

**RISK INVOLVED IN INTERNATIONAL DEBT  
INVESTMENT IN EMERGING MARKETS**

(A CASE STUDY OF India, Malaysia and Taiwan)

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## ABSTRACT

The purpose of this research paper is to find how much risk is involved in investing emerging market debt. Emerging markets are becoming a hub for foreign investors either that is an equity or debt investment. The risk is the important element for investors. As for emerging markets the most important risk that investor can face is exchange rate and political risk. I used Augmented Dickey-Fuller to carry out unit roots and johansen cointegration analysis of exchange rates and political risk in emerging markets. My result shows that individual variables are integrated order one, means unit root exist. This shows that political risk tends to follow a random walk. My finding suggests that there is a long run relationship between political risk and exchange rate. As the political risk increase exchange rate also fluctuate with relation to political situation.

**Key words:** Risk, Debt, Exchange rate, Politics, Emerging markets

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## CHAPTER



## INTRODUCTION

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One of the basic factors in deciding whether to invest in debt in emerging markets often depend on how much risk you can bear. With the passage of time there is an increase in the fixed income securities and now a days emerging market debt become very attractive. A World Bank estimate put the size of the global bond market at \$ 61 trillion in 2005, making it the world largest market. The size of the world equity market for the same year was \$ 41 trillion. This shows that there are more opportunities in debt market than equity market.

Investment professionals currently face explosion of investment opportunities around the world. For some area, the professional investors can use their models and knowledge of investments to foreign markets but this is not possible for all the markets in different locations in the world. In fact, projected risk and expected returns for many different countries creates numerous complexities. Black (1995) clearly stated these difficulties: “Because risk and expected return are correlated in different ways, we need not see a positive correlation between risk and expected return across countries over time. Because actual return differs greatly from expected return, we especially need not see a significant correlation between actual return and risk. (p. 46). Sir John Templeton, perhaps the greatest global investor, has said that never before has our financial system been so mired in both public and private debt, and further he has stated that never before has any civilized in history escaped from such level of debt without dire consequences for its citizen and society. There has been relatively little research in finance that focuses on the economic content of various country rating. Political risk measure have been studied in Harlow (1993) and Diamonte, Harvey and Viskanta (1995).

Today, investors have cause than ever to seek the answer of where the markets are heading. What returns can be expected from securities? What are the risks of debt market investments? And what are the rewards? The purpose of the paper is to find the answer of one of the question asked by the investors. And that are risks of debt market investments and with focus on emerging markets. As emerging markets debt has also been an asset that has generated high returns. In fact emerging market debt is the best performing asset of the last 10 years. The paper focuses on which risk

involved when investing in debt markets in emerging markets. The aim is, from individual investors and institutional investors, to determine the effect of risk can be and what derives it.

The investors are now much concerned about their investments either those are in equity or debt. In the recent years, lot of investors believes that its good opportunity to invest in debt markets in emerging markets. The purpose of this paper is to investigate which country is more risky for debt investment. To do this analysis I choose two main factors which influence risk in any country, Political Risk and exchange rate risk. For this I checked the relationship between political risk and exchange rate. For first variable political Risk, I investigate about the political situation in selected countries means that which country has less political risk and enhanced financial environment for the investors. For the Political Risk, I took the difference between long term interest rates of selected countries against the long term interest rates of United States of America. The logic to bench mark United State of America is that; a) U.S.A has stable political system and polices are long term b) leader in financial markets and financial reforms. Second factor is the exchange rate risk that means how much stable is the currency in term of U.S dollars.

Organization of the study will be as follow, chapter 2 outlines the basic concepts related to debt markets and briefly reviews relevant literature. Chapter 3 is about empirical work. Chapter 4 presents debt markets, risk and return and reforms in the financial markets in India, Malaysia and Taiwan. Chapter 5 gives frame work of the study, illustrate about the construction of variables, data sources and analysis from the results. Chapter 6 ends with conclusions and remarks.

### Literature review

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Debt markets are seen to be more popular than the equity markets in almost all parts of the world. What makes them gain popularity? It is the need for funds by the government and corporates for different purposes for different purpose that gives increasing popularity to the debt markets. Investment opportunities no longer restricted to domestic markets, financial capital can now seek opportunities abroad with relative ease. Certainly, international capital for funds has caused scorching growth in international flows of equities as well as debt and monetary instruments. Statistically, there is some evidence that correlation among markets has been increasing and worse, there is sustained and strong evidence that co-movement among markets increased dramatically during periods of volatile price change, prompting investors to ask “where is international diversification when I need it.”<sup>1</sup>

Emerging markets tend to have higher rates of economic growth than the developed world. Hence the profits of companies operating there tend to grow faster than in the developed world, means higher average return to investors. Harvey (1992) studied 20 new equity markets in emerging markets. These markets have historically been characterized by high average returns and large volatility. His results explain that given the low correlation between with developed country returns, the evidence suggest that emerging market returns are not spanned by the developed market returns. Results shows, inclusion of emerging market assets in mean-variance efficient portfolio will significantly reduce portfolio volatility and increase expected returns.

The demographic profile of emerging markets also creates a striking proposition for long term investment. Population growth in Asia and Latin America dwarfs that developed markets such as Europe and Japan. Emerging market debt has performed well in recent years, driven by the strong investment flows and improvements in credit quality.

There are two strands of literature that are complementary for my approach. The first political risk related to returns from debt investments. Different measures have been used to assess political stability of a country. Hurwitz (1973, p.449-63) found five approaches that had been used to define political stability: 1) the absence of violence and disturbance, 2) government longevity/endurance,

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<sup>1</sup> Fuerbringer (2001), Brooks/Catao (2000)

3) the existence of a legitimate constitutional order, 4) the absence of structural change, 5) combination of 1 and 4, that is, a multifaceted approach.

Erb, Harvey and Viskanta (6 May 1996) measure the economic content of five different measures Risk of country: The International Country risk Guide's Political Financial, Economic and composite risk indices and institutional investor's country credit rating. They explore whether any of these measures contain information about future expected stock returns. They conduct time-series- cross-sectional analysis linking these risk measures to future expected returns. They also analyze the linkage between fundamental attributes which each economy such as book to price ratio, and the risk measures. Their outcomes suggest that the country risk measures are correlated future equity returns.

Erb, Harvey and Viskanta (21st May 1996) examine the content of country risk measure provide by institutional investors and political risk services' international country risk guide. Their analysis suggests that there is information in these measures with regard to world bond market expected returns. They showed that when they formed portfolio based on changes in risk ratings, they find risk-adjusted abnormal returns in the range of 500 bp per year on unhedged returns. They also find evidence that ex-post real yields have an ability to predict the cross-section of returns. It is also the case that real yields are inversely correlated with risk measures, (higher real yields imply lower ratings or higher risk).

Bartram and Duffy (1997) find that investing in foreign securities, investors can participate in the growth in other countries, hedge their consumption basket against the exchange rate risk, realize diversification effects and take advantage of market segmentation on global scale. They suggest that in international constraints, financial investments are not only subjects to currency risk and political risk, but there are many institutional constraints and barriers, significantly among them a host of tax issue.

The second strand of literature studies the effects of exchange rates in context of debt investment. Foreign assets are denominated in foreign currency terms; foreign securities are usually exposed to unexpected change in the exchange rates of the respective currency. If the total risk of foreign security is decomposed into the components currency risk and volatility in local-currency value, exchange risk contributes significantly to the total volatility of a security.<sup>2</sup>

Chiang and Jiang (1995) examined foreign exchange return behavior over short and long time horizons for six major currencies. Their evidence indicates strong positive correlation for intervals

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<sup>2</sup> Odier/solnik 1993

from 12 to 52 weeks. They measured the returns over there to four year horizons, the coefficients on first-order autoregression are negative, supporting a mean reversion hypothesis. Their results showed that mean reverting behavior, which is consistent with the variance ratio being less than unity, implies that the foreign exchange markets are more stable and investment over long horizons is less risky than it appears to be.

Sturges (2000) explored the relationship between foreign bond and currency returns. Results (1978-1997) showed that for the U.S. investor, excess returns on German, Japanese and U.K bonds are positively correlated with the respective excess local currency returns. But for the investors who measure their performance in the currencies of these countries, the comparable correlation between U.S. bond returns and position in U.S dollars found negative. Morcereav and Sowa (2008) investigate that emerging market government debt in local currency is a fast growing class, because this asset class is new and therefore offer attractive opportunities for investors. Their model relates long term interest rate to economic fundamentals. And they suggest that their model explain emerging markets interest rates well. They suggest that an investment strategy based on their model seem promising.

