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EFFECT OF MONETARY POLICY ON EQUITY RETURNS: EVIDENCE FROM DEVELOPING COUNTRIES

Rajiv Kalra, Jason Wolf
Minnesota State University Moorhead, MN

Narayana Rao KVSS
ICFAI University, Mumbai

ABSTRACT

Unlike prior studies which document that equity returns in developed markets are greater during domestic and U.S. expansionary monetary regimes than they are during restrictive environment, we do not find any significant relationship between monetary environment and equity returns in developing countries. This shows that equity returns developing countries are independent of monetary policy. Our findings are consistent with the efficient market hypotheses. In addition, we do not find any strong evidence which would indicate that for a U.S. investor, diversification in developing equities is more desirable during expansionary (restrictive) monetary environments than it is during restrictive (expansive) environments.

Investors and analysts have long been interested in identifying the factors that affect security returns.[1] Finance theory suggests that the value of a financial asset impounds the future expected cash flows and the discount rate used to discount the cash flows to the present. This implies that values and returns should change in response to *news* about a change in cash flows, discount rate, or both. Interest rates influence value in two ways. For most companies, an increase in the interest rate represents increased financing cost, and therefore, reduced future cash flows. In addition, asset pricing models (e.g., the capital asset pricing model, CAPM) suggest that an increase in interest rates (risk-free rate) would cause the investor required rate of return (discount rate) for equities to increase. Apart from impacting interest rates, the monetary policy in a country provides insights into its central bank's efforts in shaping inflation, growth rate, unemployment, and the exchange rate. For this reason, investors closely anticipate and watch the central bank's actions to estimate the future economic conditions and equity market performance.[2]

Using U.S. equity data from 1962 through 1991, Jensen and Johnson (1995) show that stock returns are systematically related to monetary conditions. Jensen, Mercer, and Johnson (1996) provide additional evidence that stock (and bond) returns are significantly higher during expansionary monetary policy regime than they were during restrictive policy periods. Conover, *et al.* (1999a and 1999b) document a similar relationship between monetary environment and equity returns in most developed markets.[3] They found that returns were highest when both the

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domestic and U.S. had expansive monetary policies and worst when both were following restrictive policies.

Conover, Jensen, Johnson, and Mercer (2002) examine the relationship between U.S. monetary conditions and security returns in developing markets while investigating the benefits of investing in international equities. They found that, except for three countries (Columbia, the Philippines, and Portugal), the equity returns in 20 developing countries were not closely related to the U.S. monetary environment.

The following conclusions about the relationship between monetary environment and equity returns can be drawn from the prior studies:

1. Equity returns in the U.S. and other developed countries are higher during expansive U.S. monetary policy periods than during restrictive periods.
2. A similar relationship exists between domestic currency (and U.S. dollar) equity returns and domestic monetary policy regime in other developed countries although the return relationship appears to be stronger with the U.S. monetary policy.
3. The U.S. monetary policy, by and large, does not seem to affect U.S. dollar returns in developing countries.

The purpose of this study is to extend the work of Conover, Jensen, Johnson, and Mercer (2002) by using more recent data to examine the relationship between monetary environment and equity returns in developing countries. Specifically, we examine the effects of domestic and U.S. monetary policies on domestic currency and U.S. dollar equity returns for our sample developing countries.

DATA AND METHODOLOGY

To examine the relationship between monetary policy and equity returns, we use the monthly domestic currency and U.S. dollar equity returns during periods of:

1. expansive and restrictive domestic monetary policy regimes
2. expansive and restrictive U.S. monetary policy regimes
3. when both, domestic and U.S. monetary environments are expansive and restrictive
4. when domestic policy is expansive but U.S. policy is restrictive, and
5. When U.S. policy is expansive but domestic policy is restrictive.

The availability of currency, equity returns, and domestic monetary policy related data limited the countries in our sample and the period of our analysis.

Monthly equity index data in domestic currencies and in U.S. dollar for the 208 month period, from January 1988 to April 2005, is taken from Morgan Stanley Capital International (MSCI, *www.msci.com*). The dividend adjusted S&P 500 index data is obtained from Yahoo!Finance. http://finance.yahoo.com/q/hp?s=%5eSPX. Apart from the U.S., our sample consists of nine developing countries—six in Asia: India, Indonesia, Korea, Malaysia, the Philippines, and Thailand, and three in Latin America: Argentina, Brazil, and Venezuela. To track the performance of their equity markets, monthly returns are computed in the domestic

currency and in U.S. dollars.[4] We obtain discount rate data for the developing countries from Global Financial Data, www.globalfindata.com. U.S. discount rate data is obtained from http://ifs.apdi.net/imf/logon.aspx.

