the equation GDP and DM3 are significant. CPI Granger causes DM3.There exists a relationship between money, output and prices. The results for Granger causality are mixed when Divisia is used compared to the simple sum aggregates of Poland's economy.

5. Conclusion

The empirical results show that Divisia lays out a stronger and stable relationship with output, prices and interest rates as indicated by the results of the correlation; co-integration and vector error correction models. Similar tests using simple sum aggregates (M1 and M3) show weaker relationship compared to Divisia. The results show that most of the Divisia perform better or at least at par with simple sum aggregates by establishing a long term relationship with output, prices and interest rates.

Evidence from the Granger casualty tests suggest that money is useful in predicting nominal income and the price level when Divisia aggregates are used. In addition, the error correction terms in the VECM equations signify that the velocity of money has statistically significant predictive content for output and price. Hence, our results indicate that money especially Divisia money matters for the U.S, the UK, Poland, Israel, India, and the Euro Area.

Appendix

Note 1:

* implies that the test is significant at 10% level of significance.

** implies that the test is significant at 5% level of significance.

*** implies that the test is significant at 1% level of significance.

Table 1: Description of Time series variables

	US	UK	India	Poland	Israel	Euro Area
M1 and M3	1959:1-2018:1	1987:1-2018:1	1951:3-2018:1	1990:1-2018:1	1983:1-2018:1	1970:1-2018:1
Divisia	1967:1-2018:1	1977:1-2013:4	1993:2-2008:2	1996:4-2018:1	1989:1-2014:3	2001:1-2017:3
GDP	1960:1-2018:1	1960:1-2018:1	1996:2-2018:1	1995:1-2018:1	1995:1-2018:1	1995:1-2018:1
CPI	1955:1-2018:1	1955:1-2018:1	1957:1-2018:1	1989:1-2018:1	1970:1-2018:1	1990:1-2018:1
Inflation	1956:1-2017:4	1955:2-2018:1	1958:1-2018:1	1990:1-2018:1	1971:1-2018:1	1991:1-2018:1
Interest Rates	1953:3-2018:1	1978:1-2018:1	1968:1-2018:1	1989:4-2018:1	1992:4-2018:1	1994:1-2018:1

Table 2: Augmented Dickey Fuller Unit Root Test for US: Null Hypothesis: Variable has a unit root

US	Level	1st Difference	Level	1st Difference
	With Trend and Intercept		th Intercept	
M1	3.09	-5.30***	4.97	-3.97***
M3	4.41	-6.59***	7.57	-3.71***
Divisia M3	-0.44	-6.64***	3.96	-5.56***
Divisia M4	-1.02	-6.02***	3.01	-5.34***
GDP	-1.59	-7.24***	1.86	-6.99***
CPI	-3.72**	-12.67***	1.83	-12.03***
flation	-3.18*	-8.44***	-2.88***	8.44***
Interest Rates	**-2.71**	**-13.37*** **	**-2.15**	-13.36***

Table 3:Augmented Dickey Fuller Unit Root Test for UK: Null Hypothesis: Variable has a unit root

UK	Level	1st Difference	Level	1st Difference
	With Trend and Intercept		With Intercept	
M1	-0.7	-7.00***	3.33	-5.53***
M3	-1.72	-5.55***	1.11	-5.34***
Divisia	0.79	-3.79**	5.67	-2.33
GDP	-1.7	-7.07***	1.17	-6.97***
CPI	-3.37*	-6.18***	2.69	-5.86***
Inflation	-4.98***	-16.30***	-4.67***	-16.33***
Interest Rates	-3.84**	-8.02***	-1.1	-8.03***

Table 4: Augmented Dickey Fuller Unit Root Test for Israel: Null Hypothesis: Variable has a unit root

ISRAEL	Level	First Difference	Level	First Difference
	With Trend and Intercept		With Intercept	
M1	1.06	-3.35**	2.38	-2.24
M3	-0.65	-7.14***	4.6	-4.48***
Divisia	-0.16	-5.63***	3.28	-4.34***
GDP	-1.33	-5.00***	1.5	4.74***
CPI	-1.41	-6.56***	-0.01	-6.58***
Inflation	-3.81**	-5.92***	-3.39**	-5.94***
Interest Rates	-3.14*	-7.61***	-1.18	-7.65***

Table 5: Augmented Dickey Fuller Unit Root Test for India: Null Hypothesis: Variable has a unit root

IIndia	Level	First Difference	Level	First Difference
	With Trend and Intercept		With Intercept	
MM1	3.65	-14.58***	6.24	-11.87***
MM3	8.32	-1.51	8.47	0.16
DDM2	3.79	-5.60***	7.84	-3.00**
DDM3	5.86	-4.12***	10.32	-1.65
DDL1	5.71	-4.24***	10.44	-1.68
GGDP	0.02	6.05***	5.69	-3.42**
CCPI	2.7	-13.48***	7.32	-8.79***
Inflation	-6.39***		-6.41***	
Interest Rates	-1.77	-10.44***	-1.57	-10.24***

Table 6: Augmented Dickey Fuller Unit Root Test for Euro Area: Null Hypothesis: Variable has a unit root

EURO AREA	Level	1st Difference	Level	1st Difference
	With Trend and Intercept		With Intercept	
M1	2.75	-5.54***	5.52	-3.46**
M3	-1.14	-4.99***	2.68	-4.16***
M1 Divisia	0.4	-2.53	2.21	-1.84
M2 Divisia	-0.78	-2.65	1.32	-2.49
M3 Divisia	-1.22	-2.36	0.36	-2.36
GDP	-2.35	-4.07***	-1.14	-4.05***
CPI	-0.78	-5.99***	-2.66*	-5.69***
Inflation	-3.54**	-6.00***	-3.06**	-5.98***

Table 7: Augmented Dickey Fuller Unit Root Test for Poland: Null Hypothesis: Variable has a unit root

POLAND	Level	1st Difference	Level	1st Difference
	With Trend and Intercept		With Intercept	
M1	2	4.27***	4.64	-2.19
M3	0.38	-4.58***	3.71	-2.94**
Divisia 1	1.61	-5.22***	6.61	-3.40**
Divisia 2	1.69	-5.51***	6.48	-3.70***
Divisia 3	1.69	-5.50***	6.48	-3.69***
GDP	-0.86	-6.92***	1.47	-6.67***
CPI	-0.86	-7.51***	-4.55***	
Inflation	-40.49***		-36.29***	
Interest Rates	-6.55***		-2.87*	-27.95***

Table 8: Johansen maximum eigenvalue test for cointegrating relationship in US

US	M1		M3		Divisa M3		Divisia M4	
H0	Statistic	C.V at 5%	Statistic	C.V at 5%	Statistic	C.V at 5%	Statistic	C.V at 5 %
r ≤3	0.46	8.18	0.04	8.18	1.44	8.18	1.31	8.18
r≤2	13.29	14.90	13.19	14.90	11.57	14.90	9.98	14.90
r≤1	15.96	21.07	19.76	21.07	13.35	21.07	16.97	21.07
r=0	27.98	27.14	28.81	27.14	31.14	27.14	28.42	27.14

Table 9:Johansen maximum eigenvalue test for cointegrating relationship in UK

UK	M1		M3		Divisia	
H0	Statistic	C.V at 5%	Statistic	C.V at 5 %	Statistic	C.V at 5 %
r ≤3	0.46	8.18	0.02	8.18	0.53	8.18
r≤2	8.08	14.90	10.79	14.90	5.24	14.90
r≤1	15.56	21.07	17.73	21.07	14.92	21.07
r=0	32.07	27.14	27.00	27.14	33.78	27.14

Table 10:Johansen maximum eigenvalue test for cointegrating relationship in Israel

ISRAEL	M1		M3		Divisia	
H0	Statistic	C.V at 5%	Statistic	C.V at 5 %	Statistic	C.V at 5 %
r ≤3	4.04	8.18	5.16	8.18	1.28	8.18
r≤2	11.87	14.90	11.21	14.90	16.80	14.90
r≤1	16.56	21.07	14.11	21.07	20.90	21.07
r=0	25.06	27.14	26.73	27.14	29.70	27.14

Table 11:Johansen maximum eigenvalue test for cointegrating relationship in India

INDIA	M1		M3		Divisia M2		Divisia M3		DL1	
H0	Statistic	C.V at 5%	Statistic	C.V at 5%	Statistic	C.V at 5%	Statistic	C.V at 5%	Statistic	C.V at 5%
r ≤ 3	3.68	8.18	0.46	8.18	1.6	8.18	2.09	8.18	2.98	8.18
r ≤ 2	11.1	14.9	8.36	14.9	17.34	14.9	15.04	14.9	14.61	14.9
r ≤ 1	26.3	21.07	18.23	21.07	30.54	21.07	27.63	21.07	26.71	21.07
r = 0	44.14	27.14	34.17	27.14	52.14	27.14	46.57	27.14	47.46	27.14

Table 12:Johansen maximum eigenvalue test for cointegrating relationship in Euro Area

EUR_{O} AREA	M1		M3		Divisia M1		DivisiaM2		DivisiaM3	
H0	Statistic	C.V at 5%	Statistic	C.V at 5 %	Statistic	C.V at 5 %	Statistic	C.V at 5 %	Statistic	C.V at 5 %
r ≤3	3.10	8.18	0.45	8.18	4.00	8.18	0.04	8.18	0.58	8.18
r≤2	6.90	14.90	10.18	14.90	12.51	14.90	11.23	14.90	10.73	14.90
r≤1	12.81	21.07	20.75	21.07	14.03	21.07	20.64	21.07	21.75	21.07
r=0	17.05	27.14	40.53	27.14	19.23	27.14	22.86	27.14	31.29	27.14

