

**EQUITY VALUATION MODEL OF VIETNAMESE COMPANIES
IN A FOREIGN SECURITIES MARKET- A SIMULATION APPROACH**

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ABSTRACT

Listed companies in Vietnamese securities market have not employed any consistent equity valuation models; some models based on the traditional Capital Asset Pricing Model (CAPM) produced unpersuasive results because the CAPM's assumptions do not hold in an emerging market like Vietnam. The problem has been considered as one possible reason for the unpredictable stock prices in the Vietnamese securities market. The purpose of this paper is to propose a suitable equity valuation model of Vietnamese companies under the concern of international investors. In particular, the paper studied the Hybrid Adjusted CAPM (AH-CAPM) model with an international securities market in the region being used as a benchmark. The proposed model was also tested with a typical Vietnamese company to check the feasibility of the model and the ease of capital mobilization from foreign securities markets.

1 INTRODUCTION

After 10 years of development, the Vietnamese securities market is still an emerging market with basic characteristics of low liquidity, information asymmetries and inefficient regulation, etc. Consequently, stocks price did not reflect the intrinsic value of a company; conventional valuation models failed to estimate the stocks' price. Besides, although stocks price as well as equity value resulting from company valuation models have been popular in international academics and practice (Pereiro 2006, Kim 2012), Vietnamese companies and practitioners have remained in the first stage of company valuation understandings. For example, most of the Vietnamese research papers studied the traditional Capital Asset Pricing Model (Sharpe 1964, Lintner 1965, Black 1972) while its basic assumptions could not be held in emerging securities markets. Thus, Vietnamese companies need to have a customized practical model in calculating their equity value under the characteristics of an emerging market.

More importantly, there is a factual demand for a better equity valuation model from some Vietnamese big listed companies who have recently planned to list their stocks in foreign securities markets. These companies hope to benefit from cross-listing such as being better valued, internationally recognized and accessible to global capital, etc. (Doukas and Switzer 2000, Foerster and Karolyi 1999). To realize such advantages, a successful listing requires an appropriate stock's offering price. Therefore, the main

purpose of this research is to propose an equity valuation model which possibly is used by big Vietnamese companies to estimate their stocks price in a foreign securities market. In addition, a gap between Vietnamese and the international literature on company valuation in emerging markets can also be bridged.

Pereiro (2002) introduced a company valuation model in emerging markets under a practical approach. The fundamental-based valuation method, named Discounted Cash Flow method (DCF), should be tailored to specific contexts. Therefore, the DCF method applied in equity valuation of emerging markets is customized in regard to two important components: (1) the cost of equity known as the discount rate and (2) the free cash flow to equity of the company.

In the first component, the measurement of the cost of equity has been introduced in two main theoretical strands such as CAPM-based models (Sharpe 1964, Lintner 1965, Black 1972, O'Brien 1999, Godfrey and Espinosa 1996) and non-CAPM based models (Estrada 2000, Erb-Harvey-Viskanta 1996). Nevertheless, only the CAPM-based models were discussed in this research because the models have been developed to different versions so that a specific market possibly finds a suitable one. The first version- the Global CAPM model (O'Brien 1999) supposes that the world financial market is completely integrated, then geographic diversification makes unsystematic risk disappear. However, the implication of G-CAPM in the imperfect market is still controversial due to the existence of country risk. The second version- the Local CAPM (L-CAPM) is used when the markets are segmented (Pereiro 2002). Nonetheless, L-CAPM seems to double-count the country risk in the cost of equity (Godfrey and Espinosa 1996). To correct the risk's overestimation, Pereiro (2002) adds the $(1 - R^2)$ factor in Adjusted L-CAPM (AL-CAPM) with R^2 being the coefficient of determination of the regression between the volatility of the firm and the volatility of the market. To deal with the data quality problem as well as to capture both local and global factors, the Adjusted Hybrid CAPM-based model (AH-CAPM) (Pereiro 2002) is preferred to employ. This model uses US market as the benchmark to calculate the cost of equity in an emerging country.

$$C_E = R_{FG} + R_C + B_{CLG} [B_{GG} (R_{MG} - R_{FG})] (1 - R^2)$$

With R_{FG} is the global risk-free rate; R_C is the country risk premium; B_{CLG} is the country beta; B_{GG} is the average unlevered beta of comparable companies quoting in the global market; R_{MG} is the global market return; R^2 is the coefficient of determination of the regression between the equity volatility of the local market against the variation in country risk.

