

## **Cross-listing Equity Valuation Model - A New Tool to Stimulate Capital Mobilization of Vietnamese Companies**

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*Economic integration has becoming the major trend on international scale including the Asia-Pacific region; in the financial sector, the integration will lead to capital transferring among countries to get the most efficient investment. Vietnamese companies can take advantage of this trend by listing their stocks in regional securities markets such as Singapore Securities Exchange, Australia Securities Exchange. However, studying about stocks cross-listing have not been done in Vietnam due to the lack of strategic tools and polices. The purpose of this paper is to propose suitable cross-listing equity valuation model of Vietnamese companies. The proposed model was developed by discounting the foreign-currency-converted Free Cash-flows to Equity (FCFEs) on the cost of equity which is defined by the customized Adjusted Hybrid-CAPM model; the model's application on a tested Vietnamese company was appreciated and implied cross-listing suggestions to the company.*

**JEL Codes: G12, G32 and G17**

### **1. Introduction**

The Vietnam's securities market is an emerging market with basic characteristics of low liquidity, small trading volume, small market capitalization, information asymmetries and inefficient regulatory efforts. Stock prices in Vietnamese securities market could not be estimated or predicted by any standard and classic valuation model; stock price trends often go inversely against experts' analysis. Although stock valuation models originating from company valuation models have become popular in international research as well as in practical approach (Pereiro

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2006, Kim 2012), Vietnam's companies have not been familiar with these models. For example, most of the Vietnamese research still study and apply traditional Capital Asset Pricing Model (Sharpe 1964, Lintner 1965, Black 1972) as the centre of company valuation, while many basic conditions of this model cannot be held. Therefore, Vietnamese companies need to have a better practical model to calculate their firms' value in the real market. This model should be customized to fit with the characteristics of Vietnam's emerging market.

The main purpose of this paper is to study the suitable company valuation model for Vietnamese companies who want to list their stocks in a foreign securities market. Vietnamese companies, especially big companies, are now planning to list their stocks in foreign securities markets when they find out problems of transparency in financial reporting, uncertain legal doctrines or institutions, etc. in Vietnamese securities market. Therefore, a good company valuation model may help these big companies to estimate their stock price in an international securities market.

The paper is organized as follows. Section 2 reviews the extant literature on valuation models; section 3 presents the methodology employed by the research. Section 4 introduces the principles of Discounted Cash Flow model while section 5 reveals the results from the discussions and interviews with financial experts and managers. Section 6 presents the proposed valuation model which will be tested on a practical Vietnamese case in section 7. The conclusion is shown in section 8.

### 2. Literature Review

Pereiro (2002) introduced a valuation model to emerging markets under a practical approach. The fundamentals-based, Discounted Cash Flow methods (DCF methods) of valuation should be applied in emerging markets with clear clarification of particular factors under specific contexts. The model deals with (i) the discount rate computation with the cost of company capital and (ii) the company free cash flow projection.

Firstly, to measure the discount rate, the cost of equity was introduced in many financial theories with 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). The cost of equity refers to the rate of return to the shareholders for delaying consumption and bearing the risk. There are various ways to calculate this rate in an emerging market. Nevertheless, in this research we only study the CAPM-based methods which have been developed to many versions, so that a specific market can find and match with a suitable version. In detail, from the basic and traditional model of Sharpe (1964), Lintner (1965) and Black (1972), the Capital Asset Pricing Model (CAPM) has been developed and adjusted for different cases. Under the globalization trends, the market has been considered with the Global

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CAPM (G-CAPM) model (Obrien 1999). This model supposes that the world financial market is completely integrated. That means there are no transaction costs and no barriers to enter and leave. Based on that idea, Obrien (1999) proposed the G-CAPM, the simplest extension of the traditional CAPM model in which it is assumed that 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. When the markets are segmented, the Local CAPM (L-CAPM) should be used (Pereiro 2001). Nonetheless, L-CAPM seems to double-count the country risk in cost of equity (Godfrey and Espinosa 1996). To correct the overestimation of risk, Pereiro (2002) added the  $(1-R^2)$  factor in Adjusted L-CAPM (AL-CAPM), where  $R^2$  is the coefficient of determination of the regression between the volatility of the firm and the volatility of the market. Therefore, the  $(1-R^2)$  factor depresses the risk premium and partially counters the overestimation problems.

