Style Timing in Emerging Markets

STÉPHANIE DESROSIERS, MOHAMED KORTAS, JEAN-FRANÇOIS L'HER, JEAN-FRANÇOIS PLANTE, AND MATHIEU ROBERGE

STÉPHANIE DESROSIERS
is director of investment policy advising at La Caisse de dépôt et placement du Québec in Montreal, Canada.
sdesrosiers@lacaisse.com

MOHAMED KORTAS
is a senior research advisor at La Caisse de dépôt et placement du Québec in Montreal, Canada.
mkortas@lacaisse.com

JEAN-FRANÇOIS L'HER
is a senior vice president of investment policy research at La Caisse de dépôt et placement du Québec in Montreal, Canada.
jlher@lacaisse.com

JEAN-FRANÇOIS PLANTE
is a senior investment policy advisor at La Caisse de dépôt et placement du Québec in Montreal, Canada.
jfplante@lacaisse.com

MATHIEU ROBERGE
is a research advisor at La Caisse de dépôt et placement du Québec in Montreal, Canada.
mroberge@lacaisse.com

During the 1990s, capital flows to emerging markets increased dramatically due principally to the structural changes and economic liberalization that took place in many of these markets. The number of countries considered as emerging also considerably increased. Prior to 1990, Morgan Stanley Capital International (MSCI) classified 12 countries as emerging markets. At the end of the 1990s, this number had more than doubled to 26. The increase in capital flows coincided with roller-coaster-type returns. In the first half of the 1990s, emerging markets offered high rates of return, high risk, and low correlation with developed markets. Rationales for investing in emerging markets were easy to find. The second half of the decade was more troublesome for emerging markets with many crises and contagion effects. Returns were lower and, to exacerbate the situation, correlation with developed markets increased. As documented by Bekaert et al. [1997] and Bruner et al. [2003], the increase in correlation was mainly the result of greater financial and economic integration of emerging markets with developed markets, and should, as such, be considered as an enduring phenomenon.

This difficult period raised some questions for international investors about the benefits of investing in emerging markets. Still the potential returns of emerging stock markets remained higher than those of their developed market counterparts. Bruner et al. [2003] underscore these higher potential returns; at the end of December 2002, the emerging stock markets examined represented 10.5% of global market capitalization, although they accounted for 20% of global GDP. Although not as attractive as at the beginning of the decade, emerging markets were still an interesting avenue for many investors. Those who dared to invest after the crises have been well rewarded. For the 3 years ended October 2004, the average annual return of the MSCI Emerging Markets Index, 24.4%, has clearly been inviting. We are now witnessing a renewal of interest in emerging markets with particular attention aimed at China and India.

Following the decision to be exposed to emerging markets, the next concern which arises is whether to focus primarily on country or industry selection. While using different methodologies, most studies (Serra [2000], Bilson et al. [2001], Bruner et al. [2003], and Van der Hart et al. [2003]) conclude that country factors dominate industry factors in explaining cross-sectional variations in returns among individual stocks. Estrada et al. [2004] underscore, however, that the conclusion may hold for Asia, but results are not as conclusive for Latin America and EMEA (Europe, Middle East, and Africa).

Considering the general consensus that country selection should be the priority in emerging markets, the next question is: Which

criteria could be used for country selection? Country versions of firm characteristics such as size, dividend yield, book-to-market ratio, price momentum, or earnings momentum, play a significant role for country selection in emerging markets selection (Achour et al. [1998], Kargin [2002], Serra [2003], Van der Hart et al. [2003], and Ramcharran [2004]). Macroeconomic and country risk variables also appear useful for country selection (Bekaert et al. [1997], Erb et al. [1997], Achour et al. [1998], and Bilson et al. [2001]). Even more interesting, country-selection strategies benefit from style diversification through the combination of uncorrelated variables. Achour et al. [1998] suggest that while weights on country attributes are assumed constant through time, it is more than reasonable to presume that some classes of variables may become more important than others in certain economic environments.

Desrosiers et al. [2004] document that, for developed markets, relative-value and relative-strength (momentum) style strategies cycle in and out of favor.[1] Although both strategies exhibit good average performance through time, they both also suffer from relatively long non-overlapping periods of underperformance. In other words, relative-value strategies tend to post good results when relative-strength strategies do not, and vice-versa. This is reflected by a negative correlation between both strategies.

