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Determinants of Currency Risk: An Empirical Analysis of Emerging Markets

by

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This article is dedicated to my family.

CAPITAL UNIVERSITY OF SCIENCE & TECHNOLOGY

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CERTIFICATE OF APPROVAL

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Abstract

The aim of the study is to examine the impact of the macro economic factors on exchange rate risk. The current study has employed the data of the eight emerging countries for the period of 1999 to 2016. Currency beta is used as a proxy of exchange rate volatility.The panel regression is applied to investigate the impact of macroeconomic variable on exchange rate volatility.The findings of the study revealed that inflation, trade openness, credit ratings, and tax revenues significantly affect exchange rate volatility. This shows that investors are rational decision makers. For investment decision they incorporate more country specific information.

Keywords: Exchange rate risk; Macroeconomic variables

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Abbreviations

CPI	Consumer Price Index
CR	Currency risk
ERR	Exchange Rate Risk.
IMF	International Monetary Funds
INC	Inflation
MSCI	Morgan Stanley Capital International
PPP	Purchasing Power Parity
TO	Trade Openness
TR	Tax Revenue

Chapter 1

Introduction

Particularly in developing economies, the emerging economies are much appealing for the group of investors. The investors cannot acquire more return in established countries as compared to emerging countries because established market are not more volatile than emerging markets. To minimize risk and to limit the hazards many speculators expand their investment towards emerging economies. In 1973 when exchange rate system started floating the currency exchange rate was permitted to flow to a point and extent in opposition to different most important currencies. On the other hand by using the material information of one market investor can assist the speculator in forecasting the trend of other market relation.

The definition of the exchange rate volatility is grounded on the instance in Adler & Dumas (1984). The role of exchange rates is extremely significant in the worldwide market and the variability of exchange rates in each of the case of appreciation or depreciation is connected directly with the economic performance of a country. Exchange rate fluctuation have become excessive since the acceptance of changeable interchange price establishments and the volatility of the currencies of developing countries depends on the pegging system and the embedded weight of the currency that a particular country pegs (Chong and Tan, 2007).

Foreign exchange rate is also known as exchange rate risk. It can also be referred as currency uncertainty or sensitivity. This study uses the word beta and currency risk interchangeably. There are three types of exchange rate risk operation,

transactional and translational risk. Once the investor has invested in diversified market the only risk left is systematic risk which is due to the change in foreign exchange rate. The risk which arises due to fluctuation in exchange rate is linked with the returns on stock, bond and securities. Due to loss in return foreign investors and managers become reluctant to invest in such countries whose currency devalue and increase the exchange rate risk because of this ultimately the foreign investors or managers will face higher operational, transactional and translational cost. Overseas interchange threat also happens when the external subsidiary of a corporation withstands monetary declarations in an exchange other than the reportage exchange of the combined unit. The menace is that there might be an opposing drive in the interchange rate of the supremacy money in relative to the base money before the day when the transaction is accomplished.

Interestingly, macroeconomic factors play an important role towards determination of exchange rate risk such as tax revenues, exports and imports while referring to GDP, inflation and credit ratings (Patro, Wald, & Wu, 2002). Economists have made enormous deliberation regarding existence of a constructive liaison between a country's commitment in international trade and economic performance. Fluctuations in security prices have been pertinently noted due to different macroeconomic variables. This study observes the reflection of these economic activities in currency risk. As a result, the study identifies a robust connection amongst macroeconomic variables and foreign exchange rate. Subsequently, stock market returns are significantly tied with the economic variables (Fama E. F., 1981).

The perseverance of this study is to enquiry the effect because of the factors of macro-economic variables. This study particularly focuses on identifying key factors having an impact on currency risk More specifically, it strives to determine those factors having direct link to increase in beta (β) as well as factors having an inverse relationship. This study uses multiple types of macroeconomic variables, in order to evaluate currency risk. Beta (β) is used as a proxy of currency risk.

Prime goal line of this study is to scrutinize the impact of the factor of foreign exchange rate risk of eight Asian nations, over the duration starting from 1999 to 2016. In this study different macroeconomic variables are consider to describe

exchange rate risk such as inflation, credit ratings, tax revenue, trade openness. Therefore many potential interpretations regarding observed relations which exist among foreign exchange rate and aforesaid macroeconomic variables.

This study significantly diverges from the prevailing study of Patro, D.K., Wald, J.K. and Wu, Y. (2002) from many factors. Betas are not thought to be a function of some specific variables although these are allowed to change on yearly basis. Annual betas are calculated and estimated precisely by using daily data on exchange rates and currency indices. Further moving forward in the second phase of the research the country specific annually calculated betas are estimated through regression on the variables of the macroeconomics. This practice ensures provision of an econometric relationship between macroeconomic variables and exchange risk This also enables us for potential economic clarification and it is revealed through the results that all the macroeconomic variables significantly influence the volatility of foreign exchange rate.

Findings of this study are consistent with previous researchers and can have few empirical consequences. For instance, portfolio manager's eager in global asset allocation can realize variation in exchange rate risk through nations and thereby they can rely on such information towards portfolio assortment decisions. In an attempt to propose suitable hedging strategies for risk revelations to unique currencies, international organizations may employ material data about the current nation of the macro economy to predict future exchange rate risk. Finally, the makers of the government policy may also benefit from the relationship between exchange rate risk and macro economy.

1.1 Theoretical Background

In a global with perfectly incorporated capital markets, if purchasing power parity (PPP) embraces between two nations, then the real return of an asset testation in either currency will be the same because exchange rate fluctuations will principally mirror differential inflation rates. Exchange rates can be categorized on the foundation of numerous currencies. Bilateral exchange rates are actually depicting

the currencies of two countries such as bilateral peso & the dollar exchange rate. One of the effective exchange rates is called multilateral exchange rate which is actually the weighted average of foreign currencies basket to decide the overall changes and factors of particular countries' currencies in the comparison of rest whole world. On the basis of some weighting formulas, numerous institutions has computed and published the effective exchange rate.

According to the number of some researches done by few authors like Abuaf and Jorion (1990), Frankel and Rose (1996) and Wu (1996) a assisting proof for purchasing power parity (PPP) is revealed in the elongated phase of growth. As per the survey of Rogoff (1996) purchasing power parity in the short run is discovered to be incredibly disrupted. Alternatively according to Dumas and Solnik (1995) because of country's revelation to variations in exchange rates, the profit of a local home countries stock market not simply concern to the systematic risk of the global market of stock, however additionally concerned to a currency risk as well. Alternatively, if purchasing power parity not clutches, the return for an asset designate in unlike currencies were in standard might change. In this situation, the uncertainty and apprehension accompanying with future exchange rate fluctuations can have an effect on expected returns of securities (Adler and Dumas, 1984), and there will be systematic risk on securities and bonds through the fluctuation of exchange rates. Such kind of risk is usually anticipated as currency risk or foreign exchange risk. Experiential indication suggests that purchasing power parity PPP is disrupted on consistent basis, as a minimum in short-run. Thus, it increases the vulnerability of currency risk. In the economic theory of purchasing power parity (PPP) after the adjustment of exchange rate the price levels among two nations must be equivalent to each other. The law of one price is the foundation of this theory, in which the price of the similar good ought to be the identical round the world. According to this concept, if after exchange rate adjustment there is a substantial difference in price among two countries for the identical product it will create the opportunity of an arbitrage because the product can be acquired from the country who sells it for the lowest price.

The quantity theory of money is the classical theory and as per this theory inflation

is driven by money growth. It recommends that the establishment of price level is linked with high rates of money growth. Suppose the government desires to change each rupee with two new rupees, the prices will be twice times greater in terms of recent rupees. Briefly, variations in money supply accomplish in this manner will relate with proportional variations in prices having no consequence on output or employment. If money growth does no longer impact output then higher inflation is the cause of this money growth. According to famous Friedman dictum everywhere and always inflation is a monetary phenomenon. Though, the sphere is more complex than this and monetary policy consists of more than just currency exchanges.

In the opinion of the theory of taxation and ability to pay rational if investor is concerned about the after tax return and demands the constant or nearly constant return which will results in higher currency risk. Due to higher transactional risk the investor would have to pay higher tax which reduces the trade revenue and the investors suffers the loss and are not ready to invest in the countries having high translation and transactional risk.

According to the theory of Fama (1970 & 1991) market efficiency the information of credit rating is very useful to market participants and investors. The phenomenon of the theory results with outcomes that markets always adapt the price when the market gets the new information. The information passed in one market is created in other market when the market is integrating market. This proposes that by considering new information all investors can have investment opportunities equally when the investors have the same. This investigation clutches the market efficiency theory in powerfully manner as rating declaration behavior in single market can favorably explore to others.

This study mainly focuses systematic risk along with its determinants. By considering modern theory of asset pricing in terms of currency (Adler & Dumas, 1984), the central point of consideration is beta or exchange rate risk. Foreign exchange rate is blend of different kinds of risk such as financial or business liquidity risk of country. The advantage of diversification can be obtained primarily by an investor by means of endowing in more than one stock, resulting in the

diminution in the riskiness of the portfolio. When the investor does not intend to put all eggs in a single basket then it is claimed that the benefits of diversification have been counted for. In the literal context, if all the investment is not put in one type of industry, then the risk would be reduced to a minimum level that is hard to avoid. The return that the investors will obtain is slighter and lesser than the expected amount whereas the risk aligned with it is assumed to be higher for the widely held mindset of the investors. This is considered as a deviation and variation from the usual return in other terms. He defines risk of any stock as it having a certain standard deviation from its mean. Any risk that is associated with any individual stock is supposedly higher than when such individual stocks are bound together in a portfolio. This risk of the formed portfolio is significantly lesser than the individual stocks if considered separately (whereas it is considered that the risks associated with different securities are inversely related). When any investment is to be done, it not only means the selection of stocks merely, however also determining what is the spot on perfect merging of stocks amongst which to invest for the minimum amount of risk and resulting in the maximum return. The investment needs to be made in the industries that are totally divergent of each other and they possess the minimum correlation between them.

The exchange rate is consequently an essential comparative price as it has effects on the international competitiveness of national goods. Therefore, exchange rate has obtained substantial attention in terms of its influence on investment and economic growth. (Goldberg, 1996) According to Shapiro (1975) the nominal exchange rate has been quantified by the real exchange rates which were modified for the variation in the comparative price levels.

The pragmatic work is stimulated by the research on international asset pricing which was also been studied. Because of country's declaration to fluctuation in exchange rates, the profit of a home country not merely concern to the sensitivity or uncertainty of the global market of money but additionally concerned with currency risk. The emphasis is on investigating the volatility of currency to variations in the exchange rate by the influence of the elements of macroeconomics.