An increase in the discount rate indicates that the central bank is following a restrictive monetary policy; a decline indicates an expansive monetary policy. Similar to prior studies, a change in the direction of the discount rate change is identified as the reversal of the monetary policy stance. For example, after a period of increase(s) in the discount rate, a reduction in the rate is considered the beginning of an expansive monetary policy regime. A following cut in the discount rate indicates the continuation of the expansive monetary policy. A subsequent increase in the discount rate signifies that the central bank has shifted to a restrictive policy environment. Because the month in which the direction of a monetary policy changes contains a few days of expansionary monetary policy environment, and the remaining, of the restrictive monetary policy environment, using that month's returns in our analysis are likely to confound the comparison of equity returns during the two environments. For this reason, we exclude the month of the change in the monetary policy from our analysis. For some countries, such as Argentina, Brazil, Indonesia, Malaysia, the Philippines and Venezuela, the monetary policy, as indicated by the direction of the discount rate changes, reversed quite frequently, sometimes on a monthly basis. To avoid the confounding effect on categorizing a particular month under expansive policy and the subsequent under restrictive policy, and so on, we exclude a period under either expansive or restrictive policy unless the previous change in the monetary policy stance persists for at least four months.[5] That is, if a discount rate change indicates a change in monetary policy stance, but the policy is reversed within the next four months, we exclude the month of the initial change and the next few months before the policy changes again and persists for at least four months.

We collected the data in May 2005. However, for most countries, the data was not available either from January 1988 and/or it was not available up to April 2005. Apart from the U.S., data for the entire period was available only for the Philippines and Thailand. For all other countries, the data was available for periods shorter than 208 months. We exclude countries where the data was not available for at least 144 months (12 years). Data for Venezuela was available for the shortest period—January 1993 to February 2005 (146 months).

To examine the effect of monetary policy on equity market performance, we compute summary statistics and conduct *t*-tests for the difference between the mean performances during expansionary and restrictive monetary policy periods. The test used is the standard *t*-test for the difference between the means for two sample sets with different sizes and variances.

$$t = \frac{\overline{r_e} - \overline{r_r}}{\sqrt{\frac{s_e^2}{n_e} + \frac{s_r^2}{n_r}}}$$

Where,

$\overline{r_e}$ and $\overline{r_r}$ are the mean monthly returns during expansionary and restrictive policy periods, respectively,

s_e^2 and s_r^2 are the variance of monthly returns during the expansionary and restrictive policy periods, respectively, and

n_e and n_r are the number of months in expansionary and restrictive policies, respectively.

Findings

The summary statistics—mean monthly returns and standard deviation of returns for the nine developing countries and the U.S. are provided in Table 1. Of the developing countries, Brazil had the highest average monthly domestic currency return of 13.75 per cent during our sample period. India had the lowest domestic currency return of 1.09 per cent. From the perspective of a U.S. investor, Brazil provided the highest return of 2.86 per cent while Indonesia offered the lowest return (0.65 per cent). As measured by the standard deviation of returns, Brazil's equity returns (both, domestic currency and U.S. dollar) were also the most volatile. Domestic currency and U.S. dollar returns for India were the least volatile. An examination of the coefficient of variation of returns reveals that, in fact, Brazil had the best risk/return domestic currency performance; Argentina had the worst performance with a coefficient of variation of returns of 9.79. However, from a U.S. investor's perspective, the U.S. had the lowest coefficient of variation of 4.00, and Argentina the worst, 24.56.[6]

Table 1
Summary Statistics for Monthly Stock Returns
The table shows the mean monthly returns, standard deviation of returns, and coefficient of variation of domestic currency and U.S. dollar returns.

