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INTERNATIONAL DIVERSIFICATION INTO EMERGING EQUITY MARKETS:
*Perspective of U. S. Investors***

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Abstract

In this study, we examine whether investing in emerging markets is indeed beneficial to U. S. investors. The results we find in this study are not so encouraging for U. S. investors. First, the change in currency exchange rate weakens the benefit of overseas investment to U. S. investors. Second, the correlations between the U. S. market and the emerging markets have been steadily rising during the sample period. Third, most of these emerging equity markets scored lower Sharpe Ratios than the U. S. equity market. Fourth, we find that the emerging market and its currency market move in the same direction. Finally, we find that emerging markets are more sensitive to the U. S. stock market return when it falls rather than when it rises. In other words, the magnitude of the negative return on these emerging markets in response to the U. S. down market is larger than the positive return in response to the U. S. up market, which defeats the purpose of international diversification.

I. Introduction

International diversification is a natural risk reduction vehicle for the investors whose investment domain is limited to the domestic market. Given the argument made by Markowitz (1952), the benefits of international portfolio diversification increase as the correlations between equity markets decrease. Therefore, the investors in developed countries can achieve bigger diversification benefits from investing in emerging markets than from investing in developed markets, since developed countries are more highly integrated. The early literature (e.g., Grubel (1968), Levy and Sarnat (1970), Lessard (1973)) confirms that low correlations between developed markets and emerging markets offer considerable benefits for investors of developed countries. The subsequent studies (e.g., Eun and Resnick (1984), Errunza and Padmanabhan (1988), Meric and Meric

(1989), Bailey and Stulz (1990), Divecha et al. (1992), Harvey (1995), Li, Sarkar, and Wang (2003), Driessen and Laeven (2007) elaborate on the benefit from diversifying into emerging markets, and suggest that emerging markets should be an important component of investors' portfolios.

Particularly when the U. S. market underperformed many emerging markets after the Dot.com Crash, there arose a strong sentiment that U. S. investors should expand their investment domain over to emerging markets. For example, *Business Week* (December 25, 2005) states that "developed nations can't match the growth of emerging economies." Later *Business Week* (January 18, 2007) reports, "Even after such a lengthy winning streak, now might be as good a time as any to follow the experts' advice and make sure your portfolio has proper international exposure, pegged by some analysts at 20% of total holdings. Exchange-traded funds, or ETFs, can be a smart, low-cost route to a globally diversified portfolio." International diversification would be an exciting proposition to U. S. investors if the emerging markets they are buying into move in a different way. It would be a great comfort to them if the emerging market zigs when the U. S. market zags. Ideally for U. S. investors, the emerging market would fall to a lesser degree or even rise when the U. S. market falls.

Recently, however, several studies (e.g., Goetzmann et al. (2005), Carrieri et al. (2007), Pukthuanthong and Roll (2009), Berger et al. (2011)) document that the benefits of international diversification had been reduced due to the intensifying globalization and world equity market integration. Some go as far as to question the benefits even from those markets with low correlations with developed markets (see You and Daigler (2010) and Christoffersen et al. (2012)).

In this study, we examine whether investing in emerging markets is indeed beneficial to U. S. investors and retail investors in particular. We focus on the potential benefits from international diversification into the thirteen emerging equity markets: Brazil, Chile, China, India, Indonesia, Malaysia, Mexico, Philippines, Russia, South Africa, South Korea, Thailand, and Turkey. Our sample period covers January 1995 through December 2013, which includes the Dot.com Crash period and the recent financial crisis period. The sample period is then divided into three sub-periods: January 1, 1995 – March 20, 2000, March 21, 2000 – October 8, 2007, and October 9, 2007 – December 31, 2013. The first sub-period includes the 1997 Asian Crisis period, but it was a very bullish period for U. S. investors, which ended by the Dot.Com Crash in March 2000. The second sub-period is the post-Dot.Com Crash period, which ended by the recent financial crisis. The third sub-period can be called the period of financial crisis and recovery.

The results we find in this study are not so encouraging for international diversification. First, the change in currency exchange rate weakens the benefit of overseas investment to U. S. investors. When we measured returns on emerging equity markets in their own local currencies, several countries outperformed the U. S. market. But when we translated the returns into U. S. dollar-denominated returns, the outperformance mostly disappeared. We find that, with an exception of China, all these markets witnessed the value of their currencies fall during the sample period. The only country in the sample that outperformed the U. S. is Mexico. It is quite ironic because

Mexico is the country that we believe has the least diversification benefit for U. S. investors due to its geographical proximity.

Second, the correlations between the U. S. market and the emerging markets have been steadily rising during the sample period. Our results manifest a clear pattern in the equity markets. The co-movements undeniably rose not only among the emerging markets but also between the U S. and emerging markets. For example, the correlation between the U. S. and India was only 0.0572 in the first period, but it jumped to 0.5809 in the third sub-period. These results are consistent with the findings reported by several studies (e.g., Longin and Solnik (1995), Christoffersen et al. (2012)). Given that the correlations dramatically increased recently, the benefit of international diversification is questionable.

Third, to see whether the investment in emerging markets offered a desirable opportunity to U. S. investors in the sense of return and volatility, we also compute the Sharpe Ratios. All these results are based on the U. S. dollar-denominated returns. From the perspective of U. S. investors, Mexico and Turkey produced higher returns than the U. S. market. But as volatilities of Turkey's exchange rate and market return are too high, the Sharpe Ratio of Turkey is way below that of the U. S. Mexico is the only country that scored a higher Sharpe Ratio than the U. S. for the sample period.

Fourth, using a regression analysis, we investigate how the emerging market return in its own currency is associated with the U. S. market and with its currency exchange rate move. We find that the emerging market return in terms of its own currency is positively associated with both. The finding that the emerging equity market and the U. S. equity market move in the same direction is not desirable from the diversification perspective, but it is not surprising. More important is the finding that the emerging market and its currency market move in the same direction. In other words, when its equity market rises, its currency market also strengthens. That makes international diversification more difficult for U. S. investors. Basically, when the emerging equity market performs well, the value of its currency also rises so that the return to U. S. investors is even higher. But when the emerging market does not perform well, the currency of the emerging market adds to the damage to U. S. investors.

Finally, we examined how differently the emerging markets move in response to whether the U. S. market moves up or down. Obviously, U. S. investors would want to invest where the return is as positive as the U. S. market when it rises, but the return is not as negative as the U. S. market when it falls. For this purpose, we estimated the return on the emerging market in response to the upward move and downward move of the U. S. market. Results show that emerging markets are more sensitive to the U. S. stock market return when it falls rather than when it rises. In other words, the magnitude of the negative return on these emerging markets in response to the U. S. down market is larger than the positive return in response to the U. S. up market, which defeats the purpose of international diversification.

This study contributes to investors' understanding of diversification into emerging equity markets. As the aforementioned studies (e.g., Eun and Resnick (1984), Errunza and Padmanabhan (1988), Meric and Meric (1989), Bailey and Stulz (1990), Divecha et al. (1992), Harvey (1995), Li, Sarkar, and Wang (2003), Driessen and Laeven

(2007)) show, investors can only benefit from diversification into emerging equity markets by enlarging their investment domain. Many investment experts suggest that investors increase their exposure to emerging equity markets through index funds or ETFs. However, this study shows that benefits from emerging equity markets are not so readily available to U.S. investors and retail investors in particular. All the results we find are not so encouraging. Although the results cannot be generalized for other emerging countries, it seems that international diversification into emerging markets does not bring what U. S. investors would want to achieve. Emerging markets pose a great challenge to U.S. investors and retail investors in particular, as the investment is complicated by the exchange rate moves and unexpected political risks that they do not face in domestic investment.

The remainder of the paper is structured as follows. Section II describes the data sources. Section III reports the descriptive statistics of the data as well as the correlations, volatilities, and Sharpe Ratios for the emerging markets. Section IV presents regression results, including VAR (vector auto-regression) results. Section V contains our summary and conclusions.

II. Data

We obtain weekly stock market indices and currency exchange rates for thirteen emerging countries between January 1995 and December 2013 from *Thomson Reuters Datastream*. Emerging markets in the Euro zone are excluded from this study mainly because they do not have their own independent currencies. The database reports stock indices in their own currencies and exchange rates in number of units of their currencies per U. S. dollar. In case of Mexico, for example, it reports MSCI (Morgan Stanley Capital International) Mexican Market Index in Mexican Peso and currency exchange rate as units of Mexican Peso per U. S. dollar. For our purpose, we converted all the exchange rates into units of U. S. dollar per foreign currency. Whenever the exchange rate data for some countries are not available from *Thomson Reuters Datastream*, we separately collected from FRED of Federal Reserve Bank of St. Louis.

