Measuring Carry Trade Activity

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I. Introduction

Many commentators attribute recent episodes of rapid changes in asset prices to widespread investment in carry trades fueled by low interest rates. While carry trade strategies did not contribute to the recent financial crisis, the disparate monetary policies in place after the height of the crisis—with some central banks pursuing very accommodative policies with low interest rates and others returning to higher rates—may have created an environment where carry trades were attractive.

In this paper we describe common carry-trade strategies and the associated risks that are of concern to financial regulators and policymakers. These risks include excessive exchange-rate and asset price volatility, and increased stress on the banking system arising from loan defaults. We then review the available evidence as to whether carry trades were actually being undertaken during two recent periods when carry trade activity was reported to be widespread—during 2006-2007 funded by yen-denominated borrowing, and during 2008-2009 funded by U.S. dollar-denominated borrowing. Because detailed data on individual investor positions that would provide direct evidence on the carry trade are not available, we use several proxies for carry trade activity.

We do not find convincing evidence that carry trade strategies were adopted on a widespread and substantial basis during these periods. This conclusion must be only tentative, however, because the data needed to definitively assess how widely carry trade strategies were used are not available. For example, most measures do not allow the segregation of transactions associated with carry trades from other types of investment activities. Further, none of the available measures identify the amount of leverage associated with carry trades. We conclude with a discussion of recent data initiatives, such as the creation of trade repositories, and suggest improvements to existing data sources which would improve our ability to measure carry trade activity.

II. The Carry Trade and Its Risks

The most basic carry-trade strategy pairs borrowing in a low-interest rate funding currency with a deposit in a higher-yielding target currency.[1] At initiation, the borrowed funds are exchanged for the target currency in the spot FX market and deposited in a higher-yielding account, and at termination the deposited funds are withdrawn and exchanged back to the funding currency in the spot market. The investment return depends on both exchange rate movements and the difference between the borrowing and deposit rates. Another form of carry trade with a very similar investment return involves purchasing an exchange-rate future or forward contract to buy the target currency and sell the funding currency. For retail investors, there are also exchange-traded funds (ETFs) and exchange-traded notes (ETNs) that are designed to borrow in low-interest rate currencies and invest in higher-yielding currencies.

[1] The carry trade label has also been used more broadly to refer to investment strategies designed to profit from almost any type of expected return differential, such as borrowing and investing in risky assets of the same currency, or simply investing in rapidly appreciating commodities such as gold. However, in this note we use the term to refer to a strategy of taking a short position in a low-interest rate currency and investing the proceeds in a higher-interest rate currency.

A carry trade will be profitable as long as the exchange rate of the currency in which the funds are deposited does not depreciate by too much against the funding currency.[2] Even a small depreciation of the target currency can erase the gains from the higher rate of interest. Thus, exchange rate volatility is the main risk for a carry trade investor, and carry trades tend to take place in periods when exchange rate volatility has been low.[3]

The carry trade may often serve a useful economic purpose in helping equilibrate rates of return across markets. To the extent that the carry trade represents the kind of risky arbitrage between markets that is necessary for market functioning, it may be of little concern to policy makers. However, there are also valid reasons for policy makers to monitor this activity. Because carry trades tend to take place when exchange rate volatility is low, there is a concern that some investors fail to understand that volatility can rise, and hence are not taking the full risk of these trades into account. If this is the case, then as investment in a carry trade builds there may be depreciation of the funding currency in excess of that implied by fundamentals, and also excessive appreciation of assets in the target currency. Further, carry trade positions are quite fragile because they are typically highly leveraged. Because the profitability of these trades can be quickly erased if the exchange rate moves against them, even minor depreciation of the target currency may induce a large-scale unwinding of carry trade positions. This could induce a further, and perhaps considerably sharper, depreciation of the target currency and a rapid fall of

[2] Uncovered interest rate parity, a central tenet of many theories of international finance, predicts that investors should expect exchange rates to move in a way that equalizes the rates of return on equally risky assets denominated in different currencies. If this theory held true, then carry trades would yield no excess profits. However, historical evidence suggests that exchange rates frequently fail to follow the path implied by uncovered interest rate parity for extended periods of time, and instead follow something closer to a random walk. Investor expectations that uncovered interest rate parity will continue to fail drives many global investment flows, including carry trades.

[3] Other risks include performance risk (the risk that the deposited funds will not be returned) and settlement risk (the risk that the currency is not received in the foreign exchange transaction).

asset prices in the target country.[4] The resulting losses may be large enough to lead to widespread loan defaults and serious consequences for the banking systems in both funding and target countries.

III. Evidence of Carry Trades

Direct evidence on the carry trade requires detailed data on individual investor positions, something that is rarely available. Purchases of assets in high-yielding currencies, for example, do not by themselves represent conclusive evidence of the basic carry-trade strategy. To identify a carry trade, we would also need data indicating that investors were borrowing to make these purchases. Below we discuss common measures of carry trade activity and discuss their weaknesses.

Exchange Traded Funds (ETFs) and Exchange Traded Notes (ETNs)

The only direct evidence on the carry trade comes from exchange traded funds (ETFs) and exchange traded notes (ETNs), whose returns are linked to carry-trade strategies that involve borrowing in low-yielding currencies and investing in high-yielding currencies.[5] Two such investment vehicles are the Deutsche Bank Global Currency Harvest Index ETF and Barclay's Capital Intelligent Carry Index ETN.[6] The return on these indexes is an indication of the ex post

[4] Brunnermeier, Nagel, and Pedersen (2008), document that target currencies are more likely to experience large depreciations. Two classic examples of rapid yen-carry trade unwinding occurred on October 7th 1998 and February 27, 2007. On October 7th 1998 the U.S. dollar depreciated 7 percent against the yen, the largest one-day movement of the dollar-yen exchange rate.

[5] An exchange-traded note is a senior, unsecured debt security issued by an underwriting bank. Similar to other debt securities, ETNs have a maturity date and are backed only by the credit of the issuer. ETNs, like ETFs, are usually linked to the return of a benchmark index and trade on an exchange. However, because ETNs are debt securities, investing in them has an additional risk compared to an ETF; upon any reduction of credit ratings or if the underwriting bank goes bankrupt, the value of the ETN will be eroded.

[6] Specifically, the Deutsche Bank Currency Harvest Index tracks the performance of a portfolio that systematically invests in the 5 highest-yielding currencies and goes short in the five lowest-yielding currencies out of a pool of ten advanced economy currencies and ten emerging market currencies. Deutsche Bank implements the strategy as follows: it ranks currencies by 3-month Libor rates and invests in 3-month exchange rate forwards. The strategy is re-balanced quarterly.

profitability of carry trade strategies, though these indexes are constructed using a fairly complicated mix of leverage and investment products and may not accurately represent the profitability of carry trade strategies in general. As shown in the top panel of Figure 1, during 2006-2007 when there were reports of widespread investment in yen-funded carry trades, the performance of these carry trade indexes was mixed. Barclay's index slightly outperformed the S&P 500 index, while Deutsche Bank's index had about the same return the S&P 500 index. In contrast, the bottom panel shows that both indexes outperformed the S&P during 2009 when U.S. dollar-funded carry trades were reported to be popular. Shares outstanding in Deutsche Bank's carry trade index ETF, a measure of carry-trade demand shown in Figure 2, grew during 2009 and indicates increasing interest in these strategies.[7] Unfortunately, ETFs and ETNs are mostly used by retail investors and are unlikely to represent a large percentage of overall carry-trade activity should it exist.

U.S. Commodity Futures Trading Commission (CFTC) Large Trader Reporting Data

A frequently-cited measure of carry-trade activity, which provides some information regarding favored funding and target currencies, is the net position of non-commercial (speculative) traders in exchange rate futures on the Chicago Mercantile Exchange that is collected and reported by the CFTC.[8] Of course, traders use these contracts for many purposes other than the carry trade. Moreover, hedge funds, which are considered to be prominent in the carry trade, reportedly trade more in forward markets (which are over-the-counter and are not subject to CFTC reporting requirements) than in futures markets. Nevertheless, engagement in carry trades could be indicated by a net short futures position in the funding currency, paired with a net long futures position in the target currency.

[7] We do not have data on the shares outstanding of Barclay's carry trade index ETN.
[8] For example, the Financial Times article titled "dollar becoming top carry trade currency" published on September 15, 2009, cites these data as a measure of carry-trade activity.

