Center for International Securities and Derivatives Markets

The USDX as an Investment and Trading Vehicle: An Update

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Thomas Schneeweis
Director

Bhaswar Gupta
Research Director

Erkin Mustafokulov
Research Associate

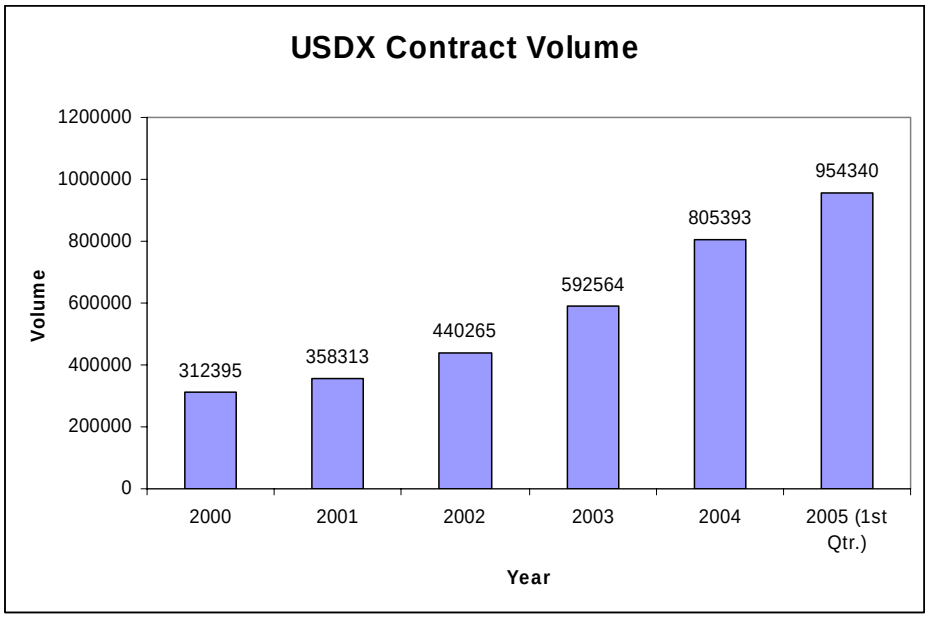
Please address all correspondence to:

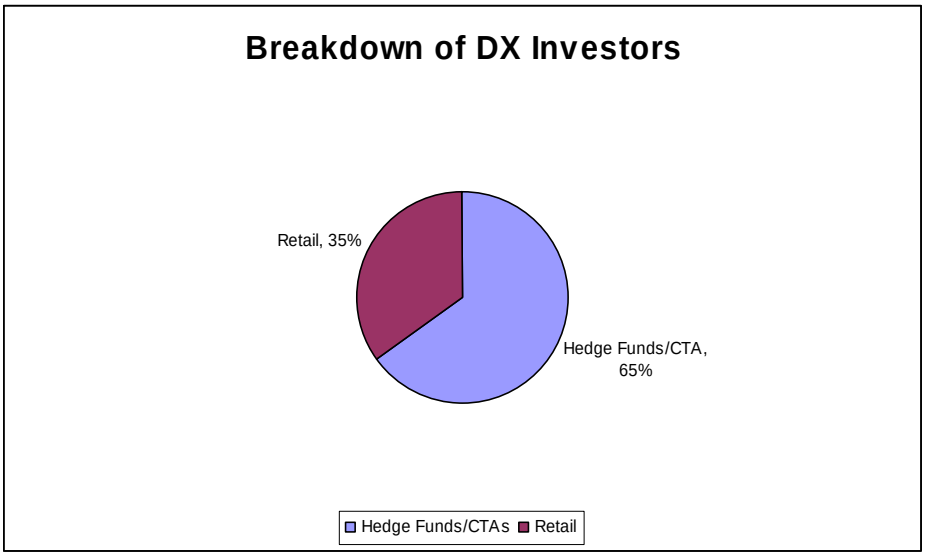
Bhaswar Gupta
Research Director
Center for International Securities and Derivatives Markets
The University of Massachusetts
Amherst, MA, 01003
Phone: (413) 545-5641
Fax: (413) 577-3166
E-mail: raj@cisdm.org

I. NTRODUCTION

In a previous article, Schneeweis, Spurgin and Georgiev [2003] examined the investment and risk management benefits of USDX (also known as DX) index over the period Jan 1991-Apr 2002. The New York Board of Trade (NYBOT) US Dollar Index (USDX; DX for short) represents the value of the US Dollar in terms of a basket of six major foreign currencies: Euro (57.6 %), Japanese Yen (13.6 %), UK Pound (11.9 %), Canadian Dollar (9.1 %), Swedish Krona (4.2 %) and Swiss Franc (3.6 %). There exist a futures contract and an option contract on the DX, traded on the FINEX (a division of NYBOT). The DX provides a convenient method for direct investment in the US Dollar as well as a tool for hedging FX exposure relative to the Dollar.

Much has happened in the ensuing period including the significant rise of the Euro. Currency indexing has gained more attention. There has been a significant increase in the volume of DX contracts traded. The majority of DX investors are either hedge funds/CTAs or retail. The following charts show the volume of contracts traded and investor breakdown.





In this article, we re-examine the USDX index over the period July 1995-June 2005. Specifically we explore the following questions:

1. Whether the USDX is a good currency investment to trade/invest/speculate in the value for the US dollar- offering comparable returns with lower risk parameters than individual currency pairs such as Euro, Yen, Pound or Swiss Francs, etc.
2. Whether the USDX is a good investment to include in a portfolio as presented on the efficient frontier and return distribution.
3. Whether the USDX is a structured product that is a good proxy to track international flows of capital. Be the origin of that trade balances or sheer volume in stock exchanges.

In the appendix, we present a brief update of the academic and practitioner literature on currency investing and risk management since Schneeweis, Spurgin and Georgiev [2003]. Section II describes the data and methodology used in this study, while section III presents our findings as they relate to the performance of the DX as an investment and a risk management

tool. Results show that the DX provides both investment and risk management benefits, especially for investors in diversified global investment portfolios. Section IV summarizes the results.

II. DATA AND METHODOLOGY

This section outlines the data and methodology employed in the analysis of the USDX as investment and trading vehicle. Data including currency futures, interest rates, Major Equity and Bond Indices, Stock Markets trading volumes, external trade balances and other data were obtained from DataStream.

The return for a domestic investor with an investment denominated in foreign currency can written as $r_{DC} = r_{FC} + c$

where r_{DC} is the return in the domestic currency, r_{FC} is the foreign-currency return on the investment and c is the percentage change in the domestic-currency price of foreign currency.

We use futures contracts data from DataStream to construct daily time series representing the DX and its component currencies (Euro, Japanese Yen, British Pound, Canadian Dollar, Swedish Krona and Swiss Franc). The time series are constructed using a continuous roll strategy. We hold positions in the two nearby contracts, and each day sell some of the front contract and roll the position into the next-out contract. The roll strategy is linear -- if there are 90 days between the start of the nearby expiration month and the start of the next-out expiration month, then 1/90 of the position will be rolled each day (3/90 will be rolled over the weekend). The proportion of each contract held in the nearby contract on date *t* is given by

$$p_t = \frac{Number\ of\ Days\ until\ First\ Day\ of\ Nearby\ Contract\ Expiration\ Month}{Number\ of\ Days\ from\ Last\ Expiration\ until\ Next\ Expiration}$$

and the proportion held in the next out contract is $1-p_t$. At the end of each day $p_{t-1}-p_t$ is rolled from the nearby contract to the next-out contract. If *NB* denotes the nearby contract and *NX* is the next-out contract, then the spot index on date *t* is given by

$$Spot_t = p_t\, NB_t + (1-p_t)\, NX_t$$

The 1-day spot index return is calculated as

$$Spot_{return} = LN\left(\frac{Spot_t}{Spot_{t-1}}\right)$$

Roll index is denoted as

$$Roll_t = (NX_t - NB_t)(p_{t-1} - p_t)$$

The roll return for each day is

$$Roll_{return} = LN\left(\frac{Roll_t}{Roll_{t-1}}\right)$$

The total return is equal to the index return plus the roll return.

For trade balances, monthly trade balances in USD-terms are used.