In emerging markets like Vietnam, the market data are highly unstable and tends to be unreliable or slightly useless; the implementation of L-CAPM or AL-CAPM is difficult. To deal with the data quality problem as well as to capture both local and global factor, the Adjusted Hybrid CAPM-based model (AH-CAPM) (Pereiro 2002) is preferred to use. This model suggests that another standard and developed market becomes the benchmark in calculating the cost of equity of an emerging country. The idea of AH-CAPM model was studied under the US investors' perspective; the cost of equity is calculated as follows:

$$CE=RfG+RC +BCLG [BGG(RMG -RfG)](1-R^2)$$

- CE: cost of equity
- RfG: the global risk-free rate
- RC: the country risk premium
- BCLG: the country beta (i.e., the slope of the regression between the local equity market index and the global market index)
- BGG: the average unlevered beta of comparable companies quoting in the global market
- RMG: the global market return
- R<sup>2</sup>: the coefficient of determination of the regression between the equity volatility of the local market against the variation in country risk.

However, the US-based benchmark variables seem irrelevant to Vietnam as Vietnam has not been integrated to the global market. Hence, the AH-CAPM will be adjusted in which the cost of equity of Vietnamese companies will be calculated in comparison with some regional markets. If a Vietnamese company wants to evaluate its firm and stock in a particular foreign market, all variables of the AH-CAPM will be explained under the investors' perspective of such foreign market.

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Secondly, under Vietnamese circumstance, Free Cash Flow to Equity (FCFE) will be estimated with company business plan analysis, sale volume forecast, inflation adjustment and other related factors. To be listed in a foreign market, the FCFE will be converted into foreign currency through addressed exchange rate. The foreign exchange rate is considered to be uncertain in Vietnam because the Vietnamese government has not let the foreign exchange market float freely. The change of foreign exchange rate is one of the risky factors to Vietnamese companies while the exchange rate of forward contracts has not been allowed to trade in Vietnam. To project the FCFEs in a foreign currency, the exchange rate factor will be simulated randomly through Monte Carlo simulation method (Holtan 2002).

There have not been any academic papers and practical studies on Vietnamese company valuation model in a foreign securities market. The contribution of this paper is to estimate Vietnamese company value denominated in a foreign currency by discounting foreign-currency-converted FCFE on the cost of equity which is defined by the customized AH-CAPM model. The calculation process is supported by simulation to estimate uncertain variables in the emerging market.

### 3. Research Methodology

The paper combines both academic approach (by reviewing international literature) and practical approach (by interviewing Vietnamese practitioners) to derive the suitable adjustments to the international equity valuation models to be applied in Vietnam.

- 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 the Vietnamese context.
- Third, the 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 (Company A) in a foreign developed securities market (Singapore Securities Market – SGX) in South East Asia.
- Sixth, general revision was carried out to conclude the study.

In details, the company A performance was projected for five years ranges from 2013 to 2018; the terminal value is from 2018 onward. Historical data was collected from 2007-2012 to capture the long-term trend of Company A's development to build more reliable forecasted financial statements in the planning period.

