TexPERS Summer Forum: Demystifying Currency

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Examining Whether to Manage Currencies: Why Now?

Three reasons:

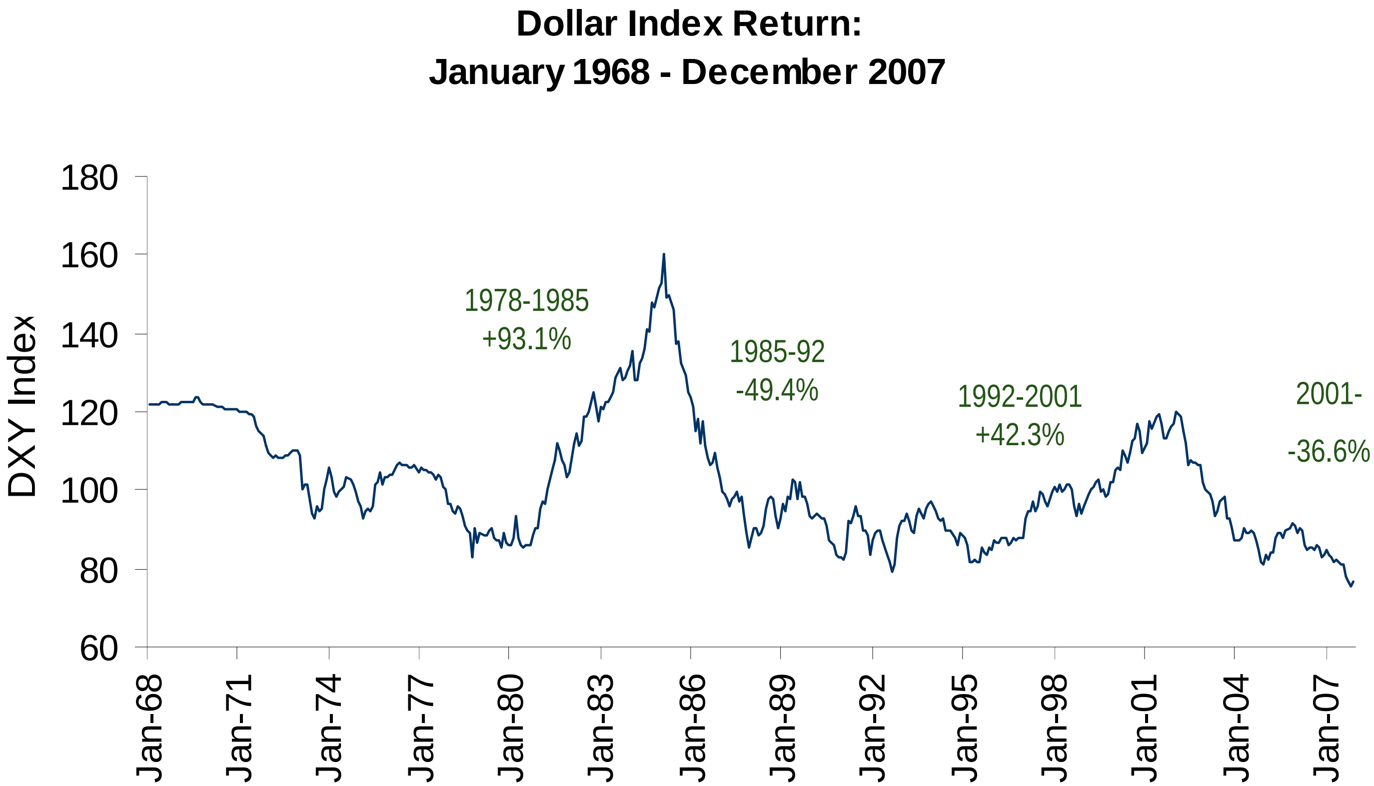
- First, exposures to foreign currencies have now reached 20% of overall exposures for most US pension funds
  - Currency management tends to make sense once exposures exceed 10% to 15% of a portfolio
- Second, the US dollar has declined by more than 35% since 2002
  - Eventually it will rally, and when it does, returns on international asset exposures will be negatively impacted
- Third, the future underlying returns from traditional asset classes are not likely to parallel those of the past several decades
  - We believe that pure alpha currency management can provide a diversified source of value added that will enable plans to attain performance or actuarial targets

The views expressed above are those of SSgA's Global Currency Team only as of July 24, 2008 and are subject to change based on market and other conditions.

