

EMERGING MARKETS FOR CANADIAN PORTFOLIOS: ARE THEY STILL WORTH IT?

By

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ABSTRACT

Conover, Jensen, and Johnson (CJJ 2002) concluded that evaluating U.S monetary conditions is an important pre-requisite to identify an optimal asset allocation to international equities. Using 148 months of data, this study will identify emerging markets as beneficial additions to a Canadian investor's portfolio of developed market equities. The study will show that rising correlation between global equity markets has negated much of the diversification benefits. By incorporating emerging market equities, a Canadian portfolio's returns increased by approximately .25% annually. When considering the Bank of Canada monetary policy, the benefits of investing in emerging markets accrued exclusively during periods of expansive Canadian monetary policy. During restrictive monetary conditions, there was no benefit for a Canadian portfolio to hold emerging market securities. The implication of the study is that evaluating Canadian monetary policy is a necessary prerequisite in identifying an optimal allocation to international equities for Canadian investors.

DEDICATION

First and foremost to my mother, father and my family; I never say it enough. Second dedication is to Candace. Even from a distance and time apart her smile, warmth and compassion have continued to motivate me to live life to the fullest.

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1 INTRODUCTION:

International diversification has been advocated by practitioners and academics for years. Two factors have been argued as the main drivers of international diversification: higher returns realized in non-domestic equity markets and risk reduction from low correlation between domestic and international equities. Conover, Jensen, and Johnson (CJJ) acknowledged that international diversification varies over time (CJJ 2000). This inconsistency raises concerns for investors about the practical advantage of international investing. CJJ provided evidence suggesting patterns in U.S Federal Reserve monetary policy can be a guide in assessing the appropriate allocation into foreign equities. Their findings indicated a U.S investor's portfolio should maximize investing in emerging market equities exclusively during restrictive U.S monetary conditions (CJJ 2002). During expansive U.S monetary periods, the benefits of holding emerging market equities were trivial.

This paper will extend CJJ findings from a Canadian (\$CDN) standpoint. The paper is unique as it will focus on the relationship between equity market returns and Canadian monetary policy. Recent emerging market data may prove useful in indicating if Canadian monetary policy can be associated with return patterns in Canadian and global equities. Firstly, the paper will examine the statistical results using more current data in \$U.S and \$CDN dollar terms. Secondly, the paper will examine, using the current sample period, whether the CJJ findings for U.S investors remains valid. Finally, the analysis will conclude by examining the relationship between Canadian monetary policy and equity returns within a mean-variance framework for Canadian portfolios.

2 LITERATURE REVIEW

2.1 Initial Research:

DEFINING EMERGING MARKETS & MACROECONOMIC CHARACTERISTICS

The World Bank defines a developed country:

- As one that has a per capita gross national product of \$9266 U.S (IFC 2000) for at least three consecutive years and:
- An investable market cap to GDP ratio in the top 25% of the EM universe for three consecutive years.

The World Bank considers a market “emerging” if it meets one of the following two criteria:

- It is a low, lower middle or upper middle income economy as defined by the World Bank and
- It is investable market capitalization is low relative to its most recent GDP

Macroeconomic characteristic beyond income level are used by the International Finance Corporation (IFC) to classify emerging markets. These other characteristics are market size, liquidity and transparency. EM countries have lower GNP per capita and lower investable market cap relative to developed markets. The difference between developed markets and emerging markets is a large one.

Overall the IFC designates most of these emerging economies as upper-middle income countries just below developed countries. Even though these emerging markets market cap to GDP ratio is below the developed countries they are still in the upper bound of economies outside the developed world. Of the 113 developing nations followed by the S&P/IFC, the 32 countries classified as emerging markets have an average percentile rank of 80.3.

Market liquidity in EM is one of the main factors that differentiate them from developed markets. The liquidity or more importantly *the illiquidity* varies from each EM. The developed countries have markets that offer a greater depth in trading thus the liquidity of an EM country's stock

market is an important factor. Unlike the developed markets that offer high liquidity at lower costs, EM countries do not have this efficiency. In a nutshell there is market breadth and depth in developed nations that are not as offered in EM countries. Large trades can be executed in developed markets without adverse affect to the pricing of the underlying security.

The turnover ratio is used to provide insight into a market's liquidity. Bruner (2003) calculates the turnover ratio by calculating the overall value of trades over one month dividing by the countries market cap. A high turnover ratio indicates a large amount of shares traded thus a larger ratio equates to higher liquidity (Bruner 2003). A threshold of 5% turn over ratio was used to separate EM from developed markets. With exception of South Korea, Taiwan and Turkey, all other EM had turnover ratios below 5%. Comparatively the NYSE had a turnover ratio of 8-9% (Bruner 2003).

Transparency, competitiveness and corruption are other risk factors that differentiate EM countries from developed countries (Bruner 2003). These are important because these characteristics determine the ability of an investor to obtain information to ascertain the viability and potential of an EM. A more transparent, more competitive and less corrupt EM will be looked upon more favourably.

An interesting index was created by Pricewaterhouse Coopers called the Opacity Index. The Opacity Index was designed to measure the transparency of individual markets within five areas: corruption, legal, economic, accounting and regulatory. The outcome is known as the "O-Factor" which is an average score of the corresponding five categories. The higher the score the greater the opacity of that market thus the greater risk to ones invested capital within that market.

Overall there is a distinct separation between developed markets and EM as indicated in

Table 2.1. The EM scored on average much higher O-Factors than the developed nations.

TABLE 2.1: Pricewaterhouse Coopers Opacity Index 2001

Country	Corruption	Legal	Economics	Accounting	Regulatory	O-Factor
Singapore	13	32	42	38	23	29
Chile	30	32	52	28	36	36
United States	25	37	42	25	48	36
United Kingdom	15	40	53	45	38	38
Hong Kong	25	55	49	53	42	45
Italy	28	57	73	26	56	48
Mexico	42	58	57	29	52	48
Hungary	37	48	53	65	47	50
Israel	18	61	70	62	51	53
Uruguay	44	56	61	56	49	53
Greece	49	51	76	49	62	57
Egypt	33	52	73	68	64	58
Lithuania	46	50	71	59	66	58
Peru	46	58	65	61	57	58
Colombia	48	66	77	55	55	60
Japan	22	72	72	81	53	60
South Africa	45	53	68	82	50	60
Argentina	56	63	68	49	67	61
Brazil	53	59	68	63	62	61
Taiwan	45	70	71	56	61	61
Pakistan	48	66	81	62	54	62
Venezuela	53	68	80	50	67	63
India	55	68	59	79	58	64
Poland	56	61	77	55	72	64
Guatemala	59	49	80	71	66	65
Thailand	55	65	70	78	66	67
Ecuador	60	72	78	68	62	68
Kenya	60	72	78	72	63	69
Czech Republic	57	97	62	77	62	71
Romania	61	68	77	78	73	71
South Korea	48	79	76	90	73	73
Turkey	51	72	87	80	81	74
Indonesia	70	86	82	68	69	75
Russia	78	84	90	81	84	84
China	62	100	87	86	100	87

Source: Based on data from PricewaterhouseCoopers.

Table 2.2 provides a correlation matrix that reveals the tendency for markets to score high in one factor to score consistently in the others.

TABLE 2.2: Correlation Factors of 2001 Opacity Index

	Corruption	Legal	Economics	Accounting	Regulatory
Corruption	1.000				
Legal	0.666	1.000			
Economics	0.692	0.662	1.000		
Accounting	0.532	0.666	0.566	1.000	
Regulatory	0.773	0.747	0.822	0.596	1.000

Source Based on data from Pricewaterhouse Coopers

2.2 HISTORICAL RETURNS, VOLATILITY AND CORRELATION

EM countries have been attractive to investors and portfolio managers based on two factors: future growth potential in EM equity markets and these markets' low correlation to developed equity markets. Since risk is quantified using standard deviation in a mean-variance framework, the low correlation of returns between EM and global markets implied that adding EM to a diversified portfolio would result in an improvement of an investors optimal asset mix between a specific given level of risk. By adding EM equities, Harvey (1995) noted a reduction of 6% in a portfolio's standard deviation while maintaining the same expected return level.

Data from 1990-2003 indicate the average returns for EM countries were greater than those of the MSCI World Index and the S&P500 Index. **Table 2.3** shows the arithmetic and geometric annualized rates of past return using monthly data in \$.U.S from January 1990-January 2003 on 31 EM within the S&P/IFCI. Twelve of the EM show a negative return if an investor used a buy and hold strategy within this time period. What is clear in **Table 2.3** is the higher volatility in past EM returns.

One thing is certain that return characteristics of EM countries have changed over time. Until the mid 1990's, due to financial contagion and turmoil, investment inflows dropped sharply into EM countries (Mexico Crisis 1995, Asian Flu Crisis 1997 and the Russian default crisis 1998). By the mid 1990s, due to economic liberalization, there has been strong rationale for EM investments. EM countries began to increasingly allow foreign ownership of its country's stock market. The outcome of economic liberalization is the open door policy for foreign ownership will decrease the cost of capital for holding these EM stocks due to the spread of risk between domestic and foreign ownership. Then by reducing the cost of capital for holding these EM stocks the price of these stocks will increase. With the increase of stock prices, investment inflows into these newly liberalized EM countries will increase.

Table 2.3 Annual Monthly Returns- For S&P/IFCI vs. MSCI World & S&P500 from 1990-2003 \$U.S

Country	Arithmetic Annual Return	Geometric Annual Return	Annual Volatility of Return	Skewness	Excess Kurtosis
Argentina	16.8%	3.3%	50.7%	1.46	11.15
Brazil	27.2	8.5	61.6	0.68	4.54
Chile	15.5	12.8	26.4	0.05	0.83
China	0.6	-8.0	42.7	0.54	1.03
Colombia	15.7	9.6	37.6	0.99	1.88
Czech Republic	3.7	-2.9	37.9	1.62	10.12
Egypt	-17.2	-17.8	24.4	0.81	1.02
Greece	15.8	9.1	39.4	1.49	5.33
Hungary	20.0	12.2	42.5	1.14	5.84
India	2.5	-1.6	28.9	0.25	-0.11
Indonesia	0.1	-11.8	50.3	0.44	2.03
Israel	7.4	3.8	26.8	-0.47	-0.25
Jordan	10.5	9.8	14.3	0.59	1.13
Malaysia	6.5	-0.2	37.5	0.86	4.77
Mexico	15.3	9.6	34.2	-0.71	1.34
Morocco	2.6	1.2	17.1	0.45	0.16
Pakistan	11.9	2.3	44.3	0.37	1.25
Peru	12.7	8.8	29.3	0.28	2.69
Philippines	-2.2	-8.9	38.2	0.54	1.98
Poland	30.7	17.9	57.3	1.99	10.45
Portugal	12.1	9.8	23.3	0.40	0.89
Russia	27.4	1.2	71.1	0.10	1.48
Slovakia	-14.8	-17.1	27.6	0.07	-0.44
South Africa	13.0	9.2	28.5	-0.52	2.23
South Korea	8.8	-1.5	47.5	1.34	5.45
Sri Lanka	2.0	-4.8	37.9	0.79	3.94
Taiwan	7.3	0.8	37.3	1.21	3.02
Thailand	1.4	-7.6	43.7	0.44	1.20
Turkey	17.0	-2.7	63.6	0.75	1.33
Venezuela	33.8	18.7	58.4	0.51	1.94
Zimbabwe	29.3	20.0	46.3	-0.23	1.56
IFCI Composite	6.6	1.6	23.3	-0.61	1.68
MSCI World	3.4	2.3	15.1	-0.40	0.22
S&P 500	7.9	7.0	15.2	-0.44	0.43
<i>January 1990–December 1994</i>					
IFCI Composite	18.2	17.9	21.0	-0.02	0.40
MSCI World	2.8	1.7	14.8	-0.07	0.28
S&P 500	6.0	5.4	12.1	0.12	1.26
<i>January 1994–January 2003</i>					
IFCI Composite	-0.5	-1.9	24.5	-0.77	1.83
MSCI World	3.8	2.9	15.3	-0.60	0.28
S&P 500	9.1	7.8	16.7	-0.60	0.11

Source: Based on data from S&P's Emerging Markets Data Base (EMDB) and Datastream.

EM economic liberalization is symbolized in the growth of EM stock markets. Market capitalization of EM countries has more than doubled in the past decade from less than \$2 trillion U.S to more than \$5 trillion U.S in 2006. EM equity market capitalization now equates to more than 12% of the total global equity market capitalization. Net equity inflows into EM stock markets reached \$200 billion in 2005. From 1999-2003 foreign direct investment and portfolio equity in the finance mix of EM countries has risen to 80% of total external financing from developed nations. This has risen from 60% during 1993-1998. The past decade has seen EM bonds rise in size and overall breadth. Sovereign and corporate debt issuance by EM countries has risen from \$325 million U.S to \$700 million U.S in 2003. Domestic bond issuance by EM countries has risen from \$1 trillion U.S to over \$2.4 trillion in the same period. Spreads on EM bonds have been halved from 800 basis points to 400 basis points since 2002. Foreign investment into EM bonds has risen dramatically as volume in local currency bonds has risen to 45% from 25% of total trade volume in the secondary markets from 1997-2004. Overall net private investment inflows to emerging markets performance peaked are at \$300 billion U.S since 2005. This inflow is four times the size of official development aid from developed nation's governments. (All data from website www.ifc.org)

Bekaert and Harvey (1997) concluded volatility in EM returns can be attributed to four main factors:

1. **Asset Concentration**- Refers to the degree of concentration and diversification within the indexes for each country. The stocks in each respective index do not reflect the actual country industrial mix.
2. **Equity Market Liberalization and Economic Integration**- Greater liberalization and integration of EM capital markets with developed markets will decrease the volatility of EM returns. Increasing percentage of foreign ownership improves the transparency and efficiency of these markets.
3. **Market Microstructure**- As market liquidity and information symmetries increase between traders market volatility within EM should decrease

4. **Political risk and Macroeconomic Influences-** These risk can negatively affect a given market thus increasing volatility of a stock market's returns.

Bruner (2003) then discusses the benefits of international diversification if there is low correlation of returns between the different markets. Within this framework Bruner (2003) discusses the changing correlation between EM and the global equity markets. After the Asian Flu Crisis (1997) and the Russia Default Crisis (1998), correlation increased between the S&P/IFCI Composite Index and both the S&P500 and MSCI World Index. Bruner (2003) explains that financial contagion observed during the Asian crisis in 1997 was an important factor causing the increase in volatility and correlation with the developed markets: macroeconomic factors amongst the crisis countries, weak economic fundamentals and over reliance and heavy exposure to specific financial agents (Bruner 2003).

