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**World Real Interest Rates:
A Tale of Two Regimes**

Jagjit S. Chadha

February 2012

KDPE 1205



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Prof. Jagjit S. Chadha



PROF. JAGJIT S. CHADHA

Professor of Economics
University of Kent
Centre for International
Macroeconomics and Finance
University of Cambridge

Email:

jsc@kent.ac.uk

Web Page:

→ [Click here](#)

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ABSTRACT

Global real interest rates were driven up in the 1980s, partly to encourage disinflation, while subsequently structural and conjunctural factors have driven rates to lower levels. The increase in the global pool of savings and the fiscal correction associated with the long economic expansion from 1992 to 2007 had put downward pressure on real rates and the extraordinary monetary policy responses since 2008 have sustained that trend into negative territory. The initial consequences of low real rates in the early part of this century had been to elevate asset prices, promote leverage in financial institutions and, as a counterparty, increase private sector indebtedness. The management of deleveraging by policymakers implies setting a low path for real rates along the yield curve by using a combination of traditional and non-traditional monetary and fiscal policies for as long as the

economic dislocation persists. Facing a public and private debt overhang, low real rates help the adjustment of global balance sheets but cannot be driven low permanently by policymakers. My analysis suggests that there are two regimes for real rates; those for normal times are positive and vary with the global economic cycle, while those that deal with economic dislocation are negative. Once growth is secured, real rates will rise quickly to more normal levels, not least because, in order to limit any increase in funding costs that may result from capital inadequacy (apparent or real), banks themselves have a considerable appetite for capital, and that will also start to crank up real rates given a fixed pool of savings. It therefore seems likely that, over the medium term, real yields are likely to be in the range of 2–4%, rather than their current levels.

1 INTRODUCTION

Long-term real interest rates move to equilibrate the desired stock of savings with the planned level of investment. In a closed economy, the real rate is determined by domestic factors driving these schedules and, in an increasingly globalised economy, it is world real rates that adjust to ensure that the world pool of savings equals investment plans. In this White Paper, we examine secular and recent trends in world real rates and examine the observation that long-term rates have trended downwards, perhaps puzzlingly, in the past decade or so since the millennium.

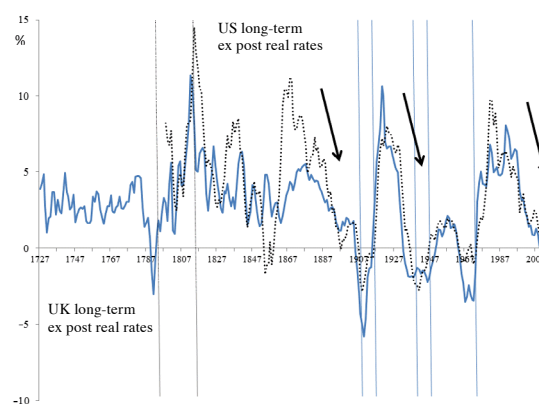


Figure 1: Long-term ex post real rates, 1727–2010

*This paper draws upon earlier work with Nicholas Dimsdale and Francis Breedon. I am grateful for research assistance from Alex Waters and for very helpful comments from Henning Stein and Jun Shiomitsu. It has been prepared as a White Paper for DWS Global Financial Institute. © Jagjit S. Chadha 2011.

**Professor of Economics, Chair in Banking and Finance, School of Economics, Keynes College, University of Kent, Canterbury, CT2 7NP, UK. Email: jsc@kent.ac.uk. Centre for International Macroeconomics and Finance, University of Cambridge.

Figure 1 shows, by way of introduction, a long time series of real rates from 1727 onwards. We deflate the long-term interest rates on UK Consols and US long-term bonds by a 10-year average of actual future inflation in order to estimate real holding period returns. There is considerable coherence in the real rates derived in this manner across the two nations, which were in turn the world's leading industrialised nations. The UK real rates suggest remarkable stability over the eighteenth and nineteenth centuries, save for a period of volatility associated with the French Revolutionary and Napoleonic Wars and their aftermath. There has been considerably more volatility subsequently, with sustained negative rates during WW1 and WW2, and in the 1970s, but also, as a result of the surprise disinflation, there was a sharp upward movement in real rates in the early 1980s.

At first blush this observation presents something of a puzzle, as we would expect the long economic expansion from the early 1990s through to the late 2000s to be accompanied by stable real interest rates that reflect the return on savings and the marginal efficiency of capital. That the expansion was accompanied by increasingly low real rates is likely to be connected to the increasing globalisation of capital flows, the considerable growth in and strategic importance of developing countries, aggressively low short real policy rates and the creation of highly leveraged financial institutions that then faced cheap refinancing costs over an extended period.

From the examination of real rates in this paper, it is also clear that, although there is a common trend in long-term real rates across industrialised economies, there is far from complete convergence. Differences in real rates are likely to persist, as various risks are embedded in both nominal and inflation-proofed government securities: default, liquidity and term premia. When comparing real rates across countries, it also seems likely that expected changes in the real exchange rate from differential rates of growth in productivity may drive wedges into different countries' real rates, even across long horizons. Preferences from domestic financial and non-financial

institutions may also have an impact on the real rates paid by various sovereign states.

