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Currency Markets & Hedging Analysis

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Overview

This presentation is designed to:

1. Address why currency is a significant consideration for institutional investors:

- Components of international returns to US investors
- Historic impact of currency on returns

2. Educate Committee or Trustee members regarding the fundamental factors that could affect currency markets:

- Balance of payments
- Real interest rates
- US dollar valuation
- Purchasing Power Parity (PPP) relativistic currency valuations

3. Analyze current market conditions and determine the likely direction of US dollar valuations:

- Current real interest rates with major trading partners
- PPP relativistic analysis amongst major trading partners
- Absolute valuation and mean reversion analysis

4. Dimension the potential impact of US dollar values on international exposures:

- The impact of mean reversion in currency valuations over 10 years

5. Recommend a course of action:

- Differentiate between market timing and rational long term strategic shifts
- Whether or not to hedge based on current market conditions, and appropriate time horizon
- Ways to implement a currency hedge



Why is Currency Exposure an Important Consideration?

- Any international investment is comprised of two distinct risk exposures, the underlying investment's risk and currency risk.
 - Equity and fixed income risk are systematically rewarded over time, meaning the real expected return is positive.*
 - Currency risk is not systematically rewarded over time, meaning the real expected return is zero.*
- Even though currency risk is not expected to provide real returns over the long term, it can still represent a substantial portion of returns experienced by US investors over reasonably long periods of time.
- In fact, currency effects have more than doubled the return for the MSCI EAFE equity index over the last ten years; note this effect could have been negative.
- So when evaluating international opportunities, investors must be cognizant of the potential effects of currency movements on returns.
- Research strongly indicates the US dollar is poised for appreciation in the current market environment, which could materially detract from US investors' international returns. In other words, we believe currency exposure represents a substantial downside risk to investors at this point in time.
- Because we know bearing currency risk is uncompensated over the long term, it is arguable that US investors now face an uncompensated downside investment risk in their international investments.
- As a general rule of thumb it is best to avoid uncompensated (or poorly compensated) investment risks.

Composition of International Equity Returns	
Local Equity Return	& Currency Return
Systematically Rewarded	<u>Not</u> Systematically Rewarded

Query: Should investors systematically employ diversifying risk exposures that are expected to produce a zero real rate of return?

Or should such exposures be strategically employed?

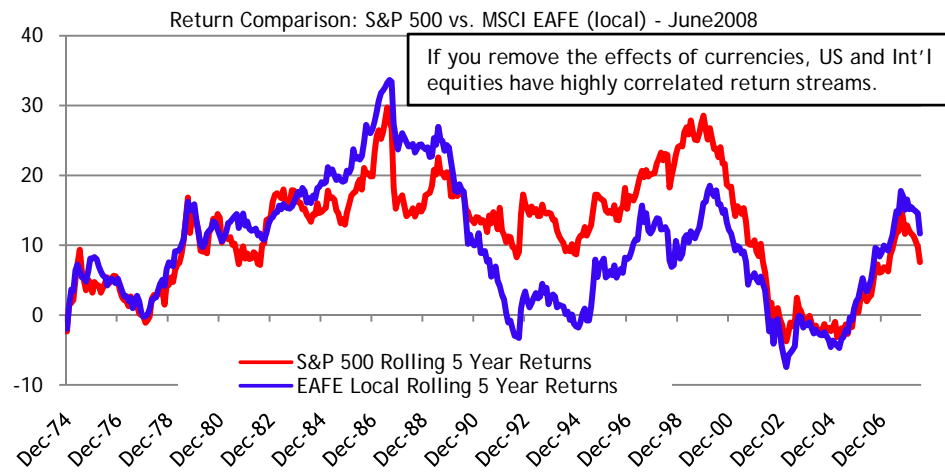
As of June, 2008	Last 1 Year	Last 3 Years	Last 5 Years	Last 10 Years
MSCI EAFE (Local)	(19.8)	7.1	11.7	3.0
Currency Benefit (+)/Drag (-)	9.7	6.2	5.5	3.2
Net US \$ EAFE Return	(10.2)	13.3	17.2	6.2
Currency Effect as % of Total Return	33%	46%	32%	52%

Note: Returns greater than one year are annualized.