Table 13:Johansen maximum eigenvalue test for cointegrating relationship in Poland

POLAND	M1		M3		Divisia M1		DivisiaM2		DivisiaM3	
H0	Statistic	C.V at 5%	Statistic	C.V at 5 %	Statistic	C.V at 5 %	Statistic	C.V at 5 %	Statistic	C.V at 5 %
r ≤3	2.36	8.18	1.85	8.18	1.24	8.18	0.94	8.18	0.95	8.18
r≤2	10.30	14.90	12.35	14.90	10.89	14.90	11.91	14.90	11.94	14.90
r≤1	14.68	21.07	15.84	21.07	13.74	21.07	14.28	21.07	14.62	21.07
r=0	31.33	27.14	51.34	27.14	32.18	27.14	41.78	27.14	41.31	27.14

Table 14: VECM results for US using M1 as a measure of money

VECM US M1	ECT	Intercept	GDP-1	M1-1	Inflation-1	Interest rate-1
GDP	-0.0034***	78989.66***	0.2923***	-8284.4937	-10188.77	8586.5414*
M1	-5.3e-08***	0.8765***	-1.4e-06	0.606***	0.1264	-0.0579
Inflation	-1.4e-08	0.128	4.1e-07	-0.528	0.3167***	0.166***
Interest rate	-1.5e-08	-0.0227	2.4e-06	-0.0438	-0.0921	-0.134

Table 15: VECM results for US using M3 as a measure of money

VECM US M3	ECT	Intercept	GDP-1	M3-1	Inflation-1	Interest rate-1
GDP	0.0005*	31086.8619***	0.3541***	-1817.43	-10321.68	6717.0655
M3	1.6e-08***	0.0806	-1.2e-06**	0.4457***	0.0355	-0.0295
Inflation	4.7e-09	-0.043	5.3e-07	-0.1526	0.3059***	0.1573***
Interest rate	-7.1e-09	-0.1271	3.3e-06	0.1217	-0.0896	-0.146*

Table 16:VECM results for US using Divisia M3 as a measure of money

VECM US Divisia M3	ECT	Intercept	GDP-1	Divisia M3-1	Inflation-1	Interest rate-1
GDP	-0.006*	78706.85**	0.3516***	1776.99**	-7532.9646	6132.65
Divisia M3	8.2e-07**	-3.8452	1.7e-05*	0.4144***	-1.0783	-0.7611*
Inflation	-1.18e-07***	0.8051**	5.9e-07	0.0018	0.3629***	0.1392***
Interest rate	3.1e-08	-0.416	3.0e-06*	-0.006	-0.1093	-0.1406

Table 17:VECM results for US using Divisia M4 as a measure of money

VECM US divM4	ECT	Intercept	GDP-1	Divisia M4-1	Inflation-1	Interest rate-1
GDP	0.0167***	-1102.30	0.2408**	-1013.8	-8887.85	7801.65*
Divisia M4	9.4e-07*	-0.6249	1.1e-05	0.5216***	0.6218	-0.7691
Inflation	8.9e-08*	-0.2114	3.2e-08	-0.0141*	0.3126***	0.1613***
Interest rate	-6.1e-08	-0.0053	3.4e-06*	-0.0023	0.1121	-0.1504*

Table 18: VECM results for UK using M1 as a measure of money

VECM UK M1	ECT	Intercept	GDP-1	M1-1	CPI-1	Interest rate-1
GDP	-0.0034	14080.6165*	0.5692***	1333.62	-3290.4125*	3876.69***
M1	1.1e-06***	-2.6463***	1.2e-05	0.2371*	-0.1258	-0.2102
CPI	2.8e-07**	-0.956**	3.6e-08	-0.0060	0.1755*	0.0508
Interest rate	-1.9e-07	0.3619	1.6e-05**	0.0328	0.0883	0.2074*

Table19: :VECM results for UK using Divisia as a measure of money

VECM UK Divisia	ECT	Intercept	GDP-1	Divisia-1	CPI-1	Interest rate-1
GDP	0.0021*	9253.72**	0.5521***	188.7475	-3575.68*	4081.5**
Divisia	-4.8-06***	-4.1134	9.0e-06	0.122	-3.7828*	1.1183
CPI	-2.1e-07***	-0.6743***	6.3e-06	-0.0116*	0.1659	0.0322
Interest rate	1.4e-07	0.1342	1.4e-05*	0.0124	0.0699	0.2208

Table20: VECM results for Israel using Divisia as a measure of money

VECM ISRAEL divisia	ECT	Intercept	GDP-1	Divisia-1	CPI-1	Interest rate-1
GDP	-0.0206	4266.18	0.3559**	5.47	-549.71*	160.91
Divisia	0.0026***	-348.47***	-0.0042	0.2678*	12.23*	-11.2203*
CPI	-8.9e-06	1.493	5.5e-05	-0.0021	0.5510*	-0.4538***
Interest rate	1.1e-05	-2.022	7.1e-05	-0.0041	0.4705**	-0.1629

Table 21: VECM results for India using M1 as a measure of money

VECM INDIA M1	ECT	Intercept	GDP-1	M1-1	Inflation-1	Interest rate-1
GDP	0.0081	24092.35	0..3062**	2113.51	4703.07	-376.13
M1	2.0e-05***	-43.42***	6.0e-06	0.4964***	0.1680	-0.6616
Inflation	1.1e-06	-1.79	5.0e-06	0.0881	0.1516	0.2691
Interest rate	-1.5e-07	0.136	1.1e-06	-0.008	0.0352	-0.3028**

Table 22: VECM results for India using M3 as a measure of money

VECM INDIA M3	ECT	Intercept	GDP-1	M3-1	Inflation-1	Interest rate-1
GDP	0.0474	-136120.38	-0.0022	5610.21	-605.7112	-4717.2439
M3	3.4e-06***	-11.2553***	-2.0e-06	-0.0609	0.1063	-0.1285
Inflation	-1.0e-07	0.8170	3.4e-06	0.2545	0.1062	0.2874
Interest rate	-5.7e-08	-0.0450	3.1e-07	0.0573	0.0173	-3081**

Table 23:VECM results for India using DivisiaM2 as a measure of money

VECM INDIA divM2	ECT	Intercept	GDP-1	DM2-1	CPI	Interest rate-1
GDP	0.1029**	114696.69***	-0.2069	-389.75	8717.42	-6060.0008
CPI	1.3e-06	1.6508*	-3.5e-06	-0.0037	0.0757	-0.2498
DM2	3.4e-05**	32.1224**	0.0002**	-0.6014***	0.0213	1.6850
Interest rate	7.4e-07	0.1958	-1.4e-09	-0.0025	0.0668	-0.4931***

Table 24:VECM results for India using Divisia M3 as a measure of money

VECM INDIA divM3	ECT	Intercept	GDP-1	CPI-1	DM3-1	Interest rate-1
GDP	0.0568**	-95787.92*	-0.2077	5581.87	-619.2367	-10166.047
CPI	1.9e-07	0.0197	-2.3e-07	0.0978	0.0079	-0.2855
DM3	2.8e-05***	-55.5954***	0.0001**	-2.2919	-0.7634***	0.1612
Interest rate	1.8e-07	-0.8435	1.5e-06	0.0665	0.0005	-0.5126***

Table 25:VECM results for India using DivisiaL1 as a measure of money

VECM INDIA divl1	ECT	Intercept	GDP-1	CPI-1	DL1-1	Interest rate-1
GDP	0.0638**	-76243.16*	-0.2130	5970.74	-608.46	-9738.47
CPI	2.5e-07	0.0238	-4.8e-07	0.096	0.0072	-0.28
DL1	3.1e-05***	-44.2574***	0.0001**	-2.1453	-0.7595***	0.50
Interest rate	2.4e-07	-0.8356	1.3e-06	0.0651	1.7e-05	-0.5126***

Table 26: VECM results for euro area using M3 as a measure of money

VECM EURO M3	ECT	Intercept	GDP-1	M3-1	CPI-1	Interest rate-1
GDP	-0.1243*	1444465.61*	0.6164***	7555.2196	-5677.311	58674.0151
M3	2.0e-06***	-22.0612***	-9.9e-07	0.4344***	-0.4646***	0.2863
CPI	6.5e-07	-6.8334	3.1e-07	-0.0396	-0.5189***	0.1332
Interest rate	-3.9e-08	0.3309	2.3e-06**	-0.0324	0.3553	0.1189

Table 27: VECM results for Euro area using Divisia M3 as a measure of money

VECM EURO Divisia M3	ECT	Intercept	GDP-1	CPI-1	DM3-1	Interest rate-1
GDP	-0.1987**	2270615	0.5517***	-630.4699	-1893.247	63121.818
CPI	1.7e-06**	-17.9290**	1.9e-06	-0.6131***	-0.1825*	-0.2427
Divisia M3	-3.0e-07	4.4132	-5.3e-06*	0.0240	0.6909***	1.6386**
Interest rate	3.0e-07	-3.4155	2.6e-06**	0.0005	-0.0476	0.0079

Table 28:VECM results for Poland using M1 as a measure of money

VECM POLAND M1	ECT	Intercept	GDP-1	M1-1	CPI-1	Interest rate-1
GDP	-0.0318***	5397.86***	-0.2418*	-436.26	1368.92	612.104
M1	-2.1e-06**	8.3392**	-2.2e-05	0.5374***	-0.3181	-0.104
CPI	1.8e-07	-0.0213	1.9e-05	-0.092	0.2603*	0.0881
Interest rate	-1.3e-06**	3.8665*	2.1e-05	-0.0594	0.2368*	0.4805***