Source: Greenwich Associates Survey — 2007

US Dollar Index (DXY): January 1968 to December 2007

The US dollar index (DXY) has been volatile in various periods over the past 40 years



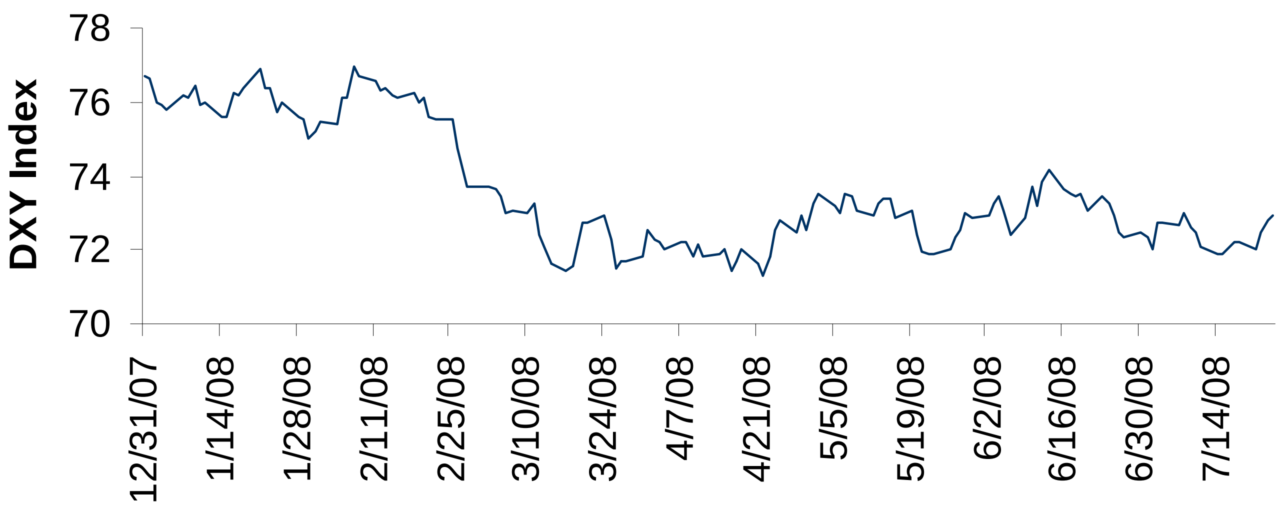
- DXY is comprised of the following currencies by weight (as of December 31, 2007): Euro (57.6%), Japanese Yen (13.6%), British Pound (11.9%), Canadian dollar (9.1%), Swedish Krona (4.2%), Swiss Franc (3.6%)

Source: Bloomberg

US Dollar Index (DXY): January 1, 2008 to July 24, 2008

The US dollar index (DXY) appears to be "searching for a bottom" — especially versus Europe

Dollar Index Return
January 1, 2008 - July 24, 2008



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Source: Bloomberg

Currency Mechanics: Introduction

Currency: Nomenclature and Lexicon

Different currency pairs are cited using varied conventions:

- The denominator currency is listed before the numerator currency
  - For example, as of July 24, 2008, EURUSD = $1.5686.
    - This means that 1 Euro is equal to $1.5686.
  - USDJPY = Y 107.28. This means that 1 US dollar equals Y 107.28
  - GBPUSD = $1.9858. This means that 1 GBP equals $1.9858
- Bloomberg: as of July 24, 2008:

	Value	Change	% Change
EURUSD	1.5686	0.0009	0.06%
USDJPY	107.2800	-0.0500	-0.05%
GBPUSD	1.9858	-0.0011	-0.05%

- Currency conventions tend to differ:

GBP**USD**
EUR**USD**
USDJPY
USDCHF
USDNOK

AUD**USD**
NZD**USD**
USDCAD
USDSEK

EURGBP
EURJPY
EURCHF

Foreign Equity Investment: Example

$1 Thousand Investment in Japanese Equities

$1,000 Investment in Japanese Equities	X	USDJPY Exchange Rate = Y 105	=	Y 105,000 Investment in Japanese Equities
Y 105,000 Investment in Japanese Equities	X	10% Local Equity Market Return	=	Y 115,500

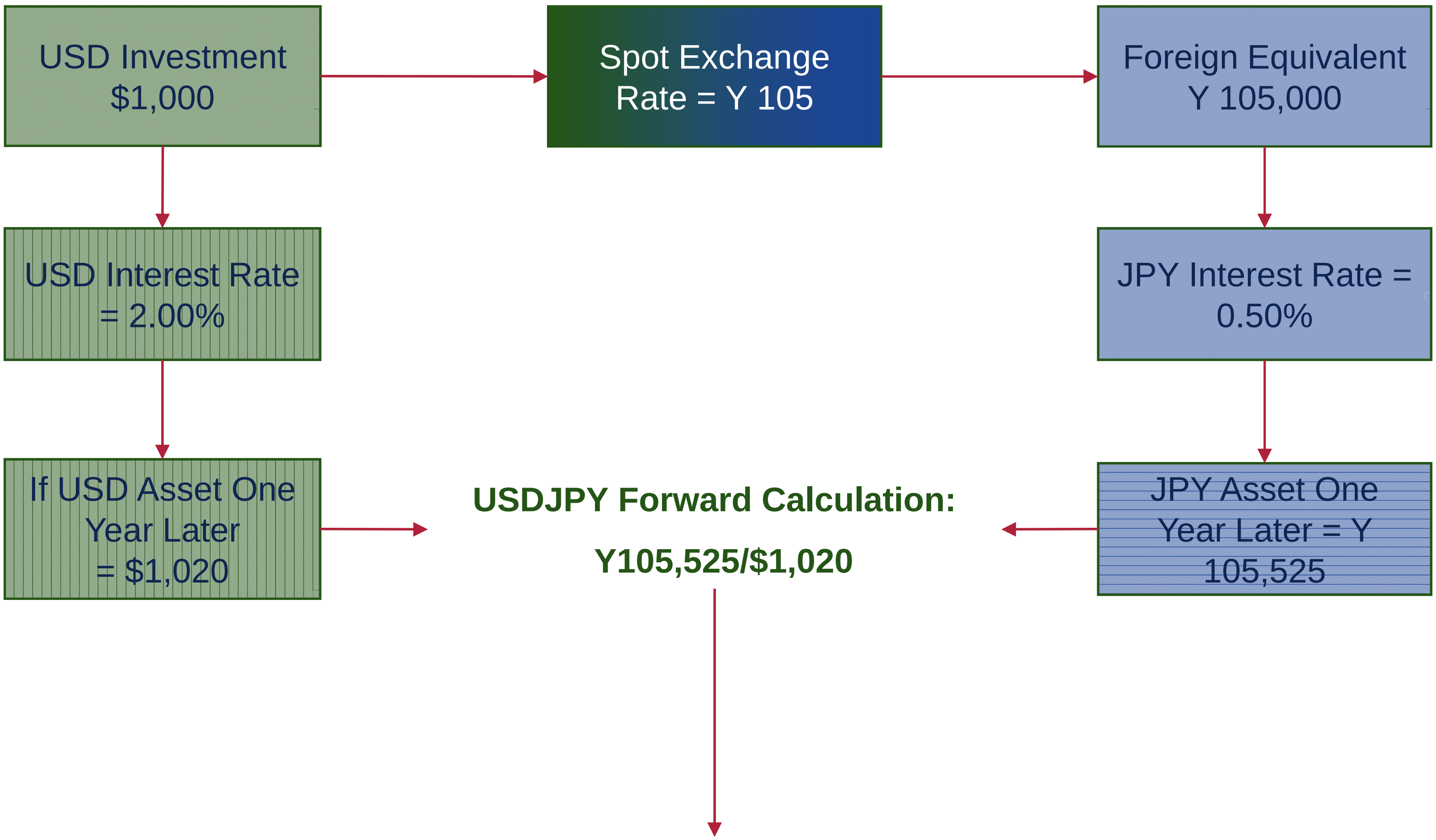
Currency Impact on Total Return

If USDJPY depreciates by 10% = Y 96.1045	→	Y 115,500/Y 96.1045 = $1,200	=	20% Return
If USDJPY appreciates by 10% = Y 117.4611	→	Y 115,500,000/Y 117.4611 = $990	=	0% Return

What is a Currency Forward?

- Most investors use the currency forward market to implement passive and active currency strategies.
- A forward contract is an agreement to exchange one currency for another at a specified exchange rate on a future date.
- What do we need to know to define the terms of a forward contract?
    - Buy and sell currencies (e.g., USDJPY)
    - Current spot rate ($1 USD = Y105.000)
    - Buy and sell interest rates (USD 2.00% and 0.50% JPY)
    - Maturity (e.g., one year)
- Currency Forwards can be used in two ways
    - Passively
    - Actively

Currency Forward Calculation: USDJPY Example



USDJPY FORWARD RATE = Y 103.46

Managing Uncompensated Risk

Unmanaged Currency Exposure = Uncompensated Risk

- Foreign currency exposure is an unavoidable part of all non-domestic portfolios
  - Yet, exposure to FX risk is often ignored
- Similar to other assets, foreign currency exposure introduces volatility and diversification
