

### What Moves the Yen?

After remaining remarkably low during the recent correction in global equities, implied volatility (IV) of Yen and other major currencies is stirring from slumber. One-year ATM Yen volatility has risen from December lows of 7.7 to current levels of 8.6 after spending most of 2018 around 8.0, the low end of a three-decade range. We believe IV will continue to rise, fanning the flames of equity volatility, as speculative short yen positioning and carry trades are unwound. Is there any overarching significance to this move? Answers are hard to find: mainstream commentary on currency markets is invariably circular (e.g., investors became risk averse and thus fled to safe havens) and forex trading desks these days are so under-resourced that expecting them to provide plausible explanations for large currency movements is an exercise in futility. Sometimes it is thus useful to take a moment to reexamine the received wisdom on a much-discussed but imperfectly understood topic such as the yen in order to reveal and test some of our subconscious trading biases.

**The macroeconomic explanation.** Bloomberg (30 Dec 2018) quotes a currency strategist from a major investment bank as saying “news in Japan has been less negative than it has been in some other places...relative to original expectations...and that allowed the yen to play the role of a safe asset of sorts...” The argument thus becomes that the yen benefits from the “relative” economic outperformance of Japan when other economies disappoint (even more). This argument tends to imply that yen becomes a less-safe asset when Japan underperforms economically and also that global investors (who dominate activity in Japanese asset markets) would favor yen over equities or JGBs as a way to express their positive view on the economy. There are, however, numerous counter-examples in which yen strengthened in direct response to either adverse financial shocks in which Japan underperformed (e.g., early 1990s and post 2008) or Japan-specific natural disasters. Furthermore, even during the recoveries from the dotcom bust and the GFC, Japan clearly underperformed economically, but the yen still strengthened. Numerous academic studies (see Obstfeld, 2009) have addressed the question of the yen’s appreciation vs. the US dollar despite periods of stagnant productivity and rolling domestic financial crises. In most cases, these studies conclude that the yen is erratically procyclical, tending to appreciate during economic downturns in anticipation of falling exports and domestic deflation, hence causing the Japanese economy to experience even more pain during global economic downturns.

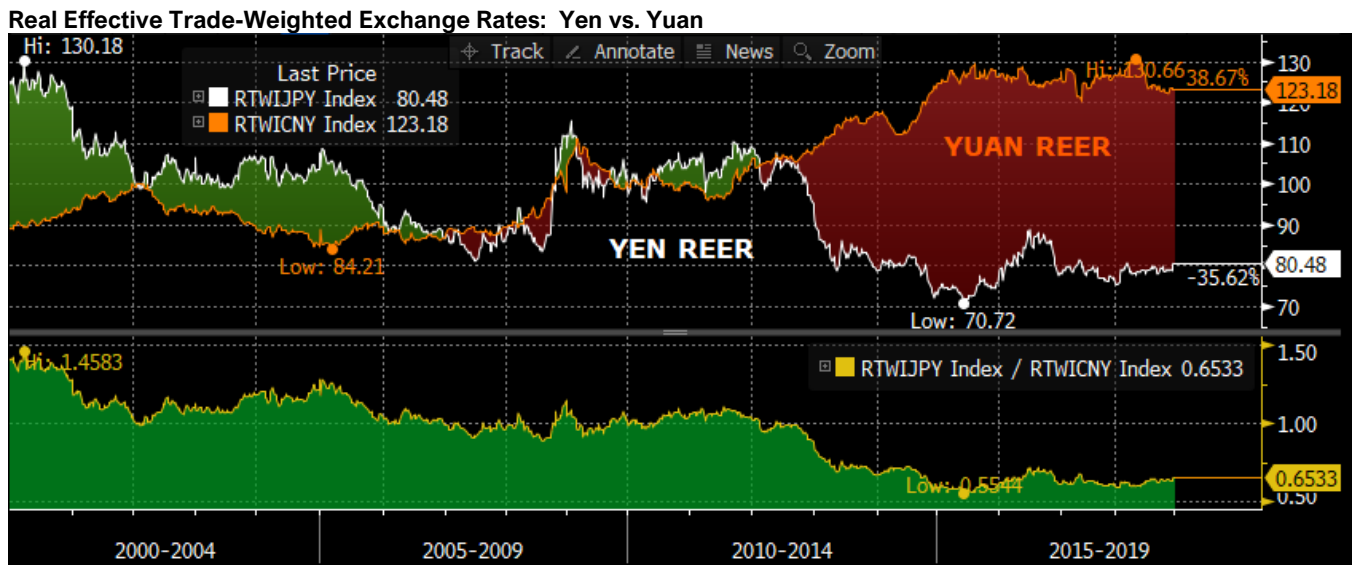
**Interest rate differentials.** The interest rate parity theory of exchange rates assumes that currency spot and futures rates adjust to prevent the possibility of interest rate arbitrage between two currencies as the rate differential reflects the future depreciation of the higher-yielding currency. Empirical studies of interest rate parity’s applicability to the dollar-yen relationship, however, are ambiguous (Wu & Chen 2007). While a cursory examination of the relationship between Treasury/JGB spreads and the USDJPY cross rate indicates a generally positive correlation, the statistical significance of this relationship is low and we can identify prolonged periods of inverse correlation, most notably 1994-2004 and 2014/15. Hence, detailed analyses of “QE tapering” and “yield curve control” (or the relaxation thereof) are of limited value unless accompanied by concrete data on how they will affect fund flows, which are, unfortunately, seldom available.