Table 29:VECM results for Poland using M3 as a measure of money

VECM POLAND M3	ECT	Intercept	GDP-1	CPI-1	Interest rate-1	M3-1
GDP	-0.0988**	61170.31***	-01049	1175.7708	1388.8442	78.2863
CPI	1.2e-05**	-5.7881**	1.3e-05	0.1513	0.0142	-0.0508
Interest rate	-1.1e-05**	5.4117**	3.0e-05*	0.2767*	0.5473***	0.0433
M3	4.4e-06	-1.3798	-1.3e-05	-0.2914*	0.1472	0.6291***

Table 30:VECM results for Poland using DivisiaM1 as a measure of money

VECM POLAND DM1	ECT	Intercept	GDP-1	CPI-1	DM1-1	Interest rate-1
GDP	0.0098***	30350.8949***	-0.2204*	997.503	-13.2005	401.697
CPI	-2.7e-07	-0.1558	1.7e-05	0.2912**	-0.0076	0.0783
DM1	3.6e-05***	108.3428***	-4.8e-05	-7.5841***	-0.5449***	-0.5067
Interest rate	8.6e-07*	1.5993	2.3e-05	0.2015	-0.0038	0.4603***

Table 31: VECM results for Poland using DivisiaM2 as a measure of money

VECM POLAND DM2	ECT	Intercept	GDP-1	CPI-1	Interest rate-1	DM2-1
GDP	0.0500*	9136.097***	-0.1908	-12.6319	389.007	27.7824
CPI	1.2e-06	0.5018*	1.1e-05	0.3529***	0.0525	-0.0103
Interest rate	4.1e-06	-0.2693	2.6e-05	0.1124	0.4625***	-0.0008
DM2	0.0002***	29.5732***	-0.0002	-6.9614***	0.1811	-0.5371***

Table 32: VECM results for Poland using DivisiaM3 as a measure of money

VECM POLAND DM3	ECT	Intercept	GDP-1	CPI-1	Interest rate-1	DM3-1
GDP	0.0508*	10048.607***	-0.1947	32.4668	374.4428	23.7490
CPI	1.0e-06	0.5089*	1.1e-05	0.3524	0.0548	-0.0102
Interest rate	4.2e-06	-0.1931	2.6e-05	0.1166	0.4610***	-0.0011
DM3	0.0002***	32.7099***	-0.0002	-6.7133***	0.2128	-0.5385***

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A Quantitative Analysis of Factors that contribute to Non-Managerial Employees' Productivity in the Apparel Industry of Sri Lanka

Apeksha Embuldeniya[1], L.W.Dasanayake[2]

Abstract

Productivity is an assessment of the efficiency of a worker and productivity of the organization depends on the productivity of the single employee. The management faces a complex situation in maintaining the satisfaction of the employees as they are the most valuable asset to an organization in today's business context. The primary objective of this study is to identify the determinants that contribute to enhance employee productivity in the apparel industry in Sri Lanka. The research model comprises eighteen factors that are grouped into three categories as compensation practices, training and development practices, and health and safety practices. This study is based upon primary data from 150 non-managerial employees in the apparel industry in Sri Lanka based on stratified random sampling plan where questionnaire is the main source of information. The dependent variable of this study is employees' productivity of non-managerial employees that is measured using the level of individual productivity, while the independent variables are the factors that are measured by practices pertaining to compensation, training and development, and health and safety. Data analysis are based on descriptive statistics, Chi-square test, and Logistic Regression analysis. The selection of the sample from one apparel industry is limitation of the research. Findings indicate that there is a positive correlation between above practices towards employee productivity in the apparel industry.

Key words: Compensation practices, Employee Productivity, Health and Safety practices, Non-managerial employees, Training and Development practices

[1] Lecturer (Probationary), Department of Social Statistics, University of Kelaniya
[2] Senior Lecturer, Department of Economics, University of Kelaniya

Corresponding Author
Apeksha Embuldeniya, Lecturer (Probationary), Department of Social Statistics, University of Kelaniya
E-mail: apekshae@kln.ac.lk

1. Introduction

An organization must have a clear vision and also well specified mission in order to be an effective and efficient organization while being successful. An organization should have a statement of a philosophy as well as a list of programs and goals that focuses on the skills and talents of its employees that can lead to the success of the organization.

The success of an organization is dependent on its workers- both employers and employees, or in other words, the managerial and non-managerial employees. Therefore, the motivation, engagement and willingness of the employees in an organization towards the key result areas of an organization will lead to the excellence in productivity which leads by the excellence in the productivity of the employees. If the employees or the labour force, are not committed to work or are not focused on enhancing the productivity of the organization, then the organization will face the failure of an unsuccessful effort. Therefore, employees are the most valuable and for any organization which can make the impossible possible, while making inanimate and lifeless things transform into animated and spirited things. For an organization to be a successful organization, it should have clear goals which are in line with its mission. For this purpose, an organization needs to develop an unique plan and to remain in line with its own mission and goals, never letting external factors to shift the goals of the organization and communicate work progress often to keep all the employees on the track to success. Furthermore, in an organization, jobs are generally organized into teams, groups, units, departments and divisions. However, each unit consists of employees, hence the individual employee productivity should be taken into consideration because individual employee productivity is a deciding factor of the entire organization's productivity.

The apparel industry which is focused in this research is highly employee-oriented, and its success or failure will be decided by the productivity of employees, either individually or as a team. The present research is carried out to identify the factors that contribute to the productivity of non-managerial employees in apparel industry. The general objective of the study is to suggest some systematic ways to the management in order to enhance employee productivity while also addressing the significance of the factors pertaining to compensation practices, health and safety practices and training and development practices.

1.1 Research Problem

There is a huge opportunity in enhancing Sri Lankan apparels exports by reaching their expected level of production while reducing the unexpected wastages in their companies and increasing the level of employee productivity.

Therefore, the research problem is as follows: what are the factors that contribute to the productivity of non-managerial employees in apparel industry?.

1.2 Research Questions

According to this research following research questions are to be addressed:

1. What is the level of employee productivity and is the employee productivity at the expected level?
2. Does employee compensation practices have impact on employee productivity?
3. Does health and safety practices have impact on employee productivity?
4. Does employee training and development practices have impact on employee productivity?

2. Literature Review

Productivity is a term that is used in management. The term production and productivity are often used interchangeably. However, there is a significant difference between these two. Production can be considered as the total quantity of goods and services produced by utilizing different resources. Productivity is the amount of output that is produced per unit of input, usually expressed in terms of output per unit of time. These two concepts seem to be similar but are two different concepts that are not replaceable by each other. Finally, it gives the finished products or services which are called production.

Productivity is a standard measure often used to assess organizational performance. Culnan and Bair (1983) stated that productivity can be delineated in many ways. Productivity is generally defined as increased value over time (Phipps and Nelinguri, 2013). According to Culnan and Bair (1983) productivity has been defined in terms of output, sales, profitability, work quality, and process completed on schedule. As Kyoung, Wilson and Myung (2004) stated, another major organizational productivity indicator is absenteeism. However, the measurement of productivity varies based on what is important to the organization. Workforce productivity has become a critical

factor in the strength and sustainability of a company's overall business performance (Cheryl 2002). Also Cherly indicated that absenteeism affects productivity, even when employees are physically present at their jobs, they may experience decreased presenteeism.

The ratio used to calculate labour productivity provides a measure of the efficiency with which inputs are used in an economy to produce goods and services; it can be measured in various ways. Employee/ Labour productivity is equal to the ratio between a volume measure of output and a measure of input use (Freeman, 2008).

Employee Productivity is multi-faceted in nature and consists of dimensions such as hours of work, hours paid, labour inputs and labour wastage. Harshauer (1974) suggests other dimensions for employee productivity including the task capability, individual capability and individual effort.

In reference to the above mentioned research, a number of working hours during a day, number of days worked during last month, number of Scrap units, completed number of units, number of absent days, number of occasions failed to adhere to rules and number of days of late attendance are used as the dimensions in this study.

Importance of Employee Productivity

According to Nawan and Shafi (2011), employee productivity is the major dynamic in shaping the success or downfall of any organization, highlighting why organizations are continuously striving to enhance the productivity of their employees. This underscores the value of an individual employee to the organization, or in other words, points to how the employee can help the organization achieve its targets. Therefore, Phipps and Nelinguri (2013) stated that employee involvement has an impact on organizational productivity, which is a form of organizational performance. According to Phipps and Nelinguri (2013), have discussed the link between involvement and commitment as firms that invested in high involvement work practices and processes had better economic performance including higher productivity in conditions of low labour turnover. The moral according to them is that work practices that encourage employee involvement can potentially interact with organizational commitment as well as impact organizational productivity. Therefore, companies should get the commitment of the employees to enhance the organizational productivity. People expect valuables to convey their effort

towards any work related activity. Therefore, employers should identify the factors that determine their employee productivity which leads to the organizational productivity as a whole. According to Derek (1987), worker participation in decision making has either no effect or sometimes a positive effect on productivity. Therefore, employee involvement in important activities such as decision making can impact employee productivity. Employees should not just get involved in decision making and accept every policy and procedure that managers have proposed, but employees should be actively involved in decision-making to get the right decision at the right time. For an employee to be actively involved in these activities, he should have adequate motivation to make the correct decision. Therefore, managers should clearly identify which factors can enhance employee productivity and their involvement in crucial activities in an organization. According to Nanda and Browne (1977) productivity does not mean working labour longer or harder but rather improving the organization and management of human resources.