### Empirical Work

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Jianping Mei (1999) examines the impact of political uncertainty on the recent financial crises in emerging markets. They constructed dummy variables by dividing country's election cycle into two periods. a) The time leading up to an election and the time of government transition after the election, and b) The time after the transition is complete and next election starts. If the election is held in the first half of the year  $t$ , they set as the political dummy to be 1 for year  $t$  and then  $t-1$ . If the election held in the second half of the year  $t$ , then it is as  $1+t$ . They used the data from 1994-1997 of 22 different countries from emerging markets. He found that there is a significant relationship between political uncertainty and financial crises after controlling for market contagion and difference in economic conditions.

Nathan Jensen and Andrew Sobel (2005) conducted a pilot study of five Latin American countries from 2000-2004 to explore the relationship between existing measures of political risk and financial markets. For that they constructed a data base of monthly observations from the selected period. Their key political variables came from political risk services ICRG database. Political Risk Rating is the core variable of this database, which is an ordinal variable from 0 (highest risk) to 100(lowest risk).this core variable is constructed from a number of measures including: government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religion in politics etc. They present the monthly time-series of political risks measures for five countries. They find that political risk vary over time. They also find that correlation between percentage change in government stability and percentage change in political risk varies from a low of 0.57 to a high of 0.81 for five selected countries.

Claudio Borio and Frank Packer (2004) examine in a unified framework three recent perspectives on country risk: debt tolerance, original sin, and currency mismatch. Their sample comprises 52 countries for which they collected annual data from 1996 to 2003. They use panel data to exploit the information contained in the time variation and cross-sectional variation in the data. They use a correlation matrix of rating and selected explanatory variables. Country credit ratings are strongly correlated with a number of their explanatory variables, notably with per capita GDP ( $\rho=0.80$ ), the corruption and political risk indices (-0.85 and -0.87, respectively), as well as years since default and inflation history (0.69 and -0.62). The original sin measures are also strongly correlated

with country credit ratings. The currency mismatch measures appear to have relatively little correlation with country credit ratings, though the results show that countries with higher measures of original sin tend to have negative mismatch.

Berument and Gunay (2001) examined the effect of exchange rate risk on interest rates within the uncovered interest rate parity condition for Turkey. They measured the interest with the treasury auction interest rate and exchange rate risk is measured with the conditional variance of the exchange rate, they find that there is a positive relation between the exchange rate risk and interest rate with the data from 1986:12 to 2001:01.

Alexius and Sellin (2002) studied the relationship between the US dollar – Deutsch Mark exchange rate and German and American bonds rates. Data on returns to weekly investments in ten-year Us and German bench mark government bonds have been collected by Dahlquist, Hordahl and Sellin. They collected data on USD/DEM exchange rate from the BIS database. The sample period was October 1993 to November 1998.

They regress ex post exchange rate on relative bond returns as in below equation and investigate whether  $[\alpha, \beta]$  equals  $[0, 1]$  for different choices of investment horizon  $\tau$ . They test t hypothesis that the expected exchange rate change equal the expected difference between returns to investments in long-term bonds. Their finding shows that there is negative relationship between exchange rate changes and short-term interest rate differentials, the behavior of US dollar- Deutsch Mark exchange rate and returns to short investment in Germany and American long-term bonds appears to consistent with standard asset pricing theory.

### **DEBT MARKETS RISK AND RETURNS in emerging markets**

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This study has been undertaken to explore risk management in emerging markets. I am not interested in determining whether individual markets are more or less risky – that is inherent in emerging markets given the scale and pace of change and their current level of economic development. Experience tells us the conditions that make them riskier than mature markets will continue to apply for some time, hence, in an increasingly interconnected global economy; managing risk in emerging markets is and will continue to be an essential competence for multinational organizations.

Developed and emerging market companies identify their key objective for being there as growth and the market potential of the country itself. This is a reflection of the sheer scale and growing economic power of Developed Market companies place a significantly greater emphasis on political, operational and supply chain risk. Emerging Market companies, in turn, are significantly more likely to focus on market and competitive risk, currency, workforce, pricing and tax risk.

For investors, the term *emerging markets* signifies both a degree of risk and a corresponding potential for reward. In recent years emerging markets have provided some of the richest returns to investors in public securities. Emerging markets are relative newcomers to a market economy and financial securities trading. They represent large, rapidly growing economies such as China, India, Russia, Brazil and Mexico, as well as smaller economies such as Vietnam, Singapore, Kuwait, Israel, Egypt, Chile, Costa Rica, Botswana, New Zealand and others. (North Korea, Zimbabwe and others lacking market economies and/or securities markets open to foreign investors, are not included in the category.)

The past monetary policy experience of many emerging market countries has been dismal, with extreme episodes of monetary instability, swinging from very high inflations, to massive capital flight, to collapses in their financial systems. However, in recent years the prospects for successful monetary policy in emerging market countries have increased, as exemplified by the far lower rates of inflation in the Latin American region, which have fallen from an average of over 400% in 1989 to below 10% at the beginning of the millennium.

The major issue is whether an emerging market country has a chance of setting up institutions and mechanisms that will effectively and efficiently constrain the discretion of its monetary authorities.

In principle, there are three broad monetary policy strategies that can produce a nominal anchor that credibly constrains the discretion of the central bank over the medium term: “hard” exchange-rate pegs, monetary targeting, and inflation targeting.

#### **4.1.1 Structure, risk and returns in Indian debt market:**

The Debt Markets play a very critical role for any growing economy which needs to employ a large amount of capital and resources for achieving the desired industrial and financial growth. The Indian debt market is today one of the largest in Asia and includes securities issued by the Government (Central & State Governments), public sector undertakings, other government bodies, financial institutions, banks and corporate. The Indian debt markets with an outstanding issue size of Government securities (Central and state) close to Rs.13,474 billion (or Rs. 1,34,7435 crore) and a secondary market turnover of around Rs 56,033 billion (in the previous year 2007) is the largest segment of the Indian financial markets.<sup>3</sup>

Prior to 1992, the government bonds in India did not trade on the exchange. Majority of the deals were through bilateral negotiations between the dealers. The commencement of financial reforms in 1992 changed the situation dramatically. The idea of the financial reforms is to bring about more transparency and activity in debt market. The reform process was initiated to deregulate the interest rates and make them determined by the market forces of supply and demand. This brings a distinct revolution in the activities of the Indian debt market. The major player in debt markets are corporate and institutional investors.

#### **4.1.2 Composition of Indian debt market**

The Indian debt market comprising both the government securities and the corporate securities market is dominated by the former in terms of outstanding securities, market capitalization, trading volume and number of participants. The year 2001-02 was an eventful year for debt markets in India in which several important changes like setting up of clearing corporation for government securities, a negotiated dealing system to facilitate transparency in auction, and dematerialization of debt instruments took place.<sup>4</sup>

There are three main segments of the debt market in India: government securities, public sector unit (PSU) bonds and private corporate securities. The market for government securities comprises the central government securities such as T-bills and state government securities. The PSU bonds are generally treated as surrogates for sovereign paper, sometimes due to explicit guarantees and often due to the comfort of public ownership. Some of the PSU bonds are tax-free, unlike most

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<sup>3</sup> Bombay stock Exchange (RBI & CCIL)

<sup>4</sup> State Bank of India

other bonds, including government securities. Private corporate securities include corporate bonds and debentures, which are mostly medium-term papers with maturities up to seven years, and commercial paper, which is a short-term corporate debt instrument with maturities from 15 days to one year. The money market overlaps with the debt market inasmuch as T-bills and other short-term debt papers with maturities up to one year form an integral part of the money market.<sup>5</sup>

In the recent past, the corporate debt market has seen high growth of innovative securities like floating rate instruments, zero coupon bonds, convertible bonds, callable bonds, etc. These instruments catered to the needs of a wide variety of investors based on their risk return preferences. The instrument in the corporate debt market are traded either through bilateral agreement between two counterparties or in a stock exchange through broker. If they are traded through brokers, then they are traded on the Bombay Stock Exchange (BSE) and on the wholesale debt market segment of the National Stock Exchange (NSE).

Though the volume in the debt market is larger than of the equity markets, but the participant are fewer than those in equity market. Unlike equity markets, debt markets do not draw much attention of the investors, particularly the individual investors. This may be due to attractive returns associated with the equity investments and their easy accessibility to the individual investors.

Particularly, the interest rates in the Indian debt market are indirectly regulated even now by way of changes in the monetary and fiscal policies triggered by the government borrowing requirements. When the equity markets are volatile, the returns on investments in them are uncertain. In such situation, exposure to fixed income market would be desirable by some of the individual risk averse investors and portfolio managers as they would be interested in earning an assured fixed return. Though the debt instruments are more secured than equity instruments, the pricing of the former is as crucial as that of the latter.