		Domestic Currency Returns			*U.S. dollar Returns*			
Country	*Sample Period*	*Mean Returns*	*Standard Deviation of Returns*	*Coefficient of Variation*	*Mean Returns*	*Standard Deviation of Returns*	*Coefficient of Variation*	*Sample Size*
Argentina	Feb 1992-Aug 2004	1.197%	11.721%	9.790	0.468%	11.504%	24.557	151
Brazil	Jan 1988-Feb 2004	13.753%	23.542%	1.712	2.863%	16.935%	5.916	194
India	Jan 1993-Apr 2005	1.092%	8.091%	7.409	0.881%	8.386%	9.522	148
Indonesia	Jun 1991-Mar 2005	1.211%	11.046%	9.118	0.650%	13.970%	21.484	173
Korea	Jan 1988-Mar 2005	1.108%	10.086%	9.100	1.154%	11.765%	10.191	207
Malaysia	Jan 1988-Oct 2004	1.115%	8.715%	7.814	0.966%	9.398%	9.733	202
Philippines	Jan 1988-Apr 2005	1.155%	8.979%	7.772	0.771%	9.828%	12.751	208
Thailand	Jan 1988-Apr 2005	1.333%	11.523%	8.642	1.182%	11.981%	10.139	208
Venezuela	Jan 1993-Feb 2005	3.875%	13.551%	3.497	1.626%	14.604%	8.981	146
United States	Jan 1988-Apr 2005	1.032%	4.129%	4.002	1.032%	4.129%	4.002	208

Table 2 breaks down a country's domestic currency and U.S. dollar monthly returns into two periods, when the central bank of the country was following (1) an expansive monetary policy, and (2) a restrictive monetary policy. The table shows that during expansive domestic monetary policy, Brazil provided the highest average monthly domestic currency and U.S. dollar returns of 5.3 per cent and 3.2 per cent, respectively. Argentina had the lowest domestic currency return of 0.72 per cent. Argentina also had the lowest U.S. dollar returns of 0.75 per cent. Brazil had the highest volatility of monthly domestic currency returns.

Table 2
Mean Monthly Returns and Standard Deviation by Domestic Central Bank Policy
Mean monthly domestic currency and U.S. dollar equity returns, standard deviation of returns, difference between the returns, and t-values during expansive and restrictive domestic monetary environment.

	Domestic Currency Returns				*U.S. Dollar Returns*			
Country	*Expansive Monetary Policy*	*Restrictive Monetary Policy*	*Difference in Returns (Expansive minus Restrictive)*	*t-value*	*Expansive Monetary Policy*	*Restrictive Monetary Policy*	*Difference in Returns (Expansive minus Restrictive)*	*t-value*
Argentina								
Sample Size	112	9			112	9		
Mean	0.72%	-1.12%	1.84%	0.48	0.75%	-1.13%	1.88%	0.49
St. Deviation	10.41%	11.15%			10.52%	11.18%		
Brazil								
Sample Size	58	39			58	39		
Mean	5.31%	23.11%	-17.81%	-3.86	3.18%	0.58%	2.60%	1.02
St. Deviation	13.95%	26.46%			10.96%	13.12%		
India								
Sample Size	84	58			84	58		
Mean	1.56%	0.65%	0.91%	0.67	1.42%	0.34%	1.07%	0.77
St. Deviation	7.91%	7.82%			8.33%	8.00%		
Indonesia								
Sample Size	83	52			83	52		
Mean	1.68%	1.40%	0.28%	0.15	0.89%	0.76%	0.13%	0.05
St. Deviation	11.51%	9.50%			14.92%	12.41%		
Korea								
Sample Size	172	34			172	34		
Mean	1.10%	1.16%	-0.06%	-0.03	1.09%	1.49%	-0.41%	(0.22)
St. Deviation	10.35%	8.95%			12.25%	9.28%		
Malaysia								
Sample Size	96	40			96	40		
Mean	2.51%	-0.11%	2.62%	1.46	2.49%	-0.31%	2.80%	1.33
St. Deviation	8.99%	9.78%			8.75%	12.04%		
Philippines								
Sample Size	54	70			54	70		
Mean	1.19%	1.74%	-0.55%	-0.30	1.21%	1.11%	0.10%	0.05
St. Deviation	10.73%	9.12%			11.75%	9.73%		
Thailand								
Sample Size	127	76			127	76		
Mean	2.87%	-0.92%	3.80%	2.11	2.84%	-1.28%	4.12%	2.22
St. Deviation	10.00%	13.67%			10.64%	13.88%		
Venezuela								
Sample Size	76	41			76	41		
Mean	4.00%	5.61%	-1.61%	-0.56	2.14%	1.88%	0.26%	0.08
St. Deviation	11.86%	16.23%			13.14%	17.50%		

