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RISK ATTRIBUTION ANALYSIS FOR SOUTH EAST ASIAN MARKETS

Abstract: This paper is concentrated on those factors which have significant influence over stock returns on five South East Asia markets. Quantifying these factors and accounting for their influence leads to the specific stock return which we call “pure return”. This process is called return decomposition or risk attribution and it shows the sources of return/risk to the assets. This information can be very valuable in portfolio construction, because it makes managing expositions more precise and flexible. Better understanding which factors drive stock prices allows asset managers to adjust their investment strategies accordingly and apply more successful risk management. We find that nine macroeconomic factors are significant for the studied markets. Also we quantify the specific risk exposure of the companies of the studied markets.

Key words: Risk attribution, Return decomposition, Multifac-

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tor model, South East Asia, Emerging markets, Stock Risk Exposure

INTRODUCTION

Since the introduction of the modern portfolio theory (MPT) by Harry Markowitz (1952) as corner stone of passive portfolio management, asset managers are trying to improve their performance through active investment decisions. The fundamental theory of active portfolio management was laid by Grinold and Kahn (1999) and they define the concepts of alpha return and active risk. The main goal of active management is to outperform the market portfolio through actively managing expositions rather than betting on the optimal portfolio given by MPT and this spread is the so called “alpha return”. The active risk is the additional risk that investors bear from applying active management.

In managing both the active and passive risk one of the questions that still remains is where the risk comes from. Analyzing the sources of the equity risk is called risk/performance attribution. The oldest and best known model for risk attribution is CAPM (Capital Asset Pricing Model) where the risk of an asset is caught by its “beta” to the market. But this model does not describe the complexity of the risk. It accepts that there is only one source of risk. This assumption is very restrictive. The complicity of the risk should be described in a more complicated manner. This could be done by applying other types of factors - macroeconomic factors, equity market factors and industry factors. We try to quantify these three groups of factors for the specific emerging market region – South-East Asia.

LITERATURE REVIEW

Evident from the CAPM formula is that the whole risk is attributed to a single factor – excess return of the market portfolio. Main critique against the model is from *Roll (1972)*. In his paper he asserts that the market portfolio is not observable and any approximation by benchmark and indices leads to poor results. Also *Fama and French (1992)* show that long term returns are not significantly correlated with betas from CAPM. According to the famous Fama – French Three Factor Model presented by *Fama and French (1992)* the risk of any portfolio can be attributed to three market factors – excess return of the benchmark, the spread between Small and Large cap companies and the spread between growth and value assets. Since then authors have been looking

for observable factors, which contribute to the risk of the assets. This approach to investing is called risk premium investing, where the active investment decisions are based on managing the exposure to certain factors. *Bender et al (2010)* breaks risk premium to asset class, style and strategy risk premiums and uses existing benchmarks for constructing the indices. *Page and Taborsky (2011)* recommend approach using macroeconomic factors for portfolio construction and risk management.

Although CAPM is inferior in explaining the variations in stock returns one very important result from its application is the concept of breaking down the total risk of an asset to systematic and unsystematic. Using this notion that part of the risk is specific for the stock and part is driven by macroeconomic and market conditions, every investor should separately manage the exposure to these two types of risk. In the past the systematic risk was assumed to be country specific, *Griffin (2002)* posits the question whether the Fama – French factors should be local or global in order to better explain the time series variation of stock returns. With the progressive globalization of the economy and the fast development of the emerging markets it has become clear that systematic risk must be analyzed at a global level. Risk attribution models such as Citibank’s “GRAM”, are used to create “global risk heat maps” to guide asset managers for best capital allocation and risk management. Also many studies have concluded that most of the return on portfolios can be attributed to factors outside the company.

When searching for sources of return there a large number of systematic factors that can be examined. In generally they can be classified into three groups – macroeconomic factors, equity market factors and industry factors.

Global macroeconomic factors include four types of factors – interest levels, economic output, key commodities and exchange rates. Their influence on stock prices is through defining the economic environment where companies do their business. Changes in interest rates lead to expanding/contracting the credit lines, further in recent years base rates have become the main tool for Central banks in stimulating the economy. Economic output is a barometer for the growth levels in private business. Commodities affect the performance of the companies by raising or lowering the operating expenses. Exchange rates also have their specific influence on stock returns through modeling the international trading activity.

