

## Performance Measures of Selected Euro-Asian Equity Markets

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### Introduction

Some of the equity markets in Asia have been established for a long period of time. For example, widespread sovereign borrowing got under way in the late 18<sup>th</sup> century, when the spread of constitutional forms of government led to more stable nation states that recognized continuing liabilities to lenders, so by 1866, some forms of stock markets were operating in countries like Turkey. Net private flows into the emerging markets did not pick up again until the early 1990s. But the recovery thereafter was swift, with net inflows rising from \$12 billion in 1988 to more than \$100 billion by 1991. According to Boston-based Pioneering Management Corp. statistics, over the 50 years through 1995, emerging-market equities showed average annual returns of 16.5%, compared with 12.4% for the Standard & Poor's 500-stock index and 11.8% for the EAFE index.

As a category of equity investment, emerging markets should be considered to begin to exist in 1986 under the sponsorship of the International Finance Corporation, an arm of the World Bank. For more than a decade stock markets have boomed in just about every country. From 1984 to 1994 the capitalization of world stock exchanges grew fivefold to a combined \$18 trillion. Investments in emerging markets can result in spectacular returns, positive or negative. But picking potential winners, at the level of either country or company, is very difficult. It is clear that emerging markets carry considerable risks, including liquidity, lack of transparency, and sharp swings in prices.

In general, S&P classifies a stock market as "emerging" if it corresponds with at least one of two general criteria:

1. It is located in a low- or middle-income economy as defined by the World Bank.
2. Its market capitalization is low relative to its most recent GDP figures.

Until 1995, S&P's definition of an emerging stock was based entirely on the World Bank's classification of low- and middle-income economies. If a country's GNP per capita did not achieve the World Bank's threshold for a high-income country, the stock market in that country was said to be "emerging." More recently, this definition has proved to be less than satisfactory because of wide fluctuations in dollar-based GNP per capita figures. Dollar-based GNP figures have been significantly impacted by severe swings in exchange rates, especially in Asia. Moreover, reported GNP figures, which take significant time to prepare, are often out-of-date by the time they are released.

Accordingly, S&P has adopted new criteria for a market to graduate from index coverage. To graduate from index coverage, GNP per capita for an economy should exceed the World Bank's upper income threshold for at least three consecutive years. The three-year minimum limits the possibility that the GNP per capita level is biased by an overvalued currency.

Some of the markets are still at their infant stage, and yet others are still expected to debut. Furthermore, there are other markets that are getting reborn, such as Egypt, which existed in principle for a century but only recently began operating again as a real marketplace for capital. Yet, other markets have been around for decades, and have formed the core of today's emerging market portfolios. There are several long-established markets where trading still takes place over a cup of tea, whereas many other ones have implemented the latest technology to expedite trading, settlement, portfolio management, market supervision, and information dissemination process.

### The Purpose of the Study

The recent uncertainty of the American and European stock markets raises the question of where to invest to get the highest return with the lowest risk. Investing in emerging stock markets or foreign countries in general also means facing a currency risk, which should never be underestimated. This study provides exchange rate adjusted returns for the weighted Composite Index of 7

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Euro-Asia emerging markets (Bulgaria, Jordan, Egypt, Turkey, Pakistan, Iran and Croatia) and compares them with the S&P 500 Index, several portfolios, as well as themselves.

### Literature review

These results indicate growth in opportunities to raise capital through the stock markets in developing economies and enhanced ability to diversify risk. Emerging stock markets (ESMs) now exist in about 70 developing countries. These markets share about 12% of the global stock market capitalization and value traded and over 50% of number of listed companies. Performance indicators show a growing competition between the emerging and developed markets, where for example the size of the market measured by the ratio of the market capitalization to GDP, shows that some emerging markets are larger than the developed ones (Bonser-Neal and Dewenter, 1999). Similarly, market liquidity measured by the ratio of value traded to market capitalization, indicates that some emerging markets are more liquid than the developed ones, an indication of a gained momentum in the development process. Emerging markets also show increased stock prices, which could be attributed to increased demand (Kim and Singal, 2000).