During periods when the domestic central bank was following a restrictive monetary policy, Brazil had the highest average monthly return, 23.1 per cent, and Argentina, the lowest, -1.1 per cent. Again the domestic currency returns for Brazil were most volatile (standard deviation of 26.5 per cent). From a U.S. investor's perspective, Venezuela had the highest average monthly U.S. dollar return of 1.9 per cent and Thailand, the lowest, -1.3 per cent. Unlike Conover, Jensen and Johnson (1999a) who found that the developed market equity returns were significantly higher during expansive local monetary policy environment than when domestic policy was restrictive, we do not find strong evidence that suggests that the returns are higher during expansive policy environment than during restrictive periods in developing markets. Domestic currency and U.S. dollar returns in Argentina, India, Indonesia, Malaysia, and Thailand were higher in expansive monetary periods than restrictive periods but the differences were not significant. But, only Thailand exhibited significantly higher domestic currency and U.S. dollar returns during expansive domestic monetary policy periods.

During expansive local monetary environment, Brazil, Philippines, and Venezuela experienced lower domestic currency returns but higher U.S. dollar returns.[7] Only Korea experienced lower domestic currency and U.S. dollar returns during expansive monetary regime.

Conover, Jensen, and Johnson (2002) find no evidence of a systematic relationship between U.S. monetary policy and U.S. dollar returns in developing countries. Similar to their findings, we do not observe any systematic relationship between domestic monetary policy and domestic currency and U.S. dollar returns in our sample developing countries. Our results are presented in Table 3 which shows the equity returns during expansive and restrictive U.S. monetary policy regimes. Like Table 2, this table does not reveal any systematic relationship between U.S. Federal Reserve Bank's monetary policy and domestic currency and U.S. dollar equity returns in developing markets. The table shows that Brazil had the highest domestic currency and U.S. dollar returns (12.9 per cent and 2.5 per cent, respectively) during expansive policy periods as well as during restrictive policy periods (14.6 per cent and 3.1 per cent, respectively). For all countries, except, Brazil, Malaysia, and Venezuela, domestic currency returns were higher during expansive periods. However, the U.S. dollar returns for Argentina, Brazil, Malaysia, Thailand, and Venezuela were actually higher during restrictive periods. None of the differences in returns, however, were statistically significant.

Like Corover, Jensen, and Johnson (1999b) we examine if the equity returns are related to the consistency (or inconsistency) between the domestic and U.S. monetary policies. We categorize all possible monetary environment combinations into four groups—(1) expansive local and expansive U.S., (2) expansive local and restrictive U.S., (3) restrictive local and expansive U.S., and (4) restrictive local and restrictive U.S. environments. The first and the last groups indicate that the domestic and U.S. monetary policies are consistent. Table 4 shows the domestic currency return performance under the four monetary policy combinations. Once again, Brazil exhibits the highest average returns in each of the four monetary policy combinations with the highest at 34.68 per cent when both the local and U.S. environments were restrictive. Brazil experienced the second highest domestic currency returns when the domestic monetary policy was restrictive but the U.S., expansive. However, if we ignore Brazil's results as outlying, the domestic currency returns were generally higher when either both, the domestic and U.S. policies were expansive, or

Table 3
Mean Monthly Returns and Standard Deviation by U.S. Federal Reserve Policy
Mean monthly domestic currency and U.S. dollar stock returns, standard deviation of returns, difference between the returns, and t-values during expansive and restrictive U.S. monetary environment.