Equity market factors aim to capture how current sentiments on the capital markets affect stock prices. Two best known factors are the growth-value premium and small cap vs large cap spread. Such style premiums can distort the

market and misprice stocks. Same conclusions can be made when analyzing the industry factor. Some stocks are priced higher than others, because the industry that they operate in is currently performing better. When looking at a global level similar influence also has the local market. For example some stock on the emerging markets can look riskier just because the capital market where they are listed is riskier.

All those factors can be represented by several quantifiable metrics. After finding which of these factors have significant influence over stock returns and accounting for this influence we are left with return that is specific for the stock. This process is called return decomposition or risk attribution and it shows the sources of return/risk to the assets. This information can be very valuable in portfolio construction, because it makes managing expositions more precise and flexible. Better understanding which factors drive stock prices allows asset managers to adjust their investment strategies accordingly and apply more successful risk management.

It is necessary to point that although capital markets are growing more global still there are significant differences between them. Main difference will be in the set of macroeconomic and equity market factors that affect stock movements. The developed methodology will be applied and back tested to publicly traded companies in the emerging markets in South East Asia in the period 2004-2014. According to IMF's grouping of world economies in the selected region there are four emerging markets – Thailand, Philippines, Malaysia and Indonesia. We also include Vietnam, mainly because of the well-developed capital market and growing economy. Grouping these five countries and analyzing them should give better understanding on the subject of risk attribution in the region. Selected markets are comparable and the results from the analysis will provide investors with valuable information which factors drive the return on these exchanges.

The most valuable result from risk attribution models is obtaining detail structure of stock returns on the given market. Analyzing this structure over time we can conclude about which part of the investment process is most important. If global factors contribute most of the return then it is vital for investors to have good strategic global allocation. Contrary, if there are strong relation between equity market factors and stock returns then style allocation becomes primary in the process. It is interesting to look at the unexplained part of the return it can be called “pure return”, because all outside influence has been removed. Theoretically, if we control for all significant factors outside the company, the unexplained return is coming from stock specific information. This can answer the question whether there is need for fundamental analysis or investors can focus on forecasting only market conditions. Form valuation

standpoint working with such “pure return” makes the analysis more accurate and finds what performance metrics in reality have impact on stocks. If proven applicable this “pure return” can be used as a base of future studies in the fundamental analysis.

The goal of this paper is to derive the structure of risk exposure of equity on the analyzed markets. In the next section is described the methodology used to calculate factor premiums and the unexplained return.

METHODOLOGY

When looking to explain stock returns respectively sources of risk most researchers use regression models. We use a standard multi-factor time series model framework to explain a stock's return using set of exogenous factors. These factors quantify the effect of global economic indicators, the financial market, industry and country on the stock price's return. The model is given by:

$$R_{i,t} = \alpha_i + \sum_j \beta_i * F_{Macr,t} + \sum_k \beta_i * F_{Mkt,t} + \beta_i * F_{Ind,t} + \beta_i * F_{Cntr,t} + \varepsilon_{i,t} \quad (1)$$

where:

- is the total realized return of a stock for a period ;
- the stock return component independent of risk factors;
- the value of a macroeconomic (), equity market (), industry () or country () specific risk factor;
- the sensitivity of the stock to a risk factor;
- the risk premium of a factor to the stock return for a period ;
- the residual stock return component for a period .

Traditionally all multi-factor time series models are restricted by the assumption that analyzed factors must be uncorrelated. To overcome this problem the study includes a factor decomposition aiming at the reduction of correlation. In essence this happens with the following equation:

$$F_j = \alpha_j + \sum_{j=1}^{J-1} \beta_j * F_j + \varepsilon_j \quad (2)$$

where α_j is a given factor, while β_j are all other factors from 1 to J .

The focus falls on the residuals, as they measure the dependent factor's movement unexplained by the independent factors. Their presence translates into low explanatory power of the given model which we assume leaves them highly correlated with the dependent variable. But by definition of the classical ordinary least squares framework, there also shouldn't be any correlation between residuals and independent factors. Taking into account both, we can assume that the use of a factor's residuals as a factor by itself would solve the heavier assumption of high analyzed factor correlation. Applying this factor decomposition to our model we transform (1) into:

$$R_{i,t} = \alpha_i + \sum_j \beta_i * F_{Macr,t} + \sum_k \beta_i * \varepsilon_{Mkt,t} + \beta_i * \varepsilon_{Ind,t} + \beta_i * \varepsilon_{Cntr,t} + \varepsilon_{i,t} \quad (3)$$

where:

α_i are the residuals of equity market factors after regressing them against macro- factors and themselves;

– the residuals of industry factors after regressing them against macro- and equity market factors;

– the residuals of country factors after regressing them against macro-, equity market and industry factors;

and all other indications are the same as in (1).

