



**INTERNATIONAL ASSET PRICING MODELS AND CURRENCY RISK:
EVIDENCE FROM VIETNAM**

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Bachelor of Finance with Honors
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2014

Grade: _____

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Final Year Project Report

Masters

PhD

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**INTERNATIONAL ASSET PRICING MODELS AND CURRENCY RISK:
EVIDENCE FROM VIETNAM**

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This project is submitted in partial fulfillment of the requirement for the degree of
Bachelor of Finance with Honors
(Finance)

Faculty of Economics and Business
UNIVERSITI MALAYSIA SARAWAK

2014

Statement of Originality

This work described in this Final Year Project, entitled “**International Asset Pricing Models and Currency Risk: Evidence from Vietnam**” is to the best of the author’s knowledge that of the author except where due reference is made.

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ABSTRACT

INTERNATIONAL ASSET PRICING MODELS AND CURRENCY RISK: EVIDENCE FROM VIETNAM

By

Edward Chua Yau Sheng

This study investigates international asset pricing and whether currency risk is priced in Vietnam's Ho Chi Minh stock market from August 2000 to February 2014. Three international capital asset pricing models (ICAPM) are constructed to examine the pricing of risks in Vietnam market. A tri-variate GARCH-In-Mean approach with BEKK parameterisation for conditional variance-covariance matrix is employed. Surprisingly, empirical findings reveal that no misspecifications are detected for all three models. Price of world and local risk is found to be significant in fully integrated and partially integrated model. However, with the inclusion of currency risk into partially segmented model, local risk turns insignificant. It should be noted that price of currency risk (4.725) constitutes a large part as compared to price world and local market risk (-0.307 & 0.014). In a nutshell, we can conclude that world market risk and currency risk are priced in Vietnam's market. However, constant price of risk might not be appropriate if the price of risk is time varying. Hence, further research should explore more using a time varying specification before a conclusion could be reach regarding price of risks in Vietnam market.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Asset pricing is an attempt to predict or explain an asset's price movement. According to Krause (2001), asset pricing theories aim to determine the fundamental value of an asset. It has been used to model prices of equities, bond, real estate and etc. Asset pricing model will help to provide insight into factors affecting market returns and forecast the effect of crisis on a country. With this improved understanding of the market, investment or fund managers could use these results to make better decision and government could implement better policies in case of crisis.

Traditional capital asset pricing models (CAPM) are usually used to explain returns for individual stocks, only domestic factors are considered in the pricing model. In other words, they consider the market as segmented market, a market which is only affected by domestic factors alone. However, when we are looking at international scale, it is found in previous research that several additional factors must be taken into consideration. In International Capital Asset Pricing Model (ICAPM) context, investor must also take into account currency exchange risk when investing internationally. In addition, due to increasing globalization, countries are becoming more integrated with the world market, and investors must acknowledge that world market also affects domestic market in a way or another.

1.2 Liberalization and ICAPM

Liberalization is a process whereby regulations are reduced and restrictions are loosened to enable investment of foreign investors. A highly liberalized country would have a more "open" policy towards foreign investment, whereas a non-liberalized country would have a relatively "closed" policy. In addition to increasing foreign involvement in one country, liberalization also links the economies together. This implied that a crisis affecting a particular country would also affect its trading and investment partners. In recent years, more countries are becoming more "open" due to the increasing globalization trend. We can observe this through the recent 2008 mortgage crisis originating in US. Although the crisis is in US, yet the effects were felt globally as there are many foreign investors of US mortgage debts. From this, we can see that a highly liberalized country such as US is "integrated" with the world economy. Specifically, US markets are affected by world market movement. This had been verified by researches in various developed countries. Generally, ICAPM assuming full integration would only consider one risk, the risk from the world market and local risk would not be priced in its risk premium since local market are fully integrated into world market. For example, De Santis and Gerard (1998) used model of full integration considering only Morgan Stanley Capital International (MSCI) world index as a proxy for world factor and did not include local factor as the four countries studied (Germany, Japan, UK and US) are developed countries.