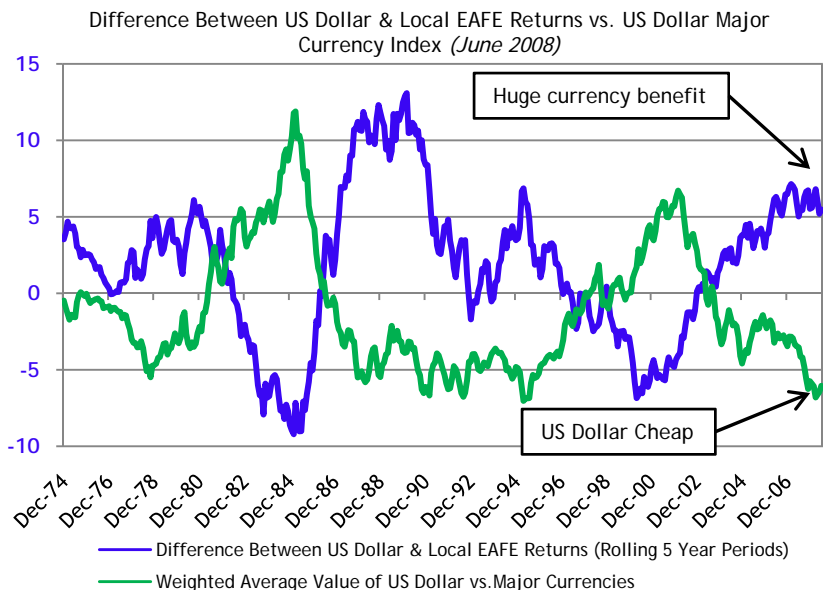


A History of Currency Impact on Returns

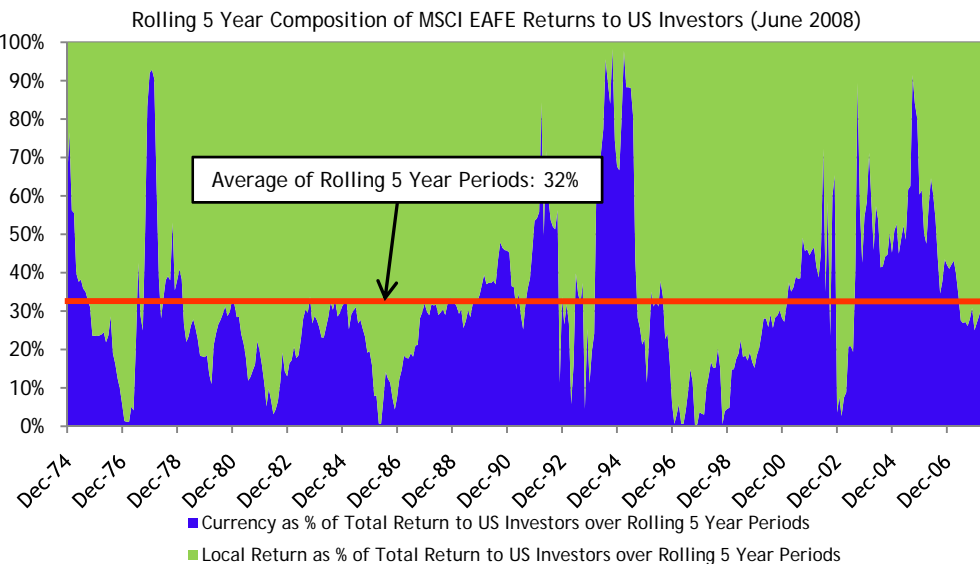
- For US investors in international equities, currency has historically impacted returns to a high degree, and has done so with substantial amounts of volatility.
- On average currency effects constitute 32% of the total returns experienced by US investors over rolling 5 year periods.
- Additionally, the difference between Local and US Dollar EAFE returns can fluctuate wildly over rolling 5 year periods; the monthly standard deviation of this difference is 4.8%.
- As theoretically expected, the relationship between currency effects and US dollar valuation is inverse. This means the more the dollar falls the better the benefit to returns; and vice versa.