The revitalisation process is characterised by a growing shift from periodic to continuous systems, automation of various services, reduced restrictions on foreign investment, improved settlement and clearance procedures, and strengthening of the legal and regulatory systems. The process is aimed at strengthening the institutional set up, thus creates investors' confidence and enhances competitive trading. Indeed, Röell (1992) and Khambata (2000) note that tight disclosure requirements and competitive auditing and accounting standards create confidence among investors to commit their resources to the emerging stock markets. Demirgüç-Kunt and Levine (1996) also observe that economies with strong information disclosure laws, internationally accepted accounting standards and unrestricted international capital flows tend to have larger and more liquid markets. In comparative terms, while the developed markets with well-established institutions are characterised as having high level of liquidity and trading activity, substantial market depth and low information asymmetry, the emerging markets are said to exhibit more information asymmetry, thin trading and shallow depth because of their weak institutional infrastructure. Kumar and Tsetsekos (1999) demonstrate the implied differences between the emerging markets and developed stock markets institutional set up using 1980-1992 data set. They conclude that as emerging markets mature in terms of their institutional infrastructure, they tend to converge to their developed counterparts.

To enhance business performance and ensure higher investment returns, attempts have been made to create an enabling policy environment through implementation of various economic reform programs. The idea is that the development of stock markets depends not only on the institutional set up, but also on the macroeconomic and fiscal environment (Pardy, 1992). For example, Sung (1992) attributes the remarkable performance of some emerging markets to the positive response of foreign and local investors to economic reforms. Similarly, Bonser-Neal and Dewenter (1999) observe that investors tend to show growing interest in some emerging markets and this depends on the prospects for rapid economic growth, financial reforms, and the benefits from international diversification. Furthermore, Kawakatsu and Morey (1999) attribute growth of the emerging markets to institutional changes, in particular changes in laws allowing foreigners to invest in the markets legally.

Despite the progress made by the emerging markets, differences exist in the institutional set up and macroeconomic environment between the developed and emerging markets. These differences provide a basis for comparative analysis of developed versus emerging markets, especially in terms of their microstructure characteristics as well as the relative contributions of the markets to economic growth. For example, although Bonser-Neal and Dewenter (1999) observe that costs of trading play a major role in defining the investment strategies, the literature on the size and trends in costs of trading from the emerging markets is limited. Besides, while Khambata (2000) and Kumar and Tsetsekos (1999) emphasize the need to create an efficient market in order to enhance the role of stock markets in the development process, there is little evidence on the distribution characteristic of stock returns. Moreover, while the emerging markets are expected to be directly influenced by macroeconomic conditions (Madhavan, 1992), there is minimal research

output on the interaction between the stock market and the macroeconomic environment. Because empirical research on emerging markets is still in the infancy, foreign investors tended to treat these emerging markets as a homogenous asset (Aitken, 1998). For example, Kim and Singal (2000) make a general observation that high volatility of stock prices in emerging markets makes investors more averse to hold stocks and lead them to demand a higher risk premium thus increasing the cost of capital and reducing the investment level.

### Data Collection

In order to analyze the performance and risk of the selected stock markets with their comparison to the performance of the S&P 500 exchange rates, short-term government bond rates (as risk free indicator) and market capitalization have been collected to create a weighted Composite Index. To be able to compare the different countries on a common basis, only the main indices of each country were chosen for the period of 1999-2001 on a monthly basis. The monthly data and monthly return of the S&P500 Index, Istanbul Stock Exchange (IMKB), The Zagreb Stock Exchange (CROBEX), Karachi All Share Index, the main Index of the Amman Stock Exchange (GENINDX), the main Bulgarian Index (SOFIX), the main Index in Egypt (CASE), and the Iranian. All share index (TEPIX) have also been collected.

The following exchange rates, quoted indirect to the US Dollar, have been collected.

Table 1

#### Exchange rates

Exchange Rates	Average 1999	Average 2001
Turkish Lira	420648,94521	1240941,73973
Croatian Kuna	7,14443	8,40316
Pakistanian Rupee	51,40172	62,62971
Jordanian Dinar	0,71360	0,71747
Bulgarian Lev	1,84925	2,17724
Egyptian Pound	3,42342	4,05984
Iranian Rial	1755,22466	1755,00000

Short-term government bond rates are used to determine the risk free rate of the seven Emerging stock markets. Furthermore, the risk free rate is needed to calculate the Sharp Index.