This White Paper proceeds in three leaps. First, with reference to the Metzler diagram of real rates, global investment and savings schedules, I outline the basic implications of globalisation for global real rates, at least in the first stage – lower real rates and escalating claims of saver countries on debtor countries. Second, I outline recent movements in the raw data from a number of advanced economies and also the G20. We can also examine the expected real rates from index-linked bond markets and, in all cases, the overall drift down in real rates is clear. The historical evidence suggests that downward movements in real rates and persistently negative real rates seem broadly associated with economic dislocations. In the final section, I outline some of the broad trends that will affect global real rates and conclude that low real rates are likely to persist for some time as they will ease adjustment of highly indebted public and private sectors in advanced economies. Over the medium term, these rates will trend back up as demand for global capital will emerge from saver nations and financial intermediaries will be required to hold more capital against assets created.

This process of regularisation of real rates is both uncertain and critically dependent on the return of sustained growth in the leading economies. But if we put the economic dislocation to one side, the overriding solution to the downward cycle in real rates is the creation of more assets that provide both a store of value and liquidity for financial intermediaries. If there is an inadequate development of savings vehicles in the saver economies then these savings will tend to drive up the prices of existing assets, for example US Treasury notes, which will be in short supply. It is, rather, a global excess demand for assets that both drives down real interest rates and raises other asset prices in turn, for example housing, equity or real commodities. Part of the problem is simply that, with a shortage of assets, a given shock to demand will then have a much larger impact on the price (real rates) than otherwise. We return to this point in the conclusion.

2 SOME BASIC CONCEPTS

In this section, I explain why globalisation leads initially to lower rates when the newly globalising countries entering the world economy have a higher propensity to hold excess savings at any given interest rate and when their own domestic investment opportunities are limited. I use, and explain the process with, the famous Metzler diagram. Over the medium-term, we can expect real rates to rise again when the countries start to reduce savings propensity and also develop more domestic investment opportunities. In the short run, however, downward pressure on real rates can stoke a boom in the price of fixed investment goods and lead to extensive accumulation of private sector debts. This is because higher asset prices provide the credit-constrained private sector with higher quantities of collateral, thus relaxing such constraints and promoting higher levels of borrowing.

In the long run, real rates can be expected to adjust to equilibrate the pool of savings and planned investment. In a global economy, capital outflows tend to go from saver countries that are wealthy to poorer countries that have limited savings but abundant investment opportunities. One of the root causes of the financial crisis has been the unnatural sight of capital flowing uphill, that is from poor to rich countries. In a famous calculation, Robert Lucas (1990, American Economic Review) showed that if a rich country and a poor one have equivalent production technologies and differ only in income per head, then because the amount of capital employed in the poorer country will be less than in the richer country, the marginal efficiency of capital must be higher in the poorer country and so attract capital. For example, latest EIU data suggests that Chinese PPP per capita income is around \$5,000 and the same figure in the US is \$45,000, which implies that the rate of return on capital in the US should be a small fraction, at around 3–4%,¹ of that in China and should in turn mean that China runs a current account deficit financed by a US capital surplus. The reality has,

of course, been the obverse, with the US recycling China's capital flows. Or more generally, poorer growing economies funding the external payments positions of richer but more slowly growing economies.

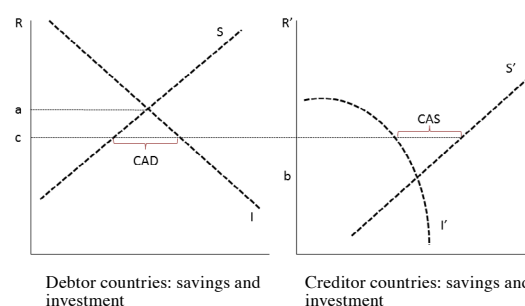


Figure 2: World rates under autarchy and globalisation

Let us examine the basic problem. Global savings equal investment at a single world interest rate (absenting risk). Figure 2 draws the equilibria for both an autarchy (points *a* and *b*) and a two-country world (point *c*), given their respective savings and investment schedules. Let us first consider that both the debtor countries and the creditor countries form two closed economies. In this case, in the debtor country – the left-hand side of Figure 2 – real interest rates would clear the domestic market for saving at *a* and the equilibrium level for savings and investment would be determined accordingly. Overseas in the saver economy, on the right-hand side of the chart, the higher level of savings at any given interest rate and lower investment demand would imply, if there were no capital mobility from “saver nations” to borrower nations, that the real rate there would fall to *b* with savings and investment clearing internally.²

We can now understand why, in the absence of perfect capital flows, real rate differences may persist, as real interest rates will depend on domestic savings and investment schedules alone. But when we open up to capital flows at initial interest rates, *a* and

¹The returns on US capital ought to be such a small fraction of those in a lesser-developed country because output per head, in this example, is around nine times higher than China, and so considerably more capital is employed per head in the US, which at decreasing returns to scale implies a lower marginal rate of return. The exact expression for how much more productive Chinese capital should be is the $(\frac{y_{US}}{y_{China}})^{\frac{1}{1-\alpha}}$, where α is capital share in the production function.

²I have drawn the investment schedule for saver nations as concave to the origin to try and capture capacity constraints and domestic difficulties in financial intermediation.

b , the debtors will expand investment demand relative to savings and run a current account deficit (CAD) at some intermediate interest rate between a and b , let us say c , and the creditor nations will generate a current account surplus (CAS) to meet the debtors' demands. The surplus (deficit) in each year adds to (reduces) net foreign assets in each year in the creditor (debtor) country and leads to an increasing stock of claims by the surplus nations on the debtor nations.