	Domestic Currency Returns				*U.S. dollar Returns*			
Country	*Expansive Monetary Policy*	*Restrictive Monetary Policy*	*Difference in Returns (Expansive minus Restrictive)*	*t-value*	*Expansive Monetary Policy*	*Restrictive Monetary Policy*	*Difference in Returns (Expansive minus Restrictive)*	*t-value*
Argentina								
Sample Size	103	40			103	40		
Mean	1.10%	-0.11%	1.20%	0.65	-0.14%	0.24%	-0.38%	-0.21
St. Deviation	12.75%	8.55%			12.37%	8.69%		
Brazil								
Sample Size	112	74			112	74		
Mean	12.87%	14.64%	-1.76%	-0.48	2.48%	3.06%	-0.58%	-0.21
St. Deviation	22.22%	26.08%			15.21%	19.83%		
India								
Sample Size	92	49			92	49		
Mean	1.24%	0.17%	1.06%	0.76	0.95%	-0.03%	0.98%	0.67
St. Deviation	8.30%	7.74%			8.41%	8.15%		
Indonesia								
Sample Size	115	58			115	58		
Mean	1.27%	0.43%	0.83%	0.52	0.61%	0.21%	0.40%	0.20
St. Deviation	12.06%	8.74%			15.39%	11.05%		
Korea								
Sample Size	115	84			115	84		
Mean	1.49%	0.34%	1.15%	0.83	1.32%	0.62%	0.70%	0.44
St. Deviation	11.29%	8.18%			13.55%	8.99%		
Malaysia								
Sample Size	115	79			115	79		
Mean	1.03%	1.09%	-0.06%	-0.05	0.64%	1.01%	-0.37%	-0.29
St. Deviation	10.01%	6.85%			10.92%	6.95%		
Philippines								
Sample Size	115	85			115	85		
Mean	1.27%	0.58%	0.69%	0.55	0.92%	0.10%	0.83%	0.61
St. Deviation	9.83%	7.85%			10.77%	8.49%		
Thailand								
Sample Size	115	85			115	85		
Mean	1.09%	0.96%	0.12%	0.08	0.84%	0.94%	-0.10%	-0.06
St. Deviation	13.08%	9.09%			13.45%	9.68%		
Venezuela								
Sample Size	91	48			91	48		
Mean	3.58%	3.79%	-0.21%	-0.09	1.23%	2.65%	-1.42%	-0.52
St. Deviation	13.47%	13.36%			13.83%	16.06%		
U.S.								
Sample Size	115	85			115	85		
Mean	0.94%	1.11%	-0.18%	-0.30	0.94%	1.11%	-0.18%	-0.30
St. Deviation	4.45%	3.84%			4.45%	3.84%		

when the local monetary policy was expansive but the U.S. policy restrictive. This indicates that, contrary to the findings of Corover, Johnson, and Jensen (1999a and 1999b), the local monetary policy appears to have a greater, albeit small, impact on domestic currency returns than the U.S. monetary policy. Also, no consistent pattern emerges regarding the volatility of returns during the four policy periods, and therefore, no inference can be drawn here.

Table 4
Average Monthly Domestic Currency Returns and Standard Deviation of Returns under the four Different Monetary Policy Environment

	Monetary Environment			
	Expansive Local and Expansive U.S.	*Expansive Local and Restrictive U.S.*	*Restrictive Local and Expansive U.S.*	*Restrictive Local and Restrictive U.S.*
Argentina				
Sample Size	83	29	9	-
Mean Return	0.64%	0.96%	-1.12%	-
St. Deviation	11.21%	7.83%	11.15%	-
Brazil				
Sample Size	47	11	23	16
Mean	5.94%	2.59%	15.07%	34.68%
St. Deviation	14.73%	10.01%	17.87%	32.61%
India				
Sample Size	56	28	33	25
Mean Return	1.27%	2.12%	1.94%	-1.04%
St. Deviation	7.68%	8.47%	9.03%	5.58%
Indonesia				
Sample Size	67	16	18	34
Mean Return	2.03%	0.20%	1.86%	1.15%
St. Deviation	12.09%	8.89%	11.03%	8.75%
Korea				
Sample Size	119	53	-	34
Mean Return	1.73%	-0.33%	0.00%	1.16%
St. Deviation	11.36%	7.51%	0.00%	8.95%
Malaysia				
Sample Size	62	34	12	28
Mean Return	3.34%	1.00%	-3.00%	1.12%
St. Deviation	9.98%	6.70%	13.16%	7.89%
Philippines				
Sample Size	44	10	40	30
Mean Return	2.03%	-2.53%	2.35%	0.92%
St. Deviation	11.13%	8.15%	9.60%	8.53%
Thailand				
Sample Size	71	56	46	30
Mean Return	3.28%	2.35%	-0.88%	-1.00%
St. Deviation	10.86%	8.88%	16.03%	9.18%
Venezuela				
Sample Size	44	34	30	9
Mean Return	3.31%	5.18%	4.69%	7.89%
St. Deviation	10.75%	15.26%	15.98%	10.73%
U.S.				
Sample Size	115			85
Mean Return	0.94%			1.11%
St. Deviation	4.45%			3.84%