In emerging markets, equity valuation is still a controversial issue. The adjusted versions of CAPM-based method has been made based on the availability of local data and the degree of market integration (Javier et al. 2007). Pereiro (2005) showed that different CAPM-based versions including G-CAPM, L-CAPM, AH-CAPM were used in calculating the cost of equity in Argentina with benchmark being US securities market. Other research used CAPM methods to estimate the cost of equity based on local factors: Bruner and Chan (2002) used four CAPM-related models to estimate the cost of equity of large firms in Brazil, South Africa, Thailand, Malaysia and Poland; Kim (2012) considered and compared between CAPM methods to price assets in Korean stock market.

In this research, due to the similarity between Vietnam and researched countries Pereiro (2005), the AH-CAPM was studied to estimate the cost of equity of the large Vietnamese companies. However, the U.S. benchmark market seems irrelevant to Vietnam because the Vietnamese stocks market has not been integrated to the global market. Therefore, the AH-CAPM was adjusted by using regional market data (i.e a developed South East Asian stocks market) rather than global market data.

In the second component of projecting free cash flow to equity (FCFEs) for Vietnamese companies, our proposed model relied on business plan analyses, sale volume forecasts and inflation adjustments, etc. More importantly, the FCFEs were converted into the foreign currency of the chosen foreign securities market by suggested exchange rates. The foreign exchange rate has been considered uncertain in Vietnam because the Vietnamese government has not let the foreign exchange market float freely. Therefore, to project the FCFEs in a foreign currency, the exchange rate factor was simulated randomly through Monte Carlo simulation method within a specified range and probability distribution (Holtan 2002) with the support of Crystal Ball software.

In short, the paper aims to build a suitable model to estimate the equity values of Vietnamese companies denominated in a foreign currency. The study was done by discounting foreign currency-converted FCFEs with the cost of equity which was defined by the customized AH-CAPM model. The AH-CAPM model's customization and the simulation approach brought a new practical way in forecasting equity values as well as stock prices for Vietnamese practitioners and managers.

The paper is organized as follows. The research methodology and fundamentals of the Discounted Cash-flows model are presented in section 2 and 3. Results from discussions with financial experts are introduced in section 4. Finally, the model is proposed in section 5 and tested on a specific company in section 6.

2 RESEARCH METHODOLOGY

The research methodology of this paper is shown in Figure 1:

