Research Topic: "The Balance Sheet Effects of Exchange Rate Fluctuations in Emerging Markets"

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As part of the Master of Management in Finance and Investments.

Declaration

I, Bushra Asad, declare that this dissertation is my own, unaided work. It is being submitted for the Degree of Master of Management in Finance and Investments (MMFI) at Wits Business School, University of the Witwatersrand, Johannesburg. It has not been submitted for any degree or examination at any other university.

Signed:

Date: Dec 16, 2020

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Abstract:

The main objective of the research is to check the effect of GDP growth, beside baseline model for investment (including only previous investment, output growth and real interest rate), while in Tobin Q equation investment model including (change in real interest rate, equity value, exchange rate depreciation and lag term of investment growth on growth of real investment has been investigated) as Q ratio has been consider valid porky for Investment opportunities. The results have been obtained in scenario of eight Emerging Markets Chile, Czech Republic, Hungary, India, Mexico, Poland, South Africa and South Korean in order to check which estimation is more robust, and which model best forecast actual growth with respect to investment in selected emerging markets. Dynamic models have been used and in all countries except Chile, the significant influence of real GDP growth on real investment growth has been found in both models. Moreover, in scenario of South Korea, the influence of Real interest Rate has also been found. The practical implication and future direction of the study has also been discussed in detail

1: Introduction

1.1 Background of the study:

The financial crises for Emerging Markets during the late 1990s challenged the classical view that such crises are only due to volatility in key macroeconomic variables. Emerging market suffers from structural weaknesses, which make them more vulnerable than the developed economies. In spite of all that, what could make the variability of the real exchange rate is difficult to manage, the reason behind is that many of the emerging markets are the victims of Domestic Liability Dollarization which refers to the high frequency of foreign-exchange denominated obligations.

A series of studies inspired by the emerging market crises in the late 1990s seem to undercut a new view that has emerged in which emphasis has been moved from macro-variables to the firm level financial variables and to the interaction of these variables with the Emerging Markets experienced fluctuations in the external cost of capital (both debt and equity), as well as faced several financial crises, which affected their economic growth (Hansen & Rand, 2006). For this reason, academics and practitioners interested in the Emerging Markets have been paying particular attention to dig out the elements important for a country's investment and gross fixed capital formation process. Emerging Markets are suffering from a high degree of macroeconomic uncertainty. Growth, inflation, real exchange rates, real interest rate and other key macroeconomic variables are much more volatile than in industrial economies, and the consequences of this excess volatility for aggregate performance in several dimensions which includes growth, investment and trade (Serven, 2002). Although a lot of work has been done in trying to understand both emerging markets investment and crisis, it appears as though data availability stops most studies from being robust.

1.2 Research Problem:

Generally, when focusing on investment, it is found that three main variables influence gross fixed capital formation within an economy, namely; output growth (which acts as a measure for whether a country is in crisis or not), the real interest rate, and the inertia from previous investment, and the investment made by fixed capital, primarily depends on the firm's expected demand either relative to its existing capacity also considering its ability to generate investment funding through internal cash flow and external debt financing((Fazzari and Mott, 1986) .

Other important factors which influence investment include the real exchange rate, since it is particularly volatile in emerging markets, and Tobin's Q ratio theory whose summary of market value may be able to explain emerging market investment driven by the financial sector of an economy. In addition to this, there is some literature which explores the direct link between real exchange fluctuations and economic performance, which can also serve as a basis to analyse the relationship between the real exchange rate and investment.

1.3 Research Objective:

The objective of the study is to emphasis on a baseline model for investment (including only previous investment, output growth and the real interest rate) before estimating another investment model (including the real exchange rate and Tobin's Q) as also Tobin's Q ratio extensively used in financial literature as a proxy for future investment opportunities. Last not but the least will check on which estimation is more robust, and which model best forecasts actual growth in investment for 8 emerging market countries (Chile, Czech Republic, Hungary, India, Mexico, Poland, South Africa and South Korea).

1.4 Methodology of the study:

Methodology of the report which explains both the baseline model and Tobin's Q ratio. The purpose of using bassline study to provide an information in which to monitor and compare with the new equation model which modified form of Tobin's q ratio. So it is important and also beneficial to know about the availability. The model inclusive of the real exchange rate and Tobin's Q. The Tobin ratio (Q) reveal the work of Tobin 1969, Tobin and Brainerd, 1968. The value of the firm divided by the replacement cost of the firm's asset. Tobin ratio (Q) found to be used in many state of affairs regarding financial literature to survey different financial phenomena, decisions and is also consider valid proxy for investment opportunities. (Ling Fu, 2016). This is followed by estimation and analysis of both these models, before concluding with some results.

1.5 Organization of the Dissertation:

This paper is structured as follows; firstly, I review literature around investment that how investment played key role factor for the marginal efficiency, balance sheet give an idea of the financial position in regard what owns and owes, in short balance sheet may give insight or reason to invest in stock and also literature reviewed on monetary policy as it involves management of money supply and interest supply. Monetary policy usually contribute to the firmness of gross domestic product and also to maintain foreseeable exchange rates.

Secondly, we will discuss the methodology by using Tobin's Q ratio consider to valid porky for Investment opportunities. There is a significant positive relation between Tobin's Q ratio and the magnitude of stock market reaction to capital investment announcement (Blos and Shieh (1997). Sample of 8 emerging markets and source of data collection is from Federal Reserve Economic Data on quarterly basis starting from 1990 to 2017.

2: Literature review

2.1: Introduction:

Fluctuations in the Investment played a key role in Keynes's view of trade cycle shows the shift in the marginal efficiency curve, which has impact on investment, aggregate demand and therefore because of these two factors shows disequilibrium in the labour market, employment and investment. Keynes's (1936) is of the view that shocks to the marginal efficiency of Investment consider to be an important part for generating business fluctuations. Theoretical and quantitative analysis suggest that shocks and transmission mechanism may be the important part of business cycle Investment changes Real business cycle type developed in a new way by Finn Kydland and Edward Prescott (1982).

Basic principal underlying in all these theories may help in looking out for better plan of action which is derived by Keynes General Theory the Three coupled oscillating sectors in a multisector Kaldor-type business cycle model can give rise to the occurrence of chaotic motion. If the sectors are linked by investment demand interdependencies, this coupling can be interpreted as a perturbation of a motion on a three-dimensional torus. Kalecki's theory, consider past profits as the major on investment, came not only from the correlation between actual and expected pro's but also from his `principle of increasing risk' , the idea that marginal risk to the wealth position of an entrepreneur increases with the percentage of his or her wealth sunk into an illiquid investment. The use of leverage further increases this risk and issuing new equity dilutes the ownership value of the original investors. This leads to the conclusion that actual pros are both the basic and the preferred source of funds for investment spending.

2.2: Theoretical Frame Work:

Investment and net worth has been widely treated in many ways, including the areas of macroeconomics and corporate finance. Looking at the macro side of factors, Bernanke and Gertler (1989) developed closed-economy "financial accelerator" models in which the premium on external credit decreases the net worth. Additionally, an extensive literature, based on empirical studies, documents the effect of net worth on investment. Hubbard (1998) carries out the studies to provide a strong support and also link between the changes that occur in net worth and investment, arising from the information problems which exist in the financial market. The reasons for such information problems can mostly be attributed to the following

two reasons Firstly, because of the gap between the cost of external and internal financing. Secondly, borrowers engaged in the activity as they forced to do what they don't like to, because of the lack of money a positive relation should be made between the borrowers and the lenders for the development of the industries would be useful.

2.3: Empirical Literature:

Most of the literature is of the opinion that balance sheet effects represent the open economy version of the financial accelerator, as shown by Gertler, Gilchrist and Natalucci (2003). They generally show that balance sheet effects, related to a sudden reduction in net wealth, are detrimental either in terms of the cost of capital or output. This happens due to the existence of financial imperfections. Under these circumstances, the conclusive answer to the question of whether balance sheet effects are detrimental depends upon the channels of balance sheet, in determining the reduction in net worth and the reality of financial imperfections.