The following "risk free" rates (short-term government bonds) were used:

Table 2

#### "Risk free" rates (short-term government bonds)

Country	Interest, %
Turkey	7.50
Croatia	6.13
Pakistan	15.00
Jordan	4.00
Bulgaria	9.00
Egypt	11.00
Iran	9.77
USA	3.25

Data on the world market capitalization of the seven countries have been collected to determine the weight of each country and to create a weighted 7 Composite Index.

The International Finance Corporation (IFC) calculates several indices, which can be used as an indicator of the stock market activity. The IFC Global Index 2001 has been used to determine the following market capitalization:

Table 3

## Market capitalization

Market Capitalization	In \$ mill	% Weight in 7 Composite
Turkey	25,512.70	34.89078
Croatia	1,621.40	2.21740
Pakistan	2,434.20	3.32898
Jordan	4,099.50	5.60641
Bulgaria	114.00	0.15590
Egypt	5,314.80	7.26844
Iran	34,025.00	46.53208
SUM	73,121.60	100.00000

### Methodology of the study

To compare the performance of the selected seven countries and to measure the risk for foreign investors the following procedures were chosen:

1. To measure the performance of the single indices the monthly return, average monthly return and annualized return (AR) for the countries indices were calculated from 1999-2001.
2. The standard deviation and the annualized standard deviation (ASD) were calculated for each country as an indicator for the investors risk.
3. To measure the relationship between price movements the Correlation Coefficient between each country and the S&P 500 were determined.
4. The exchange rate adjusted annualized return concept was used to eliminate exchange rate risk for potential US investors in the foreign markets.
5. To compare risk adjusted return performances of the chosen countries, Sharp Indices were calculated, as well as exchange rate adjusted Sharp Indices.
6. As a measure of the performance of the seven markets as a whole, the weighted 7 Composite Index was determined.
7. Sample portfolios were used to facilitate comparison between domestic, foreign and a combination of domestic and foreign investment.

To measure the performance of each Index the Monthly Return was calculated for the years 1999-2001 by using the following formula:

$$R_{it} = (P_{it} - P_{it-1}) / P_{it-1}, \quad (1)$$

$R_{it}$  = Return of  $t$  month of  $i$  market;

$P_{it}$  = Price Index of  $t$  month of  $i$  market;

$P_{it-1}$  = Price Index of  $t-1$  month of  $i$  market.

To measure the risk for investors the Standard Deviation of Monthly Return of each index was calculated:

$$SD_i = \left( \text{SUM}(R_{it} - R_{mit})^2 / n \right)^{0.5}, \quad (2)$$

$SD_i$  = Standard Deviation of Monthly Return of  $i$  market;

$n$  = amount of months considered (36).

To be able to compare the risk of the different countries on an annually cross-section basis, the Annualized Standard Deviation for each index was determined.

The Correlation Coefficient between the S&P 500 and the different markets was determined to measure the price movement relationship between the US and the selected indices:

$$r_{ij} = \frac{SUM(R_{it} - R_{mit})(R_{jt} - R_{mit})}{(SD_i SD_j * t)}, \quad (3)$$

$r_{ij}$  = Correlation Coefficient between  $i$  and  $j$  markets;

$t$  = amount of months considered (36).

Investments in foreign countries always face international investors with exchange rate risk. To eliminate the risk for US investors the Exchange Rate Adjusted Annualized Return concept (ARE) was used:

$$ARE_i = AR_i * (1 + (\text{Exchange Rate Adjust Factor})), \quad (4)$$

$ARE_i$  = Exchange Rate Adjusted Annualized Return of  $i$  market.

The Exchange Rate Adjusted Factor was determined by using the average exchange rates of 1999 and 2001 of each country, which was indirectly quoted to the US Dollar:

$$ERAF = (E_{xi99} - E_{xi01}) / E_{xi01}, \quad (5)$$

$E_{xi99}$  = Average exchange rate of  $i$  country to dollar in 1999;

$E_{xi01}$  = Average exchange rate of  $i$  country to dollar in 2001.

A Sharp Index (SI) for each country was determined to compare the risk adjusted return performance of each index to the S&P 500:

$$SI_i = (AR_i - RF_i) / ASD_i, \quad (6)$$

$SI_i$  = Sharp Index of  $i$  market;

$RF_i$  = Risk free rate of  $i$  market.