From the simple regression model where

$$Y = \alpha + \beta \times X + error$$

the following equation is used for regression

$$TradeBalance_{(CountryY)} = \alpha + \beta \times DX + error$$

for discovering DX as a proxy for the trade balance. Similar equation was used in order to test the importance of DX as a proxy for stock market turnover.

$$StockMarketTurnover_{(CountryY)} = \alpha + \beta \times DX + error$$

To determine the value of DX multi-factor regression analysis was used. The equation takes the following form

$$DX = \alpha + \beta_1 \times Vol_1 + \beta_2 \times Vo_2 + ...\beta_{12} \times Vol_{12} + error$$

Vol_1 stands for turnover volume in USD terms.

With the regression results we constructed $\hat{Y}$ (Y-hat).

$$\hat{Y} = \alpha + \beta_1 \times Vol_1 + \beta_2 \times Vol_2 + ...\beta_{12} \times Vol_{12}$$

$\hat{Y}$ (Y-hat) serves as estimation for DX.

III. RESARCH RESULTS

A. The DX as an Investment Asset

In this section we analyze the benefits of direct investment in the US Dollar through the DX over the period from July 1995 through June 2005. The time period was chosen in order to conduct the analysis with at least ten years of data. Exhibit 1 contains comparative performance statistics on the DX as well as the Australian dollar, the British Pound, the Canadian Dollar, the Euro, the Japanese Yen, the Swedish Krona and the Swiss Franc. The returns on all of these currencies are futures-based, except Swedish Krona. Swedish Krona returns are spot rate plus interest rate differentials.

The results in the Exhibit 1 show that over the sample period of 10 years the dollar index had a return of 0.41% whereas the Euro had a return of -2.92%. In addition, DX had much lower volatility, 8.02%, compared to that of the Euro, 9.96%. Of the seven currencies analyzed only the British Pound and Canadian Dollar had higher returns and lower volatilities than the dollar index. While the Canadian Dollar had a return of 1.02% and a volatility of 6.47%, the British Pound had 2.19% and 7.97% respectively.

The Japanese Yen had the worst performance over the sample period with a return of -7.10% and a volatility of 11.76%. For a dollar-based investor, investment in the DX would have been more attractive than the Euro or Japanese Yen.

The investment benefits of the DX, however, are better understood in a portfolio setting. Exhibit 2-A shows the performance of the DX relative to a number of US and international equity and bond indices. Here we have added collateral return, Treasury 3-month bills to the DX return for comparison to other assets. Exhibits 2-B and 2-C depict DX as part of both domestic and international diversified portfolios.

Exhibit 1. Performance of DX compared to major currencies.

July 95- June 2005	DX	Japanese Yen	Euro	Pound Sterling	Canadian Dollars	Swedish Krona	Swiss Francs	Australian Dollars
Average Annual Return	0.41%	-7.10%	-2.92%	2.19%	1.02%	-0.18%	-4.05%	1.26%
Standard Deviation	8.02%	11.76%	9.96%	7.97%	6.47%	9.79%	10.87%	10.98%
Sharpe Ratio	0.05	(0.60)	(0.29)	0.27	0.16	(0.02)	(0.37)	0.11
Corr DX	1.00	(0.53)	(0.96)	(0.68)	(0.29)	(0.66)	(0.91)	(0.40)
Corr SP500	0.18	(0.05)	(0.20)	(0.14)	0.10	(0.06)	(0.23)	0.05
Corr Russell 1000	0.18	(0.05)	(0.20)	(0.14)	0.11	(0.06)	(0.23)	0.04
Corr Euro STOXX 50	(0.13)	0.05	0.12	0.03	0.18	0.15	0.04	0.18
Corr Europe STOXX 50	(0.13)	0.06	0.11	0.08	0.18	0.15	0.04	0.18
Corr MSCI EAFE	(0.18)	0.21	0.12	0.11	0.22	0.26	0.06	0.27
Corr Lehman Gov/Corp	(0.15)	(0.02)	0.16	0.13	0.05	0.08	0.17	0.02
Corr MSCI Europe Bond	(0.72)	0.26	0.73	0.52	0.17	0.75	0.68	0.29
Corr MSCI Euro Debt	(0.73)	0.26	0.75	0.48	0.17	0.75	0.70	0.29
Corr MSCI Euro Credit	(0.74)	0.27	0.76	0.49	0.16	0.75	0.70	0.29
Corr MSCI EAFE Bond	(0.74)	0.57	0.67	0.50	0.19	0.69	0.66	0.33

Exhibit 2-A. DX and major equity and fixed income benchmarks.

July 95- June 2005	DX+Riskless	S&P 500	Russell 1000	Euro STOXX 50	Europe STOXX 50	MSCI EAFE$	Lehman Gov/Cred	MSCI Europe	MSCI EURO Debt	MSCI EURO Credit	MSCI EAFE BOND
Average Annual Return	4.27%	9.90%	10.12%	10.02%	9.89%	4.56%	7.67%	7.25%	6.69%	6.13%	4.48%
Standard Deviation	8.03%	18.25%	18.17%	22.24%	19.97%	15.14%	5.05%	10.00%	10.53%	10.54%	8.51%
Sharpe Ratio	0.05	0.33	0.35	0.28	0.30	0.05	0.76	0.34	0.27	0.22	0.08
Corr DX	1.00	0.18	0.18	(0.13)	(0.13)	(0.18)	(0.15)	(0.72)	(0.73)	(0.74)	(0.74)
Corr SP500	0.18	1.00	1.00	0.43	0.43	0.40	(0.07)	(0.15)	(0.15)	(0.14)	(0.14)
Corr Russell 1000	0.18	1.00	1.00	0.44	0.44	0.41	(0.07)	(0.15)	(0.15)	(0.15)	(0.14)
Corr Euro STOXX 50	(0.13)	0.43	0.44	1.00	0.97	0.85	(0.09)	(0.02)	(0.01)	0.01	(0.02)
Corr Europe STOXX 50	(0.13)	0.43	0.44	0.97	1.00	0.87	(0.07)	(0.02)	(0.02)	(0.00)	(0.02)
Corr MSCI EAFE	(0.18)	0.40	0.41	0.85	0.87	1.00	(0.10)	0.08	0.08	0.10	0.14
Corr Lehman Gov/Corp	(0.15)	(0.07)	(0.07)	(0.09)	(0.07)	(0.10)	1.00	0.27	0.25	0.24	0.20
Corr MSCI Europe Bond	(0.72)	(0.15)	(0.15)	(0.02)	(0.02)	0.08	0.27	1.00	0.99	0.98	0.90
Corr MSCI Euro Debt	(0.73)	(0.15)	(0.15)	(0.01)	(0.02)	0.08	0.25	0.99	1.00	0.99	0.89
Corr MSCI Euro Credit	(0.74)	(0.14)	(0.15)	0.01	(0.00)	0.10	0.24	0.98	0.99	1.00	0.89
Corr MSCI EAFE Bond	(0.74)	(0.14)	(0.14)	(0.02)	(0.02)	0.14	0.20	0.90	0.89	0.89	1.00

The statistics in Exhibit 2-B suggests that the DX would have been a useful addition to equity and bond portfolios as far as volatility of a portfolio is concerned. Traditional stock and bond portfolios with a 50/50 allocation were compared to portfolios with a 40/40/20 allocation to determine if there were improvements in performance when DX is added.

The DX has low positive correlation to U.S. equity indices and a low negative correlation to U.S. bonds. This is demonstrated in Exhibit 2-B, where the DX is added (with a weight of 20%) to equally-weighted portfolios (P1 & P2) of U.S. stocks (S&P 500 or Russell 1000 indices) and bonds (Lehman Government/Corporate Bond index). The volatility of the portfolio decrease from 9.29% and 9.24% to 7.81% and 7.77% (P3 &P 4) respectively when DX is added to the portfolios.