Balance sheet is the statement of assets and liabilities, which defines net worth of the company. The channels of balance sheets are Interest rates, cash flows and net worth of companies and consumers. Emphasis will be put on the purpose of monetary policy as it is also a significant balance sheet channel in regard to having an impact on the emerging markets. As the policy affects important economic elements such as inflation, output gap, interest and exchange rates, the policy transmission not only affects the market interest rate but also the financial position of private economic medium. This is because change in the interest rates affects balance sheets, net cash flows and also the net worth of companies and consumers, as higher interest rates results into or becomes the cause of reduced cash flow, reduced net worth, drop in loans, and decline in aggregate demand.

The survey reported done by Mihaljek's, which than elaborated by him in paper shows that many emerging market central banks view intervention as effective in influencing the exchange rate consistent with their objectives. Part of this may be attributable to cases in which fixed or targeted exchange rate regimes are in place: under such condition monetary policy actions are primarily dictated by what is needed to achieve and maintain the exchange rate target, intervention in the foreign exchange market is automatic or nearly so, and the exchange rate peg has proved reasonably durable.

The monetary policy channel of the balance sheet shows how the policy affects the credit portfolio of financial intermediaries as well as other economic agents. Ize and Levy-Yeyati (1998) argue that a history of bad monetary policy in emerging markets causes investors to place a premium on domestic debt, in spite of changes in the monetary policy. In these economies investors favour dollar denominated debt contracts because such contracts provide them with the limited insurance against unexpected inflation.

Lack of monetary credibility can also explain dollarization without making full use of the portfolio effects, with the possibility of debt defaults. Calvo and Guidotti (1989) provide an early illustration of this effect in the context of public debt. Lack of monetary credibility deriving from the monetary authorities' inability to pre-commit can raise the cost of domestic currency debt to the point where it becomes optimal for the government to effectively get some type of financial support on the debt, which comes through inflation. Considering this type of situation, local currency activity comes to an end, in order to be an effective medium for financial contracts. Instead, dollar debt becomes the medium of choice.

One set of model (Jeanne 1999a, 1999b) of the view that dollarization has provide an incentive to take unusual risk in a desperate attempt to earn profit and also the signalling problem, the reason for all this because foreign currency debt lowers the interest rate. Calvo (1999a, 2001) is of the view that uncovered interest parity failure can be arising due to the interaction of information asymmetries, regulatory restriction on the banking sector and also to the costs of forming devaluation expectations, which than included in the price of domestic currency debt. All of these information advantages pushes the bank to place this debt domestically, which results in both lower and balance rate on dollar loans.

Some series of author's debate that in many cases dollar debt consider to be the safe and sound form of financing and savings in emerging markets. Eichengreen and Hausmann (1999) emphasis that if there is not any presence of a long term currency market, firms are freely or voluntarily agree to go with the exchange rate risk that is used to be overcome the interest rate risk which is naturally found in short term domestic liabilities. Berganza, Chang and García-Herrero (2004), who find that balance sheet effects originated from the increase in the external debt service after a real depreciation raise a country's risk premium for the emerging market economies.

Jeanne (2002) shows that lack of monetary credibility weakens the utility or effectiveness of the local currency in private contracts in the same way. The expectation of depreciation under a fixed exchange rate increases the risk premium on local currency debt and also generates a shift to the dollar because it increases the probability of default on local currency loans and therefore increases the cost of insurance against devaluations.

One set of the model assumes that the dollar debt give the right to the creditor to pay to the lager payments in a time of defaults, as by lowering the required rate of interest on the dollar loans. For Schneider and Tornell (2004), usually this happens within the banking sector, where financial assistance has been provided to the dollar indebted banks as a back up to tackle devaluations. Chamon (2001), on the other hand, convincing that when financial support is mutually related with depreciations, those who are burdened by dollar debt will get benefit from this type of situation, as they are consider to be eligible for the larger part of liquidated assets.

3: Methodology

3.1: Introduction:

Fluctuation in Investment played the key role in Keynes's (1936) view of trade cycle, upward and downward movement of marginal efficiency of investment marked an effect on the investment, aggregate demand which results disequilibrium in the labor market, employment and output. Investment function is consider to be the summary of variables that affect the growth rate of aggregate investment, the view of trade cycle given below:

$$gI_t = \theta_0 + \theta_1 gy_t - \theta_2 \Delta r_t + \theta_3 gI_{t-1} + \varepsilon_t \ldots\text{.eq (1)}$$

Where gI_t and gI_{t-1} are current and previous investment growth, Where gy_t is output growth, an increase in the GDP give rise to the output and also the capacity utilization. Although capital inflows contribute to economic growth through their positive effect on private consumption and investment (Celasun, Denizer and He (1998).An increase in the GDP growth give rise to the output and also the capacity utilization increases, which result in an increase of capital investment. This shows that GDP is positively related to the investment. According to World Bank (1989) GDP growth higher for those countries, which have relatively higher investment/GDP ratio.

Interest rates (r) is also consider to be an important determinant of investment higher interest rates reduce investment, because higher rates increase the cost of borrowing and require investment to have a higher rate of return to be profitable; However, this is not the only factor, other factors are too which includes investor confidence, economic growth, and the willingness of banks to lend, accelerator theory, and state of technology. Higher interest rates reduce investment, because higher rates increase the cost of borrowing and require investment to have a higher rate of return to be profitable.

This look at investment is not complete, though. Instead, one could add details which are not thought about in the regular investment function, namely Tobin's Q and the exchange rate. Tobin's Q theory of investment explains that firm needs money for investment. Money can be raised either by borrowing or by selling shares, equity. When the firm sells the share, the buyer buys the share to earn a capital gain from the increase in the market value of the shares. The effect of foreign currency liabilities on firm level investment in periods of exchange rate volatility. Consequence of the currency mismatch lead to a collapse of a firm net worth (Tobin (1969).

3.2: Measurement and description of Variables:

The Q theory of investment based on the casual relationship between investment and stock price, an effective attempt to link financial markets with economic variables also the primary objective of management is to leverage the net present value of company. (Wael Ibrahim Alokla, 2020) Tobin's Q ratio is defined as the ratio of the market value of firms to the replacement cost of their assets and consider to be an important determinant of aggregate investment has been advanced by Tobin (1969). Which are consider to be the channels of balance sheet and also the statement of financial position of company businesses stating the assets, liabilities and the owner equity of the firm at a particular time. In other words balance sheet illustrates the net worth of the company businesses.

Valuation method used to access the relationship of balance sheet variables which shows fluctuation in correspondence with exchange rate fluctuation .Using basic regression (OLS) in which Tobin Q is the Independent variable which usually measures two variables current price of capital assets and market value of equity and bond there are other variables that may affect the value of Q. Using regression technique that consider potential endogeneity between investment and Tobin's Q and also with some of the additional firms and macroeconomic control variables.

$$gI_t = \theta_0 + \theta_1 gy_t - \theta_2 \Delta r_t + \theta_3 gq_t - \theta_4 ge_t + \theta_5 gI_{t-1} + \varepsilon_t \qquad (2)$$

$gI_t = real\ investment\ growth\ of\ the\ firm\ in\ country$

$gy_t = real\ output\ \ growth\ \ in\ country$

$\Delta r_t = Differenced\ real\ interest\ rate\ in\ country$

$gq_t = price\ of\ the\ firm\ equity\ growth\ \ in\ country$

$ge_t = nominal\ exchange\ growth\ \ rate\ in\ the\ country$

$\varepsilon_t = error\ term$

As basic equation is for Eq (2) which examine the bilateral exchange rate and we also add some additional firms and macroeconomic control variables. Equation used for estimation is ordinary

least squares (OLS). Investment is therefore modelled as a function of predetermined micro-level variables. At same the time also including the macro level variables transforming these variables which than change into the real exchange rate and real interest rate. These variables consider to be an exogenous to any particular firm.

Where Δr_trepresents the real interest rate (nominal interest rate – Inflation), Δe_{t-1} represents the variation in the real exchange rate (nominal exchange rate divided by CPI). The theoretical signs of the parameters in the Eq (2) are $\theta_0, \theta_1, \theta_3$>0, where as θ_2<0 andθ_4< >0.