Erb, Harvey, and Viscanta (1994) observed that correlation in international equity increased during times of negative market conditions. During high return volatility and global economic contraction, correlation increased (Harvey 1994). Correlation decreased during low return volatility and periods of economic expansion. These findings indicated that international diversification is least effective in times when it is most needed. However, these findings are inconsistent and correlations between equity markets have varied considerably over time (Solnik, Boucrelle, and Le Fur 1996).

The actual return performances of EM countries from 1990-2003 have been disappointing due financial contagion. Since 2003 there has been rapid growth in EM investing with foreign investment reaching record levels. Ten of the twenty-six EM countries within the MSCI EM index reached record levels by 2005. Net equity inflows into EM countries have grown to \$200 billion U.S per year and GDP growth in EM countries have grown to 6.6% in 2004, doubling developed nations growth rate of 3.1% (all data from website www.ifc.org). Bekaert and Harvey (1997) noted that the factors affecting volatility should decline and correlation with developed markets increase as these EM countries become more transparent, efficient and more integrated with the

developed markets. In tandem macroeconomic and political risks will decrease due to this interdependency.

SECTION 2.3 MONETARY POLICY AND EQUITY RETURNS

Previous studies have argued that changes in central bank monetary policy have high correlation to long run equity returns (CJJ 2000). Long run, CJJ have focused on developed and EM stock returns on U.S portfolios (CJJ 2000, 2002). CJJ associates changes in monetary conditions by labelling expansive monetary periods with lower interest rates and restrictive monetary periods with higher interest rates. The forecast for lower interest rates is higher economic activity and higher interest rates are associated with lower economic activity. CJJ have stated that the changes in monetary conditions by central bank corresponds to periods of rising and contracting economic growth and that these periods will have effects on current and required rates of returns on one's portfolio. CJJ using monthly data from 1962-1991 found that U.S equity returns were greater in times of expansionary monetary periods over restrictive monetary periods (CJJ 2000). CJJ concluded as well that international equities showed the same results. Using data from 1956-1995 CJJ analyzed international equity returns and this relationship held for 12 of the 16 countries tested. CJJ concluded that international equity returns benefited U.S portfolios and that an investor should increase allocation in global stocks in countries that were easing interest rates and sell stocks in countries that were increasing interest rates. Therefore, monetary condition can be used as a predictor on future changes in the required cost of capital of stocks and future expectations on the stock returns. If interest rates rise then the cost of capital will incrementally increase, negatively effecting stock returns. Changes in the monetary action can be seen as changes in the expectation of future corporate profitability.

3 DATA AND METHODOLOGY

3.1 THE SAMPLE PERIOD

The sample period for \$CDN and \$U.S returns starts in January 1995 and ends in May 2007. No hedging of the local currency was used in either the CJJ study or the current sample period. This study uses the Morgan Stanley Capital International (MSCI) series of indices for our emerging market return series because of the ease of access to the data. Although shorter than the period used for the 2002 CJJ study, the period is appropriate due to the emergence of China in the most recent decade. Due to the rise of China, past EM data is dated as it did not effectively incorporate this factor. The MSCI EM data is appropriate as MSCI began to collect data on China's capital markets starting in 1995. Although it is debatable that China's capital markets are not a true reflection on China's economy, it is a benchmark in terms of relevancy similar to other EM indices.

The data set of EM incorporates twenty-four countries providing an in-depth cross section of each major global region. These major EM regions are Latin America, Asia, Europe, Middle East and Africa. The foreign exchange data used was compiled from the Chass Data Centre (DRI Economic database). Similar to CJJ using ten years of data, a Gross Domestic Product (GDP) weighted EM Index was calculated. The GDP data compiled calculated each respective country's GDP using current market prices in U.S dollars, providing consistency to the data. The data was obtained from the United Nations Statistics Division. **Table 3.1** indicates the results from the data compiled on each respective countries ten year average GDP in U.S dollar terms. Since the CJJ study, the EM GDP weighted index has change significantly: China, Brazil, and South Korea have the heaviest weights while Sri Lanka, Morocco, and Jordan have the lightest. All individual and composite indices have been checked and reconciled to represent accurate returns in \$CDN and \$U.S and reflect all monthly returns gross of dividends.

TABLE 3.1. Average Weights GDP-Weighted EM Index, 1995-2005
(Based on Current Market Price \$U.S)

EM Countries	Average GDP Weight
Argentina	4.05%
Brazil	11.36%
Chile	1.40%
China	21.03%
Colombia	1.65%
Czech Republic	1.29%
Egypt	1.54%
Hungary	1.11%
India	8.94%
Indonesia	3.64%
Jordan	0.16%
Korea, Republic of	9.61%
Malaysia	1.71%
Mexico	9.39%
Morocco	0.68%
Pakistan	1.39%
Peru	1.03%
Philippines	1.39%
Poland	3.30%
Russian Federation	6.99%
Sri Lanka	0.30%
Thailand	2.53%
Turkey	3.78%
Venezuela	1.73%
Total	100%

The MSCI data for the developed equity markets was used to continue with the consistency of the source of the data. The Europe, Australia, Far East (EAFE) index replaced the Europe, Australia, Far East, and Canada (EAFEC) Index in the 2002 CJJ study. For CDN returns, this study will represent Canada as a separate asset class. The MSCI World Index was used to represent a cap weighted index incorporating the U.S, Canada and EAFE. The \$U.S data used the MSCI World

Index excluding the U.S weighting. The Canada and U.S equity indices also were obtained from the MSCI data base. Additionally, all the developed equity indices are gross of dividends.

The next part of the data methodology was to breakdown the monthly returns on a country and composite index basis in \$CDN and \$U.S terms. The results will report the mean monthly return, the standard deviation of the returns, and the coefficient of variation. Following the 2002 CJJ process, the coefficient of variation is calculated by taking the standard deviation and dividing it by the mean return. It is another way of processing return adjusting for risk the higher the number the higher the volatility of the returns around the mean.

Correlation data will be summarized from the statistical results in \$U.S and \$CDN. As variations in correlation benefits have been observed over differing time periods in previous studies, the statistical results will be evaluated for any significant changes in correlation during the sample period.

3.2 DEFINING MONETARY CONDITIONS: CANADA AND U.S

Following the guidelines set forth by CJJ in their use of U.S monetary policy, Canadian monetary policy is categorized as either restrictive or expansive based on the change in the Bank of Canada's overnight lending rate. In replacing the U.S Federal Reserve discount rate and the Federal overnight rate with the Bank of Canada overnight lending rate the paper will ascertain if under changes in Canadian monetary conditions play an influential factor in optimal periods when to invest or divest from EM under a mean variance framework. Using the overnight rate is logical because this is the rate major Canadian financial institutions borrow and lend overnight among themselves. The Bank of Canada sets a target level for this rate. It is also referred as the key policy rate. This key policy rate influences other interest rates such as consumer loans and mortgages. This overnight rate is important as it affects Canada's exchange rate and influencing portfolio returns. The overnight lending rate data was compiled from the Bank of Canada, Department of Monetary and Financial Analysis.

A decrease in the overnight rate initiates an expansionary period while an increase in the overnight rate initiates a restrictive period. As per CJJ study, the bank of Canada follows the same consistent guidelines, and monetary conditions continue regardless of the number of consecutive rate changes in the same direction until it changes the overnight rate in the opposite direction. A change in the opposite direction from the previous change initiates a new monetary environment. Like the CJJ study, the first month of each respective overnight rate change in a specific direction was eliminated. The focus of the study is on long term effects of changes in monetary action and equity returns thus it is logical to omit the transitional month to eliminate any potential overlap between months and any months that could not be classified as either expansive or restrictive. To keep the data clean these transitional months have been deleted. Out of the 148 month sample size sixty-seven months have been classified as expansionary and seventy-two classified as restrictive. Nine months were deleted due to the change in monetary action.

Similar to the 2002 CJJ study, equity returns in \$U.S will differentiate between expansionary monetary periods and restrictive monetary periods, based on changes in the Federal overnight rate. The rationale as per CJJ and explained in the previous research by (Waud 1970; Laurent 1988) provided three primary reasons in using this data:

1. The changes are perceived to be signals of Fed action that are influenced by external macro-factor and are easily interpreted.
2. The rate is consistently used as a policy tool by the Federal reserve throughout the time period indicating monetary developments and reaction to concerns of real output.
3. The data is widely reported and monetary changes are a relatively infrequent event

The month of the first change in the U.S Overnight funds rate in a particular direction was eliminated similar to CJJ. It was logical to eliminate this first month as a transition month. The first month could not be classified as either expansionary or restrictive due to the overlap which saw the first month fall into each respective category. The total months of data used was 148

months of which sixty-nine months were classified as expansionary, seventy-three months as restrictive and six months were omitted as previously discussed.

3.3 DETERMINING OPTIMAL ALLOCATION

This paper will then assess the results of the data within mean-variance efficient portfolios for \$U.S and \$CDN. Like CJJ, there is no short selling and no risk less lending and borrowing. The asset weights for the efficient portfolios generated will be provided for all time periods. The framework will utilize the Quadratic Optimization System (QOS) optimizer to assess the mean variance efficient portfolios. Basing the results from mean return, standard deviation and covariance of the asset classes, the QOS was a logical choice. Continuing in the same vein as CJJ, the U.S results will be presented in two and three-asset class portfolios. The evaluation will compare and contrast the results from the CJJ findings with results from current data. The Canadian methodology will use three and four-asset classes. The Canadian equity market is shown as a separate asset class opposed to CJJ including Canada within the EAFEC index. The three and four-asset portfolios will consist of Canada, U.S, EAFE, and the GDP weighted EM index. The results will be presented like the CJJ study, based on the entire timeline, expansive monetary conditions and restrictive monetary conditions for \$U.S and \$CDN. Tables for the portfolio weights and graphs of the efficient frontier for all time lines will be presented in both currencies.

4 RESULTS

4.1 SUMMARY STATISTICS- U.S

Table 4.1 reports the statistical summary for \$U.S returns for the EM countries and the composite indices. The table reports the mean \$U.S dollar return, standard deviation of returns and the coefficient of variation. The exchange rate data came directly from the MSCI data base that reflected all local currency returns into \$U.S dollar returns including all dividends.

The statistical results based on the individual EM countries support CJJ findings. On a return basis eighteen of the twenty-four EM countries had a mean return over the time period higher than the U.S index. Second, consistent with CJJ findings, the volatility of EM countries are higher and in some cases much higher than the U.S index. All twenty-four EM countries have a higher standard deviation that exceeds the standard deviation of the U.S index. Finally on a relative risk basis, overall EM countries continues to compare unfavourably to the performance of the U.S index but the evidence is not as clear as previous data indicated. There is an increasing amount of individual EM countries that exhibit the same risk-return traits as the U.S equity market. One EM country on a risk adjusted basis, compared more favourably than its U.S counterpart while four other EM countries have only slightly higher coefficient of variation than the U.S index. The U.S stock market continues to offer higher return for given level of risk. Although current data continues to indicate that on a stand alone basis EM countries are not attractive investments, the gap in terms of performance has narrowed.

On the bottom of **Table 4.1**, evidence based on the composite indices indicates that EM countries are a more attractive investment combined together. Similar to the 2002 CJJ findings the volatility decreases dramatically when the EM countries are considered as a group. The GDP weighted EM index performs similar to its U.S counterpart and even superior to the EAFEC and World ex-U.S indices as indicated by the standard deviation of the EM Index dropping to a more

favourable 5.79 versus the 4.19 standard deviation of the U.S index. Using the coefficient of variation, the score of 4.27 of the GDP EM Index compares even more favourable to the U.S index score of 4.00. The risk adjusted returns of the EM index outperforms those of the EAFE and World Index score of 5.00.

**Table 4.1 Summary Statistic for Monthly Returns US\$
January 1995-May 2007**

Index U.S	Return	Standard Deviation of Returns	Coefficient of Variation
MSCI Argentina	1.56%	11.41%	7.32
MSCI Brazil	1.92%	11.34%	5.92
MSCI China	0.88%	6.60%	7.47
MSCI Chile	0.85%	10.90%	12.87
MSCI Colombia	1.45%	10.15%	6.99
MSCI Czech Republic	1.80%	8.12%	4.50
MSCI Egypt	2.32%	9.28%	4.01
MSCI Hungary	2.28%	10.16%	4.46
MSCI Indonesia	1.25%	8.22%	6.59
MSCI India	1.29%	14.51%	11.23
MSCI Jordan	0.92%	5.27%	5.71
MSCI Korea	1.39%	12.58%	9.04
MSCI Malaysia	0.71%	9.73%	13.67
MSCI Mexico	1.71%	8.61%	5.03
MSCI Morocco	1.44%	5.40%	3.74
MSCI Pakistan	1.37%	11.55%	8.42
MSCI Peru	1.78%	8.20%	4.60
MSCI Philippines	0.16%	9.62%	62.00
MSCI Poland	1.58%	10.47%	6.64
MSCI Russia	3.27%	17.35%	5.31
MSCI Sri Lanka	0.78%	10.33%	13.25
MSCI Thailand	0.37%	12.57%	33.99
MSCI Turkey	2.65%	16.62%	6.28
MSCI Venezuela	1.95%	14.72%	7.55
MSCI EAFEC	0.82%	4.09%	5.00
MSCI USA	1.05%	4.19%	4.00
MSCI World Index	0.82%	4.09%	5.00
EM Benchmark	1.36%	5.79%	4.27

Data is rounded to two decimal points

Table 4.2 reports the risk and return characteristics by monetary environment for the twenty-four EM countries and the four composite indices. **Table 4.2** also reports the statistical tests for differences in these statistics between the monetary environments. While CJJ only found three EM countries having statistically significant higher returns in expansive periods, current sample period indicates the similar results: of the twenty-four EM countries, eighteen exhibited higher returns during expansive monetary periods but only two countries showed statistically significant results. Malaysia and India exhibited statistically significant results during expansionary periods while Morocco and Indonesia exhibited statistically significant returns during restrictive periods. These findings are contrary to the 2000 CJJ findings that evaluated developed stock markets and found twelve of fifteen indices were statistically higher during expansive periods than during restrictive monetary periods. In contrast, returns for the composite indices showed lower returns during expansive periods compared to returns during restrictive monetary periods.

Examining the risk of the sample period, eight of the twenty-four EM countries exhibited higher volatility of returns during expansive periods. The volatility of the returns for the Canada, U.S., EAFE, and the World Indices exhibited higher standard deviation during expansive periods. The GPD weighted EM index exhibited much lower volatility during expansive monetary periods. On a relative risk basis the statistics are significant as only four EM countries exhibited higher correlation of variation during expansive periods compared to restrictive monetary periods. What is notable is the composite indices correlation of variation is significantly higher during expansive periods compared to restrictive monetary periods.