Exhibit 2-B.DX as a part of portfolio of US Securities

July 95- June 2005	P1	P2	P3	P4
Average Annual Return	9.29%	9.39%	8.38%	8.46%
Standard Deviation	9.29%	9.24%	7.81%	7.77%
Sharpe Ratio	0.59	0.60	0.58	0.59
Corr DX	0.13	0.13	0.33	0.33
Corr SP500	0.96	0.96	0.95	0.95
Corr Russell 1000	0.96	0.96	0.95	0.95
Corr Euro STOXX 50	0.40	0.41	0.36	0.36
Corr Europe STOXX 50	0.40	0.41	0.36	0.37
Corr MSCI EAFE	0.36	0.37	0.31	0.32
Corr Lehman Gov/Corp	0.20	0.20	0.16	0.16
Corr MSCI Europe Bond	(0.08)	(0.08)	(0.22)	(0.22)
Corr MSCI Euro Debt	(0.08)	(0.08)	(0.23)	(0.23)
Corr MSCI Euro Credit	(0.08)	(0.08)	(0.22)	(0.23)
Corr MSCI EAFE Bond	(0.08)	(0.09)	(0.23)	(0.23)

Portfolio Composition	S&P 500	LB Gov/Cred	Russell 1000	DX+Riskless	Total
P1	50%	50%	0%	0%	100%
P2	0%	50%	50%	0%	100%
P3	40%	40%	0%	20%	100%
P4	0%	40%	40%	20%	100%

As shown in Exhibit 2-C, the portfolio benefits of the DX, however, can truly best be appreciated in an international setting. This is a result of the positive correlations between those assets' returns and their local currencies, whose returns, of course, have the opposite signs to DX returns. DX has small negative correlation with both DJ Stoxx and MSCI EAFE stocks indexes, while the correlation with the respective bond indices (MSCI Europe Bond, MSCI Euro Bond and MSCI EAFE Bond) are largely negative. In effect, adding the DX to portfolios (P5, P6 & P7) of international stocks and bonds hedges out part of the currency component inherent in those returns and thus decreases volatility.

Exhibit 2-C. DX as a part of portfolio of Non-US Securities.

July 95- June 2005	P5	P6	P7	P8	P9	P10
Average Annual Return	9.25%	9.02%	4.87%	8.47%	8.31%	4.93%
Standard Deviation	11.07%	12.31%	9.19%	8.28%	9.27%	6.71%
Sharpe Ratio	0.49	0.42	0.11	0.56	0.48	0.16
Corr DX	(0.44)	(0.43)	(0.49)	(0.28)	(0.29)	(0.30)
Corr SP500	0.32	0.33	0.26	0.38	0.38	0.33
Corr Russell 1000	0.33	0.33	0.27	0.38	0.39	0.34
Corr Euro STOXX 50	0.86	0.90	0.69	0.90	0.94	0.73
Corr Europe STOXX 50	0.89	0.87	0.71	0.93	0.90	0.74
Corr MSCI EAFE	0.82	0.81	0.89	0.84	0.83	0.93
Corr Lehman Gov/Corp	0.06	0.03	0.01	0.03	0.00	(0.02)
Corr MSCI Europe Bond	0.43	0.41	0.48	0.32	0.31	0.35
Corr MSCI Euro Debt	0.43	0.42	0.48	0.32	0.32	0.35
Corr MSCI Euro Credit	0.44	0.43	0.49	0.33	0.33	0.36
Corr MSCI EAFE Bond	0.39	0.36	0.58	0.27	0.26	0.46

Portfolio Composition	Stoxx 50 Europe	Stoxx 50 Euro	MSCI EAFE	MSCI Europe Bond	MSCI Euro Bond	MSCI EAFE Bond	DX+Riskless	Total
P5	50%	0%	0%	50%	0%	0%	0%	100%
P6	0%	50%	0%	0%	50%	0%	0%	100%
P7	0%	0%	50%	0%	0%	50%	0%	100%
P8	40%	0%	0%	40%	0%	0%	20%	100%
P9	0%	40%	0%	0%	40%	0%	20%	100%
P10	0%	0%	40%	0%	0%	40%	20%	100%

Exhibit 2-C also shows that while average portfolio returns remain slightly changed after the addition of the DX, the reduction in volatility helps increase Sharpe ratios. The Sharpe ratios of all portfolios (P5, P6 and P7 are Europe, Euro-zone and EAFE respectively), improve with the addition of DX (with a weight of 20%) to the portfolio.

The above results suggest that the DX is a valuable investment vehicle, both on its own and as a part of a diversified domestic or international portfolio. A further illustration of this is given in Exhibits 3 where the efficient frontiers of traditional portfolios (including domestic and international stocks and bonds) with DX are depicted. Exhibit 3-A, shows the efficient frontier for US portfolio (50 % S&P500 and 50% Lehman Government/Corporate Bond) vs. DX.

Exhibit 3: Risk and Return of DX, Stock and Bond Portfolio.

