Investigations on Global Investments

Fundamentals of Top-Down Global Asset Management

Introduction

Singapore has a highly industrialized economy with a large and vibrant manufacturing sector. The country attracted over 8 billion on Singapore dollars in investment commitments to its manufacturing sector in year 2000. Of the total investment commitments, 73 percent comes from foreign investors, mainly the U.S. In fact, the government has increasingly focused its efforts on promoting small and medium-sized enterprises since 1988.

Singapore is heavily dependent and strong on foreign trade. Essentially, the Singapore government strongly supports international trade and offers a range of incentives to local firms who seek to expand abroad within the Pacific-rim. The current account remains very healthy showing a surplus estimated $4.4 billion.

After considering all the factors of Singapore, we still believe that Singapore is a good choice for this assignment. We would like to know how much of Singapore's economy is actually affected by financial changes around the world.

In this report, we attempt to investigate the predictability in national equity market returns, and its relation to Singapore economic risks. We show how to consistently estimate the fraction of the predictable variation that is captured by an asset pricing model for the expected returns. Thus, we will use the unconditional international asset pricing model (IAPT).

Most tests of conditional asset pricing models ask the models to explain 100 percent of the predictability of the asset returns. Since a model can be useful even if it does not account for all of the variance, we estimate directly the fraction of the predictability that is explained by the model and the fraction that is left unexplained.

This paper is organized as follows: first we outline the methodology, model and assumptions, then the choice of predictable variables and their significance with the construction of instruments, followed by data report and analysis, and finally the conclusion.

Methodology

In this exercise, we have chosen to apply the conditional model, where the risk premiums on factors are conditional based on the information available, and betas are constant. At the beginning of the period, say at time t-1, we attempt to predict the return of securities at time t. We have chosen to use the conditional model rather than the unconditional model based on the fact that average returns are estimates are formed using no information about the current state of the economy, whereas the conditional model takes the current state of economy as the base of future return. The expected return at the future is composed of expected and unexpected return. The formula is written as:

$$R_t = E[R_t|Z_{t-1}] + U_t$$

Where $E[R_t|Z_{t-1}]$ is the expected conditional component;
U_t is the unexpected component of the future return

The model's expected returns are functions of betas and risk premia. The predictability arises from the degree of correlation between beta and information variables.
Information variables can be scalar or a vector, they are observable by market participants at time t-1, and any set of information variables is a subset of a true information set of investors.

The constant betas conditional asset pricing models imply that factor premiums are time varying and modeled by regression on lagged instrumental variables and the betas are constant.

The regression model:

$$r_t = \alpha + \beta r_{m,t} + u_t$$
$$r_{m,t} = \mu + kZ_{t-1} + w_t$$

To implement the constant beta model, first, regress the excess market or other factor return on Z:

$$r_{m,t} = \mu + kZ_{t-1} + w_t$$

The fitted values are the conditional expected excess returns (risk premium) $E[r_{m,t}|Z_{t-1}]$. Then use them in the regression below:

$$r_t = \gamma + \delta E[r_{m,t}|Z_{t-1}] + \varepsilon_t$$

Notice that:

$$r_t = \alpha + \beta(\mu + kZ_{t-1} + w_t) + u_t$$

Therefore, the actual predictive regression is:

$$\mathbf{R_t = \gamma + \delta Z_{t-1} + \varepsilon_t}$$

Where:
$\gamma = \alpha + \beta\mu$,
$\delta = \beta k$,
$\varepsilon = \beta w_t + u_t$

Model assumptions

In this project, we assume that:

1. Betas are constant
2. Factor premiums are time variant and modeled by regression on lagged instrumental variables.
3. The conditioning information is assumed to be public knowledge at time t-1.
4. We assume that investors' demand on Singaporean firms' premiums on risk factors may vary over time.
5. Predictability of returns attributed to correlation between expected returns and current information.
6. Information is assumed to be persistent over time and expected returns inherit this persistence.
7. Singapore and the world markets are perfectly integrated global economy
8. No barriers to extranational equity investments
9. No transaction costs or information cost, and no taxes.