The sample period, from January 1995 to December 2013, is set largely by the data availability. This sample period is then divided into three sub-periods to see whether there is any noticeable pattern in our empirical analyses: January 1, 1995 – March 20, 2000, March 21, 2000 – October 8, 2007, and October 9, 2007 – December 31, 2013. The first sub-period represents the very bullish period for the U. S. market, which ended by the Dot.Com Crash in March 2000. The second sub-period is the post-Dot.Com Crash period, which was doomed by the recent financial crisis. The third sub-period can be called the period of the financial crisis and recovery.

III. Empirical Results

Descriptive statistics are reported in Table 1. Panel A presents average weekly market returns in local currency for each country during the whole sample period and sub-periods. These returns represent weekly average returns on each of emerging

markets. For example, the Brazilian stock market produced, on average, 0.22% on a weekly basis (12.11% on an annual basis), as measured in its own currency, during the sample period, whereas the weekly average return on the U. S. market in dollar terms was 0.14% (7.55% per annum). In that sense, the Brazilian market outperformed the U.S. market during the sample period. But it does not mean that U. S. investors could have earned higher returns if they had invested in the Brazilian equity market. The panel demonstrates that several countries outperformed the U.S. market during the sample period: Brazil, India, Indonesia, Mexico, Russia, South Africa, and Turkey. Interestingly, every market beat the U.S. market during the second sub-period, from March 21, 2000 to October 8, 2007. It is not surprising, however, because the U. S. market had plunged for a while since the so-called Dot.Com Crash of March 2000. The average weekly return on the U. S. market is only 0.02% (1.05% per annum) during this post-Dot.Com Crash period. In contrast, the average weekly market returns for Russia, Indonesia, and Brazil are 0.42% (24.35% per annum), 0.38% (21.8% per annum), and 0.37% (21.17% per annum), respectively, dramatically higher that the U. S. return. These results marked a strong impression that emerging markets would be the place to put the money in.

Panel B reports weekly exchange rate changes. With an exception of China, emerging markets witnessed the value of their currency fall during the sample period. Currency devaluation was particularly severe during the first sub-period, from January 1995 to March 2000. During this period, emerging markets, and Asian countries in particular, experienced the currency crisis and the IMF intervention eventually followed. The currency devaluation was especially severe for Indonesia with -0.17% on a weekly basis (-8.47% on an annual basis) and Russia with a -0.22% weekly (-10.82% annually). So the strong performance of the emerging market displayed in Panel A could not be directly translated into strong performance for U. S. investors. This is a difficult aspect of international investment. For example, even if U. S. investors invest in a promising company in an emerging market that performs great with soaring domestic sales, an adverse exchange rate move can result in a loss for the U. S. investors.

The emerging market performance from the perspective of U. S. investors is represented in Panel C. All these returns are measured in U. S. dollars, and therefore they represent the returns that U. S. investors could have earned if they had invested in these emerging markets. Panel C clearly shows that the only country that outperformed the U. S. is Mexico. U. S. investors could have earned 0.20% weekly (10.95% annually) if they had invested in Mexico, which was substantially higher than the weekly return of 0.14% (7.55% per annum) on the U. S. market. All other countries generated lower returns than the U. S. market from the U.S. investors' perspective. Indonesia and Russia in Panel C displays dramatically different pictures than in Panel A. Indonesia and Russia produced greater returns in their own currencies than the U. S., as shown in Panel A, but their U. S. dollar-denominated returns were a lot smaller than the U. S.: the average weekly returns on Indonesia and Russia were 0.03% (1.57% per annum) and
-0.01% (-0.52% per annum), respectively. It is clear that investors need to be careful of exchange rate moves when they pick overseas investments. As Indonesia and Russia reveal, their domestic market return in their own currencies can be wiped out by adverse exchange rate moves for U. S. investors.

Table 1: Descriptive Statistics: Stock Market Return in Local Currency, Currency Exchange Rate, & Stock Market Return in U.S. $
(Weekly Return: January 1995 – December 2013)

Panel A presents average weekly market returns in local currency for each country during the whole sample period and sub-periods. These returns represent weekly average returns on each market. Panel B reports weekly exchange rate changes. The emerging market performances in U.S. dollar-denominated returns are represented in Panel C.

Panel A: Stock Market Return in Local Currency

	BRAZIL	CHILE	CHINA	INDIA	INDONESIA	MALAYSIA	MEXICO	PHILIPPINES	RUSSIA	S.AFRICA	S.KOREA	THAILAND	TURKEY	U.S
Whole	0.0022	0.0009	-0.0004	0.0018	0.0020	0.0007	0.0028	0.0003	0.0021	0.0019	0.0013	-0.0002	0.0054	0.0014
1st Period	0.0037	-0.0001	-0.0032	0.0019	0.0006	0.0001	0.0046	-0.0021	0.0035	0.0011	0.0006	-0.0044	0.0156	0.0043
2nd Period	0.0037	0.0024	0.0021	0.0028	0.0038	0.0010	0.0033	0.0017	0.0042	0.0029	0.0025	0.0018	0.0029	0.0002
3rd Period	-0.0007	0.0000	-0.0011	0.0004	0.0011	0.0008	0.0008	0.0007	-0.0016	0.0012	0.0002	0.0008	0.0001	0.0005

Panel B: Currency Exchange Rate (U.S. $ / Local Currency) Change

	BRAZIL	CHILE	CHINA	INDIA	INDONESIA	MALAYSIA	MEXICO	PHILIPPINES	RUSSIA	S.AFRICA	S.KOREA	THAILAND	TURKEY
Whole	-0.0010	-0.0003	0.0003	-0.0004	-0.0017	-0.0003	-0.0008	-0.0006	-0.0022	-0.0011	-0.0003	-0.0003	-0.0040
1st Period	-0.0027	-0.0008	0.0001	-0.0012	-0.0045	-0.0015	-0.0017	-0.0019	-0.0076	-0.0012	-0.0013	-0.0015	-0.0059
2nd Period	-0.0001	0.0000	0.0002	0.0003	-0.0005	0.0003	-0.0004	-0.0002	0.0003	-0.0001	0.0005	0.0003	-0.0018
3rd Period	-0.0008	-0.0001	0.0007	-0.0006	-0.0009	0.0001	-0.0006	0.0000	-0.0008	-0.0013	-0.0004	0.0001	-0.0018

Panel C: Stock Market Return in U.S. Dollars

	BRAZIL	CHILE	CHINA	INDIA	INDONESIA	MALAYSIA	MEXICO	PHILIPPINES	RUSSIA	S.AFRICA	S.KOREA	THAILAND	TURKEY	U.S
Whole	0.0012	0.0007	-0.0001	0.0013	0.0003	0.0004	0.0020	-0.0003	-0.0001	0.0008	0.0010	-0.0005	0.0014	0.0014
1st Period	0.0010	-0.0009	-0.0032	0.0007	-0.0039	-0.0014	0.0029	-0.0040	-0.0041	-0.0011	-0.0007	-0.0059	0.0057	0.0043
2nd Period	0.0036	0.0024	0.0023	0.0030	0.0033	0.0013	0.0029	0.0014	0.0045	0.0027	0.0030	0.0021	0.0011	0.0002
3rd Period	-0.0015	-0.0002	-0.0005	-0.0002	0.0001	0.0009	0.0002	0.0008	-0.0024	-0.0001	-0.0002	0.0010	-0.0018	0.0005

1st Period: January 1, 1995 – March 20, 2000
2nd Period: March 21, 2000 – October 8, 2007
3rd Period: October 9, 2007 – December 31, 2013

xxxx

Table 2 reports the correlations among these emerging markets and the U. S. market. All these correlations are based on U. S. dollar-denominated returns. Panel A contains the correlations for the whole sample period. The correlations for the three sub-periods are presented in Panels B, C, and D. Comparing sub-period correlations, we can see a clear pattern among all these markets. Apparently, correlations increased as we moved from the first sub-period to the second, and to the third. For example, the correlation between China and India rose from 0.1286 to 0.3803, and then to 0.6740. Even Malaysia and Turkey, which has the lowest correlation (0.1695) overall, saw their correlation jump from 0.0355 to 0.2528, and to 0.5054. These results are likely due to the increasing integration of the international markets. In addition, the recent worldwide financial crisis likely intensified the global market integration. The comparison of Panels B and D clearly show that the correlations between the U. S. and the emerging markets strengthened with no exception. For example, the correlation between the U. S. and India was only 0.0572 first the first sub-period, but it jumped to 0.5809 for the third sub-period. This is another difficult challenge in diversification through overseas investment. Because of increasing global integration, diversification is more difficult to achieve through overseas investment.

