

## **G3 Exchange Rates: What My Crystal Ball Didn't Tell Me in 1999**

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10 years ago, in the aftermath of the Asia-Russia-LTCM crisis, I was invited by Paul Volcker to prepare a report for the Group of 30 (which he then chaired) on “G3 Exchange Rate Relationships: A Review of the Record and of Proposals for Change”. Many of you may recall that, in that turbulent time, there was widespread (but certainly not unanimous) dissatisfaction with the prevailing status quo regime of managed floating exchange rates among the G3 – comprised of the US, Germany (now EMU), and Japan. It was said by many that G3 exchange rates were not well anchored by fundamentals and were excessively volatile. As a consequence, the critics believed, the post Bretton Woods status quo for G3 exchange rates contributed to, rather than stabilized, the global financial system of the late 1990s. Defenders of the status quo did not, in general, suggest that G3 exchange rate relationships were ideal but rather that, leading alternatives – essentially variants of a target zones with hard or soft commitment to narrow or wide bands - were likely either to be inferior or, if superior in the abstract, not feasible (or more technically, time inconsistent) in practice.

In this lecture, I step back and reflect on what has been learned about G3 exchange rate relationships that was not clearly foreseen or fully appreciated 10 years ago. While your 1999 crystal ball may have been better than mine was at the time, here is what I myself have learned about G3 exchange rate relationships that I did not clearly foresee back then.

*Capital Accounts Now Drive Current Accounts – The Saving Glut*

Some things never change, but our interpretation of them can and should as facts and circumstances change. The US ran large current account deficits in the 1980s, in the 1990s, and in the first decade of the 21<sup>st</sup> century. In the 1980s and 1990s, large US current account deficits were correlated with high real interest rates in the US. Low US saving relative to average or better US investment generated a current account deficit which required a capital inflow attracted by these high real interest rates. The US current account deficits of the present decade widened (from an already elevated reading of 4 percent of GDP in 2000) in large part because of the global saving glut.<sup>1</sup> The global saving glut brought down global real interest rates, both spot and forward, and this encouraged consumption and residential investment not only in the US, but in other countries as well (think UK, Spain). Initially the driving source of the global saving glut (more precisely the excess of desired saving relative to desired investment at unchanged global interest rates) was Asia, with China and other emerging Asian countries joining Japan which has had its own, structural saving glut (and the current account surpluses to show for it). Notwithstanding all the focus on China, and its BWII development strategy, it is important to remember that as recently as 2003, China's overall current account surplus was just 2 percent of GDP. After 2003, strong global growth in the emerging world triggered a commodity boom which became a second source of excess global saving through the channel of petrodollar recycling.

The global saving glut, and the exponential explosion of gross cross border capital flows that has accompanied it, has had a significant impact of G3 exchange rate relationships. The wider current account deficit resulting from the saving glut (and the fact that much of it was financed through central bank reserve accumulation and not private capital flows) and the bursting of the US housing bubble that was, in part, caused by it have for some time and will continue to put downward pressure on the dollar. Once the flight to quality bid for the dollar begins to subside (and it eventually will) the Euro is likely to bear the brunt of this adjustment. Until 2005, Japan fiercely resisted allowing its exchange rate to appreciate rapidly, intervening massively (and in largely unsterilized fashion) in the foreign exchange markets to halt deflation. More recently, the yen has traded with the whim and whimsy of the pool of global capital still chasing exchange rate carry trades – to be discussed later, still 10 years after the original crash of the yen carry trade the source of much fluctuation in the dollar yen exchange rate. As we will see, the more things change, the more they stay the same.