  - The added volatility tends to dwarf the diversification benefits
- Unlike other assets, unmanaged foreign currency exposures do not generate risk premiums
  - That is, currency risks are largely uncompensated
- These risks can be managed in an effort to enhance risk-adjusted portfolio returns
  - Risk budget savings can be allocated elsewhere in a portfolio

The views expressed above are those of SSgA's Global Currency Team only as of March 20, 2008 and are subject to change based on market and other conditions.

Managing Currency Risks: Passive versus Active Management

- Currency exposures can be managed either passively or actively
  - Passive hedging seeks to mitigate volatility
  - Active management can be used to aim to add value
  - Alpha/Beta management of currency exposures
- We will demystify some of the confusion that persists about currency exposure
  - Myth versus Reality

Currency Management: Myths versus Reality

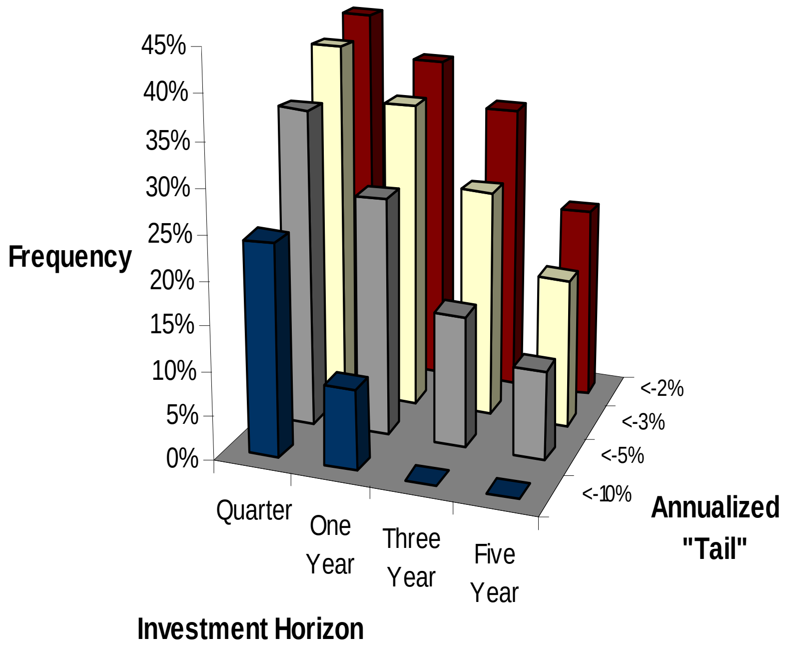
	Myths	Realities	Conclusion
1	Currencies mean-revert — no need to manage these exposures	Currency exposure introduces risk with zero long-run expected return. However, this does not imply that currencies mean-revert. In fact, currency exposures can introduce sizable risks over extended periods of time.	Managing currency risks makes good sense.