The counterpart of "excess" savings in creditor nations is "excessive" investment in the US – recall that this comprises both public and private investment. So might small reductions in debtor country demand (investment) provide the answer? And even though that seems part of the current adjustment, it may not necessarily be enough. Even if demand falls sufficiently with an inward shift in the investment demand function, I , to eliminate the debtor's current account deficit at stable world rates, c , then creditors would still have excess savings. This excess would drive rates down from c and lead to the "re-emergence" of a current account deficit, albeit with lower world rates and a lower level of global imbalances. Obviously, with large enough falls in US demand, we can achieve zero current account balances in both countries at very low R and low market clearing levels of debtor country savings and investment. Perhaps this is the interim solution, as we stare at the prolonged global recession into which we are heading?

We can also consider a number of alternative solutions. For example, an upward shift in creditor investment demand, I' , to clear the surplus at c , at the original equilibrium, will mean excess demand in the debtors continues and thus world rates, $c \uparrow$, will go higher and there will still be a creditor surplus and a debtor deficit. Obviously again, if creditor demand shifts up even further, we can have no capital flows but at significantly higher world interest rates and high world demand. This may not be the solution we are heading towards immediately, but seems likely to be the sort of long-run equilibrium solution to the problem in which real rates and both global savings and investment are at higher levels.

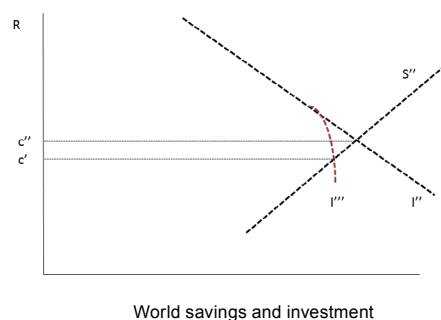


Figure 3: World real rates with and without constrained investment

The analysis that results from Figure 2 tells us that any R can lead to an equilibrium provided creditors are willing to lend and debtors are willing to borrow: it does not really tell us where the curves should be. That said, we discover that if we want to adjust to some different level or direction of capital flows and only one country adjusts, the overall change in interest rates and of output will be greater than if they both adjust somewhat. It also reminds us that, in a globalised economy, real rates will be determined by the global pool of savings supply and investment demand. So let's add the two sets of schedules together for global savings and investment in Figure 3, where these aggregate schedules are given by S'' and I'' . What we can see immediately from Figure 3 is that market-clearing global real rates can be significantly affected by constraints or impediments to investment opportunities, which may emerge from financial frictions or from real domestic capacity constraints. But if the investment frontier is constrained, for example so that the frontier looks like I''' , then the implication is that real rates will have to fall further to increase investment by any amount. What we can therefore expect when these constraints are severe, at the margin, is that real rates will fall quite markedly near the investment frontier, which is the way I interpret events in the 2000s, when movements out of the global pool of savings were against the steeper I''' schedule rather than the flatter I'' schedule, leading to a fall in real rates down to c' . This fall in real rates can lead to bubbles in the prices of fixed assets. Should some of these frictions have been sorted out, we can expect rates to rise from c' to c'' and global savings and investment to clear at higher levels.

So what is the overall constraint or target? It is closely linked to the equilibrium level of net foreign assets to GDP, which is the accumulation of surpluses or deficits, where flows from one country to another are simply net additions or subtractions depending on whether a CAS or CAD occurs. The equilibrium level of net foreign assets for any one country is hard to model but again, under the world's adding-up constraint, these claims must net out across economies. The US is a debtor nation (at around 6–7% of global GDP), implying that its current demand will be met by saving from higher future income. In this scenario, Asia will be the creditor and, according to the IMF's World Economic Outlook emerging Asia is in credit by around 5% of global GDP. But for the reasons

given earlier, Asia should probably be the net debtor and borrow from its higher future income. And so, if we are to get to a situation in which countries such as China become debtors and capital flows downhill (from rich to poor), this will imply the need for surpluses in countries such as the US and a deficit in China, which implies lower US demand, greater US propensity to save, higher Chinese demand and lower Chinese propensity to save. But whether capital flows from rich to poor or vice versa, in normal times real rates are stable and positive. The current conjuncture has rates that are often negative and must be viewed as a temporary response engineered by policymakers to try and rebalance global balance sheets. The way this works is explained in the next section.

3 A LONG VIEW ON REAL RATES

In this section, I outline long-term trends in real rates from deflated nominal long-term rates and from the index-linked market.

3.1 The Density Function

Figure 4 shows the histogram (empirical density function) for annual UK long-run real rates from 1727 to 2011. This near-three-century-long series was plotted in Figure 1, but we can learn much from this portrayal as well.³ It turns out that we have 42 observations, or years, out of 284 when rates were negative – so just under 15% of the time. Relative to their mean, rates are more variable when they are lower, which suggests more uncertainty. The long run of data does suggest that we have two interest rate regimes, which we can term normal and abnormal times. In normal times real rates have a mean of 3.6% and in abnormal times they are nearer to -2.0% . The overall mean at 2.8% is a weighted average of the two. Against this observation, the current level of real rates seems likely to persist only as long as the current financial and economic crisis and then return to the other distribution.⁴