3.3: Regression Analysis:

In order to find out the impact of exchange rate on investment we use ordinary least square (OLS) regression analysis as we are regressing one variable on the other, but OLS regression analysis is suitable when data is homoscedastic. But in our case the data is heteroscedastic i.e. variance is not the same at different times. To overcome this situation, it is prefer to implement weighted least square (WLS), which is considered to be an appropriate approach. There might be another possibility when the errors in the data are not only heteroscedastic but also correlated, so in this situation general least square (GLS) consider to be better one. At the end of the analysis Robustness check has been applied to check the validity of assumptions.

3.4: Data, Sample and Sample Period:

Table 1 provides the brief description of data used in this study for the thirteen Emerging Markets. The selected eight emerging markets are India, South Korea, Chile, Mexico, Czech Republic, Hungary, Poland and South Africa, reason for selecting these specified Emerging Markets. As the data availability for selected variables was feasible regarding these Emerging Markets. Their data from 1990 to 2017 on a quarterly basis will be used from FRED [Federal Reserve of Economic Data]. The samples are restricted to mostly public traded firms and some non- traded ones.

Table 1: Data description

Variables	**Frequencies**	**sample**	**source**
Investment	Quarterly	1990-2017	FRED
GDP	Quarterly	1990-2017	FRED
rate of interest rate	Quarterly	1990-2017	FRED
price of equity	Quarterly	1990-2017	FRED
exchange rate	Quarterly	1990-2017	FRED

4: Data Analysis

4.1 - Descriptive Statistics

4.1.1 - Czech Republic

Table 2: Descriptive Statistics of Czech Republic

	GI	GY	DRINT	GQ	GE
Mean	0.035	0.024	-0.001	0.865	-0.007
Median	0.043	0.027	-0.001	-0.447	0.007
Maximum	0.191	0.071	0.076	50.416	0.234
Minimum	-0.122	-0.057	-0.070	-18.319	-0.277
Std. Dev.	0.062	0.029	0.014	9.299	0.122
Skewness	-0.101	-0.623	0.360	3.973	0.049
Kurtosis	2.742	3.173	18.975	20.90	2.312
Jarque-Bera	0.376	5.542	895.038	1343.4	1.690
Probability	0.828	0.063	0.000	0.000	0.430

The table No. 2 is showing the results for descriptive statistics of all variables pertaining to Czech Republic.

The results are indicated that average real investment growth (GI) in Czech Republic is 0.035, which means averagely growth in real investment is 3.5%, anyhow, it is an average growth in investment and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.062 and this value is showing that data for this variable has deviation from mean upto 6.2%.

The results are also depicting the maximum and minimum growth in investment during the period of sample data. The value of skewness is -0.101, which negative but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that average real output growth (GY) in Czech Republic is 0.024, which means averagely real output growth is 2.4%, anyhow, it is an average growth and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.027 and this value is showing that data for this variable has deviation from mean up to 2.7%.

The results are also depicting the maximum and minimum real output growth during the period of sample data. The value of skewness is negative but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that differenced real interest rate in Czech Republic is -0.001, which means averagely difference in real interest rate over the period of time is -0.001, which showing that real interest rate has decreasing tendency over the period of time. However, it is an average difference and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.014 and this value is showing that data for this variable has deviation from mean up to 1.4%.

The results are also depicting the maximum and minimum difference in real interest rate during the period of sample data. The value of skewness is positive, which is showing that data is positively skewed. Moreover, value of kurtosis also greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that firm equity growth in Czech Republic is 0.865, which means averagely equity growth over the period of time is 86.5%, which showing that real interest rate has decreasing tendency over the period of time. However, it is an average growth in equity and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 9.29 and this value is showing that data for this variable has deviation from mean, which is a big variation.

The results are also depicting the maximum and minimum growth rate during the period of sample data. The value of skewness is positive, which is showing that data is positively skewed. Moreover, value of kurtosis also greater than 3 and showing that the height of curve for this

variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that nominal exchange growth rate in Czech Republic is -0.007, which means averagely growth in nominal exchange is -0.7%, anyhow, it is an average growth rate in nominal exchange and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.122 and this value is showing that data for this variable has deviation from mean upto 12.2%.

The results are also depicting the maximum and minimum growth in nominal exchange during the period of sample data. The value of skewness is positive but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is normal for this variable.

4.1.2- Chile

Table 3: Descriptive Statistics of Chile

	GI	GY	DINT	GQ	GE
Mean	0.132	0.039	0.002	0.126	0.238
Median	0.138	0.050	0.003	0.344	0.116
Maximum	0.277	0.088	0.089	1.585	0.852
Minimum	-0.166	-0.034	-0.073	-1.796	0.000
Std. Dev.	0.104	0.037	0.037	1.112	0.289
Skewness	-1.473	-0.778	0.346	-0.424	1.012
Kurtosis	5.528	2.553	4.270	2.070	2.723
Jarque-Bera	9.419	1.639	1.308	0.989	2.607
Probability	0.009	0.441	0.520	0.610	0.272

In Table No.3 results are indicated that average real investment growth (GI) in CHILE is 0.132, which means averagely growth in real investment is 13.2%, anyhow, it is an average growth in investment and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.104 and this value is showing that data for this variable has deviation from mean upto 10.4%.

The results are also depicting the maximum and minimum growth in investment during the period of sample data. The value of skewness is negative, which means the data is negatively skewed. Moreover, value of kurtosis is greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that average real output growth (GY) in CHILE is 0.039, which means averagely real output growth is 3.9%, anyhow, it is an average growth and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.037 and this value is showing that data for this variable has deviation from mean upto 3.7%.

The results are also depicting the maximum and minimum real output growth during the period of sample data. The value of skewness is negative but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that differenced real interest rate in CHILE is 0.002, which means averagely difference in real interest rate over the period of time is 0.002, which showing that real interest rate has decreasing tendency over the period of time. However, it is an average difference and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.037 and this value is showing that data for this variable has deviation from mean upto 3.7%.

The results are also depicting the maximum and minimum difference in real interest rate during the period of sample data. The value of skewness is positive, which is closer to zero and shows the normality of the data. Moreover, value of kurtosis also greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that firm equity growth in CHILE is 0.126, which means averagely equity growth over the period of time is 12.6%, which showing that real interest rate has decreasing tendency over the period of time. However, it is an average growth in equity and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable

is also be measured with the value of standard deviation i.e. 1.112 and this value is showing that data for this variable has deviation from mean, which is a big variation.

The results are also depicting the maximum and minimum growth rate during the period of sample data. The value of skewness is negative, but closer to zero so data is normally distributed. Moreover, value of kurtosis also less than 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that nominal exchange growth rate in CHILE is 0.238, which means averagely growth in nominal exchange is 23.8%, anyhow, it is an average growth rate in nominal exchange and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.289 and this value is showing that data for this variable has deviation from mean upto 28.9%.

The results are also depicting the maximum and minimum growth in nominal exchange during the period of sample data. The value of skewness is positive but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is normal for this variable.

4.1.3-Hungary

Table 4: Descriptive statistics for Hungary

	GI	GY	RINT	GQ	GE
Mean	0.09	0.02	0.03	0.39	0.04
Median	0.09	0.03	0.03	-0.34	0.03
Maximum	0.29	0.05	0.07	52.86	0.28
Minimum	-0.14	-0.08	-0.02	-46.03	-0.20
Std. Dev.	0.10	0.03	0.02	9.36	0.13
Skewness	-0.23	-1.98	-0.09	0.86	-0.14
Kurtosis	2.32	7.84	3.61	21.55	1.81
Jarque-Bera	2.23	128.96	1.36	1142.16	4.92
Probability	0.33	0.00	0.51	0.00	0.09

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The results are indicated in table No.4 that average real investment growth (GI) in Hungary is 0.09, which means averagely growth in real investment is 9.0%, anyhow, it is an average growth in investment and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.10 and this value is showing that data for this variable has deviation from mean up to 10%.