The measure of systematic risk is characterized as the beta which shows a sign of the enormity of any single security's allegiance or covariance by way of the market or understanding to the market's fluctuation. The rapport between the performances of the stock market and the any individual or particular firm's decision making is explicitly explained by the importance of beta. The exchange rate for any security or firm is adjusted when the investors show less confidence in the firm or security and hence demote the firm's credibility by lowering its expected expectations of the likely returns, therefore as a result of any firm's bad decision making regarding any particular environmental change. When the expected risk rises, it is resultant with the supposed estimation that firm's stock value would fall and the likely return would also be lower as compared to a firm with low value of the exchange rate risk or the beta (Eldomiaty, Dhahery, & Shukri, 2009). The classification of the factors contributing to the currency risk is decisive as compared to the unsystematic risk which can be branched out by the use of portfolio creation causing diversification in order to construct triumphant decisions regarding the investments made by the investors and the unbeaten risk management. The understanding of the beta and its factors contributing to its value are into the consideration in the long-standing part of the apprehension and is still an area that is being addressed till the time to further evaluate and determine the features of the risk that is undiversified.

Any firm's financing, operating and investing policies can impinge on its business dealing and financial risks that would eventually affect the overall systematic risk of the market or industry where the firm is operating. Any company's systematic risk is the result of the pressure of the risks transferred by the business and the financial risk that is eventually relayed by the operating firm's executives that are in incrimination of any of these decisions (Mao, 1976). The risk of any firm's stock and its characteristics related to return can modify due to the changes made by the management of the firm in its decisions regarding the finance options of the firm, the decisions regarding the operations of the firm and from where the financing is to be done but in essence it mostly affects the overall risk associated to the stock as faced by the investor which is the systematic risk (Breen & Lerner, 1973). The

value of the firm is to increase or decrease resulting in either the enhancement or decrease of a firm's value. For that reason, it is stated that there is a linkage between the overall market value of the firm stock with its commercial behavior due to the risk that the firm possesses as a result of the market association known as the beta. Studies have been carried out to find out the factors that make up the beta. Some of the earlier studies put in to attention the relationship and correlation of the macroeconomic variables affecting and making up the variables that represent the country's inflation, credit rating, tax revenue and trade openness in specification. Few of such practical studies show the relationship by using multiple regressions having the country specific variables as the independent ones to affect the beta as being the one to be impacted.

1.2 Problem Statement

Numerous studies investigate the effect of currency volatility in equity returns. Earlier researchers were using the US market information and had simply inadequate accomplishment in authenticating the implication of uncertainty of the exchange rate in equity return (Jorion, 1990 Bartov & Bodnar,1994).Emerging markets of Asian countries have greater level of effect of macroeconomic variables such as trade openness, credit rating, inflation and tax revenue on exchange rate risk. The novelty of this work is that it has established a panel and a pool of emerging countries from Asia with middle power economies according to the GDP. A panel approach is applied for investigation on a data set of more than decade. Furthermore, studies conducted in Western and some Asian countries cannot be generalized and may not necessarily have any application in context of selected Asian market likewise Pakistan due to the absence of a robust legal system and inefficient capital market. Consequently, it is significant to have understanding of what have an effect of exchange rate risk sensitivity by kinds of dynamics have an impact on this effect.

It is stimulating for scholars to do empirical research with a view to discover the connection amongst macroeconomic variables and exchange rate movement. However in preparation, it is also precious for management to have this know-how in order to control the exposure of the currency volatility. Extending the sample markets of the study by Dilip, Patro, John and Yangru (2002) in this research, eight sample markets are designated over laying both developing markets and evolving markets of Asia. Sample countries and areas include China, India, Indonesia, Korea, Malaysia, Pakistan, Philippine and Russia. The focal cause of this thesis was to observe whether or not a substantial volatility of Asian countries is affected by exchange rate movement in Asia or not. The Asian countries which are considered in this research are China, India, Indonesia, Korea, Malaysia, Pakistan, Philippine and Russia during the period from January 1999 to January 2016.

1.3 Research Questions

Particularly in the current study the below mentioned questions are focused and analyzed

1. How does macroeconomic factor affect exchange rate risk of emerging Asian countries?
2. Whether the behavior of inflation influences currency risk in emerging Asian countries?
3. Whether the change in credit rating has an impact on foreign exchange rate of emerging Asian countries?
4. Does the variation in trade openness affect the exchange rate risk?
5. Does foreign exchange rate is same in all emerging countries?

1.4 Research Objectives for This Study

Below are the lists of objectives which are considered in this study.

1. To determine the effect of the currency risk.
2. To investigate the effect of macroeconomic variables on exchange rate risk.
3. To examine the difference in foreign exchange rate due to emerging markets.

1.5 Significance of the Study

Macroeconomic factors play a vital role on the exchange rate volatility. So it is important to examine the affect of macroeconomic factor on the exchange rate volatility of emerging market. The study contributes by providing further empirical evidence in attempting the answer of the questions regarding the affect of macroeconomic factors on exchange rate volatility in emerging Asian countries. Very limited researches have been directed using real time economic data. Maximum of the empirical investigation has utilized reviewed estimates of macroeconomics variables while examining the association amongst ERR and macroeconomics variables. This empirical investigation is an effort in altered way and would attempt to discover any association amongst the macroeconomic variables and exchange rate risk (ERR) of emerging Asian Countries by using daily data.

This study gives benefits to the investors and managers to consider the factors while making decision of investment in an emerging economy for higher economic growth. This study gives guidance to the managers and the speculator to focus on the important factors and to build the hedging strategies to maximize the economic growth.

This study also gives information to the policy makers to control the important factors those are effecting exchange rate volatility because exchange rate policy itself will not eliminate exchange rate volatility therefor policy maker should also pay attention to fiscal policy.

1.6 Organization of Thesis:

The study is organized and divided in a set pattern. The first chapter of the study is based on the introduction, theoretical background, research questions, research objectives, problem statement and significance of the study. Chapter number two is based on the literature review of variables involved. Subsequently, the following chapter includes sample size, data description and the employed methodology to estimate the results. The next chapter gives detail about the empirical results

and its discussion. The final following fifth chapter gives details regarding the conclusion, further directions and recommendations.

Chapter 2

REVIEW OF LITERATURE

Risk by means of explanation can be read between the lines as a probable apprehension of the divergence linking the return on investment asset through a price up to that time anticipated to turn out. The larger the expanse (distinction) of the return price is projected to crop up (likely return) to its real value will be acknowledged (actual return), the intensified the risk of the investment assets. Risks are capable of commencing from a multiplicity of causes. A number of sources with the intention of may possibly confer an augment to risks, along with others: the interest rate, the market conditions depicting the rate of inflation, flow in currency values and the political and economic conditions. All the causes with the intention of having a say on the risk of investment can be clustered into two sorts of risk. These two types of risk are: Systematic risk which defines to facilitate that this risk cannot be detached and attached to all on hand investment instruments. The reason for the occurrence of this type of risk is owed to macro-economic factors (market). The second is the non-systematic risk that is distinctive to every asset investment; meaning so as to explain that any assets may have diverse risks.

Systematic risk (beta) is of great significance in capital markets study. At the same time price unearthing and sighting and market comprehensiveness every now and then are pointed out as validations for the subsistence of conditionally argued markets, risk alteration is the for the most part recurrently advocated advantage.

In multinationals companies or enterprises, many managers are seen as worried towards the abrupt movements of exchange rates. Here question lies that does the fluctuation matter? So answer is YES! Since firms always considers ERR as integral & significant part because cash flow statements' figures are more vulnerable to the exchange rate movements by simply changing translation exposure position and by operating, transaction. In the concerned countries different rate of inflation are generally connected by the enormous changes in exchange rate but when the prices are freely adjusted to clear market it is revealed that there is auto correlated deviations from the purchasing power parity and the exchange rates may be unstable. According to the study of Stockman (1980) it is reported that when all the markets are in equilibrium the exchange rate fluctuations may appear to cause comparative price variations and incur additional sensitivity. Dornbusch and Fisher (1980) suggest that currency movements affect international competitiveness, the balance of trade position, and consequently the real output of the country. This in turn affects current and future flow of companies and their stock prices. The pragmatic work is stimulated by the research on international asset pricing which was also been studied by Adler and Dumas (1983, 1984), Dumas and Solnik (1995) because of country's revelation to variations in exchange rates, the profit of a local home countries stock market not simply concern to the systematic risk of the global market of stock, however additionally concerned to a currency risk as well .The emphasis of estimating the domestic currency uncertainty to variations in the exchange rate of its currency and on examining the influence of the dynamic of macroeconomic on this computed risk of exchange rate of the emerging countries.

The description of exchange rate risk is built on the illustrations of Adler and Dumas (1984). It is stated by the PPP theory that when in both countries the purchasing power price is the equivalent than there is evenness in the exchange rate among the two currencies of the country. Though if PPP is contravening, the common currency of the two nations will differ once the price indices are expressed or translated. According to international asset pricing model, expected return of an asset is accompanying with covariance of asset's return with the returns

on the world market portfolio and currency risk. Otherwise, arbitrage pricing theory (Ross, 1977) can particularly designate model requirement and significance of currency risk factor, where rare mutual factors illustrate asset returns. The additional return on currency index of a country and the return on global market portfolio are the principle dynamics considered in this model. Significance of exchange rate risk in currency returns has been a point of consideration for many other researchers. According to Jorion (1990), exchange rate exposure is has positive impact on the ratio of foreign sales to the total sales for US multinational companies.

Jorion (1990) stated in his studies that periodic sensitivity of comparative variations in exchange rates is approximately ten instances the sensitivity in inflation rates. There were only minimal researches spotted light on the Asian emerging and developing markets. Maximum of discussed researches about the correlation among exchange rate movements and stock returns are constructed on EU, UK and US environment. Following the evolution of international trade, exchange rate uncertainty is a foremost foundation of risk for companies, specifically tangled in international accomplishments. In comparison to few further macroeconomic dynamics, for instance inflation rate and interest rate, Currency risk are characteristically four intervals and ten times as erratic as interest rates and inflation, correspondingly (Jorion, 1990). It has enforced managers and scholars to emphasis further consideration to the influence and causes of instability because of exchange rate on company value.

Consequently maximum of the movement in exchange rates cannot be recorded for with the aid of inflation rates. In the market of US according to Jorion (1991) he revealed in his study that the systematic risk of exchange rate is not priced. Different researchers found that the currency risk is enormously time varying. Previous studies by Jorion (1990), Jorion (1991) and Bartov and Bordnar (1994) based on US market data could have inadequate success in observing the returns of equity with the importance of exchange rate risk (ERR). Amongst aforesaid studies, It is investigated by Ferson and Harvey (1993) have discovered that the international equity returns can be explored by studying trade weighted currency index and the

portfolio of the global market. Khoo (1994) that due to the changes in exchange rate it is found that the values of returns of Japanese banking organizations and Australian mining multinationals are weakly influenced only.

While examining the importance of currency risk few researcher such as Hodrick (1981), Ferson and Harvey (1993), Dumas and Solnik (1995) and De Santis and Gerard (1998) especially showed the importance to model for the period variation consideration in the return distribution.