In Figure 3 we plot net positions of traders designated as speculators in a long-favored target currency, the Australian dollar (grey bars), and in a long-favored funding currency, the Japanese yen (black bars).[9] Positive net positions indicate that speculators going long the foreign currency and shorting the U.S. dollar. Conversely, negative net positions indicate that speculators are shorting the foreign currency and investing in the U.S. dollar.[10] In 2006 and 2007, when a carry trade funded by Japanese yen and invested in Australian dollars was reportedly very popular, net short positions in USD/JPY futures (the black bars) and net long positions in USD/AUD futures (the grey bars) also peaked, consistent with these reports. In Figure 4 we plot net positions of speculators in several additional currencies and observe that in 2006 and 2007, net short positions in USD/CHF futures (aqua bars) also peaked, consistent with media accounts that the Swiss franc was also a favored funding currency at the time.

Returning to Figure 3, starting in mid-2009 there was a noticeable shift and speculators held short positions in the U.S. dollar against the Australian dollar (the grey bars). However, Figure 4 shows that during 2009 speculators also held net long positions in many other currencies. Although this is consistent with some rise in dollar-funded carry trades, the fact that speculators had net long positions in both high-interest currencies and low-interest rate currencies such as the Japanese yen and the Swiss franc suggests that there might simply have been a general expectation of further U.S. dollar depreciation rather than an actual increase in

[9] The CFTC aggregates net positions in the foreign exchange futures market according to investor type – commercial and non-commercial traders. A trader's reported futures position is determined to be commercial if the trader uses futures contracts for the purposes of hedging as defined by the CFTC regulations. The non-commercial or speculator category includes participants who are not involved in the underlying cash business, which include hedge funds, floor brokers/traders etc.

[10] Data are available only for positions for which one of the currencies is the U.S. dollar; thus, for example, we have no direct data on positions that are short yen and long Australian dollar.

carry trades.[11] A similar configuration of positions was evident in 2002–2004, when the dollar was starting its long decline.

Carry-to-Risk Ratios

We next discuss a measure frequently used to assess the attractiveness of the carry trade. The carry-to-risk ratio measures the ex-ante, risk-adjusted profitability of a carry-trade position. This measure is based on the interest rate differential that the carry trade will earn, adjusted for the risk of future exchange rate movements that could erase the trade's profits. We measure this risk using the option-implied volatility of the exchange rate. A higher value of the carry-to-risk ratio indicates a greater risk-adjusted ex-ante profitability of a carry trade.

In Figure 5 we show the carry-to-risk ratio for a carry trade funded by U.S. dollars and invested in Australian dollars (blue line) and carry trades funded by Japanese yen and invested in either Australian dollars or U.S. dollars (red and green line, respectively).[12] Consistent with media accounts of a buildup in carry trades funded by Japanese yen and invested in Australian and U.S. dollars in 2006-07, the carry-to-risk ratios associated with these two strategies were highest during that period (the red and green line). In January 2008, as the FOMC lowered interest rates, the expected profitability of a carry trade funded by U.S. dollars and invested in Australian dollars (the blue line) began to increase and became as attractive as that of the JPY – AUD carry trade (the red line). However, all three carry-to-risk ratios declined quickly in September and October of 2008 due to a sharp increase in the implied volatilities as the financial crisis intensified following the bankruptcy of Lehman Brothers.

[11] This expectation may not necessarily materialize. Klitgaard and Weir (2004) estimate a 75 percent contemporaneous correlation between changes in the net position of speculators and exchange rate movements. But net positions of speculators cannot forecast exchange rate movements one week ahead.

[12] The USD-AUD carry-to-risk ratio is defined as the 3-month interest rate differential between the Australian dollar and the U.S. dollar divided by the implied volatility of 3-month at-the-money AUD/USD exchange rate option. The other carry-to-risk ratios are defined similarly. Most carry trades tend to be short-term, so comparing 3-month rates or shorter should be representative of the profits involved.

In early 2009, as implied volatilities declined and U.S. dollar and Japanese yen interest rates remained low, the carry-to-risk ratios of both dollar- and yen-funded carry trades into the Australian dollar began to rise again. The expected profitability of dollar-funded carry trades (the blue line) was higher than that of yen-funded carry trades (the red and green line) from the beginning of 2009, leading some discussions of a buildup of dollar-funded carry trades as a replacement of yen-funded carry trades over this period. However, the risk-adjusted profitability of these trades was relatively low, which throws some doubt on the claim that interest in the carry trade was particularly high.

BIS and Treasury International Capital (TIC) Data

Yet another frequently-cited measure of carry-trade activity is the amount of cross-border lending. Banks may lend the funding currency to other firms that are engaged in the carry trade, or increase their foreign-currency deposits and engage in the carry trade for their own accounts. BIS data show that global cross-border yen-denominated lending to hedge funds and other non-bank financial firms (grey bars in Figure 6) remained fairly constant during 2006-2007, and the amount outstanding was substantially lower than that denominated in U.S. dollars despite substantially higher dollar interest rates. These data also show that U.S. dollar lending to non-banks ticked up very slightly in the second quarter of 2009 (black bars in Figure 6), but claims in other currencies (the white bars) increased more noticeably in the second half of 2009, and U.S. dollar claims remained below the levels recorded in 2007 and 2008. More recent Treasury International Capital (TIC) data show that cross-border lending in U.S. dollars reported by U.S. banks vis-à-vis investors in all countries (black bars in Figure 7) and Caribbean financial centers (black bars in Figure 8) trended upward starting in the first half 2009, but there is no evidence of an increase in foreign-currency deposits (the grey bars). U.S. dollar appreciation in the last

quarter of 2009 and first quarter of 2010 should have induced some unwinding of carry trade positions, resulting in lower decreased outstanding claims. So either the pick-up in U.S. dollar lending originating from U.S. banks associated with the global recovery was so large that it more than compensated for the unwinding of carry trade positions, or there never was substantial carry trade borrowing originating from the United States.

The Carry Trade, Exchange Rate Movements, and Capital Flows

Our final measures of carry trade activity are based on exchange rate and capital flow correlations between high and low-interest rate currencies. If a low-interest rate currency-funded carry trade is driving up investment flows into high-interest rate countries, then we might expect high-interest rate currencies to appreciate against the low-interest rate currency. In Figure 9 we plot the exchange rate appreciation of major advanced-economy and emerging-market currencies against the yen during 2006-2007 against the average differential between local-currency 3-month interbank interest rates and 3-month yen LIBOR.[13] When the yen-funded carry trade was thought to be at its peak, the correlation between exchange rate appreciation against the yen and interest-rate differentials across a broad range of countries was statistically significant. Figure 10 plots this for the U.S. dollar from mid-March 2009 to January 2010, and shows a similar positive and statistically significant correlation. Although most currencies appreciated against the dollar, high-interest rate currencies have appreciated more. However, the existence of a positive correlation between exchange rate appreciation and interest rate differentials does not imply that carry trades per se, rather than a broader range of financial transactions, underpin this relationship.

[13] We do not adjust the interest-rate differential for risk, since option-implied exchange rate volatilities are not available for many of the currency pairs.

A more direct piece of evidence in support of the carry-trade hypothesis would be relatively higher capital flows to high-interest rate countries. To test this hypothesis, Figure 11 plots net portfolio flows (net foreign purchases of equity and debt less net domestic purchases of foreign equity and debt), expressed as a percent of GDP, against the same interest rate differentials plotted in Figure 9. During 2006-07 there was a positive and statistically significant relationship between capital flows and yen interest-rate differentials. However, Figure 12 shows no evidence that high-interest rate countries attracted greater capital inflows in 2009. This may be, in part, because other determinants of capital flows –such as the level of domestic financial market development or the pace of economic growth– are likely to be important. But in any event, it suggests that the carry trade may not have been a prominent factor in international capital flows and associated macroeconomic outcomes in 2009.

IV. Data Needs to Measure Carry-Trade Activity

As we have mentioned, it is difficult to measure carry-trade activity because the data needed to definitively assess how widely this strategy is used are not available. In this section we discuss potential new data sources and changes to existing systems that could help measure the size of carry-trade activity.

Trade Repositories

Because of the prominent role played by derivative products in the recent financial crisis, the Group of 20 has called for all standardized derivatives to be central cleared and reported to trade repositories. Firms including Depository Trust and Clearing Corporation (DTCC), CLS Bank and TriOptima have trade repositories which are operational or in development for many

types of derivatives.[14,15,16] Since derivatives are frequently used to implement carry trade strategies, these data would improve our ability to assess carry-trade activity because they would include details on the positions of all types of counterparties, including hedge funds, and could be used to identify investors who simultaneously hold short positions in low-interest rate currencies, and long positions in high-interest rate currencies.

In order for regulators to use data from trade repositories to assess exposure, however, there must be cooperation among platforms to consistently identify counterparties or classes of counterparties. Further, regulators must be sensitive to the confidential nature of these data and legal safeguards must be created to ensure that this confidentiality is not violated, or trading firms will be reluctant to use these facilities.