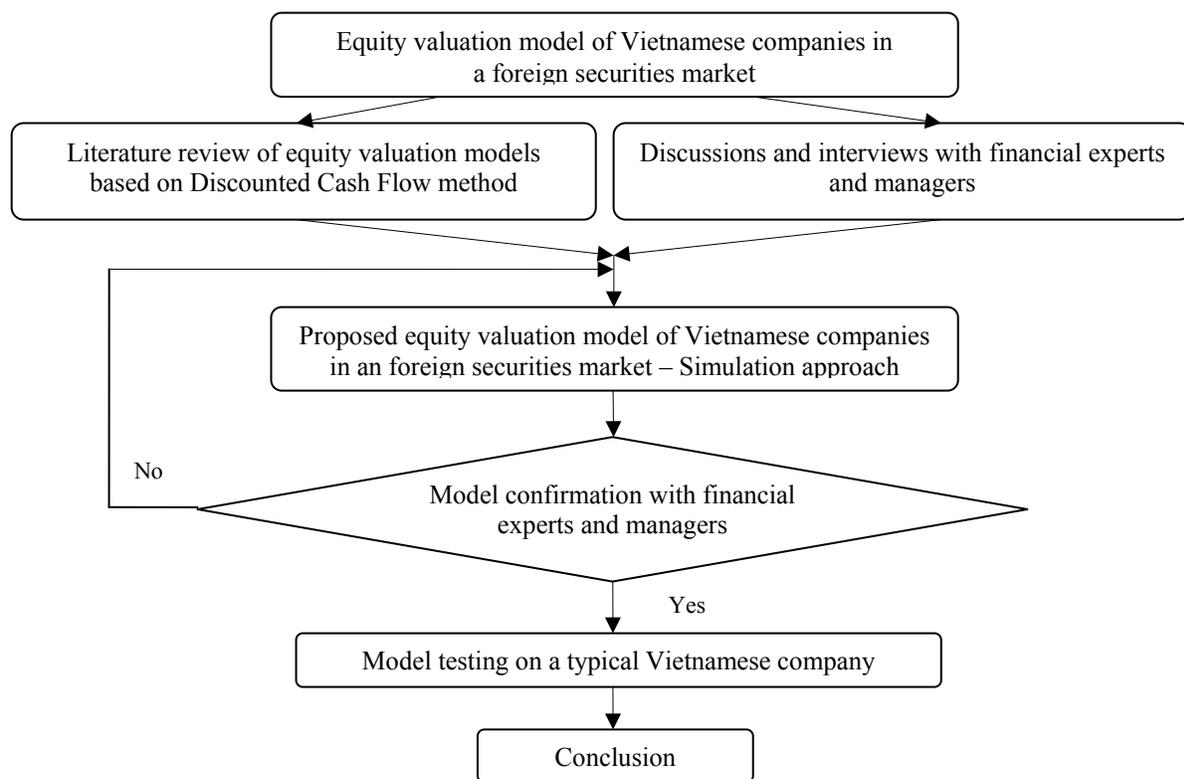


Figure 1: Research Methodology Diagram

The research was developed with a combination of theoretical and practical approach:

- First, an academic model was studied from literature review.
- Second, discussions and interviews with financial experts and managers were held to obtain practical opinions and to construct the suitable valuation model under Vietnamese context.
- Third, Vietnamese equity valuation model was proposed on the basis of the academic and practical viewpoints.
- Fourth, the proposed model was confirmed again with the financial experts and managers.
- Fifth, the feasibility of the model was tested on a typical Vietnamese company in a foreign developed securities market in South East Asia (i.e Singapore Exchange market).
- Sixth, general revision was carried out to conclude the study.

4.2 FCFEs’ Determinants

The targeted interviewees were not only financial experts but also experienced managers of big and international companies in Vietnam. As these companies have been oriented toward international standards, they are more concerned with macro-economic conditions than their unsystematic risks. The financial experts and managers shared their viewpoints on the impact of some major determinants on Vietnamese company’s FCFEs. As seen in Table 1, the most risky factor to company’s FCFEs is the foreign exchange rate when all of the experts and managers stated that they could not estimate the State Bank of Vietnam’s adjustment towards exchange rate. Inflation was agreed to be considered to project FCFEs due to high inflation rates in recent years. Economic growth was used to estimate FCFEs after the planning period when the mature companies were assumed to grow along with the economy. Company risks seemed not to affect substantially FCFEs because these companies are big and stable. The managers and experts mostly agreed that their target sale volume of the planning year was usually adjusted based on their past sale performance.

Table 1: Interview results on FCFE’s determinants

Interviewees		Impact of determinants to FCFE				
		Inflation	Economic growth	Foreign exchange rate	Past sales volume	Company risks ¹
Financial managers	Food processing	Yes	Yes	Strongly yes	No	No
	Textiles	Yes	Yes	Yes	Yes	No
	Automobile	Yes	Yes	Yes	Yes	No
	Agricultural machines	Yes	Yes	Yes	Yes	No
	Electronics	Yes	Yes	Firmly Yes	Yes	No
Financial experts	National Economics University	Yes	Yes	Surely	Yes	No
	General Statistics Office	Yes	Yes	Yes	Yes	No
	Development Strategy Institute	Yes	Yes	Yes	Yes	No

¹ Company risks refer as unsystematic risks such as change of management board, operational risks, etc.

5 THE PROPOSED EQUITY VALUATION MODEL

After reviewing literature on equity valuation in emerging markets and the viewpoints of Vietnamese financial experts and managers, the proposed model is developed from standard DCF model as in Figure 3.