#### **4.2.1 Debt markets structure, risk and returns in Malaysia:**

The capital market in Malaysia has developed significantly in terms of market size, range of instruments and efficiency. The Capital Market Master Plan launched in February 2001 provides support for the development of the Malaysian capital market in the new decade. Debt market is composed of two main securities market Government Debt and Private Debt Securities

#### **4.2.2 The Government Debt**

Malaysian government securities (MGS) are interest bearing bonds issued by the government with the help of Bank Negara Malaysia (BNM), the central bank, to raise long-term funds from the domestic capital market to finance the government's development expenditure. MGS are issued by

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<sup>5</sup> Bank of International settlement; the development of bonds market in emerging economies

tender via selected dealers. Tendering is done through the Fully Automated System for Tendering, whereby the coupon rate is determined by the weighted average of the successful bids.

In the early years, MGS were issued to meet up the investment needs of the Employees' Provident Fund, banks and insurance companies. In the late 1970s and early 1980s, MGS were used to finance public sector development expenditure. From 1989 to 1992, they served to fund part of the government's budget deficit, and in the mid-1990s, to prepay some of the costly government peripheral loans.<sup>6</sup>

In the 10-year period from 1988 to 1997, new MGS issues slowed, due to the decline in the government's borrowing programme. The government was scaling back its operations to enhance the private sector's job as the main engine of growth. One of the noticeable features of the MGS market is the creation of a captive market as the papers are sought to meet mandatory investment requirements for most financial intermediaries, insurance companies, provident funds. Furthermore, MGS are risk-free papers and hence generally held to maturity. Trading is very slight and only picked up from late 1999 onwards.

Recognizing the importance of an active and viable secondary market for MGS, several regulatory and operational reforms were introduced to the market. The reforms also met other objectives such as facilitating the conduct of monetary policy, adding greater depth to the market, providing flexibility in the government's management of debt and increasing allocative efficiency. MGS remained the most actively traded bonds, accounting for MYR 15 billion of the total monthly trading volume of MYR 38 billion in 2001.<sup>7</sup>

#### **4.2.3 The Private Debt Securities:**

The bond market is a significant source of finance for various development projects in Malaysia. Though Malaysian government bonds dominate the bond market, constituting about 48% of outstanding issues at end-2000, private debt securities grew by nearly 380 times from MYR 0.4 billion as at end – 1987 to MYR 152 billion at end September 2001. The market for private debt securities is now equivalent to 28% of GDP. This is in line with the government's ambition to promote the private sector as to boost up the growth.

The range of debt securities has also widened in tandem with the growth of the market. In general, the private debt securities market comprises various types of instruments with the range covering fixed rate, floating rate, zero-coupon, convertible/non-convertible and secured/unsecured. The maturity ranges from three to 20 years.

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<sup>6</sup> Bank Negara Malaysia

<sup>7</sup> Bank of International Settlement

#### **4.2.4 Market Structure**

To improve the efficiency of the tendering for securities, BNM introduced the Fully Automated System for Issuing/Tendering (FAST) to replace the tender form submission. FAST is an automated tendering system whereby the invitations to tender, the submission of bids and the processing of tenders for scripless securities and short-term private debt securities are conducted electronically. The process reduces errors and delays arising from manual handling of tenders. Under this system, BNM acts as the facility agent for both the government and its own issues. For PDS, the companies appoint financial institutions as their arrangers and facility agents. FAST has now been enhanced to be the system to capture all primary issuance of all unlisted instruments.

The Bond Information and Dissemination System (BIDS) is a computerized and centralized database on Malaysian ringgit debt securities, providing information on the terms of issue, real-time prices, details of trades done and relevant news on the various government and private debt securities. In July 1999, the deferred net settlement protocol was replaced with the Real-Time and Gross Settlement System (RENTAS) to enhance liquidity and reduce settlement risks. Online RENTAS reduces settlement risks for market participants as it introduced a delivery versus payment (DvP) arrangement for transactions involving securities. Under DvP, securities transactions will only be effected when securities and funds are available in both the seller's and the buyer's accounts. Currently, the system captures all government and BNM issues and unlisted issues of corporate bonds, which account for approximately 95% of the total market.<sup>8</sup>

#### **4.3.1 Debt markets structure, risk and returns in Taiwan:**

Since the development of fixed income securities, Taiwan is still in its infancy, trading activities and volumes are still much less than those of the equity market. The total bond trading value was only \$414.40 billion in 1988. Yet, the total bond trading value reached \$118,968.40 billion in 2001 with a 285 fold increase. On the contrary, there is no considerable growth in equity market in terms of total transaction value during the past ten years. For sure, Taiwan bond market growth potential can be expected in the coming decade.

The biggest challenge in building an efficient bond market is coordinating the different regulatory agencies. Since 1991, in an attempt to develop an efficient bond market, Taiwan switched the issuance of government bonds from flexible allocation to competitive bidding. Over the counter trading was established for price quotations and discovery. However, the government had too many regulatory agencies in charge of issuance and trading. With each having its own way of doing things, it became difficult for these agencies to work together towards a common goal.

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<sup>8</sup> Bank Negara Malaysia

Therefore, performance was unsatisfactory before 2000. Based on this experience, it is advisable that any plan for efficient price discovery should involve one agency with overall authority to coordinate the action of various policy makers.

There are numerous kinds of bond issuance in Taiwan. The bond price disclosure depends on the yield to maturity (YTM). The yield to maturity reflects the market risk that a firm faces. Since there is not much trading volume of bonds, it is practically difficult, if not impossible, to observe the market risk data. To the participants in fixed income securities market, there is not enough information to understand the intrinsic value and credit risk of an issuing firm.

#### **4.3.2 Financial Reforms in Debt Market:**

It is important that government bonds be issued periodically and in the appropriate amount. If the government issues bonds consistently, it will lower uncertainty and help manage positions. Taiwan used a policy of periodical issuance of appropriate amount since July 2002. The amount of issuances is neither fixed nor pre-determined. The Finance Ministry wants to control fiscal spending, therefore a policy, where the issued amount varies is more suitable. However, every issue ranged from one to two billion US Dollar, making the market large enough to be efficient and to prevent price manipulation.

Bond traders prefer on-the-run issues and this makes the active trading life of each bond shorter. This makes it easier for particular bonds to disappear from the market and the price can be easily manipulated. There are huge price discrepancies between the on-the-run issues and the over-run issues. In order to raise the saturation of individual bonds in the secondary market and to create a deeper market, Taiwan (China) instituted a re-open policy in April 2003. It has been effective in prolonging the trading life of benchmark bonds.

The electronic bond transaction system was implemented in July 2002 and was used to diminish the level of information asymmetry between issuers and investors. Currently, trading via the electronic bond transaction system accounts for 90% of bond transactions. As the sole secondary market intermediary, the GreTai Security Market is responsible for all kinds of information disclosure, such as end of day transaction data, historical performance, issuer-related news and announcements and market-rate statistics.

Long and short trade is basic elements required for price discovery. It is quite rare to borrow bonds to short-sell and the regulators, especially in developing countries, often ban selling short. Moreover, Taiwan (China) was no different. In October 2002 the government, realizing the importance of long and short trade in price discovery, allowed the borrowing of bonds to short-sell. However, at that time, the bond market was at its peak and therefore this procedure was not

successful. It was only in March 2005, when the repo trading system began to be used and the yield curve began to rise that the borrowing of bonds for short selling began to be profitable. Since then, the number of short selling of trades through the repo trading system has grown dramatically. A Primary dealer system was launched in November 2003. There are now 11 primary dealers dealing in government bonds



### Frame Work of Study

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#### 5.1 Presentation of Data and Model

I start with looking the appropriate methodology to continue with the empirical analysis of the study. I adopted ADF test for unit root and Johansen to test for co integration. Data used in the empirical test of this paper is composed by next variables with observations from 31-01-1997 to 30-06-2008 on monthly basis. Data is obtained from EcoWin database.

Political risk calculated by using government long term interest rates at the end month. Exchange rates at the end of month against US dollar. Different people used different methods to calculate political risk as Jensen and Sobel (2005), Harvey (1996) used international Country Risk Guide (ICRG). Borio and Packer observed country risk on the basis of debit tolerance, original sin and currency mismatch.

I used a different way from the above to calculate the political risk. I used USA as a bench mark because of political stability and policies of the government. I used government long term interest rates of USA and compare it with the countries from emerging markets. The reason to use this way to calculate political risk is that the long term interest rate shows the stability of government policies in long run. This also shows the behavior of politicians towards the stability of financial markets. And choosing USA as bench mark is because USA has stable political system and polices are long term, leader in financial markets and financial reforms.