Exhibit 3-A

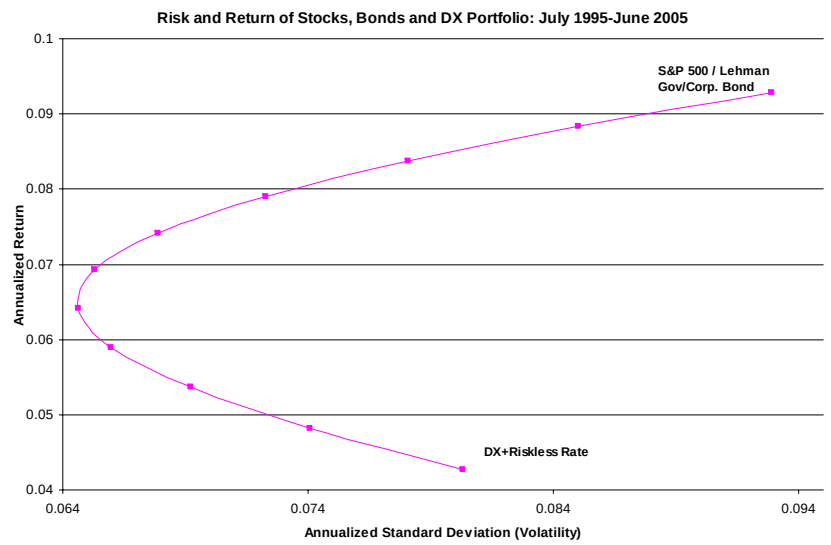


Exhibit 3-B

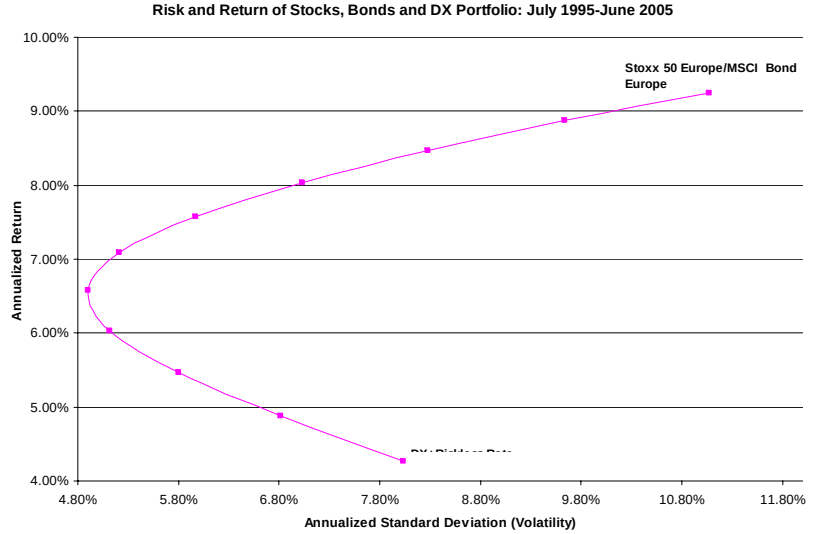


Exhibit 3-C

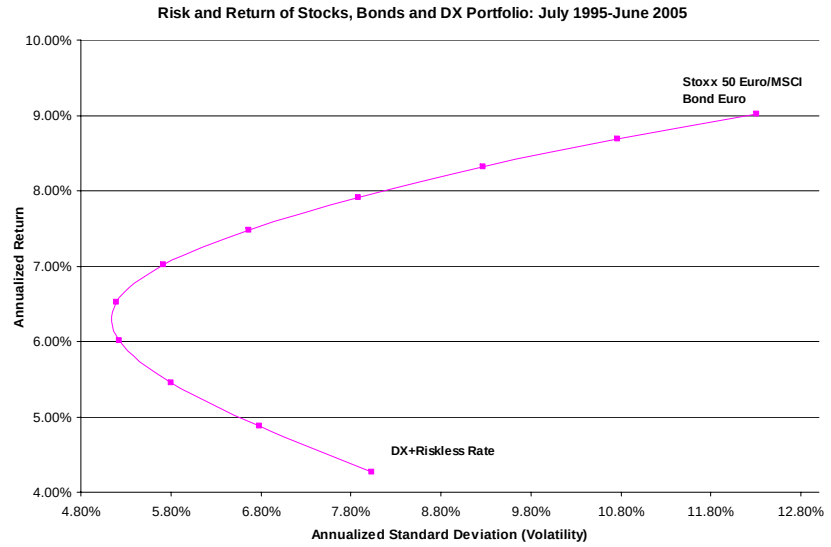
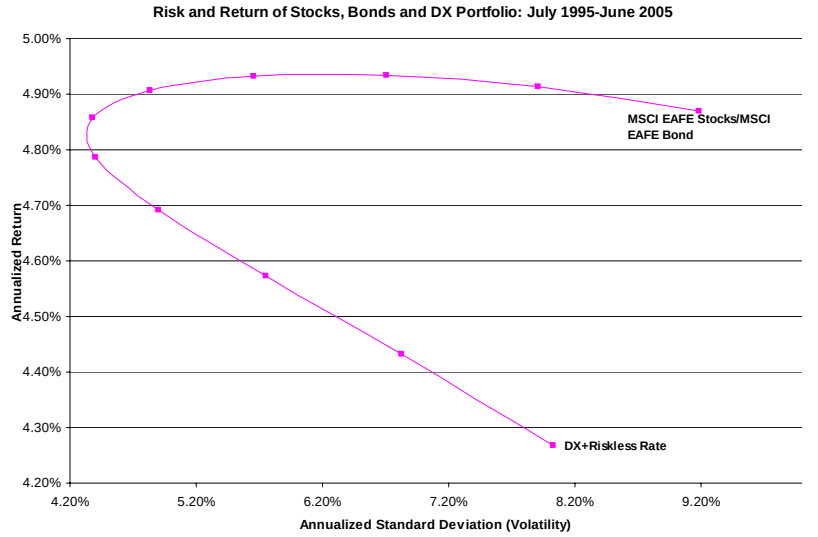


Exhibit 3-D



The results for Europe and Euro-zone in Exhibit 3-B and Exhibit 3-C are logically similar because of overlapping underlying securities. The results are worth taking note, especially for risk-averse investors.

Exhibit 3-D shows the efficient frontiers for EAFE. DX decreases the volatility while keeping the return in the same level for most part of the frontier. It should be noted, however that past results are not indicative of future performance. During sample time period (10 years) EAFE had one of the worse time periods.

We formed baskets of the component currencies, using the DX weights. Thus, the basket would invest in component of DX: in Euro (57.6 %), Japanese Yen (13.6 %), UK Pound (11.9 %), Canadian Dollar (9.1 %), Swedish Krona (4.2 %) and Swiss Franc (3.6 %). Exhibit 4 shows performance of DX and with the constituent currency series.

Exhibit 4. Performance of DX compared to major currencies and basket of currencies.

July 95- June 2005	DX	JY	EURO	GBP	CAD	SWE	CHF	Basket
Average Annual Return	0.41%	-7.10%	-2.92%	2.19%	1.02%	-0.18%	-4.05%	-2.31%
Standard Deviation	8.02%	11.76%	9.96%	7.97%	6.47%	9.79%	10.87%	7.61%
Sharpe Ratio	0.05	(0.60)	(0.29)	0.27	0.16	(0.02)	(0.37)	(0.30)
Corr DX	1.00	(0.53)	(0.96)	(0.68)	(0.29)	(0.66)	(0.91)	(0.99)
Corr SP500	0.18	(0.05)	(0.20)	(0.14)	0.10	(0.06)	(0.23)	(0.18)
Corr Russell 1000	0.18	(0.05)	(0.20)	(0.14)	0.11	(0.06)	(0.23)	(0.18)
Corr Euro STOXX 50	(0.13)	0.05	0.12	0.03	0.18	0.15	0.04	0.12
Corr Europe STOXX 50	(0.13)	0.06	0.11	0.08	0.18	0.15	0.04	0.12
Corr MSCI EAFE	(0.18)	0.21	0.12	0.11	0.22	0.26	0.06	0.17
Corr Lehman Gov/Corp	(0.15)	(0.02)	0.16	0.13	0.05	0.08	0.17	0.15
Corr MSCI Europe Bond	(0.72)	0.26	0.73	0.52	0.17	0.75	0.68	0.72
Corr MSCI Euro Debt	(0.73)	0.26	0.75	0.48	0.17	0.75	0.70	0.73
Corr MSCI Euro Credit	(0.74)	0.27	0.76	0.49	0.16	0.75	0.70	0.74
Corr MSCI EAFE Bond	(0.74)	0.57	0.67	0.50	0.19	0.69	0.66	0.74

Exhibit 5. Correlation table

July 95- June 2005	DX	Japanese Yen	Euro	Pound Sterling	Canadian Dollars	Swedish Krona	Swiss Francs	Basket	Australian Dollars
USDX	1.00	(0.53)	(0.96)	(0.68)	(0.29)	(0.66)	(0.91)	(0.99)	(0.40)
Japanese Yen	(0.53)	1.00	0.37	0.28	0.14	0.26	0.40	0.56	0.26
Euro	(0.96)	0.37	1.00	0.60	0.19	0.64	0.92	0.97	0.33
Pound Sterling	(0.68)	0.28	0.60	1.00	0.18	0.44	0.58	0.68	0.31
Canadian Dollars	(0.29)	0.14	0.19	0.18	1.00	0.23	0.16	0.28	0.37
Swedish Krona	(0.66)	0.26	0.64	0.44	0.23	1.00	0.58	0.64	0.36
Swiss Francs	(0.91)	0.40	0.92	0.58	0.16	0.58	1.00	0.91	0.29
Basket	(0.99)	0.56	0.97	0.68	0.28	0.64	0.91	1.00	0.39
Australian Dollars	(0.40)	0.26	0.33	0.31	0.37	0.36	0.29	0.39	1.00

Correlations among currency returns are shown in exhibit 5. It is worth noting that there is a strong negative correlation between DX and Euro.

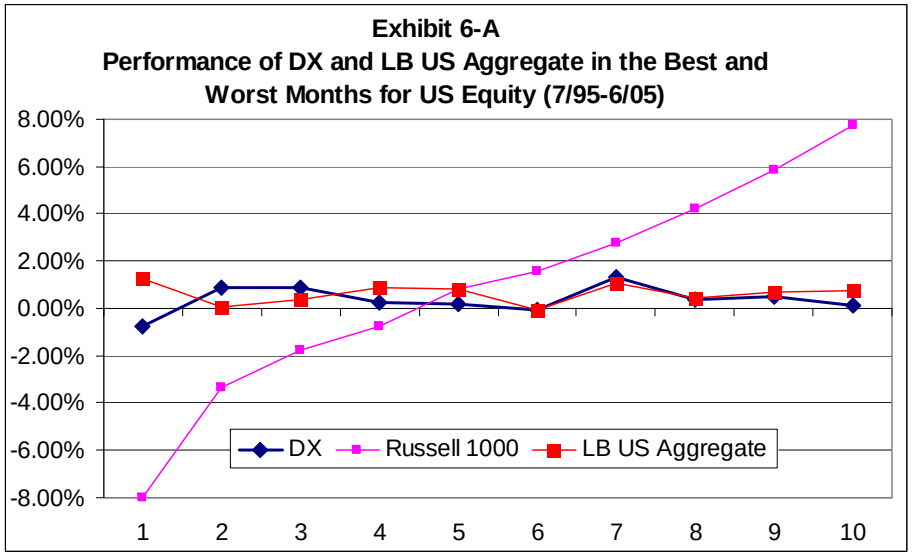
B. Performance of USDX during Market Extremes