The results are also depicting the maximum and minimum growth in investment during the period of sample data. The value of skewness is negative but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that average real output growth (GY) in Hungary is 0.02, which means averagely real output growth is 2.0%, anyhow, it is an average growth and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.03 and this value is showing that data for this variable has deviation from mean upto 3.0%.

The results are also depicting the maximum and minimum real output growth during the period of sample data. The value of skewness is negative so data is negatively skewed. Moreover, value of kurtosis is greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that differenced real interest rate in Hungary is 0.03, which means averagely difference in real interest rate over the period of time is 0.03, which showing that real interest rate has decreasing tendency over the period of time. However, it is an average difference and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.02 and this value is showing that data for this variable has deviation.

The results are also depicting the maximum and minimum difference in real interest rate during the period of sample data. The value of skewness is closer to zero. Moreover, value of kurtosis is closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that firm equity growth in Hungary is 0.39, which means averagely equity growth over the period of time is 86.5%, which showing that real interest rate has decreasing tendency over the period of time. However, it is an average growth in equity and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 9.36 and this value is showing that data for this variable has deviation from mean, which is a big variation.

The results are also depicting the maximum and minimum growth rate during the period of sample data. The value of skewness is positive, which is showing that data is positively skewed. Moreover, value of kurtosis also greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that nominal exchange growth rate in Hungary is 0.04, which means averagely growth in nominal exchange is 0.4%, anyhow, it is an average growth rate in nominal exchange and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.13 and this value is showing that data for this variable has deviation from mean upto 13%.

The results are also depicting the maximum and minimum growth in nominal exchange during the period of sample data. The value of skewness is negative but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis is greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is normal for this variable.

4.1.4-India

Table 5: Descriptive Statistics of India

	GI	GY	DRINT	GQ	GE
Mean	0.077	0.066	0.005	0.110	0.054
Median	0.081	0.067	0.002	-0.095	0.060
Maximum	0.134	0.085	0.092	1.131	0.191
Minimum	0.018	0.040	-0.028	-0.469	-0.041
Std. Dev.	0.033	0.010	0.023	0.576	0.067
Skewness	-0.029	-0.415	2.290	0.877	0.439
Kurtosis	2.233	3.345	9.703	2.214	2.516
Jarque-Bera	0.567	0.775	63.152	3.540	0.962
Probability	0.753	0.679	0.000	0.170	0.618

The results in table No.5 are showing that average real investment growth (GI) in India is 0.077, which means averagely growth in real investment is 7.7%, anyhow, it is an average growth in investment and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.033 and this value is showing that data for this variable has deviation from mean up to 3.3%.

The results are also depicting the maximum and minimum growth in investment during the period of sample data. The value of skewness is negative but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that average real output growth (GY) in India is 0.066, which means averagely real output growth is 6.6%, anyhow, it is an average growth and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be

measured with the value of standard deviation i.e. 0.010 and this value is showing that data for this variable has deviation from mean upto 1.0%.

The results are also depicting the maximum and minimum real output growth during the period of sample data. The value of skewness is negative but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that differenced real interest rate in India is 0.005, which means averagely difference in real interest rate over the period of time is -0.001, which showing that real interest rate has decreasing tendency over the period of time. However, it is an average difference and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.023 and this value is showing that data for this variable has deviation from mean up to 2.3%.

The results are also depicting the maximum and minimum difference in real interest rate during the period of sample data. The value of skewness is positive, which is showing that data is positively skewed. Moreover, value of kurtosis also greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that firm equity growth in India is 0.110, which means averagely equity growth over the period of time is 86.5%, which showing that real interest rate has decreasing tendency over the period of time. However, it is an average growth in equity and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.576 and this value is showing that data for this variable has deviation from mean, which is a big variation.

The results are also depicting the maximum and minimum growth rate during the period of sample data. The value of skewness is positive closer to zero, which is showing that data is normally distributed. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that nominal exchange growth rate in India is 0.054, which means averagely growth in nominal exchange is 5.4%, anyhow, it is an average growth rate in nominal exchange and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.067 and this value is showing that data for this variable has deviation from mean up to 6.7%.

The results are also depicting the maximum and minimum growth in nominal exchange during the period of sample data. The value of skewness is positive but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is normal for this variable.

4.1.5-Mexico

Table 6: Descriptive Statistics of Mexico

	GI	GY	DRINT	GQ	GE
Mean	0.10	0.02	-0.0001	0.30	0.04
Median	0.10	0.03	0.00	0.11	0.02
Maximum	0.34	0.07	0.09	4.38	0.29
Minimum	-0.09	-0.08	-0.07	-0.81	-0.12
Std. Dev.	0.09	0.03	0.02	0.91	0.09
Skewness	0.17	-1.33	0.28	2.66	0.69
Kurtosis	3.14	6.75	13.76	11.03	2.69
Jarque-Bera	0.46	72.92	401.27	321.24	6.91
Probability	0.79	0.00	0.00	0.00	0.03

In table No. 6 the results are indicated that average real investment growth (GI) in Mexico is 0.10, which means averagely growth in real investment is 10%, anyhow, it is an average growth in investment and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.09 and this value is showing that data for this variable has deviation from mean upto 9%.

The results are also depicting the maximum and minimum growth in investment during the period of sample data. The value of skewness is closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that average real output growth (GY) in Mexico is 0.02, which means averagely real output growth is 2.0%, anyhow, it is an average growth and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.03 and this value is showing that data for this variable has deviation from mean up to 3%.

The results are also depicting the maximum and minimum real output growth during the period of sample data. The value of skewness is negative, which mean data is negatively skewed. Moreover, value of kurtosis is greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that differenced real interest rate in Mexico is -0.0001, which means averagely difference in real interest rate over the period of time is -0.0001, which showing that real interest rate has decreasing tendency over the period of time. However, it is an average difference and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.02 and this value is showing that data for this variable has deviation from mean upto 2%.

The results are also depicting the maximum and minimum difference in real interest rate during the period of sample data. The value of skewness is positive, which is showing that data is positively skewed. Moreover, value of kurtosis also greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that firm equity growth in Mexico is 0.30, which means averagely equity growth over the period of time is 30%, which showing that real interest rate has decreasing tendency over the period of time. However, it is an average growth in equity and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.91 and this value is showing that data for this variable has deviation from mean, which is a big variation.

The results are also depicting the maximum and minimum growth rate during the period of sample data. The value of skewness is positive, which is showing that data is positively skewed. Moreover, value of kurtosis is greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that nominal exchange growth rate in Mexico is 0.04, which means averagely growth in nominal exchange is 4%, anyhow, it is an average growth rate in nominal exchange and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.09 and this value is showing that data for this variable has deviation from mean upto 9%.

The results are also depicting the maximum and minimum growth in nominal exchange during the period of sample data. The value of skewness is positive so data is positively skewed. Moreover, value of kurtosis is less than 3 and showing that the height of curve for this variable is platy-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is normal for this variable.

4.1.6-Poland

Table 7: Descriptive Statistics of Poland

	GI	GY	DRINT	GQ	GE
Mean	0.06	0.04	-0.0006	0.20	0.01
Median	0.06	0.04	0.00	-0.13	-0.02
Maximum	0.22	0.07	0.01	12.68	0.40
Minimum	-0.10	0.00	-0.02	-7.01	-0.26
Std. Dev.	0.08	0.02	0.01	2.90	0.14
Skewness	0.06	0.11	-0.92	1.52	0.68
Kurtosis	2.29	2.69	4.02	9.41	3.61
Jarque-Bera	1.09	0.29	9.35	106.79	4.66
Probability	0.58	0.86	0.01	0.00	0.10

The results are indicated that average real investment growth (GI) in Poland is 0.06, which means averagely growth in real investment is 6%, anyhow, it is an average growth in investment and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.08 and this value is showing that data for this variable has deviation from mean up to 8%.

The results are also depicting the maximum and minimum growth in investment during the period of sample data. The value of skewness is closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that average real output growth (GY) in Poland is 0.04, which means averagely real output growth is 4%, anyhow, it is an average growth and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.02 and this value is showing that data for this variable has deviation from mean up to 2%.