Factors that affect employee productivity

As stated earlier employee is the most valuable asset to the organization through whom all inanimate things can be turned into animate. Similarly, the organization consist of employees as a whole. Therefore, employees are the main driving force of the organization to the success. For an organization to succeed, they need to be considerate about their employees in order to gain their maximum capacity towards the enhanced productivity of the organization. Productivity of the organization depends on the productivity of the single employee. However, it cannot be said that defining and/ or measuring productivity constitutes an end in itself. Therefore, the organization needs to identify the factors that could boost the productivity of the employees while motivating them. The organization should consider the requirement of the employees at their point of view towards their individual goals and career goals. Thereby managements' focus should be on the compensation packages of the employee and whether it is reasonable to the employee to carry-on their day-to-day life, health and safety practices as well as transport water, training and development opportunities as education and research and development.

Compensation practices

Employee Compensation refers to all forms of pay or rewards going to employees and those that arise from their employment (Dessler, 2006). The

term compensation refers to all forms of financial returns and tangible benefits that employees receive as part of an employment relationship (Bernadin, 2007). Compensation may be defined as money or remuneration received by the employee for the performance of work in addition to the various benefits provided to him by the organization (Mankidy, 2006).

Health and Safety practices

Health and safety are two terms that are closely related but these terms have two different meanings. However, the terms are used together where the application of these terms emerge together. The Dictionary of Human Resources and Personnel Management (2003) has defined the terms 'Health and Safety' as the area of policy and the law that deal with the well-being of employees at work and are intended to protect them against accidents and risks to their health. According to the International Labour Organization and World Health Organization (1950), occupational health and safety is protecting and maintaining the highest level of physical, mental and social well-being of workers in all occupations. In order to adapt to the capabilities and requirements of the job to be done employees may be affected by the hazards. Miller (1996) has stated that employee health and safety is the effect of work on employees and the effect of employees on their work. Therefore, there is a greater requirement for an organization to help employees adapt to their jobs effectively and efficiently in order to avoid risk of hazards, sickness and diseases at the workplace (Quartey and Puplampu, 2012). Armstrong (2005) concluded that occupational health programmes deal with the prevention of ill health arising from working conditions. It consists of two elements as occupational medicine and occupational hygiene. Parallel programmes for safety deal with, prevention of accidents and minimizing the resulting loss and damage to person and property.

Training and Development practices

Training is the process of assisting a person to enhance his efficiency and effectiveness at work by improving and updating his professional knowledge by developing skills relevant to his work and cultivating appropriate behavior and attitude towards work and people (Dubey, 1997).

Similarly, Nadler (1984) stated that training is for any type of learning, related to the present job. The Management Blog (2010) has defined Training as the act of increasing the knowledge and skill of an employee for doing a particular

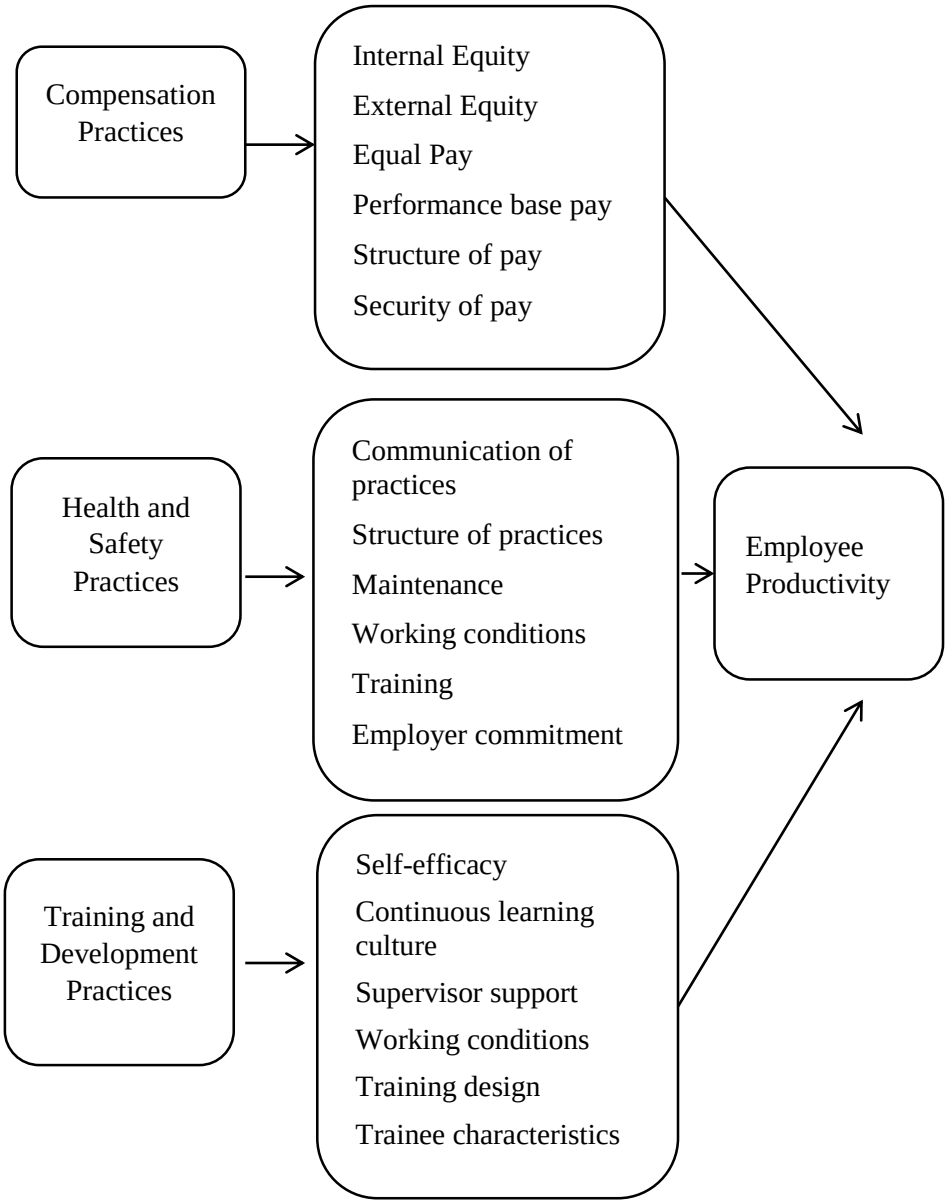
job. According to Lynton and Pareek (1967), training aims at a lasting improvement "on the job". With reference to Mathis and Jackson (2003), training is a process through which people acquire capabilities to aid in the achievement of organizational goals. Simply, Training emphasizes immediate improvements in job performance via gaining of specific knowledge, skills and attitudes.

3. Methodology

The methodology consists of the methods used in designing, sampling, collecting, measuring, analyzing, and presenting the data relevant to this research study. Prior to the designing of the study, the purpose of the study should be clearly identified. Accordingly, this research is carried out to identify the factors that contribute to the productivity of non-managerial employees in the apparel industry and the impact of compensation practices, health and safety practices (H and S) and training and development (T and D) practices on employee productivity in the apparel industry in Sri Lanka. Similarly, considering the type of the study, it can be identified that the study is a correlation rather than a casual study where the researcher formulates correlations between each independent variable and dependent variable. In this research, eighteen (18) hypotheses have been formulated for testing which are grouped into three categories. The study is done as a field study and it examines the relationship between compensation practices, health and safety practices, training and development practices and employee productivity in the natural work environment of the garment industry in Sri Lanka. The independent variables are measured by using instruments with five point likert scale while the dependent variable is measured as a dichotomous variable. The study examines the relationship between the above mentioned variables from the perspective of the apparel industry non-managerial employees who are working in the apparel industry of Sri Lanka. Therefore, the unit of analysis was at individual level, the non-managerial employees. This study continues with the hand delivered questionnaire to collect data. The target population of this study consists of non-managerial employees working in the garment factory of the apparel industry in the Colombo district of Western Province, Sri Lanka. The researcher has selected a company at ease to collect data where 520 employees are working and only 500 employees are entitled for the survey due to the working experience of more than six months with the relevant company. The study selected 150 employees through the stratified random

sampling technique. Descriptive analysis, Correlation and chi-square analysis, and logistic regression analysis were used to analyze data. The Statistical Package for Social Sciences (SPSS) version 19 and Microsoft Excel computer packages were used as tools to analyze data.

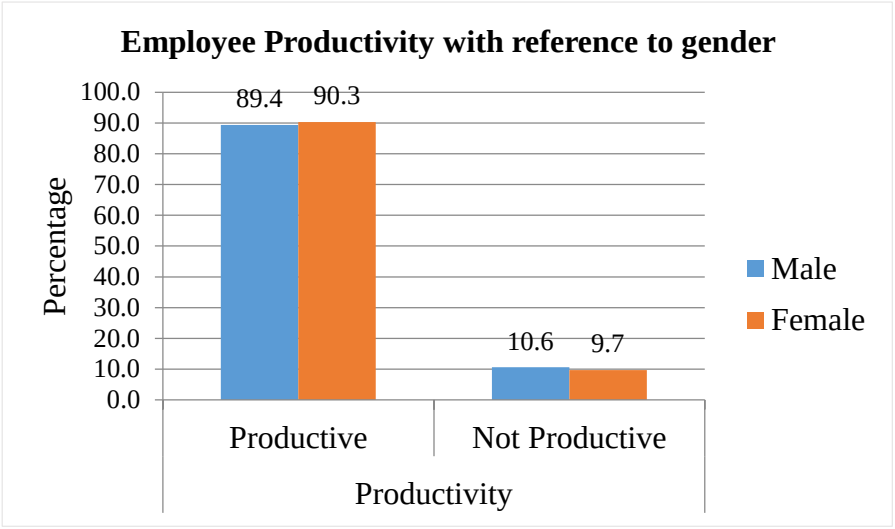
Conceptual Framework



4. Data Analysis and Presentation

The gender composition of respondents with reference to the employee productivity is as follows.