Expanded Reporting on Exchange-Traded Futures Positions

Information from futures exchanges is currently used to estimate the size of carry trade activity, but additional information could substantially improve the usefulness of these measures. For example, the U.S. Commodity Futures Trading Commission (CFTC) has a Large Traders Reporting Program (LTRP), which requires firms to report their daily market close positions in

[14] CLS Bank International is owned by the foreign exchange community and it operates the largest multi-currency cash settlement system. This system was created to eliminate settlement risk. Seventeen currencies are currently eligible for CLS settlement: US Dollar, Euro, UK Pound, Japanese Yen, Swiss Franc, Canadian Dollar, Australian Dollar, Swedish Krona, Danish Krone, Norwegian Krone, the Singapore Dollar, the Hong Kong Dollar, the New Zealand Dollar, the Korean Won, the South African Rand, the Israeli Shekel and the Mexican Peso. CLS reportedly settles 75% of the world's interbank foreign exchange payment instructions for spot, forwards, options, and swap transactions, and according to the Committee on Payment and Settlement System of the central banks of the G10 countries it settles 55 of FX obligations from the surveyed institutions. CLS is regulated and supervised by the Federal Reserve and subject to a cooperative oversight arrangement established by the central banks of the 17 currencies mentioned above.

[15] The DTCC is user owned and provides clearance, settlement, and information services for equities, corporate and municipal bonds, unit investment trusts, government and mortgage-backed securities, money market instruments, and over-the-counter derivatives. In 2007 DTCC settled the vast majority of securities transactions in the United States. On June 9th 2009 the Depository Trust and Clearing Corporation (DTCC) called for maintaining a single trade repository for over-the-counter (OTC) derivatives contracts during testimony before a subcommittee of the House Financial Services Committee.

[16] TriOptima is a privately owned financial technology company that specializes in solving post-trade processing problems in the OTC derivatives market.

any futures or options contract if their position is above certain level. The CFTC publishes long and short positions aggregated by trader type (commercial and non-commercial traders), and these are the data we plot in Figures 3 and 4. Even though these data are informative, we do not observe how many firms are simultaneously holding long positions in high-yielding currencies and short positions in low-yielding currencies. Such firms are more likely to be engaged in carry-trade activity than other firms. The CFTC and other futures exchanges could produce reports that identify long and short positions of "carry trade investors," defined as firms who simultaneously hold long positions in high-yielding currencies and short positions in low-yielding currencies in the futures market.

Expanded Reporting of Foreign Currency Positions

Local foreign exchange committees conduct semi-annual foreign exchange market turnover surveys, and the BIS also collects turnover data for the Triennial Central Bank Survey.[17] By expanding these surveys to include position data regulators would have a better sense of the amount of carry trade activity. Additional breakdowns could include separate reporting for each of the spot, futures and forward markets, long and short positions held by carry trade investor (defined as individuals who simultaneously hold long positions in high-yielding currencies and short positions in low-yielding currencies in the forward market), and separate reporting of end-user positions and the positions of non-dealer banks and non-commercial banks. Finally, these institutions could conduct the surveys on a more frequent basis.

The U.S. Treasury currently publishes the Weekly Consolidated Foreign Currency Report of Major Market Participants. The report shows long, short, and net positions of large market participants aggregated across three different markets: spot, forward, and futures market. The

[17] Such committees include the Foreign Exchange Committee in New York, and the Foreign Exchange Joint Standing Committee in London.

report currently only covers five major foreign currencies (Canadian dollar, Japanese yen, Swiss franc, pound sterling, and euro) but could be extended to include large and small market participants and additional currencies, and to aggregate the data in a similar fashion to that described above. In addition, in its current form this report comingles the worldwide positions of U.S.-based firms with the positions of the U.S. operations of foreign-based firms. This hinders comparison of these data with other statistics which typically segregate firms by either nationality or location.

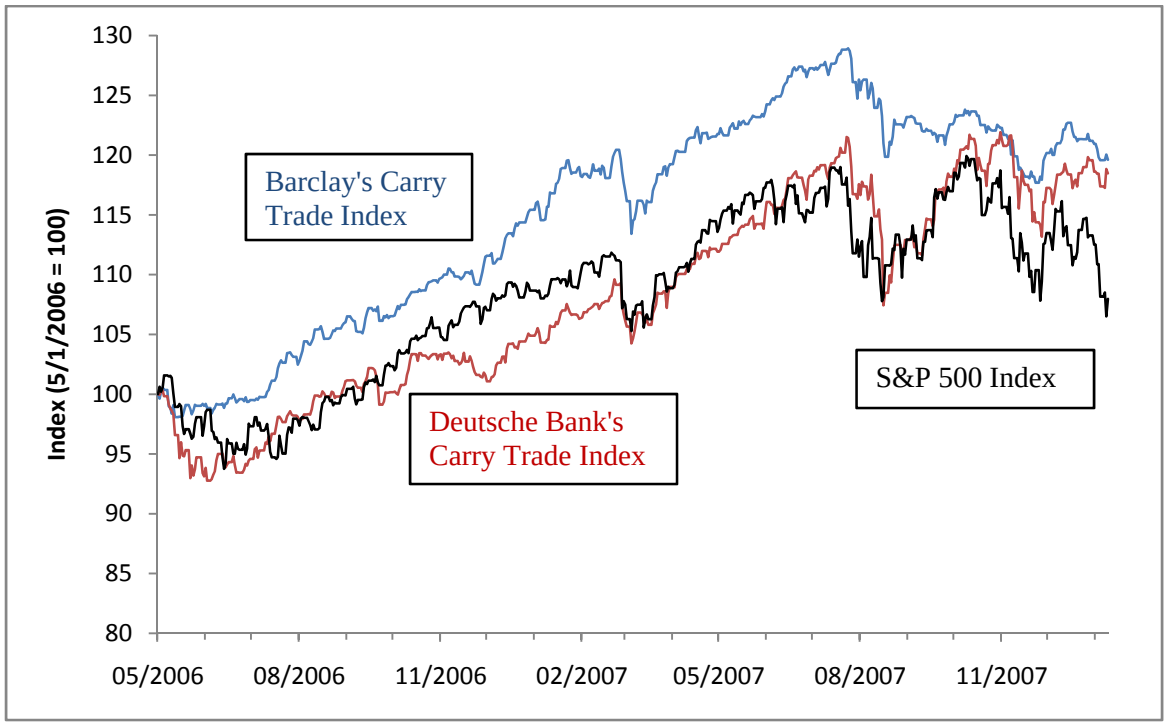
Regulatory reports filed by U.S. banking organizations contain a large amount of information on balance sheet assets and liabilities, but not the currency composition of these positions. For example, the FX composition of balance sheet positions of U.S. banks vis-à-vis U.S. residents is not available. Separate identification of FX-denominated balance sheet positions on existing reports would allow reporting of the amount of FX-denominated lending to different sectors of the economy, and give us a better estimate of the amount of borrowing associated with carry trade activity.

References

Brunnermeier, M., Nagel, S., Pedersen, L., 2008, Carry Trades and Currency Crashes, NBER Working Paper 14473.

Klitgaard, T., and Weir, L., 2004, Exchange Rate Changes and Net Positions of Speculators in the Futures Market, FRBNY Economic Policy Review, 17-28.

Figure 1, Panel A: S&P 500 and Carry Trade Index ETFs and ETNs, 5/1/2006 Index = 100