The results are also depicting the maximum and minimum real output growth during the period of sample data. The value of skewness is negative but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that differenced real interest rate in Poland is -0.0006, which means averagely difference in real interest rate over the period of time is -0.0006, which showing that real interest rate has decreasing tendency over the period of time. However, it is an average difference and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.01 and this value is showing that data for this variable has deviation from mean up to 1%.

The results are also depicting the maximum and minimum difference in real interest rate during the period of sample data. The value of skewness is negative, which is showing that data is negatively skewed. Moreover, value of kurtosis also greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that firm equity growth in Poland is 0.20, which means averagely equity growth over the period of time is 20%, which showing that real interest rate has decreasing tendency over the period of time. However, it is an average growth in equity and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 2.90 and this value is showing that data for this variable has deviation from mean, which is a big variation.

The results are also depicting the maximum and minimum growth rate during the period of sample data. The value of skewness is positive, which is showing that data is positively skewed. Moreover, value of kurtosis also greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that nominal exchange growth rate in Poland is 0.01, which means averagely growth in nominal exchange is 1%, anyhow, it is an average growth rate in nominal exchange and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.14 and this value is showing that data for this variable has deviation from mean up to 14%.

The results are also depicting the maximum and minimum growth in nominal exchange during the period of sample data. The value of skewness is positive but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is normal for this variable.

4.1.7-South Africa

Table 8: Descriptive Statistics of South Africa

	GI	**GY**	**DRINT**	**GQ**	**GE**
Mean	0.071	0.018	0.0002	2.551	0.086
Median	0.060	0.020	0.001	1.871	0.103
Maximum	0.174	0.038	0.014	21.887	0.299

Minimum	-0.004	-0.006	-0.011	-12.055	-0.179
Std. Dev.	0.045	0.010	0.006	7.828	0.119
Skewness	0.692	-0.204	0.215	0.320	-0.540
Kurtosis	2.806	3.221	2.739	2.851	2.483
Jarque-Bera	2.276	0.252	0.295	0.505	1.672
Probability	0.320	0.882	0.863	0.777	0.434

The above presented table is showing the results for descriptive statistics of all variables pertaining to South Africa.

The results are indicated that average real investment growth (GI) in South Africa is 0.071, which means averagely growth in real investment is 7.1%, anyhow, it is an average growth in investment and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.045 and this value is showing that data for this variable has deviation from mean up to 4.5%.

The results are also depicting the maximum and minimum growth in investment during the period of sample data. The value of skewness is closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that average real output growth (GY) in South Africa is 0.018, which means averagely real output growth is 1.8%, anyhow, it is an average growth and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.01 and this value is showing that data for this variable has deviation from mean upto 10%.

The results are also depicting the maximum and minimum real output growth during the period of sample data. The value of skewness is negative but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that differenced real interest rate in South Africa is 0.0002, which means averagely difference in real interest rate over the period of time is 0.0002, which showing that real interest rate has decreasing tendency over the period of time. However, it is an average difference and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.006 and this value is showing that data for this variable has deviation from mean upto 0.6%.

The results are also depicting the maximum and minimum difference in real interest rate during the period of sample data. The value of skewness is negative but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable. .

The results are indicated that firm averagely equity growth in South Africa is 2.551. However, it is an average growth in equity and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 7.28 and this value is showing that data for this variable has deviation from mean, which is a big variation.

The results are also depicting the maximum and minimum growth rate during the period of sample data. The value of skewness is negative but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The probability of Jarque-Bera is showing the insignificant results, which is showing that data is normal for this variable.

The results are indicated that nominal exchange growth rate in South Africa is 0.086, which means averagely growth in nominal exchange is 8.6%, anyhow, it is an average growth rate in nominal exchange and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.119 and this value is showing that data for this variable has deviation from mean up to 11.9%.

The results are also depicting the maximum and minimum growth in nominal exchange during the period of sample data. The value of skewness is positive but closer to zero, which mean data is normally distributed as value of skewness is closer to zero. Moreover, value of kurtosis also closer to 3 and showing that the height of curve for this variable is meso-kurtic. The

probability of Jarque-Bera is showing the significant results, which is showing that data is normal for this variable.

4.1.8-South Korea

Table 9: Descriptive Statistics of South Korea

	GI	GY	DRINT	GQ	GE
Mean	0.066	0.046	-0.001	1.881	0.017
Median	0.067	0.045	-0.001	-0.302	-0.018
Maximum	0.198	0.129	0.040	171.855	0.617
Minimum	-0.209	-0.077	-0.056	-16.725	-0.297
Std. Dev.	0.070	0.035	0.013	17.900	0.133
Skewness	-1.241	-0.672	-0.452	8.580	1.785
Kurtosis	7.036	5.226	7.547	81.456	8.048
Jarque-Bera	95.415	28.747	91.338	27411.580	162.457
Probability	0.000	0.000	0.000	0.000	0.000

The results presented in Table No.9 are showing that average real investment growth (GI) in South Korea is 0.066, which means averagely growth in real investment is 6.6%, anyhow, it is an average growth in investment and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.070 and this value is showing that data for this variable has deviation from mean up to 7%.

The results are also depicting the maximum and minimum growth in investment during the period of sample data. The value of skewness is negative so data is negatively skewed. Moreover, value of kurtosis also greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that average real output growth (GY) in South Korea is 0.046, which means averagely real output growth is 4.6%, anyhow, it is an average growth and it may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also

be measured with the value of standard deviation i.e. 0.035 and this value is showing that data for this variable has deviation from mean up to 3.5%.

The results are also depicting the maximum and minimum real output growth during the period of sample data. The value of skewness is negative so data is negatively skewed. Moreover, value of kurtosis also greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that differenced real interest rate in South Korea is -0.001, which means averagely difference in real interest rate over the period of time is -0.001, which showing that real interest rate has decreasing tendency over the period of time. However, it is an average difference and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 0.013 and this value is showing that data for this variable has deviation from mean up to 1.3%.

The results are also depicting the maximum and minimum difference in real interest rate during the period of sample data. The value of skewness is negative so data is negatively skewed. Moreover, value of kurtosis also greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that firm equity growth in South Korea is 1.881, which means averagely equity growth over the period of time is 1.881 units. However, it is an average growth in equity and may vary from time to time (Quarter to Quarter). The variation in data for this specific variable is also be measured with the value of standard deviation i.e. 17.9 and this value is showing that data for this variable has deviation from mean, which is a big variation.

The results are also depicting the maximum and minimum growth rate during the period of sample data. The value of skewness is positive so data is positively skewed. Moreover, value of kurtosis also greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

The results are indicated that nominal exchange growth rate in South Korea is 0.017, which means averagely growth in nominal exchange is 1.7%, anyhow, it is an average growth rate in nominal exchange and it may vary from time to time (Quarter to Quarter). The variation in data

for this specific variable is also be measured with the value of standard deviation i.e. 0.133 and this value is showing that data for this variable has deviation from mean up to 13.3%.

The results are also depicting the maximum and minimum growth in nominal exchange during the period of sample data. The value of skewness is positive so data is positively skewed. Moreover, value of kurtosis also greater than 3 and showing that the height of curve for this variable is lepto-kurtic. The probability of Jarque-Bera is showing the significant results, which is showing that data is non-normal for this variable.