2	Currency markets are too efficient	The currency market is indeed the most liquid in the world. From a hedging perspective, this is in fact a benefit — it may reduce the cost of hedging these risks, relative to other asset classes. However, liquidity is not the same as efficiency.	Many participants in currency markets do not trade to maximize profits, but for other purposes (e.g., liquidity demanders versus suppliers). Inefficiencies in currency markets persist despite the liquidity. Active management can potentially add value.
3	Currency exposure is a diversifier and should not be hedged away.	This is partially true, however, we believe that in the vast majority of cases the volatility introduced by currency far outweighs the diversification benefits associated with unmanaged currency exposure.	The diversification benefits are rarely sufficient to eliminate the need to hedge these risks. To the extent that currency exposure introduces diversification, it may make sense to hedge less than the full exposure. However, to seek to minimize risks, we believe that hedging these exposures makes sense.
4	Currency is not an asset class	In our view this does not matter. Currency exposure may uniquely introduces risks with zero expected long-run return.	Whether or not currency is an asset class, it introduces risks and opportunities and in our view should be managed.
5	Currency is too complex	Currency management is similar to a long/short or market-neutral portfolio. The limited number of currencies can simplify the challenge of managing these risks.	Not a reason not to manage currency risk. Currency management can be outsourced, either to the manager who manages the base portfolio or to a specialist currency hedge manager.