#### *Global Reserve Currency Status of the Dollar and Role of the Euro*

A decade ago, there was much anticipation but also a great deal of uncertainty over the prospects for Euro as viable competitor to the dollar. There were those (and I was among them) who were skeptical that EMU would even be launched, or if it were launched, only with a small group of core countries. The skeptics (and they were mostly on the other side of the Atlantic) for the most part supported the creation of the ECB and the Euro in the abstract, but made the judgment that, in the end, the Bundesbank, among

other powerful institutions, would delay the launch or at minimum, limit it to a small, core group of countries. Of course, the skeptics were wrong and the Euro and ECB have, without question, more than assumed the role in the first decade of the 21<sup>st</sup> century that the mark and the Bundesbank played in the last decades of the 20<sup>th</sup> century. Given the Euro's to a record value of 1.60 as recently as last summer ((before the ECB starting cutting rates in October), it is easy to forget that the Euro spent most of its first 3 years depreciating against the dollar, all the way from 1.18 at its launch in 1999 to 0.82 in the summer of 2001. I did not at the time judge this to reflect a market verdict against the brand new ECB, but rather a global market infatuation with US internet and tech stocks.<sup>ii</sup> As I often remind my students, everything worth studying in international finance depends on relative not absolute valuations, and the launch of the Euro coincided by chance with the peak of the internet bubble (and it should be pointed out, at peak of market preoccupation with the US 'strong dollar' rhetoric). Since then, the journey for the Euro against dollar has been on an uptrend, reflecting the forces discussed above as well as accumulating credibility of the ECB in anchoring inflation expectations. In the context of the current financial crisis, I also expect the Euro to benefit from the resistance of the ECB to pursuing an aggressive course of quantitative easing comparable to what we are seeing from the Fed and the BoE.

As we look ahead to the next 10 years, is it likely that the Euro (or the current flavor of the month, the SDR) supplants the dollar as the global vehicle currency? I for one do not think so. By vehicle currency, of course, I mean the role that the dollar plays not just in the reserve holdings of global central banks, but also in the daily trading in the

foreign exchange market, the interest rate derivatives markets, and as the currency of invoice for global commodity trade and also much trade in goods and services. To date there is no compelling evidence that the dollar's market share as a vehicle currency has precipitously declined, notwithstanding a substantial depreciation since 2001 and somewhat higher US inflation as compared with EMU inflation. There *is* some evidence (for example the IMF COFER data) that the dollar's share as a global reserve currency has peaked and is on a path of gradual decline. While I expect this trend in reserve diversification to continue, I expected it will resemble an evolution and not a crash landing. There is a crucial difference between the dollar's *share* as a reserve portfolio holding – in which it makes good sense to hold a diversified portfolio – as contrasted with the dollar's role as a vehicle currency in the currency, derivatives, and commodity markets where, owing to economies of scale and scope, it is there is likely only to be one dominant currency.

Over the longer term, the Euro could conceivably supplant the dollar at least as a global reserve currency. The best recent research on this is by Jeff Frankel and Menzie Chinn published in a volume I edited on G7 Current Account Imbalances.<sup>iii</sup> Chinn and Frankel argue that, absent the UK – and thus the London financial center – joining the EMU, it is unlikely that the Euro – lacking a country with a global financial hub - would be expected to overtake the dollar as a global reserve currency. However, with the UK (and London) in EMU, the authors describe plausible scenarios in which persistently a weak dollar (and presumably higher US inflation) could trigger a gradual, but material shift in global currency reserves to the Euro. I would say not implausible, but not likely.

*The Exorbitant Privilege – Hundreds of Billions a Year and a Source of a Weaker Dollar*

Fact 1: Between year - end 2001 and 2007, the US ran cumulative current accounts deficits in excess of 3.88 *trillion* dollars.

Fact 2: Between year end 2001 and 2007, the US net international investment position *improved*, its net foreign liability position *fell*, by more than 500 billion dollars.

How could the US run large current account deficits without running up a commensurate increase in its net foreign liability position? The answer reflects the 21<sup>st</sup> century *exorbitant privilege* that accrues to the US as the provider of the global reserve and vehicle currency.<sup>iv</sup> As is by now much better understood than it was a decade ago, there are two sources of the privilege. While virtually all of the US gross external liability (which at year end 2006 was in excess of 18 *trillion* dollars) is US dollar denominated, most of gross US holdings of foreign assets (which at year end 2006 was in excess of 16 *trillion* dollars) is denominated in foreign currency. As a consequence its ability to borrow massive amounts in its own currency, US investors benefit from a capital gain (and European, Japanese, and other investors suffer from a capital loss) when the dollar depreciates against the Euro, yen, and other currencies. Because of the immense gross holding of foreign assets by US investors, even an orderly decline in the dollar generates a large and growing net capital gain to US investors. In 2002, 2003, 2003, 2004, and 2006 the net capital gain from a weaker dollar accruing to US investors totaled more than 1.3 trillion dollars. The second and larger source of the exorbitant