Formula (003)² gives detailed explanation on how the risk attribute model is applied. Using factor residual is a sound way to increase the accuracy of the multi-factor regression method. After developing applicable methodology for the model we must determine which factors should be included and find their quantifiable approximation in the financial data.

2 Montagu, C. et al. "Citi Global Risk Attribute Model (GRAM): Version 2.0", Citi Research, September 2013, p. 5.

Beginning with macroeconomic factors we distinguish between two groups – already available factors and custom calculated for the needs of the study. The already available macroeconomic factors include:

- 1-year and 1-month ICE Libor, Euribor, and U.S. Treasury bills rates and their maturity spreads (1-year vs 1-month);
- Crude oil (Brent) price;
- S&P Global REIT index;
- MSCI World index, MSCI ACWI + Frontier markets index and spread between MSCI Emerging markets index and MSCI World index;
- Volatility S&P 500 index;
- USD/SDR, GBP/SDR, EUR/SDR and JPY/SDR exchange rates.

Custom global macro- factors are the averages of leading economies' national macro- factors. The relationship can be shown in:

$$F_{Gl,t} = \sum_{n=1}^{10} w_{n,t} * F_{Nat,t} = \sum_{n=1}^{10} \frac{GDP_{n,t}}{\sum_{n=1}^{10} GDP_{n,t}} * F_{Nat,t} \quad (4)$$

where:

is the national macro- factor value;

– the weight of a national macro- factor into the aggregated global macro-factor;

– the country's GDP in period ;

A common misconception of weighting values that change with time is connected with the proper way of their weighting. If for example the weights are calculated using static values, weights can also stay static. But when calculating weights using dynamic values it's only logical to use dynamic weights. This is especially true when weighing time series using data that originates from other time series. This is why a better way of weighting should be the use of dynamic weights, that like the changing values, also change with time.

Another major drawback of weighting is the existence of elements with very high weights, as they tend to distort the value of the weighted average towards their own values. To counteract this, the study uses a winsorization methodology that flattens outlying towards all other weights. The idea behind winsorizing data is to: reduce the value of all outliers over a specific upper border to that

border’s value. Traditionally when winsorizing data the selected upper border is equal to three standard deviations of observed data. As we’re applying the winsorization methodology towards weights it is obligatory to distribute the sum of all reductions between all other weights. The process of winsorizing data can be shown in:

$$w'_{n,t} = \begin{cases} 3\sigma_{w_{n,t}} & \text{if } w_{n,t} > 3\sigma_{w_{n,t}} \\ w_{n,t} * \left(1 + \frac{w_{n,t} - 3\sigma_{w_{n,t}}}{\sum_{u,t}^u w_{n,t} = \begin{cases} w_{n,t} & \text{if } w_{n,t} < 3\sigma_{w_{n,t}} \\ 0 & \text{if } w_{n,t} > 3\sigma_{w_{n,t}} \end{cases}} \right) & \text{if } w_{n,t} < 3\sigma_{w_{n,t}} \end{cases} \quad (5)$$

As it can be seen weights are reduced to three standard deviations, when their value is greater; and corrected with part of the sum of reductions, when their value is smaller. After defining the methodology for custom global macro-factor calculation we apply it for the top 10 leading economies’ local macro-factors, using their GDP, measured in PPP, as weights:

<ul style="list-style-type: none">• 10 year Government Bond yields• GDP growth• Industrial production indices• Unemployment rates• Export, Import and Trade Balances• FDI Inflow, Outflow and Net spread• Consumer Price Indices• Credit default spreads	<ul style="list-style-type: none">• USA• China• Japan• Germany• France• United Kingdom• Brazil• Italy• Russia• Indonesia
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On one hand the set of countries is based on the values of their GDP, as they have the top 10 highest ranking GDPs in the world. On the other hand the total sum of their GDPs is over 60% of the total world GDP. From this it can be

concluded that the local macro- factors of these leading economies are more than sufficient in being representatives for the whole world.