As a second step, the Exchange Rate Adjusted Sharp Index was calculated in order to compare the risk adjusted return performances of the seven chosen countries after eliminating the exchange rate risk of the US investors:

$$SIE_i = (ARE_i - RF_i) / ASD_i, \quad (7)$$

$SIE_i$  = Exchange Rate Adjusted Sharp index of  $i$  market;

$RF_i$  = Risk free rate of  $i$  market.

By weighing the different countries by their market capitalization a 7 Composite Index was defined. This Index measures the performance of the seven markets as a whole. For this index, the risk was identified by calculating Standard Deviation and Annualized Standard Deviation. To determine the 7 Composite Index the following formula was used:

$$7COMPINDEX_t = SUM(w_i P_{it}), \quad (8)$$

- $t$  =  $t$  month of  $i$  market (1-36);  
 $w_i$  = weight of market capitalization;  
 $P_{it}$  = Price index of  $t$  month of  $i$  market.

As the last step, sample portfolios were created in order to analyze the possible risk diversification for investors. For this purpose four types of portfolios have been generated:

S&P 500 portfolio: This portfolio consists of 100% of the S&P 500 Index.

7 Composite portfolio: The 7 Composite portfolio consists of 100 % of 7 Composite Index.

Index portfolio: The portfolio comprised the 7 Composite Index and the S&P 500, weighted according to their market capitalization. The S&P 500 was weighted with 99.26 % and the 7 Composite Index with 0.74 %.

Aggressive portfolio: The aggressive portfolio consists of 50 % of S&P 500 and 50 % of 7 Composite Index.

Risk and return of the above four portfolios were analyzed on the basis of Annualized Risk and Annualized Return (AR), Exchange Rate Adjusted Annualized Return (ARE) and Sharp Index:

*Annualized Return:*

$$AR(P) = \text{SUM}(w_i \times AR_i), \quad (9)$$

$w_i$  = weight of market capitalization;

$$\text{SUM}(w_i) = 1.00;$$

*Exchange Rate Adjusted Annualized Return:*

$$ARE(P) = \text{SUM}(w_i \times ARE_i), \quad (10)$$

$w_i$  = weight of market capitalization;

$$\text{SUM}(w_i) = 1.00.$$

*Portfolio Standard Deviation:*

$$SD_i = \left( \text{SUM}(R_{it} - R_{mit})^2 / n \right)^{0.5}, \quad (11)$$

$SD_i$  = Standard Deviation of Monthly Return of  $i$  market;

$n$  = amount of months considered (36).

### Analysis of the finding of the study

The results of the calculations shown in the appendix are summarized in the following table. All markets were observed from January 1999 to December 2001.

All selected countries, except Jordan, have a positive correlation to the S&P 500. The Turkish All National is highly correlated to the S&P 500 with a Correlation Coefficient of 0.4442. Because of the general positive correlation and the strong weighing of Turkey (34.89 %), the 7 Composite Index also has a relatively strong Correlation Coefficient of 0.4579 to the S&P 500.

The table shows a typical example of the risk-return relationship. While the S&P 500 has a poor monthly average performance (0.03 %) between 1999 and 2001 the Turkish All National performed well with an Average Monthly Return of 6.78 % during this time period. Of course higher return means greater risk.

Table 4

## Risk and Return of the seven stock markets, the 7 Composite Index and the S&amp;P 500

Market	Number of Observation	Average monthly Return, %	Standard Deviation, %	Correlation Coefficient with S&P 500
Turkey	36	6.78	22.06	0.4442
Croatia	36	1.28	6.94	0.1845
Pakistan	36	1.17	8.93	0.0950
Jordan	36	0.08	2.87	-0.0049
Bulgaria	36	-0.29	11.57	0.1201
Egypt	36	-0.08	8.59	0.0048
Iran	36	2.40	2.52	0.2045
7 Composite	36	4.89	15.65	0.4579
S&P 500	36	0.03	4.82 %	1.0000

Compared to the Standard Deviation of the S&P 500 (4.82 %) investors in the Turkish market have faced a greater risk with a Standard Deviation of 22.06 %, but investors have been rewarded with a good performance. However, higher risk could have also turned out in a negative return, like it did for investors in the Bulgarian or Egyptian markets. As shown later in the study, both countries' return was even lower on an annually basis.