privilege results from the fact that US investors in the aggregate own a riskier, higher average return portfolio than do foreign investors in the US. US portfolio's abroad are weighted toward equity and FDI investments, while foreign claims against the US are more concentrated in government and agency securities and bank deposits. As a consequence, in recent years capital gains (in local currency) on US investments abroad have far exceeded the capital gains enjoyed by foreign investors in the US.

Thus, notwithstanding the run of record U.S. current account deficits, the U.S. net international investment position has remained roughly stable in dollar terms and has actually declined as a share of U.S. and world GDP. This does not imply that it will remain stable forever if current account deficits persist. But it does confirm that U.S. has benefited from the exorbitant privilege, and that the revaluation of the US net liability position caused a weaker dollar is part of the international adjustment process of the 21<sup>st</sup> century. Until recently, little of recent years' dollar depreciation has been passed through to higher import prices – instead it has been absorbed by the profit margins of foreign producers. If, however, the weaker dollar does start to raise import prices on a more sustained basis, it will translate into a terms of trade deterioration and lower the real incomes of U.S. households. Thus a depreciation of the dollar produces a one time capital gain to U.S. investors abroad, but also a potentially permanent reduction in U.S. real income from current production. Thus in open as in closed economies, there is no “free lunch” from dollar depreciation.

*Carry Trades are Dead: Long Live the Carry Trade!*

In 1999, one of the prominent puzzles in international finance was the well documented failure of uncovered interest parity (surveyed by Thaler and Froot in 1991 and Engel in 1996). Of course, in a risk neutral world, the forward exchange rate should be an unbiased predictor of the future spot exchange rate so that carry trades should not generate *ex ante* predictable returns. This empirical prediction has been consistently rejected in the data, starting with classic contributions by Meese and Rogoff (1981) , Hansen and Hodrick (1981), Cumby and Obstfeld (1980), and most famously Fama (1984). However, by 1999, there was some sentiment that the spectacular collapse of the Yen carry trade in October 1998 spelled the end for these strategies that attempt to exploit violations of UIP.<sup>v</sup> However, this has not been the case. The UIP puzzle has not been arbitrated away in the past 10 years, nor has interest in it waned, as recent innovative papers by Burnside et. al. (2007) and Brunnermeier et. al. (2008) demonstrate. Today, just as 10 years ago, papers continue to find that currencies in countries with high interest rates tend *on average* to appreciate relative to currencies in countries with low interest rates. This stylized fact constitutes the forward rate bias puzzle. This view is often expressed in terms of the apparent profitability of the carry trade, which has become a popular investment strategy in the asset management industry.

In a recent paper<sup>vi</sup> with Josh Davis and Niels Pedersen, I contribute to the literature on the carry trade and the forward exchange rate bias puzzle along several dimensions. First, I provide new evidence that carry trade returns are strongly, systematically, and inversely related to both realized and actual exchange rate volatility. This true for daily returns on a range of currency carry trade portfolios spanning 18 years,