5.1 Cost of Equity Computation

As seen in equation (1) of the Figure 3, the Adjusted Hybrid CAPM (Pereiro 2002) is modified to Vietnamese context by using market data from a foreign securities market in the South East Asia region as benchmark values. The modified variables were also reconfirmed in the discussions with Vietnamese experts and practitioners. The equation’s variables are explained in details as follows:

R_{FR}^X is the risk free rate of an investigated foreign market (hereby refer as X market). The research model stands on the foreign investors’ viewpoint; the investors will compare the market return as well as a specific investment return with their own risk free return. As the result, T-bond 10- Years rate of X government is adopted as the risk-free rate.

R_C^{VN} represents the country risks of Vietnam that foreign investors have to bear when they invest in another country like Vietnam; this is the premium added to the expected return of a foreign investor to compensate the country risks. In this case, Vietnamese country risk premium is calculated by the spread of Vietnamese sovereign bonds over equivalent bonds of the X market.

B^{VN} is the country Beta which is referred as the slope regression between Vietnamese equity market index (VN index) and X market index.

B_U^X is the average unlevered beta of comparable companies quoting in the X securities market. Unlevered Beta helps to remove the effect of debt on capital structure. As a result, this approach allows a foreign investor compares the real level of risk between different companies. Unlevered beta is calculated by Hamada (1969)'s equation: $B_U^X = \frac{B_L^X}{1 + (1 - t^X) \times D/E}$ with B_L^X being Levered Beta of a comparable company; t^X being Corporate tax of the foreign country; D/E being Debt/Equity ratio of the company.

R_{MT}^X is the X market return. Then $(R_{MT}^X - R_{FR}^X)$ is referred as market risk premium that foreign investors require to compensate their X market risk.

$(1 - R_{VN}^2)$ is the factor to alleviate the double-estimation of country risk premium on cost of equity. R_{VN}^2 is the coefficient of determination of the regression between the volatility of Vietnam's securities market index (VN-index) against the variation in country premium risk.

5.2 Free Cash-Flows to Equity (FCFEs) Calculation in X currency

5.2.1 FCFEs in Real Value

The technique to model free cash flows to equity (FCFEs) has been exhaustively discussed in finance textbook (Damodaran 2006, Arnold 2007). The paper only addressed some noteworthy points to value Vietnamese companies.

Firstly, we proposed that the companies should have a five-year planning period in which they have detailed FCFEs' forecast in each year. A longer-term prediction (of 10 or 15 years) will produce less accurate results due to the volatile economic conditions in Vietnam. Besides, planning period is often regarded as a firm's extraordinary growth period (Pereiro 2002). Most listed big companies in Vietnam have reached their mature stage (or operated in mature industries); thus, their time to maintain high growth rate is likely to be shortened. In short, five-year planning horizon is reasonable given the features of Vietnamese economy and its listed big companies.

Secondly, expected FCFEs in planning period were derived from the projected financial statements; the process was shown in equation (2) in Figure 3. Because listed companies are required to public historical financial data and future business plan to investors, appraisals can employ the information to build financial statements for up-coming years.

Finally, Terminal Value (TV) can be estimated by assuming that company will grow at constant rate g from planning period to infinity as described in equation (3). Since most big listed Vietnamese companies are at their mature stage, a good proxy for g can be GDP growth rate. According to Pereiro (2002) and John Tjia (2009), most mature business grow at around the economy's growth as competition increases and profit decreases in their operating industries.

5.2.2 Inflation Adjustment to FCFEs

Inflation is among key concerns of Vietnamese companies in our interviews. Equation (4) is used to deal with inflation, in which the projected financial statements in real term will be multiplied with expected inflation rate in the next year to obtain nominal value.

5.2.3 Currency Conversion

At this step, FCFE_i and TV denominated in VND were converted into the listing currency used in a foreign stock market (hereafter refer to X currency). The literature (McKinsey et al. 2010, Pereiro 2002) suggested two alternatives: using spot exchange rate or forward exchange rate. The former first discounts the VND projected cash-flows with the VND discount rate; then translates the present value of equity in VND into X currency using current spot exchange rate X/VND. Since most asset pricing models (including AH-CAPM model) provide a discount rate expressed in the currency of a developed market, the unavailability of VND discount rate led to our preference of the second option.