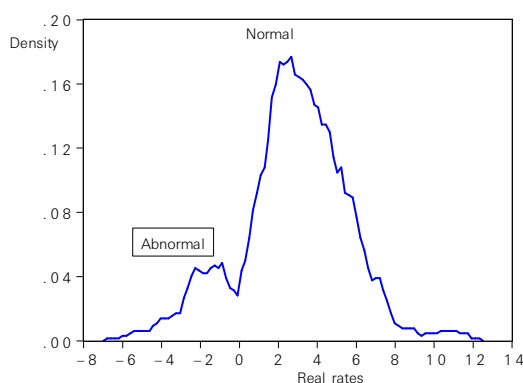


Figure 4: Normal vs. abnormal times

One way to think about the normal versus abnormal times, the two regimes suggested in Figure 4, is by considering equilibria in goods markets and the money markets. The downward sloping, IS , schedule shows the combinations of real rates and output that lead to clearing in the goods market, where lower real rates generate more demand that is met by a higher supply

of goods because supply is demand-determined. The upward sloping, LM , schedule traces combinations of real rates and output that lead to money market clearing, where at higher levels of output more money is needed to effect transactions and so interest rates rise in order to choke off alternate uses of money. Figure 5 shows a normal equilibrium for goods and money markets around d , where both markets clear. We can see that small perturbations in either schedule lead to real rates hovering around some equilibrium. From our previous chart, we can see that such perturbations may be quite large but tend to be temporary.

Interest rates adjust in normal time. Following an expansion in goods demand, with the IS curve shifting out to IS' , we should expect real rates to jump vertically up from d to the stable red path passing through e and then gradually allow the economy to adjust to the higher level of spending by moving along the stabilising arm to e . Real rates should thus increase along with the increase in demand, and this is basically what we observed in the 1980s. But if, however, at the same time, the money market curve shifts significantly out because of an increase in loanable funds from banks and other financial intermediaries, real rates may actually fall down onto the line going south-west from f , before moving back to f and this may be more reminiscent of the situation in the first decade of this century.

Now let us imagine that the goods demand shifts back quite radically, following a change in confidence or collapse in asset prices. In this case, real rates might have to jump a long way down, g , to ensure equilibrium in the goods and money markets – these are the abnormal times we currently face. The large recession of 2008–9, along with the balance sheet effects arising from a large debt overhang, may have shifted the IS schedule to somewhere like IS'' . In this case, real rates would jump down from f to the line heading north-east from g and then fall along that line as output itself fell. For as long as demand remains emaciated, real rates will remain low.

³I estimated a uniform kernel density function across the real rate series. Tests suggest that there are two distributions in this series, one centred at around 3% and a significantly smaller distribution centred at just under 1%.

⁴We do not estimate the switching process, its parametric determinants nor the factors governing the switch.

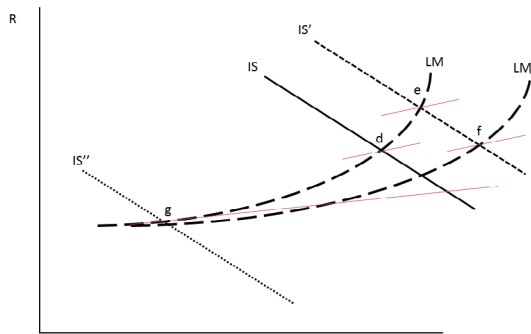


Figure 5: High and low real rates – normal and abnormal regimes

3.2 Long-Run Advanced Economy Real Rates

One of the findings of this White Paper is that negative real rates are associated with economic dislocation and are not sustained during normal times. This means that long-run averages of real rates should be conditioned on the state of nature rather than simply unconditional. The four time series here show UK, US, German and French long real rates at an annual frequency under a variety of deflating methodologies.⁵

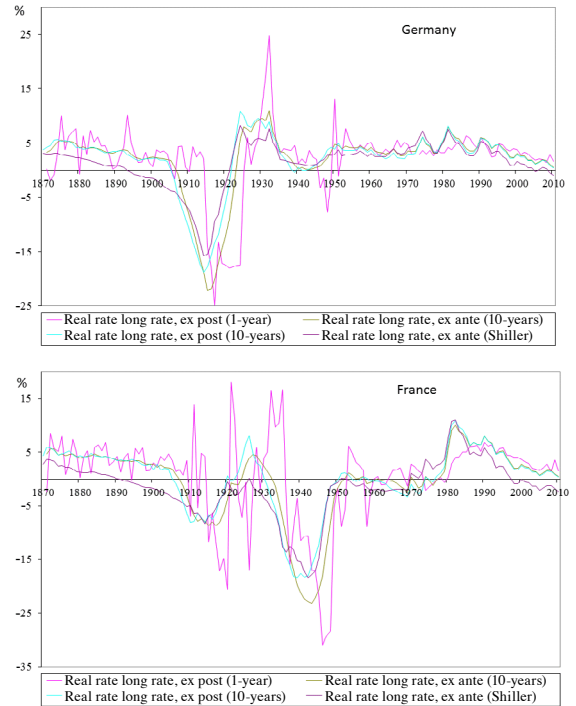
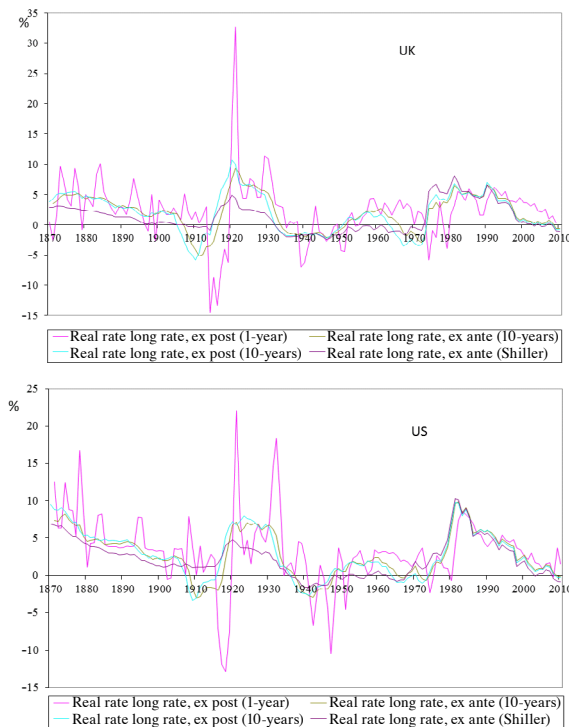