I have 138 observations on the monthly basis. The first task is to check stationary for political risk through ADF unit root test. Second task is to find co integration using Johansen test for co integration to find the relationship between political risk and exchange rate. Political risk serves as independent variable while exchange rate is dependent variable, which depends on political situation.

The model express exchange rate as a function political risk lags.

$$EX = f (PR)$$

It can be expressed in this equation as:

$$EX_t = \alpha + \alpha_1PRI + \alpha_2PRM + \alpha_3PRT + \mathcal{E}_t \quad (1)$$

EX = Exchange Rates

PRI = Political Risk in India

PRM = Political Risk in Malaysia

PRT = Political Risk in Taiwan

$\mathcal{E}_t$  = Random Error Term

$\alpha$  = Constant

## 5.2 Unit Root

I adopted the unit root test (Augmented Dickey Fuller) as well as Johansen co-integration test. The null hypothesis is accepted if unit root exists ( $H_0 = \beta = 0$ ) otherwise the alternative hypothesis is accepted ( $H_A = \beta < 0$ ). While the null hypothesis for co integration is accepted if ( $H_A = \Pi = 0$ ) otherwise rejected if ( $H_0 = \Pi < 0$ ) i.e. co-integration exist.

I applied the unit root test to determine the order of integration of variables using the Augmented Dickey Fuller tests.

In ADF test, the choice of the optimal lag is determined by the Akaike information criterion AIC. The variable that has unit root is non-stationary at the level form, but stationary after differenced. This type of variable is said to be integrated of order one or two denoted by I (1) or I (2) depending on the number of times it was differenced. It is very important to further test for the linear combination between them.

If they are co intergraded, then the variables genuinely related and they establish a long run relationship. I test for co integration by utilizing the Johansen. If the variables are co integrated, then the vector error correction (VEC) model is employed. For the purpose of this study I limited my tests to unit root and co integration. The first test in our analysis is to check the order of

integration of the variables by testing for unit root using ADF. Augmented Dickey-Fuller (ADF) (1979), based on the following model, and introduced a robust test for unit root, which is specified as follows:

$$\Delta Y_t = \alpha + \beta_t + \theta Y_{t-1} + \sum_{p=1}^n \Delta Y_{t-p} + \varepsilon_t \quad (2)$$

$\Delta Y_t$  = change in y variable at time t

$\alpha$  = Drift

$\beta_t$  = Deterministic trend (coefficient on a time trend)

$\theta$  = Constant

$\Sigma$  = summation

$P$  = lag order

$\varepsilon_t$  = Error term at time t

### 5.3 Co integration

Co-integration is an econometric property of time series variables. If two or more series are themselves non-stationary, but a linear combination of them is stationary, then the series are said to be co integrated. Co-integration test aims at identifying whether the long term economic relationship existing among variables is stable. The test is carried out using Johansen co-integrated test (1991). Some of the concepts of the equation have been described above except  $\mu$ ,  $\Pi$ , and  $\Gamma$ .

Johansen's methodology takes its starting point in the vector autoregression (VAR) of order  $p$  given by

$$Y_t = \mu + AY_t + A_p Y_{t-p} + \dots + \varepsilon_t \quad (3)$$

Where  $y_t$  is an  $n \times 1$  vector of variables that are integrated of order one – commonly denoted  $I(1)$  – and  $\varepsilon_t$  is an  $n \times 1$  vector of innovations. This VAR can be re-written as

$$\Delta Y_t = \mu\Gamma + \Pi y_{t-1} + \sum_{i=1}^{P-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t \quad (4)$$

Where

$$\Pi = \sum_{i=1}^p A_i \cdot I \quad \text{and} \quad \Gamma_i = - \sum_{j=i+1}^p A_j$$

**$\Pi$  = Rank**  
 **$\mu$  = Vector constant**  
 **$\Gamma$  = Lag order**

Hypothesis:  $H_0 = \Pi = 0$  (co-integration does not exist)

$H_A = \Pi < 0$  (co-integration exist). If the coefficient matrix  $\Pi$  has reduced rank  $r < n$ , then there exist  $n \times r$  matrices  $\alpha$  and  $\beta$  each with rank  $r$  such that  $\Pi = \alpha \beta'$  and  $\beta' y$  is stationary.  $r$  is the number of co integration relationships, the elements of  $\alpha$  are known as the adjustment parameters in the vector error correction model and each column of  $\beta$  is a co integration vector. It can be shown that for a given  $r$ , the maximum likelihood estimator of  $\beta$  defines the combination of  $yt-1$  that yields the  $r$  largest canonical correlation of  $\Delta yt$  with  $yt-1$  after correcting for lagged differenced and deterministic variables when present. Johansen proposed two different likelihood ratio tests of the significance of these canonical correlations and thereby the reduced rank of the  $\Pi$  matrix: the trace test and maximum eigenvalue test, shown in equation below;

$$J_{\text{trace}} = -T \sum_{i=r+1}^n \ln(1 - \lambda_i^2)$$

$$J_{\text{max}} = -T \ln(1 - \lambda_{r+1}^2)$$

Here  $T$  is the sample size and  $\lambda_i^2$  is the  $i$ : th largest canonical correlation. The trace test tests the null hypothesis of  $r$  co integrating vectors against the alternative hypothesis of  $n$  co integrating vectors. The maximum eigenvalue test, on the other hand, tests the null hypothesis of  $r$  co integrating vectors against the alternative hypothesis of  $r + 1$  co-integrating vectors.

## 5.4 Interpretation of Results

### 5.4.1 Unit Root Test

Tables 1, 2 and 3 shows the results from ADF (Said and Dickey 1984) unit root test, where lag length has been established using Akaike (1974) information criterion. The results for Political risk for India as shown in table 1 indicates, the null hypothesis cannot be rejected at 5 % and 1 % significant level respectively. This implies that the political risk in the country is integrated of order one  $I(1)$ . This shows that each variable follow a random walk. Table 2 shows the results of

Political risk Malaysia, which also reflects that at 5 % and 1% we are not able to reject the null hypothesis of non-stationary in levels. This suggests that the variables in levels are integrated of order I (1). As for results for Political risk in Taiwan as mentioned in Table 3 confirms that null hypothesis can not be rejected at 5% and 1% significant level.

#### **5.4.2 Co Integration Test**

Johansen's method is a multivariate method based on a VAR representation of the stochastic process. Once the VAR has been formulated, we can determine the number of significant eigenvalues (0 number of co integrating vectors) in the system. The test can be described as a multivariate form of the ADF-test for unit roots.

The first null is that there are no stationary relations in the data. If the Probability value is not below say 0.100 the eigenvalue is not significant. No significance means that the null of no stationary relations (=no co integration) is not reject. The test is over, and we conclude that there is no co integration. In case of rejection of the null of no stationary relations, the conclusion is so far, that there is at least one co integrating vector ( $r=1$ ).

Determining the Cointegrating Rank of the system, which is done by estimating equation 3 with  $y_t = (\Pi_t I_t)$ . Lag length is set to  $p-1$  based on Akaike information criterion.

The results imply that null hypothesis is rejected in all the three tests for India, Malaysia and Taiwan. Table 4 shows the OLS and table 7 significant eigenvalue and probability results for India. From the result it is clear that probability value is less than 0.100 which means eigenvalue is significant and long term relationship exist between exchange rate and political risk. Table 7, 8 and 9 shows results from the co integration test. All the three tests reject the null of zero Co integrating vectors. The hypothesis that there is one Co integrating vector can not be rejected on the other hand; that is, based on the co integration test there is no support for variables in the system being stationary. Based on the evidence on the tables 7, 8 and 9 I would conclude that there is existence of Co integrating relationship.

## CHAPTER



## CONCLUSION

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Although there is an abundant literature on sovereign debt investment but still not enough research has done on debt investment particularly in government or private debt securities. This paper focused on how much risk is involved in debt investment in emerging markets. This is assessed through two main variables political risk and exchange rate risk because a foreign investor is worried about government policies and the exchange rate of that country against the other countries. To check the relationship between these two I used Johansen's co integration method. On the basis of results it is concluded that political risk in each selected country is integrated order I (1). This shows that each variable follow random walk, which means it can go up or down without any influence from the past movements. I also find that there is a long term relationship between exchange rate risk and political risk. The study exposes that, all the variables are correlated, which means that political risk has emphasis on exchange rate. This predicts that if the political situation in the country is stable and policies are for long term, there is a less risk as compared to the country which has fluctuation in his political system.