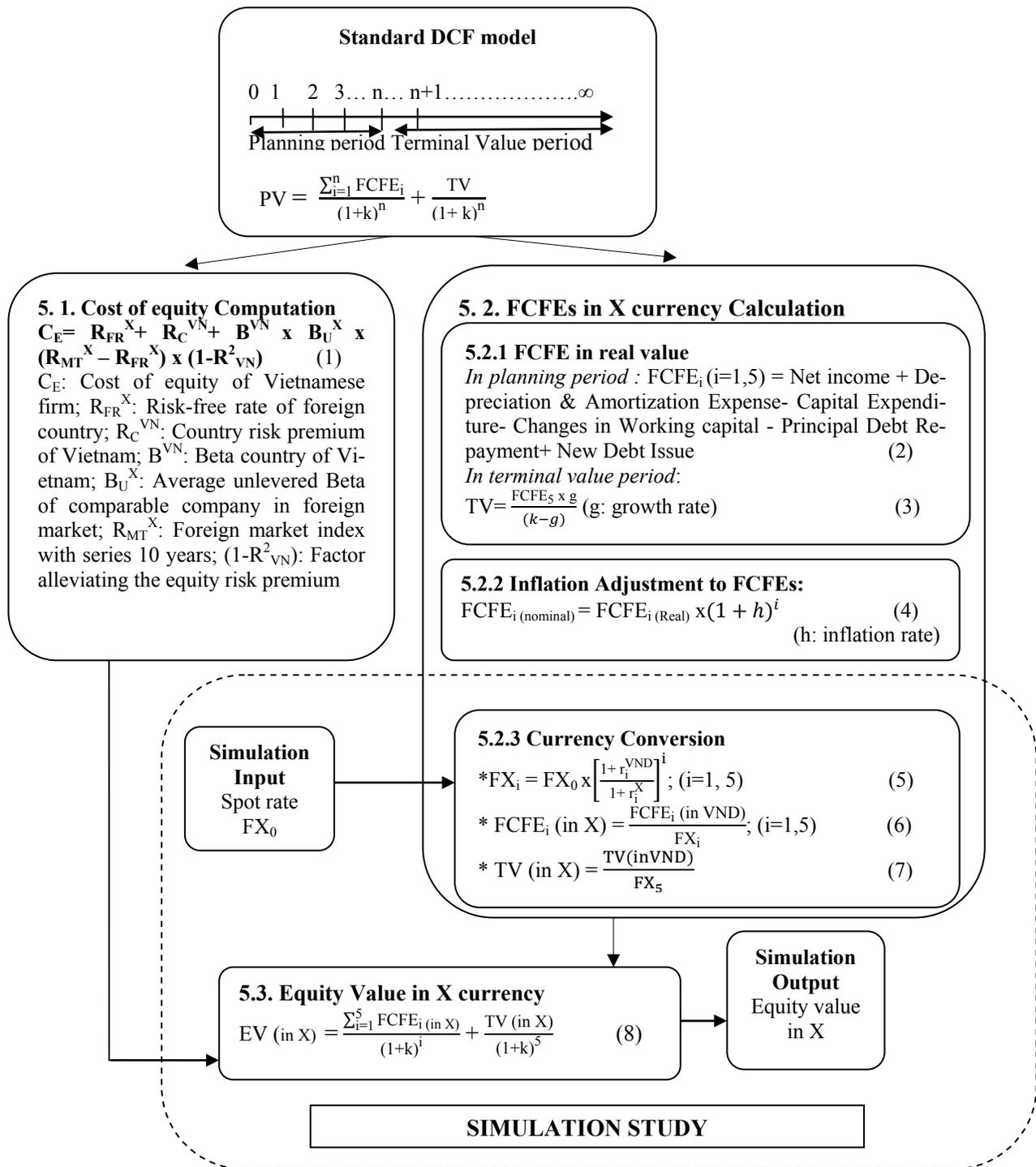


Figure 3: The proposed equity valuation model of Vietnamese companies in foreign securities market

Following the second method, cash-flows and terminal value in VND were converted into X currency on a year-by-year basis using the forward exchange rate. The obtained figures ($FCFE_i$ and TV in X currency) were then discounted at X-based cost of equity which was drawn from the AH-CAPM model. However, in Vietnam, a forward-exchange market is nonexistent. Therefore, it is necessary to compute

the forward exchange rate from the spot current exchange rate using the interest rate parity theory as in equation (5) in Figure 3.