Figure 6: UK, US, German and French real rates, 1870–2010



Two reasonably clear stylised facts emerge – that volatile (stable) real rates are associated with periods of economic dislocation (stability) and that, although there is a considerable degree of comovement in the series in these advanced economies, even here there are considerable and persistent deviations. We can model the four series as a common trend and then find that the three smaller countries take around two to three years for their respective real rates to return to the common trend. We do not wish to place too much weight on the statistical analysis of the relationship between the real rates, but they do suggest that even if there is a world rate closely related to the real rates for these major economies, there are substantive and persistent deviations, which may reflect various types of nominal and real risk premia.

3.3 Index-Linked Real Rates

An increasingly popular fixed-income asset over the past 25 years or so has been inflation-protected government debt. Unlike their nominal counterpart, these securities provide a coupon that is linked directly to the domestic price level, so rather than trading on the expectation of inflation, they trade solely on the expected real rate. Yields on inflation index-linked debt

⁵In each case, the long rate is deflated by: (i) next year's inflation rate; (ii) the actual inflation rate over the next 10 years; (iii) a forecast of 10-year inflation; (iv) a forecast using the method outlined in Chadha and Dimsdale (1999).

yields are thus real rates, and from the 1980s onwards show both a secular downward trend and also a clear fall from 2008 onwards for Canada, the US, France and the UK. Japanese index-linked debt has fallen sharply since 2009. The early periods of index-linked debt issuance suggest the existence of liquidity premia in each country: in the 1980s for Japan and the UK, in the early part of the 21st century for France and in 2006–7 for Canada. This suggests that some fraction of the observed fall in real rates from this market reflects some reduction in liquidity as issuance increased. It seems likely, though, that medium-term real yields are likely to be in the range of 2–4%, rather than their current level.

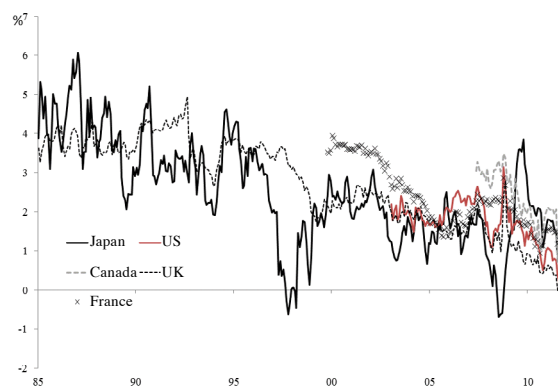


Figure 7: Medium-term benchmark yields of inflation-proofed sovereign debt

3.4 A Recent G7 and G20 View

Figures 8a and 8b deflate nominal 10-year benchmark rates for the G7 and G20 countries by the past two years' average inflation rate.⁶ We interpret this as a proxy for medium-term inflation expectations. A now familiar story emerges: real rates declining from an early 90s peak and the period of stability from 2000 onwards being rudely interrupted by the financial crisis. Although the median long-term rate is near zero, the spread in real rate across the G7 remains quite wide – again telling us that there is less-than-perfect substitutability across medium-term G7 bonds.

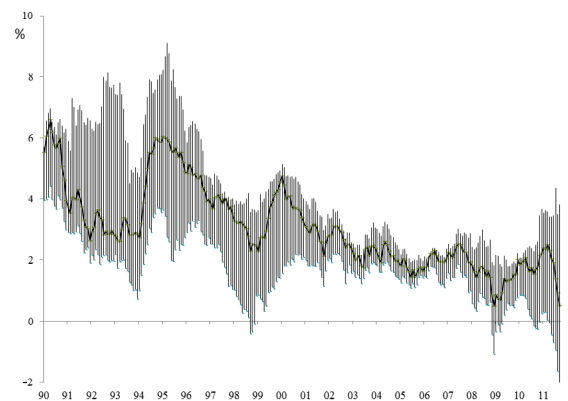


Figure 8a: G7 long-term real rates – median and range

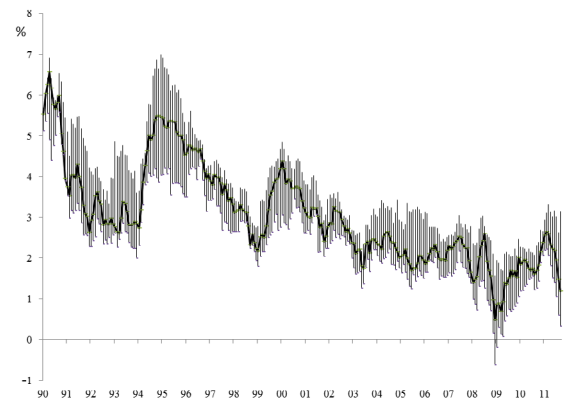


Figure 8b: G20 long-term real rates – interquartile range

A similar exercise for the G20 yields very similar observations. In this case, rather than the range, we could also point out the interquartile range. And the median observation looks rather similar, which is suggestive again of a common trend in real rates. The interquartile range, though, of the G20 is somewhat narrower, as we might expect. But it is far from insignificant. The seeming downward trend in real rates again seems clear. The decline in real rates from the early 1990s seems associated with a loosening of monetary policy following the 1990–2 recession but also the increasing globalisation of capital, which allowed cross-border capital flows to meet domestic capital demands and so tended to put downward pressure on real rates. The extension of the long expansion into the 2000s