Source: Ibbotson; Wurts & Associates



Source: Ibbotson; Federal Reserve; Freelunch.com; Wurts & Associates



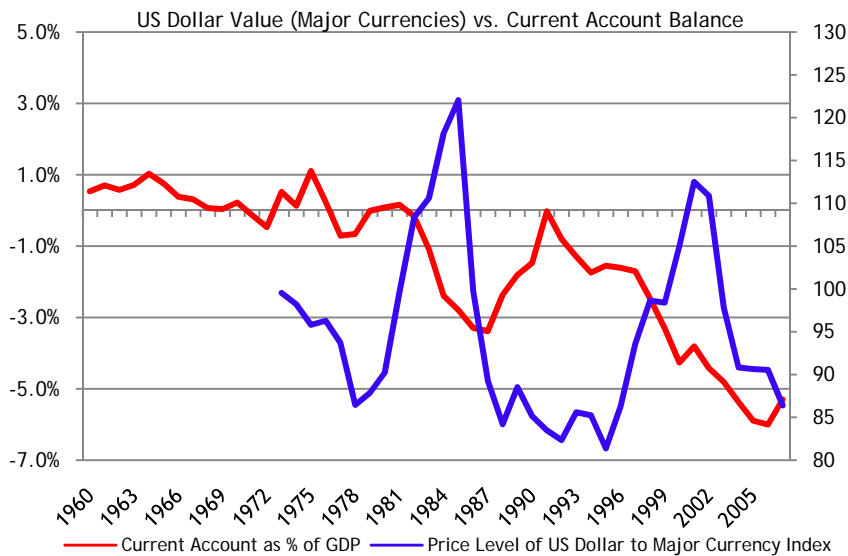
Source: Ibbotson; Wurts & Associates



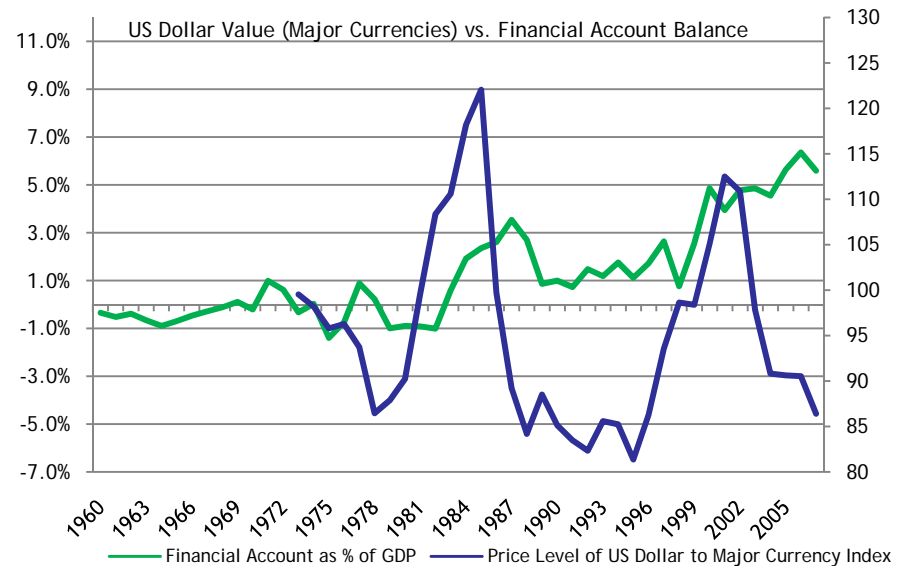
US Dollar & Balance of Payments

Current account: Balance of trade for all goods and services; Financial account: Balance of all investment and capital flows

- Because the US is running a huge current account deficit, many argue it is susceptible to a downturn in foreign reinvestment of US dollars into our capital markets. This would cause the dollar to depreciate further from current levels. However, even if foreigners slow their reinvestment of US dollars, currency depreciation will not necessarily result over the long term.
- To understand, consider the chain of logic if foreigners slow their reinvestment of US dollars.
 - This will depreciate the dollar (or decrease its demand), which will in turn make US exports more attractive and imports less attractive. This in turn will increase demand for US dollars (i.e., exports) and decrease demand for foreign currencies (i.e., imports), offsetting the initial effects of slowing reinvestment of US dollars.
- We have examined movements in the US dollar relative to the current and financial account, and find no clear relationship among them. This is because our current and financial accounts have indeed offset one another over time. This could change, but we have no fundamental reason to believe it will change.
- Instead, other fundamental factors have been shown to materially affect US dollar valuations; real interest rates, comparative price levels, and absolute valuations (*discussed on following pages*).