Figure 1: Employee productivity with reference to gender



Source: Sample Survey (2015)

According to table 1, with reference to the calculated values of reliability test, the independent variable- maintenance included in Health and Safety practices contains a 0.585 value which is less than 0.7. Therefore, this independent variable is not suitable for the model and should be neglected from the rest of the analysis. Similarly, the independent variable titled 'continuous learning culture' also contains reliability values as 0.589 and is neglected from the model.

With reference to the above table 1, the independent variables that contain values more than 0.5 have been identified as highly influencing factors. Moreover, the variables that have values less than 0.5 have been identified as moderately influencing factors. Or in other words worrisomely strong variables that says either an extremely good relationship or the two variables are measuring the same concept. The variables that contain values more than 0.35 are known as very strong and are interpreted as extremely desirable. Thereby, this study considered the factors that haven't been rejected by either the reliability test or the Cramer's V rule.

Table 1: Test for independency with Cramer's V rule.

DV	Category	Independent Variable	Cronbach's Alpha Value	Cramer's V value	Strength of the relationship
Employee Productivity	Compensation Practices	Internal Equity	0.879	0.505	Redundant
		External equity	0.829	0.443	Worrisomely Strong
		Equal pay	0.818	0.473	Worrisomely Strong
		Performance based pay	0.837	0.511	Redundant
		Structure of pay	0.793	0.508	Redundant
		Security of pay	0.843	0.449	Worrisomely Strong
	Health and Safety Practices	Communication of practices	0.808	0.462	Worrisomely Strong
		Structure of practices	0.792	0.449	Worrisomely Strong
		Maintenance	0.585	0.371	Very Strong
		Working conditions for H and S	0.735	0.455	Worrisomely Strong
		Training on H and S	0.796	0.427	Worrisomely Strong
		Employer commitment	0.814	0.502	Redundant
	Training and Development	Self-efficacy	0.784	0.475	Worrisomely Strong
		Continuous learning culture	0.589	0.393	Very Strong
		Supervisor support	0.851	0.447	Worrisomely Strong
		Working conditions for T and D	0.786	0.566	Redundant
		Training design	0.693	0.592	Redundant
		Trainee characteristics	0.786	0.426	Worrisomely Strong

Source: Author Calculations

Factor Analysis

A principal component analysis (PCA) was conducted on 18 variables with orthogonal rotation (Varimax).

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.964
Bartlett's Test of Sphericity	Approx. Chi-Square	2164.408
	df	153
	Sig.	.000

The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = 0.964 which is superb adequacy (Field, 2009). Bartlet's test of sphericity $\chi^2 = (153) = 2164.408$, $p < 0.001$, indicated that correlations between items were sufficiently large for the Principal Component Analysis (df = 153).

An initial analysis was run to obtain eigenvalues for each component in the data and only one component had eigenvalues over Kaiser's criterion of 1 and it explained 61.76 percent of the variance Each item entered for the factor analysis had loaded to the component matrix indicating that all the factors should be included in the model. Therefore, none of the factors reduced by this analysis and then performed the logistic regression in order to construct multiple regression model to the variables (The variables, Maintenance and Continuous learning culture were excluded from the model with reference to the reliability test identified that there were no dependency towards employee productivity).

The hypotheses designed are tested in the analysis. The hypotheses were tested by chi-square test. Further, spearman's correlation coefficient was calculated to verify the findings since they are qualitative data.

Table 3: Hypotheses test

DV	Category	Independent Variable	Sig. Value (Chi-square)	R value (Spearman)
Employee Productivity	Compensation Practices	Internal Equity	0.000	0.728
		External equity	0.000	0.663
		Equal pay	0.000	0.693
		Performance based pay	0.000	0.680
		Structure of pay	0.000	0.715
		Security of pay	0.000	0.654
	Health and Safety Practices	Communication of practices	0.000	0.684
		Structure of practices	0.000	0.601
		Maintenance	0.000	0.384
		Working conditions for H and S	0.000	0.680
		Training on H and S	0.000	0.678
		Employer commitment	0.000	0.601
	Training and Development Practices	Self-efficacy	0.000	0.661
		Continuous learning culture	0.000	0.633
		Supervisor support	0.000	0.659
		Working conditions for T and D	0.000	0.694
		Training design	0.000	0.614
		Trainee characteristics	0.000	0.584

Source: Author Calculations

Determining Employee Productivity

According to the study there were 135 employees who were productive and only 15 employees were not productive. Therefore, if the study predicts that every employee was productive then this prediction will be correct 135 out of 150 (i.e. 90 percent). However, if the study predicted that every employee was not productive, then this prediction would be correct only 15 out of 150 (i.e.10 percent). Also, the study predicted that all employees are productive, which results in 0 percent accuracy for the employees who were not productive, and 100 percent of accuracy for those observed to be productive. Overall model correctly classifies 90 percent of employees.

Table 4: Step 0 - Initial Model

The model predicts that all of the employees who were productive are those who are entitled to practices identified as independent variables. There were

Classification Table[a,b]

Observed			Predicted		
			ProductivityBi		Percentage Correct
			Not Productive	Productive	
Step 0	Productivity Bi	Not Productive	0	15	.0
		Productive	0	135	100.0
	Overall Percentage				90.0

a. Constant is included in the model.
b. The cut value is .500

141 employees were productive but only 134 (i.e. 95 percent) employees were correctly predicted and 7 out of 141 (i.e. 5 percent) employees were misclassified as those who were not productive. It has resulted in a 99.3 percent accuracy in the output. This model predicts that all of the 9 employees who was not productive was predicted as not productive. However, both classifications are at the acceptable level due to being above the cut point (0.5) Therefore, overall 94.7 percent has correctly classified.

Table 5: Step 1 – with other independent variables

Classification Table[a]

Observed			Predicted		
			ProductivityBi		Percentage Correct
			Not Productive	Productive	
Step 1	Productivity Bi	Not Productive	8	7	53.3
		Productive	1	134	99.3
	Overall Percentage				94.7

a. The cut value is .500

Goodness of fit- Log likelihood statistic (-2LL)

The Iteration History concludes that the log-likelihood of the baseline model is 97.525 which represents the fit of the most basic model to the data. The overall fit of the new model is assessed using the log-likelihood statistic while the value is multiplied by -2 and sometimes referred to as -2LL. At this stage of analysis the value of -2LL should be less than the value when only the constant was included in the model. When only the constant was included -2LL is equal to 97.525 and in the step one -2LL became 46.531. This reduction tells that the model is better at predicting whether an employee was productive than it was before the practices were added.

Table 6: Iteration History

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	1	103.170	1.600
	2	97.696	2.086
	3	97.525	2.193
	4	97.525	2.197
	5	97.525	2.197

a. Constant is included in the model.
b. Initial -2 Log Likelihood: 97.525
c. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Goodness of fit - Model Chi-square statistic

Omnibus tests of model coefficients show the value of log-likelihood of new model subtracted by log-likelihood of the baseline model (97.525 – 46.531 = 50.994). This value has a chi-square distribution and the value is significant at a 0.01 level and overall the model is predicting whether an employee is productive or not productive significantly better than it was with only the constant. This indicates the additional ability of the model in increasing goodness of fit to the model by 50.994 with include of predictor variables in to the model.

Table 7: Goodness of fit

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	50.994	10	.000
	Block	50.994	10	.000
	Model	50.994	10	.000

Hosmer and Lemeshow's measure (R^2)

This measure is calculated by dividing the model chi-square by the original -2LL. The significant value of the Hosmer and Lemeshow measure should be greater than 0.5 for being better in goodness of fit and this model fulfills the requirement by being the significant value, 0.666.

Table 8: Hosmer and Lemeshow's measure (R^2)

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	.186	1	.666

Cox and Snell's measure and Nagelkerte's adjusted value

In the output there are two measures for R^2 as Cox and Snell's measure and Nagelkerte's adjusted value. These values differ from each other but they can be used as effective size measures for the model. This study shows 0.288 in Cox and Snell's measure which indicates 28.8 percent variance of the dependent variable which is explained by the model and 0.603 in Nagelkerte's adjusted value which indicated 60.3 percent variance of the dependent variable explained by the model.

Table 9: Cox and Snell's measure and Nagelkertr's adjusted value

Model Summary

Step	-2 Log likelihood	Cox and Snell R Square	Nagelkerke R Square
1	46.531[a]	.288	.603

a. Estimation terminated at iteration number 20 because maximum iterations has been reached. Final solution cannot be found.

The model consists of values in the table labeled as variables in the equation. According to the table there were 10 variables as predictors. Therefore, the developed model to measure the factors that contribute to the productivity of non-managerial employees is as follow.

Table 10: Variable in the equation

	B (SE)	Odds Ratio	Sig	95% Confidence Interval for odds ratio	
				Lower	Upper
Constant	-0.6158		0.000		
External Equity	1.9147	3.884	0.009	1.245	61.694
Security of Pay	2.4997	13.629	0.006	2.091	88.854
Employer Commitment	0.8844	2.356	0.007	1.312	17.810
Trainee Characteristics	1.1029	2.672	0.009	1.297	24.068
Internal Equity	77133.85	3.884	1.000	0.000	
Equal Pay	-1719203.8	0.000	1.000	0.000	
Performance pay	808360.85	5.424	1.000	0.000	
Structure of pay	773915.48	2.302	1.000	0.000	
Training Design	773916.6	2.302	1.000	0.000	

According to the model, the constant (b_0) shows the base of the variables and the model stated that when the employee is entitled for external equity of compensation practices, the odds of the employee being productive will be increased by 3.884. If the employee is entitled for security of pay towards compensation practices, the odds of the employee being productive will be increased in 13.629 and similarly when the employee is having employer commitment on health and safety practices, the odds of an employee being productive will be increased by 2.356. At the same time, when the trainee has his/ her own characteristics towards training and development practices, the odds of employee being productive will be increased by 2.672.