We test whether the same conclusion holds for emerging markets. Over the period from October 1995 to October 2004, we find that both relative-value and relative-strength strategies on emerging market indices post a positive but non-significant monthly market risk-adjusted return at the 5% level (0.73%, $t = 1.81$ for relative value, and 0.66%, $t = 1.22$ for relative strength). Nevertheless, the negative monthly correlation (statistically significant at approximately –50%) between the relative-value and relative-strength strategies over the period underlines the potential for diversification and a style-timing model between those strategies.

To implement a style-rotation strategy, we need a conditional indicator that would predict with a certain degree of success when relative-value and relative-strength strategies tend to cycle in and out of favor. According to Clarke and Statman [1994], the most popular factors affecting style rotation are either economic factors or sentiment factors. Economic factors include variables such as the stage of the business cycle, the bond-term spread, and the default premium. In contrast, sentiment factors correspond to variables such as recent volatility, risk premium, and level of investor confidence. Very few studies in this second category of factors—with the exception of Macedo [1995] and Desrosiers et al. [2004]—document the power of recent performance as a rotation criterion between relative-value and relative-strength investment styles in the context of country selection. Desrosiers et al. [2004] show that style timing based on a criterion supported by psychological evidence could be quite rewarding. Their style-rotation strategy in developed markets presents a significant market risk-adjusted performance that is superior to that obtained by following a fixed-style or a style-diversification strategy.

To our knowledge, this topic has not been examined in emerging markets. This article attempts to fill this gap. The contribution of this study is to test a style-timing strategy in the emerging market universe. Using a conditioning criterion related to changes in wealth and risk aversion (Thaler and Johnson [1990]), as in Desrosiers et al. [2004], we determine each month our preference for a relative-value or a relative-strength strategy according to whether the past twelve-month excess return of the equally weighted emerging market index is negative or positive. Over the entire sample period, the style-timing strategy posts a market risk-adjusted return of 1.46% per month ($t = 3.36$). To assess the robustness of these results, we use a four-factor pricing model, and find that the strategy's raw return does not come from smaller illiquid markets; the size loading of the risk factor SMB (Small minus Big) is not significant, and the alpha coefficient remains significantly positive, at 0.78% per month ($t = 2.09$). Furthermore, results from the style-timing strategy are robust to the inclusion of realistic transaction costs.

The rest of the article is organized as follows. The first section presents descriptive statistics on the sample and the variables examined. The second section presents the performance results of fixed-style strategies and the style-timing model. The third section provides robustness tests regarding risk exposure and implementation costs. Finally, we provide concluding remarks.

DATA

Our sample consists of data from 26 emerging markets over the period from October 1995 to October 2004.[2] We use MSCI emerging market return indices denominated in U.S. dollars unhedged. The indices include dividends.

Exhibit 1 reports descriptive statistics of monthly return distributions for the 26 emerging markets considered over the sample period. Statistics on the MSCI USA, MSCI EAFE, and MSCI World indices are presented for comparison purposes. As stated in the introduction, the second half of the 1990s, which represents close to half of our sample period, was a difficult period for emerging markets. Starting with the Mexican crisis of 1994–1995, crises have followed one after the other: the Asian crisis in 1997, the Russian default in 1998, the devaluation of the Brazilian real in 1999, and the Argentinean crisis in 2001. These lean years obviously had a great impact on the results shown in Exhibit 1.

The average return varies considerably from one country to another. The average monthly return ranges from a minimum of −1.1% for the Philippines to a maximum of 1.9% for Russia. Only five of the 26 emerging countries—the Philippines, Thailand, China, Indonesia, and Malaysia—exhibited a negative average monthly return over the period. This is not that surprising, considering that these five countries were severely hit by the 1997 Asian crisis. What is surprising is that Russia, in spite of the 1998 debt crisis, is the country that had the highest monthly return (1.9%). Exhibit 1 also shows that the equally weighted index of the 26 emerging markets (the Emerging Market EW) slightly outperformed the MSCI USA, MSCI World, and MSCI EAFE indices over the sample period.

Volatility varies as much as return across the different emerging markets. At 4.2%, Jordan has the lowest monthly standard deviation of the 26 countries. By contrast, the maximum monthly standard deviation is 18.8% for Russia, followed by Turkey (18.1%), and Indonesia (16.4%). At the aggregate level, the volatility of the equally weighted emerging market sample is higher than the volatility of developed markets: 6.2% versus 4.7%, 4.4%, and 4.3% for the monthly standard deviation of MSCI USA, MSCI EAFE, and MSCI World, respectively.