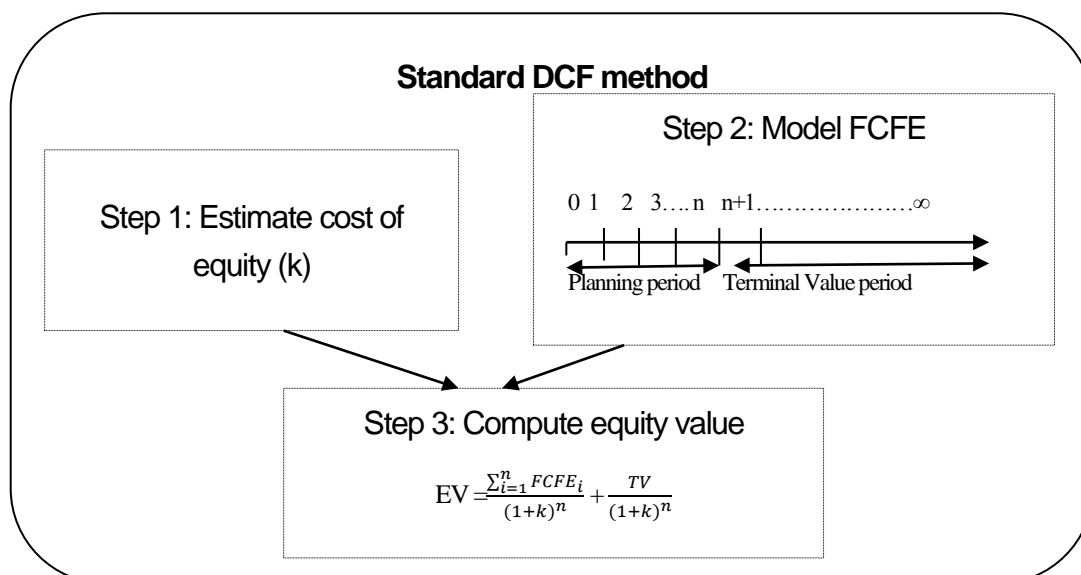
#### 4. Discounted Cash Flow Method

DCF method (Figure 1) is very popular in finance text book (Arnold 2007, Reilly and Brown 2008). In this method, the equity’s value is determined by the present value of expected cash-flows to equity through three major steps.

- Step 1: Estimate the cost of equity (k) that reflects the shareholders’ risk.
- Step 2: Model free cash flows to equity (FCFEs). These cash-flows comprise (i) cash-flows generated in short and medium term (planning period) and (ii) cash-flows generated after planning period to infinity (terminal value- TV).
- Step 3: Discount the projected cash-flows by the cost of equity to compute equity’s value.

DCF method was selected as a basis to our proposed valuation model for following reasons. Firstly, it is flexible to modify the conventional valuation model used in developed markets to incorporate emerging country’s risk; either cash-flow projection or discount rate can be altered to reflect economic condition (Pereiro 2002, James and Koller 2000). Secondly, DCF method provides intrinsic value. Since Vietnamese companies may choose to list in different overseas securities market, intrinsic value as the fundamental value of equity is more broadly helpful than an extrinsic value.

**Figure 1: Standard Discounted Cash Flow method**



### 5. Discussions and Interviews with Financial Experts and Managers

#### 5.1 Suitable Cost of Equity's Model

Among different asset pricing models, two academic discussions with attendees from universities, governmental agencies were organized. The first discussion revolved around "Vietnam's cost of equity model should be CAPM-based or non-CAPM based?". The financial experts and researchers agreed upon the use of CAPM-based model because of the ease in its variables' forecast and CAPM-based model's customization to emerging countries like Vietnam. The second discussion was held to answer which CAPM-based model is suitable to Vietnam. Five models were raised including G-CAPM, L-CAPM, AL-CAPM, AH-CAPM and Godfrey-Espinosa Model. Participants commented on each method's advantages, disadvantages and feasibility in Vietnam context. Finally, the AH-CAPM model was selected, but this model needs to be adjusted to the level of Vietnam's securities market development.

#### 5.2 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 taken into account to project FCFEs due to high inflation rates in Vietnam 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 years usually adjusted based on their past sale performance.