In the study of Dumas and Solnik (1995) and De Santis and Gerard (1998), currency risk is priced, and those exchange risks are economically significant and time-varying. Additionally by doing the analysis it has been evaluated that due to higher openness there will be higher sensitivity in foreign exchange rate due to change in stock returns which was alike to the hypothesis tested for Japanese multinational firms by He and Ng (1998).Whilst countries have better imports (exports), their stock markets will mirror an extra destructive (constructive) exposure to foreign money volatility, and therefore the foreign money betas could be smaller (higher).

On contrary, studies covering international currency betas, many studies have found significant currency risk exposure. It is reported by Chamberlain et al. (1996) and For instance, De Santis and Gerard (1998) summarized that the time variation in the risk premium may want to give an explanation for why the unqualified models are not able to identify exceedingly time-varying currency risk.

Though, it is noted that currency crises are more common in emerging and developing markets because the nominal currencies of the growing and emerging countries may not produce constant and predictable exchange rates and their parity level might deviate, flagging way for currency speculation moves. However the managed floating exchange rate system was generally preferred in Asian economies, the exchange rate sensitivity of every individual currency differs even in the existence of a pegging system (Warner and Kreinin, 1983; Alba and Papell, 1998).

Ferson and Harvey (1997) study link among risk, mispricing along with different financial macroeconomic variables. Allayannis (1997), while referring US multinationals, describes time-varying currency exposures related with level of their

imports as well as exports. Similarly, Ferson and Harvey (1997), indicate joint relationship between exchange rate betas and country-specific and international risk dynamics including credit ratings and inflation for a few nations.He and Ng (1998) argue that export ratios are tightly related to exchange rate exposure for Japanese multinational companies. They apprise that aforesaid variables initially describe changes associated with risk exposures. According to He and Ng (1998), few Japanese multinational companies possess notable positive coverage to the currency risk (CR). Besides this, five more researches discover substantial uncertainty of currency by testing the models which are restricted.

Additionally in the study of Doukas et al. (1999) and Choi et al. (1998) stock returns of Japanese firms can be explained by conditional currency risk. Doukas et al. (1999) and Nydahl (1999) have studied the impact of the variability of exchange rate and suggested that the values of Swedish and Japanese corporations are significantly influenced by the fluctuations incurred in the exchange rate Many scholars like Jorion (1990 & 1991), Amihud (1994), Bartov and Bodnar (1994), He and Ng (1998), Doukas et al. (2003), concluded the outcomes of showing the correlation of exchange rates and stock returns. They have used both trade-weighted basket of currencies and exchange rates.

The influence of diminutive outing CR on the exports capacity has been scrutinized by the Frey (1998). One of the monetarists Gavin (1989) argued in his studies that due to change in demand and wealth for money equity prices affect the exchange rate. Bleany et.al. (1999) evaluated with the help of a model that the inflationary expectancies in emerging nations might reduce if in emerging nations the exchange rate of stable countries is secured.

The apparition of altered exchange rate selections advantaged by wealthy and evolving countries had compared by Cooper (1999). Molo (2001) featured the association between alternative exchange rate systems and modified origination of money and the role of the market as an economic controller. However, as per findings of Doidge et al., (2002) study many firms would have an effect by a single or few currencies which is called as exposure effect. Also if we use trade weighted basket exchange rates, the results would be under-valued but it's a vice versa in

the case of exchange rate and so it's appropriate. The association of few macroeconomic dynamics and currency prices fluctuates from market to marketplace. According to Eiteman et al., 2001) in comparison with domestic oriented firms, multinational corporations (MNCs) are more vulnerable to higher CR given that no financial instruments are used. But in reality corporations which has no foreign operations, assets, liabilities and transactions are also vulnerable to risk of moving and change in the CR because this risk would be a reason of influencing their input and output price linkages, or their supply and demand chains, or competitors' prices.

According to the study of Calvo and Reinhart (2000) the author provided the evidence that the devaluations were followed by the downfall and is deeper in developing market economies than in established economies. The balance of trade and inflation impact were analyzed by Zhang (2001) to reveal the impact after appraising China's foreign exchange.Esquivel et al. (2002) characterized the exchange rate instability of G-3 nations. Chen et al. 2002 had reported that the consequence would be significant if immediately an unanticipated difference in the exchange rate ought to be priced into share prices depending on the efficient market hypothesis. Exchange rate actions consequently influence stock price instability of a firm (Chen, Naylor, & Lu, 2004). Exchange rate risk encouragement too together international companies and national corporations' competitive positions, their contribution and productivity worth, their supply and demand chains, or their entrants' prices.

The association among exchange rate and stock prices is explained through the flow model by the classical economist. Larrain et al. (2001) situate emphasis on the interrogation of which exchange rate preparation central income countries should embrace. The influence of exchange rate instability on movement of international trade had studied by Wang (2002). Xiaopu (2002), Few researchers such as Du and Zhu 2001, Brahmasrene and Jiranyakul 2002; Appuhamilage and Alhayky 2010, Pattichis 2012 had studied the important role of import and export on exchange rates of China, Sri Lanka, Thailand, the UK and the USA. It has been found that

there was a significant influence on regional trade flows both in developing and advanced countries.

MacDonald and Ricci (2003) studied and proposed that the long term dynamics of real exchange rate are Openness of an economy and terms of trade. In one more study the same relationship is investigated by Sanchez-Fung (2003) and stated that due to depreciation the response of the exchange rate is more reactive. Galati and Ho (2003) presented in the study that news which float in the market plays a vital role in variability of exchange rate for dollar and euro. The outcomes of the literature revealed that appreciation in currency is because of good news while depreciation of currency is the result of bad news. Kawai et al. (2005) deliberated theoretical and pragmatic concerns pertinent to exchange rate policies. Huang and Yang (2004) have studied the model of vector auto regressive (VAR) in Canada, France, Japan, Taiwan and concluded that there is no statistical correlation occurred among macroeconomic variables and prices. Agha (2006) proposed in the literature that those company who can shift its exporting activities and production from one nation to another will more likely to be less affected by inflation and exchange rate variability which means that there will be less CR. The classification of the factors contributing to the systematic risk is decisive as compared to the unsystematic risk which can be branched out by the use of portfolio creation causing diversification in order to construct triumphant decisions regarding the investments made by the investors and the unbeaten risk management. The understanding of the beta and its factors contributing to its value are into the consideration in the long-standing part of the apprehension and is still an area that is being addressed till the time to further evaluate and determine the features of the risk that is undiversified (Chiou & Su, 2007). In contrast, the analyses of the earlier researchers concluded that even though it can be supposed that an increase in systematic risk might cause a reduction in economic activity and the theoretic studies gives the justifications for both positive and insignificant effects as well. According to Bahmani (2007) it was observed that in the literature not only particular measure of exchange rate volatility has dominated.

Wong and Tang (2008) examined the relationship between export and CR. In the

study he found that the variability of exchange rate adversely effect on Malaysian exports and proposed that the foreign prices and income are the significant dynamics of the variation in exchange rate. Schnabl (2009) reported evidence for a negative impact of CR on growth by using cross sectional panel estimation in both developing emerging Europe countries and East Asia. This negative effect of growth has also been associated with macroeconomic instability and currency risk. Akbar and Kundi (2009) have determined that monetarist policy variables (inflation, interest rate, money supply, industrial production) and stock prices are co-incorporated. For developing and developed countries around the globe a study is rapidly expanded to examine the effects of CR on bilateral imports and exports. In the study of Chaban (2011) in an extensive study had empirically investigated the relationship among exchange rates and international trade, the theoretical rationalization for this study originates from exchange rate determination. Chowdhury (2012) found that in the long run for Australia the trade openness, interest rate differentials, terms of trade, and government expenditure are the significant contributing factor of exchange rates.

Aftab et al. (2012) it is analyzed in Pakistan that the exchange rate risk has negative influence on the exports whilst negative affect has been reported among the association of foreign income and exports which holds for the long run. Chowdhury (2012) established that the trade openness, interest rate differentials, terms of trade and government expenditure are the significant elements of exchange rates for Australia in the long run. Since liberalization Asian economies have experienced numerous modifications in their exchange rate measurement, this study enhances to the literature by concentrating on the macroeconomic aspects affecting the exchange rates of Asian emerging economies. Furthermore, Candelon, at el 2007, and Wong 2013, has examined the most important element that impacts the exchange rate. It has been found that productivity differentials are very important factors of exchange rate. Though, the unpredictable fluctuations in exchange rates also referred to as currency volatility which could also be described as phases of domestic currency appreciation or depreciation (Ojongbo, 2014). Bahmani (2015) presented in the literature that on the industrial level the trade of china and UK

was negatively affected by the exchange rate beta.

2.1 Inflation and Systematic Risk of Exchange Rate:

The inflation rate of a country can have a substantial impact on the currency. A low inflation rate may not assure an advantageous exchange rate while a high rate of inflation is more likely to have a significantly negative impact on the currency of a particular country.

The consumer prices index (CPI) is alternative essential variable that is applied in preceding studies to scrutinize the association amongst macroeconomic dynamics and currency indices. There were only minimal researches spotted light on the Asian emerging and developing markets. Maximum of discussed researches about the correlation among exchange rate movements and stock returns are constructed on EU, UK and US environment. Following the evolution of international trade, exchange rate uncertainty is a foremost foundation of risk for companies, specifically tangled in international accomplishments. In comparison to few further macroeconomic dynamics, for instance inflation rate and interest rate, CR are characteristically four intervals and ten times as erratic as interest rates and inflation, correspondingly (Jorion, 1990). It has enforced managers and scholars to emphasis further consideration to the influence and causes of instability because of exchange rate on company value. Though, in different studies, it has been mentioned that empirical practices articulate us enormous and repetitive deviations from PPP. Jorion (1990) stated in his studies that periodic sensitivity of comparative variations in exchange rates is approximately ten instances the sensitivity in inflation rates, consequently maximum of the movement in exchange rates cannot be recorded for with the aid of inflation rates. The possibility of exchange rate risk is predicted to increase by a higher rate of inflation over a period of time because of which it will lower credit rating. (Lee 1992).

Ferson and Harvey (1997) suggested that exchange rate volatility are collectively connected to each global and country specific risk dynamics consisting of credit ratings and inflation for few countries. The quick expansion in global exchange at some stage in the Nineteen Seventies, and the adoption of freely floating exchange rate establishment with the resource of many industrialized worldwide places in 1973, indicated a contemporary era of stepped forward of exchange rate sensitivity. Ferson and Harvey (1997) study link among risk, mispricing along with different financial macroeconomic variables. They apprise that aforesaid variables initially describe changes associated with risk exposures. According to De Santis and Gerard (1998) a large part of the variabilities in national inflation are triggered by fluctuations in the exchange rate. In the research paper of Nasseh and Strauss (2000) consumer price index (CPI) was utilized as indicator for discount rate due to the fact nominal prices is usually listed as stock prices. Their studies advised that CPI (Consumer price Index) is evaluated neutrality or its rationalization as stock prices will respond by one percentage for each percentile variation in consumer price index CPI. The measure used in the studies for Inflation is CPI consumer price index and for the innovation of the stock the discount rate is used when stock prices are in nominal term. Earlier research discussed that consumer price index CPI is the type of a specic element representing numerous macroeconomic indicator such as the inflation, the discount rate, and the goods market (Nasseh and Strauss, 2000; Wongbangpo and Sharma, 2002; Gunasekarage et al., 2004). Gunasekarage et al. (2004) determined that CPI is used as a proxy for ination which has a signicant impression on Sri Lanka's Stock Market.