We apply the methodology again for the 10 year Government Bond yields, but this time for another set of countries: Argentina, Brazil, China, India, Indonesia, Mexico, Russia, Saudi Arabia, South Africa and Turkey – the top 10 highest ranking GDPs but of countries, classified as developing economies. This gives us the factor “Emerging Markets Government Bond Yield”, which we include in the group of custom calculated macro- factors.

After having all macroeconomic factors we continue with the derivation of two equity market factors, which will be used as a representation of specific market relationships. These factors represent the equity styles and have been proven to have large influence over stock movements. The two most widely used styles are the original Fama - French factors – Growth vs. Value and Small vs. Large Cap spreads. These theoretical styles can be quantified by the following indices:

- S&P Global BMI Growth and Value indices spread
- STOXX Global 3000 Large and Small indices spread

Growth – Value spread is the difference between the return of companies with low valuations against these with high valuations. F growth companies should have higher return associated with the higher risk, because of their uncertain future. Same case can be made also for Small vs. Large capitalization stocks. Smaller companies are more volatile and have higher return over larger firms. These two factors should be accounted for, because in the era of exchange traded funds some stocks can have higher/lower return only because of their association with these styles.

Next we derive custom industry indices for the purpose of capturing the specific movement of industry returns for the widest possible range of companies at given time – all investable companies in the world. The industry classification that is used is GICS. Custom industry indices creation begins with calculation of monthly returns of all companies in the investable universe, followed by their averaging, thus measuring the return of equal-weight industry portfolios. Depending on companies that begin or stop being public or tradable, the structure of the equal-weight industry portfolios changes with each month, but this isn't a problem, as the only thing observed are the industry returns. The calculation is repeated without taking into account industry, for the purpose of averaging a custom global market index and its return. Using the custom industry indices

and a custom market index, we calculate industry spreads, which are proper approximations of industry specific return movements.

Finally depending on the studied stock universe a country specific return movement is required. Although equity indices have been moving in sync there are custom local market effects that must be taken into consideration. The idea is to remove the influence of major market movements over the individual stock, because certain stock can be greatly over or underappreciated.

Having a broad set of macroeconomic factors we must select those that prove to be most significant to the given stock universe. This is done by following a simple methodology. First each stock is regressed against each macro- factor for the purpose of obtaining the coefficient of determination and the p-value of the regression slope. Then for each macro factor we calculate a weighted average coefficient of determination given by:

$$\overline{R_j^2} = \sum_{i=1}^n w_{i,j} * R_{i,j}^2 = \sum_{i=1}^n \frac{1}{(k_{max} + 1) - k_i} * R_{i,j}^2 \quad (6)$$

where:

is the weight of stock 's coefficient of determination against macro- factor ;

– the length of an analyzed stock return's time series measured in number of returns;

– the maximum possible length of a stock return's time series³;

– the stock's coefficient of determination against macro- factor j.

Next we measure the percent of significant p-value coefficients of regression slopes of all stocks versus each factor. Finally we calculate:

$$Rank_{j,i} = \sqrt{\frac{\overline{R_j^2}}{\sum_{j=1}^m \overline{R_j^2}} * \frac{\frac{pv_{\beta_j}}{i_s}}{\sum_{j=1}^m \frac{pv_{\beta_j}}{i_s}}} \quad (7)$$

3 Which in this study is accepted as 132, in result of 12 monthly observation for the duration of 11 years.

where:

- is the overall significance rank of factor in the given stock universe;
- number of macro- factors;
- proportion of significant p-value coefficients of regression slopes measured against number of companies ;
- number of companies with return time series longer than 49 observations.

After calculating each macro- factor's significance rank, it is used for the creation of a correlation matrix of the top 20 most significant macro-factors. Using a simple correlation analysis we reduce the number to 9 factors, representing the given stock universe's significance.

EMPIRICAL RESULTS

Risk exposure

The empirical result of the applied methodology gives us the ability to measure stock risk exposure. In the case of a multidimensional relationship between stock return and exogenous factors, measured through the framework of a multi-factor regression, the stock risk exposure is measured through its regression coefficients. The relationship between both is proper – when the beta coefficients grow, so does the stock's risk exposure. It is important to note that even if the relationship between beta coefficient and risk exposure towards a given factor is proper, the same cannot be said about the relationship between beta coefficient and factor risk premium. This case is true when the observed factor's value is negative which results in negative factor risk premium. But even if that's the case, the stock's risk exposure stays the same and this is enough, as investors can only control for that – exposure, but not risk premium.