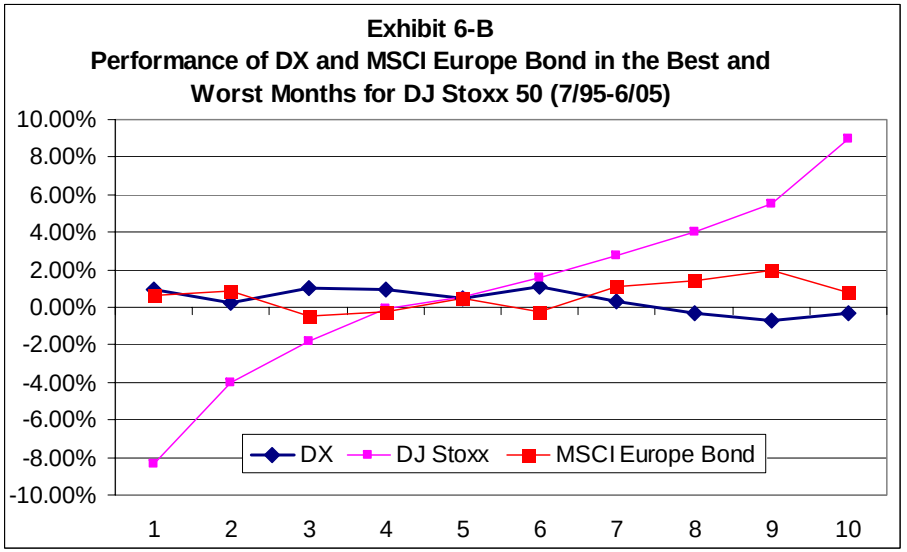
This section illustrated the movement of the DX and relative bond index with regard to performance of the corresponding equity index. Recently, academic research has focused more on the behavior of assets and asset classes during market extremes. Experiences such as the 1994 bond meltdown and the 1998 liquidity crisis reinforced the notion that correlation between asset classes may be different during market extremes than during periods of relative calm. This is particularly true for the currency markets, as currencies are highly liquid and certain currencies are considered safe havens during periods of global turmoil.

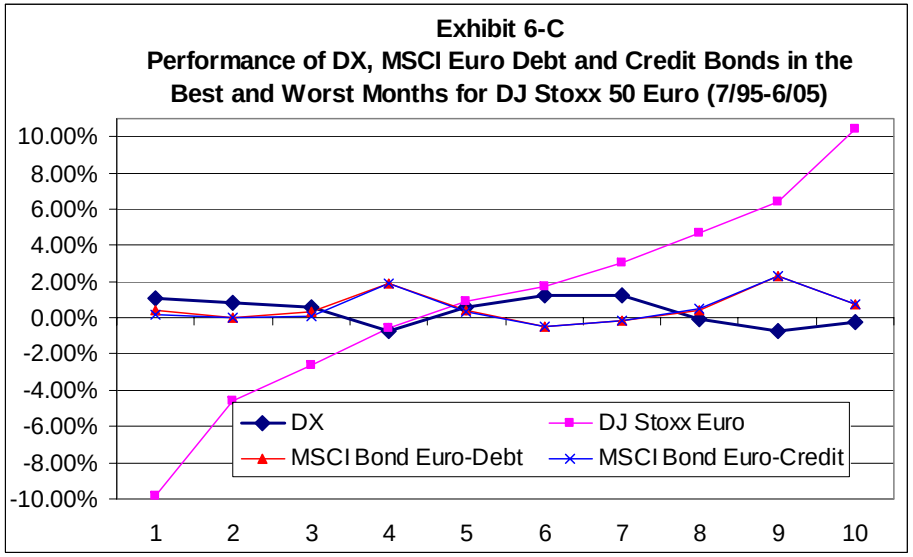
Exhibit 6-A shows the performance of the US Dollar Index and Lehman US Aggregate during periods of extreme movements in the US Equities (Russell 1000). To measure performance during extremes, we sort monthly returns for stock and bond indices into deciles and then report the average performance of asset classes during those months.

Decile #1 is the average performance I the worst 10% of months (out of 120 observations) and decile #10 is average performance in the best months. In other words, deciles #1 is the average of returns for worst 12 months during the period studied. In Exhibit 6- A, the deciles are plotted using returns for the Russell 1000 equity index. Deciles are made using the performance of equities because of more volatile and extreme prone nature of equity indices.

Exhibit 6: Performance of DX compared to market extremes







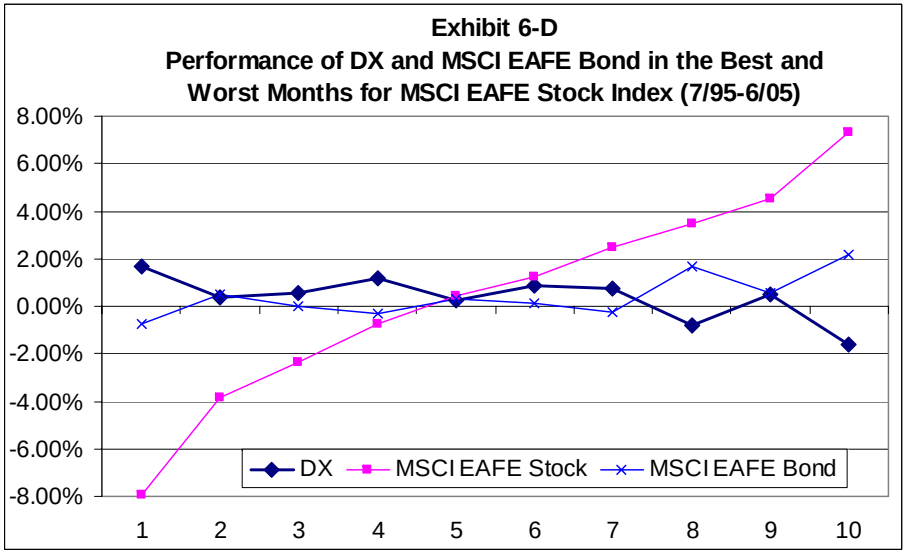
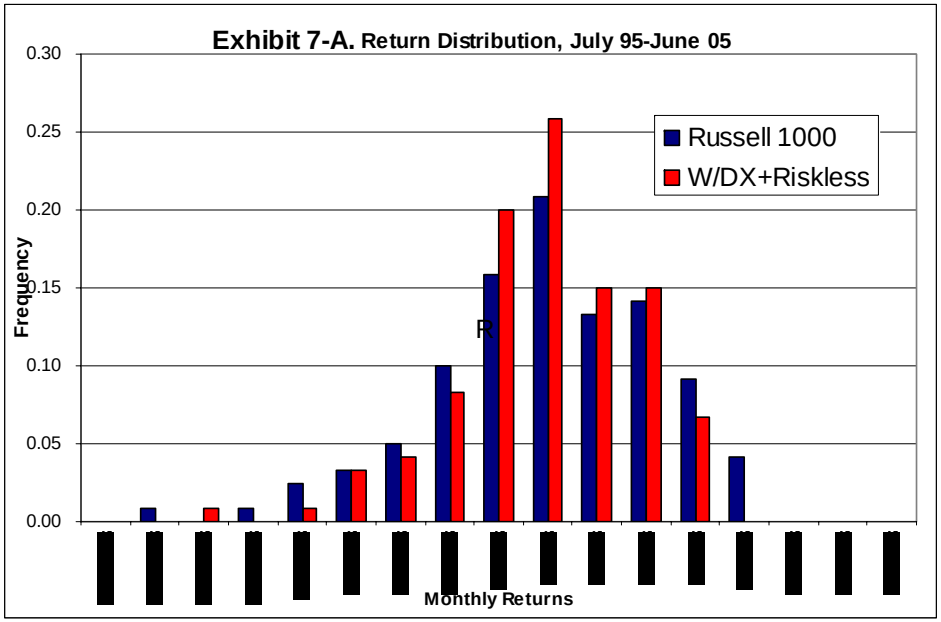
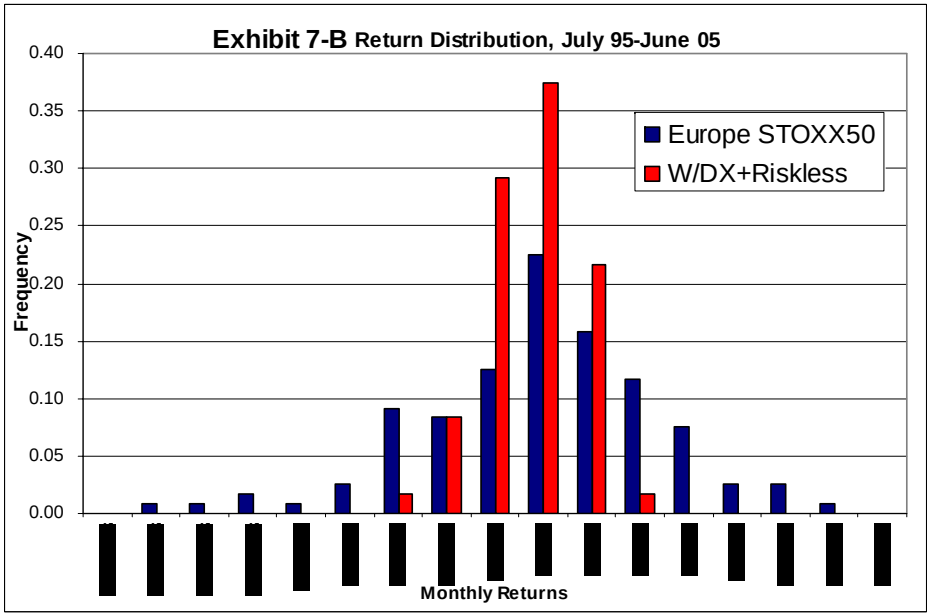
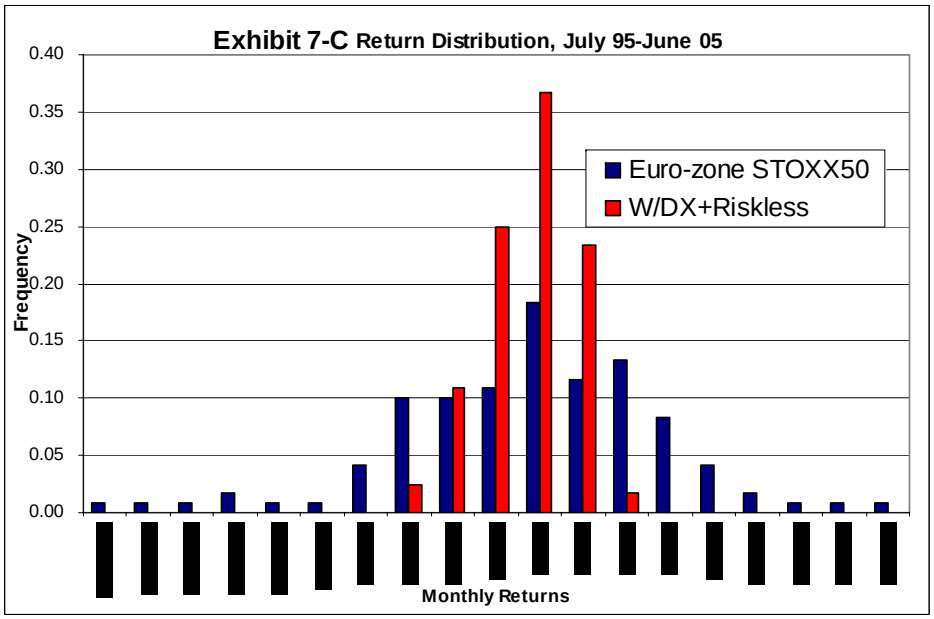