**Table 4.2 Mean Monthly Stock Returns by U.S Monetary Environment,
January 1995-May 2007**

	Expansive Environment		Restrictive Environment		Difference (Expansive Minus Restrictive)	
Index U.S	Return	Standard Deviation	Return	Standard Deviation	Return	Standard Deviation
MSCI Argentina	0.88%	12.52%	1.75%	10.17%	-0.87%	2.34%**
MSCI Brazil	1.57%	12.17%	2.08%	10.84%	-0.51%	1.33%
MSCI China	0.98%	6.76%	0.83%	6.59%	0.15%	0.17%
MSCI Chile	1.02%	10.29%	0.52%	11.73%	0.49%	-1.44%
MSCI Colombia	2.55%	9.89%	0.40%	10.48%	2.16%	-0.59%
MSCI Czech Rep.	2.55%	7.30%	1.22%	8.95%	1.33%	-1.65%
MSCI Egypt	2.46%	8.97%	2.33%	9.79%	0.13%	-0.82%
MSCI Hungary	3.17%	9.91%	1.53%	10.70%	1.64%	-0.79%
MSCI Indonesia	1.04%	8.42%	1.24%	8.17%	-0.20%***	0.25%
MSCI India	4.48%	14.36%	-1.62%	14.40%	6.10%***	-0.04%
MSCI Jordan	1.31%	4.09%	0.61%	6.28%	0.71%	-2.19%
MSCI Korea	2.62%	11.30%	0.01%	13.64%	2.60%	-2.34%
MSCI Malaysia	2.40%	7.98%	-1.15%	10.99%	3.55%***	-3.01%
MSCI Mexico	1.62%	7.05%	1.68%	9.98%	-0.06%	-2.93%
MSCI Morocco	1.03%	4.24%	1.75%	6.12%	-0.73%*	-1.88%
MSCI Pakistan	2.16%	12.56%	0.78%	10.86%	1.38%	1.70%
MSCI Peru	2.01%	7.08%	1.43%	9.28%	0.58%	-2.20%
MSCI Philippines	0.96%	9.12%	-0.70%	10.07%	1.67%	-0.95%
MSCI Poland	1.87%	9.52%	1.63%	11.58%	0.23%	-2.06%
MSCI Russia	6.21%	15.98%	0.87%	18.51%	5.34%	-2.53%
MSCI Sri Lanka	2.31%	11.43%	-0.42%	9.31%	2.73%	2.11%**
MSCI Thailand	1.83%	11.43%	-1.30%	13.38%	3.13%	-1.95%
MSCI Turkey	2.33%	17.91%	2.97%	15.74%	-0.63%	2.17%
MSCI Venezuela	2.72%	14.89%	1.34%	14.71%	1.38%	0.19%
MSCI EAFEC	0.54%	4.34%	1.09%	3.91%	-0.55%*	0.43%
MSCI USA	0.88%	4.55%	1.30%	3.88%	-0.42%	0.67%*
MSCI World Index	0.54%	4.34%	1.09%	3.92%	-0.55%*	0.43%
EM Benchmark	1.85%	5.29%	0.84%	6.23%	1.01%	-0.95%
	worse returns in expansion than restrictive					
	Higher standard deviation in Expansion period					

Note: Returns are arithmetic mean U.S. dollar returns. Differences are given in percentage points.

* Difference in mean returns significant in a one-tailed *t*-test at the 10 percent level. Difference in standard deviation significant in an *F*-test at the 10 percent level.

** Difference in mean returns significant in a one-tailed *t*-test at the 5 percent level. Difference in standard deviation significant in an *F*-test at the 5 percent level.

*** Difference in mean returns significant in a one-tailed *t*-test at the 1 percent level. Difference in standard deviation significant in an *F*-test at the 1 percent level.

Table 4.3 presents the correlation data for the overall period and two monetary policy sub periods. Category A represents the correlation data for the entire time period indicating a substantial increase in correlation compared to the 2002 CJJ findings. Compared to CJJ findings on the correlation of the entire period from 1975-1999 of .31 with their EM index to \$U.S equity returns, the current data indicates this correlation has risen to .65. The rise in correlation is even more pronounced between the EM index, EAFE and the World Index: the correlation has risen to .74 from CJJ findings of .31. These findings seem to substantiate previous research that correlation between U.S equity returns and non-U.S equity returns vary considerably over time (Michaud, Bergstrom, Frashure, and Wolahan 1996). Overall any substantial movement in returns between the differing monetary environments will be heavily influenced by the increase in correlation between equity markets. Category B shows during expansive period that correlation between EM equity returns and U.S equity returns has moved from .39 to .71. During restrictive periods, Category C shows correlation between EM equity returns and U.S equity returns has risen from .21 to .63. Evidence in Category A and B signify that despite the rise of correlation between all equities returns, U.S equity returns are more closely related to EM returns during expansive periods, and more correlated with EAFE and the World index during restrictive monetary periods, the data does not substantiate CJJ claim that EM returns are more favourable during restrictive periods. Current data seems to support changes in the global economy due to globalization and economic liberalization has increased overall equity return correlation between all equity markets. As CJJ indicated that EM can serve as a hedge against adverse monetary conditions, current data will prove the contrary.

**Table 4.3 Correlation Coefficient for U.S Monthly Stock Returns
January 1995-May 2007**

Index	MSCI EAFEC	MSCI USA	MSCI World ex U.S	EM Benchmark
<i>A. Correlation Coefficient for entire sample period</i>				
MSCI EAFEC	1.00	0.76	1.00	0.74
MSCI USA		1.00	0.76	0.65
MSCI World ex U.S			1.00	0.74
EM Benchmark				1.00
<i>B. Correlation Coefficient for expansive monetary environments</i>				
MSCI EAFEC	1.00	0.82	1.00	0.73
MSCI USA		1.00	0.82	0.71
MSCI World ex U.S			1.00	0.73
EM Benchmark				1.00
<i>C. Correlation Coefficient for restrictive monetary environments</i>				
MSCI EAFEC	1.00	0.70	1.00	0.82
MSCI USA		1.00	0.70	0.63
MSCI World ex U.S			1.00	0.82
EM Benchmark				1.00

4.2 OPTIMAL ALLOCATION FOR U.S

Entire Period \$U.S Returns

We assessed the benefits if any, of international investing by examining mean-variance efficient portfolios and in evaluating gains in efficiency related to changes in monetary conditions. **Table 4.4** provides details on optimal asset weights and monthly return data at specific risk levels for two and three-asset portfolios. The two asset portfolio consists of investments in the EAFEC and U.S indices and the three-asset portfolio includes EM equities. For the entire time period, the three-asset U.S. portfolios with EM allocation, exhibit greater return possibilities other than the lower risk portfolio at 3.90%. The two-asset portfolio without EM could not obtain a level of return at the given level of risk attained by the three-asset portfolio that includes EM. A three asset portfolio could attain a 2.28% greater annual return at 4.80% standard deviation while the two asset portfolio without EM could not attain this threshold. What is noticeable is the superior performance of U.S portfolios with the inclusion of U.S equities. By examining the outcome between the two-asset portfolio with U.S and the two asset portfolio without U.S it is clear that

the two-asset portfolio with U.S equities performs much better. Delving further into the portfolios with higher risk it is evident by the portfolio with 4.80% standard deviation that the two-asset portfolio including U.S equities outperforms the two asset portfolio without U.S equities by 1.20% annually. **Table 4.5 and Table 4.6** details the optimal portfolio weights and returns at specific risk levels for two and three-asset portfolio with and without U.S and EAFEC equities. Please see **Graphs 4.1 to 4.4** for efficient frontiers of the entire period. What is clear by the efficient frontier graphs is the efficient frontier of the three-asset portfolio including EM dominates over the two asset portfolios without EM. What also is clear is the importance of the domestic weighting for U.S portfolios as the efficient frontier of the two asset portfolio with U.S equities dominate the efficient frontier without U.S equities.

Note 1: All efficient frontier graphs are for representation of asset weights for prescribed tables. All asset weights fall on the efficient frontier. For detail information on asset weights available upon request

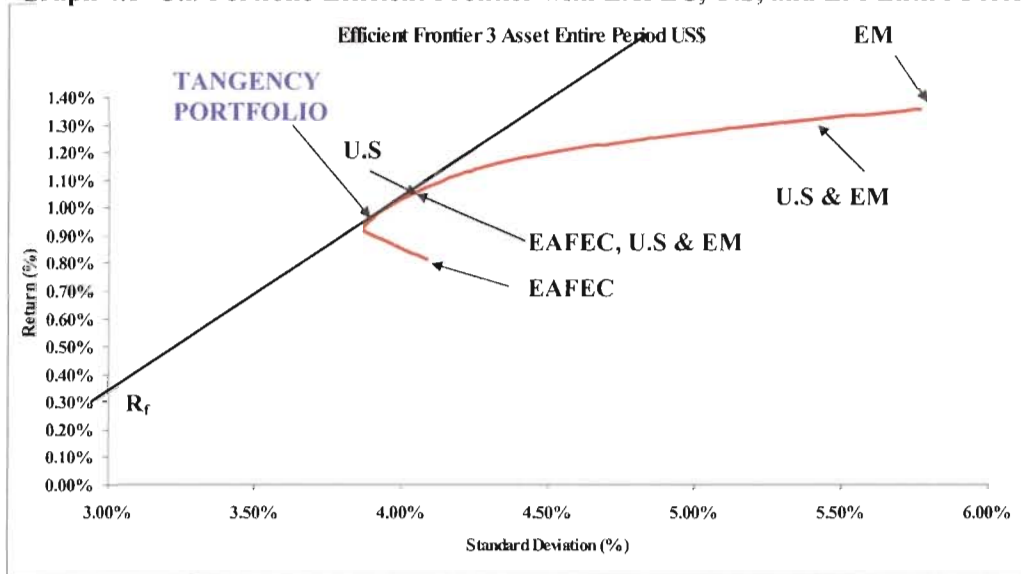
Note 2: All graphs indicate the risk free rate (R_f). The risk free rate used is the 90-day U.S Deposit London Offer. The sample period remains consistent with all equity returns. The risk free rate is the arithmetic mean monthly rate. The monthly mean 90-day U.S deposit London Offer rate is .365%

Note 3: The slope of the Security Market Line represents the market risk premium (SML). The tangency portfolio on the SML represents the optimal trade off between risk and return. The tangency portfolio is only a representation of the equity asset classes of an investor's portfolio, therefore the slope of the SML will change with further additions to the market portfolio. Equity weights for the tangency portfolio are available upon request.

Table 4.4 **Efficient portfolios with and without EM Equities,**
January 1995-May 2007
Entire Period US\$

Portfolio	Two-Asset Portfolio				Three-Asset Portfolio			
	Std Deviation	Asset Weight (%)		Mean Return	Asset Weight (%)		Mean Return	EM Index
		EAFFC	USA		EAFFC	USA		
1 (Low risk)	3.90%	0.96%	37.99	62.01	0.96%	37.99	62.01	0.00
2	4.00%	1.00%	20.74	79.26	1.03%	25.65	62.15	12.20
3	4.25%	1.05%	0.00	100.00	1.14%	0.00	71.55	28.45
4	4.50%	NA	NA	NA	1.20%	0.00	50.85	49.15
5	4.80%	NA	NA	NA	1.24%	0.00	36.53	63.47

Graph 4.1- U.S Portfolio Efficient Frontier with EAFEC, U.S, and EM Entire Period



Graph 4.2- U.S Portfolio Efficient Frontier with EAFEC, U.S Entire Period

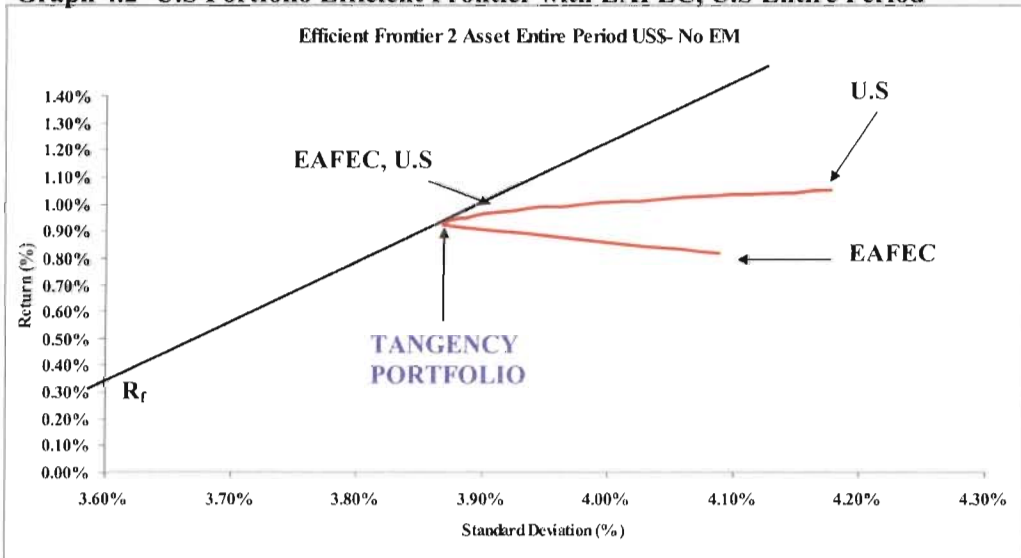


Table 4.5
Efficient portfolios with and without **EAFEC** Equities,
January 1995-May 2007
Entire Period US\$

Portfolio	Two-Asset Portfolio				Three-Asset Portfolio			
	Std Deviation	Asset Weight (%)			Mean Return	Asset Weight (%)		
		Mean Return	USA	EM Index		EAFEC	USA	EM Index
1 (Low Risk)	3.90%	NA	NA	NA	0.92%	55.23	44.77	0.00
2	4.00%	NA	NA	NA	1.03%	25.65	62.15	12.20
3	4.25%	1.14%	71.55	28.45	1.14%	0.00	71.55	28.45
4	4.50%	1.19%	50.85	49.15	1.20%	0.00	50.85	49.15
5	4.80%	1.24%	36.53	63.47	1.24%	0.00	36.53	63.47