It is important to observe the risk exposure not only on a single stock's return but the accumulated risk exposure of a whole industry or market. This can be done by averaging the stock's individual beta coefficients into aggregated benchmark betas. The average risk exposures of different industries can be seen in the next graph:

Figure 1 –Aggregated risk exposures to factors by industries

The major risk exposures shown here are towards global industry spreads, global unemployment rate and global Large/Small spread. This gives grounds for concluding that each of the observed industries is highly sensitive towards its global benchmark. These risk exposures also show the specific economic climate of the studied stock universe – these economies have a causal connection with the global economy. This can be seen in unemployment, as it contributes in overall rise in stock return, in result of outsourced production and foreign investment. Large/small spread translates into the type of economies – emerging and volatile markets composed of new and growing companies, in contrast with the developed market, composed of large international businesses.

Another interesting detail is the position and range of a given industry's risk exposures. The least risk industry can be seen in healthcare, as its average risk exposure is close to zero and a spread from +1,00 to -1,00. The most risk industry is industrials, followed by utilities, both with average risk exposures close to -1 and spreading from beta of +1,00 to -2,50. Risk exposures can also be aggregated by different markets – as shown in the next graph. The same conclusions apply here. A big part of aggregated risk exposure comes from Large/small spread, unemployment rate and industry spread. But exposure is different in different countries. Unemployment rate and large/small spread exposures are low in Vietnam in contrast of industry spread, which is high. Vietnam is also the least exposed towards given risk factors, in contrast of the Philippines that

have the highest deviating aggregated beta coefficients. Studying both graphs it can be concluded that an investment in the healthcare sector or in stocks from the Vietnamese market has the least risk exposure, but an investment in the industrial sector or in stocks from the Philippine market has the most risk exposure.

Figure 2 – Aggregated risk exposures to factors by countries

Factor significance

Another important piece of empirical evidence towards the followed methodology is the factor significance. Following the classical ordinary least squares framework, the said significance can be measured both for the stock as a dependent variable and for the stock's risk exposures, measured with the multi-factor regression coefficients. In light of risk attribution, we're measuring significance with the latter of two methods. Adding the perspective of a whole studied stock universe, the attention falls on the share of significant regression coefficients in the said universe. This can be shown in the following two graphs: Figure 3 – Factor significance by industry

Figure 4 – Factor significance by country

As it can be seen in both graphs the factors with highest significance are the expositions to industry, growth/value spread, export and unemployment. This gives the groundwork for following conclusions: returns in the studied stock universe are strongly connected with the overall countries' abilities to produce and export, attract foreign investments, accept outsourced businesses and their capabilities and capacities of maintaining a good business climate. At the other end of the spectrum are the factors with lowest significances – global market volatility, global default risk and local markets. This can be translated as weak relationship with the world's main measurements of investment risk – the possibility of debt default and stock price fall. Other more indirect measurements of investment risk – the condition of the local market, can be proven as unresourceful. This is especially important, as local market is often cited as a key factor in explaining stock return (as shown in CAPM), but when included in a multi-factor model, the market as a factor's significance falls.

It can be stated that with the given methodology, the study succeeds in reproducing the results and conclusions of many other researches on the topic of factor significance and risk decomposition.

Risk exposure among different markets

Interesting conclusion can be made when looking at how different factors contribute to the whole risk exposure of the market. From the figure it can be seen that the premium of large cap stocks over small cap stock has biggest influence. In the four countries (Indonesia, Malaysia, Philippines and Thailand) the factor has strongly negative average beta varying from -1.17 to -0.46. This highly negative can be explained in the following manner: when this premium is positive it means that investors put their capital into large companies and respectively the market of small cap stocks is declining. Specifically in these countries most of the companies are small relative to the global level and this explains the negative betas of this factors. This result confirms the classification of these markets as “emerging” with a lot of small fast growing companies. This can be viewed also from the other equity market factor – global growth – value premium.