The information above is not intended to provide investment advice. The views expressed above are those of SSgA''s Global Currency Team as of March 20, 2008 and are subject to change based on market and other conditions.

Interim Volatility: MSCI Portfolio Example

January 1971 to December 2007

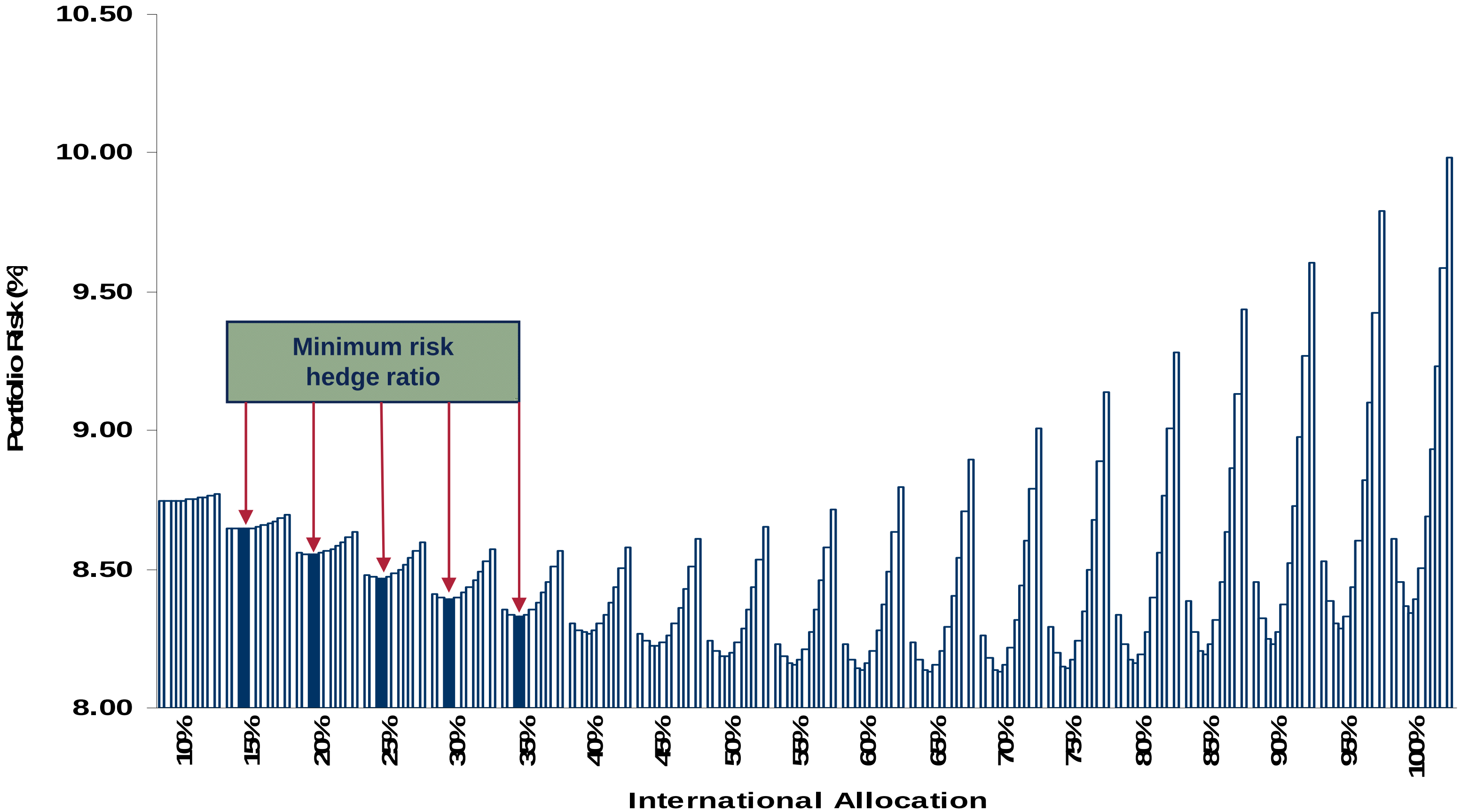
	Q2	One Year	Three Year	Five year
Worst Rolling Return	36%	-17%	-10%	-8%
Annualized Return:				
less than -10%	24%	9%	0%	0%
less than -5%	36%	27%	15%	10%
less than -3%	41%	35%	26%	17%
less than -2%	43%	38%	33%	22%
Largest Drawdown:	-41% 10/31/78 to 2/28/85			