The analysis of the third and fourth moments of the distribution shows that most emerging market returns

EXHIBIT 1

Descriptive Statistics on Monthly U.S. Dollar Unhedged Returns and Country Financial Characteristics Over the Period from October 1995 to October 2004

	Geometric Average	Standard Deviation	Skewness	Kurtosis	Beta	Average P/B
1 Russia	1.9%	18.8%	0.07	1.52*	2.2	1.2
2 Hungary	1.8%	10.6%	0.16	3.77*	1.1	2.4
3 Egypt	1.2%	8.9%	0.90*	1.27*	0.6	2.4
4 Czech Republic	1.2%	8.6%	-0.15	1.45*	0.7	0.9
5 Mexico	1.0%	8.7%	-0.68*	1.57*	1.0	2.0
6 Turkey	0.9%	18.1%	0.63*	1.93*	1.7	3.7
7 Colombia	0.9%	9.9%	0.11	0.82*	0.8	0.9
8 Venezuela	0.9%	15.2%	0.32	2.97*	1.1	1.2
9 Peru	0.7%	7.7%	-0.84*	2.95*	0.7	2.1
10 Jordan	0.7%	4.2%	0.32	-0.71*	0.1	1.3
11 Brazil	0.6%	12.0%	-0.42*	1.39*	1.4	1.0
12 Morocco	0.6%	4.9%	0.02	1.14*	0.0	2.7
13 Israel	0.5%	7.9%	-0.03	0.67	0.6	2.0
14 India	0.5%	8.7%	0.07	-0.62	0.7	2.6
15 Poland	0.4%	10.4%	0.05	1.26*	1.1	1.8
16 South Africa	0.4%	7.9%	-0.78*	1.96*	0.9	2.0
17 Pakistan	0.3%	12.5%	0.35	1.37*	0.8	1.7
18 Argentina	0.2%	11.8%	0.45*	3.49*	1.1	1.4
19 Chile	0.2%	7.1%	-0.53*	2.26*	0.9	1.5
20 Taiwan	0.0%	9.6%	0.41*	0.35	1.0	2.6
21 Korea	0.0%	14.3%	1.27*	4.81*	1.1	1.1
22 Malaysia	-0.3%	11.0%	0.84*	4.79*	1.1	2.0
23 Indonesia	-0.6%	16.4%	0.46*	1.58*	1.6	2.1
24 China	-0.7%	11.9%	0.99*	3.22*	1.1	1.5
25 Thailand	-1.0%	14.2%	0.40*	1.12*	1.5	1.8
26 Philippines	-1.1%	10.4%	0.69*	2.74*	1.1	1.7
Emerging Markets EW	0.9%	6.2%	-0.71*	2.07*	1.0	1.8
MSCI USA	0.7%	4.7%	-0.47*	0.06		3.8
MSCI EAFE	0.4%	4.4%	-0.48*	0.36		2.4
MSCI World	0.5%	4.3%	-0.58*	0.46		2.9

Notes: Betas are calculated relative to the Emerging Markets EW excess return over the U.S. risk-free rate.

* *Statistically significant at the 5% level.*

could not be considered normal. At a 5% level, the skewness statistics indicate that ten countries present a distribution significantly right-skewed and five countries are significantly left-skewed, as well as the MSCI USA, MSCI EAFE, and MSCI World return distributions. Kurtosis values show that most country return distributions exhibit fatter tails than normal distributions. As a result, we cannot reject the hypothesis of normal distribution at the 5% level for only three of the 26 emerging countries, and for the MSCI USA, MSCI EAFE, and MSCI World. These results are consistent with those reported by Bekaert and Harvey [1997] and Bruner et al. [2003].

Exhibit 1 also reports the average price-to-book ratio (P/B) for each emerging market. Colombia (0.9), the Czech Republic (0.9), and Brazil (1.0) posted the lowest price-to-book ratios over the period considered, while Turkey (3.7), Morocco (2.7), India (2.6), and Taiwan (2.6) posted the highest. The average price-to-book ratio (equally weighted) for the emerging market countries is 1.8 which contrasts sharply with the price-to-book ratio for the United States of 3.8. This difference mainly reflects different industrial structures, with more traditional (value-oriented) sectors in the emerging markets than in the United States, where growth-oriented sectors are dominant.