4.2 – Mathematical models

4.2.1 - Base Line Model:

Table 10: Base Line Model Equation

Variables	CHILE	CZECH	HUNGARY	INDIA	MEXICO	POLAND	S-AFRICA	S-KOREA
Constant	0.025	-0.004	0.002	0.014	0	-0.024	-0.003	-0.012
	(-0.247)	(-0.422)	(-0.823)	(0.768)	(-0.93)	(-0.083)	(-0.765)	(-0.026)
GDPG	-0.206	0.840***	0.772***	0.281	1.228***	1.082***	1.653***	0.659***
	(-0.600)	(0.000)	(-0.016)	(-0.667)	(0.000)	(0.016)	(-0.008)	(0.000)
RIRate	-0.425	-0.118	0.042	-0.213	-0.037	-0.889	-0.925	0.506**
	(-0.267)	(-0.666)	(-0.941)	(-0.525)	(-0.863)	(-0.289)	(-0.244)	(-0.041)
PIGrowth	0.774***	0.515***	0.761***	0.582***	0.672***	0.704***	0.643***	0.723***
	(0.000)	(0.000)	(0.000)	(-0.001)	(0.000)	(0.000)	(0.000)	(0.000)
R Squared	0.603	0.698	0.722	0.364	0.869	0.801	0.739	0.82
DW-Stat	1.519	1.461	2.127	2.06	1.414	1.848	1.625	1.754
F Statistic	20.319	61.654	60.612	3.633	174.7	74.237	21.755	148.89

p-values in brackets, significant at 1%***, 5%** and 10%*

Note: Instruments are all lagged values of independent variable

Baseline Model consider to be simple in setting up and most probably provide with the some decent results. Mostly financial statement analysis show preference baseline is called horizontal analysis. Which is used to compares a company's historical financial information over a number of reporting periods that may be monthly, quarterly, or annually. Here in our research report purpose of using baseline model is modified as explained above.

Table No.10 consider as a base line model showing the results for analytical analysis in which regression analysis has been carried out to check the effect of GDP growth, change in real interest rate and lag term of investment growth. F-statistic has values greater than 2, in case of results obtained for all countries. These results depict that models are specified in scenario of all countries. The value of R-square is showing the explanatory power of the models that have applied in case of each country. The highest explanatory power of the model is 0.820 and it has been found in scenario of South Korea, which depicted that the model has explained 82% variation in growth of real investment in South Korea. The lowest R-square is found in case of India and this explanatory power is 36.4%. Moreover, Durbin-Watson is showing that there is no issue of Auto-correlation as all models have value of Durbin-Watson closer to 2.

In scenario of CHILE, the results are showing that GDP growth has negative but insignificant influence on real growth in investment. Moreover, the similar insignificant results have also been obtained in case of INDIA. In case of all other countries, the GDP growth has significant and positive effect on real growth in investment. In scenario of Czech Republic, the co-efficient of GDP growth is 0.840 with probability less than 0.05, these results indicates that GDP growth has positive effect and significant effect on real growth in investment. If one unit of GDP growth is increased then 0.840 unit of real growth in investment in increased in case of Czech Republic. In case of Hungary, the co-efficient of GDP growth is found as 0.772 with probability less than 0.05, so if GDP growth is increased 1% then 0.772% increase is forecasted in real growth in investment. In Mexico, Poland, South Africa and South Korea scenario, the GDP growth is also showing positive and significant influence on real growth of investment. However, more growth in investment is expected in South Africa with more co-efficient of GDP growth i.e. 1.653.

Change in interest rate has no significant influence on real growth of investment in case of all countries except South Korea. In case of South Korea, the results are showing that the co-efficient of change in interest rate is 0.507 with p-value less than 0.05, which indicates if one unit interest rate in changed then 0.507 units change in growth of investment is expected and the change has positive direction.

Moreover, lagged term of GDP growth is showing positive and significant influence on growth of real investment in case of all countries taken into account. These results are depicting that growth in real investment is measured by lagged term of growth in real investment.

4.2.2 - New Equation Model:

Table 11: Tobin's Q Model Equation

Variables	CHILE	CZECH	HUNGARY	INDIA	MEXICO	POLAND	S-AFRICA	S-KOREA
Constant	0.012	-0.008	-0.003	0.018	-0.009	-0.015	-0.01	-0.004
	(-0.767)	(-0.16)	(-0.582)	(-0.741)	(-0.128)	(-0.177)	(-0.303)	(-0.506)
GY	-0.264	1.118***	0.875***	0.239	1.484***	0.829*	2.312***	0.512***
	(-0.735)	(0.000)	(-0.005)	(-0.745)	(0.000)	(-0.077)	(0.000)	(0.000)
DRINT	-0.357	-0.019	-0.377	-0.182	-0.177	-1.238	-0.642	0.386*
	(-0.536)	(-0.947)	(-0.409)	(-0.601)	(-0.178)	(-0.237)	(-0.368)	(-0.08)
GQ	0.009	-0.000**	-0.002	-0.005	0.005	0.002**	-0.005	-0.000***
	(-0.682)	(-0.026)	(-0.165)	(-0.666)	(-0.289)	(-0.04)	(-0.916)	(-0.006)
GE	-0.017	0.106***	0.053	0.021	0.167***	-0.062	0.102**	-0.039
	(-0.833)	(0.000)	(-0.237)	(-0.826)	(0.000)	(-0.151)	(-0.036)	(-0.162)
PIGrowth	0.900***	0.478***	0.788***	0.581***	0.609***	0.720***	0.447***	0.726***
	(0.000)	(0.000)	(0.000)	(-0.002)	(0.000)	(0.000)	(-0.002)	(0.000)
R Squared	0.74	0.751	0.759	0.37	0.889	0.821	0.775	0.829
DW-Stat	2.3	1.482	2.111	2.093	1.33	1.925	1.431	1.774
F Statistic	5.126	47.204	42.959	2	124.329	41.344	14.484	93.649

p-values in brackets, significant at 1%***, 5%** and 10%*

Note: Instruments are all lagged values of independent variable

*Significant at 90 percent level

**Significant at 95 percent level

***Significant at 99 percent level

For the past three decades Tobin's Q theory has been used as an important variable input in regard with the financial and the statistical financial analysis models considering it an analytical tool. The ratio has been used in investment, diversification and also to explain the relationship between managerial ownership and firm value. (Jose, Nichols, and Stevens (1986). Tobin Q ratio has been used as a measure of a firm performance to estimate the relative importance of industry, focus and share effects in determining firm's performance (Werner felt and Montgomery (1988).

Table No.11 is showing the results from New Equation Model using Tobin's Q equation in which the effect of GDP growth, change in real interest rate, equity value, exchange rate depreciation and lag term of investment growth on growth of real investment has been obtained. F-statistic has values greater than 2, in case of results obtained for all countries. These results depict that models are specified in scenario of all countries. The value of R-square is showing the explanatory power of the models that have applied in case of each country. The highest explanatory power of the model is 0.889 and it has been found in scenario of Mexico, which depicted that the model has explained 88.9% variation in growth of real investment in Mexico. The lowest R-square is found in case of India and this explanatory power is 37%. Moreover, Durbin-Watson is showing that there is no issue of Auto-correlation as all models have value of Durbin-Watson closer to 2.

In scenario of CHILE, the results are showing that GDP growth has negative but insignificant influence on real growth in investment. Moreover, the similar insignificant results have also been obtained in case of INDIA. In case of all other countries, the GDP growth has significant and positive effect on real growth in investment. In scenario of Czech Republic, the results indicate that GDP growth has positive effect and significant effect on real growth in investment. In case of Hungary, the co-efficient of GDP growth is found as positive and significant with probability less than 0.05. In Mexico, Poland, South Africa and South Korea scenario, the GDP growth is also showing positive and significant influence on real growth of investment. However, more growth in investment is expected in South Africa with more co-efficient of GDP growth and lowest growth in case of South Korea.

Change in interest rate has no significant influence on real growth of investment in case of all countries except South Korea. In case of South Korea, the results are showing that the co-efficient of change in interest rate is 0.512 with p-value less than 0.05, which indicates if one unit interest rate in changed then 0.512 units change in growth of investment is expected and the change has positive direction. The results are indicated that firm equity also has its influenced on growth of real investment in scenario of Czech Republic, Poland and South Korea. Exchange rate depreciation has showing its significant influence on growth of real investment in case of Czech Republic, South Africa and South Korea.

Moreover, lagged term of GDP growth is showing positive and significant influence on growth of real investment in case of all countries taken into account. These results are depicting that growth in real investment is measured by lagged term of growth in real investment.