Source: Bureau of Economic Analysis; Federal Reserve; Freelunch.com



Source: Bureau of Economic Analysis; Federal Reserve; Freelunch.com



Basic Relationships - Real Interest Rates & Absolute Valuations

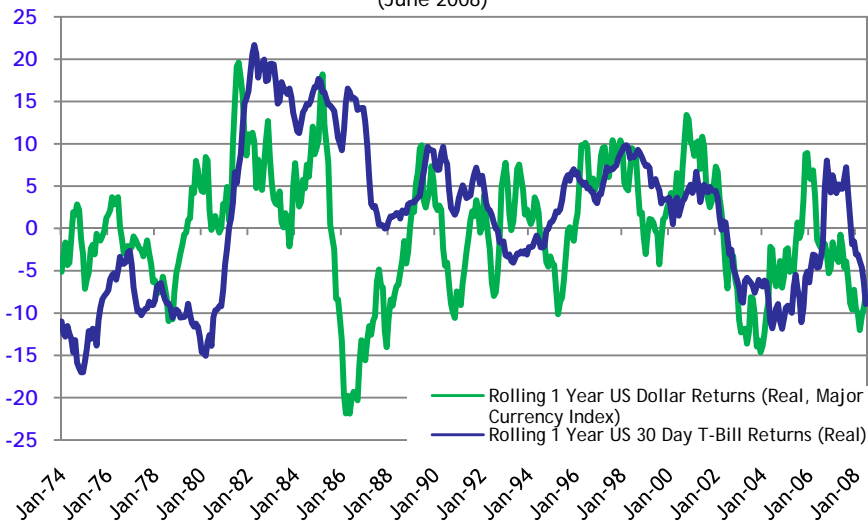
Real Interest Rates

- Economic theory tells us that global fixed income investors will seek out the highest real interest rates, which will materially affect currency valuations. This practically means if a country has relatively high real interest rates, demand for its currency will increase due to investors' desire to earn those higher yields, resulting in currency appreciation; and vice versa.
- An examination of US real cash rates clearly illustrates this relationship exists. So as US real cash rates rise, the value of the dollar rises; as rates fall, the value of the dollar falls. The implication is that if US real interest rates rise as the economy recovers from its slowdown, the US dollar should appreciate in value as its real interest rates become more globally competitive.

Absolute Valuations

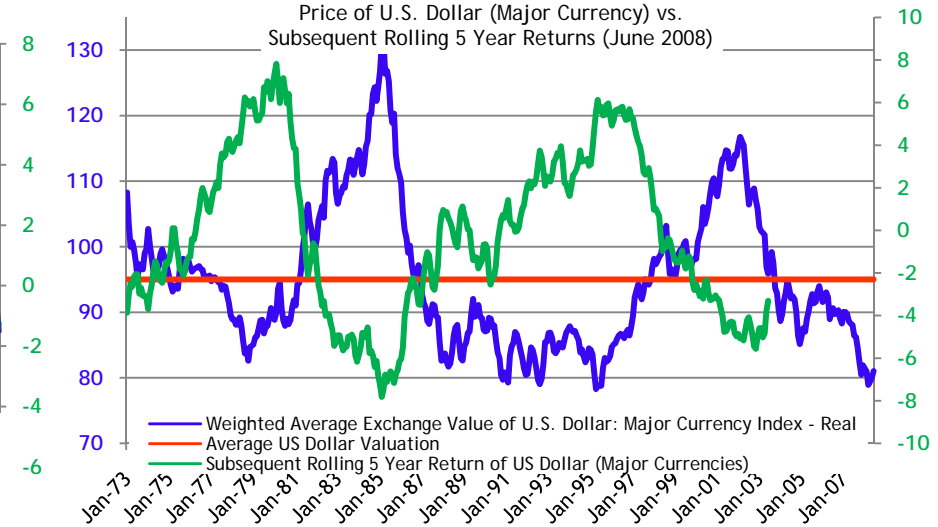
- As is the case with any investment, it seems reasonable to conclude that valuations are a strong predictor of returns. It appears this relationship holds true with the US dollar. During times when the dollar falls in value, its subsequent five year returns go higher; and vice versa.
- So from this standpoint, the US dollar appears undervalued and should appreciate going forward.

Rolling 1 Year US Dollar Returns vs. Rolling 30 Day US T-Bill Returns
(June 2008)



Source: Ibbotson; Federal Reserve; Freelunch.com; Wurts & Associates

Price of U.S. Dollar (Major Currency) vs.
Subsequent Rolling 5 Year Returns (June 2008)