Analyzing risk exposures toward macroeconomic factors also gives interesting information to investors. Average beta coefficients of the developed markets equity index shows how much the given market is globalized. In the current case these coefficients vary from 0.02 in Indonesia to 0.44 in the Philippines. Relatively high positive result means that these economies are

becoming more and more open to the influence of the global capital markets. This information can be very valuable to investors when looking to diversify their investments from the developed markets.

Next we look at the connection between the inflation in developed countries and the analyzed capital markets. Rising unemployment in developed countries is a result from the relocation of global production towards Asian countries. Strongly positive betas confirm the thesis that more and more companies from USA and Western Europe move their production and invest in South East Asia. Using the information investors can determine how the world production capital flows and turn their attention there. This characteristic of the global economy is also evident from the influence of the global export factor over the capital market, which betas are ranging from 0.20 in Malaysia to the very high 0.72 in Indonesia, these high coefficients mean that most companies in these countries are export-oriented and this confirms the direction of the global production capital and how much these economies have become dependable on it.

Risk exposure to the most vital global commodity – the price of the oil is somewhat weak. Beta coefficients are in the range of: -0.10 (Indonesia) and -0.17 (Philippines) the negative relation is understandable, because some of these countries are key global exporters of oil and cheaper price means more sales abroad. But overall low exposure can be contributed to the still developing industrial production, which is most dependable on oil prices, that has not yet become the motor behind these economies.

Because of such fact we can't classify them as "emerging" and it means that they are still developing. Although it is evident from the results that capital markets have become more globalized there are still aspects that are still not synchronized - for example the average risk exposure to the global credit spread that are very close to 0. This can be explained by the fact these governments apply their own policy in public finances rather than collective policy of the EU or USA. Also there is similar relation to the VIX index that is significant from statistics standpoint but very small in economic terms. Such low connection to some of the global factors mean that these capital markets are growing but they cannot be classified as developed.

Last factor that we must turn our attention to is the global currencies. The averaged betas can give us indication what are the main export partners for the companies in the given country. Largely negative betas toward US dollar of Philippine and Malaysian companies mean that their main clients are from USA and they suffer from the rising dollar, also the same relation is observed toward Great Britain. Interesting is to note the positive influence of the Euro on all of

the analyzed markets, it can be explain by the rising export of capitals from the Eurozone toward Asia. This information is very beneficial for investors when researching key partners of targeted firms for investment.

Average betas (by countries - all industries included)	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Index	0.004	0.058	0.001	0.057	-0.050
Industry	0.553	-0.388	-0.310	0.284	-0.698
Large/Small Spread	-1.171	-0.461	-0.682	-0.697	0.222
Growth/Value Spread	-0.213	-0.379	-0.629	-0.137	0.218
Change in USD/SDR	0.242	-0.305	-0.355	0.365	-0.001
Change in Credit spread	-0.088	-0.036	-0.064	-0.058	-0.112
Change in GBP/SDR	-0.050	-0.187	-0.273	0.111	0.008
Change in EUR/SDR	0.078	0.228	0.293	0.257	-0.013
Change in VIX index	-0.068	-0.010	-0.024	-0.046	0.037
Change in Export	0.722	0.196	0.225	0.395	-0.073
Change in Oil price	-0.105	-0.119	-0.172	-0.121	-0.114
Change in Unemployment rate	0.218	0.648	0.786	0.157	-0.074
Change in Developed markets	0.021	0.326	0.405	0.110	0.034

CONCLUSION

Summarizing all these interesting results investors can make very valuable conclusion. Most of the information supports the globalization process of these capital markets. This fact can be very dangerous to asset managers in trying to diverse their portfolios in emerging markets like Indonesia, Malaysia, Philippines and Thailand. High risk exposures of these markets to some global macroeconomic and market factors means that investors do not diverse their systematic risk when investing in these markets, which has been very popular practice among asset managers in an attempt to deal with systematic risk. However looking at the results for the fifth analyzed country – Vietnam

we can see different picture. Almost all average betas of the market towards macroeconomic factors are close to 0. Even the developed markets index has very low influence over stocks in Vietnam, also all other average betas of the Vietnamese companies toward macro factors range from just -0.11 to only 0.008, which is negligently and strong evidence that the capital market has very low association with the global systematic risk. In fact the only two significant factors are the industry factor and the exposure to the equity market factors. All these evidences show that Vietnam can be alternative market where investors can diverse their systematic risk exposures.

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