4.3 - Regression Graphs:

4.3.1 - South Korea Regression Graph:

GI= Actual Growth Investment

GIF= Forecast Growth Investment

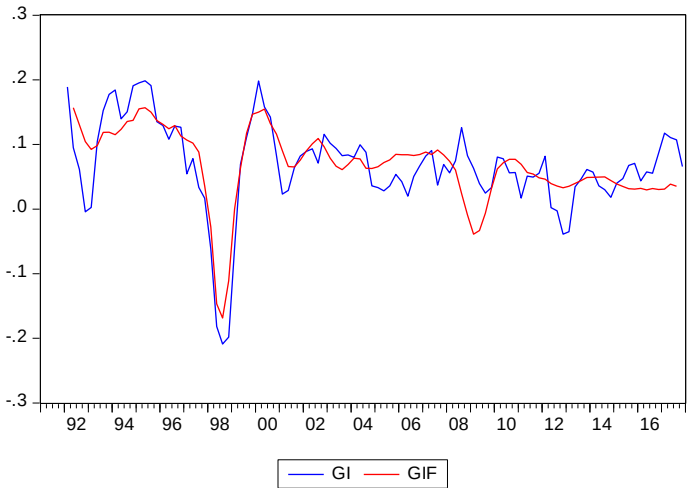

Figure 1: South Korea Regression Graph 1

Above Figure 1 of graph is showing the results for actual investment growth by GI and GIF is showing the forecasted investment growth both lines moving simultaneously in same direction, which is showing that regression equation is best fitted with minimum errors. However, a slightly difference has been seen during 2008 and 2009

4.3.2-South Africa Regression Graph:

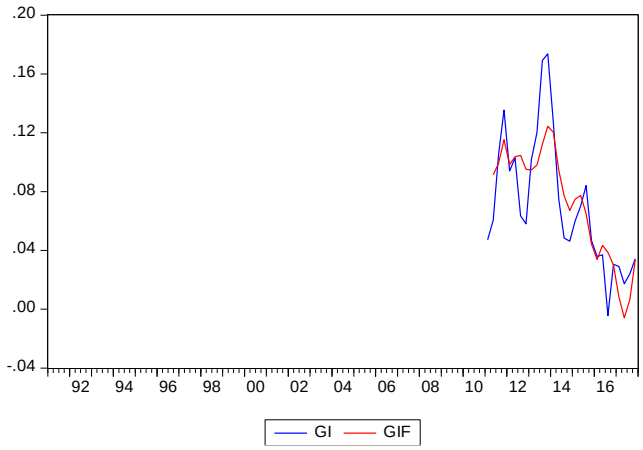

Figure 2: South Africa Regression Graph 2

Graphical figure 2 of South Africa is showing for actual investment growth by GI and GIF is showing that the forecasted investment growth both lines moving simultaneously in same direction, which is showing that regression equation is best fitted with minimum errors. However, data from 2009 to 2018 has been included for analysis in South Africa scenario

4.3.3-Czech Republic Regression Graph:

GI= Actual Growth Investment

GIF= Forecast Growth Investment

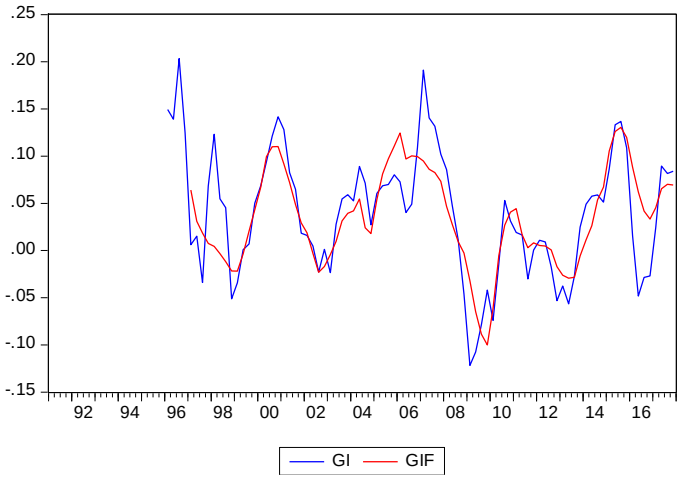

Figure 3: Czech Republic Regression Graph 3

Above Regression graph figure 3 is showing the results for actual investment growth by GI and GIF is showing the forecasted investment growth both lines moving simultaneously in same direction, which is showing that regression equation is best fitted with minimum errors. However, a slightly difference has been seen during 2008 and 2009.

4.3.4-India Regression Graph:

GI= Actual Growth Investment

GIF=Forecast Growth Investment

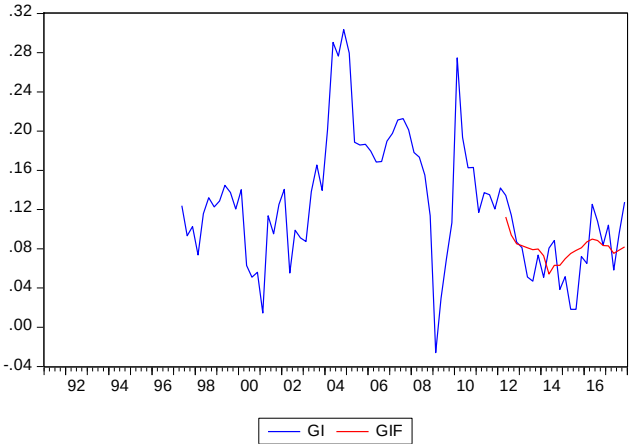

Figure 4: India regression Graph 4

India Regression graph figure 4 actually showing the results for actual investment growth by GI and GIF is showing the forecasted investment growth both lines moving simultaneously in

same direction, which is showing that regression equation is best fitted with minimum errors. However, comparison has been made from 2010 onward.

4.3.5-Hungary Regression Graph:

GI= Actual Growth Investment

GIF=Forecast Growth Investment

Figure 5: Hungary Regression Graph 5

Above line graph is showing the results for actual investment growth by GI and GIF is showing the forecasted investment growth both lines moving simultaneously in same direction, which is showing that regression equation is best fitted with minimum errors. However, a slightly difference has been seen during 1994 and 2005.

4.3.6-Poland Regression Graph:

GI= Actual Growth Investment

GIF= Forecast Growth Investment

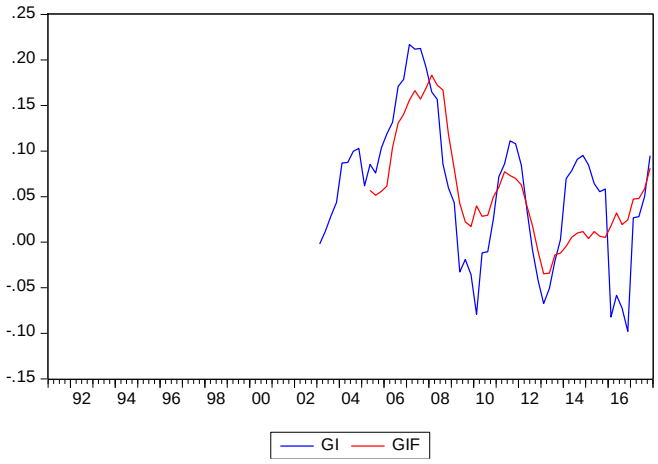

Figure 6: Poland Regression Graph 6

Poland Regression graph is showing the results for actual investment growth by GI and GIF is showing the forecasted investment growth both lines moving simultaneously in same direction, which is showing that regression equation is best fitted with minimum errors. However, a slightly difference has been seen during 2008 and 2009.

4.3.7-Chile Regression Graph:

GI= Actual Growth Investment

GIF=Forecast Growth Investment

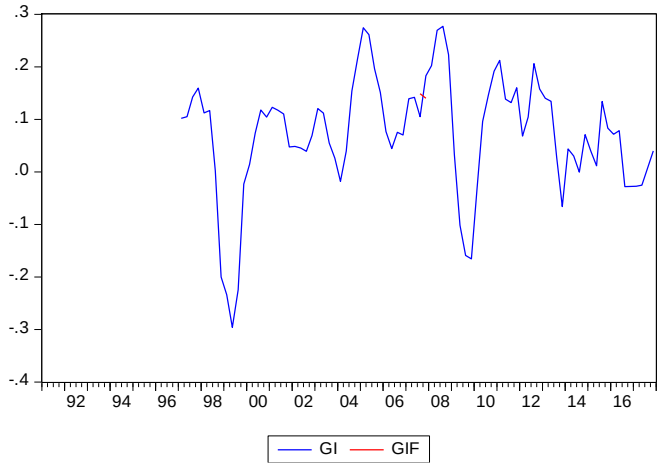

Figure 7: Chile Regression Graph 7

Above line graph is showing the results for actual investment growth by GI and GIF is showing the forecasted investment growth both lines moving simultaneously in same direction, which is showing that regression equation is best fitted with minimum errors.