However, fully integrated ICAPM is only suitable for fully liberalized country, usually a developed country. Recent researches on emerging countries indicated that their markets are not only affected by world market risk, but also local market risk as

well. Most emerging countries are still in the process of liberalization, but are not fully integrated with the world market. Hence, it would be sensible to suggest that emerging market would be affected by world market and local market to a extent. Researches in emerging countries also showed that partially segmented ICAPM model is more appropriate for emerging countries, or those in the process of liberalization. Antell and Vaihekoski (2007) found evidence that world and local market risk are priced in the Finnish stock market, suggesting that partially segmented model is more appropriate for Finland, which is in the process of liberalization. Several researches for emerging countries also used partially segmented model and yield significant results (Chkili, 2012; Phylaktis and Ravazzolo, 2004). The existing literatures suggest that partial segmentation model is more appropriate for developing or just developed countries, while full integration model is more appropriate for developed countries.

1.3 Currency Risk and ICAPM

Apart from market integration, an international investor must also take into account currency exchange risk when investing abroad. As a rule, investors do not need to worry about currency risk if Purchasing Power Parity (PPP) across countries holds. This is because market would not allow opportunity for arbitrage if PPP holds. Though, when PPP does not hold, currency risk must be taken into account as investor may gain more or loses more depending on the arbitrage opportunity.

According to Phylaktis and Ravazzolo (2004), an investment in a foreign asset is a combination of an investment in the performance of the foreign asset and investment in the performance of domestic currency relative to foreign currency. As

a result, theoretically, we must take into account currency risk premium when formulating ICAPM. Latest researches also supported this fact. Guesmi, Arouri, Abid, and Teulon (2013) reported that currency exchange risk is statistically and economically significant for emerging regions, especially South East Asia and Middle East. In addition, Antell and Vaihekoski (2007) reported that currency risk should be allowed to be time-varying.

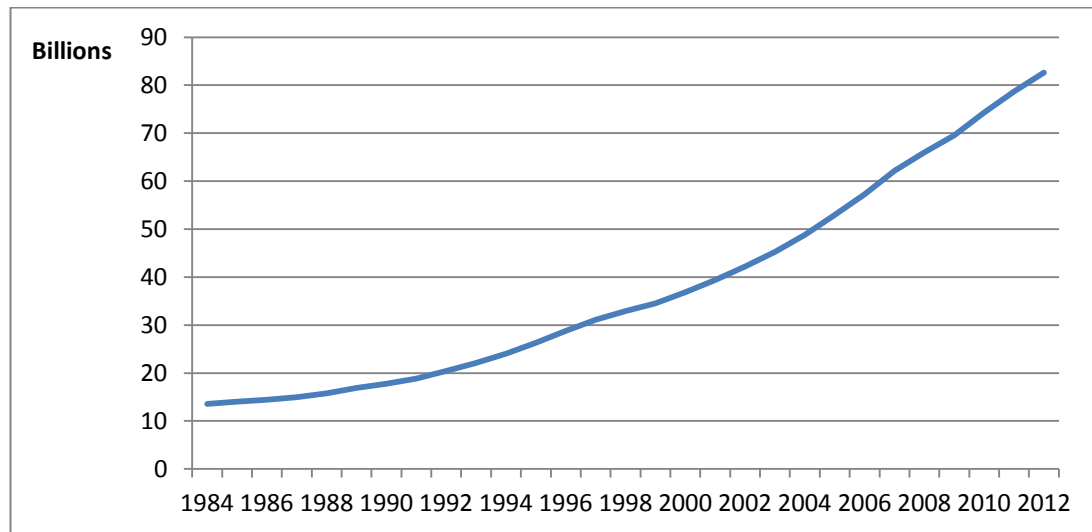
1.4 Background of the Study

1.4.1 Economic Development in Vietnam¹

Vietnam's economy developed tremendously in the previous decade. Since implementing Doi Moi in 1986, Vietnam gradually transforms from a centrally planned economy towards a free market economy. There are significant business and agricultural reforms, business are privatized and incentives for agricultural farming. As a result, gross domestic product (GDP) of Vietnam grew significantly during the 1990s. GDP growth of 4% at 1987 had increased to a maximum of 10% in 1995. During the 1990s, the GDP growth had consistently stayed above 5%. Even during East Asian financial crisis in 1997, it had managed to grow 8.15%. Governmental control exerted may have protected Vietnam from the detrimental effect. This can also be seen from GDP value (at constant 2005 US\$) which increased from US\$14 billion in 1986 to US\$82 billion in 2012, averaging 7.03% each year over the last 26 years.