Note: Rolling 5 year monthly annualized returns

Source: Federal Reserve; Freelunch.com; Wurts & Associates

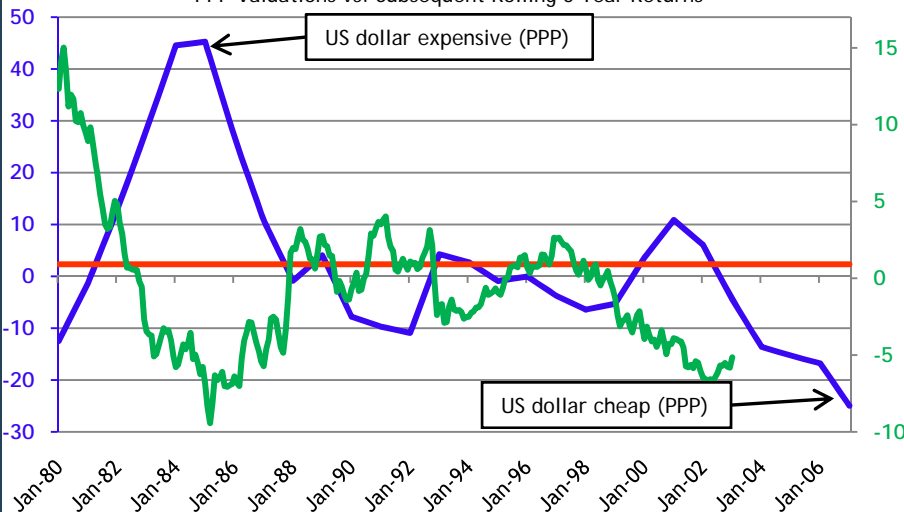


Basic Relationships - Relative Purchasing Power Parity (PPP)

Purchasing Power Parity (PPP): A basic economic theory that states equivalent baskets of goods should cost equal amounts across borders over time.

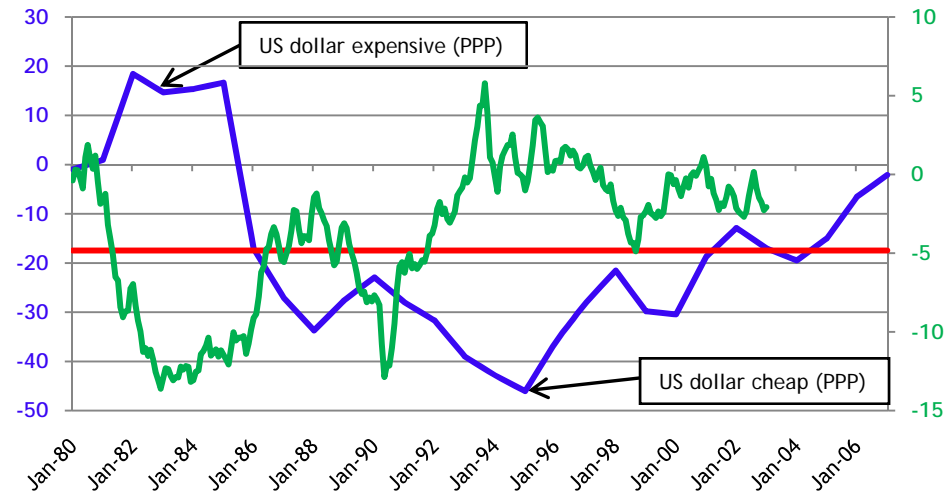
- PPP valuation metrics are often ignored by investors because they provide no predictive value to currency movements over short periods of time. However, research indicates that PPP metrics do indeed provide reasonable predictive value when viewed over long periods of time such as rolling 5 year periods.
- As you can see in the charts below, there is a clear inverse relationship between PPP valuations and the subsequent return of the US dollar. The more expensive the dollar becomes relative to PPP metrics, the lower its subsequent 5 year return; and vice versa.
- Conclusion: PPP metrics offer reasonable predictive value for currency movements over appropriately long time horizons.

US Dollar vs. UK Pound:
PPP Valuations vs. Subsequent Rolling 5 Year Returns



— US\$/UK Pound PPP Over/Under Valuation
— Average PPP Valuation
— Subsequent Rolling 5 Year Return of US Dollar to UK Pound

US Dollar vs. Japanese Yen:
PPP Valuations vs. Subsequent Rolling 5 Year Returns



— US\$/Japanese Yen PPP Over/Under Valuation
— Average PPP Valuation
— Subsequent Rolling 5 Year Return of Japanese Yen to US Dollar