4.3.8-Mexico Regression Graph:

GI=Actual Growth Investment

GIF= Forecast Growth Investment

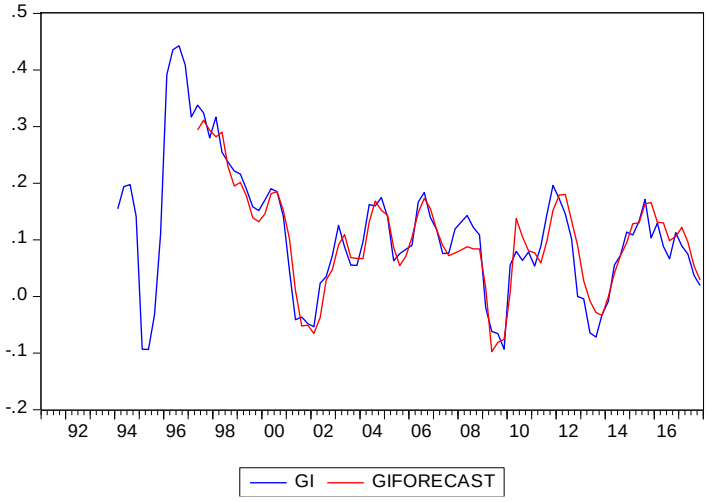

Figure 8: Mexico Regression Graph 8

Above line graph is showing the results for actual investment growth by GI and GIF is showing the forecasted investment growth both lines moving simultaneously in same direction, which is showing that regression equation is best fitted with minimum errors. However, a slightly difference has been seen during 2008 and 2009.

5: Conclusion

The main objective of the research is to check the effect of GDP growth, change in real interest rate and lag term of investment growth in Base line Model, while implementing Tobin Q Equation Model the impact of GDP growth, change in real interest rate, equity value, exchange rate depreciation and lag term of investment growth on growth of real investment has been investigated. The results have been obtained in scenario of Eight Emerging Markets, Chile, Czech Republic, Hungary, India, Mexico, Poland, South Africa and South Korea.

Dynamic models have been used and in all countries except Chile, the significant influence of GDP growth on real investment growth has been found in both models.

Base line Model give the results for analytical analysis in which regression analysis has been carried out to check the effect of GDP growth, change in real interest rate and lag term of investment growth. In scenario of CHILE, the results are showing that GDP growth has negative but insignificant influence on real growth in investment. Moreover, the similar insignificant results have also been obtained in case of INDIA. In case of all other countries, the GDP growth has significant and positive effect on real growth in investment. In scenario of Czech Republic, the results indicate that GDP growth has positive effect and significant effect on real growth in investment. In case of Hungary, the co-efficient of GDP growth is found as 0.772 with probability less than 0.05, so if GDP growth is increased 1% then 0.772% increase is forecasted in real growth in investment. In Mexico, Poland, South Africa and South Korea scenario, the GDP growth is also showing positive and significant influence on real growth of investment. However, more growth in investment is expected in South Africa with more co-efficient of GDP growth. Change in interest rate has no significant influence on real growth of investment in case of all countries except South Korea.

Moreover, lagged term of GDP growth is showing positive and significant influence on growth of real investment in case of all countries taken into account. These results are depicting that growth in real investment is measured by lagged term of growth in real investment.

Tobin Q equation model shows the effect of GDP growth, change in real interest rate, equity value, exchange rate depreciation and lag term of investment growth on growth of real investment has been obtained. In scenario of CHILE, the results are showing that GDP growth has negative but insignificant influence on real growth in investment. Moreover, the similar insignificant results have also been obtained in case of INDIA. In case of all other countries,

the GDP growth has significant and positive effect on real growth in investment. In scenario of Czech Republic, the results indicate that GDP growth has positive effect and significant effect on real growth in investment. In case of Hungary, the co-efficient of GDP growth is found as positive and significant. In Mexico, Poland, South Africa and South Korea scenario, the GDP growth is also showing positive and significant influence on real growth of investment. However, more growth in investment is expected in South Africa with more co-efficient of GDP growth and lowest growth in case of South Korea.

Change in interest rate has no significant influence on real growth of investment in case of all countries except South Korea. The results are indicated that firm equity also has its influenced on growth of real investment in scenario of Czech Republic, Poland and South Korea. Exchange rate depreciation has showing its significant influence on growth of real investment in case of Czech Republic, South Africa and South Korea. Moreover, lagged term of GDP growth is showing positive and significant influence on growth of real investment in case of all countries taken into account. These results are depicting that growth in real investment is measured by lagged term of growth in real investment.

The results are fruitful for policy makers while formulating their strategies and policies. They should consider average real output growth and lagged investment while formulating policies for investment as both these influence the real investment growth.

References:

ALOKLA, W.I. and Masri, T.A., The use of Tobin's Q model in predicting the performance and profitability of companies listed on the Damascus Securities Exchange.. *An analytical study during the period 2011-2018.*

Basile, L. and Salvadori, N., 1984. Kalecki's pricing theory. *Journal of Post Keynesian Economics*, *7*(2), pp.249-262.

Bleakley, H. and Cowan, K., 2008. Corporate dollar debt and depreciations: much ado about nothing?. *The Review of Economics and Statistics*, 90(4), pp.612-626.

Bordo, M.D. and Jeanne, O., 2002. Monetary policy and asset prices: does 'benign neglect'make sense?. *International Finance*, *5*(2), pp.139-164.

Berganza, J.C., Chang, R. and Herrero, A.G., 2004. Balance sheet effects and the country risk premium: an empirical investigation. *Review of World Economics*, *140*(4), pp.592-612.

Calvo, G.A. and Guidotti, P.E., 1989. *Indexation and maturity of government bonds: A simple model*. International Monetary Fund, Research Dept...

De Nicoló, M.G., Honohan, M.P. and Ize, M.A., 2003. *Dollarization of the banking system: good or bad?* (No. 3-146). International Monetary Fund

Eichengreen, B. and Hausmann, R., 1999. *Exchange rates and financial fragility* (No. w7418). National bureau of economic research.

Fu, L., Singhal, R. and Parkash, M., 2016. Tobin's q ratio and firm performance. *International research journal of applied finance*, *7*(4), pp.1-10.

Fazzari, S.M. and Mott, T.L., 1986. The investment theories of Kalecki and Keynes: an empirical study of firm data, 1970–1982. *Journal of Post Keynesian Economics*, *9*(2), pp.171-187.

Hansen, H. and Rand, J., 2006. On the causal links between FDI and growth in developing countries. *World Economy*, *29*(1), pp.21-41.

Hubbard, R.G., 1997. *Capital-market imperfections and investment* (No. w5996). National Bureau of economic research.

Jeanne, O., (1999a). "*Foreign currency debt and signalling". IMF Research Department, Mimeo*.

Jeanne, O.,(1999b). "*Foreign currency debt, moral hazard and the global financial architecture". IMF Research Department, Mimeo*.

Jose, M.L., Nichols, L.M. and Stevens, J.L., 1986. Contributions of diversification, promotion, and R&D to the value of multiproduct firms: A Tobin's q approach. *Financial Management*, pp.33-42.

Lopez, J. and Mott, T., 1999. Kalecki versus Keynes on the Determinants of Investment. *Review of Political Economy*, *11*(3), pp.291-301.

Serven, L., 2002. *Real exchange rate uncertainty and private investment in developing countries*. The World Bank.

Wernerfelt, B. and Montgomery, C.A., 1988. Tobin's q and the importance of focus in firm performance. *The American Economic Review*, pp.246-250.

Williamson, J., 2000. *Exchange rate regimes for emerging markets: reviving the intermediate option* (Vol. 60). Peterson Institute.