Panel B: S&P 500 and Carry Trade Index ETFs and ETNs, 10/1/2008 Index = 100

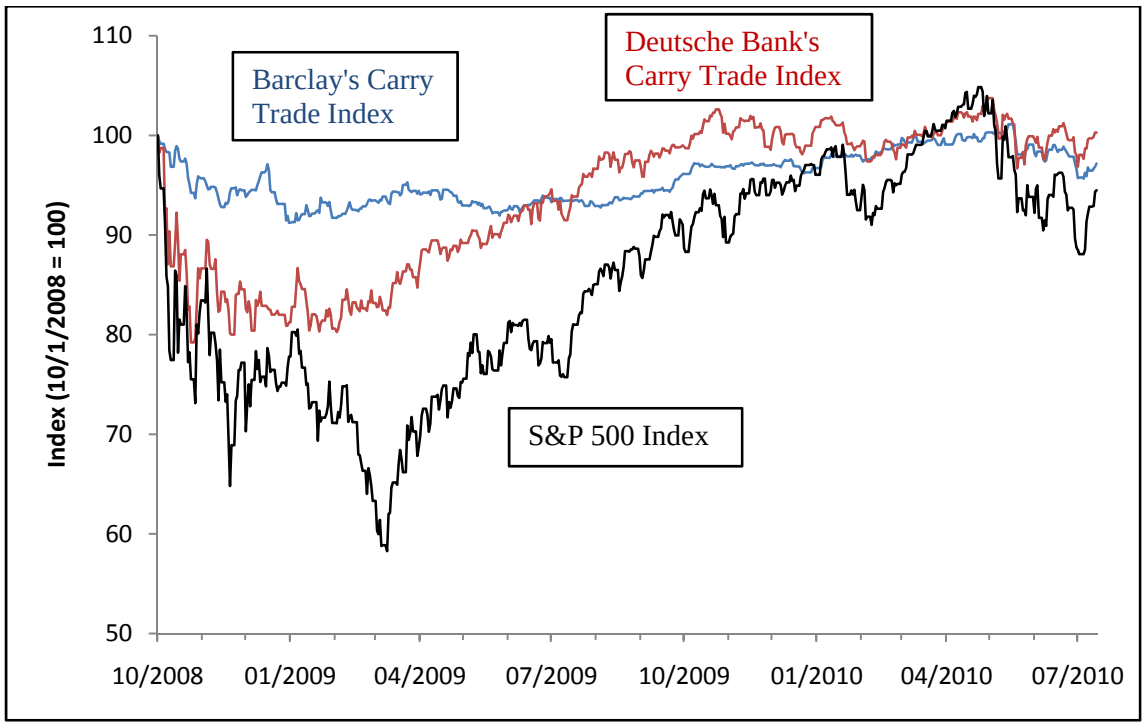


Figure 2: Shares Outstanding of Deutsche Bank's Carry Trade Index ETF

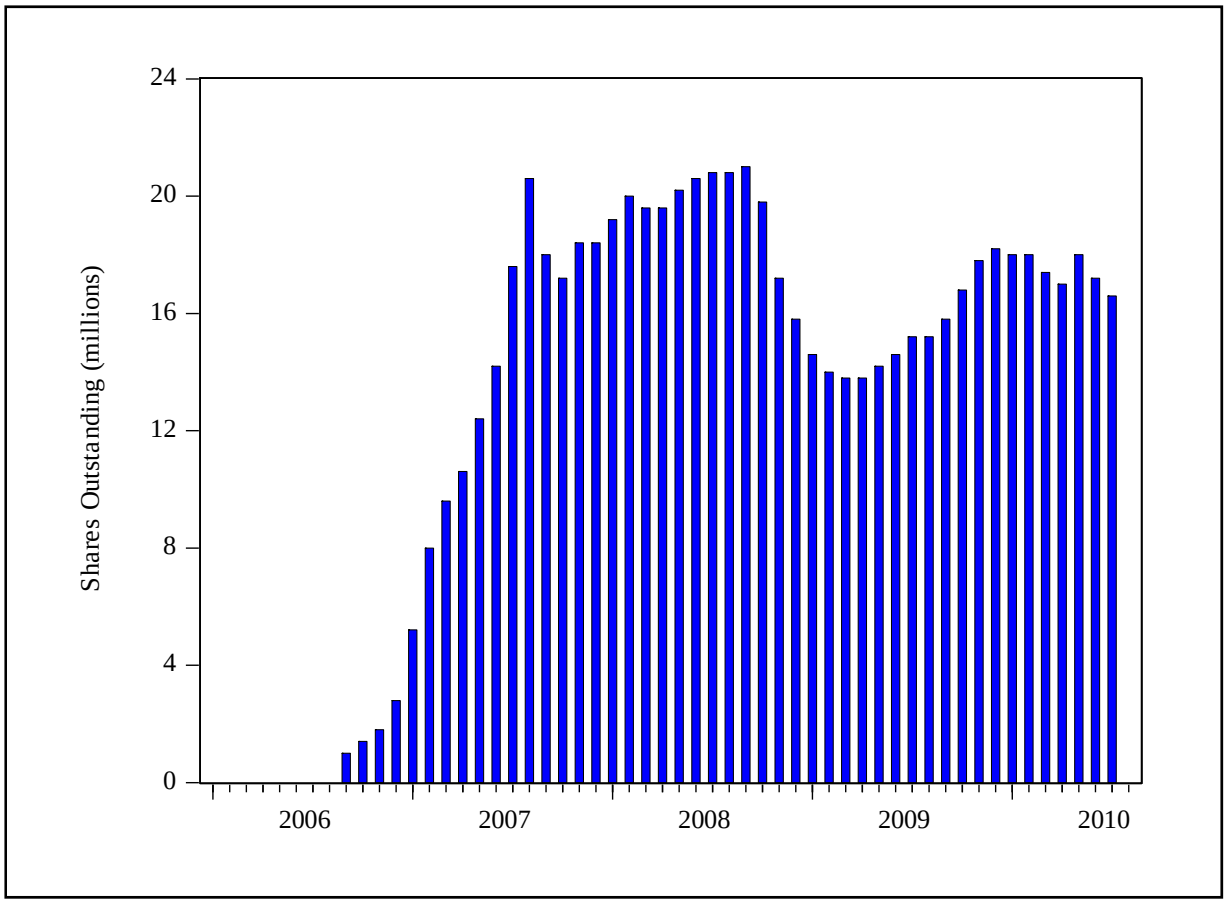
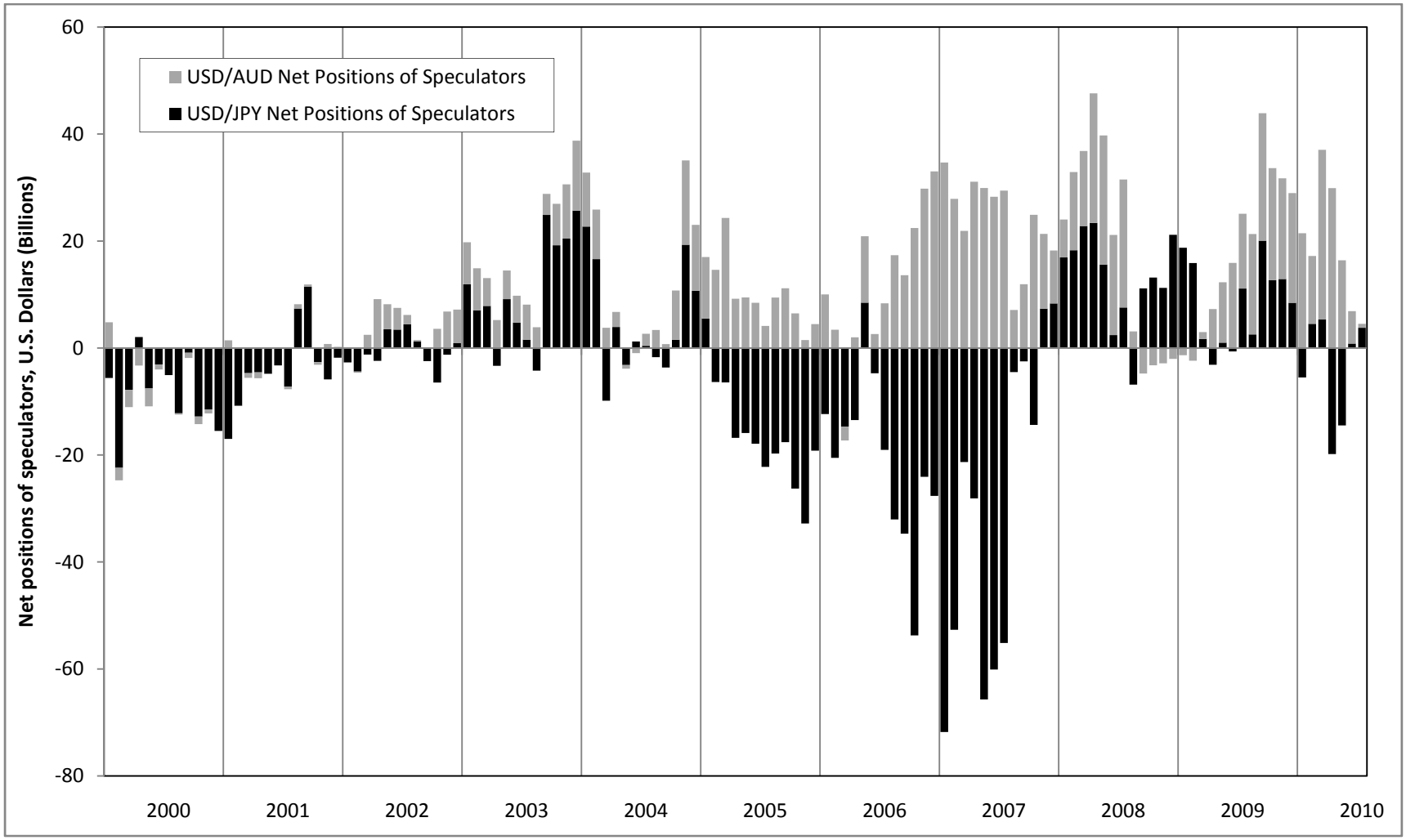
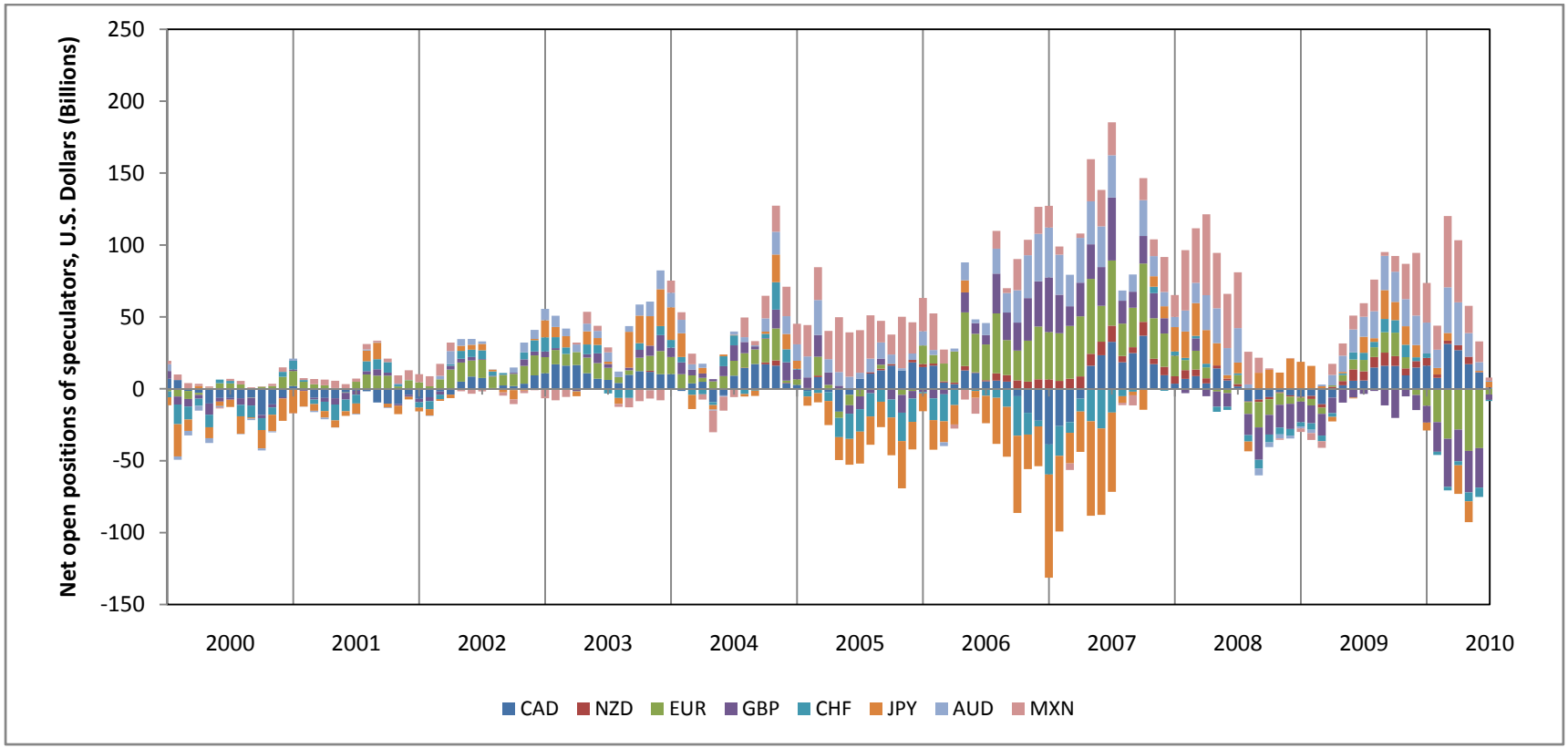