INVESTMENT STRATEGIES

Fixed-Style Strategies

We use price-to-book and one-year price momentum as the ranking variable for relative-value (*RV*) and relative-strength (*RS*) strategies, respectively. At the beginning of each month t, two equally weighted portfolios ($P_{i,j}$, $i = 1, 2$; $j = RV, RS$) are constructed according to the ranking of each variable at the end of month $t - 1$. We identify the portfolios containing the most attractive countries for a given strategy (the half of the countries with the lowest P/B or the highest one-year price return) as $P_{1,j}$, and the portfolios containing the least attractive countries (the half of the countries with the highest P/B or the lowest one-year price return) as $P_{2,j}$. We also construct a zero-investment portfolio $P_{1,j} - P_{2,j}$ for each strategy to gauge the ability of each variable to discriminate between attractive and unattractive markets. These portfolios are held for one month. Exhibit 2 details the performance results of relative-value and relative-strength strategies for the emerging market sample.

Over the entire period, the relative-value zero-investment portfolio ($P_{1,RV} - P_{2,RV}$) posts the highest market risk-adjusted return at 0.73% per month, which is not statistically significant at the 5% level ($t = 1.81$).[3] This strategy appears successful, however, at identifying unattractive markets for which the negative performance of the short portfolio ($P_{2,RV}$) is statistically significant at the 5% level ($t = -2.23$). The market risk-adjusted performance of the relative-strength zero-investment portfolio ($P_{1,RS} - P_{2,RS}$) is positive (0.66%), but not significantly different from zero, with a t-statistic of 1.22. Both relative-value and relative-strength zero-investment portfolios present betas that are statistically different from zero ($t = -2.39$ and $t = -2.28$, respectively), and a slightly lower standard deviation than the Emerging Market EW index.

Motivation for Style-Timing Strategies

The separate analysis of fixed-style strategies ignores their cyclical-style return differences. Indeed, there is a strong complementarity between the fixed-style strategies. The negative correlation (statistically significant at approximately –50%) between the two strategies triggers an interest to investigate these differences and, by the same token, provides a strong incentive to explore a style-timing model. An indicator which would determine with a certain degree of success the "right" style to adopt at any given time would clearly be attractive.

The study is based on the assumption that a high risk aversion would support a relative-value strategy while a low risk aversion would favor a relative-strength strategy. A good style-timing strategy would thus seek to predict the typical investor's risk aversion. Thaler and Johnson [1990] find that people's behavior, and particularly their risk aversion, is greatly influenced by the fact that they have just encountered success or failure. Although the normative theory stipulates that decision makers should only consider incremental investment performance, Thaler and Johnson [1990] demonstrate that the actual decision-making process of agents is also largely conditioned on prior outcomes. They observe that when facing sequential gambles, people adopt different risk behaviors depending on whether they win or lose on previous gambles. If they made money on prior games, people will be willing to take more risk than if they lost, because they are now playing with what Thaler and Johnson refer to as "the house's money." This phenomenon is explained

EXHIBIT 2

Monthly Descriptive Statistics for Relative Value, Relative Strength, and Style Timing Strategies Over the Period from October 1995 through October 2004

	Emerging Markets EW	Relative Value			Relative Strength			Style Timing		
		P_1	P_2	P_1-P_2	P_1	P_2	P_1-P_2	P_1	P_2	P_1-P_2
Arithmetic average excess return	0.73%	1.07%	0.23%	0.84%	0.99%	0.47%	0.52%	1.53%	-0.09%	1.62%
Geometric average excess return	0.53%	0.82%	0.03%	0.75%	0.79%	0.20%	0.35%	1.26%	-0.28%	1.51%
Standard deviation	6.26%	7.06%	6.11%	4.26%	6.31%	7.42%	5.73%	7.29%	6.00%	4.68%
Sharpe ratio	0.12	0.15	0.04	0.20	0.16	0.06	0.09	0.21	-0.02	0.35
Market risk-adjusted return		0.28%	-0.45%	0.73%	0.33%	-0.33%	0.66%	0.71%	-0.75%	1.46%
t-statistic		1.35	-2.23*	1.81	1.21	-1.23	1.22	3.25*	-3.46*	3.36*
Beta		1.07	0.92	0.15	0.90	1.10	-0.20	1.11	0.89	0.22
t-statistic		2.28*	-2.43*	2.39*	-2.25*	2.30*	-2.28*	3.05*	-3.19*	3.13*

Notes: The arithmetic and geometric average excess return are calculated relative to the U.S. Treasury bill 91-day return for Emerging Markets EW, P_1, and P_2 portfolios, and relative to zero for the $P_1 - P_2$ portfolios. Market risk-adjusted returns and betas are calculated by using the Emerging Markets EW return as the market proxy. The t-statistics associated with betas are based on the null hypothesis that the slope coefficients are equal to one in the case of P_1 or P_2, and zero in the case of $P_1 - P_2$.