[Table 2]

To see if emerging markets offer better investment opportunities than the U. S., we estimate volatilities and Sharpe Ratios for each country from the perspective of U. S. investors. As a proxy for risk-free rate, ten-year U.S. Treasury rates, obtained from the Federal Reserve, are adopted since Sharpe Ratios are measured from the viewpoint of U.S. investors. Table 3 reports average weekly return on the emerging markets in U. S. dollar terms, the standard deviation of exchange rate change, the standard deviation of market return in local currency, the standard deviation of market return in U. S. dollars, and the Sharpe Ratios. From the perspective of U. S. investors, Mexico and Turkey produced higher returns than the U. S. market according to Panel A. But volatilities of Turkey's exchange rate and market return are too high, so the Sharpe Ratio of Turkey is way below that of the U. S. Mexico is the only country that scored a higher Sharpe Ratio than the U. S. for the sample period.

[Table 3]

The results in Panel B for the first sub-period are largely consistent with the message from Panel A. Only Turkey outperformed the U. S. during the first sub-period in terms of mean return, but its Sharpe Ratio is below the U. S. Sharpe Ratio. As a result, no country offered better opportunity to U. S. investors in the sense of Sharpe Ratio. But

the message from Panel B is just the opposite: the U. S. market performed the worst in average return as well as in Sharpe Ratio during the second sub-period. Once again the devastating impact of the Dot.Com Crash dampened the U. S. market for this time period. During the period of the financial crisis and recovery, however, the situation largely reversed. The U. S. market outperformed most of countries except for Malaysia, Philippines, and Thailand, both in average return and Sharpe Ratio. It is noteworthy that these three countries scored the lower standard deviations of market return in the U. S. dollars than any other emerging markets.

IV. Further Analysis

It is important to see how the emerging equity market return in local currency is associated with the U. S. equity market and its currency exchange rate. For this purpose the following equation is estimated:[1]

$$R_{jt} = \alpha_0 + \alpha_1 SNP_t + \alpha_2 EXR_{jt} + e_{jt} \qquad (1)$$

where

R_{jt} =	the return on stock market of country j in local currency;
SNP_t =	the return on the S&P 500;
EXR_{jt} =	the first log difference in exchange rate for country j;
e_{jt} =	error term.

It should be noted that this estimation is implemented to examine the directional, not causal, relationship between the dependent variable and independent variables. Given that the global market is integrated and that emerging markets are positively influenced by the U. S. market, we expect that the estimate of α_1 is positive. But the estimate of α_2 is not clear. If the country's currency value rises, its competitive power in the global market will get weaker and thus having a negative impact on the stock market. However, if the stock market and currency market are affected by a third factor in the same direction, the estimate of α_2 will be positive. For example, the political risk of an emerging market is reduced, its impact on the stock market and on the currency market will be both positive. So it is an empirical matter.

The results of estimating the above equation is reported in Table 4.[2] The results in Panel A are for the entire sample period. With no exception, both α_1 and α_2 are positive and significant at the 5% level. As expected, the estimate of α_1 is positive, showing that the emerging market and the U. S. market move in the same direction, which is not so desirable from the diversification perspective. The estimate of α_2 is also

[1] Since we are focused on the equity return on emerging markets from the perspective of U.S. investors, we use the S&P 500 Index rather than MSCI World Index or Emerging Market Index. In other words, the investors view emerging markets in comparison of the U.S. market.

[2] To check the severity of multicollinearity between independent variables, we calculated the variance inflation factor (VIF) for each regression (see Kutner, Natchisheim, and Neter (1994)). We found no serious multicollinearity in any case. All the VIFs are close to 1, and the maximum VIF was 1.37.

positive, indicating that both the stock market and the currency market move in the same direction for these countries. It seems that some factors influence both markets in the same direction. The fact that α_2 is positive suggests that exchange rate moves make investment in emerging equity markets even riskier to U. S. investors. It is because when the emerging equity market performs well, the currency of the emerging market strengthens so that the return to U. S. investors is even higher. But when the emerging equity market does not perform well, the currency of the emerging market weakens so that the return to U. S. investors is even worse. In other words, the currency exchange rate amplifies the risk for U. S. investors.[3]

[Table 4]

As the R-squares manifest, more than 10% of the emerging market return is explained by the U. S. return and its currency exchange rate move with respect to U. S dollar. In case of Mexico, about 45% of the equity market return is explained by the U. S. equity return and its exchange rate with the U. S dollar. The comparison of Panels B, C, and D demonstrates that the R-square rises as we move from the first sub-period, to the second and third sub-periods: For example, the R-square for Mexico increases from 0.33 to 0.44, and to 0.64. The patterns are similar for other countries. This pattern suggests that the international diversification for U. S. investors have been more challenging more recently.

To investigate whether currency exchange rate gives U. S. investors any clue to the investment in these emerging markets, we adopt VAR (vector auto-regression) for the stock market return in foreign currency of the emerging market, its currency exchange rate move, and the S&P 500 return with two lags. The results are listed in Table 5.[4] Several patterns are noticeable. First, compared to Table 4, the R-Squares are a lot smaller across countries. Even for Mexico, the R-Squares are all below 0.04, which is a dramatic difference. This indicates that there is not much lead and lag relationship between the emerging market and the U. S. market. Second, the emerging market return is more explained by lag returns on the U. S. than the U. S. market is explained by the lag returns on the emerging markets. Virtually all countries show that the R-square for the emerging market is greater than that for the U. S. market. It is not surprising given the economic power of the U. S. with respect to these emerging markets. Third, the impact of lagged exchange rate on the stock market is not significant at the 5% level. However, for Brazil, Indonesia, Malaysia, South Korea, Thailand, and Turkey, the lagged exchange rate move has a negative and significant impact on the stock market in their own currencies. We conjecture that the currency appreciation has an adverse impact on the

[3] Exchange risk is only a part of the risk that U.S. investors should consider when they tap into the foreign market. There are many other types of risk, such as political risk and corruption, which U.S. investors need to take into consideration (see Bekaert and Harvey (1997) for country risk). Analyzing all the risk can be overwhelming to retail investors.

[4] We used the augmented Dickey Fuller test to see if the variables are stationary. The null hypothesis that the series contains a unit root is rejected at 1% level for all variables for each emerging market.

stock market as their competitive power is weakened with currency appreciation. Fourth, the lagged stock returns have a positive and significant impact on the exchange rate for Indonesia, Malaysia, Philippines, Russia, South Korea, and Thailand. Probably it is because investors' demand for the currency of the emerging market rises (falls) as the emerging equity market performs better (worse).

[Table 5]

The results presented above clearly show that we cannot afford to ignore the effect of exchange rate in our selection of international investment. In many cases investment in emerging markets sounds attractive, but the actual results for U. S. investors can be not so encouraging. Theoretically, overseas investment offers an excellent opportunity for U. S. investors to diversify their portfolio beyond the domestic horizon. U. S. investors would want to have some comfort of diversification particularly when the domestic market falls. Whether international diversification is indeed beneficial to U. S. investors during the time of falling market is an empirical issue. To address the issue, we estimate the following equation: [5]

$$RD_{jt} = \alpha_0 + \beta_1 D_1 SNP_t + \beta_2 D_2 SNP_t + e_{jt} \qquad (2)$$

where

RD_{jt} =	the return on stock market of country j in U. S. dollar terms;
D_1 =	Dummy Variable equal to 1 if $SNP_t > 0$, or 0 otherwise
SNP_t =	the return on the S&P 500;
D_2 =	Dummy Variable equal to 1 if $SNP_t < 0$, or 0 otherwise
e_{jt} =	error term.

Given the correlations in Table 2, we expect that both estimates of β_1 and β_2 will be positive, suggesting that the U. S. market and emerging markets move in the same direction whether the
U. S. market moves up or down. However, one thing is clear: For the international diversification to be truly beneficial to U. S. investors, β_1 had better be greater than β_2. In other words, U. S. investors would want to see that the return on the emerging market in response to the rising U. S. market is greater than that in response to the falling U. S. market. Otherwise, the overseas investment will only hurt, rather than help, U. S. investors.

Results of estimating Equation (2) are presented in Table 6. The results are not so encouraging. Panel A shows that for every country, the estimate of β_2 is greater than the estimate of β_1. All these estimates are highly significant with an exception of β_1 for Indonesia. Emerging markets are more sensitive to the U. S. stock market return when it falls rather than it rises. For countries like India, Indonesia, Malaysia, Philippines, and

[5] Our sample includes 991 weekly returns. In the sample, $D_1 = 1$ for 555 weeks, and $D_2 = 1$ for 435 weeks. For one week, the return on S&P 500 was zero.

Turkey, the estimate of β_2 is more than the double the estimate of β_1. In other words, the magnitude of the negative return on these emerging markets in response to the U. S. down market is more than twice the positive return in response to the U. S. up market, which defeats the purpose of international diversification.[6] This message is persistent with all the sub-periods, as displayed in Panels B, C, and D. Throughout the sample period, investing overseas does not bring much comfort to U. S. investors.