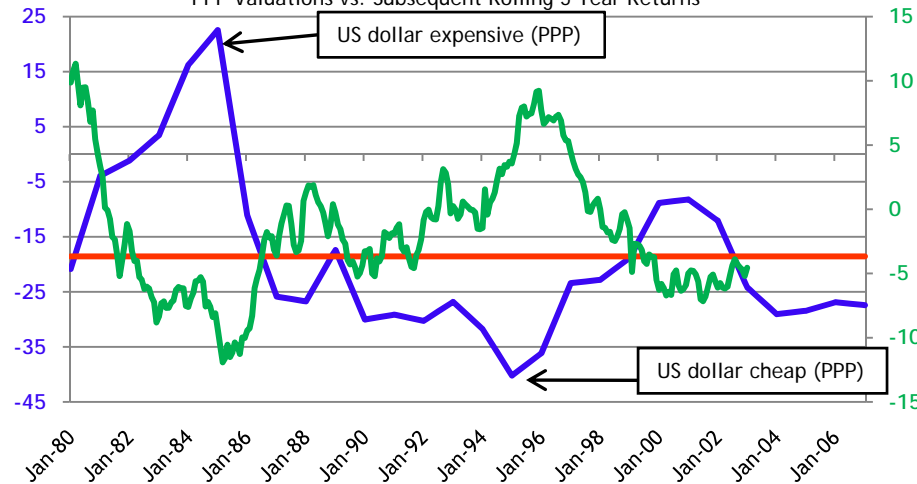
Note: Rolling 5 year monthly annualized returns
Source: Federal Reserve; Freelunch.com; Wurts & Associates;
Organization for Economic Cooperation & Development (OECD)



Basic Relationships - Relative Purchasing Power Parity (PPP)

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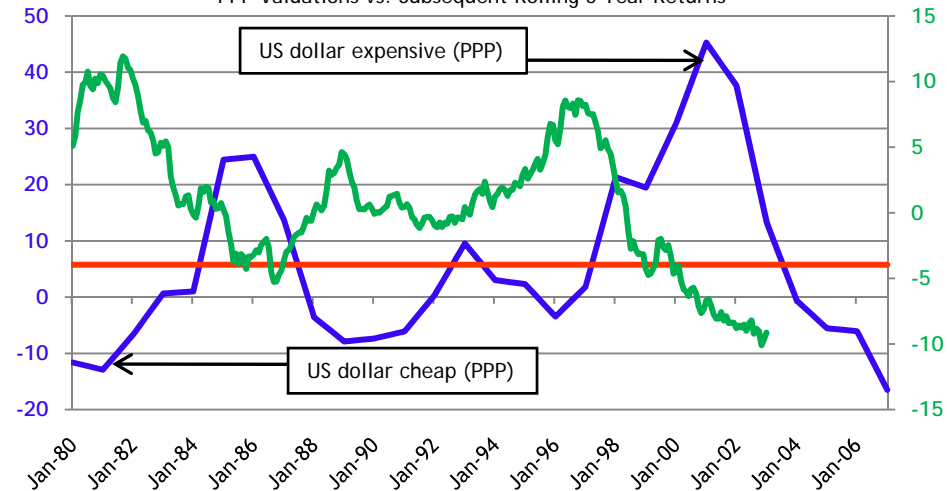
US Dollar vs. Swiss Franc:
PPP Valuations vs. Subsequent Rolling 5 Year Returns



— US\$/Swiss Franc PPP Over/Under Valuation
— Average PPP Valuation
— Subsequent Rolling 5 Year Return of US Dollar to Swiss Franc

Note: Rolling 5 year monthly annualized returns
Source: Federal Reserve; Freelunch.com; Wurts & Associates;
Organization for Economic Cooperation & Development (OECD)

US Dollar vs. Australian Dollar:
PPP Valuations vs. Subsequent Rolling 5 Year Returns

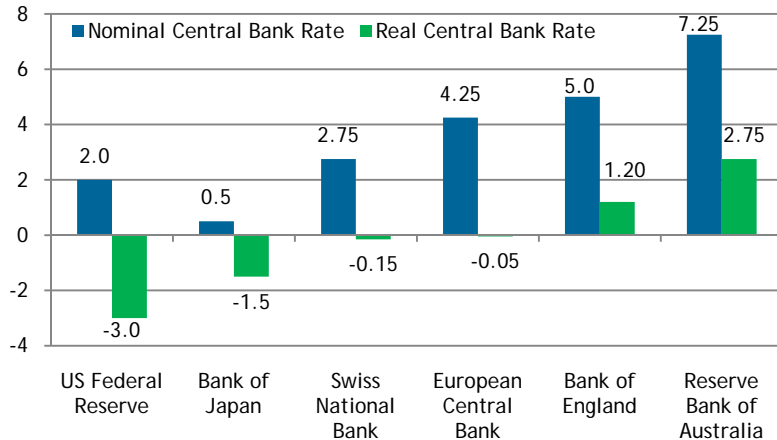


— US\$/Australian\$ PPP Over/Under Valuation
— Average PPP Valuation
— Subsequent Rolling 5 Year Return of US Dollar to Australian Dollar