Figure 3: Net open positions of speculators in the Japanese yen and Australian dollar



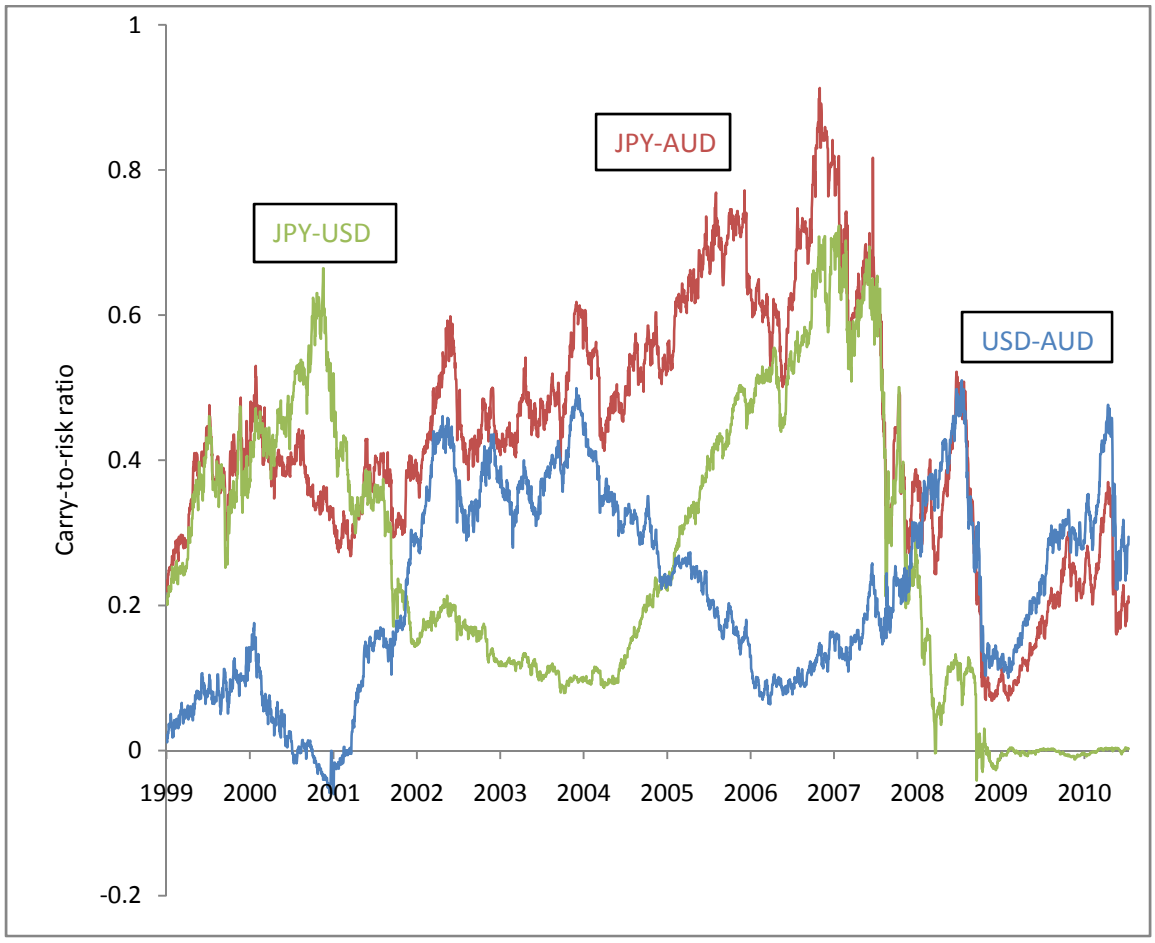
Source: U.S. Commodity Futures Trading Commission (CFTC) Large Trader Reporting data.

Figure 4: Net positions of speculators in several currencies



Source: U.S. Commodity Futures Trading Commission (CFTC) Large Trader Reporting data.

Figure 5: Carry-to-risk ratios



Note: The JPY-USD carry-to-risk ratio is defined as the 3-month interest rate differential between the US dollar and Japanese yen divided by the implied volatility of 3-month at-the-money JPY/USD exchange rate option. The other carry-to-risk ratios are defined similarly.