As for India, as it is known as the world's largest democratic country, still need lot of improvements in the policies. Tensions with Pakistan on Kashmir dispute, forced the investors to think about their long term investments. But at the same time new financial policies and innovations in financial markets also attract the investors. International business risks consultancy firm Control Risks said in its annual study on levels of global political and security risks, "Riskmap 2008," that 57 per cent of the emerging markets are at medium political risk or above, indicating significant threats to foreign investments. However, India has been named as a "low" political risks market and might benefit from political and security instability in other key emerging markets during the course of the year, it noted.

Malaysia known as the Asian Tiger is a politically stable country with growth rates that are among the highest in Southeast Asia, the country has successfully sustained strong economic growth together with a stable currency and low inflation for the past three decades. Malaysia's enjoys a

healthy financial situation underpinned by an ample current account surplus and high foreign exchange reserves. The banking sector continues moreover to grow stronger as evidenced by the decline of the proportion of non-performing loans. Public spending is still high, however, which has resulted in an appreciable fiscal deficit and public sector debt representing over 50 per cent of GDP. Sovereign risk has nonetheless been limited due to the abundance of domestic savings. Coface Country Risk Ratings reflects the average level of short-term non-payment risk associated with companies in a particular country. A2 ranking shows, default probability is still weak even in the case when one country's political and economic environment or the payment record of companies is not as good as in A1-rated countries.

The political and economic situation is very good. A quality business environment has a positive influence on corporate payment behavior. Corporate default probability is very low on average. Taiwan continues to be one of the world's lowest-risk investment destinations, ranking fifth on Business Environment Risk Intelligence's (BERI) second business risk report of the year. Taiwan's ranking is based on BERI's Profit Opportunity Recommendation (POR) Scale, which offers a score based on political risk, operations risk, and foreign exchange flows. Taiwan received a score of 72, tying with Norway. The top four countries on the survey were Switzerland, Singapore, the Netherlands, and Japan. Taiwan also reached the 1A level on the POR -- the highest level possible -- another indicator of Taiwan's low-risk investment environment. In the report, BERI predicts that Taiwan will advance to fourth place next year with a score of 73, citing factors such as decreasing political risk and a more stable foreign exchange

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## Appendix I

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**Table 1: ADF test for India**

Ox version 3.40 (Windows) (C) J.A. Doornik, 1994-2004  
Descriptive Statistics package version 1.0, object created on 28-07-2008

Unit-root tests (**using political risk for India.xls**)

The sample is 4 - 138

Political Risk: ADF tests (T=135, Constant; 5%=-2.88 1%=-3.48)

D-lag	t-ADF	beta	Y_1	sigma	t-DY_lag	t-prob	AIC	F-prob
2	-1.677	0.96740	0.4046	-1.327	0.1869	-1.781		
1	-1.784	0.96533	0.4057	0.7974	0.4266	-1.782	0.1869	
0	-1.735	0.96641	0.4052			-1.792	0.3045	

## Table 2: ADF test for Malaysia

Ox version 3.40 (Windows) (C) J.A. Doornik, 1994-2004  
Descriptive Statistics package version 1.0, object created on 28-07-2008

### Unit-root tests (using political risk Malyasia.xls)

The sample is 4 - 138

Political Risk: ADF tests (T=135, Constant; 5%=-2.88 1%=-3.48)

D-lag	t-adf	beta	Y_1	sigma	t-DY_lag	t-prob	AIC	F-prob
2	-1.712	0.95998	0.2539	-1.220	0.2246	-2.713		
1	-1.937	0.95526	0.2544	2.496	0.0138	-2.716	0.2246	
0	-1.580	0.96314	0.2593			-2.685	0.0233	

### Table 3: ADF test for Taiwan

Ox version 3.40 (Windows) (C) J.A. Doornik, 1994-2004

Ox version 3.40 (Windows) (C) J.A. Doornik, 1994-2004

Descriptive Statistics package version 1.0, object created on 28-07-2008

Political risk Taiwan.xls loaded from G:\data for thesis\Final Thesis\New Folder\political risk Taiwan.xls

#### Unit-root tests (using political risk Taiwan.xls)

The sample is 4 - 138

Political Risk: ADF tests (T=135, Constant; 5%=-2.88 1%=-3.48)

D-lag	t-ADF	beta	Y_1	sigma	t-DY_lag	t-prob	AIC	F-prob
2	-1.209	0.97934	0.2150		-0.6733	0.5019	-3.045	
1	-1.288	0.97815	0.2145		1.272	0.2056	-3.057	0.5019
0	-1.175	0.98010	0.2150				-3.059	0.3591

**Table 4: Test for optimal lag length (India)**

---- PcGive 10.40 session started at 16:26:50 on 28-07-2008 ----

Political risk for India.xls loaded from G:\data for thesis\Final Thesis\New Folder\political risk for India.xls

SYS (1) Estimating the system by OLS (using political risk for India.xls)

The estimation sample is: 3 to 138

URF equation for: Political Risk

	Coefficient	Std.Error	t-value	t-prob
Political Risk_1	1.03650	0.08489	12.2	0.000
Political Risk_2	-0.0989556	0.08383	-1.18	0.240
Exchange Rate_1	0.157887	0.06120	2.58	0.011
Exchange Rate_2	-0.175421	0.06091	-2.88	0.005
Constant U	0.989857	0.5576	1.78	0.078

Sigma = 0.392753 RSS = 20.20744337

URF equation for: Exchange Rate

	Coefficient	Std.Error	t-value	t-prob
Political Risk_1	-0.0475036	0.1180	-0.403	0.688
Political Risk_2	0.0778972	0.1165	0.669	0.505
Exchange Rate_1	1.21563	0.08506	14.3	0.000
Exchange Rate_2	-0.241854	0.08466	-2.86	0.005
Constant U	1.06992	0.7749	1.38	0.170

sigma = 0.545863 RSS = 39.03365661

log-likelihood	-169.803786	-T/2log Omega	216.147495
Omega	0.0416422655	log Y'Y/T	3.28021452
R^2(LR)	0.998433	R^2(LM)	0.955959
no. of observations	136	no. of parameters	10

F-test on regressors except unrestricted: F (8,260) = 788.618 [0.0000] \*\*

F-tests on retained regressors, F (2,130) =

Political Risk_1	75.0788 [0.000]**	Political Risk_2	0.812219 [0.446]
Exchange Rate_1	112.909 [0.000]**	Exchange Rate_2	9.64309 [0.000]**
Constant U	2.95212 [0.056]		

correlation of URF residuals (standard deviations on diagonal)

	Political Risk	Exchange Rate
Political Risk	0.39275	-0.15338
Exchange Rate	-0.15338	0.54586
correlation between actual and fitted		
Political Risk	0.97668	
Exchange Rate		0.98655

**Table 5: Test for optimal lag length (Malaysia)**

PcGive 10.40 session started at 12:46:48 on 3-08-2008 ----

Political risk Malyasia.xls loaded from G:\data for thesis\Final Thesis\New Folder\political risk Malyasia.xls

SYS (1) Estimating the system by OLS (using political risk Malyasia.xls)

The estimation sample is: 3 to 138

URF equation for: Political Risk

	Coefficient	Std.Error	t-value	t-prob
Political Risk_1	1.13838	0.08561	13.3	0.000
Political Risk_2	-0.178987	0.08615	-2.08	0.040
Exchange Rate_1	0.117882	0.1869	0.631	0.529
Exchange Rate_2	-0.211450	0.1829	-1.16	0.250
Constant U	0.350328	0.2396	1.46	0.146

sigma = 0.253246 RSS = 8.401500774

URF equation for: Exchange Rate

	Coefficient	Std.Error	t-value	t-prob
Political Risk_1	0.0482577	0.04104	1.18	0.242
Political Risk_2	-0.0347387	0.04130	-0.841	0.402
Exchange Rate_1	1.04165	0.08958	11.6	0.000
Exchange Rate_2	-0.113493	0.08768	-1.29	0.198
Constant U	0.259682	0.1149	2.26	0.025

Sigma = 0.121406 RSS = 1.930877256

log-likelihood	92.8363828	-T/2log Omega	478.787664
Omega	0.0008752552	log Y'Y/T	-2.25611064
R^2(LR)	0.991645	R^2(LM)	0.904076
no. of observations	136	no. of parameters	10

F-test on regressors except unrestricted: F(8,260) = 323.056 [0.0000] \*\*

F-tests on retained regressors, F(2,130) =

Political Risk_1	87.8938 [0.000]**	Political Risk_2	2.41895 [0.093]
Exchange Rate_1	67.0974 [0.000]**	Exchange Rate_2	1.43010 [0.243]
Constant U	3.45528 [0.035]*		

correlation of URF residuals (standard deviations on diagonal)

	Political Risk	Exchange Rate
Political Risk	0.25325	0.045475
Exchange Rate	0.045475	0.12141
correlation between actual and fitted		
Political Risk	0.96541	
Exchange Rate		0.93848