5. Conclusion

The study consists of eighteen (18) independent variables under three (3) main categories that are identified as compensation practices, health and safety practices, and training and development practices. Therefore, the test for independency was done in order to reduce variables which are not indicating a dependency on employee productivity. Thereby each variable had either high or moderate dependency with employee productivity. Similarly, the research study has emphasized on the reliability test towards variables. In this sense two independent variables as maintenance towards health and safety practices and continuous learning culture towards training and development practices were not reliable. Therefore, these two variables were neglected when developing the model using logistic regression.

All the independent variables have a positive correlation to the employee productivity. Therefore, the management should consider all these factors when stipulating their strategies for their employees. Similarly, the hypotheses were tested by chi-square test with 1 percent confidence level. Thus, all the null hypotheses regarding the significant relationship between independent variables and employee productivity were rejected (There is no significant relationship between independent variables and employee productivity). Therefore, there is a significant relationship between compensation practices, health and safety practices, and training and development practices on employee productivity.

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Factors that Influence the Revisit Intention of International Tourists - A principle Component Analysis

Dilushi Kodithuwakku[1]

Abstract

In the tourism industry, behavior and the future purchasing intention of tourists is difficult to understand because it varies with the different outlooks based on tourists' attitudes. According to the theory of planned behavior, tourists' intention of revisiting can be described based on two phenomena as: likeliness to revisit the same destination and willingness to recommend to others. Usually the tourism industry requires a high level of promotional cost though repeat visitors provide more revenue and minimize the costs. Therefore,, understanding the revisit intention and factors which affect the revisit intention is one of the dominant issues. Therefore, the objective of this study is to identify the factors which influence international tourists' revisit intention in the Galle tourism zone. To achieve this objective, the study uses the principal component analysis. The international tourists, who visit the Galle tourism zone were the target population of this study. Results revealed that, according to the results of the analysis two factors were identified as culture and social and entertainment. This indicates that, Galle has a beautiful scenery and natural attractions, culture and religious value, accommodation, local peoples' attitude towards visitors, safety and relaxation. They play a vital role in attracting repeat visitors in Galle.

Keywords: International Tourists, Revisit Intention, Travel Destination Attributes

1. Introduction

Tourism in one of the main contributors to the development of the Sri Lankan economy by increasing the foreign exchange earnings, creating employment opportunities and increasing investments (Jayawardhane, 2002). Hence, it is important to have continuous improvement in this industry in order to survive with the competitive market by studying 'intention to revisit' (Som et al., 2012). Competition in the tourism industry is dynamic and therefore in order

[1] **Corresponding Author**
Lecturer (Probationary), Department of Social Statistics, University of Kelaniya, Sri Lanka.
E-mail: dilushik@kln.ac.lk

to achieve a high level of tourists' arrival and income, different strategies have been developed to increase the tourism market throughout, worldwide. From the aspect of destination marketing, tourists revisit is the most attractive option, because it effectively cuts down the long term cost of marketing (Luo and Hsies, 2013; Som et al., 2012; Hsu et al., 2008).

As a 3rd foreign exchange earner in Sri Lanka, the tourism industry plays a vital role in economic stability (Jayawardhane, 2002). Therefore it is important to develop the tourism industry in order to achieve a high level of economic development. To develop the tourism industry it is also important to increase revisit intention. The reason for this is that tourists' revisitation effectively cuts down long term cost of marketing. The tourism industry depends highly on propaganda. Hence, as a developing country, to develop the tourism industry, Sri Lanka has to allocate a considerable proportion of finance (Jayawardhane, 2002). Therefore, the country needs to give attention for less promotional cost methods to develop the tourism industry. The, tourists revisit intention is the best method to ameliorate the tourism industry in Sri Lanka (Jayawardhane, 2002). Sri Lanka is a well-known tourist destination which consists of natural tourism as well as man-made tourism. However,, majority of the territory is rich with natural attractions (Jayawardhane, 2002). Therefore, it is importantto develop revisit intention in Sri Lanka.

In tourism, there are many studies done by researchers about the tourism destinations, positive and negative externalities of tourism andtourism related services. However, very few of them focus on the importance of revisit intention and factors influencing the revisit intention at the same destination (Pereda, 2012). At the international level, most countries keep a record of the number of tourists that arrive every year, as well as their citizens' departures and arrivals, their purpose of visit through custom controls at airports and harbors. Furthermore, there are only a few studies done by researchers about revisit influencing factors for tourism destinations in Sri Lanka (Perera and Vlosky, 2013). Therefore it is important to identify the influencing factors that affected tourists to visit the same destination again.

In the tourism industry, it is difficult to understand the behavior and the future purchasing intention of tourists; because it varies with different outlooks based on the tourists' attitudes (Som et al., 2012). Palani and Sohrabi (2013), mentioned that understanding a person's attitude towards a specific matter,

requires us to understand what lies behind the action, and the person's background and characteristics. Therefore, subjects such as cultural, social, psychological, personal, beliefs attitudes are connect with tourists' behavior (Palani and Sohrabi, 2013). Mohammadi and Mohamed (2011); Badarneh, Puad and Som (2001); Richarme (2005) explained that the future human behavior is the main purpose of the consumer behavior studies. Som et al., (2012); Rayan (2002), claimed that, the behavior of tourists include; choice of destination to visit, subsequent evaluation and future behavioral intention. According to Rayan (2002), the subsequent evaluations are the travel experience or the perceived value whereas the future behavioral intentions refer to visitors' judgment about the likeliness to revisit the same destination and willingness to recommend it to others. Therefore, tourists' revisit intention can be described based on two phenomena as likeliness to revisit the same destination and willingness to recommend to others (Rayan, 2002). Understanding the revisit intention is one of the dominant issues; because repeat visitors provide more revenue and minimizes the costs (Pratminingsih, Rudatin and Rimenta, 2014).

The concept of revisit intention comes from the behavioral intention (Som et al., 2012). A behavioral intention can be defined as an intention for planning to perform a certain behavior (Ajzen, 2002; Feng and Jang, 2004). This means that when people have a stronger intention to engage in a behavior, they are more likely to perform behavior (Ajzen, 2002). Over the past few decades, a number of theories have been developed and tested in different contexts for understanding human behavior. The theory of planned behavior is one of the most influential and popular conceptual frameworks to study people's intentions to do a specific behavior (Ajzen, 2002; McKercher and Wong, 2004). The theory of planned behavior predicts an individual's intention to engage in a behavior at a specific time and place (Ajzen, 2002). As claimed by Kozak and Decrop (2009), tourists' behavior, can be divided into three sections based on tourists' behavioral intention as: pre purchase behavioral intention, during purchase behavioral intention and post purchase behavioral intention. Pre purchase behavioral intention includes how the tourists form the destination image through several factors (Kozak and Decrop, 2009). Tasci, Gartner and Cavusgil (2007), shows that these destination related factors can be described based on two major factors as; stimulus factors and personal factors. Stimulus factors consist of information sources, and previous

experiences. Personal factors are social and psychological characteristics of the visitor. The second stage is during the purchase behavioral intention, which focuses on travel destination attributes during the tour. The third and final stage is post purchase behavioral intention which includes tourists' satisfaction, revisit intention and willingness to recommend. This research focuses on the final stage of the planned behavior.

Revisiting is accepted as a significant phenomenon in an economy and country's attractiveness to the tourists (Darnell and Johnson, 2001). Among the aspects analyzed about the revisit phenomenon, Kozak (2001), shows that some visitors revisit the same destination when they feel satisfied with the particular attribute during their first visit. However, satisfaction is not sufficient to explain the revisit phenomenon, for many respondants reported satisfactory experiences but did not return to the same destination (Kozak, 2001). It might also happen that satisfied tourists but might not return to the same destination, because they prefer to visit other places on their next holiday (Gitelson and Crompton, 1984). On the other hand, less satisfied tourists might visit the same destination and eventually become a repeat visitor (Oppermann, 1999; Gitelson and Crompton, 1984). This procedure may be used as a strategy in order to avoid a new decision process for a further decision and reduce the risk that might be faced by another disappointingt experience in the future (Oppermann, 1999). According to Oppermann (2000) , the first direct contact with the destination has implications for the future choice process. Different researches point out that there are some main factors considered to be important to have profound influencing factors on tourists return intention. They are; novelty seeking (Jang and Feng, 2007), natural and cultural environment, adventure, climate, events and activities, (Hashemi et al., 2015), safety and security, relaxation, local people friendly attitude towards visitors (Khuong and Ha, 2014), leisure and entertainment (Petrick, Morais and Norman, 2001), transportation, shopping, accommodation, price (Badarneh , Puad and Som, 2001), destination image (Mohamad and Ghani, 2014; Mat Som et al, 2011; Pratminingsih, Rudatin and Rimenta, 2014), attractiveness (Pratminingsih, Rudatin and Rimenta, 2014), satisfaction (Mat Som and Badarneh, 2011; Ngoc and Trinh, 2015; Mat Som et al., 2011; Apostolos et al., 2004; Hashemi et al., 2015) and previous experience, motivation (Pratminingsih, Rudatin and Rimenta, 2014; Rittichainuwat, Qu and Mongkhovanit, 2008; Rayan, 2002) and tourists' perception (Hsu et al.,

2008; Badarneh, Puad and Som, 2001). However, all these factors depend on visitor behavior, taste, purpose of the visit, and judgment of the visitor, concession of the visit and circumstance of the destination. Therefore, it is important to identify the key factors influencing the revisit intention in the Galle tourism zone.