Figure 6: BIS-reported cross-border banking claims on non-banks

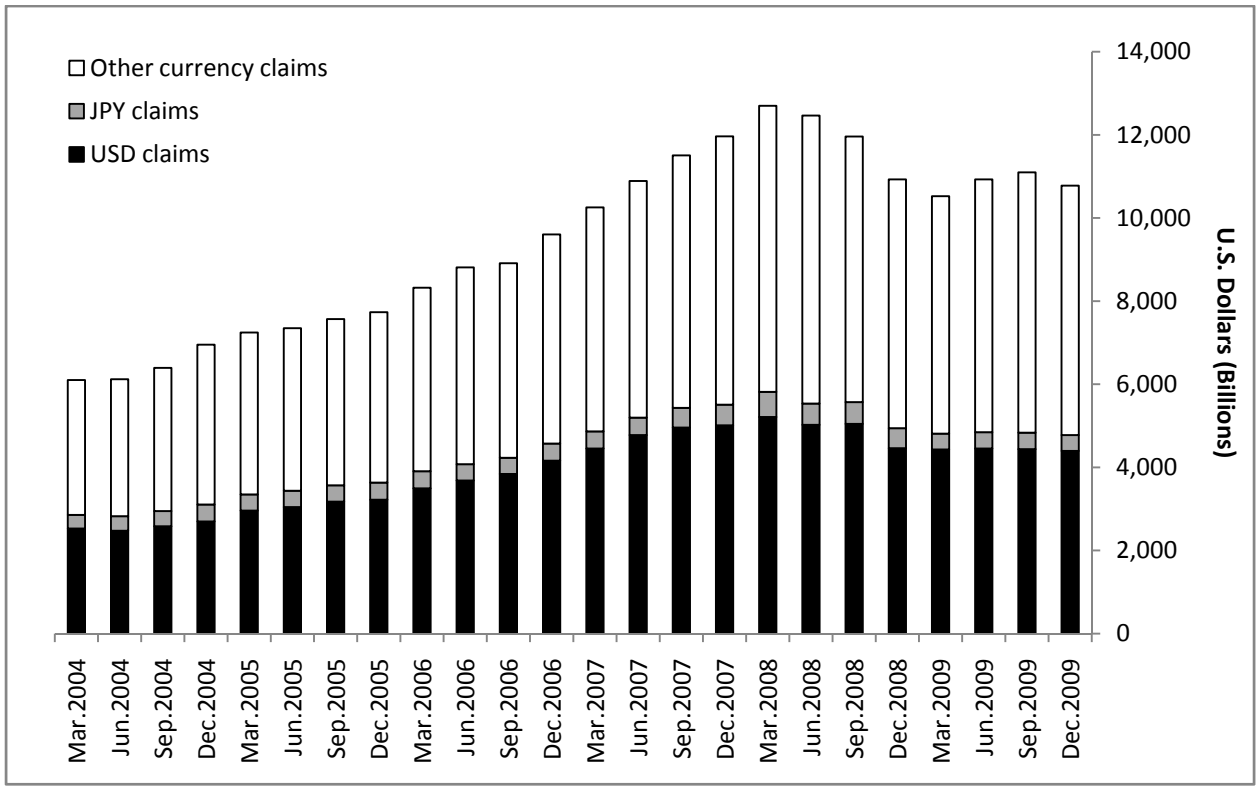


Figure 7: Treasury International Capital (TIC) data on cross-border claims of banking offices in the United States

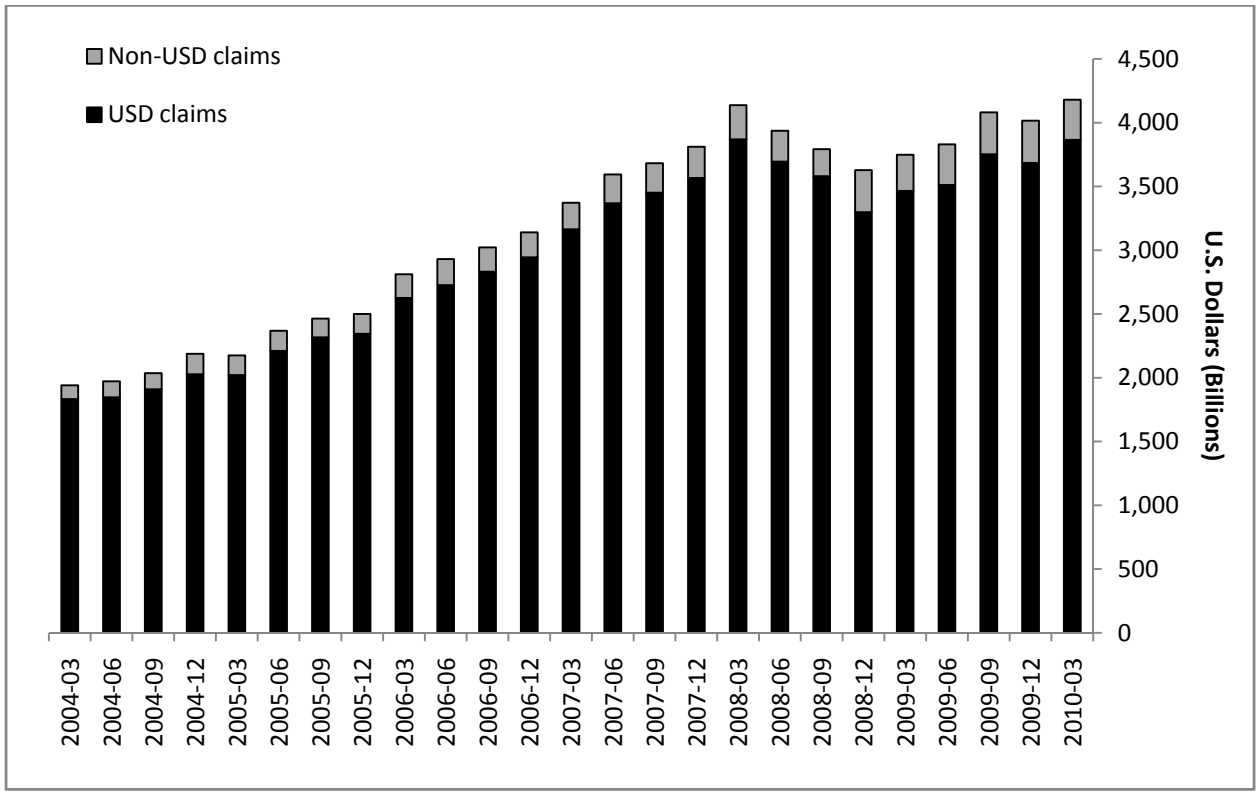


Figure 8: Treasury International Capital (TIC) data on cross-border claims of banking offices in the United States vis-à-vis Caribbean counterparties