**Table 6: Test for optimal lag length (Taiwan)**

PcGive 10.40 session started at 16:43:47 on 28-07-2008 ----

Political risk Taiwan.xls loaded from G:\data for thesis\Final Thesis\New Folder\political risk Taiwan.xls

Ox version 3.40 (Windows) (C) J.A. Doornik, 1994-2004

Descriptive Statistics package version 1.0, object created on 28-07-2008

Ox version 3.40 (Windows) (C) J.A. Doornik, 1994-2004

---- PcGive 10.40 session started at 16:46:45 on 28-07-2008 ----

SYS (1) Estimating the system by OLS (using political risk Taiwan.xls)

The estimation sample is: 6 to 138

URF equation for: Political Risk

	Coefficient	Std.Error	t-value	t-prob
Political Risk_1	1.04994	0.09155	11.5	0.000
Political Risk_2	-0.135195	0.1315	-1.03	0.306
Political Risk_3	0.173997	0.1307	1.33	0.186
Political Risk_4	-0.0983440	0.1306	-0.753	0.453
Political Risk_5	-0.0234671	0.08826	-0.266	0.791
Exchange Rates_1	-0.0192049	0.03749	-0.512	0.609
Exchange Rates_2	0.0649773	0.05518	1.18	0.241
Exchange Rates_3	-0.0238284	0.05550	-0.429	0.668
Exchange Rates_4	-0.0640303	0.05559	-1.15	0.252
Exchange Rates_5	0.0195047	0.03711	0.526	0.600
Constant U	0.694539	0.4333	1.60	0.112

Sigma = 0.212937 RSS = 5.53176636

URF equation for: Exchange Rates

	Coefficient	Std.Error	t-value	t-prob
Political Risk_1	0.134329	0.2187	0.614	0.540
Political Risk_2	-0.0617097	0.3141	-0.196	0.845
Political Risk_3	-0.0402219	0.3123	-0.129	0.898
Political Risk_4	-0.252835	0.3121	-0.810	0.419
Political Risk_5	0.244077	0.2108	1.16	0.249
Exchange Rates_1	1.08972	0.08957	12.2	0.000
Exchange Rates_2	-0.0882294	0.1318	-0.669	0.505
Exchange Rates_3	-0.0494697	0.1326	-0.373	0.710
Exchange Rates_4	-0.204846	0.1328	-1.54	0.126
Exchange Rates_5	0.160825	0.08866	1.81	0.072
Constant U	3.05435	1.035	2.95	0.004

Sigma = 0.508689 RSS = 31.56929354

log-likelihood	-69.1995381	-T/2log Omega	308.238112
Omega	0.00970455831	log Y'Y/T	0.90296113
R^2(LR)	0.996066	R^2(LM)	0.925562
no. of observations	133	no. of parameters	22

F-test on regressors except unrestricted:  $F(20,242) = 180.818 [0.0000]$  \*\*  
 F-tests on retained regressors,  $F(2,121) =$   
 Political Risk\_1 67.4768 [0.000]\*\* Political Risk\_2 0.579599 [0.562]  
 Political Risk\_3 0.879628 [0.418] Political Risk\_4 0.697283 [0.500]  
 Political Risk\_5 0.671238 [0.513] Exchange Rates\_1 73.9847 [0.000]\*\*  
 Exchange Rates\_2 0.821840 [0.442] Exchange Rates\_3 0.184336 [0.832]  
 Exchange Rates\_4 2.10321 [0.127] Exchange Rates\_5 1.92481 [0.150]  
 Constant U 6.31138 [0.002]\*\*

correlation of URF residuals (standard deviations on diagonal)

	Political Risk	Exchange Rates
Political Risk	0.21294	-0.13041
Exchange Rates	-0.13041	0.50869

correlation between actual and fitted

Political Risk	Exchange Rates
0.98265	0.94209

### Table7: Test for Significant eigenvalue (India)

I (1) cointegration analysis, 3 to 138

eigenvalue	loglik	for rank
-177.2106	0	
0.063789	-172.7284	1
0.042097	-169.8038	2

H0:rank<= Trace test [ Prob]

0	14.814 [0.062]
1	5.8492 [0.016] *

Asymptotic p-values based on: Unrestricted constant

Unrestricted variables:

[0] = Constant

Number of lags used in the analysis: 2

beta (scaled on diagonal; cointegrating vectors in columns)

Political Risk	1.0000	0.72477
Exchange Rate	0.074063	1.0000

alpha

Political Risk	-0.052566	-0.013641
Exchange Rate	0.052198	-0.030085

long-run matrix, rank 2

	Political Risk	Exchange Rate
Political Risk	-0.062452	-0.017534
Exchange Rate	0.030394	-0.026219

**Table8: Test for Significant eigenvalue (Malaysia)**

I (1) cointegration analysis, 3 to 138

eigenvalue	loglik for	rank
	86.81223	0
0.053419	90.54533	1
0.033131	92.83638	2

H0:rank<= Trace test [Prob]

0	12.048 [0.156]
1	4.5821 [0.032] *

Asymptotic p-values based on: Unrestricted constant

Unrestricted variables:

[0] = Constant

Number of lags used in the analysis: 2

beta (scaled on diagonal; cointegrating vectors in columns)

Political Risk	1.0000	-0.95127
Exchange Rate	13.996	1.0000

alpha

Political Risk	-0.0090547	0.033165
Exchange Rate	-0.0038299	-0.018237

long-run matrix, rank 2

	Political Risk	Exchange Rate
Political Risk	-0.040603	-0.093568
Exchange Rate	0.013519	-0.071841

### Table9: Test for Significant eigenvalue (Taiwan)

I (1) cointegration analysis, 6 to 138

eigenvalue	loglik	for rank
	-77.55375	0
0.094134	-70.97932	1
0.026409	-69.19954	2

H0:rank<= Trace test [ Prob]

0	16.708 [0.031] *
1	3.5596 [0.059]

Asymptotic p-values based on: Unrestricted constant

Unrestricted variables:

[0] = Constant

Number of lags used in the analysis: 5

beta (scaled on diagonal; cointegrating vectors in columns)