In the research the Wongbangpo and Sharma (2002) examined that how the stock market is affected in the five Asian countries such as namely Indonesia, Malaysia, Philippines, Singapore, and Thailand by the goods market. The author in his study used the consumer price index (CPI) and the gross national production to analyze the effect of the goods market. A destructive impact has been determined among consumer price index (CPI) and stock prices.

The experiential research regarding the linkage amongst exchange rate variability and its fundamentals are not conclusive. Exchange rates are essentially the prices

of one currency in terms of other currencies determined by the normal forces of supply and demand.

The monetary aggregate that the central banks control directly is the "monetary base," consisting of currency in the hands of the public and reserves of the commercial banks deposited in the central bank. It gives a twist to Friedman's quote: inflation might be a monetary phenomenon, but the money is a reflection of fiscal policy and not of monetary policy. An imperative question arises that why inflation is a fiscal phenomenon? If inflation was purely a monetary phenomenon caused in the first place by an exogenous excessive rate of growth of money, economies could have reduced inflation quite fast by printing less money and thus reducing the growth rate of the money supply.

Since liberalization Asian economies have experienced numerous modifications in their exchange rate measurement, this study enhances to the literature by concentrating on the macroeconomic aspects affecting the exchange rates of Asian emerging economies. Though, the unpredictable fluctuations in exchange rates also referred to as currency risk (CR) which could also be described as phases of domestic currency appreciation or depreciation (Ojongbo, 2014).

Hypothesis # 1: A significant positive linkage among inflation and currency risk (CR).

2.2 Credit Ratings and Exchange Rate Risk:

In general term with respect to a particular assessment of the creditworthiness of any borrower of country and the financial or debt obligation is known as credit rating. The credit ratings of a country reflect its ability to pay off its debts. It tells how much of a default risk a borrowing country has to face in order to return the debts it has already borrowed from other nations. In prior studies, it was assumed that countries with superior credit rating would lead to lower betas or the market risk but the analysis determined that the countries that have better credit ratings are more prone to the market risk. But this has been analyzed that it may be due to the provision of such goods and services that are more

vulnerable to the overall activity of the world market. Credit rating agency such as Moody's, Standard & Poor's and Fitch generally makes assessment and evaluate the companies and governments. However a complete analysis of different sectors is required to determine the hypothesis of positive relation (Patro, Wald, & Wu, 2002). Here, this study tends to find a positive relation between the credit ratings and the currency risk.

An important role is played by credit rating agencies in financial markets. Their focal output comprises of assigning credit ratings to private and sovereign sector borrowers throughout the world. Optimistic and affirmative ratings incident, for instance, an unambiguous and precise improvement of the credit ratings or some advancement in the credit position of a country, may indicate a pervasive familiar trend, as a consequence leading to a wide-ranging impact of lessening the interest rates in favor of every single one of other nation states. This is generally passed on as the common information effect. On the other hand, any such happening or some sort of good information may make known with the intention that the country in which the occurrence has taken place, would ultimately augment its magnetism that attract other investors at the price of all the other nation states. As a consequence, it would eventually lead to an increase in the field range of the interest rates of the other countries involved. The succeeding causation is termed as competitive effect. In addition, a few specified rating events possibly will be full of both the competitive and the common information effects. But, when the rating events are informative in nature, they would directly impact the beta of the country involved in the manner, that the better the ability of the paying off of debts of any country, the lesser would be the risk associated with the investments done in the country of the happening.

Three essential recognition evaluation organizations are Standard and Poor (S&P), Moody and Fitch, they print self-governing recognition evaluations that evaluate the affluence of management debtors. Amongst the large three credit evaluation organizations S&P is distant most inuential on nancial advertises. The research procedures the statistics of independent credit assessments delivered by S&P. Sovereign acknowledgement evaluation was rst presented in 1975 by S&P,

which has developed an imperative pointer of a republic's defaulting hazard valuation. S&P evaluations modification is added numerous than other assessment organizations and amendments prepared by S&P give indications to further credit assessment organizations in their alterations. S&P assessment statements are less expected by marketplace members so it produces a better surprise to nancial shops. Standard & Poor's evaluations scales are as follows. A' is the maximum level band which contain seven indentations: AAA, AA+, AA, AA-, A+, A, and A-. The middle level band is B'. It contains nine indentations: BBB+, BBB, BBB-, BB+,BB, BB-, B+, B, and B-. The bottom band is C' which has six indentations: CCC+, CCC, CCC-, CC, SD (selective default), and D (default). Scores above BB+ are measured to be asset grade, while others are sub-investment grade. S&P also concerns the evaluation viewpoints along with evaluation variations. An outlook is the indication of conceivable rating variations in the intermediate period of 6 months to 2 centuries. The three outlook rulers of S&P are optimistic, steady, and destructive.

Along with the four rating agencies that were scrutinized and observed, a considerable market downfall of the values is observed by a sheer diminution in the ratings given by either Fitch's or by the Standard & Poor's agency. No dissimilarity and divergence is brought into being flanked by changes in the ratings sensitivity as observed in the emerging markets and non-emerging markets.

It has been found out that the changes in the joint rating do not pass on supplementary information to the market, putting side by side to single rating modification or revision which is successive to the investigative substance that has been observed of the forces of change in the ratings given by the two agencies; the Moody's and the S & P's.

The credit evaluations offer a sensible amount of debtor's affluence; second, the moneylenders take into explanation the antiquity of overseas debt re preparation in conveying emerging countries recognition assessments; and third, the set of descriptive variables designated from the willingness-to-pay perfect is important in explanation of distinctions in the credit evaluations. In specific, it is experiential that the creditworthiness of the debtor worsens with an upsurge in the standards

of the ratio of the state's total indebtedness comparative to its transfers, the level of interest charges, and the unpredictability of variations in per capita GDP. The affluence of the borrower recovers with an upsurge in the growing rate of per capita GDP.

According to Kaminsky and Schmukler (2000) it is debatable that how credit rating agencies play a vital role on the international financial system however it theoretically supports the efficiency and effectiveness of the financial markets. Thus, countries whose credit rating would drop would have a negative coefficient of beta (Kaminsky & Schmukler, 2001).In financial reporting rating agencies were renowned as specialized intermediaries. Reinhart (2002) reports that in evolving market economies it is revealed through estimation that downgrading are predicted by the crises of the currency rather than focusing on the usage of the rating index. For the assessment in financial marketing rating organizations contributes the rather significant information of credit risk in phases of rating devalues and preferment. An additional line of way of thinking lay emphasis on the point those nation-state rating variation may well make known vital information with reference to currency risk, that is significant and decisive in support of international portfolio management (Brooks R. , Faff, Hillier, & Hillier, 2004). Brooks et al. 2004 inspected in his studies that the eect of country rating variates on stock markets. In their research it has seen enlighten that downgrade rating has a larger inuence, though rating upgrades have no effect on stocks in emerging markets.

Whereas, it would also impact the other nations in the manner, if the competitive effect is to take place, such as the country in which the event of enhancement of credit rating has taken place would lead to the alternative attraction to itself, ultimately resulting in the lower risk and beta for itself and consequently, due to the competitive environment, resulting in the increase of interest rates of other adjacent countries. This leads to the actuality with the intention of the better credit ratings, lower would be the interest rates and the low value of beta is to be obtained as the final result in the long run. (Gande & Parsley, 2003). Due to variation in country ratings not only straightly inuences the equity market of

country which were rated but also origin contagion to other countries (Brooks et al., 2004).

There exists a little negative impact on the returns of the exchange rate, stocks and the involved predictability due to the demotion in the sovereign credit ratings, almost certainly for the reason that the changes in the ratings are determined by the markets and for that reason the prices have already discounted the information (Subasi, 2008). The credit ratings of a country determine its ability and prospect of any nation state to fail to pay the debts it is obliged to pay from a multiplicity of viewpoints. The considerations include the government's solidity to bribery and fraud, the immovability and strength of the exchange rate, the growth in the GDP (considering the real instead of nominal) and some others. As a result, these ratings are a sign of the political, economical and financial essentials of any nation commencing a futuristic point of view (Sari, Uzunkaya, & Hammoudeh, 2013).

Hypothesis # 2: A significant negative association among the credit ratings and the currency risk (CR).

2.3 Tax Revenue and Exchange Rate Risk:

The income that government received through taxation is known as tax revenue. For any state the primary source of income is the taxation. Revenue may be received from different sources such as individuals, public enterprises, trade, and royalties on natural resources or foreign aid. In this study it has been hypothesized that higher tax rates would lead to a higher exposure to the currency risk therefore it is expected to find a negative relationship between tax and exchange rate beta.

According to the economic rational and the ability to pay theory if there will be no sufficient tax revenue then countries may not be able to pay its obligation and the effect is the cause of inflation which results in increasing the exchange rate risk.

Different authors like Bevan (1995), Feltenstein (1992) and Tokarick (1995) have reported in the study that tax revenues would change in proportion to the change in

the final price however, there would be a counterpoising demand effect persuaded by higher prices, and overall the size of resistances would indicate whether revenue would increase or decrease. It has been studied that the beta associated by the equity is a retreating purpose of the taxes that are being generated. As soon as tax is augmented, two effects are observed at dispense. First and foremost, the worth of the stock's equity crashes in addition to the value of debt and for this reason, the leverage ratio gets higher to some extent. Therefore, as an end result the equity beta is being set in motion. This moderates the significance of the expansion option constituent, and consequences in a slighter equity beta. In our example, the second outcomes take over; for this reason, on the whole end product of a higher tax is the stock's beta would be specking and spanning to a lower level to a little scope. As a result, by the side of the timings that the option for the growth turns to be negligible (as an instance, when the value of x is determined to be very small or the leverage ratio to be too much high then the spreading out turns to be improbable), whereas, the subsequent effect is beside the point; for this reason, there should be an increase in the beta with the increase in the tax. Hence, for the highly leveraged companies, this is without any uncertainty the sphere of influence for the growth expansion. In the economy average tax rate contemplate tax revenue to GDP ratio as a proxy. In our sample for the data precincts for the countries it is incapable to get commercial and income tax rates independently. Due to statistics boundaries, it is incapable to get business and revenue tax charges distinctly for the republics in our example. If savers are caution about revenues on an after-tax foundation, then an advanced levy rate may influence obligatory before-tax proceeds. If savers request a continuous, or closely continuous, after-tax rate of reoccurrence and reappearance premium, then advanced levies may suggest an advanced reduction rate or a greater currency beta. Therefore, we believe the restriction of the levy adjustable to be positive Benninga and Sarig (1999) and Wu and Zhang (2000).