[Table 6]

V. Summary and Conclusion

After the Dot.Com Crash of March 2000, the U. S. market underperformed many emerging markets for a while. Not surprisingly, there has been a strong sentiment that U. S. investors should invest in international markets, particularly emerging markets. Expanding the investment domain beyond the domestic market is appealing as investors can achieve diversification through supposedly different markets. International diversification will be an exciting proposition to U. S. investors if the emerging markets they are buying into move in quite a different way. It will be a great comfort to them if the foreign market zigs when the U. S. market zags. It will be of great help to U. S. investors particularly if the emerging market falls less or even rises when the domestic market falls. But the results of this study are not so encouraging.

First, the change in currency exchange rate weakens the benefit of overseas investment to U. S. investors. When we measured returns on emerging equity markets in their own currencies, several countries outperformed the U. S. market. But when we measured the returns from the perspective of U. S. investors, the outperformance mostly disappeared. The only country that outperformed the U. S. is Mexico. It is quite ironic because Mexico is the country that we believe has the least diversification benefit for U. S. investors due to its geographical proximity.

Second, the correlations between the U. S. market and the emerging markets have been steadily rising during the sample period. Our results manifest a clear pattern in the equity markets. The co-movements undeniably rose not only among the emerging markets but also between the U S. and emerging markets. Given that the correlations dramatically increased recently, the benefit of international diversification is questionable.

Third, to see whether international investment offers a good opportunity to U. S. investors in the sense of return and volatility, we also computed the Sharpe Ratios for emerging markets. Ironically, once again, Mexico is the only country that scored a higher Sharpe Ratio than the U. S. for the sample period.

Fourth, we investigated how the emerging market return in its own currency is associated with the U. S. market and with its currency exchange rate move. We found that the emerging market return in terms of its own currency is positively associated with both. The finding that the emerging market and the U. S. market move in the same direction is not so desirable from the diversification perspective. More importantly, the finding that the emerging market and its currency market move in the same direction

[6] The results are in line with what Bekaert, Harvey, and Ng (2005) found: "…….negative news regarding the world or regional market may increase volatility of the factor more than positive news and lead to increased correlations between stock markets."

makes international diversification more difficult for U. S. investors. Basically, when the emerging equity market performs well, the currency of the emerging market strengthens so that the return to U. S. investors is even higher. But when the emerging equity market does not perform well, the currency of the emerging market adds to the damage to U. S. investors.

Finally, we examined how differently the emerging markets move in response to whether the U. S. market moves up or down. Obviously, U. S. investors would want to invest where the return is as positive as the U. S. market when it rises, but the return is not as negative as the U. S. market when it falls. For this purpose, we estimated the return on the emerging market in response to the upward move and downward move of the U. S. market. Results show that emerging markets are more sensitive to the U. S. stock market return when it falls. In other words, the magnitude of the negative return on these emerging markets in response to the U. S. down market is larger than the positive return in response to the U. S. up market, which largely defeats the purpose of international diversification.

All the results we find are not so encouraging from the perspective of diversification for U. S. investors and retail investors in particular. Although the results cannot be generalized for many other emerging countries, it seems that international diversification into emerging markets does not bring what U. S. investors would want to achieve. Many suggest that investors can greatly benefit from buying into emerging markets through index funds or ETFs. Probably that is not the case. To achieve desirable diversification, investors may have to look into individual companies or sectors in the emerging markets, not just market indexes. Institutional investors can employ many sophisticated strategies for emerging equity markets, such as currency carry trades and currency hedging, and they still can earn good returns even when the emerging markets decline. However, emerging markets pose a great challenge to retail investors, as the analysis of the local economies is complicated by the exchange rate moves and unexpected political risks that they do not face in domestic investment.

Endnote

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Table 1: Descriptive Statistics: Stock Market Return in Local Currency, Currency Exchange Rate, & Stock Market Return in U.S. $
(Weekly Return: January 1995 – December 2013)

Panel A presents average weekly market returns in local currency for each country during the whole sample period and sub-periods. These returns represent weekly average returns on each market. Panel B reports weekly exchange rate changes. The emerging market performances in U.S. dollar-denominated returns are represented in Panel C.

Panel A: Stock Market Return in Local Currency

	BRAZIL	CHILE	CHINA	INDIA	INDONESIA	MALAYSIA	MEXICO	PHILIPPINES	RUSSIA	S. AFRICA	S. KOREA	THAILAND
Whole	0.0022	0.0009	-0.0004	0.0018	0.0020	0.0007	0.0028	0.0003	0.0021	0.0019	0.0013	-0.0002
1st Period	0.0037	-0.0001	-0.0032	0.0019	0.0006	0.0001	0.0046	-0.0021	0.0035	0.0011	0.0006	-0.0044
2nd Period	0.0037	0.0024	0.0021	0.0028	0.0038	0.0010	0.0033	0.0017	0.0042	0.0029	0.0025	0.0018
3rd Period	-0.0007	0.0000	-0.0011	0.0004	0.0011	0.0008	0.0008	0.0007	-0.0016	0.0012	0.0002	0.0008

Panel B: Currency Exchange Rate (U.S. $ / Local Currency) Change

	BRAZIL	CHILE	CHINA	INDIA	INDONESIA	MALAYSIA	MEXICO	PHILIPPINES	RUSSIA	S. AFRICA	S. KOREA	THAILAND
Whole	-0.0010	-0.0003	0.0003	-0.0004	-0.0017	-0.0003	-0.0008	-0.0006	-0.0022	-0.0011	-0.0003	-0.0003
1st Period	-0.0027	-0.0008	0.0001	-0.0012	-0.0045	-0.0015	-0.0017	-0.0019	-0.0076	-0.0022	-0.0013	-0.0015
2nd Period	-0.0001	0.0000	0.0002	0.0003	-0.0005	0.0003	-0.0004	-0.0002	0.0003	-0.0001	0.0005	0.0003
3rd Period	-0.0008	-0.0001	0.0007	-0.0006	-0.0009	0.0001	-0.0006	0.0000	-0.0008	-0.0013	-0.0004	0.0001

Panel C: Stock Market Return in U. S. Dollars

	BRAZIL	CHILE	CHINA	INDIA	INDONESIA	MALAYSIA	MEXICO	PHILIPPINES	RUSSIA	S. AFRICA	S. KOREA	THAILAND
Whole	0.0012	0.0007	-0.0001	0.0013	0.0003	0.0004	0.0020	-0.0003	-0.0001	0.0008	0.0010	-0.0005
1st Period	0.0010	-0.0009	-0.0032	0.0007	-0.0039	-0.0014	0.0029	-0.0040	-0.0041	-0.0011	-0.0007	-0.0059
2nd Period	0.0036	0.0024	0.0023	0.0030	0.0033	0.0013	0.0029	0.0014	0.0045	0.0027	0.0030	0.0021
3rd Period	-0.0015	-0.0002	-0.0005	-0.0002	0.0001	0.0009	0.0002	0.0008	-0.0024	-0.0001	-0.0002	0.0010

1st Period: January 1, 1995 – March 20, 2000
2nd Period: March 21, 2000 – October 8, 2007
3rd Period: October 9, 2007 – December 31, 2013

Table 2: Correlations among Stock Market Returns in U.S. $
(Weekly Return: January 1995 – December 2013)

All the correlations are based on weekly dollar-denominated returns.

Panel A: Whole Period

	U.S.	**BRAZIL**	**CHILE**	**CHINA**	**INDIA**	**INDONESIA**	**MALAYSIA**	**MEXICO**	**PHILIPPINES**	**RUSSIA**	**S. AFRICA**	**S. KOREA**
BRAZIL	0.5863											
CHILE	0.5198	0.6372										
CHINA	0.3543	0.3798	0.3985									
INDIA	0.3730	0.4014	0.3725	0.3800								
INDONESIA	0.2597	0.3293	0.3464	0.3752	0.2881							
MALAYSIA	0.2431	0.2602	0.3005	0.4511	0.2832	0.4938						
MEXICO	0.6781	0.6829	0.5736	0.3985	0.3943	0.3223	0.3282					
PHILIPPINES	0.3262	0.4052	0.3954	0.4272	0.2907	0.5037	0.4689	0.4143				

RUSSIA	0.3949	0.4635	0.3778	0.2534	0.2948	0.3213	0.1713	0.4291	0.2255			
S. AFRICA	0.5544	0.6124	0.4924	0.4470	0.4602	0.3526	0.3062	0.5950	0.3819	0.4805		
S. KOREA	0.4499	0.4519	0.4144	0.4617	0.4196	0.4276	0.3501	0.4396	0.3641	0.3539	0.4619	
THAILAND	0.3089	0.3806	0.4000	0.4378	0.3239	0.5379	0.4869	0.3885	0.5111	0.3359	0.4202	0.4939
TURKEY	0.3425	0.4332	0.3481	0.2604	0.2942	0.1782	0.1695	0.4119	0.2635	0.3550	0.4481	0.3253