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**Table 1: Interview results on FCFE's determinants**

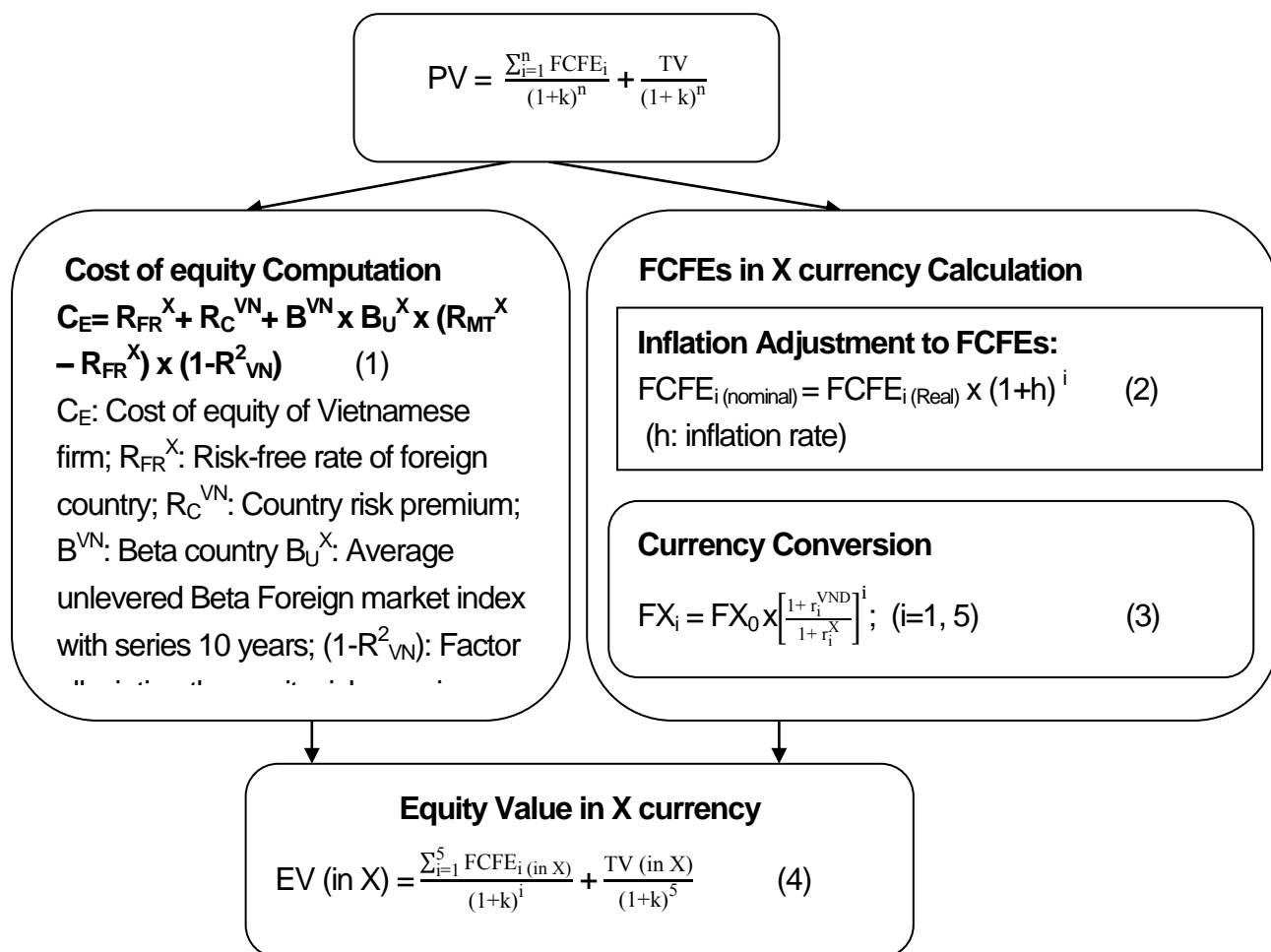
Interviewees		Impact of determinants on FCFE				
		Inflation	Economic growth	Foreign exchange rate	Past sales volume	Company risks <sup>1</sup>
Financial managers	Food processing	Yes	Yes	Strongly yes	No	No
	Textiles	Yes	Yes	Yes	Yes	No
	Automobile	Yes	Yes	Yes	Yes	No
	Agricultural machines	Yes	Yes	Yes	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

<sup>1</sup> Company risks refer as unsystematic risks such as change of management board, operational risks, etc.

### 6. The Proposed Equity Valuation Model

After reviewing literature on equity valuation in emerging markets as well as the viewpoints of Vietnamese financial experts and managers, the proposed model was developed from standard DCF model as shown in Figure 2.