**Statistically significant at the 5% level.*

in the following way: "The essence of the idea is that until the winnings are completely depleted, losses are coded as reductions in gain, as if losing some of 'their money' doesn't hurt as much as losing one's own cash" (Thaler and Johnson [1990], p. 657).[4,5] Barberis et al. [2001] relate the gambling example to financial markets by observing that the degree of loss aversion depends on investors' prior investment performance, and that investors become consequently less risk-averse after prior gains. These authors suggest that changes in risk aversion are driven by past stock market movements, and that this could explain the high equity-risk premium, excess volatility, and predictability of observed stock returns.

Similarly, our model is consistent with the same two longstanding ideas in the psychology literature: first, people care about changes in financial wealth and, second, people's risk-aversion changes with their financial wealth. The risk-aversion of an investor is thus assumed to depend on his prior investment performance experience. Given this, we support the notion that following poor stock market performance, an investor will become more nervous and much more sensitive to further potential losses. Hence, after a fall in stock prices, a relative-value strategy should be preferable because an investor should have greater risk aversion. In the opposite case, an investor tends to be less risk-averse following a run-up in stock prices because prior gains will cushion potential subsequent losses. This behavior would favor a relative-strength strategy. The next section details the results obtained when testing if such a hypothesis holds for emerging markets.

Performance of Style-Timing Strategies

We use the most recent twelve-month excess return of the MSCI Emerging Market EW Index to model recent performance in order to condition the style-timing model.[6] When recent performance is negative, investors are presumed to become nervous, and thus increase their risk aversion. In this case, we rank the countries on the basis of the relative-value variable; that is, each country's price-to-book ratio. When recent performance is positive and investors are presumed to be less risk averse, the countries are ranked on the basis of the relative-strength variable; that is, the country's one-year price momentum. No look-ahead bias is introduced as we always look at the recent global success measure at month $t-1$ before taking the P_1 and P_2 positions for month t. The performance of the style-timing model over the whole sample period is presented in Exhibit 2.

From October 1995 to October 2004, the market risk-adjusted return of P_1 (P_2) is significantly positive (negative), which implies that the return of P_1 (P_2) is significantly higher (lower) than the MSCI Emerging Market EW index return. Consequently, the market risk-adjusted return of the zero-investment portfolio $P_1 - P_2$ is statistically significant at 1.46% a month ($t = 3.36$). P_1 and P_2 portfolios have a beta significantly different from one, which results in a zero-investment portfolio $P_1 - P_2$ that is not market-neutral. Although the market risk-adjusted performance of both relative-value and relative-strength fixed-style strategies was not significant at the 5% level

over the period, the performance of the style-timing model is statistically significant. Moreover, the average raw return of the style-rotation model is almost twice the average raw return of the best fixed-style strategy (the relative-value strategy).

To further investigate the source of the style-timing model's good performance, we present the strategy's raw return breakdown in Exhibit 3. We start with a column analysis. When the timing model selects the relative-value strategy, it makes the correct decision 57% of the time (27 out of 47 months), and those correct decisions result, on average, in a much higher raw return (4.29%) than the average reduction in return associated with incorrect predictions (–2.17%). This leads to an average monthly return of 1.54% for the 47 months for which the model selects the relative-value strategy. When the model selects the relative-strength strategy, it makes a correct prediction 58% of the time (36 out of 62 months). Here again, the average return resulting from correct predictions is higher than the average return reduction resulting from incorrect predictions (3.99% compared to –1.53%). This leads to an average raw return of 1.68% when the relative-strength strategy is selected by the model. The power of the model comes from its ability to retain the best months and avoid the worst ones, resulting from its selection of one of the two fixed-style strategies. The row analysis shows that the style-rotation strategy posts a raw return of 4.12% per month when it selects the right fixed-style strategy, and posts a return of –1.81% when it selects the wrong fixed-style strategy. Overall, the model chooses the right strategy in 63 out of 109 months (58% of the time), resulting in an average raw return of 1.62% per month for the style-timing strategy over the entire period.