Selection and construction procedures of Information Variables

In this conditional model used, the factor premiums used are time varying and modeled by regression on lagged instrumental variables. In addition, the betas are assumed to be constant. In selecting instruments or information variables, it is important to note that they must make sense, must be available at the same frequency as the frequency of returns and that they should have a measurable correlation with returns or risk factors. Based on the selection criteria, below are the eight information variable chosen.

Singapore Equity Excess Return

This is defined as net income after interest and taxes. The excess return on the country's entire equity is the return on the accumulation of all the countries' past projects. Singapore equity excess return is considered to be the dependent variable, which is the variable whose returns will be regressed on the independent variables. It is constructed through several procedures. First, we collected the data of Singapore's equity in US$ from the DataStream for the period of January 1st 1990 – December 31st 1999. Since the equities index is expressed in terms of Singapore dollars, we hence converted it into US dollars term by using the exchange rates of the same amount of period. Before calculated for the return, we converted the list of equities, which was expressed in annual basis, to monthly basis by simply dividing it by 12. Then we calculated the return for each month by using the formula of:

Return = (Value at time t +1/ value at time t) – 1

Finally, in order to find the excess return, we subtracted the returns with T-Bills rate.

Lag Singapore Equity Excess Return

Lagged Singapore equity excess return can be a useful information variable. Since there is an assumption that conditional means is persistent or that there is time variation in returns, it is then possible to use previous period's return to predict the next period. This variable is one of the most

important variable in determining next month's returns. Hence, the data of lag Singapore equity excess return was obtained simply by moving the data of Singapore equity excess return down by one period, in this case, one month.

Lag Singapore Exchange Rate Changes

The traditional approach to foreign exchange rate determination is to focus on the influence of balance of payments flows. In a country in which capital flows are restricted, as is often the case with developing nations, a trade deficit would lead to a reduction in the country's reserves and, ultimately, to a depreciation of the home currency. Consequently, this depreciation would improve the terms of trade. National exports should increase and the imports should drop. This should lead to an improvement in the trade balance, and the currency should stabilize. And from a practical standpoint, any investor should be concerned about the reaction of the domestic capital market to international monetary disturbances, such as exchange rate movements. In the macroeconomic approach, it is widely recognized that economic activity is a major determinant of stock market returns, so the influence of exchange rate movements on domestic economic activity may explain the relation between exchange rate movements and stock returns. The procedures to calculate for Singapore exchange rate return are the same as the one calculated for equity return. The data of Singapore's exchange rate was obtained from the DataStream. Since the exchange rate data was expressed in European term, we converted the data into American term by calculating the inverse ratio. After converting the exchange rates into monthly basis, we then calculated the return by using the formula mentioned above.

Lag Singapore Dividend Yield Changes

This is the dollar dividend per share divided by the current price share. As a result of the reluctance of firms to raise dividends until they feel able to maintain them, and to cut dividends unless they absolutely have to, dividends follow a much smoother path than earnings. In other words, the variation in earnings yields across firms is much greater than the variation in dividend yields. Since dividend yield lags firms' earnings, this would indicate that as earnings increase and become more stable, dividends should follow on a much smoother path. In addition, dividend yield increases would provide a positive signal to investors in the market. On the other hand, the cutting of dividends would be a negative signal to investors in the market. Therefore, increases in dividend yield would lead to higher equity returns. On the other hand, decreases in dividend yield would lead to lower equity returns. Thus, equity returns and dividend yields should be positively related. Singapore dividend yield was constructed by using the same procedures as the one used to calculate for Singapore exchange rate return.