Figure 2: The proposed equity valuation model



### 6.1 Cost of Equity Computation

As seen in equation (1) of the Figure 2, 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 equation's variables are explained in details as follows:

$$C_E = R_{FR}^X + R_C^{VN} + B^{VN} \times B_U^X \times (R_{MT}^X - R_{FR}^X) \times (1 - R_{VN}^2)$$

$R_{FR}^X$  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



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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.

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

### 6.2.1 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.

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Secondly, expected FCFEs in planning period were derived from the projected financial statements. 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. 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.

### 6.2.2 Inflation Adjustment to FCFEs

Inflation is among key concerns of Vietnamese companies in our interviews. Equation (2) in Figure 2 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.

### 6.2.3 Currency Conversion

At this step, FCFE<sub>*i*</sub> 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.

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<sub>*i*</sub> 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 non-existent. 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 (3) in Figure 2.

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

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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.

### 6.3 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 (2) and (3) were obtained, equity value was derived as in equation (4).

### 6.4 Simulation Study

Monte Carlo Simulation (MCS) “relies on repeated random sampling and statistical analysis to compute the results” (Raychaudhuri 2008). MCS in our proposed model had 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 follows.

*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. In detail,  $FX_0$  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 (3). 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.

*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.

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. Due to its wild fluctuation, the spot rate’s daily (weekly) data possibly make it more difficult to find out the

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distribution pattern; the period of 2008-2012 coincides with the historical period to project Company A's FCFEs.

### 7. Model Testing

#### 7.1 Cost of Equity Computation for company A

The proposed model was tested on a typical big listed Vietnamese company (company A) with the foreign securities market being the Singapore Securities market (SGX). Operating in the dairy sector, Company A has good domestic and regional reputation such as being among of the fifty best listed companies in Vietnam and among of two- hundred best companies in Asia in 2010; this profile assures the Company's data availability and transparency. Company A has also had plan to list its stock in the SGX.

**Table 2: Cost of equity for company A**

Variables	Source of data	Value
$R_{FR}^X$ : 10 years T-Bond Singapore	<a href="http://asianbondsonline.adb.org/singapore.php">http://asianbondsonline.adb.org/singapore.php</a>	1.5
$R_C^{VN}$ : Vietnam Country Risk Premium	<a href="http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html">http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html</a>	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	<a href="http://www.reuters.com/finance/stocks/financialHighlights?symbol=FRNM.SI">http://www.reuters.com/finance/stocks/financialHighlights?symbol=FRNM.SI</a>	0.8071
$R_{MT}^X$ : MSCI Singapore Index	<a href="http://us.ishares.com/product_info/fund/overview/EWS.htm">http://us.ishares.com/product_info/fund/overview/EWS.htm</a>	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 $C_E = R_{FR}^X + R_C^{VN} + B^{VN} \times B_U^X \times (R_{MT}^X - R_{FR}^X) \times (1-R_{VN}^2) = 19.93879$		

#### 7.2 FCFEs Estimation for company A

Table 3 summarizes the result of FCFEs estimation for company A. FCFEs were drawn from these 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 2013-2018 was forecasted at 10%/ year (SBV 2012) with benchmark year being 2013. 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).

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**Table 3: Equity valuation for company A**