Graph 4.3- U.S Portfolio Efficient Frontier with U.S and EM Entire Period

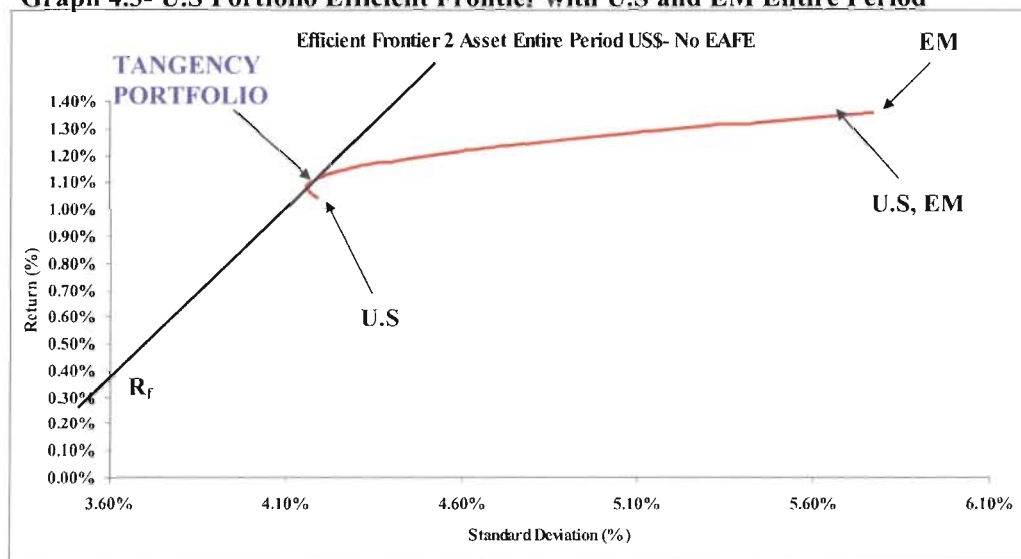
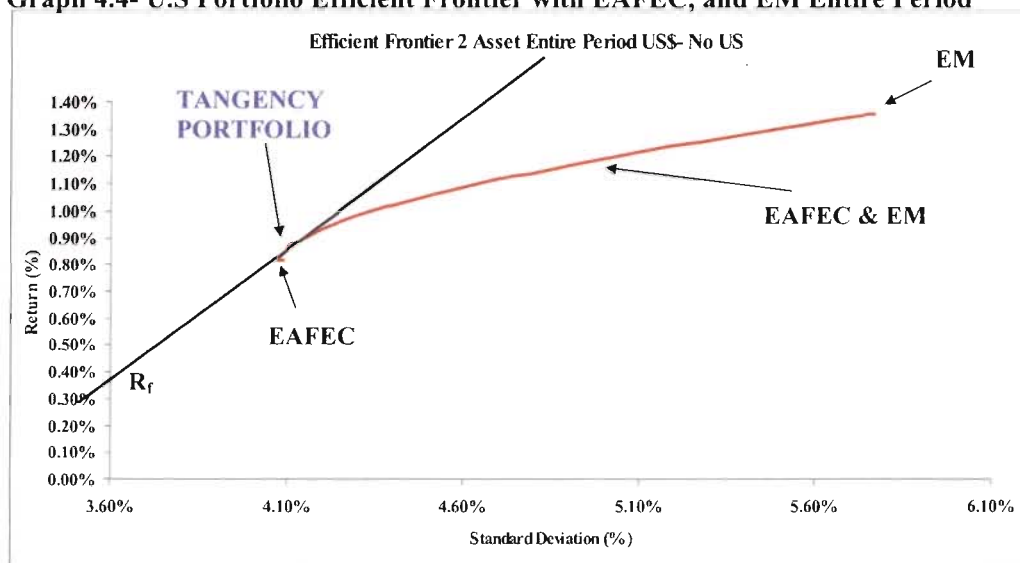


Table 4.6
Efficient portfolios with and without **U.S** Equities,
January 1995-May 2007
Entire Period US\$

Portfolio	Std Deviation	Two-Asset Portfolio			Three-Asset Portfolio			
		Asset Weight (%)	Asset Weight (%)	Asset Weight (%)	Asset Weight (%)	Asset Weight (%)	Asset Weight (%)	Asset Weight (%)
		Mean Return	EA FEC	EM Index	Mean Return	EA FEC	USA	EM Index
1 (Low Risk)	3.90%	NA	NA	NA	0.92%	55.23	44.77	0.00
2	4.00%	0.82%	100.00	0.00	1.03%	25.65	62.15	12.20
3	4.25%	0.94%	76.63	23.37	1.14%	0.00	71.55	28.45
4	4.50%	1.04%	58.51	41.49	1.20%	0.00	50.85	49.15
5	4.80%	1.14%	40.40	59.60	1.24%	0.00	36.53	63.47

Graph 4.4- U.S Portfolio Efficient Frontier with EAFEC, and EM Entire Period



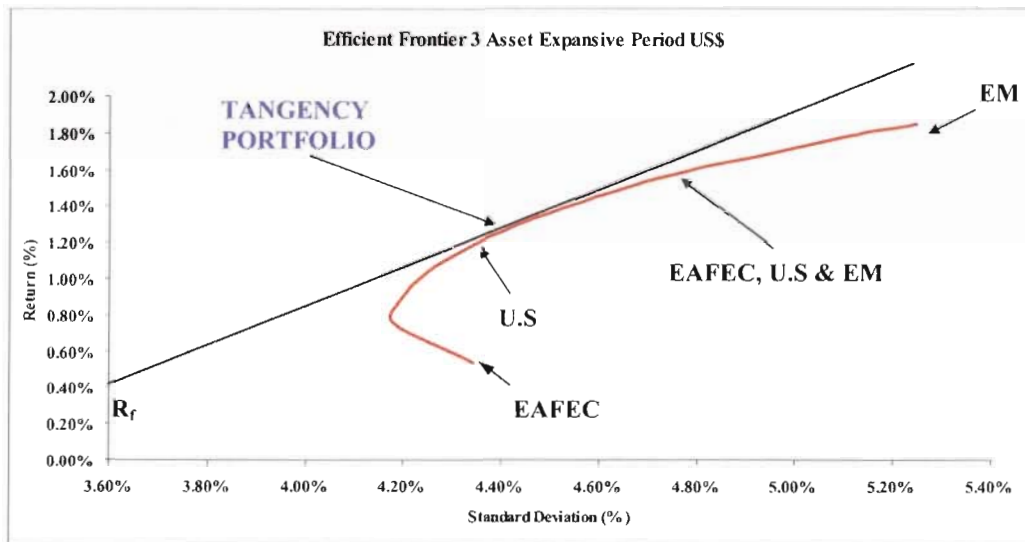
Expansive Monetary Period \$U.S Returns:

During expansive monetary conditions the three-asset portfolio including EM equities provided the highest return at the given risk levels. By examining the two-asset portfolio without EM and the three-asset portfolio including EM, both portfolios could not attain efficiency within the two lower risk levels, but the portfolios inclusive of EM outperformed the two-asset portfolio without EM at the risk level of 4.25% standard deviation and higher. At 4.50% standard deviation, the three asset portfolio outperformed the two-asset portfolio without EM by 5.16% annually. Again the portfolios including U.S equities outperformed those without. When analysing the two-asset portfolios with and without EAFEC and U.S equities it was difficult to distinguish which two-asset portfolio was more optimal as the returns generated were similar at each given risk level. The two-asset portfolio in U.S and EM performed slightly better at 4.50% standard deviation and higher by .60% and .48% annually respectively. Overall U.S equities provide an optimal asset mix with EM equities during expansive U.S monetary periods while EAFEC equities play a declining role at higher risk levels and a sub-optimal role in two-asset portfolios when U.S equities are omitted. Please see **Table 4.7 to Table 4.9** for details on two and three-asset weights at specific risk levels. Please see **Graph 4.5 to Graph 4.8** for details on various two and three-asset portfolios on the efficient frontiers in the expansive period. What the efficient frontier will indicate is the three-asset portfolio dominates all the two-asset portfolios on a return and risk basis.

Table 4.7 **Efficient portfolios with and without Emerging Market Equities, January 1995-May 2007**
Expansion Period US\$

Portfolio	Std Deviation	Two-Asset Portfolio			Mean Return	Three-Asset Portfolio		
		Asset Weight (%)	EAFEC	USA		Asset Weight (%)	EAFEC	USA
1 (Low Risk)	3.90%	NA	NA	NA	NA	NA	NA	NA
2	4.00%	NA	NA	NA	NA	NA	NA	NA
3	4.25%	0.75%	38.83	61.17	1.03%	36.40	35.64	27.96
4	4.50%	0.86%	5.53	94.47	1.29%	14.97	37.13	47.90
5	4.80%	NA	NA	NA	1.58%	0.00	27.31	72.69

Graph 4.5- U.S Portfolio Efficient Frontier with EAFEC, U.S and EM Expansive Period



Graph 4.6- U.S Portfolio Efficient Frontier with EAFEC. U.S Expansive Period

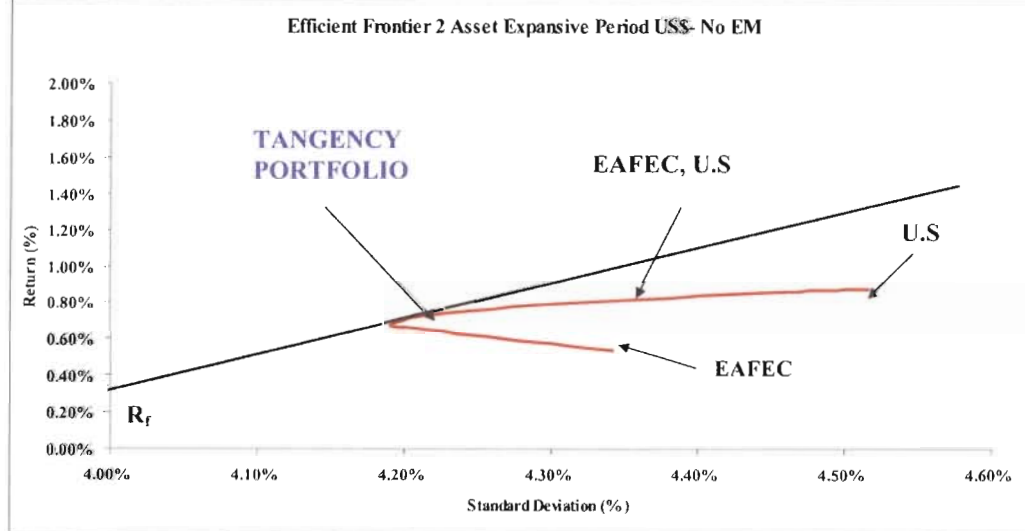


Table 4.8
Efficient portfolios with and without EAFEC Equities,
January 1995-May 2007
Expansion Period US\$

Portfolio	Two-Asset Portfolio				Three-Asset Portfolio			
	Std Deviation	Asset Weight (%)			Mean Return	Asset Weight (%)		
		Mean Return	USA	EM Index		EAFEC	USA	EM Index
1 (Low Risk)	3.90%	NA	NA	NA	NA	NA	NA	NA
2	4.00%	NA	NA	NA	NA	NA	NA	NA
3	4.25%	NA	NA	NA	1.03%	36.40	35.64	27.96
4	4.50%	1.32%	54.41	45.59	1.29%	14.97	37.13	47.90
5	4.80%	1.58%	27.31	72.69	1.58%	0.00	27.31	72.69

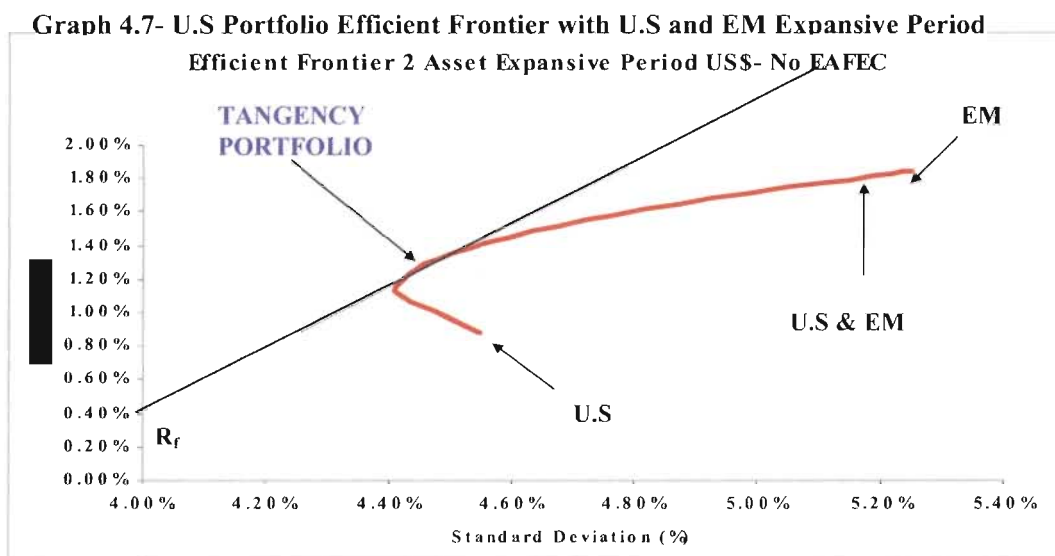
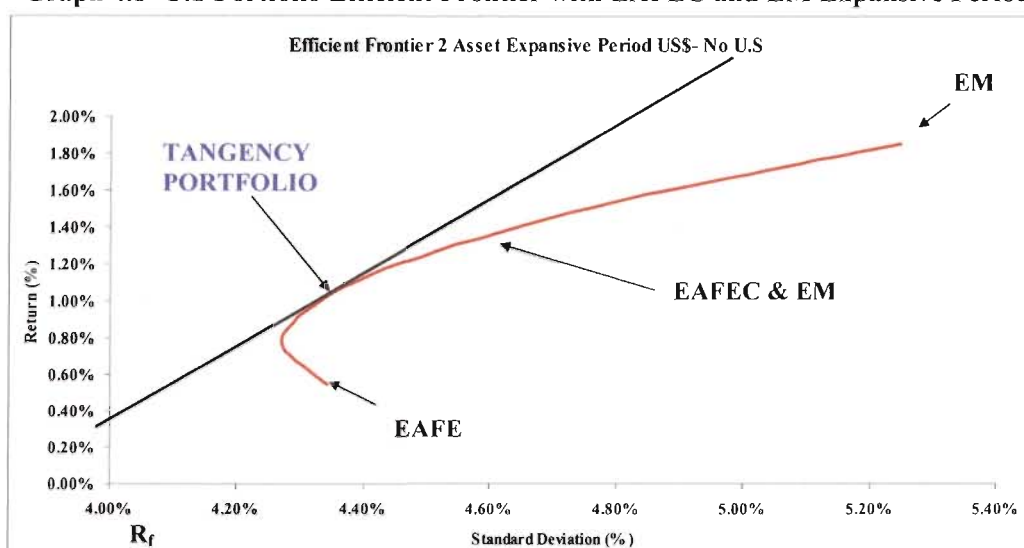