and, to a point, is robust to exclusion of the yen from the currency carry portfolio. Second, I document significant volatility regime sensitivity for Fama regressions estimated over low and high volatility periods. Specifically I find that the well known result that a regression of the realized exchange rate depreciation on the lagged interest rate differential produces a negative slope coefficient (instead of unity as predicted by uncovered interest parity) is an artifact of the volatility regime: when volatility is in the top quartile, the Fama regression produces a *positive* coefficient that is greater than unity. When volatility is high, UIP is violated but because *low* interest rate countries *appreciate by more than the interest rate differential in favor of the high interest rate country*. Third, I document the existence of an intuitive and significant co movement between currency risk premium and risk premia in yield curve factors that drive bond yields in the countries that comprise carry trade pairs. Campbell and Clarida (1987) were among the first to model theoretically and empirically the joint determination of yield curve term premia and carry trade risk premia, but for a variety of reasons, since then the yield curve literature has, to some extent, become divorced from the currency risk premium literature (however, see Clarida, Sarno, Taylor, Valente (2002) for recent papers that study yield curves and currencies jointly). The paper shows that relative yield curve *level* factors (which account for about 75 percent of the variation in excess bond returns) are *positively* and very significantly correlated with carry trade excess returns while yield curve *slope* factors (which account for most of the remaining variation in excess bond returns) are *negatively* correlated with carry trade excess returns. Importantly, I show *that this correlation is robust to the current crisis and to the inclusion of equity volatility in the model*. What distinguishes carry trade returns in the current crisis from non crisis

periods is not changed loading on yield curve factors but a much larger loading on the equity factor.

### *Inflation Targeting and Exchange Rates*

The interplay between monetary policy and asset prices is a subject of longstanding interest in financial economics. Often – but not always – the focus is directed at trying to understand how monetary policy, or shocks to policy, impacts asset prices – whether these be the prices of equities, bonds, property, or currencies. Less often, the focus is on how – or should – asset prices influence the conduct of monetary policy. In a recent paper with Dan Waldman, we ask, can the response of an asset price – in our case the exchange rate – to a non policy shock – in our case a surprise in inflation – tell us something about how monetary policy is conducted?

This paper makes a theoretical point and provides some empirical support for this point. We show in a simple – but robust – theoretical monetary exchange rate model that the sign of the covariance between an inflation surprise and the nominal exchange rate can tell us something about how monetary policy is conducted. Specifically, we show that ‘bad news’ about inflation – that it is higher than expected - can be ‘good news’ for the nominal exchange rate – that it appreciates on this news - if the central bank has an inflation target that it implements with a Taylor Rule. This result at first seemed surprising to us because our model is one of inflation – not price level – targeting so that in the model a shock to inflation has a permanent effect on the price level. Since PPP holds in the long run of the model, the nominal exchange rate depreciates in the long run to an inflation shock, even though on impact it can appreciate in response to this shock.

We show that in a traditional overshooting model in which the central bank sets a growth rate for the money stock, the exchange rate would be expected depreciate in response to an inflation shock.

The basic model is comprised of four standard equations.

$$IS: \quad y = -r + (e - p)$$

$$AD: \quad \pi = \pi_{-1} + y + \varepsilon$$

$$TR: \quad i = E \pi_{+1} + b\{\pi - \pi^*\} + ay$$

$$IP: \quad e - p = E\{e_{+1} - p_{+1}\} - r$$

With  $r = i - E \pi_{+1}$  the ex ante real interest rate,  $y$  the log output gap,  $\pi$  inflation,  $e$  the nominal exchange rate, and  $q = e - p$  the real exchange rate. Note the backward looking Phillips curve. This is not necessary, as the results will go through for a hybrid Phillip's curve, but for inflation inertia to be endogenous, there must be some backward looking element. In equilibrium, the endogenous variables  $y, \pi - \pi^*, q$ , and  $r$  will all evolve according to a zero mean, stationary, first order autoregressive process (the stable root of the system). This stable root,  $d$ , is the solution to

$$(1 + (2 - d)b/\{(1-d) + a(2-d)\}) = 1/d$$

Which depends on the Taylor rule parameters 'a' and 'b'. In the special case  $a = 0$ , the central bank is an 'inflation nutter'. Stability requires that  $b > 1$ , so that the ex ante real interest rate rises when inflation is above target

Result: For any given  $a \geq 0$ , there exists a  $b(a)$  such that, for all  $b > b(a)$ ,  $\partial e_t / \partial \varepsilon_t < 0$ . That is, if the central bank responds sufficiently aggressively to a rise in inflation, the nominal exchange rate *appreciates* on impact in response to an adverse inflation shock. For  $b < b(a)$ ,  $\partial e_t / \partial \varepsilon_t > 0$ . Thus while the *real* exchange rate must appreciate in

response to an adverse inflation shock, the effect on the nominal exchange rate depends upon the Taylor rule reaction function. Interestingly, in this model the ‘inflation nutter’ case  $a = 0$  and  $b > 0$  is not sufficient to guarantee  $\partial e_t / \partial \varepsilon_t < 0$ .