The MSCI EAFE® Index is a trademark of Morgan Stanley Capital International.
Morgan Stanley Capital International, January 1971 to December 2007, SSgA
Past performance is no guarantee of future results.

Example: Minimum Risk Hedge Ratio

For MSCI EAFE® allocations in excess of 15%, it may be possible to manage overall portfolio risk by hedging more than 50% of the currency exposure



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Morgan Stanley Capital International, January 1971 to December 2007.

Active Currency Management

Passive Currency Risk Management

- Passive currency management seeks to reduce volatility at a modest cost
- The objective is to reduce exposure to uncompensated currency risk
- Modest costs of hedging attributable to sizable currency market liquidity
  - Cash flows need to be managed
  - Bid-ask spreads tend to range from 2 to 6 basis points in developed economies
  - Passive hedging costs tend to be 3 to 5 basis points.
- Incremental risk reduction associated with a passive hedge tends to decline as the hedge level increases
  - Due to the diversification effect provided by the unhedged part of the portfolio

Active Currency Management: Academic Research

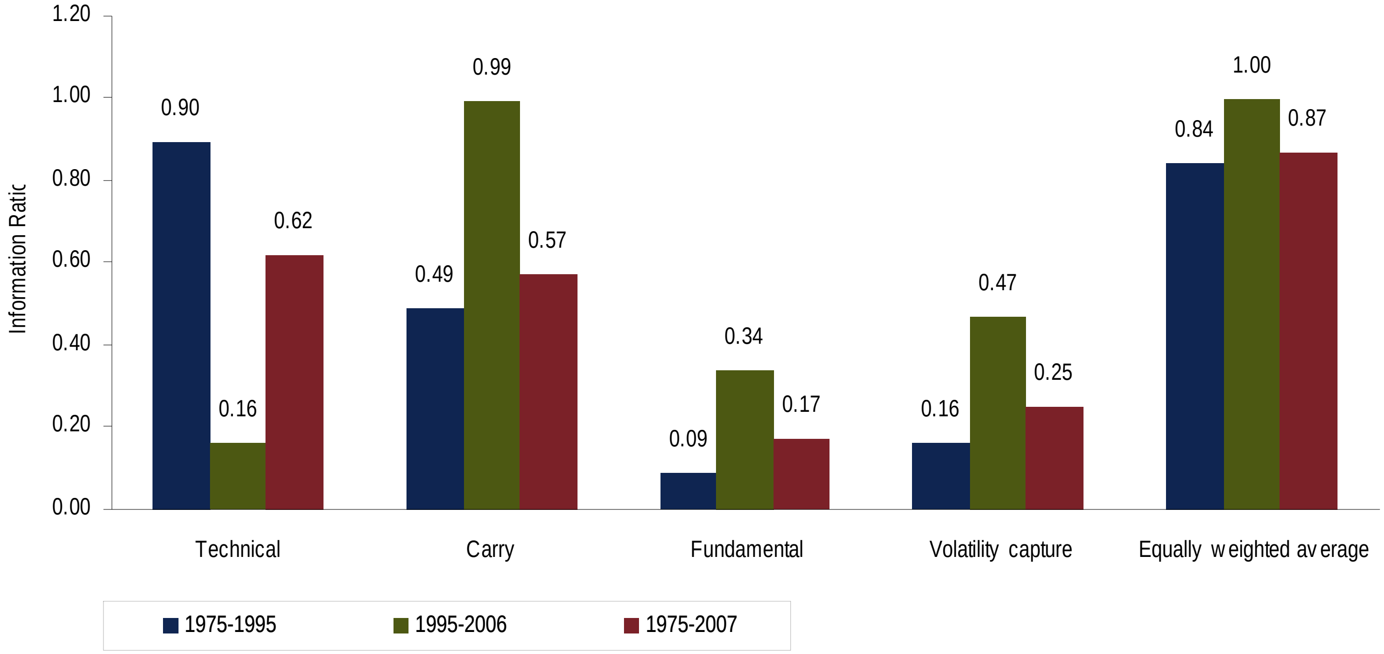
Academic research has concluded that four distinct basic strategies have added value over the past thirty years

Factor	Research	Strategy
Technical	Currency markets have a well-documented tendency to trend over time.	Moving Average cross-overs with volatility filters that are introduced to address risks.
Carry	Forward rate bias -- high (low) yield currencies do not depreciate (appreciate) to the extent predicted by uncovered interest parity.	Fund long positions in high yield currencies via short positions in low yielders. Reverse position when market conditions become risk averse.
Fundamental	Currencies tend to mean-revert over long horizons in line with purchasing power parity (PPP).	PPP may be particularly useful as a risk measure when exchange rates move far away from "fundamental value."
Volatility	Volatility tends to mean-revert.	Sell in-the-money put and call options when volatility is high — with the expectation that vol will mean-revert.

Source: James Binny, *Currency Management Style Through the Ages*, Journal of Alternative Investments, Winter 2005