Panel B: January 1, 1995 – March 20, 2000

	U.S.	**BRAZIL**	**CHILE**	**CHINA**	**INDIA**	**INDONESIA**	**MALAYSIA**	**MEXICO**	**PHILIPPINES**	**RUSSIA**	**S. AFRICA**	**S. KOREA**
BRAZIL	0.4428											
CHILE	0.4525	0.6722										
CHINA	0.1843	0.1903	0.2493									
INDIA	0.0572	0.1572	0.2108	0.1286								
INDONESIA	0.2874	0.2610	0.3159	0.3725	0.1740							
MALAYSIA	0.2130	0.1885	0.2173	0.4588	0.1896	0.5023						
MEXICO	0.4818	0.6013	0.4924	0.2538	0.1381	0.2836	0.2915					
PHILIPPINES	0.3564	0.3707	0.3699	0.4707	0.1172	0.5645	0.5413	0.3903				
RUSSIA	0.3256	0.3595	0.3650	0.1189	0.1276	0.2976	0.0631	0.2994	0.1655			
S. AFRICA	0.3684	0.4553	0.4485	0.3324	0.2342	0.3684	0.2603	0.4028	0.3771	0.3757		
S. KOREA	0.3001	0.2573	0.2381	0.2432	0.1777	0.4289	0.2773	0.2228	0.2992	0.2038	0.2687	
THAILAND	0.2681	0.3177	0.3238	0.4127	0.1252	0.5772	0.5025	0.3141	0.5988	0.2857	0.4681	0.4358
TURKEY	0.1498	0.3001	0.2258	0.0913	0.0803	0.0677	0.0355	0.2536	0.1654	0.2488	0.2623	0.1576

Panel C: March 21, 2000 – October 8, 2007

	U.S.	BRAZIL	CHILE	CHINA	INDIA	INDONESIA	MALAYSIA	MEXICO	PHILIPPINES	RUSSIA	S. AFRICA	S. KOREA
BRAZIL	0.4732											
CHILE	0.4020	0.5238										
CHINA	0.3422	0.3265	0.4141									
INDIA	0.3461	0.3498	0.3278	0.3803								
INDONESIA	0.0954	0.2877	0.2956	0.2511	0.2639							
MALAYSIA	0.2584	0.2200	0.3809	0.3490	0.2690	0.3197						
MEXICO	0.6449	0.5783	0.4455	0.3560	0.3883	0.2017	0.3273					
PHILIPPINES	0.1701	0.3078	0.2568	0.2489	0.2727	0.3489	0.2772	0.3152				
RUSSIA	0.3501	0.4084	0.3109	0.2577	0.2580	0.2217	0.2314	0.4095	0.1452			
S. AFRICA	0.4856	0.4824	0.3840	0.3766	0.4366	0.2884	0.3123	0.5300	0.2682	0.4374		
S. KOREA	0.4280	0.4173	0.4581	0.5725	0.4728	0.3254	0.3617	0.4523	0.2623	0.3669	0.4606	
THAILAND	0.2400	0.3231	0.3684	0.3932	0.3899	0.3752	0.3820	0.3695	0.3220	0.3430	0.3763	0.5293
TURKEY	0.2564	0.3668	0.3444	0.2338	0.2460	0.1539	0.2528	0.3674	0.2089	0.3761	0.3859	0.3365

Panel D: October 9, 2007 – December 31, 2013

	U.S.	BRAZIL	CHILE	CHINA	INDIA	INDONESIA	MALAYSIA	MEXICO	PHILIPPINES	RUSSIA	S. AFRICA	S. KOREA
BRAZIL	0.7832											
CHILE	0.6422	0.7061										
CHINA	0.5597	0.6763	0.5670									
INDIA	0.5809	0.6395	0.5191	0.6740								
INDONESIA	0.4759	0.5679	0.5083	0.5663	0.5688							

MALAYSIA	0.4346	0.5744	0.5209	0.6667	0.6197	0.6656						
MEXICO	0.8469	0.8473	0.7136	0.6309	0.6117	0.5510	0.5228					
PHILIPPINES	0.4884	0.5632	0.5528	0.5808	0.5006	0.6051	0.6213	0.5471				
RUSSIA	0.6196	0.7492	0.4905	0.5516	0.6126	0.4844	0.5396	0.6915	0.4408			
S. AFRICA	0.7002	0.8319	0.5857	0.6548	0.6217	0.4900	0.5402	0.7835	0.5132	0.7418		
S. KOREA	0.6713	0.7563	0.6065	0.7238	0.6807	0.5553	0.6321	0.7277	0.5921	0.6900	0.7024	
THAILAND	0.5048	0.5853	0.5785	0.5545	0.5715	0.6231	0.6092	0.5597	0.5897	0.4678	0.4769	0.5864
TURKEY	0.6181	0.6873	0.5129	0.5711	0.5813	0.5210	0.5054	0.6775	0.5138	0.6493	0.7218	0.6092

Table 3: Stock Market Return, Volatilities, and Sharpe Ratio

This table reports average weekly return on the emerging markets in U. S. dollar terms, the standard deviation of exchange rate change, the standard deviation of market return in local currency, the standard deviation of market return in U. S. dollars, and the Sharpe Ratios. As a proxy for risk-free rate, ten-year U.S. Treasury rates, obtained from the Federal Reserve, are adopted since Sharpe Ratios are measured from the viewpoint of U.S. investors.

Panel A: Whole Period

	Market Return in U.S. Dollars	Standard Deviation of Exch. Rate Move	Standard Deviation of Market Return in Local Currency	Standard Deviation of Market Return in U.S. Dollars	Sha in U
BRAZIL	0.00121	0.02149	0.04147	0.05302	0
CHILE	0.00067	0.01339	0.02761	0.03318	-0
CHINA	-0.00011	0.00146	0.04865	0.04865	-0
INDIA	0.00133	0.00636	0.03586	0.03834	0
INDONESIA	0.00029	0.03631	0.04771	0.06587	-0
MALAYSIA	0.00044	0.01331	0.03148	0.03930	-0
MEXICO	0.00202	0.01567	0.03435	0.04348	0
PHILIPPINES	-0.00027	0.01179	0.03523	0.04102	-0
RUSSIA	-0.00014	0.02353	0.07001	0.07880	-0
S. AFRICA	0.00076	0.02154	0.02861	0.03942	-0
S. KOREA	0.00126	0.02482	0.04323	0.05557	0
THAILAND	-0.00046	0.01331	0.04590	0.05093	-0
TURKEY	0.00142	0.02390	0.05639	0.06823	0
U.S.	0.00140			0.02504	0

Panel B: January 1, 1995 – March 20, 2000

	Market Return in U.S. Dollars	Standard Deviation of Exch. Rate Move	Standard Deviation of Market Return in Local Currency	Standard Deviation of Market Return in U.S. Dollars	Sharpe Ratio in U.S. Dollars
BRAZIL	0.00100	0.02077	0.05204	0.05511	-0.00237
CHILE	-0.00089	0.00795	0.03264	0.03484	-0.05797
CHINA	-0.00317	0.00070	0.06057	0.06063	-0.07100
INDIA	0.00071	0.00741	0.03762	0.03877	-0.01106

INDONESIA	-0.00386	0.06514	0.06457	0.09981	-0.04999
MALAYSIA	-0.00135	0.02305	0.04911	0.06403	-0.03887
MEXICO	0.00287	0.01753	0.03970	0.04950	0.03502
PHILIPPINES	-0.00402	0.01581	0.04190	0.04954	-0.10394
RUSSIA	-0.00412	0.04069	0.10159	0.11746	-0.04472
S. AFRICA	-0.00109	0.01392	0.03006	0.03698	-0.06019
S. KOREA	-0.00065	0.03998	0.05289	0.07371	-0.02422
THAILAND	-0.00588	0.02223	0.06280	0.07108	-0.09866
TURKEY	0.00575	0.00896	0.06741	0.06766	0.06814
U.S.	0.00427			0.02157	0.14530

Panel C: March 21, 2000 – October 8, 2007

	Market Return in U.S. Dollars	Standard Deviation of Exch. Rate move	Standard Deviation of Market Return in Local Currency	Standard Deviation of Market Return in U.S. Dollars	Sharpe Ratio in U.S. Dollars
BRAZIL	0.00357	0.02094	0.03604	0.04978	0.05413
CHILE	0.00242	0.01205	0.02035	0.02568	0.06007
CHINA	0.00230	0.00123	0.04392	0.04415	0.03222
INDIA	0.00304	0.00477	0.03348	0.03545	0.06109
INDONESIA	0.00326	0.01669	0.03872	0.04658	0.05112
MALAYSIA	0.00129	0.00255	0.02295	0.02366	0.01736
MEXICO	0.00292	0.01021	0.03063	0.03462	0.05900
PHILIPPINES	0.00144	0.01032	0.03237	0.03750	0.01508
RUSSIA	0.00450	0.00402	0.05014	0.05069	0.07137
S. AFRICA	0.00274	0.02239	0.02847	0.03479	0.05363
S. KOREA	0.00303	0.00905	0.04243	0.04520	0.04763
THAILAND	0.00209	0.00815	0.03810	0.04132	0.02930
TURKEY	0.00108	0.03222	0.05746	0.07684	0.00257
U.S.	0.00016			0.02240	-0.03224