Table 5 provides the average monthly U.S. dollar returns during the four monetary policy schemes. Once again, a visual review reveals no consistent pattern for equity returns in the four monetary policy groups. Argentina, Brazil, India, and Venezuela experienced the highest average

Table 5
Average Monthly U.S. Dollar Returns and Standard Deviation of Returns Under the Four Different Monetary Policy Environment

	Monetary Environment			
	Expansive Local and Expansive U.S.	*Expansive Local and Restrictive U.S.*	*Restrictive Local and Expansive U.S.*	*Restrictive Local and Restrictive U.S.*
Argentina				
Sample Size	83	29	9	-
Mean return	0.59%	1.19%	-1.13%	-
St. Deviation	11.27%	8.16%	11.18%	-
Brazil				
Sample Size	47	11	23	16
Mean return	3.14%	3.37%	-0.93%	2.75%
St. Deviation	10.85%	11.99%	11.79%	14.96%
India				
Sample Size	56	28	33	25
Mean return	0.97%	2.30%	1.83%	-1.63%
St. Deviation	8.18%	8.71%	9.20%	5.68%
Indonesia				
Sample Size	67	16	18	34
Mean return	1.30%	-0.87%	0.86%	0.71%
St. Deviation	15.62%	11.81%	17.06%	9.38%
Korea				
Sample Size	119	53	-	34
Mean return	1.57%	-0.01%	0.00%	1.49%
St. Deviation	13.56%	8.63%	0.00%	9.28%
Malaysia				
Sample Size	62	34	12	28
Mean return	3.05%	1.47%	-2.75%	0.74%
St. Deviation	9.49%	7.23%	18.72%	7.92%
Philippines				
Sample Size	44	10	40	30
Mean return	1.86%	-1.66%	1.93%	0.02%
St. Deviation	12.32%	8.76%	10.13%	9.22%
Thailand				
Sample Size	71	56	46	30
Mean return	3.41%	2.12%	-1.65%	-0.70%
St. Deviation	11.34%	9.74%	16.22%	9.45%
Venezuela				
Sample Size	44	34	30	9
Mean return	0.46%	4.22%	2.97%	-1.45%
St. Deviation	12.08%	14.80%	15.96%	22.10%
U.S.				
Sample Size	115			85
Mean return	0.94%			1.11%
St. Deviation	4.45%			3.84%

monthly returns during the periods when the local central bank was pursuing an expansionary monetary policy but the U.S. monetary policy was restrictive. On the other hand Indonesia, Korea, Malaysia, and Thailand experienced the highest U.S. dollar returns when both, the local and the U.S. policies were expansive. These findings further reinforce the idea that in developing markets, the domestic monetary policy has a greater effect on equity returns than the U.S. policy. Again, we do not find any consistent pattern in the volatility of U.S. dollar returns during the four periods.

The absence of a significant relationship between monetary policy and equity returns is consistent with the efficient market hypothesis (EMH) and supports Durham (2005) who provides arguments and evidence that is contrary to the studies contending such a relationship.[8] Regardless of whether U.S. and/or domestic monetary policy has implication for equity returns in developed countries, we do not find any evidence which shows that such a relationship exists in the developing markets.

Diversification

A mountain of empirical work[9] promotes the benefits of international diversification. However, almost all these studies, when examining the benefits, ignore the transaction costs associated with periodic rebalancing international portfolios. With the passage of time, component weights of an internationally diversified portfolio drift from their target levels as different equity markets perform differently. Therefore, a periodic rebalancing is needed to bring back the component weights to their target levels. (See Kalra, Stoichev and Sundaram, 2005 and Rowland, 1999).[10]