Basic Strategies: Information Ratios

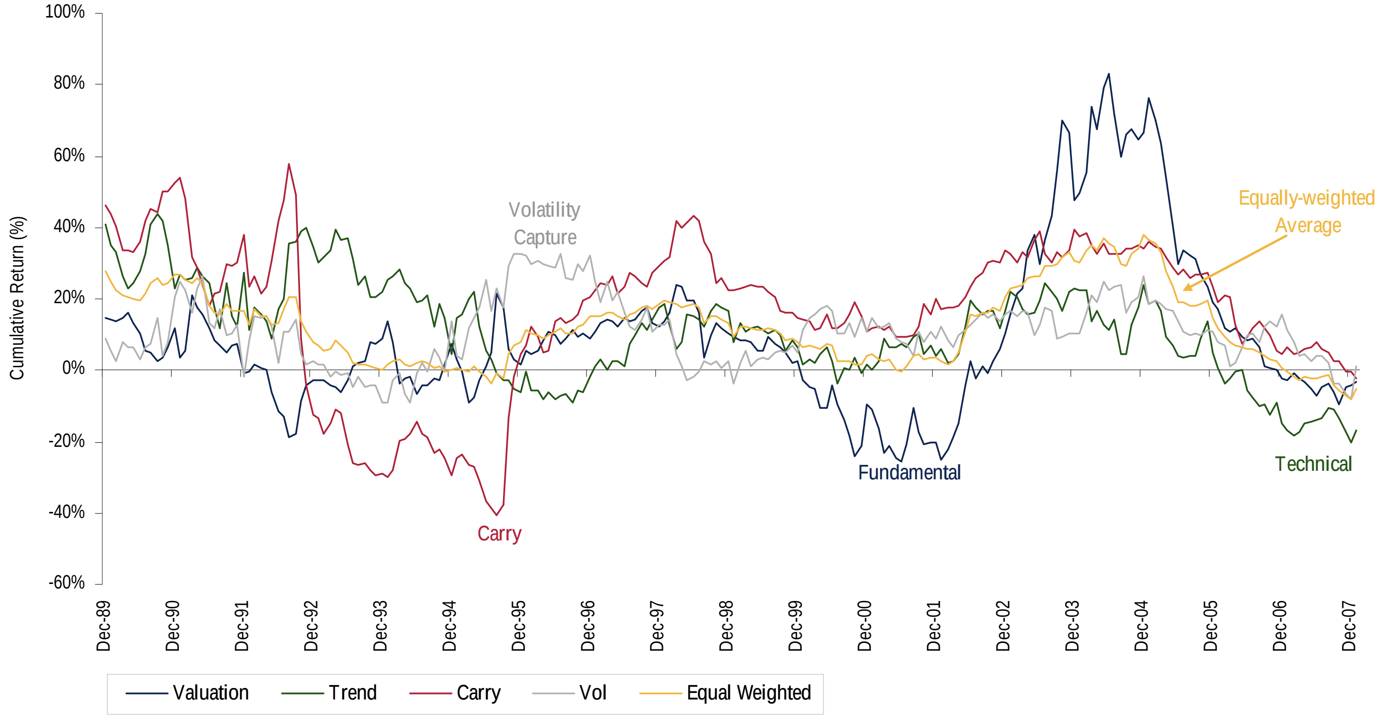
- IR for technical strategy has declined since 1995
- IR for carry and fundamental strategies have increased since 1995
- IR for equally-weighted strategy has remained consistent over the past thirty year period



Source: James Binny, ABN AMRO Bank, 12/31/07

Naive Strategies: Rolling Three-Year Returns

- Three-year rolling returns for the equally-weighted average have performed well throughout the past thirty year period
  - Historical correlations between the four strategies range from -0.64 to 0.32



Source: James Binny, ABN AMRO Bank, 12/31/07

Conclusion

- Passive or active management of currency risks can be used in an effort to enhance risk-adjusted returns
  - Unmanaged exposure to currency risk does not tend to generate risk premiums
- Unmanaged foreign currency exposures have introduced sizable “tail risks”
  - There is some probability of losses over multi-year horizons
- The US dollar has declined sharply relative to other currencies since 2002
  - In our view now is the appropriate time to be evaluating strategies for managing these risks
- Recent trend toward growth in “pure alpha” currency strategies will likely persist
  - Driven in part by lower expected future returns on traditional asset classes

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Biographies

John M. Balder

John is a Vice President of State Street Global Advisors and senior member on the Currency investment team. He is responsible for product development, investment management and research. John joined SSgA in 2006 with ten years of research, strategy, portfolio management and product development experience in currencies, fixed income and asset allocation.

He previously worked at State Street Research & Management, Grantham, Mayo, Van Otterloo & Co. LLC, and State Street Bank. Prior to joining the private sector in 1995, John served as an international economist with the U.S. Treasury Department, the Federal Reserve Bank of New York and the House Banking Committee.

John holds a Masters degree from American University and a Bachelors degree from Bucknell University. He has written numerous articles that have been published in various trade publications and journals.

Disclosures

Thank You

More information on Managing Uncompensated Currency Risk is available on:

www.ssga.com

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