As discussed in section 4.2, the spot exchange rate was confirmed by the interviewees to be among one of highly uncertain macro-economic factors because under the semi-floating foreign exchange regime in Vietnam, the exchange rate is significantly influenced by subjective adjustment from the government. Therefore, to enhance the reliability of the final equity value, Monte Carlo Simulation was employed to address the estimation of the forward exchange rate.

5.3 Equity Value denominated in X currency

After cost of equity from equation (1) and free cash-flows to equity denominated in X currency from equation (6) and (7) were obtained, equity value was derived as in equation (8).

5.4 Simulation Study

Monte Carlo Simulation (MCS) “relies on repeated random sampling and statistical analysis to compute the results” (Raychaudhuri 2008). MCS can be run in practice by software like Crystal Ball Professional Edition suite (Lawrence 2002). MCS in our proposed model has the double- functions. Like the conventional application, MCS assists the assessment of equity value’s variability originated from the uncertain spot exchange rate. Furthermore, MCS also provides a sound basis for valuation practitioners to estimate the forward exchange rate which is not available in Vietnam. Following MCS’s methodology suggested by Raychaudhuri (2008), we developed our simulation logic as in the Figure 3.

- **Input:** the spot foreign exchange rate is selected as the simulation input. To identify a statistical distribution that best captures its variability, valuation practitioners can rely on available historical data on the spot exchange rate as well as fitting procedures widely discussed in the literature (Raychaudhuri 2008, Law 2011).
- **Logical Model:** The logical relationship describes the transformation mechanism from input to output which includes box 5.2.3 and 5.3 in Figure (3). To describe, FX_0 firstly takes a random value that conforms to its probability distribution. Each given FX_0 generates a set of forward exchange rate at a term i (FX_1, FX_2, \dots, FX_5) through the equation (5). Then, the $FCFE_i$ in VND is divided by FX_i on year-by- year basis and TV in VND by FX_5 ; the projected cash-flows expressed in X currency is obtained through the equation (6) and (7).
- **Outputs:** When FX_0 was attributed a random value, a value of equity was collected. After thousands of iterations, a distribution of equity value for statistical analysis was established.

5.5 Model’s Confirmation With Experts and Practitioners

The model was presented again with the investigated experts and practitioners. They had feedback on the customized variables of the cost of equity computation. The AH-CAPM could not apply totally in Vietnam, only the idea of the model was used and the model was modified by the proposed way. In addition, the comments of the experts and practitioners were on FCFEs calculations in which each factor was discussed to get the agreed factors. Finally, the proposed model has gained agreement between academic experts and practitioners before the model testing with a typical Vietnamese company

6. MODEL TESTING

The proposed model was tested on a typical big listed Vietnamese company manufacturing dairy products (company A) with the foreign securities market, that being the Singapore Securities market (SGX). The company A is a recognized company with transparent audited financial reports. Therefore, different agents will access the same information

6.1 Cost of Equity Computation for company A

The cost of equity of the company A was calculated following the fomular 5.1 in Figure 3 with the details below:

Table 2: Cost of equity for company A

Variables	Source of data	Value
R_{FR}^X : 10 years T-Bond Singapore	http://asianbondsonline.adb.org/singapore.php	1.5
R_C^{VN} : Vietnam Country Risk Premium	http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctrypre.html	6%
B^{VN} : Country Beta of Vietnam	Author estimates by regressing VN-Index over MSCI Singapore index in 10 years	2.5710
B_U^X : Beta of comparable company listed in SGX	http://www.reuters.com/finance/stocks/financialHighlights?symbol=FRN.M.SI	0.8071
R_{MT}^X : MSCI Singapore Index	http://us.ishares.com/product_info/fund/overview/EWS.htm	11.49%
$1-R_{VN}^2$	Adjusted Local CAPM Variants (Pereiro 2002, p111)	0.6
Cost of equity (k): Adjusted Hybrid CAPM model for Vietnamese company valuation $C_E = R_{FR}^X + R_C^{VN} + B^{VN} \times B_U^X \times (R_{MT}^X - R_{FR}^X) \times (1 - R_{VN}^2) = 19.93879$		

6.2 FCFEs Estimation for company A

Table 3 summarizes the result of FCFEs estimation for company A based on the company’s audited financial reports. FCFEs were drawn from projected financial statements while terminal growth rate g was predicted at future Vietnam’s GDP growth rate 6.5% (SBV 2012). The average inflation rate for 2012-2017 was forecasted at 10%/ year (SBV 2012) with benchmark year being 2012. The forward exchange rate SGX/VND was calculated based on the Vietnamese and Singaporean government bond rate at term 1 year to 5 years (AsiaBondsOnline 2012).