Political Risk	1.0000	18.612
Exchange Rates	4.9488	1.0000

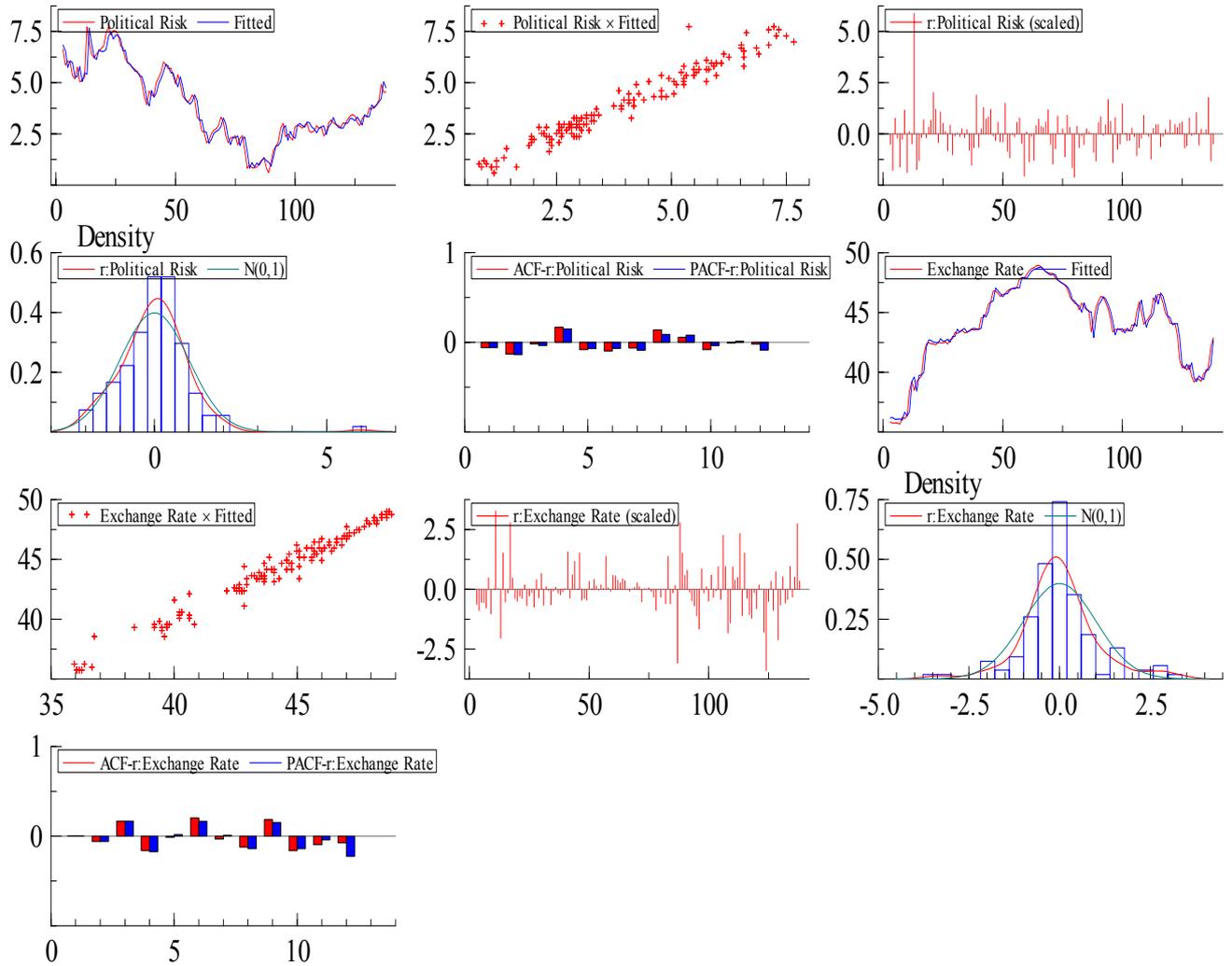
alpha

Political Risk	-0.004250	-0.0015482
Exchange Rates	-0.019054	0.0022938

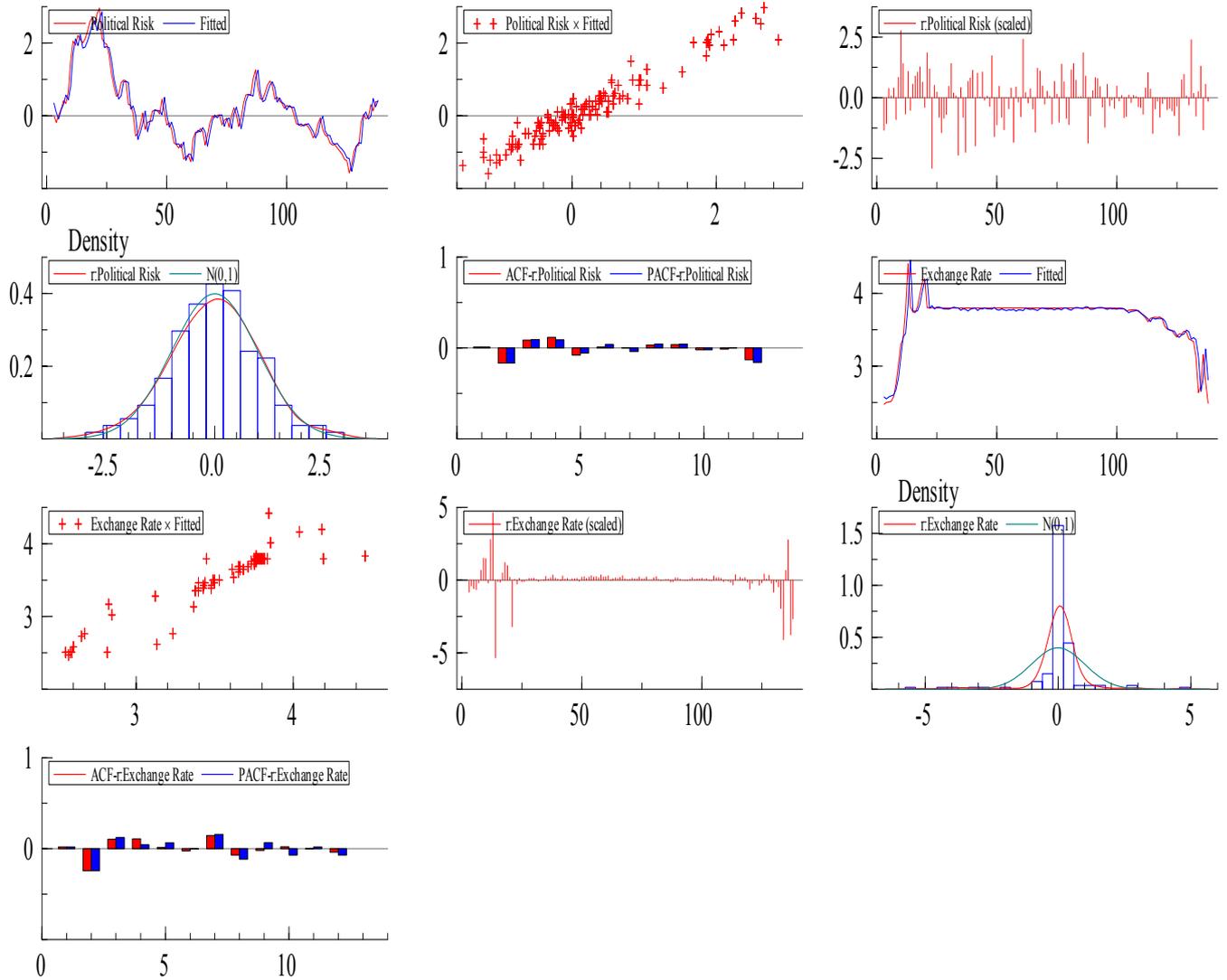
long-run matrix, rank 2

	Political Risk	Exchange Rates
Political Risk	-0.033066	-0.022582
Exchange Rates	0.023640	-0.091999

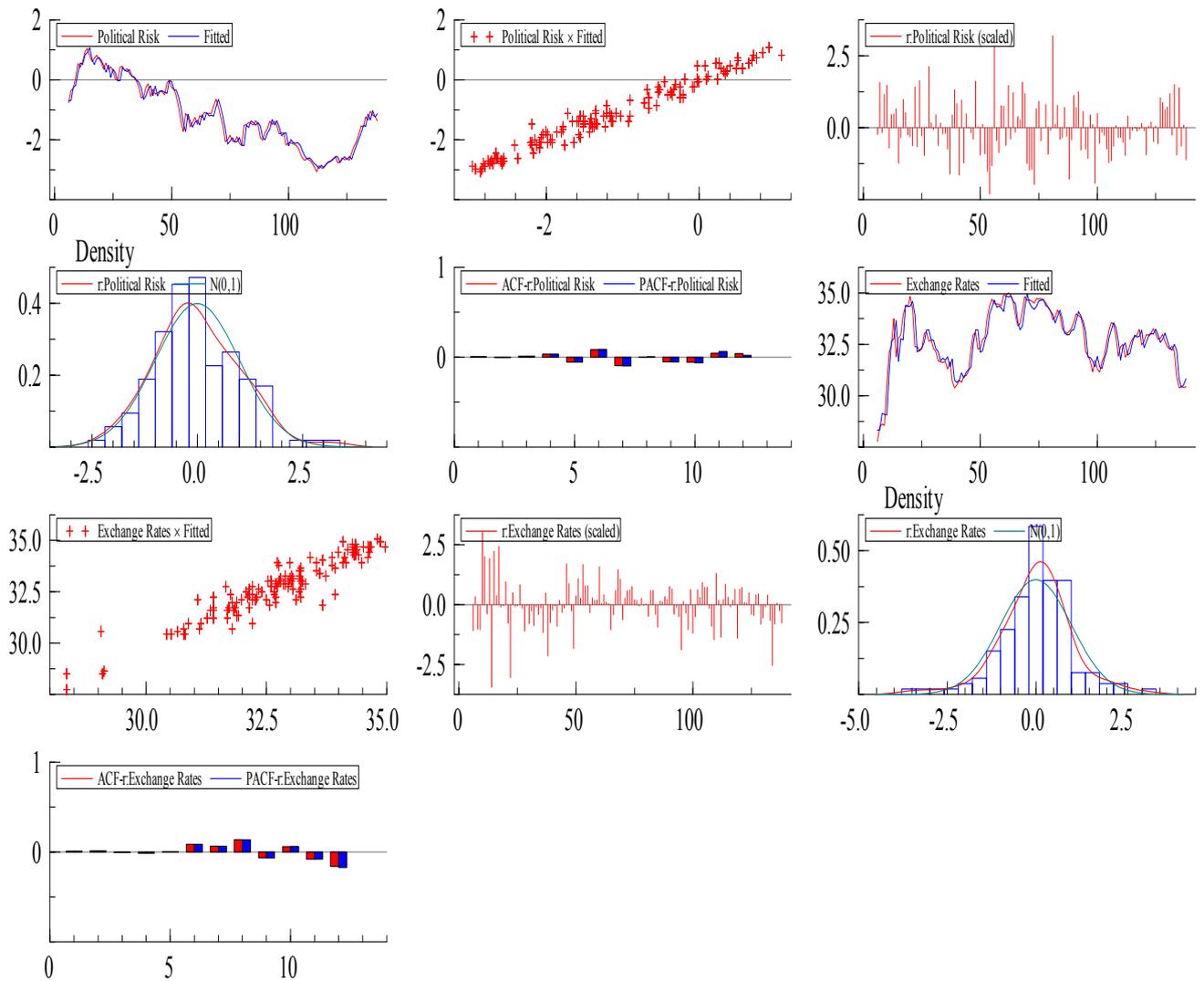
Figure 1 Data Graph for India (political risk and exchange rate)