According to McMahon and Schmidt-Hebbel (2000) higher inflation rates lead to public discouragement it will ultimately lowering tax compliance and hence lowering the amount of revenue collected. Tax systems contain a wide variety of taxes,

which can be categorized into three general kinds such as taxes on income and profits, taxes on goods and services, and international trade taxes. Fluctuations in the exchange rate interpret straight into variations in domestic collections from exports and imports. For a given level of imports or exports, a more depreciated real exchange rate would increase the base of trade taxes in domestic currency terms, which would in turn increase trade tax collections. A real depreciation of the currency would lead to an increase in excise tax and VAT or sales tax collections from imports. According to Shapiro and Sarin in 2009, foreign exchange rate can be bifurcated in to three major categories operating, transaction and translation exposure. Many researches have a consensus that there is another exposure factor called tax exposure. Tax revenue refers to compulsory transfers to the central government for public purposes. Certain compulsory transfers such as fines, penalties, and most social security contributions are excluded. Refunds and corrections of erroneously collected tax revenue are treated as negative revenue (IMF). The implication of the ability to pay theory is that, it matches the taxes and tax systems therefore this will help in increasing the Government revenues (Birungi, 2015)

Hypothesis # 3: A significant positive association among tax revenue and exchange rate risk (ERR).

2.4 Trade Openness and Exchange Rate Risk (ERR):

For the degree of openness there are two measure, one is import and other is export of the country. Through this analysis it is expected that the exports will have a positive coefficient in the regression. An import is a good or service brought into one country from another. The word “import” is derived from the word “port,” since goods are often shipped via boat to foreign countries. Gotur (1985), and Bailey et al. (1986) may perhaps not determine any significant linkage between exchange rate volatility and foreign trade. Lower import prices reduce the cost of export production. Not including the future convention, managers may perhaps

bring upon themselves considerable transaction charges to poise a portfolio in the existence of altered market estimations (Graham & Jennings, 1987).

According to He and Ng (1988) in Japanese multinationals results shows that exchange rate publicity were contiguously connected by the export ratios. Hitiris (1988) have examined the relationship between the uncertainty of exchange rate and trade. An argument was proposed in the study that decision-making is not basically the concern of a rational choice. Augmented volatility in exchange a rate causes systematic risk for the future behavior of exchange rates. Even if the economic negotiators adapted to select rationally, improbability might be the foundation of the anticipated outcome to diverge. It can also be described as uncertainty in exchange rates contains a risk. Hence, it is widely understood that increased volatility in exchange rates has had an adverse influence on international trade.

Along with exports, imports form the backbone of international trade; the higher the value of imports entering a country, compared to the value of exports, the more negative that country's balance of trade becomes (Leamer, 1988). An export is a function of international trade whereby goods produced in one country are shipped to another country for future sale or trade. The sale of such goods adds to the producing nation's gross output. If used for trade, exports are exchanged for other products or services in other countries (He & Ng, 1988). On the other hand, it is claimed by De Grauwe (1988) that while identifying the effect of exchange rate uncertainty on exports the most important factor is the degree level of risk antipathy. Whilst countries have better imports (exports), their stock markets will mirror an extra destructive (constructive) exposure to foreign money volatility, and therefore the foreign money betas could be smaller (higher). In most of the studies the nature of the consequence is also being seriously discussed. Asseery and Peel (1991) investigated the association among export and CR. Many researches such as Kenen and Rodick (1986), Thursby and Thursbay (1985), Koray and Lastrapes (1989), Pritchett (1991), Savvides (1992), Pozo (1992), Chowdhury (1992) and Arize (1997) had empirically studied the relationship between trade and exchange

rate risk. In the studies it has been found that there is a negative relationship between international trade and CR.

In the research it has been found that there was a positive relationship between CR and exports.

In few studies, indications are assured that a positive association exists among a country's rate of exchange and its openness to international trade, however on the other hand, other studies have failed to validate such linkage (Jin, 2002; Sinha & Sinha, 1996). Arize (1997) found that if exporters were highly risk-averse, then an increase in the CR will raise the expected marginal utility of export revenue since exporters will prefer to produce more in order to avoid a decline in the export revenue. Initially the estimation of regression were been done for currency risk and it has been revealed that the coefficient of export shows positive estimation and negative for imports. For instance, Allayannis (1997) reviews in the study that due the variation of interval currency revelation for US production diligences is associated with the extent of exports and imports. Additionally by doing the analysis it has been evaluated that due to higher openness there will be higher sensitivity in foreign exchange rate due to change in stock returns which was alike to the hypothesis tested for Japanese multinational firms by He and Ng (1998). Due to depreciation of home currency the profitability of local importing firm will be less as compared to local exporting firm. Hence, it is concluded that the exchange rate beta should be more negative (positive) if the stock returns of the importing (exporting) firms will decrease (rise) with a depreciation of the home currency (He & Ng, 1998). Abeysinghe and Yeok (1998), using OLS, find that appreciation does not diminish Singapore's exports due to their high import content. Oladipo (1998) measured the degree of openness as the ratio of total trade to GDP and as the ratio of export to GDP. The study is investigated on the Nigerian quarterly data and selected the sample period of 27 years from 1970 to 1996.The results showed that when the export to GDP ratio was used as a measure of openness it was positively associated with currency risk. But, when import plus export to GDP was measured it indicated a negative relationship.

Anwer (1999) also pragmatically observed the relationship of 97 countries by considering the data for the period from 1960 to 1992. This study measures the relationship of causality between exports as a measure of trade openness and economic evolution. Otherwise, observed literature announce with the intention of explanation and justification that exports put forth a positive sway at the same time as imports make use of a downbeat influence. Without a doubt, an exporting state will be additionally more susceptible to revolutionizing of the world financial system and checks, as a result, a contact to the global systematic risk. As a consequence, nations which position an elevated degree of exports is to be expected to have a stock market which checks a positive contact to world market risk and a high value of beta having a positive coefficient to it.

However McKenzie (1999) reported in the literature that an exporter will prefer to export less when there is a low degree of risk aversion since higher exchange rate uncertainty reduces the expected marginal utility of export revenue. Consequently, the exchange rate sensitivity may have negative or positive effects on exports and the theory cannot identify the relation among foreign trade and the systematic risk of exchange rates. Douganlar (2002) found in the study that the CR decreased real exports for the countries. This represents that sellers in these countries are mostly risk-averse. Furthermore it is concluded that in future the behavior of the CR will be increased because of the volatility in the rates of the exchange. So consequently, the exports will be unfavorably affected and will prefer to sell in domestic markets relatively than foreign markets. This recommends that currency volatility is not only effective on real exports in the long run but it is also effective in the short run. Thus, it can be revealed that if volatility (uncertainty) in exchange rate increases, risk-averse producers will prefer domestic trade to international trade and for that reason exports will be negatively influenced by uncertainty in exchange rates. Hau (2002) furthermore studied the association among the currency and economic openness and discovered that there is an adverse linkage among trade and beta.

This expectation is based on the supposition that a country the high exports as a fraction of GDP is more sensitive to the world market therefore, more exposed to the risk. When any country has more exports it is more vulnerable to the world

economic situations. Any change in the outer economics would affect the country doing exports. This is also consistent with (see (Patro, Wald, & Wu, 2002)).

Hypothesis # 4: A significant positive linkage among the trade openness and exchange rate risk.

Chapter 3

Research Methodology

The study aims at finding the impact of certain variables on systematic risk to identify its exposure in emerging countries, so in order to settle on the variables that affect the CR, This study first estimated the betas of exchange rate risk then examines the degree of country's macroeconomic variables explaining the exposure of the exchange rate volatility. In final regression this study included the following variables trade openness, countries credit rating, CPI inflation rate, tax revenue to GDP ratio.

3.1 Sample Selection:

The selections of variables are based on the two core reasons. Originally, this study agrees that these variables are many of the most essential monetary variables influencing the currency marketplace constancy and additionally they are objectively exogenous within the logic that they arrive from other than the stock market. Secondly the existing research has also directed to consider these variables for more materialistic results by using real time information. The study takes into account the study of eight countries to develop an understanding of the factors affecting the systematic risk in the emerging countries which is the region of developing countries therefore this study includes eight middle power countries of Asian region on the basis of GDP that are China, India, Indonesia, Korea, Malaysia, Pakistan,

Philippine and Russia among the population of a total of 48 countries in South and East of Asia on behalf of which the complete currency exchange index of each country is considered as an analysis, as the information established to determine the factors of systematic risk affecting the general exchange rate market as a whole. The population consists of the eight emerging countries of Asia. The study will take into account the data from the year 1999-2016 to regress it using the panel data methodology. The regression would be applied on the macroeconomic variables that are determined for the investigation of relationship.

3.2 Data Collection:

The current research objective is to discover the correlation and observes whether a significant volatility of Asian exchange rate are magnified by macro-economic variables in emerging Asian countries, such China, India, Indonesia, Korea, Malaysia, Pakistan, Philippine and Russia during the period from January 1999 to January 2016. The daily data of currency index is obtained from Morgan Stanley Capital International (MSCI), the data of daily exchange rate of all eight countries are taken from OANDA Corporation, the data for macroeconomic variable such as import and export are obtained from World Bank and the data of inflation and tax revenue is collected from international monetary funds (IMF).The data of credit rating is obtained from standard and poor agency (S&P's).

3.3 Variable Description

3.3.1 Exchange rate risk:

In this study the dependent variable is exchange rate risk. Exchange rate volatility is the dependent variable in our study. It is expected that the macroeconomic variable affects the exchange rate and the impact of these variables are the basic cause of the changes in exchange rate and volatility.

3.4 Independent Macroeconomic Variable:

The study of the whole economy is known as Macroeconomic. In this study it focuses on the behavior of an entire economy, the study can be done on three types of groups such as regional, national or international. According to the argument supported by Maghyereh (2002) argues that macroeconomic environment is generally the characteristics of national economy, and study focuses and analyses has been done by considering, output, interrelationship and income among diverse economic sector. The country's economic growth is promoted by the favorable macroeconomic environment. The variables that are self-determining from the income level are defined as Macroeconomic variables and those elements significantly affect the economic growth and as a whole deal with the decision-making, structure, performance and behavior of an economy rather than individual markets.

The variables that are included in our study are inflation, credit rating, tax revenue, and trade openness.

3.4.1 Inflation

In this study it has been hypothesized that higher inflation would results to a higher exposure to the CR therefore it is expected to find a positive relationship among inflation and exchange rate risk.

The hypothesis has been supported by Jorion (1990), Lee (1992) and Ferson Harvey (1997) that if the investor predict higher inflation than it would entail higher currency volatility.

3.4.2 Credit Rating

In this study it has been hypothesized that higher credit rating would results to decrease exposure to the CR therefore it is expected to find an adverse association among credit rating and exchange rate risk.

The hypothesis has been supported by Patro, Wald, & Wu (2002) , Kaminsky & Schmukler, (2001), Gand & Parsley (2003) that if the investor expect higher credit rating than it would entail lower CR .