In this section, we have seen the inability of relative-value and relative-strength fixed-style strategies to consistently add value (non-significant market risk-adjusted return at the 5% level) in emerging market selection. Comparatively, the style-timing model that chooses between those strategies selects the right strategy most of the time. Moreover, the model generates more return when it is right than it loses when it is wrong. This translates into a strongly statistically significant market risk-adjusted return for the style-timing zero-investment portfolio. Thus, we can conclude that the recent global success criterion is very useful in predicting the right strategy to adopt at a given time.

ROBUSTNESS OF STYLE-TIMING STRATEGIES

Risk-Adjusted Performance of Style-Timing Strategies

Up to this point we have only discussed raw and market risk-adjusted performance. We now examine how exposure to risk factors could explain the performance of the aforementioned strategy. We base our analysis on the Fama-French three-factor pricing model (Fama and French [1992]) supplemented with a momentum factor. We thus consider 1) the equally weighted emerging-market benchmark excess return over the U.S. risk-free rate, $Rm–Rf$; 2) a size/liquidity (small-capitalization country minus big-capitalization country) factor, *SMB*; 3) a relative-value factor, *RV*; and 4) a momentum factor, *RS*.[7] The zero-investment *SMB* portfolio is based on the country market capitalizations of the previous month. The small-cap (big-cap) equally weighted portfolio comprises half of the countries with the smallest (largest) market capitalization. The *RV* and *RS* portfolios simply correspond to the returns of the fixed-style strategies presented in Exhibit 2. The risk-adjusted (abnormal) performance of the zero-investment style-timing portfolio

EXHIBIT 3

Performance Breakdown of the Style-Timing Zero-Investment Portfolio (P_1–P_2) Monthly Raw Return (number of months in parenthesis) Over the Period from October 1995 through October 2004

	Relative Value Tilt	Relative Strength Tilt	Style Timing
Good prediction months	4.29% (27)	3.99% (36)	4.12% (63)
Wrong prediction months	-2.17% (20)	-1.53% (26)	-1.81% (46)
Weighted average of all prediction months	1.54% (47)	1.68% (62)	1.62% (109)

corresponds to the alpha coefficient (α)of the following regression:

$$R_{model,t} = \alpha + \gamma_{Rm\text{-}Rf}(R_m - R_f)_t + \gamma_{SMB}(SMB)_t + \gamma_{RV}(RV)_t + \gamma_{RS}(RS)_t + \varepsilon_t \quad (1)$$

where ε represents the residual.

Exhibit 4 presents the results of the regression. Even after controlling for the four risk factors, the alpha coefficient of the style-timing zero-investment portfolio remains positive at 0.78% per month, and is still statistically significant at the 5% level ($t = 2.09$). The difference with the market risk-adjusted returns (1.46%) reported in Exhibit 2 comes in very large part from the two fixed-style factors. The remarkably high loadings on those factors were expected as the timing model only alternates between them. As in the single-factor model (see Exhibit 2), the market-risk factor loading, $\gamma_{Rm\text{-}Rf}$, is significantly different from zero at the 5% level. The slightly negative size-, or SMB-, factor coefficient, γ_{SMB}, is, however, not statistically significant, and means that the style-timing strategy abnormal return does not come from smaller illiquid markets. The systematic exposure to these four factors explains 42% of the variance in the style-timing model. The *RV* and *RS* factors account for more than 85% of this figure, as every month the model assigns a 100% exposure to one of the two factors.

Implementation Costs of Style-Timing Strategies

We examine the extent to which transaction costs could hinder the implementation of our strategy in practice. We first estimate the average monthly turnover at roughly 15%, which represents the ratio of the average number of countries that move each month from P_1 to P_2, and vice versa, to the total number of countries in each portfolio. Based on this information, we perform a sensitivity analysis to find the maximum transaction costs for which the market risk-adjusted return of our strategy would remain significant at the 5% level. The following formula allows us to find that maximum transaction cost:

$$[\alpha - (\textit{average turnover} * \textit{max. transaction cost})] / \textit{standard error}_\alpha = 1.96 \quad (2)$$

where α is the strategy's market risk-adjusted return.