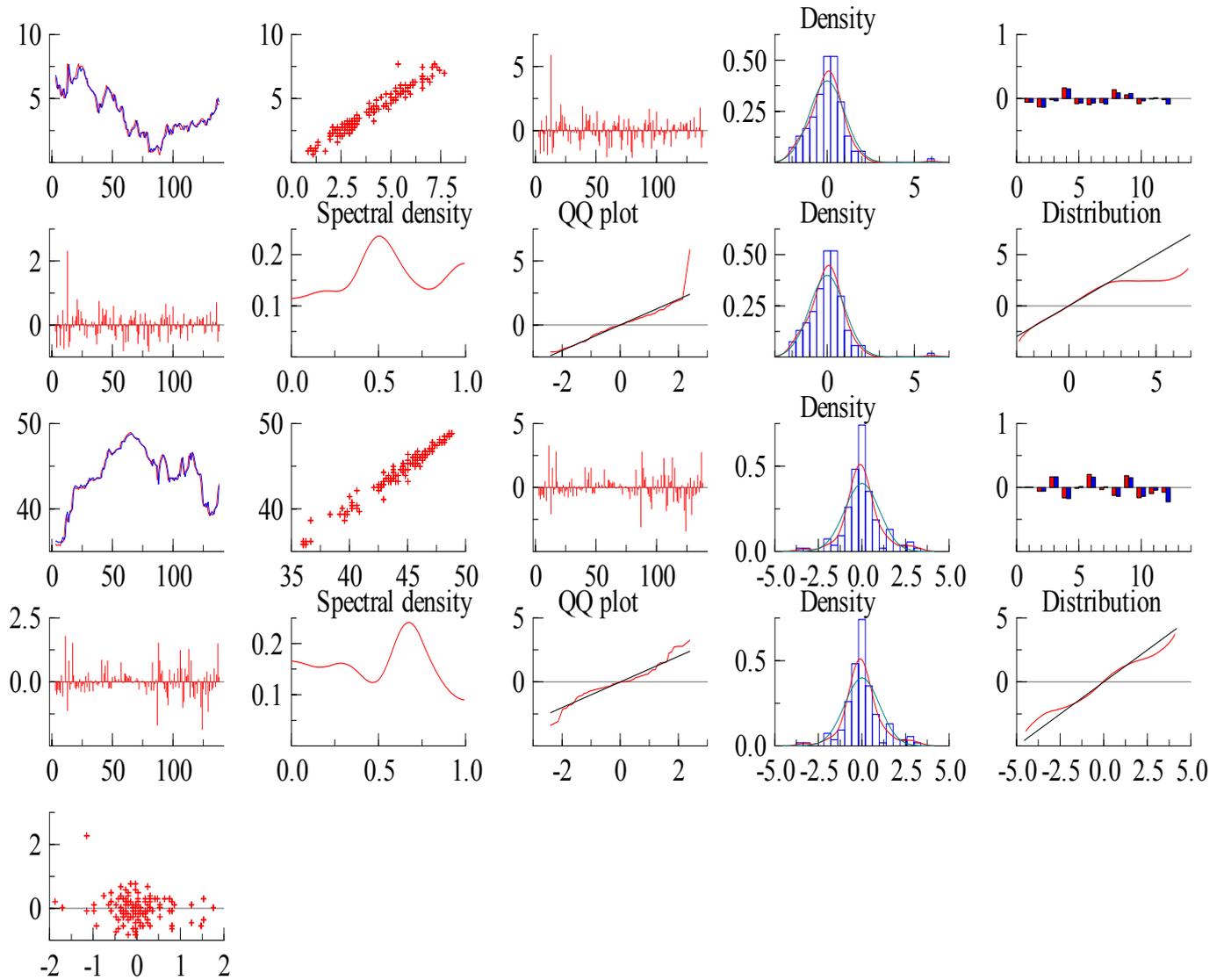
**Figure 2 Data Graph for Malaysia (political risk and exchange rate)**



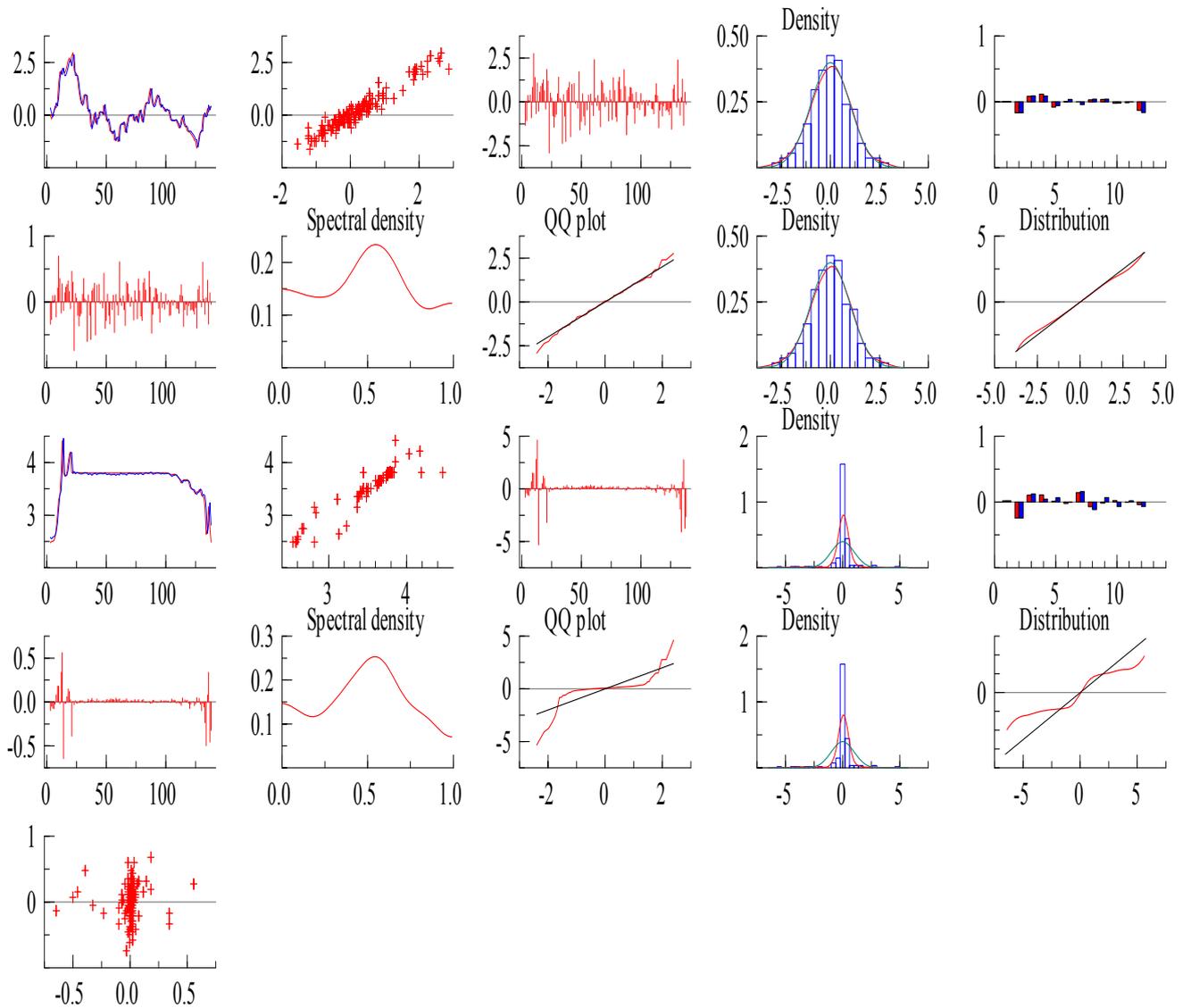
**Figure 3 Data Graph for Taiwan (political risk and exchange rate)**



**Figure 4: Graphs of Cointegrating Vector and Residuals of India**



**Figure 5: Graphs of Cointegrating Vector and Residuals of Malaysia**



**Figure 5: Graphs of Cointegrating Vector and Residuals of Taiwan**