Table 4.9
Efficient portfolios with and without U.S Equities,
January 1995-May 2007
Expansion Period US\$

Portfolio	Two-Asset Portfolio				Three-Asset Portfolio			
	Std Deviation	Asset Weight (%)	Mean Return	EAFEC	Asset Weight (%)	Mean Return	EAFEC	EM Index
1 (Low Risk)	3.90%	NA	NA	NA	NA	NA	NA	NA
2	4.00%	NA	NA	NA	NA	NA	NA	NA
3	4.25%	NA	NA	NA	1.03%	36.40	35.64	27.96
4	4.50%	1.27%	43.84	56.16	1.29%	14.97	37.13	47.90
5	4.80%	1.54%	23.57	76.43	1.58%	0.00	27.31	72.69

Graph 4.8- U.S Portfolio Efficient Frontier with EAFEC and EM Expansive Period



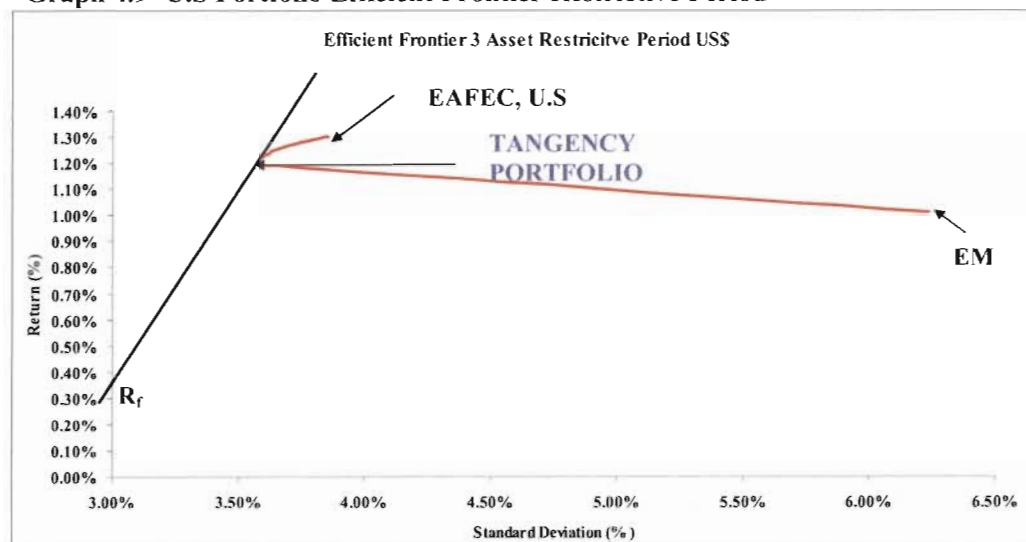
Restrictive Monetary Period: \$U.S Returns:

In contrast to CJJ findings (2002), current data indicates EM has no diversification benefits in U.S portfolios during restrictive periods. In CJJ findings, incorporating EM to the portfolio during restrictive monetary conditions showed significant benefit. In their findings, the three-asset portfolio with EM was able to obtain risk levels lower than the two-asset portfolio without EM. In contrast using current data, the identical portfolio was recommended at the 3.90% risk level for the two and three-asset portfolio. U.S portfolios without any EM equities during restrictive was the most optimal. The findings support a previous study by Erb, Harvey, and Viscanta (1994) that correlation in international equity returns increase during times of unfavourable global market conditions such as restrictive monetary periods. What is very startling is the indication of little or no benefits of international investing for US investors during unfavourable equity market conditions. If EAFEC or the U.S equity allocation is omitted then the U.S portfolio will indicate to hold 100% of the equity market that is not EM. Therefore, only the data for the entire period with and without EM in **Table 4.10** and the efficient frontier for three asset class portfolio in **Graph 4.9** are shown.

Table 4.10 **Efficient portfolios with and without Emerging Market Equities, January 1995-May 2007**
Restrictive Period US\$

Portfolio	Two-Asset Portfolio				Three-Asset Portfolio			
	Std Deviation	Asset Weight (%)			Mean Return	Asset Weight (%)		
		Mean Return	EAFEC	USA		EAFEC	USA	EM Index
1 (Low Risk)	3.90%	<i>same</i>	<i>same</i>	<i>same</i>	1.29%	3.01	96.99	0.00
2	4.00%	NA	NA	NA	NA	NA	NA	NA
3	4.25%	NA	NA	NA	NA	NA	NA	NA
4	4.50%	NA	NA	NA	NA	NA	NA	NA
5	4.80%	NA	NA	NA	NA	NA	NA	NA

Graph 4.9- U.S Portfolio Efficient Frontier Restrictive Period



4.2 SUMMARY STATISTICS- CANADA

Table 4.11 reports the statistical summary in \$CDN for the individual EM countries and the composite indices. The table reports the mean \$CDN dollar return, standard deviation of returns and the coefficient of variation. The exchange rate was calculated by taking the data in \$U.S dollar terms and converting into \$CDN dollar terms. The statistical results in \$CDN dollar terms overall supports the 2002 CJJ findings. Firstly, on a return basis fifteen of the twenty-four EM countries had a mean return over the time period higher than the CDN equity index. However the findings were not as conclusive as the results in \$U.S dollar terms. Of the twenty-four EM countries nine exhibited lower returns over the time period and one EM country had similar results compared to the CDN index. Secondly, consistent with the CJJ findings, the volatility of the individual EM countries are higher than the volatility of Canada stock market. All twenty-four EM countries exhibited higher and in some cases, much higher volatility compared to the CDN index. On a relative risk basis, measured by the coefficient of variation, the individual EM countries compared unfavourably to the performance of the CDN index. All twenty-four countries exhibited higher volatility in returns adjusting for risk. On a relative risk basis, Egypt was the closest with a coefficient of variation score of 4.33 while the CDN equity index measured at 3.85. The current data in \$CDN dollar terms indicates that the CDN equity market continues to

offer higher returns for given level of risk and that stand alone EM countries are not attractive investments.

The bottom of **Table 4.11**, evidence based on the composite indices, indicates that EM countries are a more attractive investment combined together. The results in \$CDN dollar terms reflects the findings of CJJ in \$U.S dollar terms The GDP weighted EM index monthly return of 1.25% outperformed not only Canada's 1.18%, but the other three developed world indices. In volatility terms the EM GDP weighted index significantly improved to a standard deviation of return of 6.57%. Although higher than the indices in the developed world, the GDP weighted index in \$CDN equated favourably on a relative risk basis. The coefficient of variation improved in tandem with the higher return. On a relative risk basis, the EM index coefficient of variation of 5.23% is comparable to the U.S at 4.60 and outperforms EAFE and the World Index score of 6.13 and 6.42 respectively.

**Table 4.11 Summary Statistic for Monthly Returns C\$
January 1995-May 2007**

Index CAD	Return	Standard Deviation of Returns	Coefficient of Variation
MSCI Argentina	1.34%	11.12%	8.29
MSCI Brazil	1.66%	10.72%	6.46
MSCI Chile	0.67%	6.21%	9.21
MSCI China	0.39%	10.40%	26.75
MSCI Colombia	1.52%	9.52%	6.28
MSCI Czech Republic	1.60%	7.85%	4.91
MSCI Egypt	2.12%	9.18%	4.33
MSCI Hungary	2.06%	9.83%	4.78
MSCI India	1.04%	7.98%	7.65
MSCI Indonesia	1.07%	14.27%	13.31
MSCI Jordan	0.75%	5.42%	7.25
MSCI Korea	1.19%	12.54%	10.52
MSCI Malaysia	0.51%	9.29%	18.07
MSCI Mexico	1.49%	8.24%	5.51
MSCI Morocco	1.27%	5.60%	4.40
MSCI Pakistan	1.18%	11.50%	9.75
MSCI Peru	1.55%	7.61%	4.90
MSCI Philippines	-0.05%	9.44%	-207.15
MSCI Poland	1.35%	10.02%	7.44
MSCI Russia	3.05%	17.22%	5.66
MSCI Sri Lanka	0.60%	10.43%	17.25
MSCI Thailand	0.13%	12.13%	91.09
MSCI Turkey	2.39%	16.16%	6.76
MSCI Venezuela	1.70%	14.14%	8.31
MSCI Canada	1.18%	4.54%	3.85
MSCI USA	0.85%	3.93%	4.60
MSCI EAFE	0.63%	4.02%	6.42
MSCI World	0.65%	4.00%	6.13
EM Benchmark	1.25%	6.57%	5.23

Data is rounded to two decimal points

Table 4.12 reports the risk and return characteristics in \$CDN for the twenty-four EM countries and the five composite indices by monetary environment. **Table 4.12** also reports the statistical tests for differences in these statistics between the monetary environments. While the 2002 CJJ results showed that using U.S monetary conditions revealed little statistical significance in terms of return between monetary environments, Canadian statistical results remain consistent with the 2002 CJJ findings. The CJJ results for returns were inconclusive as well as only three countries showed statistically significant returns during expansive period and two EM countries showed statistically significant results in restrictive period. Current data in \$CDN dollar terms revealed one individual EM countries showing statistically significant higher returns during expansive periods and one during restrictive monetary periods. In terms of volatility, six countries reported standard deviation of returns higher during expansive monetary periods compared to restrictive periods. Using the coefficient of variation to test relative risk only two countries reported a higher number during the expansive monetary period. What is noticeable in the results are the countries that performed worse under expansive monetary periods consisted of only 1.94% of the total weighting of the GDP weighted index. Contrary to the previous CJJ findings, the composite indices returns were statistically significant higher for only Canada. The standard deviation of return was lower during expansive periods compared to restrictive monetary periods. While the difference in mean returns were statistically insignificant, on a relative risk basis all composite indices performed better during expansive periods compared to restrictive periods as well.

* Coefficient of variation on individual EM countries per monetary environment available upon request

Table 4.12 Mean Monthly Stock Returns by CDN Monetary Environment, January 1995-May 2007

Index CAD	Expansive Environment		Restrictive Environment		Difference (Expansive Minus Restrictive)	
	Return	Standard Deviation	Return	Standard Deviation	Return	Standard Deviation
MSCI Argentina	-0.39%	12.08%	1.51%	9.78%	-1.90%**	2.29%**
MSCI Brazil	2.11%	10.03%	0.96%	11.51%	1.15%	-1.48%
MSCI Chile	0.96%	6.18%	0.27%	6.28%	0.69%	-0.10%
MSCI China	0.71%	10.37%	0.14%	10.49%	0.57%	-0.12%
MSCI Colombia	2.89%	9.93%	0.58%	9.11%	2.31%	0.83%
MSCI Czech Rep.	1.43%	7.76%	1.55%	8.15%	-0.13%	-0.39%
MSCI Egypt	2.67%	9.14%	1.72%	9.38%	0.95%	-0.24%
MSCI Hungary	3.01%	9.55%	0.58%	10.14%	2.44%	-0.58%
MSCI India	1.37%	8.36%	0.54%	7.37%	0.83%	0.99%
MSCI Indonesia	3.81%	13.57%	-2.04%	13.53%	5.85%	0.04%
MSCI Jordan	1.08%	4.38%	0.38%	6.34%	0.70%	-1.97%
MSCI Korea	2.56%	10.46%	-0.17%	13.81%	2.74%	-3.35%
MSCI Malaysia	2.75%	8.43%	-1.49%	9.96%	4.24%	-1.53%
MSCI Mexico	1.85%	6.83%	0.22%	8.91%	1.63%	-2.07%
MSCI Morocco	0.61%	5.29%	2.30%	5.93%	1.69%***	-0.64%
MSCI Pakistan	1.90%	11.90%	0.95%	10.58%	0.95%	1.32%
MSCI Peru	2.11%	6.61%	0.65%	7.75%	1.46%	-1.14%
MSCI Philippines	0.14%	7.69%	-0.70%	9.32%	0.84%	-1.63%
MSCI Poland	1.24%	9.37%	1.28%	9.93%	-0.04%	-0.56%
MSCI Russia	7.20%	17.83%	-1.35%	14.94%	8.55%	2.89%***
MSCI Sri Lanka	1.18%	10.52%	-0.04%	10.44%	1.21%	0.08%
MSCI Thailand	0.65%	10.78%	-0.88%	12.27%	1.54%	-1.49%
MSCI Turkey	3.49%	17.89%	1.65%	14.87%	1.84%	3.02%***
MSCI Venezuela	2.63%	12.01%	0.82%	14.84%	1.80%	-2.83%
MSCI Canada	1.26%	4.26%	0.86%	4.72%	0.40%**	-0.46%
MSCI USA	1.04%	3.78%	0.67%	3.85%	0.37%	-0.07%
MSCI EAFE	0.60%	3.89%	0.51%	4.11%	0.09%	-0.23%
MSCI World	0.63%	3.86%	0.53%	4.09%	0.10%	-0.23%
MSCI EM	2.12%	5.95%	0.25%	6.88%	1.88%	-0.93%
worse returns in expansion than restrictive						
Higher standard deviation in Expansion period						

Note: Returns are arithmetic mean CDN returns. Differences are given in percentage points

* Difference in mean returns significant in a one-tailed *t*-test at the 10 percent level. Difference in standard deviation significant in an *F*-test at the 10 percent level.

** Difference in mean returns significant in a one-tailed *t*-test at the 5 percent level. Difference in standard deviation significant in an *F*-test at the 5 percent level.

*** Difference in mean returns significant in a one-tailed *t*-test at the 1 percent level. Difference in standard deviation significant in an *F*-test at the 1 percent level.

Table 4.13 presents the correlation data for the overall period and two Canadian monetary sub periods in \$CDN dollar terms. Like the U.S results, Category A represents the correlation data for the entire time period indicating high correlation between the EM index and CDN equity returns.

The correlation of .67 between the EM and CDN equity indices is consistent and similar to the correlation between the CDN, U.S (.67) and EAFE (.66) indices respectively. Compared to the 2002 CJJ findings on correlation benefits of international investing for U.S investors, current data indicates a smaller benefit in terms of diversification for Canadian investors investing in international equities. Category B indicates that overall correlation continues to be higher using current data. While correlation has increased between the CDN and U.S equity indices to .74 during expansive monetary periods, the diversification benefits using international equities are stronger. Correlation between Canada's stock returns and international equity returns decreases during expansive monetary periods. International equities especially, EM returns continue to be a better diversification option than stock returns from the developed markets, indicated by the decrease in correlation between Canada's equity returns and EM equity returns decreases to .59. EAFE equity returns slightly drop to .64 compared to .66 for the entire time period.