⁶ The G7 group of nations used to dominate macroeconomic planning, but increasingly it has been usurped by the G20 group of finance ministers and central bank governors, which was established in 1999 after the Asian financial crisis and has, of course, considerably wider global membership.

by accommodative monetary policy further sustained the low-rate environment. The build-up of large gross claims from creditor to debtor countries was facilitated by the low-rate environment. In the early stages of the financial crisis, which can be thought of as a distributive shock from debtors to creditors, it is interesting to note that median real rates grew in the G20 and fell in the G7. As the crisis has lengthened and, arguably, deepened from 2010, real rates across both groups of nations have fallen.

3.5 Ex Ante and Ex Post Rates

As a cross-check with the *ex post* calculations and index-linked bond rates, I have constructed an *ex ante* real rate from UK annual consumption data. The *ex post* calculations adjust nominal rates for actual future inflation and so do not deal very well with inflation surprises. If, alternatively, we can evaluate the expected real rate before any inflation surprises, we can be reasonably sure that the results here are not driven by inflation shocks. Essentially, I evaluate the real rate that would make consumers, given the path of consumption and the variance of consumption, indifferent between consuming today and tomorrow at a one-year horizon. The *ex ante* real rate is lowered by

lower expected consumption growth – because if consumption is not expected to grow by much, a low risk-free return will make households indifferent between consuming and saving – and by higher precautionary savings, which increase in the variance of consumption and the level of risk aversion. Figure 9 helps us understand the greater variance required of one-year real rates compared to the slower evolution in long-term rates, which seem to operate as a time-varying trend through the short rates. It is again reasonably clear that the low long-term level of real rates is both unusual and consistent with economic dislocation.

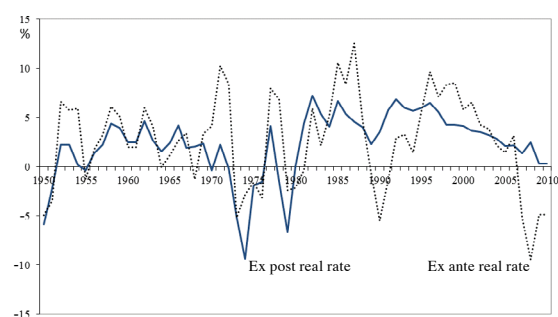


Figure 9: Real rates and risk-free rates

4 STRUCTURAL ISSUES

At a number of points in this paper, I have pointed to the extraordinarily low level of real rates. The release of global savings, alongside the lack of domestic investment infrastructure in creditor countries, has driven down rates at the margin. Deflationary pressure in traded good markets led to lower-than-otherwise nominal interest rates. Low short-term interest rates alongside this pool of global liquidity encouraged financial intermediaries to build up considerable levels of gearing. This gearing involved claims on both the private and public sectors, which were subject to considerable performance risk in the event of abrupt changes in current and expected income or in refinancing costs. The gradual realisation of this latent risk has led to the adoption of very low interest rates by central banks to smooth repayments and refinancing of debt and the need for substantial recapitalisation of the financial system. In time, central banks will regularise rates and the demand for capital from both financial intermediaries and developing countries will force real rates back to historic positive levels.

4.1 Globalisation

Figures 10 and 11 show the propensity to save globally and among Asian, so-called creditor nations. The average pool of savings across economies has ranged pretty consistently between 20 and 25% of world GDP.⁷ Over the same period, average savings rates among Asian economies have increased by over 10% of GDP to now lie in the mid 40s. The marginal propensities to save are averaged over seven years and give a clue as to the direction of global savings. We can note an increase since the turn of the millennium, but one that has been driven by the Asian economies. This implies that given the increased size of these economies in world GDP, they have offset even lower rates of average savings in the debtor economies. So real world rates have been driven down by Asian propensity to save and have, to some degree, provided a reason for debtor nations not to adjust their behaviour.

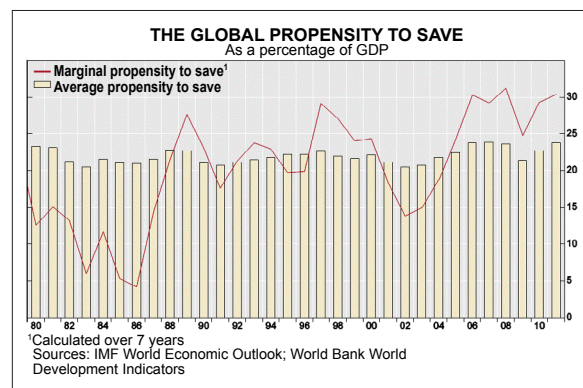


Figure 10: Global savings rates (BIS)