Panel D: October 9, 2007 – December 31, 2013

	Market Return	Standard Deviation	Standard Deviation of Market Return	Standard Deviation of Market Return	Sharpe Ratio

	in U.S. Dollars	of Exch. Rate move	in Local Currency	in U.S. Dollars	in U.S. Dollars
BRAZIL	-0.00150	0.02268	0.03747	0.05503	-0.03718
CHILE	-0.00016	0.01785	0.03052	0.03929	-0.01796
CHINA	-0.00048	0.00203	0.04258	0.04276	-0.02412
INDIA	-0.00023	0.00700	0.03719	0.04128	-0.01878
INDONESIA	0.00013	0.01191	0.04059	0.04782	-0.00875
MALAYSIA	0.00089	0.00942	0.01941	0.02482	0.01376
MEXICO	0.00022	0.01915	0.03380	0.04765	-0.00698
PHILIPPINES	0.00078	0.00920	0.03235	0.03699	0.00629
RUSSIA	-0.00244	0.01603	0.05737	0.06551	-0.04555
S. AFRICA	-0.00009	0.02539	0.02757	0.04613	-0.01392
S. KOREA	-0.00020	0.02113	0.03443	0.04912	-0.01515
THAILAND	0.00097	0.00685	0.03692	0.04002	0.01053
TURKEY	-0.00179	0.01945	0.04233	0.05665	-0.04123
U.S.	0.00052			0.03014	-0.00114

Table 4: Estimation of the Equation:
(t-values in the parentheses)

$$R_{jt} = \alpha_0 + \alpha_1 SNP_t + \alpha_2 EXR_{jt} + e_{jt}$$

where R_{jt} = the return on stock market of country j in local currency; SNP_t = the return on the S&P 500; EXR_{jt} = the first log difference in exchange rate for country j; e_{jt} = error term.

Panel A: Whole Period

	α_0	α_1	α_2	F-statistic	R-square
Brazil	0.001 (1.34)	0.811 (17.41) **	0.324 (5.97) **	243.57 **	0.33
Chile	0.000 (0.34)	0.517 (16.39) **	0.183 (3.10) **	165.09 **	0.25
China	-0.002 (-1.52)	0.681 (11.81) **	2.559 (2.59) **	74.61 **	0.13
India	0.002 (1.71)	0.466 (11.30) **	1.473 (9.06) **	125.48 **	0.20
Indonesia	0.002 (1.22)	0.497 (8.66) **	0.247(6.24) **	63.23 **	0.11
Malaysia	0.001 (0.71)	0.232 (6.56) **	1.000 (15.04) **	151.54 **	0.23
Mexico	0.002 (2.50) **	0.789 (21.80) **	0.380 (6.57) **	405.27 **	0.45
Philippines	0.000 (0.36)	0.397 (9.86) **	0.963 (11.27) **	131.55 **	0.21
Russia	0.002 (0.88)	1.028 (12.65) **	0.516 (5.97) **	111.73 **	0.18
South Africa	0.001 (1.46)	0.577 (17.71) **	0.079 (2.09) **	190.08 **	0.28
South Korea	0.000 (0.37)	0.636 (12.47) **	0.311 (6.05) **	126.86 **	0.20
Thailand	-0.001 (-0.54)	0.529 (9.75) **	0.768 (7.53) **	84.66 **	0.15
Turkey	0.007 (4.38) **	0.500 (7.31) **	0.647 (9.03) **	92.74 **	0.16

Panel B: January 1, 1995 – March 20, 2000

	α_0	α_1	α_2	F-statistic	R-square
Brazil	-0.001 (-0.49)	1.084 (8.23) **	-0.186 (-1.36)	34.22 **	0.20
Chile	-0.003 (-1.38)	0.657 (7.92) **	0.422 (1.87)	35.94 **	0.21
China	-0.006 (-1.59)	0.507 (3.02) **	6.778 (1.30)	5.57 **	0.04
India	0.002 (0.76)	0.117 (1.11)	0.309 (1.00)	1.08	0.01
Indonesia	-0.002 (-0.58)	0.820 (4.69) **	0.142 (2.46) **	16.11 **	0.11

Malaysia	-0.000 (-0.06)	0.427 (3.65) **	1.052 (9.59) **	56.41 **	0.30
Mexico	0.003 (1.22)	0.765 (8.03) **	0.689 (5.89) **	66.32 **	0.33
Philippines	-0.003 (-1.42)	0.623 (5.86) **	0.769 (5.30) **	36.76 **	0.22
Russia	0.001 (0.22)	1.254 (4.55) **	0.422 (2.89) **	17.72 **	0.12
South Africa	0.000 (0.13)	0.530 (7.14) **	0.618 (5.37) **	44.09 **	0.25
South Korea	-0.001 (-0.40)	0.519 (3.57) **	0.264 (3.36) **	15.36 **	0.10
Thailand	-0.006 (-1.77)	0.705 (4.16) **	0.544 (3.32) **	15.92 **	0.11
Turkey	0.013 (2.12) **	0.544 (2.84) **	-0.051 (-0.11)	4.25 **	0.03

Panel C: March 21, 2000 – October 8, 2007

	α_0	α_1	α_2	F-statistic	R-square
Brazil	0.004 (2.49) **	0.560 (8.09) **	0.655 (8.85) **	105.27 **	0.35
Chile	0.002 (2.49) **	0.302 (6.89) **	0.207 (2.55) **	33.29 **	0.15
China	0.001 (0.27)	0.653 (7.10) **	5.537 (3.31) **	32.18 **	0.14
India	0.002 (1.45)	0.433 (6.35) **	2.146 (6.70) **	51.34 **	0.21
Indonesia	0.004 (2.21) **	0.138 (1.65) *	0.694 (6.22) **	21.27 **	0.10
Malaysia	0.000 (0.44)	0.232 (4.68) **	1.775 (4.08) **	22.14 **	0.10
Mexico	0.003 (2.85) **	0.864 (16.33) **	0.335 (2.89) **	155.10 **	0.44
Philippines	0.002 (1.30)	0.283 (4.28) **	1.182 (8.23) **	43.11 **	0.18
Russia	0.004 (1.57)	0.772 (7.29) **	0.980 (1.66)	28.76 **	0.13
South Africa	0.003 (2.29) **	0.693 (12.88) **	-0.151 (-2.81) **	84.69 **	0.30
South Korea	0.002 (1.05)	0.809 (9.56) **	0.828 (3.96) **	56.66 **	0.22
Thailand	0.001 (0.80)	0.341 (4.23) **	1.314 (5.92) **	29.95 **	0.13
Turkey	0.004 (1.58)	0.311 (2.59) **	0.704 (8.45) **	46.64 **	0.19

Panel D: October 9, 2007 – December 31, 2013

	α_0	α_1	α_2	F-statistic	R-square
Brazil	-0.001 (-0.56)	0.748 (14.29) **	0.463 (6.66) **	297.59 **	0.65

Chile	-0.000 (-0.25)	0.618 (13.36) **	0.113 (1.45)	108.77 **	0.40
China	-0.002 (-0.97)	0.788 (12.06) **	0.701 (0.72)	73.72 **	0.31
India	0.001 (0.86)	0.577 (10.97) **	2.001 (8.83) **	143.54 **	0.47
Indonesia	0.002 (1.18)	0.490 (8.01) **	1.408 (9.09) **	101.53 **	0.39
Malaysia	0.001 (0.67)	0.177 (5.29) **	0.650 (6.07) **	48.75 **	0.24
Mexico	0.000 (0.37)	0.849 (16.22) **	0.106 (1.29)	286.14 **	0.64
Philippines	0.000 (0.32)	0.395 (7.30) **	0.955 (5.39) **	61.88 **	0.28
Russia	-0.001 (-0.61)	1.058 (12.82) **	0.870 (5.61) **	129.84 **	0.45
South Africa	0.001 (1.13)	0.440 (9.02) **	0.247 (4.26) **	114.20 **	0.41
South Korea	0.000 (0.12)	0.518 (8.90) **	0.459 (5.53) **	121.00 **	0.43
Thailand	0.000 (0.21)	0.556 (9.85) **	1.564 (6.29) **	83.60 **	0.34
Turkey	0.002 (0.98)	0.386 (5.32) **	1.017 (9.05) **	130.09 **	0.45

** Significant at the 5% level

Table 5: VAR Estimation
Market Return in Local Currency, Currency Exchange Rate Change, and S&P 500 Return
(t-value in the parentheses)

All the returns and exchange rates are weekly returns and changes.