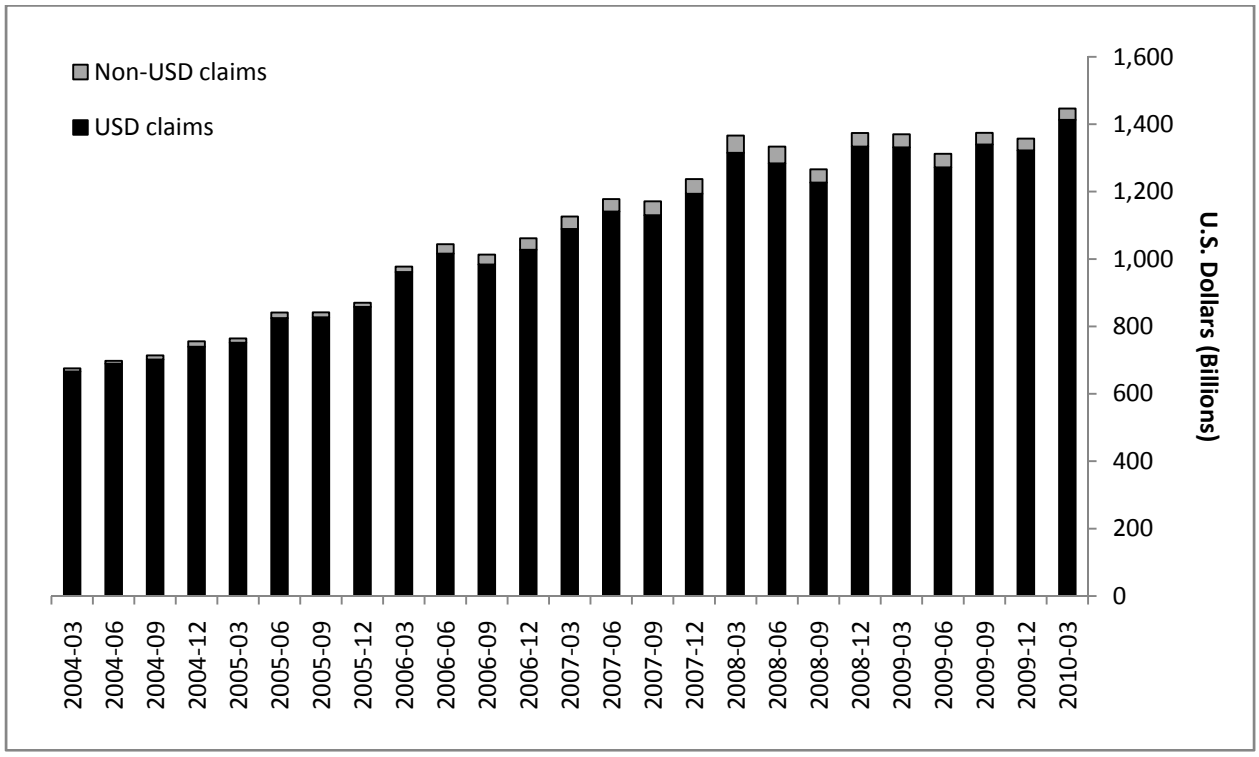
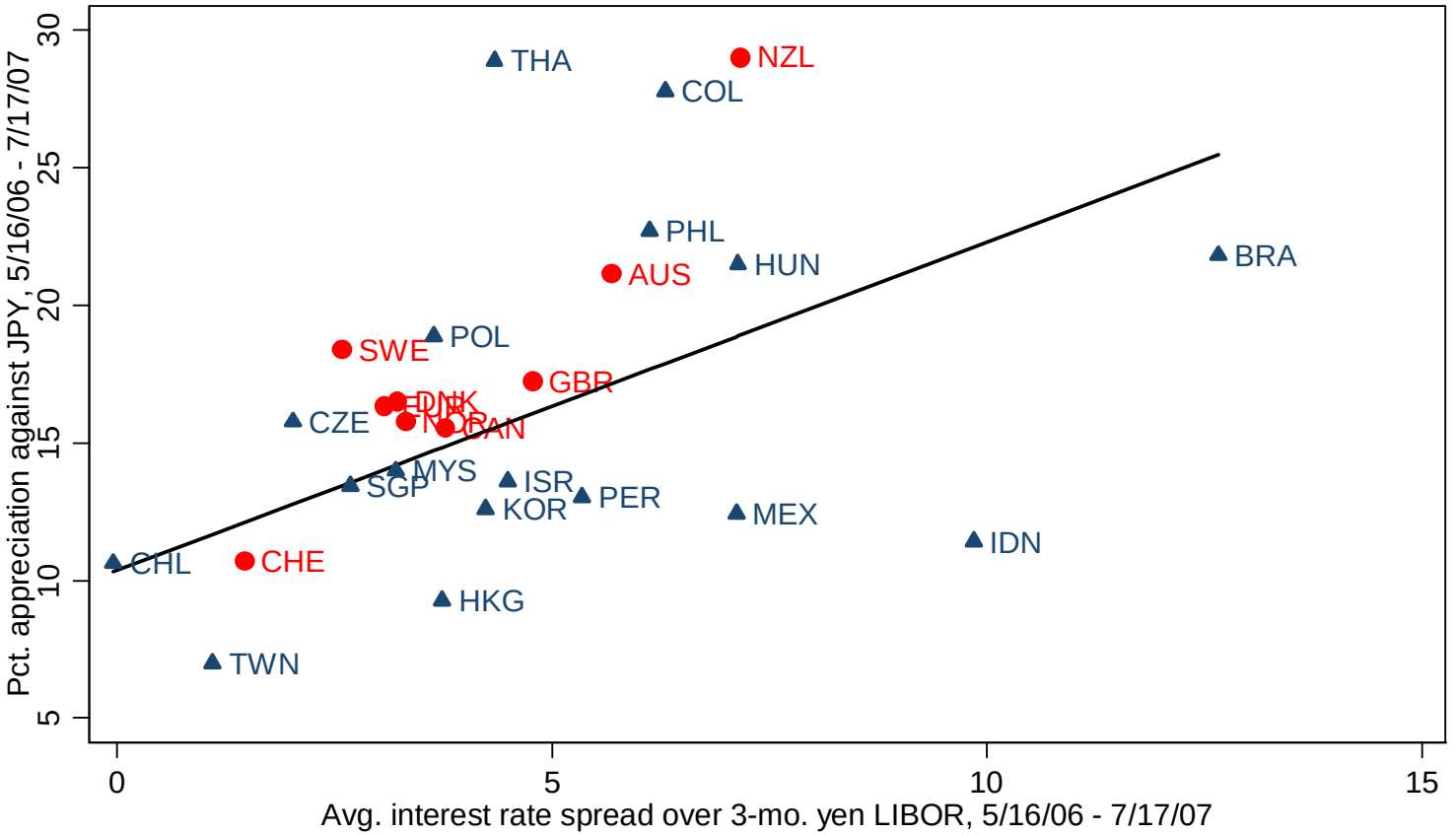
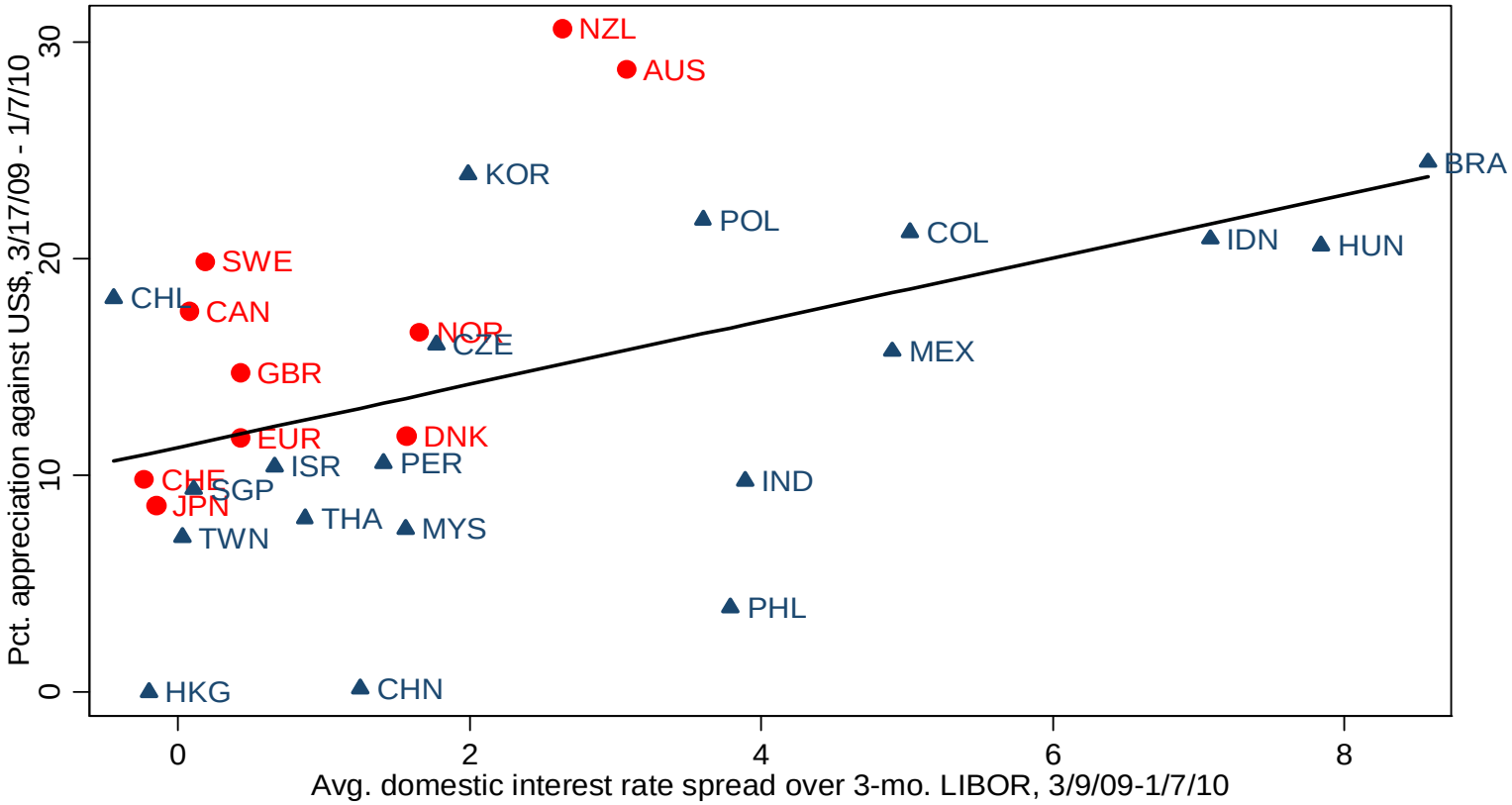


Figure 9: Exchange rate appreciation against the Japanese yen v. interest rate differentials vis-à-vis 3-month Yen LIBOR, May 2006 – July 2007