Lag Singapore Market Capitalization to GDP ratio

A higher market cap to GDP ratio would indicate higher integration (lower international capital market restrictions) between markets across the world. This would signal higher foreign investors activities in domestic markets when local equity returns are higher relative to foreign equity returns. Thus, a higher market cap to GDP ratio would indicate higher local equity returns. On the other hand, a lower market cap to GDP ratio would indicate lower integration (higher international capital market restrictions) between markets across the world. This would signal lower foreign investors activities in domestic markets when local equity returns are lower relative to foreign equity returns. Thus, a lower market cap to GDP ratio would indicate lower local equity returns. The construction of Singapore market capitalization to GDP ration was done by first collecting the data of Singapore market value equity and GDP for the same period from January 1st 1990 until

December 31st 1999 from the DataStream. Afterwards, we converted both data, which were expressed annually, into monthly basis. Then we calculated the ratio dividing the value of Singapore market value equity with GDP (value of market value equity as numerator while GDP as denominator). After the calculation for the ratio, we proceeded to find the return by using the formula of:

Return = (Value at time t +1/ value at time t) – 1

Lag Moody's Default Spread Changes

Moody's Default Spread is the difference between the yields on lower-grade and Aaa long-term corporate bonds. The Moody's default spread is a predictor of the business cycle. If the default spread is wider, then that would correspond to an increase in the riskiness of Baa rated corporate bonds because of the increase in the probability of default risk. Therefore, a wider spread would signal a higher probability of firms not being able to pay the interest payments to the creditors (recessionary period). If the default spread is narrower, that would signal a decrease in the riskiness of corporate bonds because the probability of default is lower. Therefore, a narrower spread would signal a lower probability of firms not being able to pay the interest payments to the creditors due to higher operating income (expansionary period). The descriptions of the ratings are:

Aaa: Judged to be of the best quality with a small degree of risk.
Aa: High quality but rated lower than Aaa because margin of protection may not be as large of because there may be other elements of long-term risk.
A: Bonds possess favorable investment attributes but may be susceptible to risk in the future.
Baa: Neither highly protected nor poorly secured; adequate payment capacity.
Ba: Judged to have some speculative risk.
B: Generally lacking characteristics of a desirable investment; probability of payment small.
Caa: Poor standing and perhaps in default.
Ca: Very speculative; often in default.
C: Highly speculative; in default.

The bond ratings are primarily based upon publicly available information, though private information conveyed by the firm does play a role. In order to construct default spread, we first collected the data of Moody's Baa bonds and Aaa bonds from the DataStream for the same period of the other variables. Then, for each bond data, we divided each value of each period by 12 to obtain the monthly value. The default spread is then calculated by simply taking the difference between Moody's Baa bond values and Moody's Aaa bond values. After calculating the difference, we finally calculated the return for each period, using the same formula mentioned above.

Lag Term Structure Spread Changes

Term structure spread is the difference between the yields on long-term bonds and one-month bills. This variable will be explained with an example. The Government of United States bonds will be plotted on a graph with bond yields to maturity against time to maturity. Then, one can notice that the yield curve is ascending with the long rates above the short rates. One of the reasons why the observed yield curve is ascending is that investors expect that rates will rise in the future and that there is a liquidity premium. That would mean an economy with relatively high GDP growth rate as well as inflation. Therefore, this would signal an economy is at its high end and is expecting a

recessionary period coming ahead (wider term structure spread). When the yield curve is descending, and thus the spread becoming narrow, the economy is at its low end and is expecting an expansionary period ahead. The construction of term structure spread involved several procedures. First, we obtained the data of US Treasury Benchmark Bond of 10 years for the period of January 1st 1990 to December 31st 1999. Since the data was expressed in percentage form and on annual basis, we hence converted it into monthly basis and percentage form by dividing it by 12 and then by 100. In order to find the term structure spread, we subtracted the rate of the US Treasury benchmark bond with the T-Bills rate. Similar to the other variables, we finally calculated for the return for each period by using the identical formula above.

Lag Euro Dollar Changes

Eurodollars are the most widely used Eurocurrency – are U.S. dollars deposited in banks outside the United States. The interbank forward exchange market is closely linked to the Eurocurrency market, often called the Eurodollar market, although several other currencies are traded as well. This interbank market for shot-term borrowing and lending is an offshore market and therefore beyond the purview of domestic regulations. This market started during the Cold War between the Soviet Union and the United States, when the Soviets feared that U.S. authorities might freeze the U.S. dollars they owned as reserve currencies. The interest rates on the Eurodollar market are often called LIBOR, which stands for London Interbank Offered Rate. So LIBOR is the higher rate of the quotation. LIBOR is most often used for U.S. dollar rates, but it is also used for other currencies, such as yen LIBOR or Euro LIBOR. Therefore, a higher Euro Dollar rate would indicate higher interbank market transactions, which would signal higher economic activities (expansionary period). A lower Euro Dollar rate would indicate lower interbank market transactions, which would signal lower economic activities (recessionary period). Euro dollar return was constructed by using the same procedures as the other variables above.