¹ Economic data for this section are retrieved from World Development Indicators, The World Bank.

Figure 1: Vietnam's GDP at Constant 2005 US\$



Source: World Development Indicators, The World Bank.

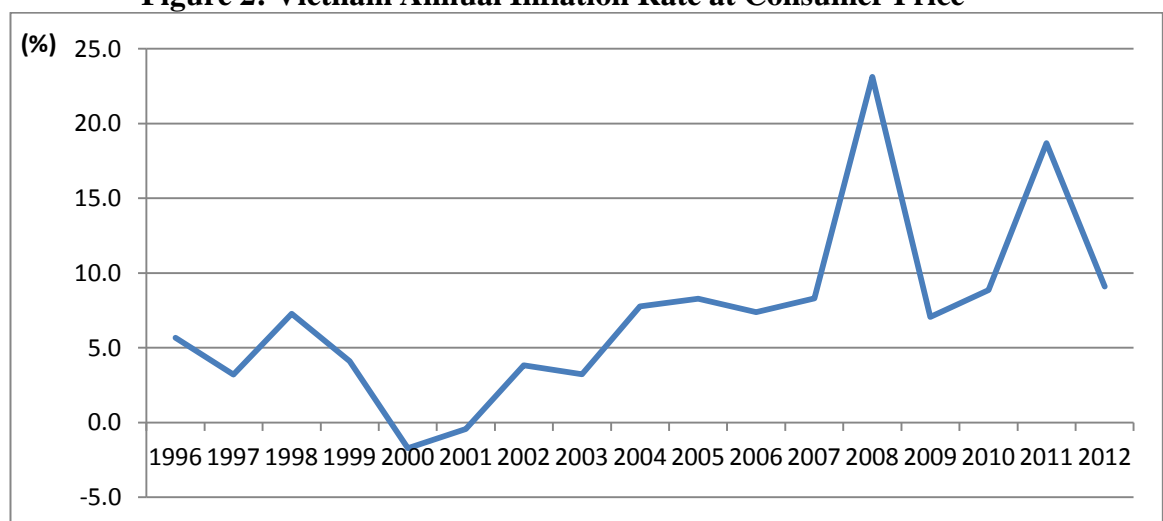
The gradual liberalization of Vietnam in 1990s had attracted an increase in foreign direct investments (FDI). From 1986, net FDI inflows of US\$40,000 had increased to US\$10 million in 1987, an increase of 258 times. This trend continued until US\$2.39 billion in 1996 and then slowed down to US\$2.22 billion in 1997 due to East Asian financial crisis. After joining World Trade Organization (WTO), Vietnam had seen a huge increase in FDI inflow from US\$2.4 billion in 2006 to US\$6.70 billion in 2007 and subsequently peaked at US\$9.57 billion in 2008.

In addition, Vietnam had also seen a great increase in international trade since implementing a more liberalized trade policy. Imports and exports in 1986 of US\$4.37 billion and US\$1.74 billion respectively increased to US\$84 billion and US\$70.9 billion before decreasing in 2009 due to mortgage crisis. From 2009, trade increased almost twofold with imports raised from US\$76 billion in 2009 to US\$127 billion in 2012 whilst exports doubled from US\$66 billion in 2009 to US\$127 billion in 2012. The imports and exports had always displayed same trend with imports

slightly more than export. Consequently, Vietnam is running a trade deficit most of the time, only attained positive trade balance in 2012 with US\$780 million.

Despite successes in liberalization, Vietnam faces problem in terms of inflation. It had a very diverse inflation experience, ranging from hyperinflation of more than 300% in 1986 to 1988 to a more stable rate of 5% to 8% in the 1996 to 2007 period. The hyperinflation was caused by a loose monetary policy and significant depreciation of the national currency unit. Thereafter, by 1989, the removal of price controls, introduction of foreign currency deposits and an increase in interest rates had successfully decreased the inflation to 35% 1989. Though, under weak credit control, the money supply surged again causing inflation of 67% in 1990 and 72% in 1991 (Goujon, 2006). Since 1993, inflation had been kept under control below 10% until 2008, where high fuel and food costs had driven inflation to 25.2%. Near the end of 2008, lower domestic demand, food and energy prices reduced the inflation (Hien, 2011). Inflation again peaked in 2011 fuelled by increase in food and transport costs. During 2012, the inflation was reduced to 9.1%.