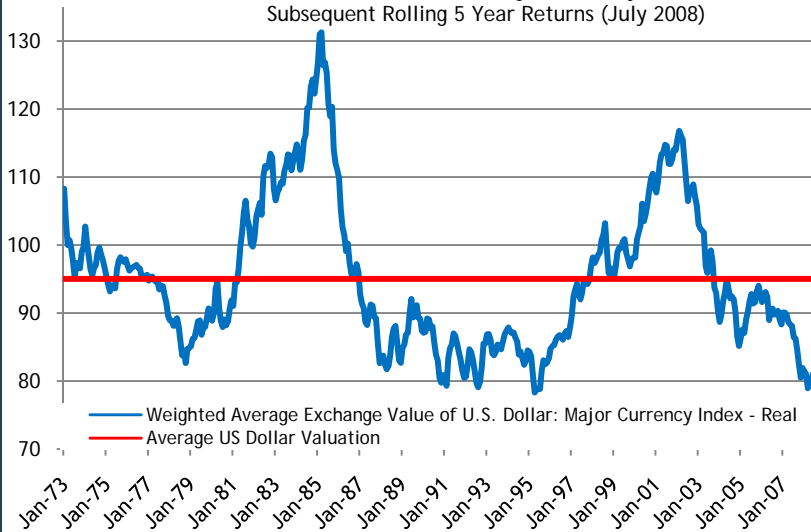
Current Market Environment

Nominal and Real Central Bank Rates (as of July, 2008)



Source: US Federal Reserve, Banks of Japan & England, ECB, Reserve Bank of Australia, Swiss National Bank; OECD; Wurts & Associates

Price of U.S. Dollar (Major Currency) vs. Subsequent Rolling 5 Year Returns (July 2008)



Source: Federal Reserve; Freelunch.com

On all fundamental metrics, the US dollar is undervalued, meaning it should appreciate going forward.

Real interest rates

- Real US interest rates are the lowest of the major MSCI EAFE constituents.

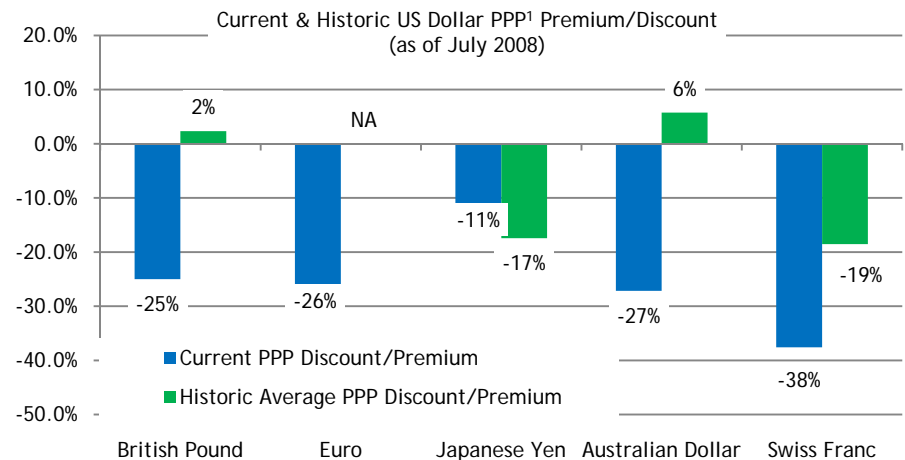
PPP Valuations

- With the exception of Japan, the US dollar is undervalued across the board.

Absolute Valuations

- Relative to an index of major currencies, the US dollar is at historic lows.

	Euro	UK Pound	Japanese Yen	Australian Dollar	Swiss Franc
Percent of MSCI EAFE Currency Exposure	35	22	21	7	7



¹ Based on 2007 year end PPP index data; based on \$/local currency valuation.
Source: Federal Reserve; OECD; Freelunch.com; Wurts & Associates



Scenario Analysis

Price of U.S. Dollar (Major Currency) vs. Subsequent Rolling 5 Year Returns (July 2008)



- Given the current market environment for the US dollar, it seems likely to expect currency appreciation from this point going forward.
- If US dollar valuations revert even close to historic levels, analysis indicates the impact on returns could be significant.
- Should the US dollar move above historic averages as it has before, the impact on returns to US investors abroad could be very large.
- Based on this analysis, we expect the impact of currency movements to detract at least 1.5%, annualized, over the next ten years for un-hedged US investments abroad.