Table 3: Equity valuation for company A

HISTORICAL DATA						
<i>(Sources: financial statements published in the official website of the company)</i>						
	2006	2007	2008	2009	2010	2011
Sales (billion VND)	6,289.44	6,675.030	8,380.560	10,820.140	16,081.466	22,071.000
Net income (billion VND)	659.890	963.448	1,248.690	2,378.070	3,165.000	4,218.000
FCFE from 2006-2011	(9.235)	(201.182)	941.008	2,554.877	1,520.251	856.794
FORECASTED DATA						
	2012	2013	2014	2015	2016	2017
Sales (b.VND)	26,480.000	31,780.000	38,130.000	45,760.000	54,900.000	65,880.00
Net income (b.VND)	4,690.000	5,230.000	5,720.000	6,180.000	6,870.000	7,557.000
FCFEs 2012-2017 (b. VND)	8,797.635	5,113.422	5,424.545	5,664.377	6,097.289	6,309.724
Perpetual growth rate (g)						6.5%
Terminal value (b. VND)						49,998.925
Average inflation rate	10%					
Inflation- adjusted FCFEs	8,797.635	5,624.764	6,563.699	7,539.286	8,927.041	10,161.873
Inflation- adjusted TV						80,523.769
Spot VND/SGD	16,509.000					
Forward FX rate		18,358.015	20,435.399	22,661.327	25,073.691	27,635.578
FCFEs 2012-2017(b.SGD)	0.533	0.306	0.321	0.333	0.356	0.368
Terminal Value (b.SGD)						2.914
Cost of equity (%)	19.94					
Equity value (bSGX)	2.1656					

6.3 Company A’s Equity Value and Simulation Study

As seen in Table (3), equity value calculated for company A is 2.1656 billion \$SGD. However, if the spot VND/SGD rate fluctuates in 2012, the final equity value will be altered correspondingly. Therefore, Monte-Carlo simulation is carried out to examine the stability of the equity value. Firstly, function FIT in Crystal-Ball software was used for 50 historical observations of monthly average VND/SGD spot rate

during 2008-2012 to determine its distribution probability. Figure 4 shows that the VND/SGD spot rate has Pareto distribution with its parameters location and shape being 11,234.61 and 5.52296 accordingly.

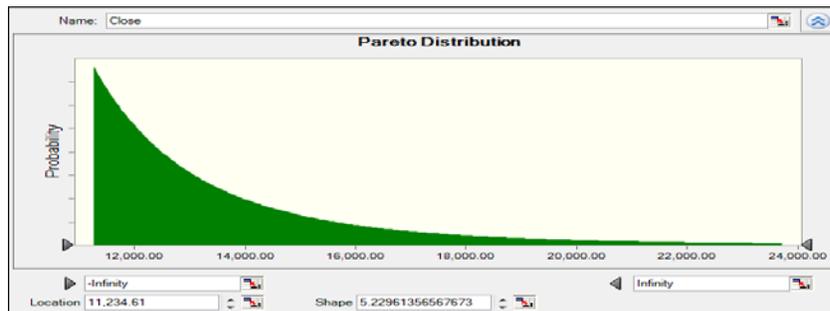


Figure 4: Spot VND/SGD distribution probability

In the simulation settings, Monte Carlo sampling method and confidence level of 95% are selected. After 10,000 trials, the result was shown in the forecast chart (Figure 5); 80% of probability the equity value of firm A ranges from 1.97 to 3.1 \$billion SGD. The statistics view also shows that the final equity values' distribution seems to be beta distribution.