Figure 2: Vietnam Annual Inflation Rate at Consumer Price



Source: World Development Indicators, The World Bank.

1.4.2 Currency Regime in Vietnam²

Vietnam's currency regime had evolved much over the last two decades. Before 1978, there were two currencies used in Vietnam, the North Vietnam Dong and South Vietnam Dong. On 1978, a uniformed currency, the Vietnam Dong (VND) was introduced. Vietnam had adopted a multiple exchange rate for different kind of transactions. In pre-1980 period, the exchange rate was set by government. However, the rates set by government were often different from market rates. This caused the existence of a black market for VND. According to Joiner (2006), after Doi Moi reforms, government made an effort to devaluate VND in order to align it with the market rate. At that time, Vietnam had a managed exchange rate loosely pegged against US dollar with an adjustable band of $\pm 5\%$ band was set for the administration of commercial banks. Vietnam's multiple exchange rate system had been unified in 13 March 1989, the new rate would apply to all transactions with the convertible currency area.

Since 1991, a new rate set based on auction was used. A new foreign exchange center was created in August 1991 in Ho Chi Minh City. Foreign exchange would be auctioned to parties needing it and the closing rate was the Auction Fixing Rate. Joiner (2006) stated that in the late 1991, exchange rates were set by the commercial banks with a $\pm 0.5\%$ band within the official rate. From 1991 to 1997, VND had been kept relatively stable about 11,000 VND/USD. However, to handle with the increasing current account deficit in 1998, SBV made a few devaluations. The first was the depreciation of OER from 11,175 VND/USD to 11,800 VND/USD on 16 February 1998. It was further depreciated to 12,988 VND/USD on 7 August 1998, a

² The discussion in this section is adopted from Joiner (2006) and Vo et al. (2000)

total devaluation of 16.3%. The depreciations were effected in part by the widening of the trading band, from $\pm 0.5\%$ in November 1996 eventually to $\pm 10\%$ in October 1997 (Vo, Dinh, Do, Hoang, & Pham, 2000). As stated by Vo et al. (2000), the depreciations effected still did not fully reflect the true market supply and demand of the market.

On 1999, a new method for determining exchange rate is implemented. The rate would be set by the State Bank of Vietnam (SBV) using an average of the interbank VND/USD exchange rate. The trading band was lowered to $\pm 0.1\%$ in an attempt to reduce volatility. This move is viewed as a step towards the flexible exchange rate regime, bringing official rate closer to market rate (Vo et al., 2000).

For the period of 2003 to 2008, the exchange rate remained relatively stable at 16,000 VND/USD as well as the trading band which is maintained at below $\pm 1\%$. During 2008 period, the global financial crisis mounted pressure for VND to depreciate, SBV responded by widening the trading band to $\pm 3\%$ in 2008. Consequently, VND depreciated to 17,065 VND/USD in 2009. A sharp increase in VND/USD exchange rate was also observed for 2009 to 2012 period, from 17,065 VND/USD to 20,828 VND/USD in 2012.

According to IMF statement, in November 2009, Vietnam's authority changed priority from growth to macroeconomic stability. The VND was devalued by 5.5% in November 2009 and another 3.5% in February 2010. In late March 2010, the successful transformation between growth and stability had restored market confidence in VND. Interbank and parallel exchange rate also recovered within the official band. Since the reforms in 2010, the currency depreciated to 20,509

VND/USD in 2011 and is slowly stabilizing its exchange rate with 20,828 VND/USD in 2012.