It is remarkable that two emerging stock markets, Iran and Jordan, have a lower Standard Deviation than the S&P 500. The Iranian market having an Average Monthly Return of 2.4 % with a Standard Deviation of just 2.52 % is quite astonishing, particularly the TEPIX which was relatively positive correlated to the S&P 500.

The 7 Composite Index also performed well, again caused by the high weight of the Turkish Index.

The results of the cross-section analysis on risk and return are summarized in the following table.

Table 5

## Cross-section analysis of the seven stock markets, the 7 Composite Index and the S&amp;P

Market	Annualized Return (AR), %	Exchange Rate adjusted AR (ARE), %	Annualized Risk (ASD), %	Sharp Index (SI), %	Sharp Index (SIE), %
Turkey	81.40	27.59	76.41	0.9672	0.2630
Croatia	15.37	13.07	24.05	0.3846	0.2888
Pakistan	14.05	11.53	30.93	-0.0308	-0.1122
Jordan	0.99	0.98	9.94	-0.3027	-0.3032
Bulgaria	-3.52	-4.05	40.07	-0.3124	-0.3256
Egypt	-0.96	-1.115	29.76	-0.4021	-0.4071
Iran	28.82	28.82	8.72	2.1848	2.1853
7 Composite	58.68	43.91	54.22	0.9193	0.6467
S&P 500	0.36	0.36	16.71	-0.1728	-0.1728

Comparing the Annualized Standard Deviation (ASD), Iran (8.72 %) and Jordan (9.94 %) also have a lower risk than the S&P 500 on an annually basis, as mentioned in the analysis of Table 4 (see above).

While Jordan performed in a "normal range" compared to the S&P 500, even after eliminating the exchange rate risk for US Investors, the Iranian TEPIX really outperformed (28.81 %)

on an annually basis, which provided investors with a lower risk compared to the US market. For an emerging market, the incredible low Annualized Standard Deviation of 8.72 % of the TEPIX is a result of the almost constant growth of the Iranian market between 1999 and 2001. Because of the Iranian Rial being pegged to the US Dollar, US investors investing in the Iranian market face very low exchange rate risk. As a result, the Turkish index has the highest Sharp Index (2.1853), even after eliminating the exchange rate risk.

However, exchange rate losses often reduce the performance of investments in emerging markets. The Turkish market can be considered as a good example. Although the Turkish All National performed on an annually basis really well (81.40 %), investors often face very high risk, considering the Annualized Standard Deviation of 76.41 %. In addition, the Turkish Lira lost almost 66 % in the period of 1999-2001. As a result, the Annual Exchange Rate Adjusted Return dropped to 27.59 %. Because of the huge exchange rate losses and the high annualized risk, the exchange rate adjusted Sharp Index of the All National achieves just 0.2630.

Because of the high weight of the Turkish and the Iranian market (together 81.42%), the 7 Composite Index offers a very high performance even after eliminating the exchange rate risk (43.91 %) between 1999 and 2001. But driven by the high risk and huge weight of the Turkish All National, the 7 Composite Index faces investors with high risk (54.22 %) and as a result, the Sharp Index ranges significantly below 1.

Table 6

## Result Analysis on 4 Portfolios

Market	Annualized Return (AR), %	Exchange Rate adjusted AR (ARE), %	Annualized Risk (ASD), %	Sharpe Index (SI)	Sharpe Index (SIE)
S&P 500	0.36	0.36	16.71	-0.1728	-0.1728
7 Composite	58.68	43.91	54.22	0.9193	0.6467
Index	0.80	0.69	16.77	-0.1488	-0.1553
Aggressive	29.53	22.14	31.81	0.7379	0.5056

By examining different portfolio structures, a portfolio consisting of 100 % of S&P 500 turns out to have the lowest Annualized Standard Deviation (16.71 %), as expected. On the other hand, as a result of the lowest risk of the S&P 500, it resulted in the lowest Annualized Return (0.36 %) between 1999 and 2001. Because of this low performance the Sharp Index turned out to be slightly negative (-0.1728).

However, the portfolio consisting of 100% of the seven selected emerging markets, weighted by their market capitalization, offered the highest Annual Return (58.68 %). Even by eliminating the exchange rate risk of this 7 Composite Portfolio the return was still high (43.91 %), but investors holding this portfolio have faced a high risk (54.22 %).