Lag World Market Dividend Yield in excess of the Eurodollar rate changes

Dividends are more likely to be raised following a permanent, rather than a temporary, increase in earnings and that firms have long run targets for their dividend-to-earnings ratios. However, because managers need time to assess the permanence of any earnings rise, divided changes appear to lag earnings changes by a number of periods. It follows that the dividend-to-earnings ratio rises when a company begins a period of bad times, and the ratio falls when a company reaches a period of good times. Then when the world dividend yield in excess of the Euro Dollar rate increases, investors in the market would expect higher earnings and thus higher equity returns (expansionary period). On the other hand, when the world market dividend yield in excess of the Euro Dollar rate decreases, investors in the market would expect lower earnings and thus lower equity returns in general (recessionary period). Therefore, this variable can be used as a good proxy in estimating business cycle. The construction for the return of euro dollar minus dividend was exactly the same as the one used to construct the euro dollar return. However, in this case, we collected also the world market dividend yield from the DataStream and we subtracted the data with the Eurodollar rate in order to obtain the world market dividend yield in excess of the Eurodollar rate. Finally, we calculated for the return for each period, using the same formula used to calculate for the return above.

Empirical results

Constant betas conditional risk premiums International multifactor APT model:

Coefficients

From table 3, we can see the results of our predictive model using eight information variables. By observing our betas we see that for the most part they are significantly different from zero, with the rare exception of the US term structure spread which serves as our proxy for the world term spread (beta = 0.003636). The magnitude of these variables is obviously important in determining the explanatory power or predictive power of the dependant variable or Singapore's equity excess returns. For example, if an information variable is not significantly different from zero, then there cannot be any risk premium associated with the information variable to predict our dependant variable. Nevertheless if the coefficients are significantly different from zero then we can rely on its predictive power given in our sample of 118 observations.

Looking at the beta of the lagged local equity excess returns we can clearly see that it is positively related to our local equity excess returns. This makes sense since this information variable will lag the variable we are trying to predict (Singapore equity excess returns) on a monthly basis. In other words we are essentially using the same variable but lagging it on a monthly basis.

Singapore's exchange rate is negatively related to the dependent variable (negative beta). This means that as the exchange rate increases over the long run, Singapore local equity excess returns falls. This relates to the fact as Singapore exchange rate appreciates, its exports become relative more expensive than foreign goods, thus decreasing its exports while increasing its imports. Since Singapore its heavily dependant on its exports for economic growth, a given rise in the exchange rate will have a negative consequence to their local equity returns.

Singapore's dividend yield is positively related to equity excess returns. This makes sense since dividends usually follow earnings but in a much smoother path. Therefore as earning increase dividend usually follows, indicating expected increases in local equity returns by investors.

Singapore's market capitalization to GDP ratio is negatively related to equity excess returns. This implies that as market cap to GDP ratio increases (meaning increases in capital inflows lead to an appreciation in the exchange rate) investors expects a deficit in the current account balance and thus decreases in local equity returns. The reason for that relates to Singapore's economy dependency on its net exports for real growth over the long run.

Moody's default spread is positively related to equity excess returns. This relates to corporate default risk. As corporate defaults risk increases investor demand higher premiums and as they do so they also demand higher risk premiums in the equity returns due to the variability in earnings.

Term structure spread (US 10 year treasury bond- US treasury bill) is positively related to equity excess returns. Since the term structure is a good predictor of the business cycle and widening of the spread would signal expectations of an expansionary period. Therefore widening of the spread would lead to increases in equity returns. On the other hand, a narrowing of the spread would indicate expectations of a recessionary period and thus lower equity returns. This seems to be consistent with our model. However, this is contrary to the general observation. According to Harvey, when the term spread is high, the economy is expecting to enter into recession and when the term spread is low, the economy is expecting to enter into an expansionary period.