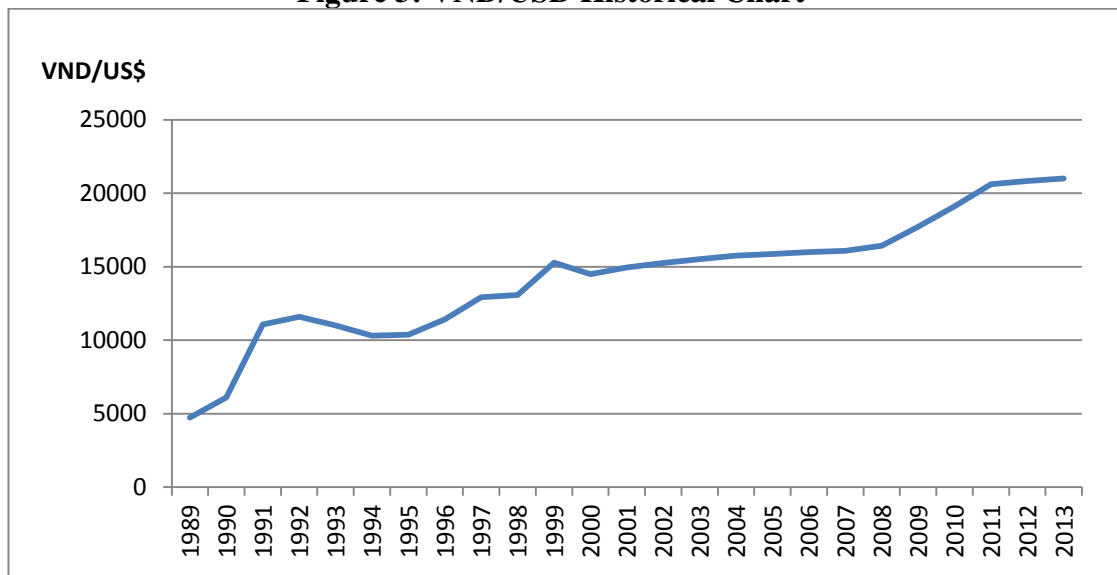
Table 1: Timeline of Vietnam Currency Regime Changes

Year	Events
Before 1978	<ul style="list-style-type: none"> • Two currencies were used: the North Vietnam Dong (VND) and South Vietnam Dong (D) • Exchange rate was set by government • Rates set were often different from market rates and caused black market to exist
1989	<ul style="list-style-type: none"> • Multiple exchange rate system were unified in 13 March 1989 • VND exchange rate was loosely pegged against US dollar with an adjustable band of $\pm 5\%$ band is set for the administration of commercial banks
1991	<ul style="list-style-type: none"> • New rate set based on auction was used • Foreign exchange center was created in August 1991 in Ho Chi Minh City • In the late 1991, exchange rates were set by the commercial banks with a $\pm 0.5\%$ band within the official rate • From 1991 to 1997, VND had been kept relatively stable about 11,000 VND/USD
1996-1998	<ul style="list-style-type: none"> • SBV made a few devaluations • The first was the depreciation of OER from 11,175 VND/USD to 11,800 VND/USD on 16 February 1998 • Further depreciation to VND 12,988/USD on 7 August 1998 • Depreciations were effected by widening trading band from $\pm 0.5\%$ in November 1996 eventually to $\pm 10\%$ in October 1997
1999	<ul style="list-style-type: none"> • New method for rate determination • The rate would be set by SBVN using an average of the interbank VND/USD • The trading band was lowered to $\pm 0.1\%$ in an attempt to reduce volatility
2003-2008	<ul style="list-style-type: none"> • The exchange rate remained relatively stable at 16,000 VND/USD as well as the trading band which was maintained at below $\pm 1\%$ • The global financial crisis mounted pressure for VND to depreciate, SBV responded by widening the trading band to $\pm 3\%$ in 2008
2009	<ul style="list-style-type: none"> • VND depreciated to 17,065 VND/USD in 2009 • Vietnam's authority changed priority from growth to macroeconomic stability

Table 1: Timeline of Vietnam Currency Regime Changes (Continued)

Year	Events
2010-2012	<ul style="list-style-type: none">• In late March 2010, the successful transformation between growth and stability had restored market confidence in VND• Interbank and parallel exchange rate also recovered within the official band• VND depreciated to 20,509 VND/USD in 2011 and is slowly stabilizing its exchange rate with 20,828 VND/USD in 2012

Figure 3: VND/USD Historical Chart



Source: State Bank of Vietnam (2013).