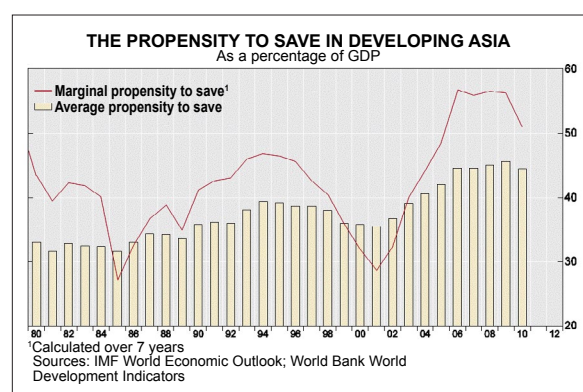


Figure 11: Savings rates in Asia

That these savings have been recycled can be judged schematically by the putative index of capital mobility suggested by Obstfeld and Taylor (2003) in Figure 12, which suggests that since 1980 we have had increasingly high levels of capital mobility, which in turn have probably driven the increasing issuance of AAA-rated US\$ securities, Figure 13. It would seem to me that under either reduced capital mobility, where debtor real rates are influenced more by domestic capital accumulation and savings, or in a world of greater internal investment demand by creditors, real rates are likely to rise. The former case will lead to lower levels of activity in the debtor nations and the latter to higher levels of global activity.

⁷Figures 10, 11 and 13 are from Turner (2011) and I am grateful for permission to draw upon them.

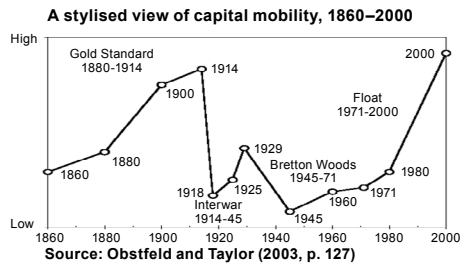


Figure 12: Global capital flows

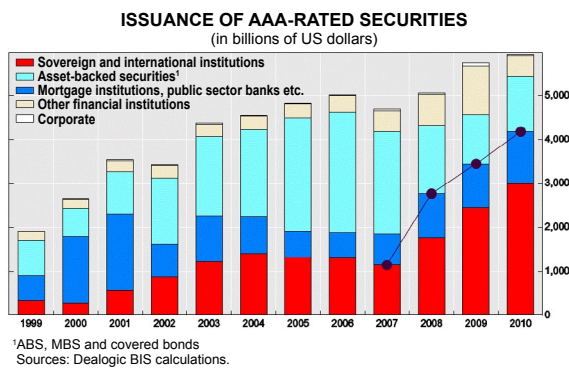


Figure 13: Debt issuance

4.2 Elevated Bond Prices

Figure 14 uncovers the impact of flows of funds on advanced economies. The upper panel shows the decomposition of the Euribor-OIS spread for the Eurozone three-month rate and the lower panel for the quantity of M3. The pink bars represent demand shocks, which result from domestic demand for money and will tend to raise the interest rate spread and the growth in M3, while the black bars represent supply shocks that lower the spread and increase the M3. We can see that from 2001 onwards, positive supply shocks in money reduced the spread and increased the growth rate of money in the Eurozone. The results (not shown) are very similar for the US and for the UK. We can also see that by 2008, the credit crunch reduced the growth of money, which increased the interest rate spread over and above that suggested by the pink demand shocks alone.

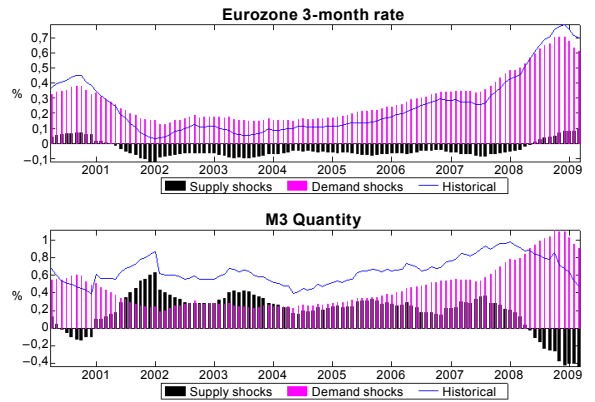


Figure 14: Eurozone demand and supply of M3

The supply shifts in loanable funds that reduced spreads and increased M3 were the result of banks that had increased their gearing levels, and we can note clearly incredible amounts of gearing in the commercial banks of advanced countries. The shift back of these supply curves after the crisis has raised market spreads and reduced overall lending. Monetary policy has offset the increase in market spreads and temporarily lowered rates. But a slow upward march in rates seems likely as and when normality is restored.

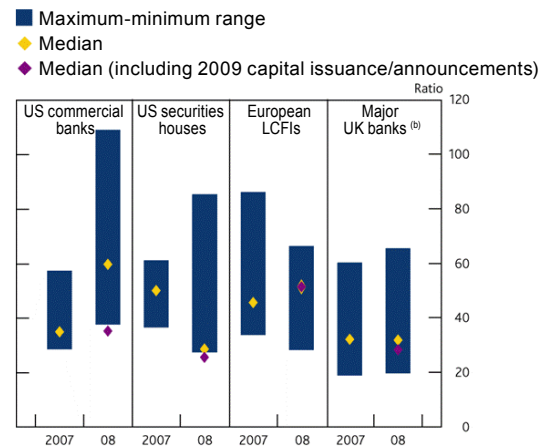


Figure 15: Historic bank leverage (BoE)

4.3 Public Debt Underpinning

The financial crisis led to an increase in the public indebtedness of advanced economies. Private sector claims were nationalised in some cases and the short-fall of private demand led to an increase in public consumption. This is not sustainable because, as public debt levels creep towards 100%, they quickly become difficult to stabilise as interest payments comprise several percentage points of GDP. Furthermore, it became clear that public debt began, as it was clearly subject to private risk, to resemble a private default-related interest rate instrument. This is because private debt seemed to morph into public debt but, more fundamentally, the repayment of public debt depends on the health of the private sector. Naturally, the short-term funding, or refinancing, of public debt was sufficiently eased at low real rates. But this is purely a temporary response during a period of extreme dislocation. Monetary and fiscal policy cannot keep real rates below the equilibrating level for global savings and investment for long.