Conover, Jensen and Johnson (2002) record a higher correlation between U.S. equity returns and an equally weighted emerging market index during expansive U.S. monetary policy period compared with the correlation when the U.S. is following a restrictive policy. Therefore, they contend that adding emerging market equities to a U.S. equity portfolio during restrictive monetary policy periods adds returns without increasing risk. To present their evidence they create a GDP weighted emerging market index and compare the risk return performance of a U.S. equities portfolio and an internationally diversified portfolio consisting of U.S. equities and the emerging market portfolio. They find that the internationally diversified portfolio offers a potential of about 4 per cent per year return gain during restrictive U.S. monetary policy period. Although the emerging market portfolio is rebalanced monthly, no attempt is made to rebalance the relative weights of U.S. and emerging market portfolio's weights which change whenever the two indexes perform differently. In addition, no allowance is made to account for transaction costs and taxes that are bound to appear each time an overweighed component is sold and the other component that has become underweighted is purchased.[11]

To examine the diversification potential of emerging markets for a U.S. investor, we compute several correlation matrices of returns of the developing countries in our sample and the U.S. Table 6, Panel A presents the correlation coefficient of U.S. returns and domestic currency returns of emerging markets. The panel shows that the U.S. and Brazil returns had the lowest correlation (0.212) while the correlation of U.S return and Thailand was the highest (0.415). Panel B shows the correlations of U.S. dollar returns. The U.S. returns with India were the least

Table 6

Panel A

Correlation Coefficients for Domestic Currency Monthly Stock Returns

	Argentina	*Brazil*	*India*	*Indonesia*	*Korea*	*Malaysia*	*Philippines*	*Thailand*	*Venezuela*	*US*
Argentina	1.000									
Brazil	0.225	1.000								
India	0.216	0.329	1.000							
Indonesia	0.304	0.140	0.238	1.000						
Korea	0.237	0.047	0.210	0.270	1.000					
Malaysia	0.305	0.147	0.228	0.437	0.322	1.000				
Philippines	0.402	0.228	0.182	0.470	0.235	0.543	1.000			
Thailand	0.326	0.153	0.158	0.467	0.457	0.538	0.570	1.000		
Venezuela	0.224	0.191	0.193	0.191	0.116	0.316	0.287	0.210	1.000	
U.S.	0.296	0.205	0.227	0.310	0.339	0.372	0.381	0.415	0.212	1.000

Panel B

Correlation Coefficients for U.S. Dollar Monthly Stock Returns

	Argentina	*Brazil*	*India*	*Indonesia*	*Korea*	*Malaysia*	*Philippines*	*Thailand*	*Venezuela*	*US*
Argentina	1.000									
Brazil	0.458	1.000								
India	0.216	0.350	1.000							
Indonesia	0.242	0.183	0.257	1.000						
Korea	0.168	0.093	0.215	0.296	1.000					
Malaysia	0.256	0.154	0.253	0.535	0.278	1.000				
Philippines	0.337	0.213	0.193	0.553	0.255	0.536	1.000			
Thailand	0.291	0.198	0.210	0.515	0.489	0.534	0.633	1.000		
Venezuela	0.215	0.245	0.231	0.208	0.142	0.241	0.263	0.197	1.000	
U.S.	0.326	0.336	0.220	0.300	0.338	0.322	0.363	0.434	0.233	1.000

Table 7
Panel A
Correlation Coefficients for U.S. Dollar Monthly Stock Returns When the U.S. is Following an Expansive Monetary Policy

	Argentina	*Brazil*	*India*	*Indonesia*	*Korea*	*Malaysia*	*Philippines*	*Thailand*	*Venezuela*
U.S.	0.364	0.537	0.270	0.226	0.319	0.297	0.358	0.370	0.314

Panel B

Correlation Coefficients for U.S. Dollar Monthly Stock Returns When the U.S. is Following a Restrictive Monetary Policy

U.S.	0.198	0.082	0.050	0.498	0.391	0.419	0.367	0.580	0.046

correlated (0.217); they had the highest correlation with Thailand returns. We construct a correlation matrix of domestic currency returns and U.S. dollar returns during expansive and restrictive U.S. monetary policies. However, because only the U.S. dollar returns are relevant from a U.S. investor's perspective, Panel A of Table 7 presents the correlation coefficients of U.S. dollar returns with developing market returns during expansive U.S. monetary policy periods and Panel B, during restrictive periods. A comparison of the two Panels revels that during restrictive U.S. policy periods, while the correlation is higher for Indonesia, Korea, Malaysia, Philippines, and Thailand, it is lower for Argentina, Brazil, India, and Venezuela. These conflicting observations indicate that no conclusion can be drawn concerning the relative attractiveness of emerging market diversification during expansive versus restrictive monetary policy regimes. Nonetheless, the relatively low correlations documented in Tables 6 and 7 confirm the potential for gains for a U.S. investor from diversification in emerging markets. It is important to once again underscore that to translate the potential gains into achievable gains, the need for periodic rebalancing and associated transaction costs must be acknowledged and discounted.