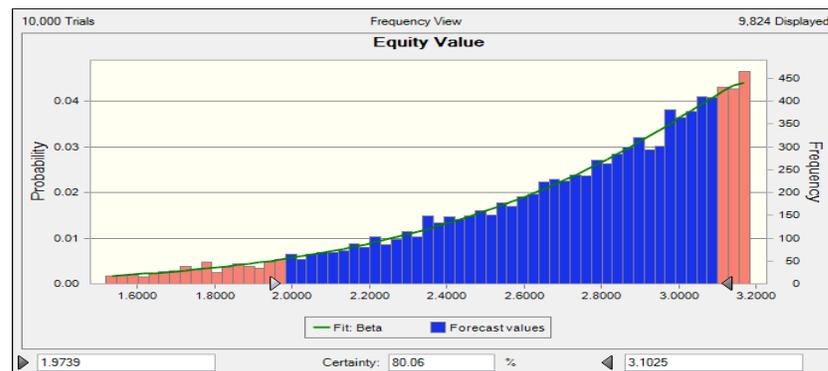


Figure 5: Simulation result for company A's equity value forecasted in SGD

With 0.55 billion outstanding shares, 80% of probability that firm A's price per shares varies from 3.58 to 5.61 \$SGD. In comparison with another dairy products- making company in Singapore with current share price being 6.7 \$SGD, company A's stock may considered to be competitively lower. Hence, company A might have a good reasoning to float its stock in SGX.

6.4 Sensitivity Analysis

To examine the sensitivity of the proposed model, inflation rate and perpetual growth rate is changed. The former adopts the triangular distribution with minimum, maximum and likeliest value being 8%, 15%, 13% correspondingly (SBV 2012). The later has the triangular distribution with its similar value being 5%, 8%, 7% (SBV 2012). Sensitivity chart (Figure 6) shows that FX rate proves the most influential factor on equity value in X currency; it contributes to 83.6% to the equity value's variance. Next comes inflation rate (12.9%) and perpetual growth rate comes last (3.4%).

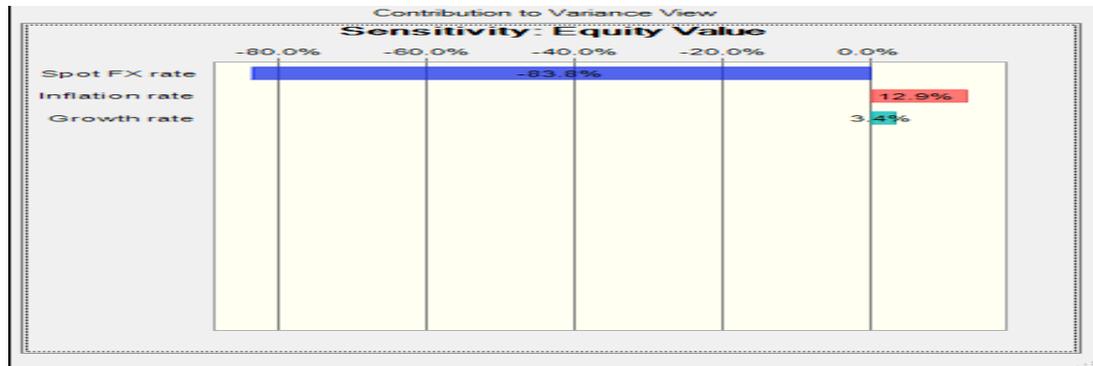


Figure 6: The sensitivity chart

7 CONCLUSION

The paper raised a new approach to Vietnamese companies in their equity valuation. In respect to international investors' perspectives, the proposed model avoided the problems of illiquidity, low volume, unstable and unreliable data, etc. in Vietnam securities markets by using another developed foreign securities market in the region. In addition, through the interviews with domestic experts and managers, the proposed model was customized and adjusted to match with Vietnamese circumstances. The feasibility and ease of the model was also proved by a model testing on a typical and big Vietnamese company. As a result, the proposed equity valuation model was highly appreciated by Vietnamese financial experts and practitioners; and the tested company A has been applied the model to calculate its stock price as reference data in its cross-listing plan. The equity value denominated in a foreign currency may give the signal to Vietnamese managers in deciding whether they should issue their firm securities in other foreign markets. Therefore, the proposed equity valuation model has planned to expand and apply to other Vietnamese companies to strengthen the Vietnamese capital mobilization from foreign securities markets

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