To find the results of diversification two further portfolios were created. The Index Portfolio consisting of S&P 500 and 7 Composite Index was dominated by the weight of the S&P 500 (99.26 %). Because of this domination, the risk of the portfolio increased only slightly (16.77%). On the other hand, the return increased strongly relative to the low weight of the 7 Composite Index. As expected, an aggressive portfolio consisting of a 50 % of 7 Composite Index and 50 % of S&P 500 had a high Annual Return (22.14 %) after eliminating exchange rate risk. But by weighing the 7 Composite Index strongly the risk almost doubled compared to the S&P 500 Portfolio.

As expected, portfolio diversification through emerging stocks increased risk. But risk-seeking investors have increased their return strongly by adding stocks of the seven selected emerging markets to their portfolio between 1999 and 2001.

## Summary and Point of Departure

While finding the results of the study analysis, it can be stated that most of the results were anticipated. Investing in emerging markets means accepting higher risk with the possibility to be rewarded with higher returns.

Although most of the seven selected emerging stock markets have been positively correlated to the S&P 500, the results varied from an exchange rate adjusted loss of -4.048 % to a 28.823 % gain. Especially with the Iranian TEPIX performing extremely well between 1999 and 2001. The main reason for this return is that the Iranian Rial is pegged to the US Dollar. As a result, US investors do not face an exchange rate risk when investing in the Iranian market. Supported by the high return, the Iranian market must be especially emphasized because of its very low risk. It is remarkable that this emerging market has even a lower Annualized Standard Deviation than the US market (Iran: 8.719 %, S&P500: 16.708 %). In contrast to the exception, the rule usually states that accepting high risk should result in higher return. The Turkish market can be considered as a typical emerging market. Achieving a high Annualized Return of 81.404 %, US investors have faced a very high risk (76.411 %). Although the market gains have been accompanied by high exchange rate losses, the Annualized Exchange Rate Adjusted Return was still high with 27.594 %.

Furthermore, because of the high weight of the well performing Iranian and Turkish markets, the 7 Composite Index performed very well on an annual basis (58.684 %). Even after eliminating the exchange rate risk for US investors, the 7 Composite Index gained 43.907 % annually. However, investors have not only faced a high market risk (54.221 %), but also a high exchange rate risk. For example the Turkish Lira lost 66 % against the US Dollar between 1999 and 2001, followed by almost 18 % depreciation of the Pakistani Rupee a 15 % loss of the Bulgarian Lev and the Egyptian Pound. Exchange rate risk is a very important component of an investment strategy for international investors. International investors often underestimate the currency risk.

But there are ways to reduce the currency rate risk in particular by hedging exchange rates using options or futures. Although hedging costs are high, it could be worth it. For example, assuming a "perfect hedge" of the Turkish Lira, the annual exchange rate adjusted return would increase from 27.59 % to 81.404 %, although investors would still face a very high market risk (76.44 %).

Risk should also be one of the most important components considered in finding an investment strategy, which is how to diversify a portfolio when investing in emerging stock markets. In general, risk increases by adding stocks of an emerging market to a portfolio. Because US investors do not only face higher market risk compared to their domestic market risk, but also exchange rate risk, a higher return must be offered. For example, by diversifying a S&P 500 portfolio by 50 % with the 7 Composite portfolio, only the market risk increased from 16.71 % to 31.81 %, but at the same time the Annualized Return increased strongly from a poor performance of 0.36 % to 22.14 %, after eliminating exchange rate risk.

This analysis stated, that risk-seeking investors could boost their earnings dramatically by diversifying their portfolio heavily with stocks of emerging markets. But as a result of the higher market risk and the additional currency risk, returns can also drop sharply by holding stocks of emerging markets.

However, even relatively conservative investors should think about diversification of their portfolio by investing in emerging stock markets to increase their return, but only to a very low percentage. This analysis showed that by weighing the S&P portfolio with less than 1 % of 7 Composite Index, earnings would have increased from 0.36 % to 0.80 %, but market risk just barely increased from 16.71 % to 16.77 %. Hedging exchange rates could minimize the additional currency risk.

All told, emerging markets offer a great opportunity for boosting returns, but investors should beware of the, sometimes sharply, increasing market risk, as well as the additional exchange rate risk.

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