3.4.3 Tax Revenue

In this study it has been hypothesized that higher tax revenue would results to decrease exposure to the currency risk therefore it is anticipated to find an adverse association among tax revenue and CR.

The hypothesis has been supported by Patro, Wald, & Wu (2002) that if the investor forecasts higher exchange rate risk (ERR) than it would require lower the tax revenue of the trade.

3.4.4 Trade Openness

In this study it has been hypothesized that higher trade Openness would results to decrease exposure to the exchange rate risk (ERR) therefore it is expected to find a negative linkage between trade openness and exchange rate risk.

The hypothesis has been supported by Patro, Wald, & Wu (2002), Oladipo (1998), Kenen and Rodick (1986), Thursby and Thursbay (1985), Koray and Lastrapes (1989), Pritchett (1991), Savvides (1992), Pozo (1992), Chowdhury (1992) and Arize (1997) that if the investor assumes higher than it would cause lower the trade openness of the trade.

3.5 Measurement of Variables

A data will be regressed to measure the impact of macroeconomic variables.

3.5.1 Exchange rate risk

Beta is used as a proxy of exchange rate risk which measures the risk of exchange rate. This proxy is also used by Patro, D.K., Wald, J.K. and Wu, Y. (2002). The

calculation of beta is done by the covariance of return on daily MSCI currency index as a benchmark and the return on the exchange rate of each country to the variance of the return of currency index which is than annualized for every country.

$$\beta = \text{Covariance } (R_i, R_m)/\text{Variance of Market} \quad (1)$$

3.5.2 Inflation:

The CPI (consumer price index) is used as a proxy of inflation. This study used CPI (Consumer price index) for inflation measurement. This is the rate at which the price level (average price of the goods) in the economy is increasing over time. CPI is the fixed-weight price index, which measures price changes of goods and services that can be purchased by the ordinary consumer that may be fixed or changed at specified intervals, such as yearly. It is the most widely-used and well-known economic indicator for inflation. (Blanchard, 2009,) The Laspeyres formula is generally used. (IMF). The country wise annual data has been gathered for investigating the relationship.

$$INC = \frac{CPI_2 - CPI_1}{CPI_1} * 100 \quad (2)$$

Where,

CPI_2 = CPI in the second period.

CPI_1 = CPI in the first period.

3.5.3 Credit Rating:

The linear conversion of rating is done by allocating numerical values to each rating notches. As there are a total of 22 notches, the highest rating notch is 'AAA' which is assigned by 22 and 'SD' is the lowest notch which is assigned by

value 1 (one). The scaling of the credit ranking is done by assigning the weights to convert them to numeric from alpha numeric as recommended by Ferri (1999). The numerics are shown in table 3.5.3. Finally this study computed the log of the credit rating, then considered the difference of the logged for investigating the relationship.

Table 3.1: Numerical Scaling of Sovereign Ratings

Sovereign Credit Rating	**Numeric**
AAA	1
AA+	0.95
AA	0.91
AA-	0.86
A+	0.82
A	0.77
A-	0.73
BBB+	0.68
BBB	0.64
BBB-	0.59
BB+	0.55
BB	0.5
BB-	0.45
B+	0.41
B	0.36
B-	0.32
CCC+	0.27
CCC	0.23
CCC-	0.18
CC	0.14
SD	0.09
D	0.05

AAA+

Credit quality is highest because risk factor is small.

AA+, AA, AA-

It also has higher credit rating where protection factors are strong but because of economic condition risk is modest and slightly change from time to time

A+, A, A

It has good credit quality where their protection factors are adequate, risk factor varies from change in economy

BBB+, BBB, BBB-

Credit quality is adequate as factors which protects are enough and reasonable.in case if there is any change in the economy risk factor consider as a variable

BB+, BB, BB-

It seems like obligation like to be considering as factor of production have capacity of weakening in case if there is any change in economy.

B+, B, B-

Obligation seems to be fulfilling if factor of production has capacity to have flexible in case if there is any change in the economy.in this category there is a chance of upward and downward movements.

CCC+

In this category there is high level uncertainty towards its obligation where factor of production is risky

C

Very risky.

3.5.4 Taxes Revenue (% of GDP):

The monthly data has been used to measure the tax revenue to GDP.

Tax Revenue to GDP Ratio = Tax Revenue/ GDP (2)

3.5.5 Trade Openness:

The ratio of trade to GDP is proxy of trade openness. The measure of trade to GDP is the sum of the import to GDP and export to GDP. The monthly data has been gathered for trade to GDP.

3.5.5.1 Import to GDP

The import to GDP ratio is calculated by dividing the total import of the country to the total GDP of the country.

$$\text{Import to GDP Ratio} = \text{Import} / \text{GDP} \qquad \text{(a)}$$

3.5.5.2 Export to GDP

The export to GDP ratio is calculated by dividing the total export of the country to the total GDP of the country.

$$\text{Export to GDP Ratio} = \text{Export} / \text{GDP} \qquad \text{(b)}$$

This study is investigating the combined effect of import and export which is referred to as trade openness. Trade openness is collectively a measure of both import and export to GDP.

$$\text{Trade Openness} = (\text{Import} + \text{Export}) / \text{GDP} \qquad (3)$$

3.6 Methodology

Panel regression is applied to investigate the effect of macroeconomic variables on exchange rate volatility.

3.6.1 Model Specification

First OLS is applied on the cross sectional data for investigating the relationship between the foreign exchange rate and macroeconomic variables such as inflation, credit rating, tax revenue and trade openness. There are three method of running simple linear panel data i-e common constant effect, fixed effect and random effect.

3.6.1.1 Common Effect:

The panel method will be used for the estimation through below defined regression estimation of common effect.

$$\beta_{i,x,n} = a + \sum b_k X_{i.k.n} + e_{i,n} \qquad (4)$$

Where $X_{i.k.n}$ is the k^{th} macroeconomic variable for country i in year n, n=1, 2, . . . ; 18, I =1,2, . . .8, b_k measures how sensitive a country's exchange rate volatility is to its k^{th} macroeconomic factor; This study assume that this sensitivity is common across countries, and $e_{i,n}$ is the error term.

3.6.1.2 Fixed Effect:

The fixed effect regression is estimated to investigate the relationship and to make the decision between common and fixed to select the appropriate model.

$$\beta_{i,x,n} = \beta_{\circ} + \beta_1(INC)_{i.n} + \beta_2(CR)_{i,n} + \beta_3(TR)_{i,n} + \beta_4(TO)_{i,n} + e_{i,n} \qquad (5)$$

Where

INC = Inflation

CR =Credit Rating

TR = Tax Revenue

TO = Trade Openness

For deciding the appropriate model between common constant and fixed effect model this study interpret the results through fixed effect likelihood ratio test.

$$F = \frac{(R^2_{FE} - R^2_{CC}) / (N-1)}{(1 - R^2_{FE}) / (NT - N - K)} \quad (6)$$

R^2_{FE} is R-square of fixed effect model, R^2_{CC} is R-square of common effect model, N is number of cross sections, K is number of explanatory variables and NT is total number of observations. If calculated value of f-statistics is significant then fixed effect model is appropriate for usage over common effect model.

3.6.1.3 Random Effect:

The random effect regression is estimated to investigate the relationship and to make the decision between fixed and random to select the appropriate model.

$$\beta_{i,x,n} = (\beta_{\circ+Vi}) + \beta_1(INC)_{i,n} + \beta_2(CR)_{i,n} + \beta_3(TR)_{i,n} + \beta_4(TO)_{i,n} + e_{i,n}$$

$$\beta_{i,x,n} = \beta_{\circ} + \beta_1(INC)_{i,n} + \beta_2(CR)_{i,n} + \beta_3(TR)_{i,n} + \beta_4(TO)_{i,n} + (_{Vi} + e_{i,n}) \quad (7)$$

Where

INC = Inflation

CR =Credit Rating

TR = Tax Revenue

TO = Trade Openness

For making the decision among random and fixed effect model the Hausman test is used. The guideline for making decision is if the p value of Hausman test is significant then the fixed model will be appropriate model.

$$H = (\hat{\beta}^{FE} - \hat{\beta}^{RE})' [Var(\hat{\beta}^{FE}) - Var(\hat{\beta}^{RE})]^{-1} (\hat{\beta}^{FE} - \hat{\beta}^{RE}) \sim \chi^2(k) \quad \textbf{(8)}$$

3.6.1.4 Least Square Dummy Variable (LSDV)

It is also called fixed effect model. Here this study will add countries dummy.

$$\beta_{i,x,n} = \beta_0 + \beta_1(ITG)_{I,n} + \beta_2(ETG)_{i,n} + \beta_3(INC)_{i,n} + \beta_4(CR)_{i,n} + \beta_5(TTG)_{i,n} + \sum_{n=1}^{5} D + e_{i,n} \quad \textbf{(9)}$$

Where

INC = Inflation

CR =Credit Rating

TR = Tax Revenue

TO = Trade Openness

D = Country.

Chapter 4

RESULTS AND DISCUSSION

The data has been evaluated using the panel methodology. The outcomes include the descriptive analysis; the behavior of data is explained by using the mean, variance, skewness and kurtosis. The table explains about the maximum and minimum values that any variable could have. Along with it the mean values and the dispersion from it in the form of standard deviation is also explained. The flatness peakedness of distribution is explained through the types of kurtosis.

4.1 Descriptive Statistics

The behavior of the data is captured by using measure of central tendency and measure of dispersion. Afore working to track some measurement through linear method of panel, the conduct of statistics is inspected to guarantee its precision. Self-governing variables as well as the overall performance of data counting reliant on variable are shown by descriptive statistics. The table of the descriptive statistics comprises of the values of mean, median, maximum, minimum, standard deviation, skewness and kurtosis of all the variables which shows that how much statistics is diverged from its midpoint as shown in the below table 4.1.

TABLE 4.1: Variables Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dv.	Skewness	Kurtosis
Beta	-0.372	-0.311	1.841	-3.418	0.545	-1.237	13.458
INC	6.21	4.263	85.742	-0.767	8.04	7.07	68.811
CR	-0.51	-0.526	-0.095	-1.482	0.232	-1.33	7.122
TR	12.297	12.315	17.795	8.189	2.216	0.171	2.116
TO	-0.083	-0.277	174.306	-168.46	23.967	0.37	38.54

Note: where INC is inflation, CR is Credit Ratings, TR is Trade Revenue to GDP ratio, TO is Trade Openness (Import of goods and services to GDP ratio + Export of goods and services to GDP ratio)

The statistical behavior of the data related to the variants of systematic risk for the period of 1999-2016 exhibits in table 4.1. Mean (median) value of the currency risk is -0.372 (-0.311) with the maximum value 1.841 of Russia and minimum -3.418 of Indonesia, with the standard deviation 0.543 which shows that the currency volatility is 54% deviated from its mean. Mean (median) value of the inflation is 6.210(4.263) with the maximum value 85.742 of Russia and minimum -1.358 of China, with the standard deviation 8.040 which shows that the currency inflation is strongly deviated from its mean. Mean (median) value of the credit rating is -0.510 (-0.526) with the maximum value (-0.095) of Malaysia and minimum (-1.482) of Indonesia, with the standard deviation 0.232 which shows that the credit rating deviated 23% from its mean. Mean (median) value of the tax revenue is 12.297 (12.315) with the maximum value 17.795 of Russia and minimum 8.189 of India, with the standard deviation 2.216 which shows that the tax revenue is strongly deviated from its mean. Mean (median) value of the trade openness is -0-083 (-0.277) with the maximum value 174.306 of Russia and minimum (-168.464) of Russia, with the standard deviation 23.967 which shows that the trade openness is strongly deviated from its mean.