Dependent Variable	Stock Market Return in Local Currency Lag 1	Stock Market Return in Local Currency Lag 2	Exchange Rate Change Lag 1	Exchange Rate Change Lag 2	S&P 500 Return Lag 1	S&P 500 Return Lag 2	F-statistic	R-square
Panel A: Brazil								
Stock Return	-0.0858	0.0043	-0.1957	-0.1059	0.2082	0.2362	5.5900	0.0331
in Local Currency	(-2.202)	(0.112)	(-2.929)	(-1.574)	(3.221)	(3.636)		
Exchange Rate	-0.0111	-0.0015	0.0499	0.1062	-0.0147	0.0321	3.0865	0.0185
Change	(-0.543)	(-0.0760)	(1.430)	(3.021)	(-0.435)	(0.944)		
S&P 500 Return	-0.0104	-0.0395	-0.0091	0.0640	-0.0605	0.0758	2.3622	0.0142
	(-0.435)	(-1.686)	(-0.223)	(1.557)	(-1.534)	(1.910)		
Panel B: Chile								
Stock Return	0.0535	-0.0489	0.0040	-0.0880	-0.0257	0.1224	1.9324	0.0117
in Local Currency	(1.455)	(-1.330)	(0.057)	(-1.290)	(-0.622)	(2.966)		
Exchange Rate	-0.0165	0.0136	0.0100	0.0410	0.0694	0.0338	3.7397	0.0224
Change	(-0.926)	(0.765)	(0.299)	(1.242)	(3.478)	(1.693)		
S&P 500 Return	-0.0405	-0.0083	-0.0253	-0.0093	-0.0470	0.0683	1.8754	0.0113
	(-1.214)	(-0.248)	(-0.404)	(-0.150)	(-1.252)	(1.821)		
Panel C: China								
Stock Return	-0.1106	0.0307	0.7403	-0.6219	0.2583	0.1914	4.9370	0.0293
in Local Currency	(-3.229)	(0.905)	(0.698)	(-0.584)	(3.909)	(2.888)		
Exchange Rate	-0.0008	-0.0010	0.1324	0.0774	0.0006	0.0029	4.7309	0.0281
Change	(-0.801)	(-0.935)	(4.143)	(2.413)	(0.323)	(1.433)		
S&P 500 Return	0.0114	0.0252	-1.0613	-0.9074	-0.0823	0.0413	3.1047	0.0186
	(0.640)	(1.433)	(-1.930)	(-1.644)	(-2.401)	(1.200)		
Panel D: India								
Stock Return	0.0063	0.0557	-0.1786	0.1755	0.1933	0.1946	7.5043	0.0439
in Local Currency	(0.177)	(1.591)	(-0.940)	(0.929)	(3.971)	(3.986)		
Exchange Rate	0.0020	-0.0017	0.1686	0.0326	0.0218	0.0046	7.9419	0.0463
Change	(0.315)	(-0.280)	(5.009)	(0.975)	(2.526)	(0.531)		
S&P 500 Return	-0.0205	-0.0052	0.0007	0.0185	-0.0616	0.0653	1.6861	0.0102
	(-0.815)	(-0.208)	(0.005)	(0.137)	(-1.780)	(1.881)		

Panel E: Indonesia								
Stock Return	-0.1093	0.0666	-0.0672	-0.2383	0.2208	0.2688	11.7950	0.0673
in Local Currency	(-3.303)	(2.029)	(-1.613)	(-5.723)	(3.591)	(4.351)		
Exchange Rate	0.0054	0.1055	-0.0741	0.2463	-0.0243	0.0179	19.5499	0.1068
Change	(0.217)	(4.308)	(-2.384)	(7.925)	(-0.528)	(0.387)		
S&P 500 Return	-0.0070	0.0035	0.0037	-0.0048	-0.0693	0.0592	1.5966	0.0097
	(-0.390)	(0.199)	(0.162)	(-0.211)	(-2.077)	(1.766)		

	Stock Market Return							
Dependent	**in Local Currency**		**Exchange Rate Change**		**S&P 500 Return**			
Variable	**Lag 1**	**Lag 2**	**Lag 1**	**Lag 2**	**Lag 1**	**Lag 2**	**F-statistic**	**R-square**
Panel F: Malaysia								
Stock Return	0.0230	0.1161	-0.2004	-0.2993	0.1287	0.0943	6.0737	0.0358
in Local Currency	(0.636)	(3.244)	(-2.374)	(-3.553)	(3.154)	(2.300)		
Exchange Rate	0.0026	0.0610	-0.1940	-0.0655	0.0073	-0.0021	8.9316	0.0518
Change	(0.168)	(4.053)	(-5.469)	(-1.849)	(0.425)	(-0.120)		
S&P 500 Return	0.0025	-0.0483	0.0028	0.0577	-0.0732	0.0692	2.0311	0.0123
	(0.085)	(-1.674)	(0.040)	(0.848)	(-2.222)	(2.092)		
Panel G: Mexico								
Stock Return	0.0054	-0.0491	-0.2154	0.1709	0.0088	0.1330	4.0856	0.0244
in Local Currency	(0.127)	(-1.153)	(-2.714)	(2.154)	(0.148)	(2.254)		
Exchange Rate	0.0359	0.0285	-0.0994	0.1418	0.0230	-0.0217	5.9379	0.0350
Change	(1.858)	(1.477)	(-2.763)	(3.939)	(0.857)	(-0.809)		
S&P 500 Return	-0.0062	-0.0231	-0.0738	0.0944	-0.0443	0.0565	2.4101	0.0145
	(-0.197)	(-0.738)	(-1.267)	(1.621)	(-1.020)	(1.304)		
Panel H: Philippines								
Stock Return	-0.0306	0.0796	-0.1418	-0.0107	0.1495	0.1894	6.5256	0.0384
in Local Currency	(-0.862)	(2.264)	(-1.405)	(-0.106)	(3.193)	(4.042)		
Exchange Rate	0.0244	0.0256	-0.1251	0.0984	0.0363	0.0025	7.1621	0.0420
Change	(2.049)	(2.172)	(-3.692)	(2.908)	(2.307)	(0.161)		
S&P 500 Return	-0.0197	0.0199	-0.0866	-0.0917	-0.0577	0.0624	2.2696	0.0137
	(-0.766)	(0.781)	(-1.185)	(-1.257)	(-1.704)	(1.841)		
Panel I: Russia								
Stock Return	0.0384	0.0141	0.0793	0.2870	0.1067	0.2757	5.1073	0.0303

in Local Currency	(1.098)	(0.403)	(0.819)	(2.981)	(1.107)	(2.862)		
Exchange Rate	0.0356	0.0184	0.0162	0.2381	-0.0059	-0.0702	13.8460	0.0781
Change	(3.109)	(1.607)	(0.510)	(7.551)	(-0.186)	(-2.225)		
S&P 500 Return	0.0211	-0.0220	-0.0066	-0.0052	-0.0922	0.0799	2.5570	0.0154
	(1.675)	(-1.744)	(-0.189)	(-0.150)	(-2.649)	(2.297)		
Panel J: South Africa								
Stock Return	-0.0700	-0.0135	-0.0078	-0.0249	0.0577	0.1287	2.2063	0.0133
in Local Currency	(-1.872)	(-0.362)	(-0.175)	(-0.560)	(1.310)	(2.924)		
Exchange Rate	-0.0351	0.0172	0.0243	0.0227	-0.0065	0.0714	2.3146	0.0140
Change	(-1.243)	(0.611)	(0.723)	(0.677)	(-0.195)	(2.152)		
S&P 500 Return	-0.0068	-0.0876	-0.0095	-0.0433	-0.0661	0.1236	3.0526	0.0183
	(-0.207)	(-2.679)	(-0.244)	(-1.112)	(-1.715)	(3.209)		