The empirical work in the paper examines point sampled data on inflation announcements and the reaction of nominal exchange rates in 10 minute windows around these announcements for 10 countries and several different inflation measures for the period July 2001 through March 2005. Eight of the countries in our study are inflation marketers, and two are not. When we pool the data, we do in fact find that bad news about inflation is indeed good news for the nominal exchange rate, that the results are statistically significant, and that the  $r$  – square is substantial, in excess of 0.25 for core measures of inflation. We also find significant differences comparing the inflation targeting countries and the two non-inflation targeting countries. For the non-IT countries, there is no significant impact of inflation announcements on the nominal exchange rate, although the estimated sign is indeed in line with our story. For each of the IT countries the sign is as predicted by the theory and quite significant. Finally we study two countries, the UK and Norway in which there was a clear regime change during a period when we can obtain data. We study the granting of independence to the Bank of England in 1997 and the shift to formal inflation targeting by Norway in 2001. For both countries, the correlation between the exchange rate and the inflation surprise before the regime change reveal that ‘bad news about inflation was bad news about the exchange rate’. After the regime change, we find that indeed ‘bad news about inflation is good news about the exchange rate’.

### *The Next 10 Years*

So much has happened in global finance in the past ten years, it would be foolish to forecast with any precision what will happen in the next ten. It would seem, however, that the financial clout of the saving glut countries—China and the commodity exporters—is likely to persist and to shape in important ways the global capital market and G3 exchange rate relationships. While the most likely scenario is for the dollar to remain the global reserve currency, the fate of the dollar will rest in part on the geofinancial calculations and policies of these sources of global capital outflows. In recent weeks, we have seen a flight-to-quality scenario in which Treasury yields fall in tandem with the dollar. In a true dollar crisis, bond yields would have risen to attract the capital inflow in tandem with a sinking dollar. We are not there yet, in part because European officials are uncomfortable with the euro surge that would accompany a dollar collapse. Perhaps the main uncertainty looking ahead is how much collateral damage to the dollar's role as a global reserve currency will be done by the U.S. policy responses—both fiscal and monetary—to the current crisis.

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<sup>i</sup> I made this point internally as Assistant Treasury Secretary in 2003 and publicly in a February 2004 speech at the IIE when I said “ The US current account deficit is a global general equilibrium phenomenon that reflects.....a post bubble excess supply of global saving relative to profitable investment opportunities”. The term ‘saving glut’ would be introduced 14 months later in a speech by then Fed Governor Ben Bernanke. My speech is available in Posen, ed., The Euro at Five, IIE, April 2005.

<sup>ii</sup> I recall vividly a lunch with Otmar Issing in Frankfurt in July 2001 when I briefed him on some econometric work I had done that placed fair value of the Euro north of 1.2 when it was at 0.85. As I recall, we both agreed that was fair value, but that the currency markets are not always fair.

<sup>iii</sup> Chinn, M. and J. Frankel, “ Will The Euro Eventually Surpass the Dollar as a Leading International Reserve Currency” in R. Clarida, ed., **G7 Current Account Imbalances: Sustainability and Adjustment**; University of Chicago Press, 2007.

<sup>iv</sup> Although originally attributed to De Gaulle, ‘exorbitant privilege’ was actually introduced by then Finance Minister Giscard D’Estaing in February 1965.

<sup>v</sup> Indeed, as I recall , one of the motivation of the Group of 30 Project was the spectacular collapse and volatility associated with unwind of the October 1998 yen carry trade.

<sup>vi</sup> Clarida, J. Davis, and N.Pedersen, “Carry Trade Regimes: Beyond the Fama Regression,” forthcoming, *Journal of International Money and Finance*.