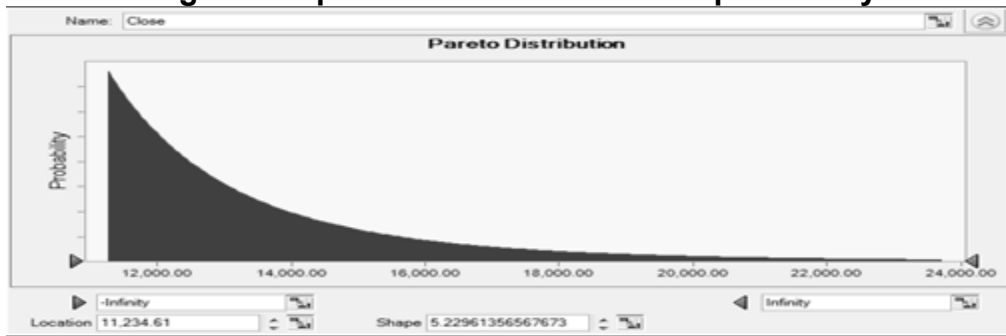
HISTORICAL DATA						
	2007	2008	2009	2010	2011	2012
Sales (billion VND)	6,289.44	6,675.030	8,380.560	10,820.140	16,081.466	22,071.000
Net income (billion VND)	659.890	963.448	1,248.690	2,378.070	3,165.000	4,218.000
FCFE from 2007-2012	(9.235)	(201.182)	941.008	2,554.877	1,520.251	856.794
FORECASTED DATA						
	2013	2014	2015	2016	2017	2018
Sales (b.VND)	26,480.000	31,780.000	38,130.000	45,760.000	54,900.000	65,880.000
Net income (b.VND)	4,690.000	5,230.000	5,720.000	6,180.000	6,870.000	7,557.000
FCFEs 2013-2018(bVND)	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 2013-2018(bSGD)	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					

### 7.3 Company's Equity Value

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 2013, the final equity value will be altered correspondingly. Therefore, Monte-Carlo simulation is carried out to examine the stability of the equity value.

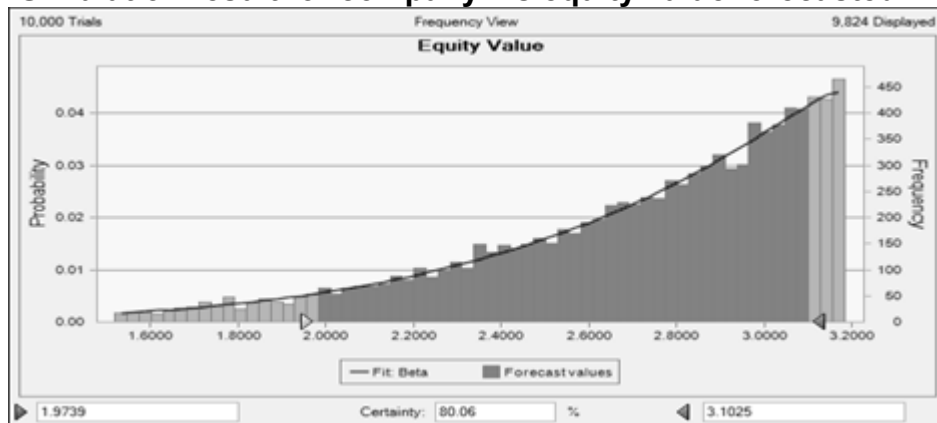
Figure 3 shows that the VND/SGD spot rate has Pareto distribution with its parameters location and shape being 11,234.61 and 5.52296 accordingly.

Figure 3: 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 4). In particular, as the spot VND/SGD rate fluctuates during the planning period after 10,000 trials, a set of equity value will be collected with its distribution implying that there is 80% of probability for the Company A's equity value to 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 4: Simulation result for company A's equity value forecasted in SGD



Dividing the Company A's equity value by 0.55 billion outstanding shares (at the end of 2012), the result shows that 80% of probability that Company 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.

## 8. Conclusion

The paper raised a new approach to Vietnamese companies in their equity valuation. In respect to international investors' perspectives, the proposed model solved the problems of illiquidity, low volume, unstable and unreliable data, etc. in Vietnam securities markets. 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

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calculate its stock price as reference data in its cross-listing plan. Therefore, 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. However, the paper just firstly applied the customized model on one big Vietnamese company which mostly followed the international regulations and requirements of the SGX. To extend the model application, the information transparency should be enhanced by all other Vietnamese companies. Besides, the government should have a consistent regulations and instructions in corporate governance regards to information publishing, financial statements, etc.

The paper also has some limitations such as the employment of quite simple simulation technique, the reliance on only one tested case, etc. The further studies will collect more practical cases and apply more sophisticated simulation technique to improve the models' reliability.

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