1.4.3 Ho Chi Minh Stock Exchange

Ho Chi Minh stock exchange is the largest stock exchange in Vietnam. It was established on 28 July 2000 as Ho Chi Minh City Securities Trading Centre (HoSTC). At the start, there were only two securities listed, Refrigeration Electrical Engineering Joint Stock Corporation (REE) and Saigon Cable and Telecommunication Material Joint Stock Company (SACOM). Ho Chi Minh stock exchange functions as primary and secondary market for bonds and equities as well as government bonds. Par value for equities is standardized at VND 10,000 and VND 100,000 for bonds. Trading session is from 9 a.m. to 11 a.m.

Initially, foreign ownership cap was imposed on equities and bonds with 20% and 40% limit initially. To participate in the exchange market, foreign participants register through a custodian licensed to hold securities on behalf of foreigners. Once registered, a securities transaction code is issued to the foreign investor that will permit securities trading. Later, to improve market liquidity, the government increased the limits to 30% for equities and unlimited for a particular issues bond. HoSTC operates via automated order-matching system, with a 300,000 orders capacity per day. A trading limit of 7% for both bonds and equities apply to the previous close price.

Ho Chi Minh exchange had grown a lot through its establishment. From 2 equities, the exchange had grown to 247 listed companies in July 2010 with a VND537.4 trillion (US\$28.28 billion) market capitalization. In January 2013, there are 308 listed companies on HOSE with a market cap of approximately VND 785.1 trillion (US\$37 billion). During 2012, compared to US\$32 billion total market capitalization of listed companies, HOSE had a market cap of VND 625,142 (US\$29.59 billion) as at 4 December 2012.

The performance of the stock exchange is represented by Vietnam Ho Chi Minh stock index (VNINDEX) with a base value of 100 as at 2000. VNINDEX is a capitalization-weighted index of all companies listed on the exchange. Since its establishment in 2000, it had risen and hovered around 200 points till 2005. Since 2005, it begins to increase towards an all time high of 1170.67 in March 2007 which then plummets with the arrival of 2008 global financial crisis in November 2009 to 255.85. It then recovered to 626 points in October 2009 before slumping sharply to 444 points in December 2009. Ever since the huge decrease, VNINDEX had mostly

stayed below 500 points barrier, unable to break this barrier. It had stayed this way until the time of this writing (December 2013) where it still hovers around 500 points mark.

Figure 4: Vietnam Ho Chi Minh Stock Index



Source: HOSE (2013).

1.5 Problem Statement

Vietnam is one of the fastest growing economies in the last decade. Since implementing Doi Moi in 1986, it had implemented a series of liberalization measures to open up the previously centrally planned economy. To encourage more efficient operation, many SOE are being privatized and foreign companies are encouraged to invest in them. Initially, in 2003, a foreign ownership limit of 20% was imposed on equities and 40% for bonds. To attract more foreign investors, the ownership limit was revised to 49% in 2009 and in 2013 Vietnam's State Securities Commission is starting a pilot program to allow foreign investor to own more than 49% in public companies. In terms of ICAPM studies, Vietnam provides us with an

interesting setting to study ICAPM model in a liberalising country. According to Antell and Vaihekoski (2007), we should consider using partially segmented asset pricing models for smaller stock markets. Through this, more evidence can be shown for the use of partially segmented models for small or developing countries. We will also be able to understand better the dynamics of local risk and international risk pricing within a still liberalising country.

Another interesting subject in ICAPM studies is the inclusion of exchange rate risk in the pricing model. Theoretically, if PPP holds, there should be no exchange rate risk in holding international portfolio. However, this is not the case found out by researchers. Dumas and Solnik (1995) and Gerard and Santis (1998) both studied ICAPM with exchange rate risk and concluded that exchange rate risk is present. Gerard and Santis (1998) further suggested that any investment in foreign asset is a combination of an investment in the performance of the foreign asset and an investment in the performance of the domestic currency relative to the foreign currency. In this sense, Vietnam's currency regime provides an interesting venue to study exchange rate risk. Vietnam's currency regime had changed quite a lot. In the pre-1980 period, the exchange rate was set by the government, with a multiple exchange rate for different kind of transactions. A new rate based on auction is then used since 1991 with a trading band for commercial banks. Vietnam's currency regime can be classified as crawling peg, or managed flotation. It is effectively pegged against US dollar and managed partly by government. Whenever the need arises, government would intervene to devalue VND, based on factors such as inflation. Looking at Vietnam's situation, it would be appealing to study the extent of currency risk pricing in Vietnam's stock market.