To assess the degree level of variable distribution is symmetrical skewness. If the distribution of responses for a variable stretches toward the right or left tail of the distribution, then the distribution is referred to as skewed. This value is known to be positive, negative, or sometimes even undefined. In the examined data,

most of the values are positively skewed for instance inflation is positively skewed with the value of 7.070, Tax revenue is positively skewed with the value of 0.171 and trade openness is positively skewed with the value of 0.370 whereas credit rating is negatively skewed with the value of -1.330 and currency risk is skewed negatively with the value of -1.237. In order to determine the kurtosis, there are three patterns in which the value may fall. Firstly, if the value is equal to 3 then the distribution is normal distribution and the pattern is called mesokurtic. Secondly, if the value is greater than 3, then the pattern is called leptokurtic that is associated simultaneously with high peaked and fat tails. And lastly, if the value is less than 3, then it is called platykurtic which is associated at the same time with the values less peaked and having a thinner tail. In the table, except tax revenue the values of all other variables are greater than 3 depicting that they possess leptokurtic behavior with the maximum value of 69.965 of inflation and the minimum value of 3.603of credit rating. The tax revenue shows the platykurtic behavior and having thinner tail with the value of 2.116. In addition, the value of kurtosis shows that the data is more peaked than normal.

	Beta				INC			
	Mean	Median	Maximum	Minimum	Mean	Median	Maximum	Minimum
China	-0.027	-0.010	0.018	-0.178	2.030	1.907	5.843	-1.359
India	-0.367	-0.356	-0.002	-0.823	6.549	5.543	11.992	3.685
Indonesia	-0.919	-0.493	-0.037	-4.762	7.914	6.401	20.489	3.526
Korea	-0.582	-0.418	0.076	-1.666	2.521	2.644	4.674	0.707
Malaysia	-0.326	-0.267	0.010	-0.869	2.260	2.054	5.441	0.583
Pakistan	-0.111	-0.096	0.105	-0.394	7.804	7.522	20.286	2.540
Philippines	-0.271	-0.237	0.086	-0.886	4.133	4.041	8.260	1.434
Russia	-0.478	-0.325	1.199	-2.303	15.720	11.261	85.742	5.087

	CR				TR			
	Mean	Median	Maximum	Minimum	Mean	Median	Maximum	Minimum
China	0.747	0.750	0.864	0.636	9.424	9.094	10.293	8.569
India	0.583	0.545	0.864	0.500	9.799	9.670	12.266	8.189
Indonesia	0.429	0.455	0.591	0.227	12.570	12.226	16.316	10.537
Korea	0.576	0.591	0.591	0.545	12.974	13.316	15.476	10.332
Malaysia	0.710	0.750	0.909	0.591	15.223	14.617	19.753	13.667
Pakistan	0.702	0.773	0.818	0.591	13.117	13.549	15.613	10.043
Philippines	0.591	0.591	0.591	0.591	10.885	9.558	16.984	8.943
Russia	0.591	0.591	0.591	0.591	12.914	13.099	13.726	11.243

	TO			
	Mean	Median	Maximum	Minimum
China	48.439	47.337	64.479	33.525
India	42.176	44.322	55.794	25.085
Indonesia	54.374	54.223	71.437	37.439
Korea	82.053	77.478	110.000	60.154
Malaysia	177.075	184.567	220.407	128.645
Pakistan	31.773	32.563	35.682	25.306
Philippines	82.228	81.451	104.730	60.245
Russia	54.092	52.544	69.394	46.193

4.2 Correlation Analysis Of The Macroeconomic Variables

Pearson's association is castoff to explore whether multicollinearity glitches happens or not amongst independent or descriptive variables. Here the statistics shows the connection among two variables, though the ive and +ive symbol shows the path of the relationship among two chains. When the correlation value is "1" then it demonstrates that there occurs a faultless correlation among the two variables, when the rate of correlation is "0" then there is no connection among two variables. Kennedy, (1998) determines that when connection surpasses the boundary of 0.70, then it designates that the subsequent two variables are extremely correlated, due to which a problematic of multicollinearity can be rise. The consequence of our study displays that there is no problem of multicollinearity between independent variables since values of all variables are within the acceptable limit.

TABLE 4.2: Correlation Matrix

	BETA	**INC**	**CR**	**TR**	**TO**
BETA	1				
INC	0.24	1			
CR	0.22	-0.13	1		
TR	-0.24	0.27	-0.19	1	
TO	-0.01	0.42*	-0.01	0	1

Table 4.2 shows the correlation analysis among all independent variables and (*) indicate the highest figure in the table.

The results of the correlation analysis are presented below. The table 4.2 shows the relationship that exists between the variables. The relationship is not only among the dependent and independent variable but also among the independent and independent variables. Beta is negatively correlated with trade openness and tax revenue. The beta has a very weak insignificant negative relationship with tax revenue and a negative relationship with trade openness at a significance level of 5%. Similarly, Inflation is negatively correlated with the credit rating. Inflation has a weak negative relationship with credit rating at a significant level of 1% while; credit rating and tax revenue has significant negative relationship with trade openness. Credit rating shows the significant moderate negative relationship with tax revenue and trade openness. Tax revenue and trade openness has a strong positive relationship at 1% significance level which indicates that if there will be an increase in one variable the other variables will move in the same direction.

4.3 Regression Analysis:

The regression analysis is carried out to determine the relation between the dependent and the independent variables. Before estimating the model few important test are analyzed to get the more accurate and effective results. First the study applied the unit root test on all the macro economic variables such as inflation, credit rating, tax revenue and trade openness. The tables of the tests are shown in the appendix. In second step the unit test is applied on beta which is referred as

exchange rate volatility in this study. Moving further the test of heteroscedasticity and multicollinearity is analyzed. The results of the entire test are being listed in the Appendix. The results show that there is no issue in any of the aforementioned test results.

To determine that the common model that is being used is significant or not decision will be made on the basis of P value. If P value is significant The F-stat and probability tells about the model worthiness. Evaluation has been done to determine the variables that impact the exchange rate risk (ERR). Selection of the model will be done by doing the likelihood ratio test and Hausman test.

4.3.1 Selection among Fixed Effect Model and Common Effect Model:

For making the decision that either redundant fixed effects model is more appropriate or common model. The likelihood test was used for making the decision. The criterion for the selection is the P-value of the likelihood test meaning that if P-value of the likelihood test is significance, then common effect model will be rejected. As per accumulated result, P-value is significant; therefore in this study common effect model is rejected.

TABLE 4.3: Likelihood Test

Test summary	Statistic	d.f	P-value
Cross-section F	10.11	-7130	0

The null and alternative hypotheses of the test are:

H_0 = Common effect model is appropriate model.

H_1 = Fixed effect model is appropriate model.

Here the guide line is if the P value is significant at 5% then fixed model is selected. So in this model the likelihood ratio shows 5% significance level so here this study is accepting H1 hypothesis and rejecting H meaning that common effect model is rejected. Now to finalize the model decision is to be made that either fixed effect model is the best model or the random effect model is the appropriate model. For making the decision Hausman measurement technique will be tested.

4.3.2 Hausman Test

Hausman (1978) proposed a test to facilitate the choice of an appropriate technique among the two opposing methodologies namely the fixed effects and the random effects. This test articulates us that difference between the fixed effect and the random effect estimators is significant or not. The null and alternative hypotheses of the test are:

H_0 = Random effect model is appropriate model.
H_1 = Fixed effect model is appropriate model.

Table 4.4: Hausman Test

Test summary	Chi-square statistic	Chi-sq. d.f	P-value
Cross section random	39.77	4	0

To identify the appropriate technique the Hausman test is applied. In table 4.3.2 the cross section value of chi-square is 39.77 with the p value of 0.000. The guide line is if p value is significant at and below 5% then fixed model is the appropriate model. So according to to the results this study is rejecting H and accepting H1 meaning that the results of Hausman test recommends that in order to obtain consistent and efficient estimates fixed effect model is appropriate model.

4.3.3 Fixed Effect Model (Final Model):

Fixed effect model is also known as least square dummy variable (LSDV) which is like pooled regression. This model allows the constant to vary across individuals .(Gujrati, 2006). As per results computed fixed effect model is final model to estimate the regression with efficient estimates.

4.3.3.1 Regression Using Macroeconomic Variables as Independent Variables:

The following table 4.5.1 explains the regression analysis between the macroeconomic variables and the dependent variable that is the currency risk or beta.

TABLE 4.5: Regression using Fixed Effect Model

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	0.457	0.605	0.755	0.452
INC	0.017	0.008	2.235	0.027
CR	-2.124	0.635	-3.347	0.001
TR	0.060	0.033	1.807	0.073
TO	-0.005	0.004	-1.435	0.154
Adj R-squared	0.30			
F-statistic	3.79			
Prob (F statistic)	0.000			

Note: where INC is inflation, CR is the Credit Ratings; TR is Tax Revenue to GDP ratio, TO is the Trade Openness (Import of goods and services to GDP ratio + Export of goods and services to GDP ratio).

A result of table 4.5 represents the GLS regression using fixed effect model of exchange rate beta on simultaneous country specific macro-economic variables. This study tests four formal hypotheses with this model. First study expects that in our regression there is a significant positive relationship between inflation and exchange rate risk. Inflation is expected to be correlated to variations in exchange rate The Patro, D.K., Wald, J.K. and Wu, Y. (2002) proposed that inflation is likely to be negatively related to exchange rate risk because countries

with high inflation and consequently larger ongoing currency depreciation may be less affected. This result contradicts the arguments of Patro, D.K., Wald, J.K. and Wu, Y. (2002). The significant and positive relationship between inflation and exchange rate betas reported in table 4.5 shows that high (or low) levels of inflation across countries are associated with high (or low) exchange rate betas. The beta coefficient of the inflation is statistically significant and is positive. The beta value of inflation is 0.017 indicating that one unit increase in inflation will result in an increase of exchange rate risk (beta) by 0.017. This study is able to accept the null hypotheses that there is a significant positive relationship between inflation and currency risk. The results are also consistent with few researches such as Jorion (1990), Lee (1992) and Ferson Harvey (1997).

In current study the second hypothesis it is expected that there is a significant negative association among credit rating and systematic risk. The beta coefficient of the credit rating is statistically significant and is negative. The beta value of credit rating is -2.124 indicating that one unit increase in credit rating will result in decrease of beta by 2.124.The results are also supported with studies of Kaminsky & Schmukler (2001), Patro, Wald & Wu (2002) and Gand & Parsley (2003). This study is able to accept the hypotheses because study concluded that due to higher credit rating of any country the currency risk of any country will reduce.