Exhibit 7: DX as Downside Risk Protection, S&P 500 without and with DX +Riskless (20%).







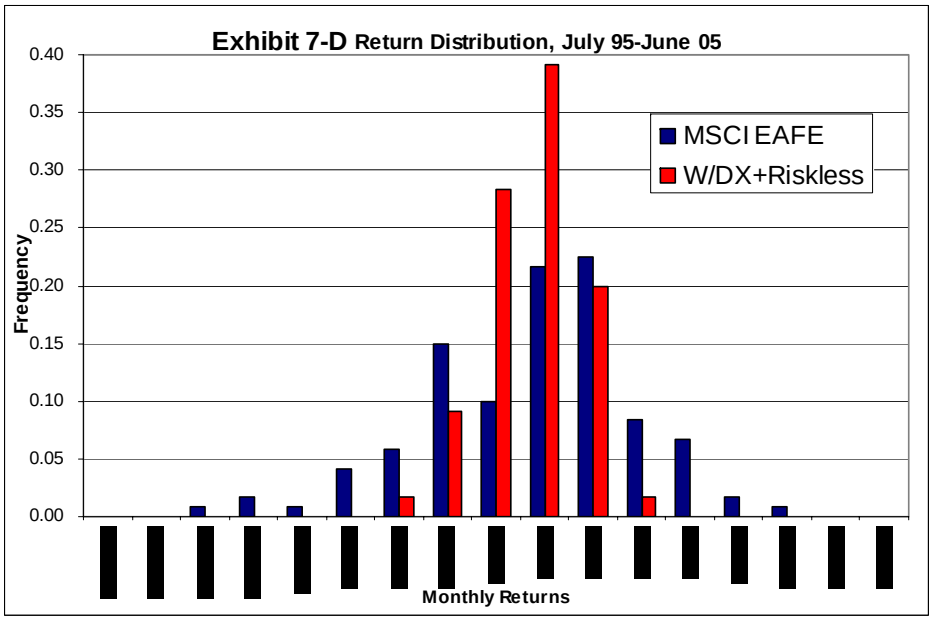


Exhibit 6-B depicts the performance of DX with respect to European Equity and Bond indices. Deciles are created using returns for the Dow Jones Stoxx equity index. Exhibit 6-C and Exhibit 6-D do the same for Euro-zone and EAFE using deciles of Stoxx Euro-zone and MSCI EAFE (Stock). For Bonds indexes MSCI Euro Debt/Credit and MSCI EAFE (Bond) were used respectively.

All exhibits indicate that the performance of the USDX is relatively insensitive to changes in equity markets. Europe and Euro-zone related exhibits (Exhibit 6-B and 6-C), suggest that in market extremes, DX has a potential to decrease the down-side when used as a hedging tool.

Exhibit 7 depicts the advantages of DX to minimize downside risk investors are concerned. The exhibits compare 100 % Russell 1000 with 80% Russell 1000 and -20 %DX. The results show that only 20% in DX decreases extreme negative results. The advantages are much more vivid for international markets in the cases of 7-B, 7-C and 7-D.

C. DX as a proxy for International Trade.

Exchange rate fluctuations can have an important impact on the amount and nature of external trade in any country. Appreciation local currency would make domestic products more expensive to the world while making imports cheaper. Obviously this development will result in the deterioration in the trade balance of a nation.

Exhibit 8. 12 month rounded trade balance of selected industrialized nations in current USD.

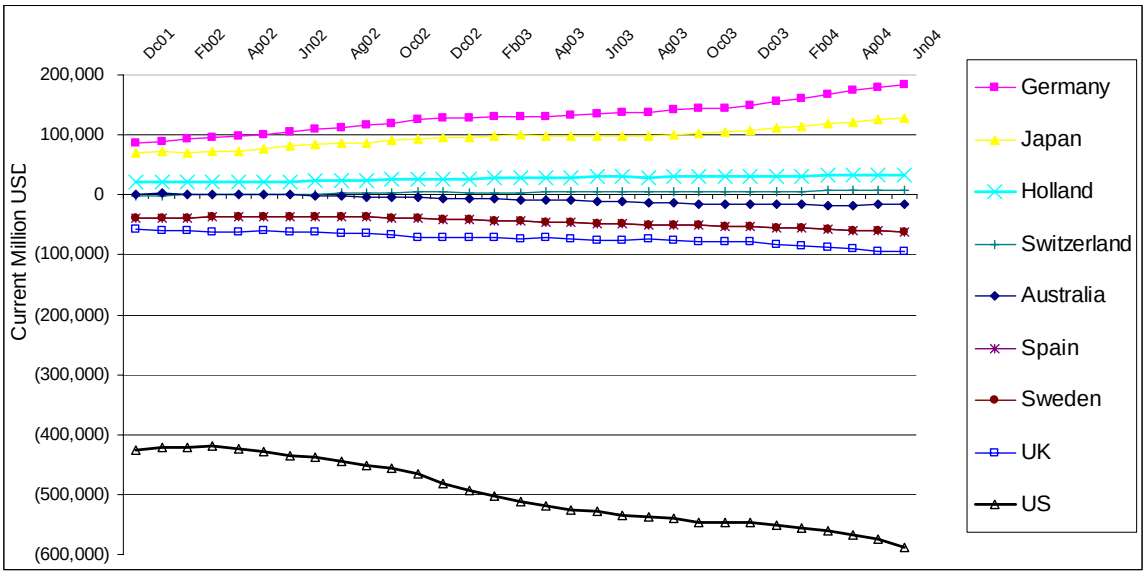


Exhibit 9. Trade Balances regression R-squares

Countries	R-Square
Australia	0.71
Germany	0.84
Japan	0.79
Holland	0.56
Spain	0.46
Sweden	0.46
Switzerland	0.38
UK	0.64
US	0.80

We ran a regression to measure the extent to which DX can be a proxy for international trade and Trade Balances. Substantial proportion of the trade balances can be explained by the movement in the DX.