The Galle tourism zone is located in the Southern Province in Sri Lanka. In the Southern Province there are 11 out of 45 tourism zones: Benthota, Hikkaduwa, Ambalangoda, Mirissa, Galle, Deniyaya, Unawatuna, Matara, Tangalle, Hambanthota and Thissamaharama. The Golden beaches of the Southern Province, greenery of its mountains, diversity of nature and unique culture play a vital role in attracting tourists (Hettiarachchi, 2014). According to the Baseline Survey on the Tourism Sector of the Southern Province (2014) conducted by the United Nations Development Program (UNDP) Art Gold Sri Lanka Program (AGSL), (2014), Southern Province tourism plays a major role in the economy of the region and at present 45% of the workforce is directly or indirectly engaged in tourism.

The Galle tourism zone provides diverse and different experiences to tourists. It lies in the south-western part of Sri Lanka in the southern province of Sri Lanka (Socio – Economic and Cultural Survey of World Heritage Site of Galle Fort - SECS, 2014). Galle is one of the best tourism destinations, in which international tourists can gain miscellaneous experience (Baseline Survey, 2014). It is world renowned for its glorious beach, the alternative tourism initiatives relating to environment/natural, historical, cultural, rural/community based, sports/adventure and thematic tourism which are becoming popular (Baseline Survey, 2014).

Environmental/natural tourism include wildlife, bird watching and rain forest; Kanneliya Forest Reserve located in the Galle is the largest of the Kanneliya-Dediyagala-Nakiyadeniya (KDN) forest complex (Baseline Survey, 2014). Kanneliya is regarded as one of the most biologically diverse areas in the country, as well as in the world. (Baseline Survey, 2014). Historical tourism such as archeological sites, religious places, monuments and museums in Galle (Baseline Survey, 2014). Cultural tourism such as dance and music recitals, puppet shows and religious parades are prevalent in Galle (Baseline Survey, 2014). Rural/community based tourism such as traditional arts and crafts including; masks, pottery, cane products, lace and brassware are there

in Galle (SECS, 2014). Sports/adventure tourism such as hiking, cycling walking and camping (Baseline Survey, 2014). Thematic tourism such as the Cultural feast in Galle and The Galle Literary Festival (Baseline Survey, 2014). Therefore, Galle can be considered a multi tourist attraction destination in Sri Lanka (Baseline Survey, 2014). Thus, it is important to maintain and increase revisit intention in Galle in order to achieve successful tourism development in Galle, as well as Sri Lanka.

1.1 Objective of the study

As mentioned above, tourists revisit intention is the important phenomenon for the tourism industry in Sri Lanka. Therefore, it is topical to discuss about the revisit intention, in order to achieve a high level of tourists' development and minimize the cost of tourism promotions in Sri Lanka, as well as Galle tourism destination. Accordingly, the objective of this study is to identify the factors which influence the revisit intention among international tourists.

1.2 Significance of the Study

Since the tourism market has been showing an increase in popularity, it is beneficial for tourism business managers to understand why people want to visit destinations, what kinds of experiences tourists have when they visit destinations, what types of perceived value people have after they visit, if they have intentions to revisit, and the variables that influence tourists to revisit the destination (Chang, 2013)

Success requires a better understanding of the likes and wants of customers. According to Chang (2013), the economy is developing from a service paradigm into an experience paradigm. Providing input to tourists is what the experience industry can do and it may turn out to become tourist experience (Anderson, 2010). In other words, experience of tourists cannot be controlled. For managers of destinations, the only thing they can do is to create conditions that will optimize customer experience (Anderson, 2010). However, as Chang (2013) indicated, many companies simply wrap experience around their traditional offerings. In order to succeed in creating experience for the tourists of their target market, the experience industry must provide inputs for experiences that fit the tourists' needs at that particular time (Anderson, 2010). Thus, understanding tourists' consumption psychology by explaining motivation, experience, and perceived value, and exploring the factors influencing tourists' revisit intentions, will benefit tourism business managers

as they plan and design thematic characteristics to fit the preferences of target markets. It will also benefit tourism business practitioners in terms of marketing strategy planning and targeted consumer recognition (Anderson, 2010).

This study mainly focuses on key factors of international tourists' revisit intention in Galle. By gaining an understanding on the relative importance of each factors which influences tourists' revisit intention, it will provide valuable insights and suggestions for the development of the tourism industry to further strengthen and improve services offered in achieving tourists' satisfaction (Anderson, 2010). From an economic perspective, study on repeat visitation is vital for tourism businesses to operate effectively and efficiently, because attracting the previous visitor is more cost effective than gaining new ones (Chang, 2013). Also this study will generate a clear understanding about Galle destination attributes in terms of their attractiveness in the international tourists' minds. The results of the study would be conducive to the tourism planners' and marketers' strategic decision making in the international tourism market.

2. Methodology

The objective of this study, is to identify factors which influence international tourists' revisit intention in Galle. To achieve this objective, this study used the theoretical and empirical research method, as follows; Literature analysis, through the collection, identification, compilation of relevant research literature, to correctly understand the research problem.

Simple Random sampling procedure was used for data collection of this study. Primary and secondary data use for this study and the primary data collected through questionnaire method and interview method was used in this study and questionnaires were distributed among international tourists who visited Galle. To identify the factors, principle component analysis was conducted.

3. Research Results and Discussion

This social characteristics profile of the respondents indicated that the gender of the respondents was not evenly distributed, with 64% being male and 36% female. Approximately half of the visitor's marital status was single (49%) and other 51% deputed married ones. The results show that the dominant age group of respondents was 25-30 years old (44%), followed by 31-35 years old

(29%), more than 46 years old (13%) and the smallest group made up 7% of the respondents was 18-24 and 41-45 years old. This indicates that the international tourists who visited Galle were young. Out of six region groups, majority of the respondents visited Galle from Europe (60%), followed by the South Asia group (17%) and East Asia and Pacific (14%). The smallest group included tourists from America which represented the 9% of the total respondents.

Table 1: Social Characteristics Profile of the Respondents

Social characteristic		%
Gender	Male	64
	Female	36
Marital Status	Single	49
	Married	51
Age	18-24	7
	25-30	44
	31-35	29
	41-45	7
	More than 46	13
Region	America	9
	East Asia and Pacific	14
	Europe	60
	South Asia	17
Occupation	Businessmen	19
	Professionals	54
	Executives	9
	Scientists and Technicians	1
	Educationists	4
	Other Occupation	3
	No Occupation	7
	Retired Persons	3

Education Level	High School	7
	Bachelor Degree	48
	Master Degree	32
	Honour's Degree	2
	Doctorate	11
Travel with	Alone	30
	Friends	29
	Family	41
Purpose of Visit	Pleasure	66
	Religious and Culture	23
	Health	11

Source: Field Survey Data, 2018

With regards to the occupational distribution of visitors, 54% of tourists were Professionals, 19% were Businessmen and 9% were Executives. Educationalists represent 4% of total 100 responders and retired persons and Scientists represented 3% and 1% respectively. Majority of the international tourists traveled with their family (41%), followed by 30% who travel alone and 29% who travelled with friends. With regard to the level of education of the visitors, most of the respondents had a Bachelor's degree (48%) and 32% had a Master's degree. Not only that but also 11% of the respondents had a Doctorate, 7% of respondents attended High School and only 2 % had an Honor's degree. These results indicate that the education level of tourists who visited Galle was high.

Galle is named as a UNESCO world heritage site and a well-known tourists attraction, where a majority of visitor's travel purpose was pleasure (66%). Religion, culture and history also plays a major role in attracting tourists in Galle. 23% of the respondent's reason to visit Galle was religion and culture. Results also indicate that Galle is a popular destination for health care as 11% of the respondents traveled for Health.

Furthermore, results revealed that, a majority of the respondents of this study were highly satisfied with the landscape, culture, religious and history, relaxation, accommodation, food, accessibility, local people friendly attitude towards visitors and safety in Galle. Moreover, the majority of international tourists were satisfied with shopping in Galle, transportation, climate, price and adventure. Therefore, according to table 2, majority of the respondents (58%) were highly satisfied with the overall image of Galle and 40% of the respondents were satisfied with Galle as a tourism destination. Only 2% have a neutral satisfaction level about Galle.

Table 2: Summary of the Satisfaction Level about Travel Destination Attributes

Attribute	Highly Satisfied	Satisfied	Neutral	Dissatisfied	Highly Dissatisfied
Landscape	78	22	-	-	-
Culture and Religious	80	20	-	-	-
Entertainment	-	9	45	38	8
Good and Services	28	59	11	2	-
Shopping	24	46	23	7	-
Accommodation	48	24	17	11	-
Food	45	39	16	-	-
Transport (Overall)	26	55	19	-	-
Air	21	35	27	17	-
Railway	24	48	25	3	-
Road	15	52	26	7	-
Accessibility	60	38	2	-	-
Local People Attitude	83	10	7	-	-
Safety	78	22	-	-	-
Relaxation	48	35	17	-	-
Climate	27	59	8	6	-
Price	35	36	13	16	-
Adventure	9	45	40	6	-
Events and Activities	15	30	33	22	-
Overall Image of Galle	58	40	2	-	-

Source: Field Survey Data, 2018

Table 2 indicates that, more than 50% of international tourists were highly satisfied with the landscape, culture and religious, accessibility, local people friendly attitude and safety in Galle and satisfied with the goods and services, transportation and climate in Galle. Also, the results indicated that, there were no tourists highly dissatisfied with any of the attributes in Galle, except entertainment. Therefore, entertainment in Galle as a tourism destination doesn't play an important role.