Category C indicates the correlation of between Canadian stock returns, developed market returns, and EM returns during the restrictive period. The data supports the results found by Erb, Harvey, and Viscanta (1994) that correlation of equity returns increase during unfavourable times for global market conditions. Compared to CJJ findings in \$U.S dollar terms, the correlation data in restrictive periods indicates a sharp rise in EM correlation to Canadian stock returns to .72. The correlation between EAFE equity returns \$CDN stock returns increased to .68 while the world index increased to .71. Contrasting the CJJ results it seems U.S equity returns prove to be the most effective diversification tool for Canadians during restrictive monetary conditions.

Correlation between U.S equity returns and CDN stock returns decreased to .59 during restrictive periods. Unlike the premise set forth by CJJ of using EM equities as a hedge against adverse global economic conditions for U.S portfolios, based on current correlation data, a Canadian's portfolios best hedge during restrictive periods is incorporating U.S equities instead.

**Table 4.13 Correlation Coefficient for Monthly Stock Returns C\$
January 1995-May 2007**

Index	MSCI Canada	MSCI USA	MSCI EAFE	MSCI World	Benchmark EM
<i>A. Correlation Coefficient for entire sample period</i>					
MSCI Canada	1.00	0.67	0.66	0.69	0.67
MSCI USA		1.00	0.67	0.68	0.57
MSCI EAFE			1.00	1.00	0.61
MSCI World				1.00	0.62
Benchmark EM					1.00
<i>B. Correlation Coefficient for expansive monetary environments</i>					
MSCI Canada	1.00	0.74	0.61	0.64	0.59
MSCI USA		1.00	0.63	0.64	0.61
MSCI EAFE			1.00	1.00	0.54
MSCI World				1.00	0.55
Benchmark EM					1.00
<i>C. Correlation Coefficient for restrictive monetary environments</i>					
MSCI Canada	1.00	0.59	0.68	0.71	0.72
MSCI USA		1.00	0.72	0.72	0.53
MSCI EAFE			1.00	1.00	0.68
MSCI World				1.00	0.70
Benchmark EM					1.00

4.4 OPTIMAL ALLOCATION: CANADIAN PORTFOLIOS

Efficient Frontier: Entire Period \$CDN

Tests were run using the QOS to examine whether there were benefits to a domestic portfolio (\$CDN) by diversifying into international equities within a mean-variance efficient framework related to changes in Canadian monetary conditions. In regards to the entire timeline, the conclusion drawn by evaluating the results provided by the QOS is that international equities continue to provide some diversification benefits for Canadian investors. The data indicates that by holding EM stocks within a portfolio will increase \$CDN returns at specific risk levels but at a much smaller rate than the conclusions drawn by CJJ for U.S investors. For example, by adding 5.00% EM stocks to a portfolio in \$CDN, the portfolio improved at 4.15% and 4.55% standard deviation by .12% annually. What is significant is that by adding EM stocks a portfolio in \$CDN would obtain an efficient portfolio at a greater standard deviation of 4.70% and above. The three-

asset portfolio with no EM stocks could not obtain these results. Another significant factor is the importance of EAFE stock in terms of risk reduction but the quick decline of the EAFE weighting in terms of returns. The EAFE weighting went to zero for portfolio with risk levels greater than 3.90%.

A Canadian portfolio performance is influenced more by the inclusion or exclusion of U.S and Canadian stocks. When not including U.S stocks the three-asset portfolio could not achieve results at the lower risk level of 3.60%. Within riskier portfolios at between 3.90%-4.15% the three-asset portfolio with U.S equities and no Canadian equities trailed those of the three asset portfolio with Canadian equities and no U.S equities. As the risk level increases further up on the efficient frontier, the U.S weighting gradually declines to zero and the results are the same as the four asset portfolio at a risk level of 4.55% and higher. The optimal portfolio becomes a two asset portfolio in Canadian and EM equities. The exclusion of Canadian equities showed the greatest deterioration. Again the efficient frontier on the three asset portfolio without Canadian equities could not obtain results at a 3.60% standard deviation. Thereafter, the results on all risk levels were far lower than all the other three and four-asset portfolios. Overall, the three-asset portfolio without Canadian equities generated 1.80% lower returns annually than the other portfolios with Canadian equities. **Tables 4.14 to 4.16** indicate these results and provide details on optimal portfolios weights for specific risk levels. Please see **Graphs 4.10 to Graph 4.13** for efficient frontiers of specified asset mixes. What the efficient frontier will indicate is the frontier with EM weightings dominates those without.

Note 1: All efficient frontier graphs are for representation of asset weights for prescribed tables. All asset weights fall on the efficient frontier. For detail information on asset weights available upon request.

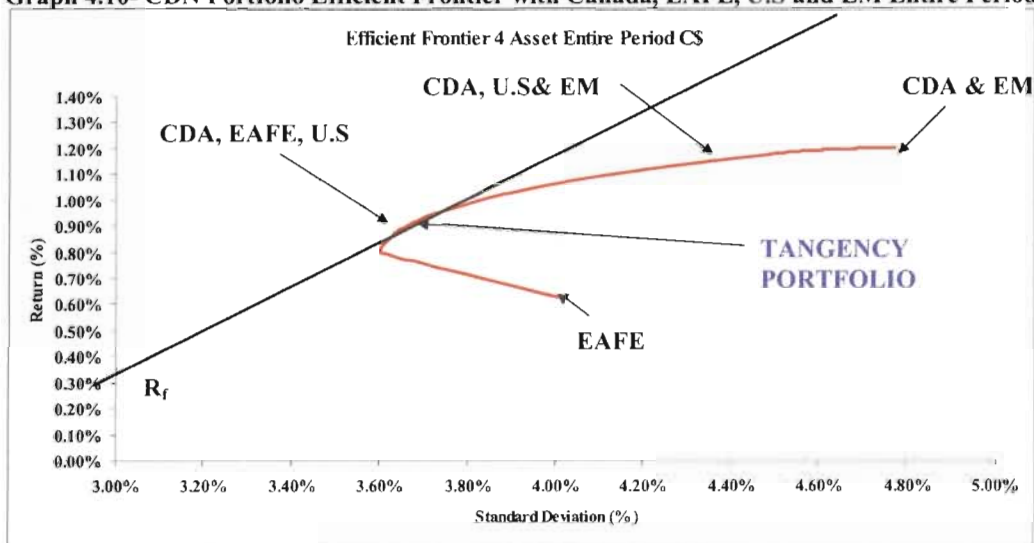
Note 2: All graphs indicate the risk free rate (R_f). The risk free rate used is the Bank of Canada Treasury Bill rate. The sample period remains consistent with all equity returns. The risk free rate is the arithmetic mean monthly rate. The monthly mean Treasury bill rate is .332%.

Note 3: The slope of the Security Market Line represents the market risk premium (SML). The tangency portfolio on the SML represents the optimal trade off between risk and return. The tangency portfolio is only a representation of the equity asset classes of an investor's portfolio, therefore the slope of the SML will change with further additions to the market portfolio. Equity weights for the tangency portfolio are available upon request.

Table 4.14 Efficient portfolios with and without **Emerging Market** Equities,
January 1995-May 2007
Entire Period C\$

Portfolio	Std Dev.	Three-Asset Portfolio				Four-Asset Portfolio					
		Mean Ret.	Asset Weight (%)				Mean Ret.	Asset Weight (%)			
			Cda	USA	EAFE			Cda	USA	EAFE	EM
1 (low Risk)	3.60%	0.80%	12.24	47.28	40.48	0.80%	12.24	47.28	40.48	0.00	
2	3.91%	1.04%	55.94	44.06	0.00	1.04%	55.94	44.06	0.00	0.00	
3	4.15%	1.10%	75.08	24.92	0.00	1.11%	71.42	23.47	0.00	5.11	
4	4.55%	1.18%	99.69	0.31	0.00	1.19%	87.13	0.00	0.00	12.87	
5	4.70%	NA	NA	NA	NA	1.20%	70.85	0.00	0.00	29.15	

Graph 4.10- CDN Portfolio Efficient Frontier with Canada, EAFE, U.S and EM Entire Period



Graph 4.11- CDN Portfolio Efficient Frontier with Canada, EAFE, and U.S Entire Period

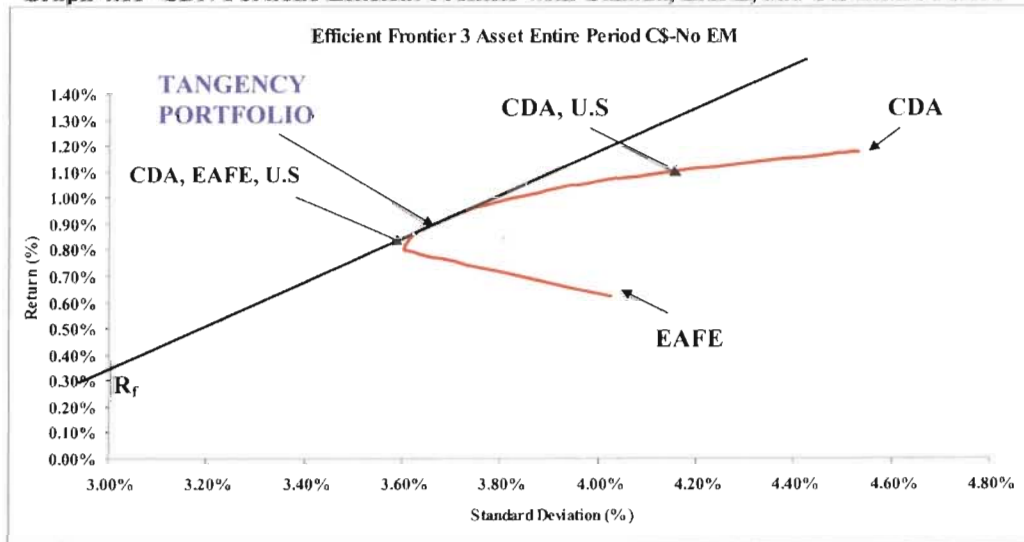


Table 4.15 Efficient portfolios with and without **Canadian** Equities,
January 1995-May 2007
Entire Period C\$

		Three-Asset Portfolio				Four-Asset Portfolio				
		Asset Weight (%)				Asset Weight (%)				
Portfolio	Std Dev.	Mean Ret.	USA	EAFE	EM	Mean Ret.	Cda	USA	EAFE	EM
1 (low Risk)	3.60%	NA	NA	NA	NA	0.80%	12.24	47.28	40.48	0.00
2	3.91%	0.89%	72.20	12.41	15.39	1.04%	55.94	44.06	0.00	0.00
3	4.15%	0.97%	72.21	0.00	27.79	1.11%	71.42	23.47	0.00	5.11
4	4.55%	1.04%	54.09	0.00	45.91	1.19%	87.13	0.00	0.00	12.87
5	4.70%	1.05%	49.91	0.00	50.09	1.20%	70.85	0.00	0.00	29.15

Graph 4.12- CDN Portfolio Efficient Frontier with EAFE, U.S and EM Entire Period

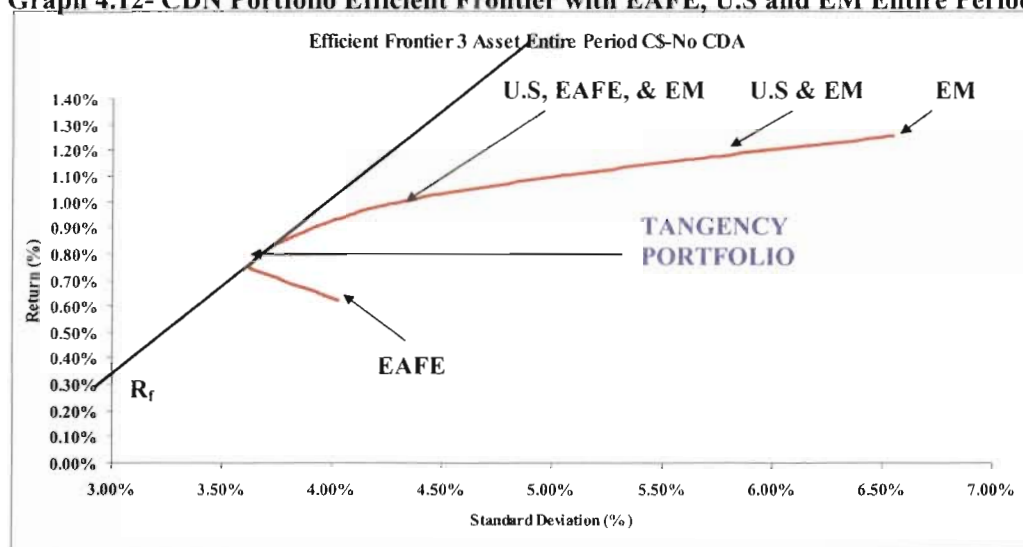
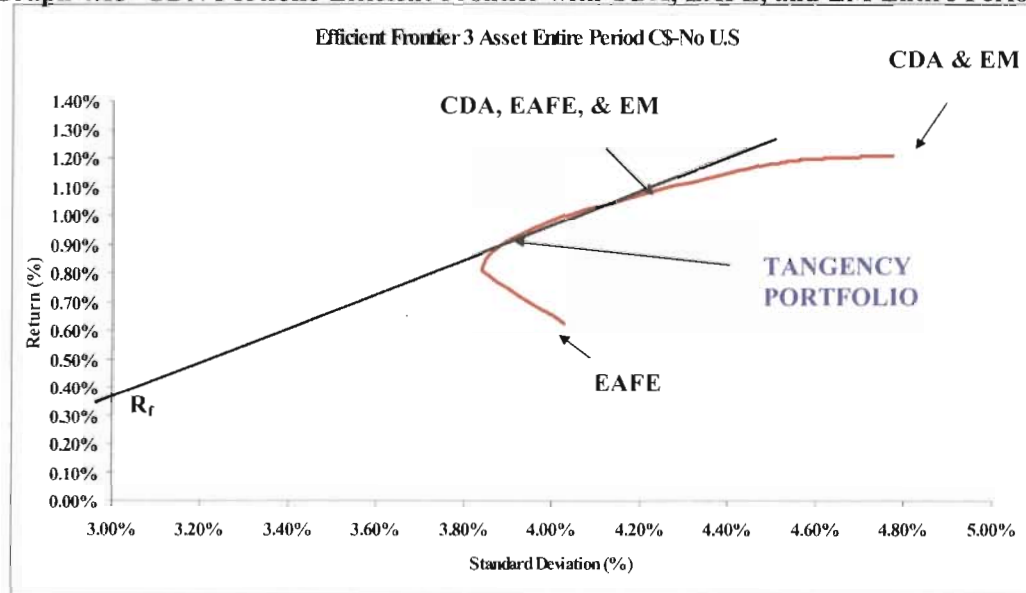