Euro-dollar rates are negatively related to equity excess returns. Since Singapore engages in many international transactions, including international borrowing and lending, increases in interbank interest rates (euro dollar rates) would increase Singapore's firms costs of borrowing thus making it harder to increase their capital expenditure and grow. A low growth will lead to lower equity returns. On the other hand, lower Euro dollar rates make it cheaper for exporting firms in Singapore to borrow thus increasing their growth rates as well as their equity returns. This is also consistent with our model.

Finally, dividends in excess of Euro dollar rates are positively related to our equity excess returns. This is due to the fact that increases in dividends in excess of euro dollar rates gives out signals pertaining to future earnings. Thus higher dividends in excess of Euro dollar rates higher expected earning and thus higher equity returns and vice versa.

T- Statistics

With regards to out t-statistic we can safely say that the only variable that seems close to being significant in our model is the Moody's default spread. The rest of the variables have insignificant t-test due to the high correlations between the variables and thus resulting in multicollinearity. This can be seen to be more apparent when we look at the correlations between exchange rate changes and lag equity excess return changes. Also when we look at market to GDP ratio and dividend yield changes, they have a correlation of -90%. Thus we cannot rely on our t-statistics as measure of significance and thus we would use betas that are significantly different from zero as our decision rule as mentioned above.

R-square and R-square adjusted

Our model's R-square is 4.9% indicating the how little predictive power our information variables have. This seems to be consistent with many of the models in the literature where equity returns are so volatile and its dependence on so many factors that it would be close to impossible for so few variables (eight of them) to have much of a predictive power in Singapore's equity return market. Also our Adjusted R -square becomes negative indicating to us the high degree on dependency between our informational variables in predicting our local equity returns.

F-test

Since we have low R square and there is a link between R-square and F statistics, we also have low F-test. This signals to the fact that information variables as a whole have low predictability powers when it comes to our equity market. This seems to indicate to us that it is very difficult to predict equity returns in a country like Singapore due to its tremendous volatility in their equity markets.

Table 1: Summary Statistics for the global risk factors: February 1990 - December 1999 (118 observation)

Variable	Mean	Median	Std. Dev.	Std. Error	Kurtosis	Skewness	Range
World risk factors							
Sg-Equity Excess Return Changes (lag)	0.002033	5.39E-05	0.071585	0.00659	4.619101	0.878786	0.5192
Sg-Exchange Rate Changes (lag)	0.001057	0.001386	0.016448	0.001514	2.794034	-0.30176	0.1168
Sg-Dividend Yield Changes(lag)	0.00152	-0.00532	0.073706	0.006785	2.858958	-0.10277	0.5269
Sg-Market to GDP Ratio Changes(lag)	0.009212	0.007526	0.088472	0.008145	15.12459	2.445998	0.7632
W-Moody's Default Spread Changes(lag)	0.002497	0	0.079777	0.007344	2.847626	0.941837	0.4833
W-Term Structure Spread Changes(lag)	0.058632	0.00028	1.952361	0.179729	69.26164	6.277717	26.169
W-Euro-dollar Changes(lag)	-0.00196	0	0.062497	0.005753	8.02224	0.890934	0.5471
W-Eurodollar to Dividend Yield Ratio Changes (lag)	0.013169	-0.00083	0.22956	0.021133	56.36719	6.064803	2.6399

Table 2: Correlation between various risk factors: February 1990 - December 1999 (118 observation)