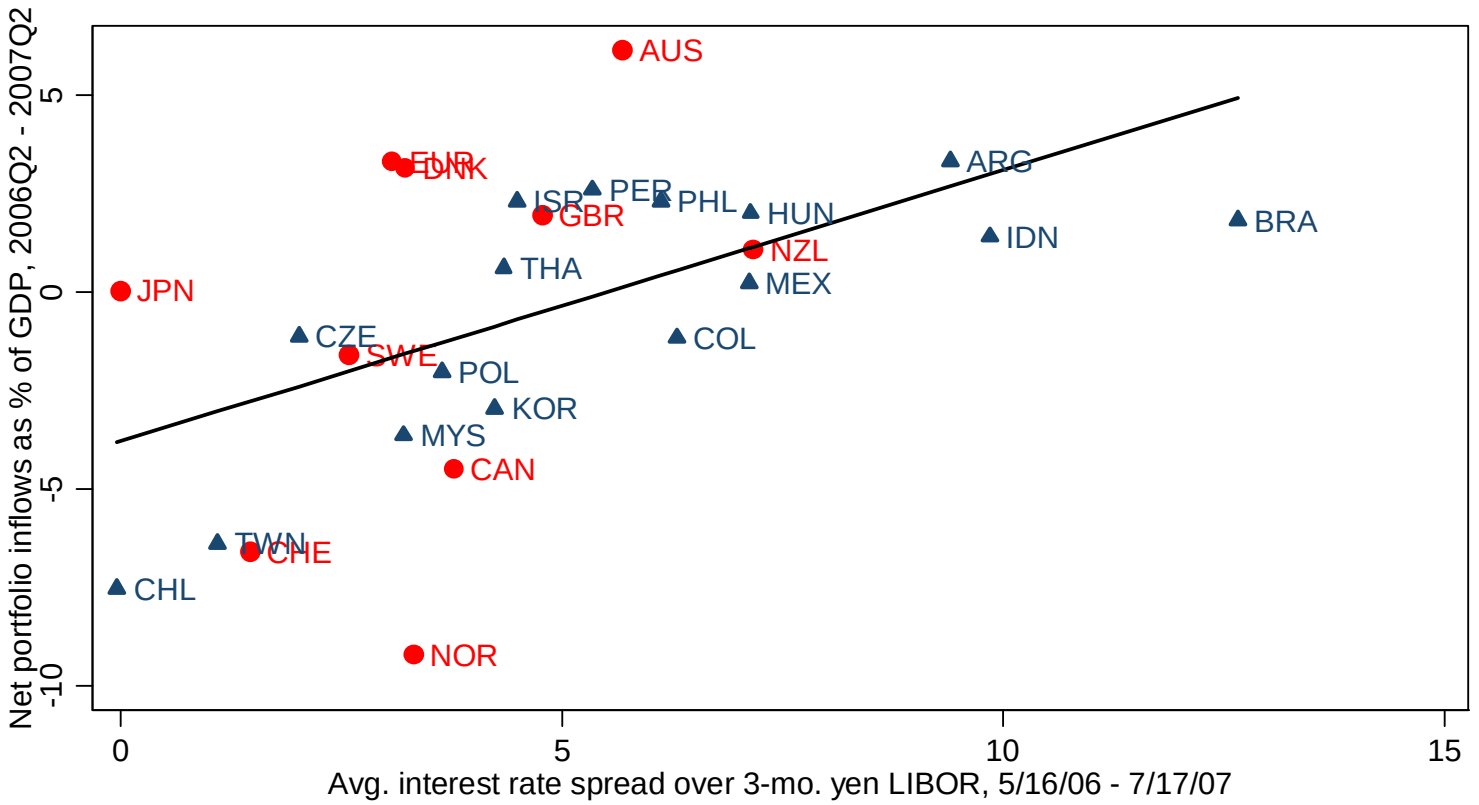
Source: Bloomberg
Note: Blue triangles are emerging markets. Red circles are advanced economies.
Regression: R-squared=.18; slope=.93 (t-stat=2.33)
Domestic interest rates used to calculate interest rate differentials are local currency 3-month unsecured interbank rates, except Colombia, where 90-day deposit rate is used.

Figure 10: Exchange rate appreciation against the U.S. dollar v. interest rate differentials vis-à-vis 3-month U.S. dollar LIBOR, March 2009 – January 2010



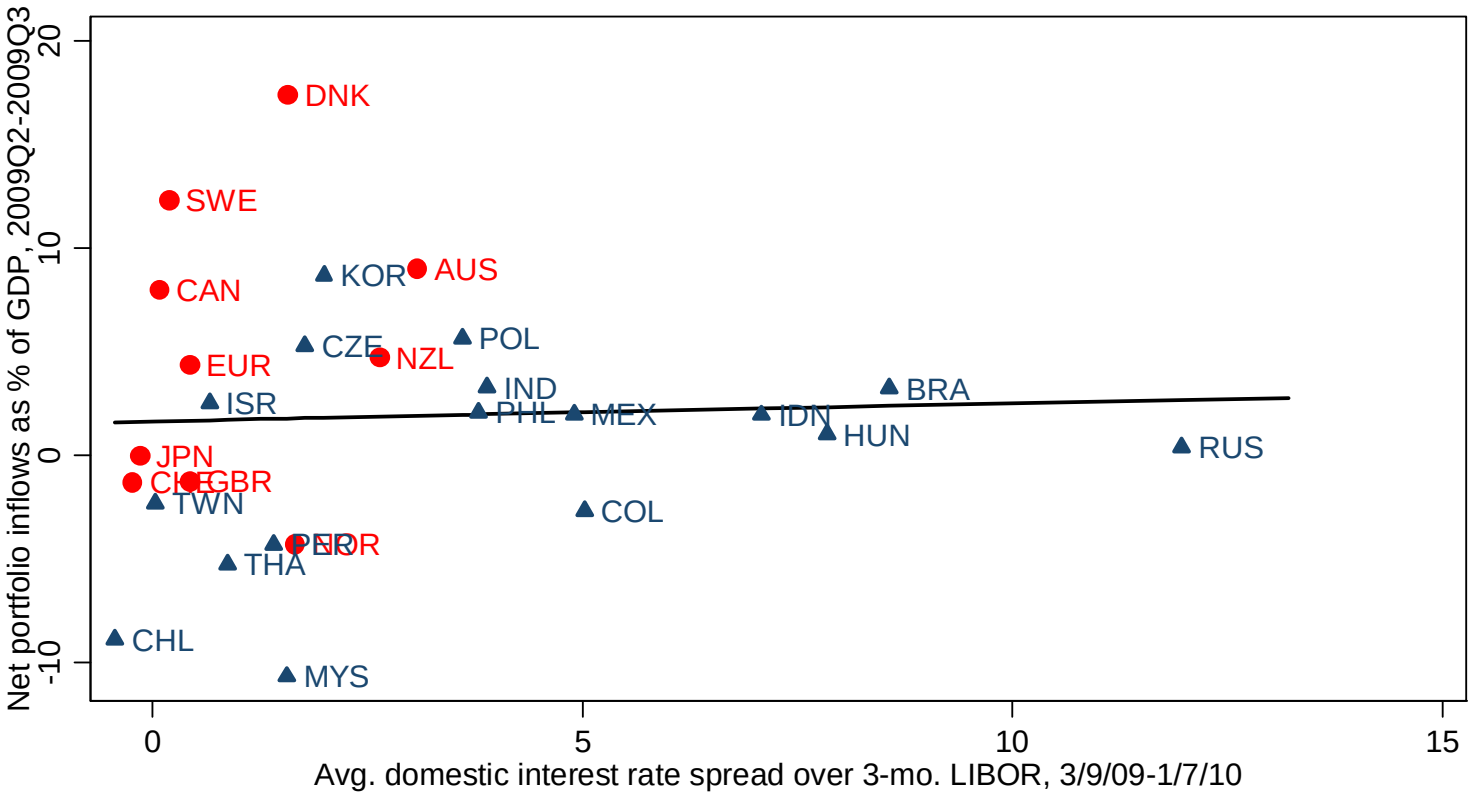
Source: Bloomberg
Note: Blue triangles are emerging markets. Red circles are advanced economies.
Regression: R-squared=.22; slope=1.46 (t-stat=2.73)
Domestic interest rates used to calculate interest rate differentials are local currency 3-month unsecured interbank rates, except Colombia, where 90-day deposit rate is used.

Figure 11: Net portfolio capital inflows v. interest rate differentials vis-à-vis 3-month yen LIBOR, 2006Q2-2007Q2



Source: Haver, Bloomberg
Note: Blue triangles are emerging markets. Red circles are advanced economies.
Regression: R-squared=.29; slope=.69 (t-stat=3.13)
Domestic interest rates used to calculate interest rate differentials are local currency 3-month unsecured interbank rates, except Colombia, where 90-day deposit rate is used.
For Malaysia, total net financial account flows used instead of net portfolio flows.
For Mexico, gross portfolio inflows used. Excludes offshore financial centers.

Figure 12: Net portfolio capital inflows v. interest rate differentials vis-à-vis 3-month U.S. dollar LIBOR, 2009Q2-2009Q3



Source: Haver, Bloomberg
Note: Blue triangles are emerging markets. Red circles are advanced economies.
Regression: R-squared=.002; slope=.087 (t-stat=0.22)
Domestic interest rates used to calculate interest rate differentials are local currency 3-month unsecured interbank rates, except Colombia, where 90-day deposit rate is used.
For Malaysia, total net financial account flows used instead of net portfolio flows.
For Mexico, gross portfolio inflows used. Excludes offshore financial centers.