Table 4.16 Efficient portfolios with and without **U.S** Equities,
January 1995-May 2007
Entire Period C\$

Portfolio	Three-Asset Portfolio					Four-Asset Portfolio				
	Std Dev.	Mean Ret.	Asset Weight (%)			Mean Ret.	Asset Weight (%)			
			Cda	EAFE	EM		Cda	USA	EAFE	EM
1 (low Risk)	3.60%	NA	NA	NA	NA	0.80%	12.24	47.28	40.48	0.00
2	3.91%	0.98%	63.57	36.43	0.00	1.04%	55.94	44.06	0.00	0.00
3	4.15%	1.03%	72.13	27.31	0.56	1.11%	71.42	23.47	0.00	5.11
4	4.55%	1.19%	87.13	0.00	12.87	1.19%	87.13	0.00	0.00	12.87
5	4.70%	1.20%	70.85	0.00	29.15	1.20%	70.85	0.00	0.00	29.15

Graph 4.13- CDN Portfolio Efficient Frontier with CDA, EAFE, and EM Entire Period



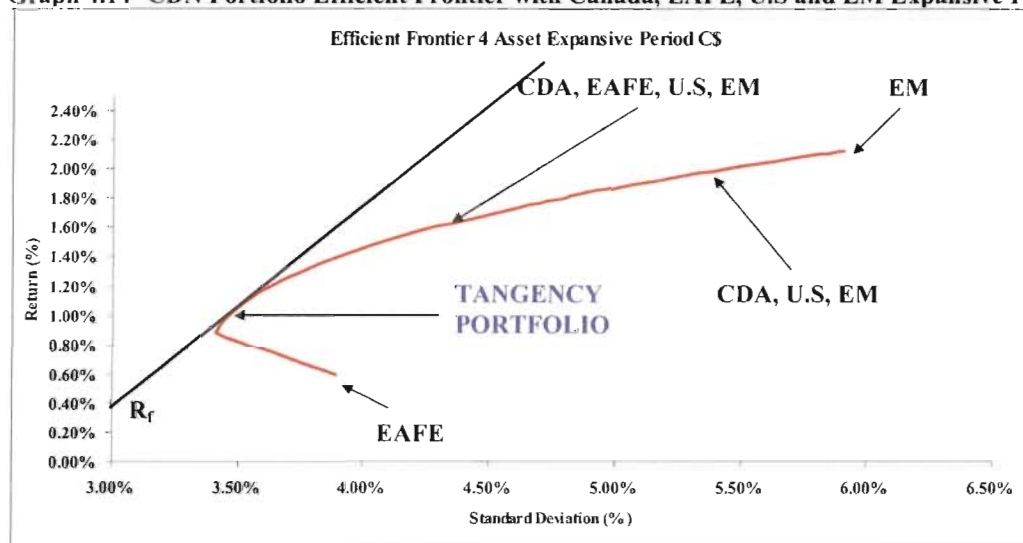
Efficient Frontier- Expansive Period \$CDN:

Contrasting the 2002 CJJ results, EM allocation for \$CDN portfolios under expansive monetary condition proved to be most optimal. Comparing returns with the three-asset portfolio without EM, the four-asset portfolio increased returns at the 3.60% standard deviation by 1.20% annually. At the higher risk level of 4.70% the four-asset portfolio achieved a 6.12% annual increase in returns compared to the most efficient three-asset portfolio without EM at risk level 4.15%. The three-asset portfolio without Canadian and U.S equities, both under performed compared to the four asset portfolio with EM. Again the significance of the EM addition is evident in the performance of the three-asset portfolio without Canadian equities. At the 3.60% risk level, the three-asset portfolio with Canadian equities outperformed the three asset portfolio without Canadian equities by 2.28% annually. The addition of the 12.50% EM plays an important role as the performance of the two portfolios become increasingly similar at higher risk levels. At the lower risk level the EM allocation plays an important role at reducing volatility when Canadian equities are absent. **Table 4.17 to Table 4.20** provide the details on optimal portfolio weights and risk levels. Please see **Graph 4.14 to Graph 4.18** for efficient frontiers of corresponding asset mixes.

Efficient portfolios with and without **Emerging Market** Equities,
 Table 4.17 January 1995-May 2007
 Expansion Period C\$

Portfolio	Three-Asset Portfolio					Four-Asset Portfolio				
	Std Dev.	Mean Ret.	Asset Weight (%)			Mean Ret.	Asset Weight (%)			
			Cda	USA	EAFE		Cda	USA	EAFE	EM
1 (low Risk)	3.60%	1.09%	40.18	50.11	9.71	1.19%	25.75	41.87	16.84	15.55
2	3.91%	1.20%	73.22	26.78	0.00	1.39%	31.62	38.58	2.81	26.98
3	4.15%	1.25%	94.60	5.40	0.00	1.52%	33.85	29.06	0.00	37.09
4	4.55%	NA	NA	NA	NA	1.68%	35.82	12.44	0.00	51.74
5	4.70%	NA	NA	NA	NA	1.73%	36.47	6.90	0.00	56.63

Graph 4.14- CDN Portfolio Efficient Frontier with Canada, EAFE, U.S and EM Expansive Period



Graph 4.15- CDN Portfolio Efficient Frontier with Canada, EAFE, and U.S Expansive Period

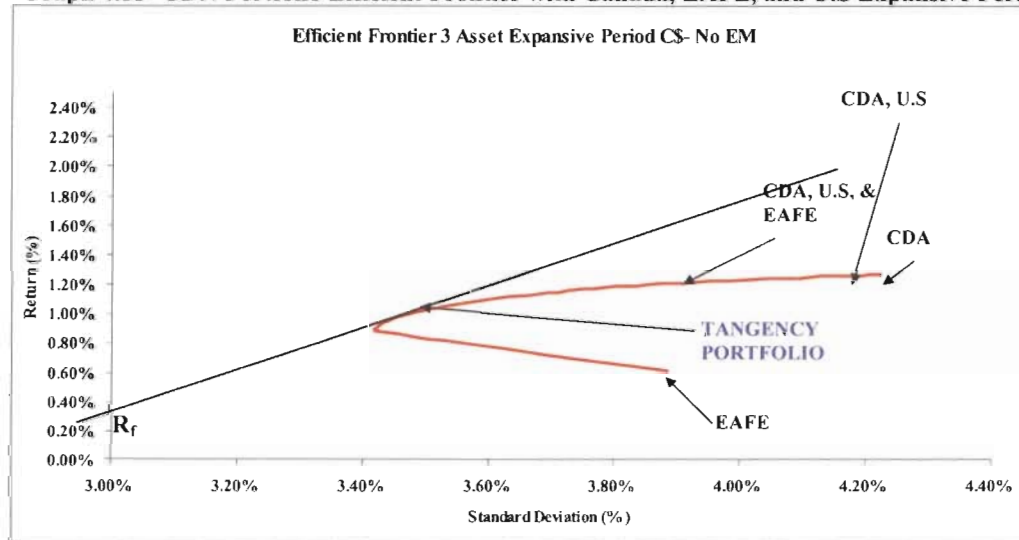


Table 4.18 Efficient portfolios with and without **U.S Equities**,
January 1995-May 2007

Portfolio	Three-Asset Portfolio					Four-Asset Portfolio				
	Std Dev.	Mean Ret.	Asset Weight (%)			Mean Ret.	Asset Weight (%)			
			Cda	EAFE	EM		Cda	USA	EAFE	EM
1 (low Risk)	3.60%	0.86%	38.41	61.59	0.00	1.19%	25.75	41.87	16.84	15.55
2	3.91%	1.33%	49.52	24.11	26.37	1.39%	31.62	38.58	2.81	26.98
3	4.15%	1.43%	51.60	16.51	31.88	1.52%	33.85	29.06	0.00	37.09
4	4.55%	1.70%	49.35	0.00	50.65	1.68%	35.82	12.44	0.00	51.74
5	4.70%	1.76%	41.92	0.00	58.08	1.73%	36.47	6.90	0.00	56.63

Graph 4.16- CDN Portfolio Efficient Frontier with Canada, EAFE, and EM Expansive Period

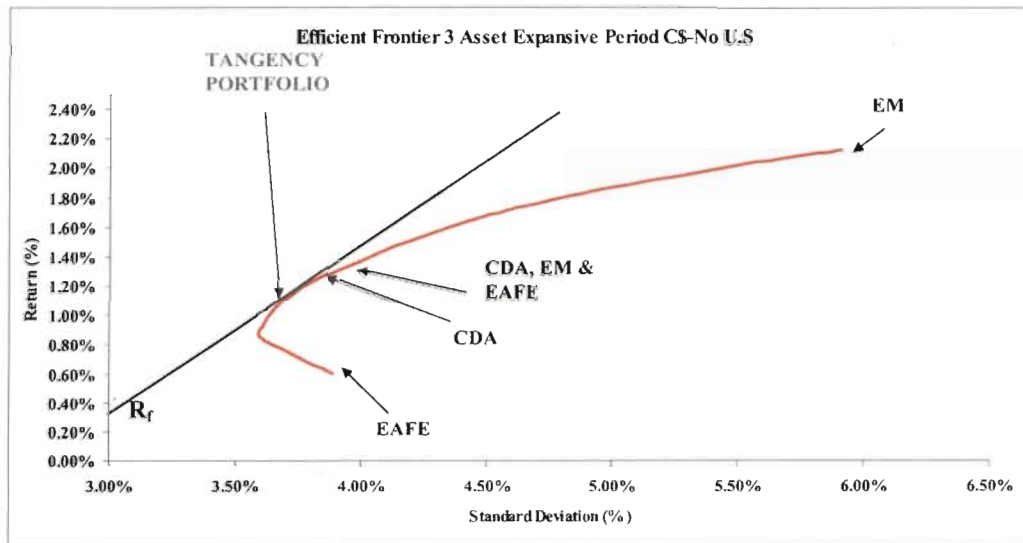
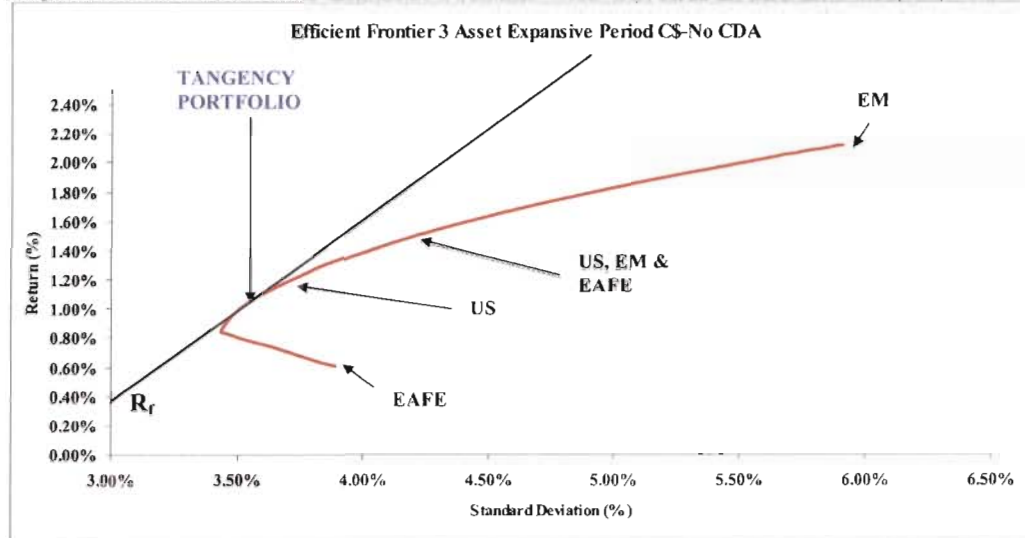


Table 4.19 Efficient portfolios with and without **Canadian Equities**,
January 1995-May 2007

Portfolio	Three-Asset Portfolio					Four-Asset Portfolio				
	Std Dev.	Mean Ret.	Asset Weight (%)			Mean Ret.	Asset Weight (%)			
			USA	EAFE	EM		Cda	USA	EAFE	EM
1 (low Risk)	3.60%	1.05%	57.91	29.64	12.45	1.19%	25.75	41.87	16.84	15.55
2	3.91%	1.32%	58.55	10.83	30.62	1.39%	31.62	38.58	2.81	26.98
3	4.15%	1.50%	57.56	0.00	42.44	1.52%	33.85	29.06	0.00	37.09
4	4.55%	1.66%	42.59	0.00	57.41	1.68%	35.82	12.44	0.00	51.74
5	4.70%	1.72%	37.60	0.00	62.40	1.73%	36.47	6.90	0.00	56.63

Graph 4.17- CDN Portfolio Efficient Frontier with US, EAFE, and EM Expansive Period



Efficient Frontier- Restrictive Period \$CDN:

Contrary to the CJJ study (2002), the restrictive period portfolios indicate holding no EM was the most efficient for Canadian portfolios. The QOS produced the same results for the four-asset class portfolio with EM and the three-asset class portfolio without EM. Under mean variance framework, the QOS ascertained that holding EM during restrictive monetary conditions was inefficient. What is also quite clear again is the quick decline of holding any developed international equity markets. The EAFE weightings in portfolios greater than 3.60% standard deviation was quickly driven down to zero. On the other hand, the U.S equity weighting remained consistent until risk levels reached higher levels greater than 4.15%. At the higher risk levels, a domestic portfolio in CDN equities was most efficient with the highest point on the efficient frontier holding 100% in CDN equity. The findings show the benefits of risk reduction using international equities, but at higher risk levels the benefit is zero. In contrast to The CJJ findings for U.S investors, current data in \$CDN dollar terms indicates the benefits of holding U.S securities under restrictive monetary periods. In contrast with the U.S results using current data, Canadian portfolio benefit from a risk reduction standpoint in holding EAFE and especially U.S equities during unfavourable global economic conditions. But by further pushing out the efficient frontier, the conclusion is the same for \$CDN portfolios: holding 100% domestic is most efficient

at higher risk levels. **Graph 4.18** demonstrates the efficient frontier of the restrictive period in \$CDN is overwhelmingly dominated by all the efficient frontiers generated using the entire time period and expansive monetary period. It is clear that the increase in correlation between Canada and global equities has decreased the diversification benefits of holding international equities. What is surprising is the increase in risk reduction benefits of holding U.S stocks in a Canadian portfolio under restrictive periods. Perhaps the overall breadth of the U.S market plays an increasingly important defensive role for Canadian portfolio. That question itself can be another study onto its own. **Table 4.19 to Table 4.21** provide the details on optimal weights and risk levels of the portfolios. Please see **Graph 4.18 to Graph 4.20** for efficient frontiers of differing asset mixes