Correlation among variables

	Equity Excess Return	Equity Excess Return (lag)	Exchange Rate (lag)	Dividend Yield (lag)	Market to GDP Ratio (lag)	Moody's Default Spread (lag)	Term Structure Spread (lag)	Euro-dollar (lag)	Eurodollar Dividend Yield Ratio (lag)
Equity Excess Return	1								
Equity Excess Return (lag)	0.146205	1							
Exchange Rate Changes (lag)	0.018506	0.429498	1						
Dividend Yield Changes(lag)	-0.175011	-0.079736	-0.17998	1					
Market to GDP Ratio Changes (lag)	0.140819	0.686933	0.147308	-0.909266	1				
Moody's Default Spread Changes (lag)	0.102115	0.070733	0.061631	-0.079047	0.115502	1			
Term Structure Spread Changes (lag)	0.034733	-0.193967	-0.16878	0.049131	-0.09544	-0.1475	1		
Euro-dollar Changes (lag)	-0.058788	-0.134686	-0.02836	0.037906	0.035517	0.10826	0.04489	1	
Eurodollar to Dividend Yield Ratio Changes (lag)	-0.01106	0.025266	-0.03969	-0.095863	0.126001	0.08816	0.00956	0.8289	1

Table 3: Regression of the asset returns on the information variables (conditional APT model): February 1990-December 1999 (118 observations)

Source of risk	Intercept	Sg-Equity excess return changes	Sg- EX rate changes	Sg- Dividend yield changes	Sg- Mkt-GDP ratio changes	W- Moody'd Default Spread changes	W-Term structure spread changes	W-Euro-dollar changes	W-Dividend yield minus Eurodollar changes
Coefficient	0.00211	0.023624	-0.071506	-0.213196	-0.066656	0.09766	0.002184	-0.11627	0.015906
t-test	0.29429	0.125739	-0.149388	-0.763404	-0.351981	1.138056	0.600705	-0.56887	0.291581

R Square (8 factors)	F Test
0.048583	0.69575

Out-of sample Estimation

	Actual return	Predicted return	Absolute pricing errors
Mean	-0.001424671	-0.004269747	0.064229245
Standard Deviation	0.083401372	0.03612364	0.067603408
Sharpe Ratio	-0.017082101	-0.118198127	0.950088864

In the out-of-sample estimation, we used the regression output from our predictive model estimated on the first sub-sample to make a prediction of Singapore's return a month ahead. In order to compare the performance of the predicted returns with the actual returns, we calculated the absolute pricing errors, which are simply the absolute difference between the actual and predicted returns. In addition, we also calculated the mean, standard deviation to further analyze the performance of predicted returns as compared to the actual returns, whose results can be seen from the table shown above.

From the table above, we can see that the predicted equity returns of the country are lower than the actual returns. This can be seen from the mean values, where the mean of the predicted return is approximately – 0.4% whereas the mean of the actual returns is approximately –0.1%. However, it is important to note although actual returns are doing better than the predicted returns, the difference in the performance is not that substantial. This can be seen especially from the mean of the absolute pricing errors, which is only about 6.4%.
By comparing the mean of predicted returns with the mean of T-Bills rate of return, we found that the predicted returns are performing much worse than the performance of the T-Bills rate, which is the short term debt rate, whose mean rate of return is 0.4%.

In addition to the comparison of the performance of mean actual and predicted returns, we also made a comparison of the standard deviations of both actual and predicted returns. Standard deviation is calculated in order to see how much the value of the predicted returns will deviate away from the mean value. The standard deviation of predicted returns is about 3.6% whereas the standard deviation of the actual returns is 8.3%. Hence, we can see that although the predicted returns are performing worse in terms of its mean return, they are actually performing better in terms of its standard deviation. The standard deviation of the absolute pricing errors is about 6.7%, which means that the probability of value of the absolute pricing errors deviating from the mean value is 6.7%.

Simple Trading Strategy vs. Buy and Hold Strategy

	Simple Trading Strategy	Buy and Hold Strategy
Mean	-0.000464952	-0.001424671
Standard Deviation	0.041389691	0.083401372
Sharpe Ratio	-0.011233534	-0.017082101

The simple trading strategy was constructed by observing the values of the predicted equity return of Singapore. When the predicted return is positive, the investor will take a 100% position in the equity market. On the other hand, when the predicted return is negative, the investor will swap his equity into one-month T-Bills. When the predicted returns are positive, the values of the return of the strategy will be based on the actual returns. In some cases, it is possible to have positive predicted returns and to have negative values in the actual returns. On the other hand, when the predicted returns are negative, the values of the return of the strategy will be zero since the investor will be taking a 100% position in the T-Bill.