Historically, 42 monthly trade balance time series was analyzed for the following countries. DX can explain 71 % the trade balance of Australia. DX is also a good proxy for its main trading partners such as Germany (84%), Japan (79%) and UK (64%). Germany account by far the biggest part of EU exports and is the biggest trading nation after US. Historically, DX was able to explain 80 % of US trade deficit.

D. Stock Market Turnover and DX.

Exhibit 10 defines 13 different indices from 13 different countries were used in order to find out if DX can be a proxy for market turnover. Many of theses indices are benchmark for the

health of the overall county equity markets. The volume information was extracted from Datastream.

Exhibit 10. Turnover indices

Country	DS Mnemonic	Definition
Australia	AUTSTAT	Australian National Turnover
Canada	TOTMKCN	Canada DS Market
China	CHSH180	Shangai 180
Hong Kong	TOTMKHK	Hong Kong DS Market
Taiwan	TAIWGHT	Taiwan SE Weighted
Italy	MILANBC	Milan Comit General
Switzerland	TOTMKSW	Switzerland-DS Market
Holland	TOTMKNL	Holland-DS Market
France	FRCAC40	CAC 40
Germany	XMDAXIN	M DAX (XETRA)
US	TOTMKUS	US-DS Market
UK	FTSE350	FTSE 350
Japan	TOKYOSE(VA)	Tokyo Se (TOPIX)

*DS-abbreviation for DataStream (Total Market)

Many country indices are DS Market indices; these are Datastream indices for the equity market of certain country. They have a broader coverage compared to more frequently used indices. For examples, US -DS Market covers thousands of stocks while Dow Jones will cover only 30 blue chips.

Recently, international flow of capital in equity markets became very large. Price of stock were affected by changes in currency markets. Appreciating Euro will make European stocks more expensive in US dollar terms, thus influencing flow of portfolio capital.

Exhibit 11. Correlations among stock market index turnovers.

	Aust.	Canada	China	HK	Taiwan	Italy	Switz.	Holland	France	Germany	US	UK	Japan
Australia	1.00	0.86	0.45	0.87	0.61	0.82	0.67	0.65	0.73	0.89	0.68	0.87	0.90
Canada	0.86	1.00	0.66	0.88	0.69	0.81	0.70	0.72	0.75	0.84	0.78	0.90	0.84
China	0.45	0.66	1.00	0.52	0.52	0.51	0.38	0.45	0.46	0.57	0.44	0.56	0.41
Hong Kong	0.87	0.88	0.52	1.00	0.60	0.65	0.60	0.68	0.58	0.81	0.69	0.89	0.85
Taiwan	0.61	0.69	0.52	0.60	1.00	0.57	0.58	0.56	0.44	0.72	0.60	0.70	0.72
Italy	0.82	0.81	0.51	0.65	0.57	1.00	0.67	0.61	0.84	0.75	0.72	0.78	0.76
Switzerland	0.67	0.70	0.38	0.60	0.58	0.67	1.00	0.94	0.82	0.67	0.83	0.80	0.64
Holland	0.65	0.72	0.45	0.68	0.56	0.61	0.94	1.00	0.75	0.61	0.87	0.82	0.61
France	0.73	0.75	0.46	0.58	0.44	0.84	0.82	0.75	1.00	0.74	0.79	0.73	0.71
Germany	0.89	0.84	0.57	0.81	0.72	0.75	0.67	0.61	0.74	1.00	0.63	0.85	0.89
US	0.68	0.78	0.44	0.69	0.60	0.72	0.83	0.87	0.79	0.63	1.00	0.77	0.68
UK	0.87	0.90	0.56	0.89	0.70	0.78	0.80	0.82	0.73	0.85	0.77	1.00	0.82
Japan	0.90	0.84	0.41	0.85	0.72	0.76	0.64	0.61	0.71	0.89	0.68	0.82	1.00

The correlation table suggests that market activity in US is highly correlated with Holland, considerably correlation with Canada, Switzerland, France and UK. China has the lowest correlation with other markets. According to regression results, DX can explain 68% turnover in Canada, 67 % of turnover is Australia and 65 % in Germany.

Exhibit 12. Country market turnover regression R-Squares (07/2002-06/2004)

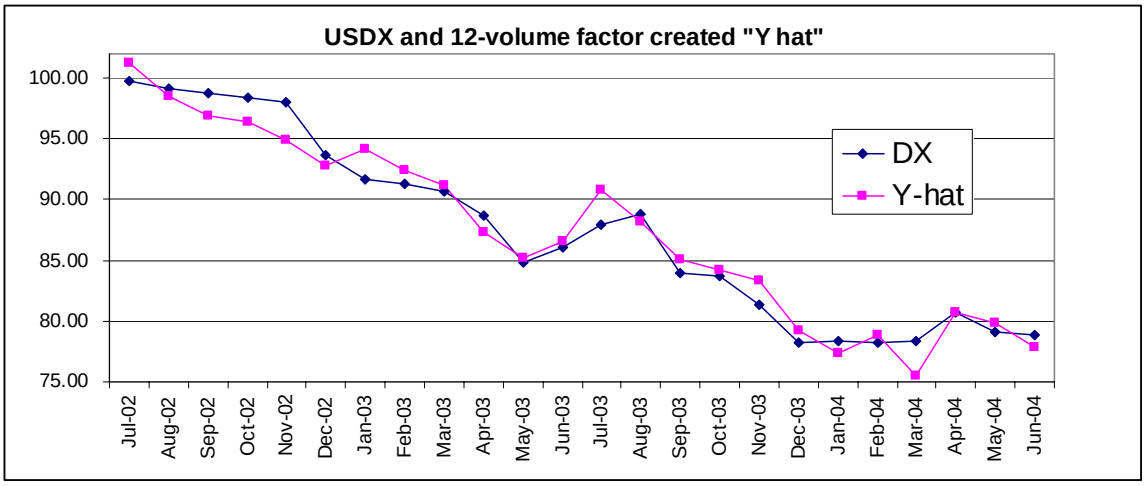
Countries	R-Square
Australia	0.67
Canada	0.68
China	0.40
Hong Kong	0.58
Taiwan	0.21
Italy	0.53
Switzerland*	0.53
Holland*	0.54
France	0.36
Germany	0.65
US*	0.52
UK	0.46
Japan	0.55

*US starts from 07/94, Holland and Switzerland From 11/02

E. How to determine DX ? Turnover value as a proxy for DX: A multi-Factor analysis

12 factors (volume turnover) were regressed for Nybot Dollar Index. The results show that there is a close relationship with the DX movement and Stock Market Activity. In the 24 month period, between July 2002 and July 2004 turnover volumes could explain 96% (R-square) of movement in DX. With the results obtained an estimate, Y-hat, compared with DX in exhibit 13. Findings suggest that there is a close relationship between market activity and DX.

Exhibit 13. DX and "Y-hat"



IV. CONCLUSION

In this article with developed previous article, Schneeweis, Spurgin and Georgiev [2003] that studied investments and risk distribution advantages of using USDX for the period between January 1991 and April 2002. The New York Board of Trade (NYBOT) US Dollar Index (USDX.; DX for short) represents the value of the US Dollar in terms of a basket of six major foreign currencies: Euro (57.6 %), Japanese Yen (13.6 %), UK Pound (11.9 %), Canadian Dollar (9.1 %), Swedish Krona (4.2 %) and Swiss Franc (3.6 %). There exist a futures contract and an option contract on the DX, traded on the FINEX (a division of NYBOT). The DX provides a convenient method for direct investment in the US Dollar as well as a tool for hedging FX exposure relative to the Dollar.

Since April 2002, much has developed in foreign exchange markets. Many foreign currencies including Euro, Yen and the Pound have appreciated substantially compared to US Dollar, thus decreasing return on investment in DX. Recent changes asked for an update and development of the previous article Schneeweis, Spurgin and Georgiev [2003].

In this article, we re-examine the USDX index over the period July 1995-June 2005. Section III describes the data and methodology used in this study, while section IV presents major findings as they relate to the performance of the DX as an investment and a risk management tool.