We find a maximum transaction cost of about 4.1%. It is reasonable to assume that real transaction costs in emerging markets are much lower than this figure. Indeed, previous studies by Bekaert et al. [1997], and Kargin [2002] estimate transaction costs at approximately 1% for emerging market individual stocks. The cushion between the 4.1% and 1.0% figures suggests that transaction costs are unlikely to be high enough to dissipate the strategy risk-adjusted performance. Thus, our results are robust to the inclusion of realistic transactions costs.

CONCLUSION

There is substantial evidence that country versions of firm characteristics can play an important role in emerging market selection (Achour et al. [1998] and Kortas et al. [2004]). We first examine the performance of relative-value and relative-strength strategies based on one variable: the price-to-book ratio and the price

EXHIBIT 4

Risk Exposure Analysis of the Style-Timing Zero-Investment Portfolio ($P_1 - P_2$) Over the Period from October 1995 through October 2004

	Coefficient	*t-statistic*
Risk-adjusted return (α)	0.78%	2.09*
Rm-Rf	0.14	2.12*
SMB	-0.08	-0.85
RV	0.78	7.67*
RS	0.32	4.38*

**Statistically significant at the 5% level.*

momentum, respectively. We document that over the October 1995–October 2004 period, both relative-value and relative-strength strategies on emerging market indices post a non-significant positive market risk-adjusted return at the 5% level. Nevertheless, the highly negative monthly correlation between the relative-value and relative-strength strategies opens the door for a style-timing model between the two strategies.

Second, following Desrosiers et al. [2004] on developed markets, we test a style-timing strategy over the emerging market universe. We use a conditioning criterion related to changes in wealth and risk aversion (Thaler and Johnson [1990]). Each month, we determine our preference for a relative-value or a relative-strength strategy according to whether the past twelve-month excess return of the equally weighted emerging market index is negative or positive. Over the entire sample period, the style-timing strategy posts a significant market risk-adjusted return of 1.46% per month.

The risk-adjusted return (alpha) remains significantly positive (0.78% per month) when we use a four-factor pricing benchmark. More specifically, the factor loading on the size factor, SMB, is not significantly different from zero. Risk-adjusted returns are not due to a portfolio bias toward smaller illiquid markets. Furthermore, results from the style-timing strategy are robust to the inclusion of realistic transaction costs.

To our knowledge, this study is the first to provide promising evidence for style rotation in emerging markets. This study thus leaves space for further research examining alternative criteria or combinations of criteria (Kao and Shumaker [1999]) belonging either to the economic-factor or sentiment-factor classes.

ENDNOTES

The authors appreciate and acknowledge the insightful comments of their colleagues. However, any errors that remain in the paper are the sole responsibility of the authors. The views expressed in this article are those of the authors, and do not necessarily reflect the position of the Caisse de dépôt et placement du Québec.

[1]A relative-value strategy will seek to invest in countries with low price-to-book or price-to-earnings ratios compared to other countries. A relative-strength strategy (or momentum-oriented strategy) invests typically in markets that posted good recent performance (in the last 6 or 12 months).

[2]Due to the unavailability of certain price-to-book data, five emerging market countries are not included as of October 1995. We include them in the sample test when the data become available: the Czech Republic and Hungary (July 1996); Russia (December 1996); Egypt and Morocco (September 1997).

[3]The market risk-adjusted return is calculated relative to the equally weighted emerging market benchmark.

[4]Thaler and Johnson [1990] find that an increase in risk aversion appears to be the norm after prior losses. However, they find that in the case where the proposed lottery involves a good chance of breaking even, subjects tend to be especially attracted to this gamble. Hence, in potential break-even situations, they find that subjects tend to be less risk averse even if they've just encountered losses.

[5]Gertner [1993] obtains similar results in a study involving much larger stakes than the one used in Thaler and Johnson [1990]. The study involves participants in the television show "Card Shark." He finds evidence of less risk-averse behavior following substantial gains.

[6]Desrosiers et al. [2004] use the most recent twelve-month return relative to the long-term historical average to determine whether investors just encountered success or failure. As a sufficiently long historical period of data for emerging markets does not exist, the authors use the most recent twelve-month return with a cutoff point equal to the risk-free rate rather than a long-term average performance of the market.