Sensitivity Analysis to Movements in US Dollar Relative to Major Currency Index (hedged position)

US Dollar Price Level Scenarios: 10 Year Outlook	July 2008 Price Level	Average Price Level	Estimated 2018 Price Level	Subsequent 10 Year Annualized %	Comments
Depreciates 10% from Current Levels	80	95	72	-1.1	Historically unprecedented - very unlikely
Reverts Half Way to Average	80	95	88	0.9	Small/modest impact- almost certain to occur
Reverts Three Quarters Way to Average	80	95	91	1.2	Modest impact - very likely to occur
Reverts to Average	80	95	95	1.7	Meaningful impact - reasonable expectation to occur
Reverts to 2002 Levels	80	95	115	3.6	Large impact - could conceivably occur
Reverts to 1985 Levels	80	95	125	4.5	Huge Impact - not likely to occur, but possible

Source: Federal Reserve; Freelunch.com; Wurts & Associates



Currency Hedging/Strategic Options

Overlay with Futures or Forward Contracts

- At this juncture there are no existing products for institutional investors to gain exposure to systematically hedged international equity portfolios. However, this may change in the future depending on investors' demand for these products.
- In the meantime though, investors can hedge currency exposure through futures and forward contracts.
 - Large investors can do this for their own accounts, and pay reasonable fees.
 - Small investors would need to pool assets to collectively offset costs.
- Wurts & Associates is currently in the process of working with investment managers to develop currency hedging options for both active and passive investment strategies through the use of futures and forward contracts.
- The end result of these efforts will depend on the aggregate level of client interest in currency hedging. Fees for a currency overlay could be as low as 10-20 basis points assuming there is sufficient interest.

Reduce International Equity Allocation

- Assuming the total size of the allocation is too small access a hedged index fund or use futures overlay, reducing the overall international allocation is the only remaining way to mitigate the effects of dollar appreciation.
- This would manifest itself in a strategic shift away from a global market capitalization weighted portfolio, with the justification being lower prospective returns for international equities.

Embrace a Truly Long Term Outlook - Do Nothing

- Given that currency fluctuations will produce a net zero effect on portfolio returns over periods of time such as 20+ years, doing nothing is an appropriate option if investors have this degree of patience.



Concluding Thoughts

[Is Hedging Market Timing or Rational Long Term Investing?](#)

- Marketing timing would best be described as investment decisions designed to capture short term fluctuations in any investment vehicle or asset class, and making such decisions on purely speculative grounds (i.e., there is no defensible theoretical or scientific basis to expect superior risk adjusted returns).
 - *Market timing is grounded in intuition and emotion.*
- Rational long term investing entails setting aside speculative arguments and making investment decisions based on reasonable expectations of superior risk adjusted returns over long periods of time. Such decisions must necessarily be supported by investment theory and empirical evidence, as opposed to speculative arguments.
 - *Rational long term investing is grounded in scientific process.*
- So depending on the basis for hedging US dollar exposure and the associated time horizon, such a decision can be either market timing or rational long term investing.
- In this particular instance though, we believe hedging US dollar exposure for a period of 10 years constitutes a rational long term investment decision.



Concluding Thoughts

[Is There a Fundamentally Sound Basis for Hedging US Dollar Exposure?](#)

- As illustrated throughout this presentation, we have examined the four major factors: 1) balance of payments, 2) real interest rates, 3) absolute valuations, and 4) PPP analysis.
- With respect to balance of payments, we have found no clear historic relationship between balance of payments and currency fluctuations.
 - *Current and capital account flows have historically offset one another. The potential for diminishing capital account flows is a near term concern to dollar depreciation, but should be offset by current account flows over the long term.*
- Real interest rates for the US are at historic lows, and are lower than our major trading partners.
 - *There is both a theoretical and empirical basis to expect real interest rates to affect currency valuation. Furthermore, real interests have been shown to increase in the face of strong economic growth, and should rise from current levels as the US economy recovers from its slowdown.*
- Absolute valuations for the US dollar relative to major currencies are at historically low levels.
 - *Reversion to the mean in US dollar valuations is supported by both theory and empirical evidence.*
- PPP analysis indicates the US dollar is undervalued relative to its major trading partners and historic averages.
 - *PPP analysis is supported by theory and empirical evidence to affect valuations.*
- Based on all of these factors, we conclude the US dollar should rise from current levels over the next ten years, and to such a degree it will meaningfully impact returns.