The "buy and hold" strategy was constructed by simply taking the actual returns of the second sub sample. It is a strategy whereby the investor will continue holding the equity no matter how good or bad the performance of the returns.

In order to make a comparison between both strategies, we calculated the mean, standard deviation and Sharpe ratio for each strategy. Sharpe ratio is calculated by taking the ratio of excess return to the standard deviation. As it can be seen from the table above, mean of returns of simple trading strategy, whose value is -0.04%, is higher as compared to the mean return of hold and buy and strategy, whose value is –0.1%. In addition the standard deviation of the simple trading is approximately 4.14%, which is lower than the standard deviation of buy and hold strategy, whose value is approximately 8.34%. By looking at the Sharpe ratio, we can also see that the simple trading strategy (ratio = -0.0112) has a higher Sharpe ratio (ratio = -0.017) as compared to the buy and hold strategy. The Sharpe ratio in the simple trading strategy says that a change in the value of standard deviation will result in a negative change of the excess return by approximately 1.12%. On the other hand, the Sharpe ratio in the buy and hold strategy indicates that a change in the value of the standard deviation will result in the negative change of the excess return by approximately 1.7%.

Hence, by making the comparison of the mean, standard deviation and Sharpe ratio between both strategies, we can see that it is preferable for the investor to adopt the simple trading strategy. However it is important to note that there are some occasions where the simple trading strategy model is not powerful enough to make a prediction because there are some occasions where the predicted returns are positive but to have negative actual returns eventually. Also, by adopting the strategy, the investor has the choice to swap his or her investment into T-Bills when the equity returns are doing badly. In the buy and hold strategy, on the other hand, the investor has no choice but to remain holding the equity even when the equity returns are negative. Hence, based on the analysis mentioned above and reasoning provided, it is hence preferable for the investor to adopt the simple trading strategy.

Concluding Remarks

After analyzing Singapore's equity markets and looking at its volatility, correlation with the market portfolio, and its performance against the short debt market (T bills), we have come to several conclusions. (All our conclusions will rely on the explanatory and predictive power of our models.) As we analyze Singapore's volatility and compared it against countries in Western Europe and North America we can see that there is a high degree of volatility in Singapore. This is due to Singapore's high real GDP growth rate and volatile expected inflation rates as compared to the world market portfolio. As a consequence, Singapore's correlation with the market portfolio is low relative to countries like the US and Western Europe. This provides ample opportunity for international investors to add countries like Singapore in their international portfolios so as to decrease their market risk while maximizing their returns. We believe that Singapore's rapid growth in industries that make up most of their GDP provides strong fundamentals for the whole equity market to form a rising trend. In addition, according to analysts use of adjusted multiple models (controlling for variables or fundamentals across industries) they have concluded that there still a lot of room for Singapore's equity market to rise in the near future even in an environment where global economic shocks can have a negative impact in the country's local equity markets (Shocks predominantly coming from Japan). When we compared Singapore's equity market with the money market we concluded that a simple trading strategy, which is a strategy of predicting when to invest in the equity market and investing in the money market when predicting negative returns, on average performed better than the buy and hold strategy. Even though this would lead us to invest some of our money in Singapore's equity market and some in the money market, we have to remember that this decision is as good as our model. Since our predictive model only explained 4.8 % of the variation in equity excess returns (very noisy) we cannot rely with sure confidence that this would be the right strategy or even that the money market performed better on average than the equity market. This was due to the fact that when our conditional model predicted positive returns what actually happened was totally different (negative returns). Nevertheless, Singapore's equity market have delivered high results relative to more stable countries in Western Europe (France, Germany and Italy) thus providing an attractive market for international investors to invest their money while at the same time diversifying their portfolios. To conclude we would recommend Singapore's equity markets for investors that are looking for attractive markets in East Asia to maximize their reward to variability ratios. In addition, since there seems to be a consensus of rising expectations among equity analysts not only would world investor be able to achieve better diversification in their portfolios but they may also experience big gains in equity returns.