[7]See Cavaglia and Moroz [2002] for a recent application of the Fama-French three-factor pricing model augmented by a momentum factor. Although we constructed the risk factors directly from country index returns, Cavaglia and Moroz [2002] discussed the construction of equally weighted and value-weighted risk factors with country weights, global industry weights, or no country/industry stratifications.

REFERENCES

Achour, D., C.R. Harvey, G. Hopkins, and C. Lang. "Stock Selection in Emerging Markets: Portfolio Strategies for Malaysia, Mexico and South Africa." *Emerging Markets Quarterly*, Vol. 2, No. 4 (1998), pp. 38–91.

Barberis, N., M. Huang, and T. Santos. "Prospect Theory and Asset Prices." *Quarterly Journal of Economics*, Vol. 116, No. 1 (2001), pp. 1–54.

Bekaert, G., and C.R. Harvey. "Emerging Equity Market Volatility." *Journal of Financial Economics*, Vol. 43, No. 1 (1997), pp. 29–77.

Bekaert G., C.B. Erb, C.R. Harvey, and T.E. Viskanta. "What Matters for Emerging Market Equity Investments." *Emerging Markets Quarterly*, Vol. 1, No. 2 (1997), pp. 17–46.

Bilson, C.M., T. Brailsford, and V. Hooper. "Selecting Macroeconomic Variables as Explanatory Factors of Emerging Stock Market Returns." *Pacific-Basin Finance Journal*, Vol. 9, No. 4 (2001), pp. 401–426.

Bruner, R.F., R.M. Conroy, W. Li, E.F. O'Halloran, and M.P. Lleras. "Investing in Emerging Markets." *The Research Foundation of AIMR*, 2003.

Cavaglia, S., and V. Moroz. "Cross-Industry, Cross-Country Allocation." *Financial Analysts Journal*, Vol. 58, No. 6 (2002), pp. 78–97.

Clarke, R., and M. Statman. "Growth, Value, Good, and Bad." *Financial Analysts Journal*, Vol. 50, No. 6 (1994), pp. 82–86.

Desrosiers, S., J.-F. L'Her, and J.-F. Plante. "Style Management in Equity Country Allocation." *Financial Analysts Journal*, Vol. 60, No. 6 (2004), pp. 40–54.

Erb, C.B., C.R. Harvey, and T.E. Viskanta. "Country Risk in Global Financial Management." *The Research Foundation of AIMR*, 1997.

Estrada, J., M. Kritzman, and S. Page. "Countries versus Industries in Emerging Markets: A Normative Portfolio Approach." Working Paper 2004, pp. 1–14.

Fama, E.F., and K.R. French. "The Cross-Section of Expected Stock Returns." *The Journal of Finance*, Vol. 47, No. 2 (1992), pp. 427–465.

Gertner, R. "Game Shows and Economic Behavior: Risk Taking on 'Card Sharks.'" *Quarterly Journal of Economics*, Vol. 108, No. 2 (1993), pp. 507–521.

Kao, D.-L., and R.D. Shumaker. "Equity Style Timing." *Financial Analysts Journal*, Vol. 55, No. 1 (1999), pp. 37–48.

Kargin, V. "Value Investing in Emerging Markets: Risk and Benefits." *Emerging Markets Review*, Vol. 3, No. 3 (2002), pp. 233–244.

Kortas, M., J.-F. L'Her, and M. Roberge. "Country Selection of Emerging Equity Markets: Benefits from Country Attribute Diversification." *Emerging Markets Review*, Vol. 6, No. 1 (2005), pp. 1–19.

Macedo, R. "Value, Relative Strength, and Volatility in Global Equity Country Selection." *Financial Analysts Journal*, Vol. 51, No. 2 (1995), pp. 70–78.

Ramcharran, H. "Returns and Pricing in Emerging Markets." *The Journal of Investing*, Vol. 13, No. 1 (2004), pp. 45–56.

Serra, A.P. "Country and Industry Factors in Returns: Evidence from Emerging Markets." *Emerging Markets Review*, Vol. 1, No. 2 (2000), pp. 127–151.

Thaler, R.H., and E.J. Johnson. "Gambling with the House Money and Trying to Break Even: The Effects of Prior Outcomes on Risky Choice." *Management Science*, Vol. 36, No. 6 (1990), pp. 643–660.

Van Der Hart, J., E. Slagter, and D. Van Dijk. "Stock Selection in Emerging Markets." *Journal of Empirical Finance*, Vol. 10, No. 1–2 (2003), pp. 105–132.