We find that USDX is still a good currency investment to trade/invest/speculate in the value for the US dollar- offering comparable returns with lower risk parameters than individual currency pairs such as Euro and Yen. We examine whether the USDX is a good investment to

include in a portfolio as presented on the efficient frontier investing and risk management since Schneeweis, Spurgin and Georgiev [2003]. Results show that the DX provides both investment and risk management benefits, especially for investors in diversified global investment portfolios. New findings that were not covered in previous article is the relationship between DX and Stock Market Turnover and between DX and international Trade Balances. DX can explain trade balances to high extent for many industrialized countries. Section V summarizes the results.

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Appendix:

A CHRONOLOGICAL REVIEW OF SELECTED CURRENCY LITERATURE

There is a plethora of academic and practitioner articles in the area of currency strategies as well as currency risk management. In this section we summarize recent research on foreign exchange rates as an investment strategy as well as a risk management tool. We first examine the literature in terms of strategies and then in terms of risk management.

Investment Strategies

Baz, Breedon, Naik and Peress [2001] assess the risk-return performance of trading strategies that seek to take advantage of the forward bias. Assuming exchange rates behave as random walks they show how to apply mean-variance analysis to construct an optimal portfolio of currencies. Their methodology results in stable portfolio weights over time and does not require exogenous constraints on weights. They find that optimal currency portfolios invested in the German Deutschemark, Japanese Yen, British Pound and Swiss Franc with the US dollar as a risk-free asset generate and average excess return of 2.79% per year over the period. The Sharpe ratio on these returns is better than that on a US treasury index and that on a global currency index (unhedged for currency risk). They also find the returns are uncorrelated with major fixed income and equity indices.

Dubofsky and Bell [2002] contend that if spot price of a currency follows a random walk with no drift, it will be a better predictor of the future spot price than the futures price. Using data over the 1984-1995 time period, they conclude that both foreign currency hedgers and speculators should follow this principle when they make trading decisions.

They note that in general, currency futures should be sold when they are above the spot price, and futures should be bought when they are below the spot price. They also note that

performance is greatly improved if the trader employs stop loss orders, and also reverses the futures position if and when the initial signal reverses.

Huang [2002] compare the risk return profile of simple currency carry trades to optimized carry trades by incorporating the volatility and correlation implied from the option market. His analysis focuses on a basket of five major currencies: Swiss Franc, Euro, British Pound, Japanese Yen and U.S. Dollar. He examines four strategies:

1. A simple carry trade by buying the highest yielding currency against the lowest yielding one.
2. A carry trade with two currency pairs by buying two highest yielding currencies against two lowest yielding ones.
3. An optimized carry trade based on interest rates, volatility and correlation.
4. Same as (3) above with the limitation of only one currency pair selected.

Among other results they find the following. Strategy 1 is the most volatile and Strategy 3 has an information ratio twice that of Strategy 1. The optimized strategies 3 and 4 out-perform the naïve ones by a significant margin in terms of the information ratio over the entire period. Strategy 4 had performed the best with the information ratio over the entire sample period and sub-periods. The correlation between the monthly returns of the Lequeux and Acar benchmark and the optimized carry trade is not significantly different from zero at the critical level of 5%. Finally they conclude that the implied volatility does a better job with higher realized information ratios and more accurate tracking error forecasting.

Green and Whinney [2002] highlight a number of characteristics related to active currency market trading and some of the broader market implications that these have to overall future expectations of returns and diversification of risk. Specifically they assess the impact of real money management on the returns that can be generated from currency trading. They compare the returns to an investment of one million in the Stark Index to returns generated from accounts with four different levels of funding:

- A fully funded account where $1 million is actually invested in the currency trading account;
- A 50% funded account where $500,000 is invested in order to trade $1 million;
- A 25% funded account where $250,000 is invested to trade $1 million; and
- A 10% funded account where $100,000 is invested respectively.

They find that the levels of returns that can be generated from investing in a currency program are extremely sensitive to and entirely dependent on the money management rules employed as well as the decisions to maintain reinvested as against non-reinvested returns and, finally, the level of fees which are paid (or charged) in relation to the investment. They also find that the timing and frequency of fee payments are a significant factor. On the matter of fees they find that the decision to pay fees as defined by amount of investment versus fees on funding capital only will make a considerable difference on the final figures. In particular the charge of management fees, which are applied to capital amounts, may vary tenfold relative to the capital to which they are applied.

In a recent article, Pedersen and De Zwart [2004] create a model from simulations and test it on G10 currency pairs to assess trend model profitability from the statistical features of the return distribution of the asset under consideration. Their results and examples facilitate the

selection of appropriate currencies or assets for inclusion in trend models going forward. Specifically a case study of the U.S. and Canadian dollar shows
that sustained past profitability of the trend model was achieved only when the model did not trade. This has potential implications for the trend model user, as this knowledge can be applied in an attempt to avoid unprofitable model activity.

More recently Middleton [2004] utilized quantitative models to identify the trading styles employed by a sample of currency CTAs and overlay managers over the period October 1996 to March 2004, in order to assess whether the perceived differences in styles are justified as well as examine the similarities that exist between the two. She found that trend-following was the dominant trading style of currency CTAs. She also found that a surprisingly high proportion of currency overlay managers were also trendfollowing models. Her research also suggests overlay managers were more inclined to diversify trading style by adopting a multi-strategy approach compared with CTAs which tended more towards single strategies.

Currency Risk Management

Reinert [2000] shows that for portfolios broadly diversified across major equity markets (including the U.S., the U.K., France, Germany, and Japan), a single technically based active currency management strategy yielded the highest risk-adjusted return in all rolling ten-year periods and in twenty-one of twenty-four rolling five-year periods during 1972-1999. They suggest that although equity managers may not be in the business of foreign exchange

management, they should not be blind to significant currency trends that could be detrimental to portfolio performance. Reinert also suggests some practical techniques to address these trends.

Abanomey and Mather [2001] examine the effect of including foreign currency forward contracts to hedge against foreign exchange risk. Their results show that investors with international portfolios of stocks, bonds, and commodities can improve the efficiency of their portfolios by hedging foreign exchange exposure. Specifically they examine the effects of including foreign currency forward contracts to hedge against foreign exchange risk. They propose three (one passive and two active) hedging techniques for ex-ante portfolio selection. The passive method involves hedging a portfolio of foreign assets fully with forward contracts. The active hedging methods involve (1) hedging the foreign currencies' proceeds only when the forward premium is positive and (2) selling the forward contract whenever it is selling at a premium. They apply these hedging techniques on four portfolio strategies. They find that passive hedging always improves the efficiency of the portfolio as measured by the Sharpe ratio although sometimes the improvement was not statistically significant. The first active hedging method they suggest above was designed to take advantage of the forward rates' premiums and enhance returns by hedging when it was advantageous to do so. Their results show that this method improves the portfolio risk/return trade-offs for all portfolio strategies considered at the 5% level. They found however that the second method described above was the most effective method overall as it showed the best improvements in terms of the Sharpe ratio.

Simpson and Morey [2001] examine how well basic models of foreign exchange determination predict the direction of future exchange rate changes. They examine two different scenarios that are consistent with what investors might know. The first, if either the forward exchange rate or the purchasing power parity can predict the future direction of the exchange rate. The second, whether large deviations in the forward rate or purchasing power parity can help to predict the future direction of the exchange rate. They find that the forward rate is consistently a poor predictor of the direction of the future spot exchange rate across different currencies, time periods, and term lengths. The authors also find, however, that after 1984, a purchasing power parity equilibrium exchange rate predicts the future direction of the spot rate quite well. This is especially the case when the equilibrium exchange rate implied by purchasing power parity diverges strongly from the spot rate. They conclude that investors should pay attention to purchasing power parity exchange rates as indicative of future directional changes in exchange rates.

In a more recent article Osler [2003], clustering in currency stop-loss and take-profit orders is examined. The clustering is also used to provide an explanation to two familiar predictions from technical analysis: trends tend to reverse course at predictable support and resistance levels and trends tend to be unusually rapid after rates cross such levels. The data comprises of stop-loss and take-profit orders placed at NatWest Markets a large foreign exchange dealing bank in three currency pairs: dollar-yen, dollar-U.K. pound and Eurodollar. Orders include all customer orders and the bulk of in-house orders. The results show that take-profit orders cluster particularly strongly at round numbers which could explain the first prediction. They also show that stop-loss orders cluster strongly just beyond round numbers which could explain the second prediction.