Table 4.20 Efficient portfolios with and without **Emerging Market** Equities, January 1995-May 2007
Restrictive Period C\$

Portfolio	Three-Asset Portfolio					Four-Asset Portfolio				
	Std Dev.	Mean Ret.	Asset Weight (%)			Mean Ret.	Asset Weight (%)			EM
			Cda	USA	EAFE		Cda	USA	EAFE	
1 (low Risk)	3.60%	Same	Same	Same	Same	0.65%	15.25	56.13	28.61	0.00
2	3.91%	Same	Same	Same	Same	0.78%	58.02	41.98	0.00	0.00
3	4.15%	Same	Same	Same	Same	0.81%	74.65	25.35	0.00	0.00
4	4.55%	Same	Same	Same	Same	0.85%	93.85	6.15	0.00	0.00
5	4.70%	Same	Same	Same	Same	0.86%	100.00	0.00	0.00	0.00

Graph 4.18- CDN Portfolio Efficient Frontier with Canada, EAFE, U.S and EM Restrictive Period

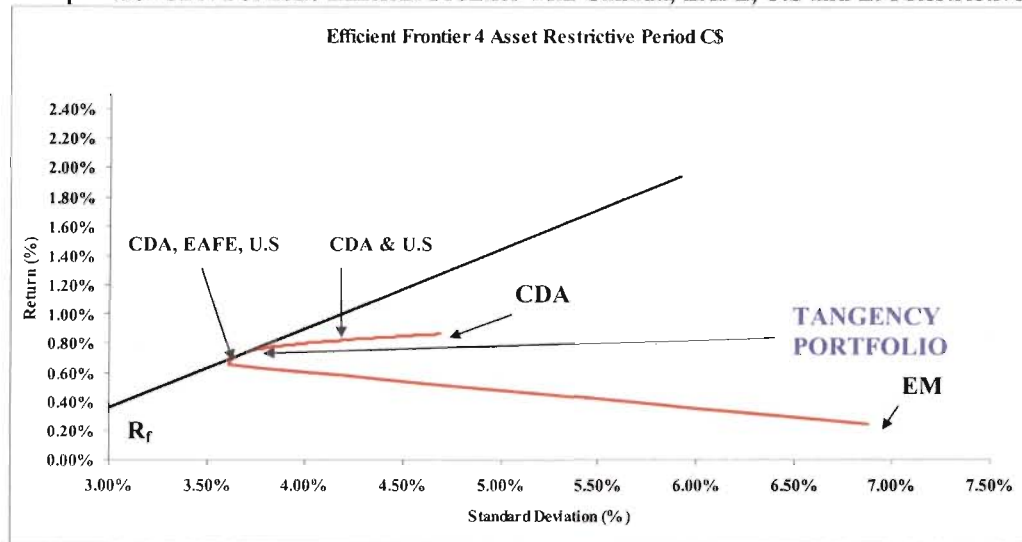


Table 4.21 Efficient portfolios with and without **U.S** Equities,
January 1995-May 2007

Portfolio	Three-Asset Portfolio					Four-Asset Portfolio				
	Std Dev.	Mean Ret.	Asset Weight (%)			Mean Ret.	Asset Weight (%)			
			Cda	EAFE	EM		Cda	USA	EAFE	EM
1 (low Risk)	3.60%	NA	NA	NA	NA	0.65%	15.25	56.13	28.61	0.00
2	3.91%	NA	NA	NA	NA	0.78%	58.02	41.98	0.00	0.00
3	4.15%	0.73%	63.07	36.93	0.00	0.81%	74.65	25.35	0.00	0.00
4	4.55%	0.83%	91.50	8.50	0.00	0.85%	93.85	6.15	0.00	0.00
5	4.70%	0.86%	100.00	0.00	0.00	0.86%	100.00	0.00	0.00	0.00

Graph 4.19- CDN Portfolio Efficient Frontier with Canada, EAFE, and EM Restrictive Period

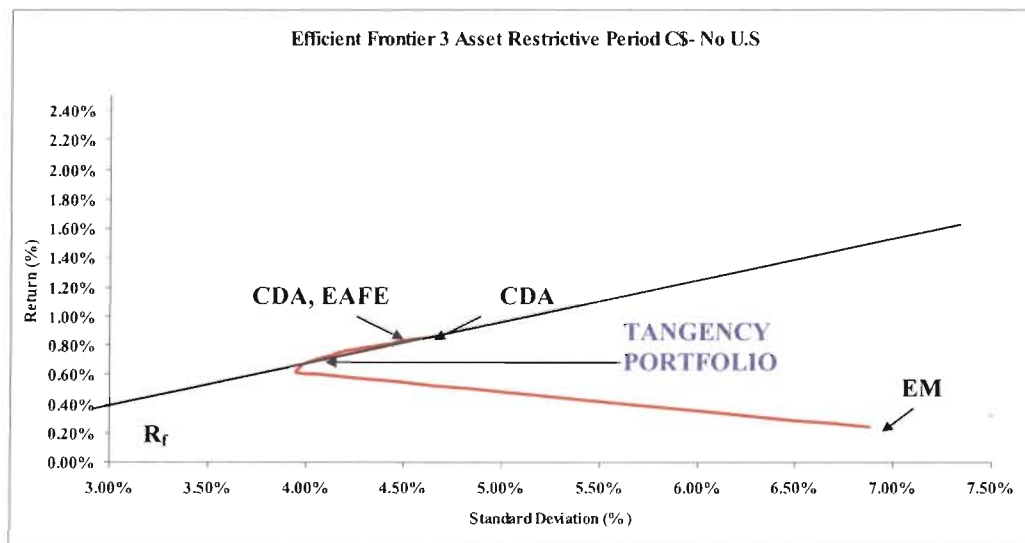
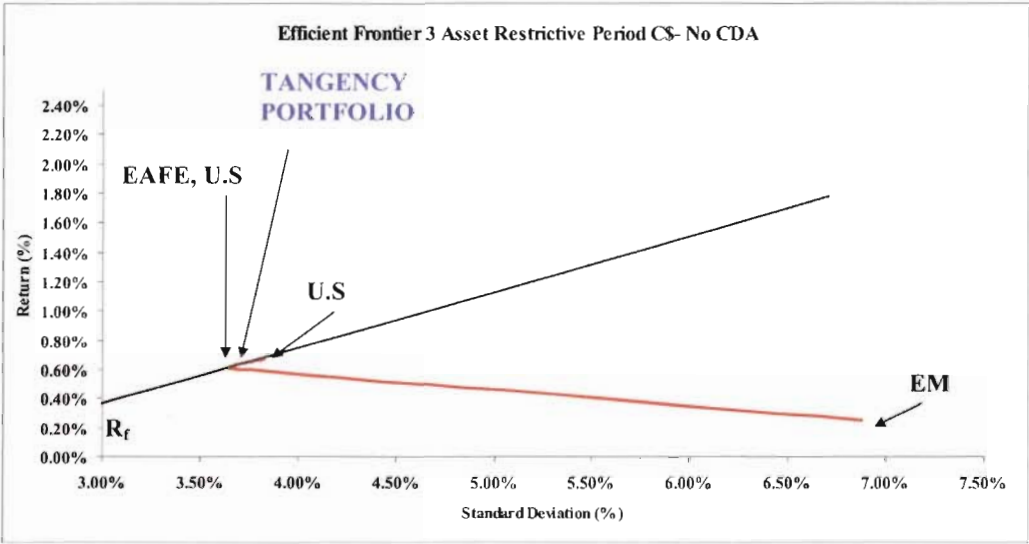


Table 4.22 Efficient portfolios with and without **Canadian** Equities,
January 1995-May 2007

Portfolio	Three-Asset Portfolio					Four-Asset Portfolio				
	Std Dev.	Mean Ret.	Asset Weight (%)			Mean Ret.	Asset Weight (%)			
			USA	EAFE	EM		Cda	USA	EAFE	EM
1 (low Risk)	3.60%	0.61%	61.44	38.56	0.00	0.65%	15.25	56.13	28.61	0.00
2	3.91%	0.67%	100.00	0.00	0.00	0.78%	58.02	41.98	0.00	0.00
3	4.15%	NA	NA	NA	NA	0.81%	74.65	25.35	0.00	0.00
4	4.55%	NA	NA	NA	NA	0.85%	93.85	6.15	0.00	0.00
5	4.70%	NA	NA	NA	NA	0.86%	100.00	0.00	0.00	0.00

Graph 4.20- CDN Portfolio Efficient Frontier with U.S, EAFE, and EM Restrictive Period



CONCLUSION

This paper examines the role Canadian monetary conditions play in international investing for Canadians. Attention focused on the relationship of Canadian monetary policy and gains on a Canadian portfolio's returns investing in international equities specifically emerging markets. The statistical results in \$U.S and \$CDN seem to be consistent with findings from the 2002 CJJ study. Overall, on a stand alone basis, emerging markets in both currencies are riskier investments than the developed equity markets; as a group emerging markets fair much better. In \$CDN the GDP emerging market index actually outperforms specific developed equity market indices on a relative risk basis. In \$U.S, the current data also indicates that this discrepancy has narrowed and more emerging market countries are beginning to show performances on par with the U.S and developed equity markets.

The statistical results in terms of monetary condition were consistent with the CJJ findings for both \$U.S and \$CDN. The current sample in both currencies identified that global equity returns outperformed during expansive monetary conditions compared to restrictive monetary periods but the mean difference in returns between monetary environments showed little statistical significance. Ironically, in \$U.S, the developed equity markets underperformed during expansive periods compared to restrictive U.S monetary periods. CJJ concluded that there was no statistically significant difference in emerging market performance from a return standpoint, during expansive or restrictive U.S monetary conditions and this study concurs with this finding.

What is startling were the statistical results in \$U.S and \$CDN, revealed the dramatic increase in correlation between all global equity markets during the sample period. In contrast to the 2002 CJJ findings, correlation between Canadian equity returns and emerging market equity returns were very similar to correlation between the developed markets. Diversification benefits

increased during expansive Canadian monetary periods and decreased during restrictive periods. Overall the correlation data indicated much smaller benefits to international diversification as previously assumed. The findings using current data validates previous studies that showed correlation varies over time and that correlation rises among equity markets during unfavourable equity market conditions.

Under the mean variance framework the findings indicate it would be disastrous for Canadian investors to emulate the asset allocation strategy recommended by CJJ for U.S portfolios. The statistical results prove that during the entire sample period, Canadian investors would partially benefit by investing in international equities including emerging markets. More importantly, under Canadian expansive monetary periods, adding an emerging market weighting to a Canadian portfolio would maximize returns at specific risk levels. The opposite occurred during Canadian restrictive monetary periods showing no benefit in holding any allocation of emerging market equities. What is surprising is the results indicate that U.S equities from a risk reduction standpoint are the best hedge for Canadian portfolios during unfavourable equity market conditions. Re-visiting the U.S results, the findings invalidate CJJ conclusion that emerging market equities improve U.S portfolio performance during restrictive U.S monetary conditions. Under mean-variance framework, U.S portfolios optimized the use of emerging market equities during expansive U.S monetary periods. The conclusion is there no benefit in holding any emerging market equities during restrictive U.S monetary periods.

Emerging market analysis for Canadian portfolios has not been studied in depth due to the size of our market in comparison to investors to the south. A continual process to analyze emerging market returns over the next decade would provide clearer explanation on whether Canadian monetary action does show consistent patterns that help formulate an effective asset allocation strategy for Canadian investors.

REFERENCE LIST

- Barry, C., J. Peavy, and M. Rodriguez 1996, Emerging Stock Markets: Risk, Return and Performance, *the Research Foundation of the Institute of Chartered Financial Analysts*, 9-60.
- Bekaert, G., R. Harvey, and Lundblad C, 2003, Equity Market Liberalization in Emerging Markets, *the Journal of Financial Research*, vol. XXVI, 275-299.
- Bruner, R., R. Conroy, and J. Estrada, 2002, Introduction to Valuation in Emerging Markets, *Emerging Market Review*, vol. 3 no. 4, 310-324.
- Bruner, R, R. Conroy, 2003, Investing in Emerging Markets, *Research Foundation of Investment Management and Research*, 16-59.
- Campbell, John Y., P. Rathjens, 2003, The Case for International Diversification Part 1: Forming Return Expectations, *Arrowstreet Capital*, L.P May 2003.
- Campbell, John Y., P. Rathjens, 2003, The Case for International Diversification Part 2: Reducing Risk and the Cost of International Diversification, *Arrowstreet Capital*, L.P., May 2003.
- Claude, E., R. Harvey, T. Viskanta , 1995, Country risk and Global equity Selection, *Journal of Portfolio Management* vol. 21 no.2, 74-83.
- C. Mitchell Conover, Gerald R. Jensen, and Robert R. Johnson, 2002, Emerging Markets: When Are They Worth It? , *Financial Analysts Journal*, March/April, Vol. 58, No. 2: 86-95.
- C. Mitchell Conover, Gerald R. Jensen, and Robert R. Johnson, 2000, Monetary Conditions and International Investing, *CFA Digest*. February, Vol. 30, No. 1: 33-35.
- Durham, J., 2003, Monetary Policy and Stock Returns, *Financial Analyst Journal*, July/August Vol.59 no.4: 26-35.
- Durham, J., 2005, More on Monetary Policy and Stock Price Returns, *Financial Analyst Journal*, July/August Vol.61 no.4: 83-91.

Erb, C., C. Harvey, T. Viskanta, 1996- Political risk, Economic risk and Financial risk, *Financial Analyst Journal* 52, 28-46.

Estrada, J., 2002, Systematic risk in Emerging Markets: The D-CAPM, *Emerging Market Review*, vol. 3 no. 4: 365-379.

Forbes, K., R. Rigobon, 2002, No Contagion, Only Interdependence: Measuring Stock market Co movements, *The Journal of Financial Research* Vol. LVII.

Harvey, C., 1995, Predictable Risk and Returns in Emerging Markets, *Review of Financial Studies*, 8, 773-816.

Harvey, C., 2000, The Drivers of Expected Returns in Emerging Markets, *Emerging Markets Quarterly* 4, 1-17.

Hildebrand, Philipp C., The Virtues of Flexible Financial Markets, CFA Annual Conference, Zurich, May 21-24, 2006.

Jones, David M., How Central Bank Policies Affect Global Economies and Markets, *Financial Analysts Seminar held in Evanston, Illinois*, on 16–21 July 2006.

Kortas, M., J. L'Her, M. Roberge, 2004, Country Selection of Emerging Markets: Benefits from Country Attribute Diversification, *Emerging Market Review* vol. 6, 1-19.