CONCLUSION

In this paper, we examine if equity returns in developing countries are systematically related to the domestic and U.S. monetary policies. Similar to the findings of a prior study, we do not find any significant relationship. The absence of a relationship between monetary policy and equity returns is consistent with the efficient market hypotheses (EMH). An examination of the relationship of U.S. returns and developing markets' returns reveals relatively low correlation coefficients reaffirming the potential diversification gains to a U.S. investor from diversifying in developing markets. However, no inference can be drawn that would indicate whether the diversification benefits are greater during expansionary U.S. monetary periods compared with restrictive periods.

Notes

1. Fama and French (1992) show that equity returns are systematically related to two variables, size– as measured by the market value of equity, and book-to-market-ratio. Campbell and Vuolteenaho (2004) found that value stocks and small-cap stocks have higher (cash flow) betas and provide higher returns.
2. Fama and French (1989) argued that expected returns on common stocks and long-term bonds contain a premium that has a clear business-cycle pattern (low near peaks, high near troughs). Their general conclusion was that expected returns are related to business conditions.
3. Interestingly, they observe that several stock markets exhibit a stronger relationship with the U.S. monetary environment than to the local monetary conditions.
4. MSCI Gross Monthly U.S. dollar indexes are used to compute monthly U.S. dollar returns. MSCI Gross series reflects the reinvestment of dividends distributed to individuals resident in the country of the company, but does not include taxes. While MSCI market indexes are not investable, they are standard benchmarks for the performance of well-diversified country equity portfolios.
5. Equity is considered to be a long-term investment and investors generally make their decisions based on their expectation of its long-term prospects.

6. These findings are consistent with Kalra, Sundaram, and Stoichev (2005) who found that, compared with all the developing countries in their sample, the U.S. equity offered the highest risk-return performance as measured by the Sharpe ratio.

7. However, only the domestic currency return difference for Brazil was statistically significant.

8. Conover, Jensen, Johnson, and Mercer (2005) extended their work of 1999 and found that, similar to prior studies, equity returns were higher during periods of expansive monetary environment than during restrictive periods. In addition, they found that the influence of U.S. monetary policy extended to several international stock indexes.

   Durham (2005) challenge the conclusions of Conover, Jensen, Johnson, and Mercer (2005) on the grounds that (1) the results were sensitive to the sample selection, (2) the study did not differentiate between anticipated and unanticipated monetary policy decisions, and (3) the study ignored the simultaneous relationship between equity price and fed policy. He argues that the findings are unreliable because just as monetary policy affects equity prices, equity prices, in all likelihood, affects fed action.

9. See for example, Levy and Sarnat, 1970; Solnik, 1974; Lassard, 1976; Biger, 1979, Baily and Stulz (1990), Odier and Solnik (1993), Doukas and Yung (1993), Solnik (1995), Akdogan (1996), Michaud, Bergstrom, Frashure and Wolahan (1996), and Solnik (1997).

10. Conover, Jensen, and Johnson (1999b) create one U.S. and four hypothetical portfolios consisting of U.S. and developed markets equities to compare their risk return performances. Out of the four internationally diversified portfolios, one actively managed portfolio was invested equally in the U.S. and foreign equities when the U.S. and the foreign country were following expansive monetary policies. The portfolio was invested in T-bills when the U.S. policy was restrictive. They found that such an internationally diversified and actively managed portfolio offered the best risk-return performance of all the five portfolios. The authors contend that the transaction costs associated with this actively managed portfolio would have been small because this portfolio was invested in equities only during 209 out of the 480 month study period. We suggest that this conclusion is problematic. There might actually be no such benefits from international diversification if the transaction costs associated with the periodic rebalancing the internationally diversified portfolio are considered.10 Kalra, Stoichev, and Sundaram (2005) found that any gains from international diversification disappear when transaction costs are included in the analysis.

11. Transaction costs, especially in emerging markets tend to be high and can significantly impact the return performance of an internationally diversified portfolio.

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