The third hypothesis is that there is significant positive linkage between tax revenue and systematic risk. The result stated in table 4.5 explains that the beta coefficient of the tax revenue is statistically significant and is negative. The beta value of tax revenue is 0.060 indicating that one unit increase in tax revenue will result in increase of CR by 0.060. The results are also consistent with the studies of Patro, Wald, & Wu (2002) So this study is able to accept the hypotheses that is when investor forecast higher exchange rate risk (ERR) than it will reduces the tax revenue as well as the return due to which investors or mangers will prefer to hedge the risk or will invest in alternative market. In our study it is accumulated that the minimum tax revenue is of china and the highest tax revenue is earned by Malaysia from these eight Asian emerging markets.

In last hypothesis of this study it is hypnotized that there is a significant negative association among trade openness and CR. The results estimated in table 4.5 summarized that the beta coefficient of the trade openness is statistically insignificant and is negative. The beta value of trade openness is -0.005 indicating that one unit increase in exchange rate volatility will result in decrease of beta by 0.005. Our results are aligned with studies of few researchers such as Patro, Wald, & Wu (2002), Oladipo (1998), Kenen and Rodick (1986), Thursby and Thursbay (1985), Koray and Lastrapes (1989), Pritchett (1991), Savvides (1992), Pozo (1992), Chowdhury (1992) and Arize (1997).

The adjusted R2 is 0.30 that indicate that the macroeconomic variables have 30% explanatory power of the model, so the model is based on the macroeconomic variables which can explain a significant portion of the beta.

4.4 Pool Dummy Regression using Macroeconomic Variables with Base Country Pakistan

The pooled dummy regression is also known as least square dummy variable (LSDV). The following table 4.6 explains the regression analysis between the macroeconomic variables as independent variables and Pakistan as a base for country dummy variables and the dependent variable that is the systematic risk or beta. The table includes the statistical tests of the F-statistic, the probable F-statistic and the adjusted R square.

TABLE 4.6: Regression using Dummy Variables

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.017	0.008	2.295	0.023
INC	-1.715	0.494	-3.470	0.001
CR	0.079	0.028	2.880	0.005
TR	-0.004	0.003	-1.134	0.259
TO	0.653	0.249	2.621	0.010
D1_ CHN	-1.115	0.229	-4.861	0.000
D2_IND	-0.101	0.195	-0.517	0.606
D3_IDN	-0.361	0.272	-1.329	0.186
D4_KOR	0.307	0.533	0.576	0.566
D5_MYS	0.114	0.271	0.422	0.674
D7_PHL	-0.560	0.219	-2.559	0.012
D8_RUS	0.017	0.008	2.295	0.023
Adjusted R-Squared	0.243			
F- Statistic	12.13			
Prob(F-statistic)	0.0000			

Note: where INC is inflation, CR is the Credit Ratings; TR is Tax Revenue to GDP ratio, TO is the Trade Openness (Import of goods and services to GDP ratio + Export of goods and services to GDP ratio). D1 is country dummy of China, D2 is country dummy of India, D3 is country dummy of Indonesia, D4 is country dummy of Korea, D5 is country dummy of Malaysia, D7 is country dummy of Philippines and D8 is country dummy of Russia.

In this fourth step, the table 4.6 shows the regression analysis that has been done consists of all the variables including the macroeconomic variables along with the dummy variables. In order to examine the effect of the country on the exchange rate volatility country dummy is used. The country of Pakistan is excluded from the sample and representing as benchmark.

Results of table 4.6 indicate that the dummy variables of countries included are not statistically different from zero. The inflation, credit ratings, and trade openness are statistically significant. The beta coefficient of the inflation is statistically significant and is negative. The beta value of inflation is 1.715 indicating that one unit increase in beta will result in decrease of inflation by 1.715. The beta coefficient of the credit is statistically significant and is positive. The beta value of credit rating is 0.079 indicating that one unit increase in credit rating will result in an increase of beta by 0.079. The beta coefficient of the tax revenue is statistically insignificant and is negative. The beta value of tax revenue is indicating that one unit increase in tax revenue will result in decrease of beta by -0.004. The beta coefficient is statistically significant and is of the trade openness. The beta value of trade openness is 0.0653 indicating that one unit increase in trade openness will result in an increase of CR by 0.0653.

The adjusted R square is 0.243 that indicates that the macroeconomic variables collectively have 24.3% illustrative and clarifying influence of the model. So the model that is based on the macroeconomic variables can explain a certain significant portion of the beta. This significance is more as compared to the regression run by using the dummy variables. This shows that the macroeconomic and the dummy variables when included collectively have impact on the model. The results show that the impact of Pakistan is on few countries such as India, Indonesia, Korea and Malaysia. China, Philippines and Russia are significant and due to increase in currency risk of china and Philippines the beta coefficient will decrease.

Chapter 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

By using the daily index prices of MSCI index and currency exchange rate of the respective countries for the determination of beta and the annual frequency data for the macroeconomic variables, panel methodology has been applied to identify the factors affecting the exchange rate volatility across countries. Therefore, from the aforementioned results, discussions and analysis, it is concluded that the exchange rate volatility is well composed of the large impact macroeconomic variables. Furthermore, from inculcating the country dummies it is concluded that the macroeconomic variables in comparison to the company related variables does not have a numerically noteworthy impact on the exchange rate volatility. Since the data that has been collected is of the emerging markets of South Asia, thus, it does have some special characteristics as compared to the developed markets around the world but, the factors affecting the exchange rate volatility are almost same across the world with some variation in one or two variables.

Different investigators have presented that CR is significant in illustrating international equity returns. This study investigated the exposure of exchange rate volatility due to the changes and influence of macroeconomic variables. Form the

findings it is concluded that among the macroeconomic variables the inflation, trade openness, credit rating and tax revenue significantly affect the systematic risk. However, trade openness is significant too but with some mixed evidence.

All the results that have been found are in accordance with the previous literature that supports the results and findings of this study. The current study exposed that inflation is the most significant element that incur instability in interchange rate in the nation as it donates more differences in interchange amount. This study finds that the increase in inflation will increase the CR and have significant risk exposure. The consequences additionally designate that due to great inflation the currency got diminishes in exchange. Inflation has a bad outcome on interchange rate when inflation will increase and ultimately will reduce the worth of currency. . Furthermore our result shows that there is significant impact of credit rating on countries beta. As it is revealed that the countries with better credit rating will have low exchange rate volatility and investors will invest in such countries which enhance the economic growth, as in emerging countries there are more chances for economic growth.

The study found the mixed evidence for tax revenue and trade openness. There is a significant positive relationship of tax revenue and CR. As assumed it is found that the increase in tax revenue will lower the risk of the exchange rate. Due to higher after tax return of investor and the greater tax revenue of government the credit rating of the country will become better which ultimately reduces the CR.

Lastly it is finding that the more openness will reduce the currency risk and in this study it shows the significant exposure. Within the country the impact of import and export affects the currency risk. But due to devaluation in currency there is different behavior of import and export in countries. So there is a strong linkage among inflation, changes in exchange rate and trade openness. The significant coefficients suggest that these regressions are help full for the investors, managers and policy makers. The managers and investor can considers such factors before making the investment decision or can focus on the hedging strategies for the minimization of the risk which occurs due to the changes in exchange rate. It is clear that policy actions aimed at stabilizing the export market are likely to

generate results if policy makers ignore the stability as well as the level of the effective exchange rate. Higher inflation reduces the export of the domestic country. An exchange rate policy by itself would not eliminate all exchange rate volatility therefore policy makers should also pay attention to fiscal policy.

5.2 Future directions

From the results, discussions and the above mentioned findings it is recommended that for further study in this domain other variables should also be considered such as the money supply growth, impact of government surplus, impact of imports since exports have a positive relation with beta it is assumed that imports would have a negative coefficient of beta, the stock market capitalization as a ratio of world capitalization to identify the world impact.

For further enhanced results, year dummies separately and collectively as year and country dummies to find out either macroeconomic variables have more significance than the other. The value of R^2 is 46% which represents that there are also some further factors involved which are not considered in this current study. Therefore, it is suggested that to include some other factors which influence the currency risk.

5.3 Policy Recommendations:

The study results help the investors to determine where to invest as well as since it captures the whole market dynamics and statistics which also helps policy makers in the government to define their policies. This helps the government to know how the market is affected by the policies made on the outer perspective. For instance, the government should have more surplus reserves than the deficit. Also the surplus leads to a lower value of beta as well as low tax rates which will enhance the credit rating and increases the economic growth

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Appendix-A

Unit Root Test of Variables:

Null Hypothesis: CR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=13)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.061852	0.0318
Test critical values:	1% level	-3.476472	
	5% level	-2.881685	
	10% level	-2.577591	

Null Hypothesis: INC has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=13)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.765154	0.0000
Test critical values:	1% level	-3.476472	
	5% level	-2.881685	
	10% level	-2.577591	

Null Hypothesis: TR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=13)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.276946	0.0178
Test critical values:	1% level	-3.476472	
	5% level	-2.881685	
	10% level	-2.577591	

Null Hypothesis: TRADE_OPENNESS has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=13)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.76357	0.0000
Test critical values:	1% level	-3.478189	
	5% level	-2.882433	
	10% level	-2.57799	

Heteroskedasticity Test:

TABLE 5.1: Add caption

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	3.191059	Prob. F(4,137)	0.0153
Obs*R-squared	12.1025	Prob. Chi-Square(4)	0.0166
Scaled explained SS	70.29685	Prob. Chi-Square(4)	0

Test Equation:
Dependent Variable: RESID$\hat{2}$
Method: Least Squares
Date: 07/12/18 Time: 23:46
Sample: 3 144
Included observations: 142
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.771129	0.481831	-1.600414	0.1118
INC	0.014928	0.007802	1.913419	0.0578
CR	0.168328	0.08974	1.875723	0.0628
TR	0.080544	0.047162	1.707811	0.0899
TRADE_OPENNESS	-0.003893	0.001595	-2.440888	0.0159

R-squared	0.085229	Mean dependent var	0.22669
Adjusted R-squared	0.05852	S.D. dependent var	0.803676
S.E. of regression	0.779806	Akaike info criterion	2.375032
Sum squared resid	83.30924	Schwarz criterion	2.47911
Log likelihood	-163.6273	Hannan-Quinn criter.	2.417325
F-statistic	3.191059	Durbin-Watson stat	1.019092
Prob(F-statistic)	0.015305		

Multicollinearity Test:

Variance Inflation Factors
Date: 07/12/18 Time: 23:59
Sample: 1 144
Included observations: 142

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.056766	34.30667	NA
INC	3.45E-05	2.140844	1.337264
CR	0.032177	6.080656	1.039957
TR	0.000381	35.90916	1.122146
TRADE_OPENNESS	3.59E-06	1.236809	1.236794