When considering the reasons for this revisit intention, 89% international tourists revisit Galle, because Galle has beautiful scenery and natural attractions. Table 3 indicated, culture and religious value in Galle, attract 76% tourists to revisit. This means that, natural beauty, beautiful scenery, culture and religious value in Galle plays conspicuous role in motivating international tourists to revisit Galle. The other reasons to revisit Galle were Food and Local people attitude towards visitors (65%), Relaxation (49%), Safety (46%) and Accommodation (42%). However, among the respondents, less than 10% of the respondents selected entertainment, price, special events and activities, adventure and health care as one of the reasons to choose Galle for a revisit. This indicates that majority of the respondents did not select these factors as the reason for a revisit.

Table 3: Reasons for the Revisit Intention

Reason	% Revisit Intention
Galle has beautiful scenery and natural attractions (landscape)	89
Culture and Religious Value	76
Entertainment	5
Shopping	21
Accommodation	42
Food	47
Transport Facility	23

Accessibility	32
Local People' Attitude toward Visitors	65
Safety	46
Sport	6
Relaxation	49
Climate	17
Price	9
Special Events and Activities	8
Adventure	7
Health Care	6

Source: Field Survey Data, 2018

In summary, when considering the revisit intention in Galle table 3 indicated that approximately more than 50% of respondents have the revisit intention because of the landscape, Culture and religious value, and local people attitude toward visitors in Galle.

Among the travel destination attributes derived from the literature review, international tourist's satisfaction have a relationship with all the travel attributes. However, this research mainly identifies other travel attributes which are conventional in Galle as sports and health care. According to these findings it is important to identify the key travel destination factors in Galle tourism zone which affect the revisit intention. To accomplish this, the objective study used principle component analysis.

According to the results of the correlation analysis, only 6 variables have a significant correlation with the revisit intention.

Table 4: Correlation between Revisit and Travel Destination Attributes

Galle has beautiful scenery and natural attractions	-.807**.(000)
Culture and religious value	-.575**.(000)
Nightlife and entertainment	-.041(.689)
Shopping	-.189 (.060)

Accommodation	-.395** (.000)
Food	-.277** (.085)
Transport facility	-.227* (.023)
Accessibility	-.239* (.017)
Local people' attitude toward visitors	-.395** (.000)
Safety	-.290** (.003)
Sport	-.082 (.415)
Relaxation	-.412** (.000)
Climate	-.149 (.139)
Price	-.093 (.360)
Special events and activities	-.119 (.238)
Adventure	-.142 (.159)
Health Care	-.122 (.129)
Education	.096 (.343)
Meet Relations and Friends	-.041 (.689)

Source: Field Survey Data, 2018

Table 5: Analysis of Eigenvalues

Principal Component (PC)	Eigenvalue = Variance of the PC	% of Variance explained by the PC	Cumulative % of variance explained by PCs
1	3.2495	54.2	54.2
2	1.2546	20.9	75.1
3	0.7322	12.2	87.3
4	0.4649	7.7	95.0
5	0.2350	3.9	98.9
6	0.0638	1.1	100.0

Source: Field Survey Data, 2018

Results in table 3, indicate that eigenvalues are greater than one only in the first two PCs. That is variance of PC1 and PC2 are 3.2495 and 1.2546 respectively. Thus percentage variability of the initial system explained by the first two PCs is 75%. PC1 is able to capture 54.2% of the total variability whereas PC2 is able to capture 20.9%. Thus, it can be concluded that the initial 6-D can be reduced to the 2-D system. This can be confirmed by the elbow shape that appeared in the scree plot (figure 1). A scree plot displays the eigenvalues associated with a principal component in descending order versus the number of components. It clearly indicates which components acquire most of the variability in the system.

Figure 1: Scree Plot of the Principal Components Analysis

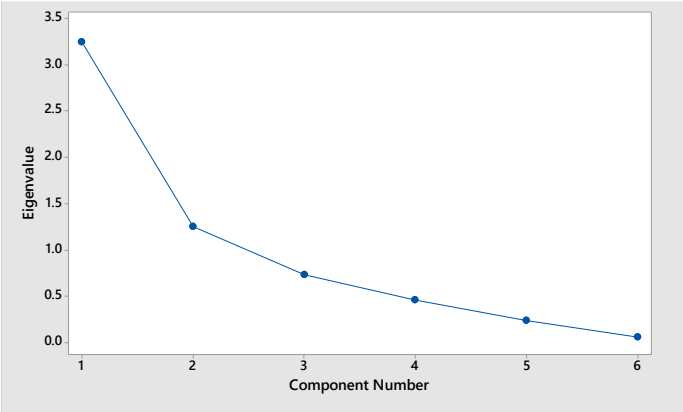

Table 6: Eigen scores of the selected two PCs

Initial Variable	Principal Components	
	1	2
Galle has beautiful scenery and natural attractions	**-0.436**	-0.383
Culture and religious value	**-0.478**	-0.320
Accommodation	0.228	**0.517**
Local people' attitude toward visitors	**0.431**	-0.274
Safety	**0.486**	-0.266
Relaxation	0.328	**-0.581**

The eigenvector of the selected two components are shown in table 5. These two components are the two orthogonal indicators to represent the initial 6 – D system.

According to the table 5, Galle has beautiful scenery and natural attractions, Culture and religious value, Local people' attitude toward visitors and Safety can be considering as PC1 and other two variables; Accommodation and Relaxation can be considered as PC2. Accordingly, it can be assumed that first PC represents, "Culture and Social Factor". The second PC represents the "Environment Factor".

Culture and Social Factor = -0.436 * [(Galle has beautiful scenery and natural attractions – 178.60) / 24.69] – 0.478*[(Culture and religious value – 35.4) / 3.202] + 0.431 * [(Local people' attitude toward visitors –9.45) /5.29] + 0.486 * [(Safety – 145.6) /62.6]

Environment Factor = 0.517 * [(Accommodation – 56.10) / 7.21] - 0.581 * [(Relaxation – 70.3) / 51.3]

4. Conclusion

Results indicate that, more than 50% of the international tourists were highly satisfied with the landscape, culture and religious, accessibility, local people friendly attitude and safety in Galle and satisfied with the goods and services, transportation and climate in Galle. The results claimed that, there were no tourists highly dissatisfied with any attributes in Galle, except entertainment.

To achieve the key objective, which was identify the factors which are influencing international tourists revisit intention in Galle tourism zone, only 6 variables have significant correlation with the revisit intention. Therefore, these 6 attributes were taken to run the principal component analysis in order to identify the factors which influence the revisit intention. According to the results of the analysis two factors were identified as culture and social and entertainment.

This means that, attributes under culture and social factors as Galle has beautiful scenery and natural attractions, Culture and religious value, Local people' attitude toward visitors and Safety which influence the revisit intention in Galle. As a multi attraction destination with natural tourism and also man-made tourism, tourism planners should give their attention to maintain and protect the natural beauty in Galle as well as the rampart, Galle

fort and other historical cultural and religious places. In addition, local people should be trained to interact nicely and politely with tourists. Galle is also a popular place among tourists as a place of relaxation; especially for health care. Therefore, it will need to develop spa centers, aurvedic centers in Galle with high level of facilities and need to establish relaxation places for tourists like meditation centres, monastery, yoga practice places, and libraries for tourists. Finally, it will need to increase the safety of international tourists.

5. Suggestions

Galle is a popular tourism destination among international tourists, and international tourists will be a big potential market for Sri Lanka as well as the tourism industry in Galle. For the long-term, it can be suggested that the Galle tourism industry creates a destination relaxation, pleasant atmosphere. As most tourists have great pressure in their daily life and work, going out to travel can reduce the pressure and relax the body and mind. Therefore, tourism needs to build a harmonious and friendly environment such as organizing various distinctive, innovative activities to increase tourist destinations and a relaxed atmosphere.

Galle tourism planners should build a long-term tourism destination brand, enhance the natural landscape attractiveness of the destination, find out their unique natural and cultural characteristics, and focus on market-oriented development of tourism products and activities that people like, such as activities islands, and in forest park, and show more Galle culture to international tourists. These cultural icons can be historical monuments, Galle cultural performances and food.

Galle tourism destination should strengthen all aspects of construction, especially to strengthen the management of social security; some negative public security problems will damage a good image for tourism. Therefore, it is essential lto improve the good image of the tourism destination. In addition, it is essential to improve the infrastructure and improve service quality, which will be possible to meet the various needs of tourists and to make the tourists feel relaxed, happy and excited.

In addition, the findings have indicated that transport, accommodation and accessibility have not played a significant role in the revisit intention. For transport, accommodation and accessibility, the marketers may need to make some effort to improve public transport facilities, providing quality service of

hotel, special events, developing tours with diverse activities at night to attract international tourists such as singing, dancing and theatres.

Also, in order to provide excellent services to tourist planners, should be a professional staff who can speak English fluently. Establishing a group with the militia and police who can speak English fluently to solve any complaints of international tourists and guarantee international tourists' safety in the Galle tourism area should be ensured.

All these results and recommendations will be valuable information to tourism marketers and planners in Galle in evaluating and giving marketing strategies and management in the future.

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