**Carry trades.** Related to the interest rate parity debate is that surrounding the effect of “carry trades”, the prevalence of which contradicts the fundamental assumption of interest parity. Carry trades, generally employing leverage to borrow in low interest rate currencies while buying high interest rate currencies, have been shown to be a profitable strategy, on average, across different currency pairs (Meese & Rogoff, 1983). However, due to the use of leverage and the tendency for such trades to be implemented during periods of low exchange rate volatility, they can result in violent unwinds during periods of financial deleveraging. Two prominent examples took place in October 1998 (LTCM-related deleveraging) and February 2007 (when Greenspan warned of recession as the US housing market was topping out) (Gagnon & Chaboud, 2007). Amplifying the effect of carry trades and their periodic unwinds in the post-GFC years are Japanese quantitative easing (QE) policies, which keep interest rates near zero while flooding the financial system with excess liquidity. In Japan, carry trades have thus tended to dilute the domestic effects of QE policies (on growth and inflation) by exporting a large part of the capital generated, while maintaining the capability to create massive volatility spikes in the Japanese currency markets (Chuffart & Dell’Eva, 2013) (Chantapacpedong, Ito & Hull, 2017). Put simply, QE reduces the yen’s tendency to depreciate (depreciation being the expected effect of heightened growth and inflation expectations), while increasing its tendency to strengthen rapidly and unpredictably in response to the reversal of larger carry trades in less liquid target currencies.

**Miscellaneous.** Observations of yen price fluctuations are often accompanied by casual references to the yen’s safe haven status or tendency to appreciate during “risk-off” episodes, including corrections in the Japanese equity market. We prefer to avoid these characterizations, which rely on circular reasoning and have not necessarily been constant traits of the yen over the years. The “safe haven” designation implies that Yen trades primarily as an asset rather than as a means of exchange during periods of higher perceived market risk. However, one can observe that international holdings of yen (currently 4.98% of total global reserves [IMF]) tend to decrease rather than increase during extended periods of volatility. While foreign dominance (70% of traded volume) of the Japanese equity market appears to result in net buying of yen during periods of foreign net equity selling (liquidating equities in exchange for yen credits), these are transactional rather than

directional trades and are not always correlated with yen appreciation. Indeed the inverse yen:Nikkei relationship has been known to disintegrate during periods of financial stress (e.g., Asian crisis and post-2000 domestic financial crisis) and is probably taken for granted today only because it has worked reliably in the post-GFC climate of low interest rates and extreme QE. For the same reason, now is probably the worst time for risk-takers to presume the indefinite continuation of the inverse yen:equity relationship.

Over brief time frames, the yen’s trading behavior is complex and influenced by multiple sources of data and fund flows. Over multi-month time horizons, such variables tend to be accommodated by modified forms of the interest rate parity theory that factor in real-time changes in expectations regarding CPI, rates, and trade flows. Such models lack theoretical robustness and are effectively trend-following tools. As a result, they are poorly suited to describe longer time periods or to predict major turning points in the yen trading regime. Perhaps the best tool for identifying the possibility of major turning points, if not precisely timing them, would be the real effective exchange rate. Combined with a high-level view of market liquidity trends and investor positioning, the long-term trend in the yen’s real effective exchange rate eliminates a great deal of short-term trading noise and reveals the cumulative effects of: 1) sustained deflation/disinflation relative to peers and 2) QE and carry-trade related distortions. Viewing the juxtaposition of Chinese yuan (due to China’s status as Japan’s largest trading partner) and yen real effective exchange rates while keeping in mind the contractionary effects of slowing trade and global QE tapering suggests that the likelihood of significant yen strengthening is increasing.



Source: Bloomberg. Westpac real effective exchange rate: a geometric average of a country’s bilateral exchange rate deflated by relative inflation rates.

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