Dependent Variable	Stock Market Return in Local Currency Lag 1	Stock Market Return in Local Currency Lag 2	Exchange Rate Change Lag 1	Exchange Rate Change Lag 2	S&P 500 Return Lag 1	S&P 500 Return Lag 2	F-statistic	R-square
Panel K: South Korea								
Stock Return in Local	-0.1587	-0.0061	-0.1615	0.0067	0.2737	0.2721	9.5662	0.0553
Currency	(-4.500)	(-0.174)	(-2.601)	(0.108)	(4.517)	(4.435)		
Exchange Rate	0.0056	0.0481	-0.2946	0.2910	0.1237	-0.0141	52.4547	0.2429
Change	(0.307)	(2.662)	(-9.231)	(9.095)	(3.972)	(-0.447)		
S&P 500 Return	-0.0163	-0.0018	-0.0402	0.0420	-0.0473	0.0530	2.4564	0.0148
	(-0.779)	(-0.085)	(-1.093)	(1.141)	(-1.320)	(1.460)		
Panel L: Thailand								
Stock Return in Local	-0.0194	0.1125	-0.4381	-0.0007	0.2022	0.0938	6.9464	0.0408
Currency	(-0.561)	(3.323)	(-3.916)	(-0.006)	(3.329)	(1.538)		
Exchange Rate	0.0209	0.0280	0.0231	0.1370	0.0080	0.0083	7.2286	0.0423
Change	(2.087)	(2.852)	(0.710)	(4.192)	(0.451)	(0.471)		
S&P 500 Return	-0.0036	-0.0072	0.0214	-0.0101	-0.0716	0.0639	1.6071	0.0097
	(-0.188)	(-0.380)	(0.344)	(-0.162)	(-2.123)	(1.887)		
Panel M: Turkey								
Stock Return in Local	0.0144	0.1218	-0.3046	-0.3517	0.2537	0.2868	10.0161	0.0577
Currency	(0.420)	(3.594)	(-3.838)	(-4.404)	(3.378)	(3.800)		
Exchange Rate	-0.0177	0.0218	-0.0784	-0.0461	0.0634	0.1077	3.9392	0.0235
Change	(-1.202)	(1.493)	(-2.288)	(-1.339)	(1.956)	(3.305)		
S&P 500 Return	-0.0001	0.0267	-0.0106	-0.1046	-0.0707	0.0691	3.1445	0.0189
	(-0.005)	(1.738)	(-0.295)	(-2.889)	(-2.078)	(2.019)		

Table 6: Up Beta & Down Beta Estimation:
(t-value in the parentheses)

$$RD_{jt} = \alpha_0 + \beta_1 D_1 SNP_t + \beta_2 D_2 SNP_t + e_{jt}$$

where RD_{jt} = the return on stock market of country j in U. S. dollar terms; D_1 = Dummy Variable equal to 1 if $SNP_t > 0$, or 0 otherwise; SNP_t = the return on the S&P 500; D_2 = Dummy Variable equal to 1 if $SNP_t < 0$, or 0 otherwise; e_{jt} = error term.

Panel A: Whole Period

	α_0	β_1	β_2	F-statistic	R-square
Brazil	0.001 (0.69)	1.128 (11.13) **	1.338 (14.72) **	259.82 **	0.34
Chile	0.003 (2.43) **	0.484 (7.27) **	0.863 (14.48) **	191.90 **	0.28
China	0.000 (0.02)	0.624 (5.79) **	0.747 (7.74) **	71.17 **	0.13
India	0.004 (2.37) **	0.375 (4.48) **	0.738 (9.83) **	84.25 **	0.15
Indonesia	0.006 (2.18) **	0.264 (1.77)	1.040 (7.76) **	41.65 **	0.08
Malaysia	0.002 (1.29)	0.240 (2.67) **	0.502 (6.23) **	32.84 **	0.06
Mexico	0.002 (1.68)	1.052 (13.96) **	1.284 (19.01) **	423.61 **	0.46
Philippines	0.002 (1.21)	0.345 (3.78) **	0.695 (8.49) **	62.13 **	0.11
Russia	-0.000 (-0.23)	1.176 (6.88) **	1.299 (8.47) **	91.29 **	0.16
South Africa	0.001 (0.76)	0.777 (10.04) **	0.954 (13.75) **	220.24 **	0.31
South Korea	0.000 (0.02)	0.970 (8.28) **	1.022 (9.76) **	125.27 **	0.20
Thailand	0.001 (0.65)	0.463 (4.05) **	0.769 (7.51) **	53.71 **	0.10
Turkey	0.006 (1.95)	0.597 (3.96) **	1.220 (9.02) **	69.56 **	0.12

Panel B: January 1, 1995 – March 20, 2000

	α_0	β_1	β_2	F-statistic	R-square

Brazil	-0.000 (-0.07)	0.947 (3.85) **	1.362 (4.72) **	33.20 **	0.20
Chile	-0.002 (-0.51)	0.603 (3.90) **	0.891 (4.91) **	35.14 **	0.21
China	0.002 (0.38)	0.116 (0.39)	1.019 (2.94) **	6.12 **	0.04
India	0.002 (0.43)	0.029 (0.15)	0.195 (0.86)	0.54	0.00
Indonesia	0.001 (0.05)	0.800 (1.68)	1.990 (3.57) **	13.06 **	0.09
Malaysia	0.000 (0.01)	0.416 (1.33)	0.903 (2.47) **	6.74 **	0.05
Mexico	0.002 (0.57)	0.878 (4.07) **	1.390 (5.49) **	41.57 **	0.24
Philippines	-0.001 (-0.19)	0.471 (2.05) **	1.253 (4.66) **	21.45 **	0.14
Russia	-0.006 (-0.56)	1.482 (2.68) **	2.137 (3.29) **	16.12 **	0.11
South Africa	-0.000 (-0.13)	0.456 (2.67) **	0.851 (4.24) **	21.94 **	0.14
South Korea	-0.009 (-1.32)	1.248 (3.56) **	0.748 (1.82)	13.59 **	0.09
Thailand	-0.002 (-0.26)	0.466 (1.37)	1.404 (3.52) **	11.57 **	0.08
Turkey	0.016 (2.47) **	-0.193 (-0.58)	1.296 (3.35) **	6.12 **	0.04

Panel C: March 21, 2000 – October 8, 2007

	α_0	β_1	β_2	F-statistic	R-square
Brazil	0.004 (1.24)	1.008 (5.23) **	1.085 (6.73) **	56.44 **	0.22
Chile	0.004 (2.14) **	0.365 (3.54) **	0.534 (6.19) **	38.38 **	0.16
China	-0.002 (-0.76)	0.989 (5.45) **	0.432 (2.84) **	28.25 **	0.13
India	0.003 (1.31)	0.530 (3.62) **	0.561 (4.59) **	26.61 **	0.12
Indonesia	0.011 (3.46) **	-0.391 (-1.95)	0.652 (3.88) **	7.70 **	0.04

	α_0	β_1	β_2	F-statistic	R-square
Malaysia	0.003 (2.01) **	0.124 (1.23)	0.388 (4.63) **	15.60 **	0.07
Mexico	0.004 (2.05) **	0.909 (7.82) **	1.064 (10.94) **	139.82 **	0.42
Philippines	0.004 (1.65)	0.069 (0.43)	0.451 (3.33) **	7.06 **	0.03
Russia	0.006 (1.66)	0.690 (3.31) **	0.871 (4.99) **	27.50 **	0.12
South Africa	0.005 (2.29) **	0.578 (4.34) **	0.890 (7.98) **	61.87 **	0.24
South Korea	0.001 (0.29)	1.004 (5.60) **	0.755 (5.03) **	44.37 **	0.18
Thailand	-0.000 (-0.01)	0.585 (3.32) **	0.333 (2.26) **	12.42 **	0.06
Turkey	0.004 (0.70)	0.679 (2.08) **	1.034 (3.79) **	14.03 **	0.07

Panel D: October 9, 2007 – December 31, 2013

	α_0	β_1	β_2	F-statistic	R-square
Brazil	-0.001 (-0.29)	1.352 (11.38) **	1.491 (14.88) **	256.25 **	0.61
Chile	0.005 (2.27) **	0.524 (5.11) **	1.079 (12.47) **	124.03 **	0.44
China	0.001 (0.45)	0.680 (5.53) **	0.882 (8.52) **	74.32 **	0.32
India	0.004 (1.48)	0.555 (4.80) **	0.982 (10.06) **	86.58 **	0.35
Indonesia	0.008 (2.42) **	0.322 (2.25) **	1.090 (9.02) **	55.38 **	0.26
Malaysia	0.004 (2.26) **	0.186 (2.42) **	0.491 (7.58) **	41.82 **	0.21
Mexico	0.001 (0.54)	1.256 (14.31) **	1.403 (18.93) **	410.50 **	0.72
Philippines	0.004 (1.57)	0.413 (3.70) **	0.744 (7.92) **	53.01 **	0.25
Russia	-0.002 (-0.60)	1.307 (7.32) **	1.378 (9.14) **	100.36 **	0.38
South Africa	-0.002 (-0.61)	1.122 (9.81) **	1.033 (4.26) **	155.14 **	0.49
South Korea	0.003 (1.19)	0.872 (6.94) **	1.266 (11.95) **	136.01 **	0.46
Thailand	0.007 (2.47) **	0.351 (2.97) **	0.917 (9.20) **	61.89 **	0.28

Turkey	0.001 (0.29)	0.979 (6.35) **	1.303 (10.01) **	101.10 **	0.39

** Significant at the 5% level