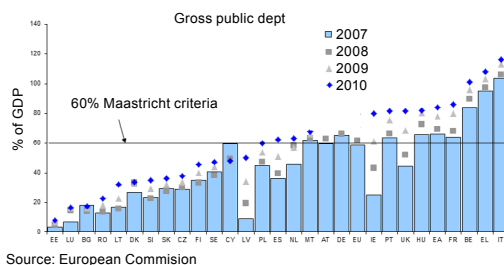


Figure 16: Public debt positions (EU)

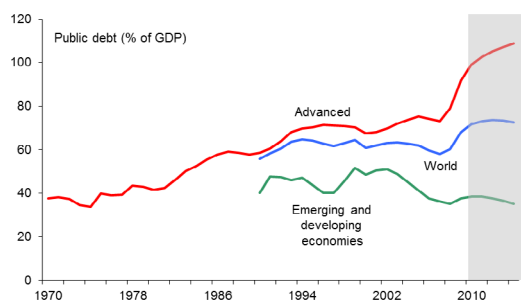


Figure 17: Global debt positions

4.4 Regulatory Reform and Constrained Real Rates

The support provided by the public sector to both aggregate demand and the financial sector has created a wedge in the growth of public indebtedness: advanced economies have found their public balance sheets stretched and emerging and developing countries have been able to run surpluses. Advanced country debt has thus become riskier and, because of the need to supply liquidity to a financial sector facing shortages, the duration of the debt has also shortened. Facing a public and private debt overhang, low real rates help the adjustment of global balance sheets but cannot be driven low permanently by policymakers. In order to limit any increase in funding costs that may result from capital inadequacy (apparent or real), banks themselves have a considerable appetite for capital, and that will also start to crank up real rates given a fixed pool of savings.

4.5 Implications

Long-term real rates are close to risk-free rates theoretically. But the heightened variance in *ex ante* and *ex post* rates has altered the demand side of the market for sovereign debt. On the demand side, investors and market participants can no longer treat debt as pure interest rate products, and so rates are variable and also differentiated. Sovereign bonds have adopted some characteristics of credit products, whose prices reflect measures of borrowers' default probabilities. Many have lower liquidity than previously because the investor base has become less diversified. During phases of heightened risk aversion, many sovereign bond rates do not benefit from any flight to quality. Rather, they correlate with risky assets.

Credit rating agencies, by downgrading some sovereigns, have played a role in these dynamics. Although central banks accept bonds as collateral in refinancing operations below certain thresholds, lower ratings could trigger sizeable haircuts or, in other words, the revaluation of bonds substantially below market values. Of course, through expansionary monetary policy, central banks have also generally provided considerable

support to sovereign bond prices. Financial regulators are free to assign a non-zero risk weight to certain sovereign bonds under the standardised approach and thus they are no longer risk-free. And even if some bonds are still considered risk-free, it would appear that the once-clear demarcation between fixed-income and credit products has become permeable.

In the long run, these developments can impact on the required return from bonds in important ways, but certainly may imply both a change in level and an increase in price differentiation. One possibility then, is that some capital on the margin may flow towards emerging markets, which are then closer substitutes for some advanced country sovereigns. To some extent this will rebalance the capital flows, but the increase

in financial leverage, rising asset prices, and building inflationary pressures in some of these emerging markets (EM) may imply challenges for financial stability.

The supply side of the sovereign debt market has also changed, as debt managers in advanced economies have started to use EM methods of risk mitigation. Confronted with a trade-off between predictability and flexibility, most choose flexibility. While retaining an open dialogue with financial markets, they realise that annual programmes have to offer sufficient flexibility to cope with the challenges of issuing and managing larger amounts of debt. Finally, debt managers are putting a high premium on proactive and timely communication as well as on understanding the evolving nature of investors.

5 CONCLUDING REMARKS

In a global financial market, long-term real interest rates ought to converge to something close to the steady-state growth of world consumption per head. This would imply that the representative world consumer would be indifferent on the margin between consuming today or saving and consuming tomorrow at a risk-free rate. We find that real rates have marched downwards since the turn of the millennium, after a long elevated period in the 1980s and 1990s. At face value, this might imply that we expect a prolonged period of low world consumption growth, as well as an extended period of precautionary savings because low rates are endogenous to expected income growth and its uncertainty.

Some of the fall in real rates, though, has been an attempt by monetary policymakers to sustain levels of demand in the advanced economies or, at least, smooth the adjustment towards sustained lower growth rates. The temporary reduction in the interest rate burden should not be used as a signal to issue more public debt, but rather treated as part of the adjustment path of the global balance sheet. The recycling of global (current account) surpluses through highly leveraged

financial institutions generated an asset price bubble and led to unsustainable levels of collateralised lending that has left a considerable legacy of both public and private debt. Low rates will, for a time, help the re-financing of this debt overhang against a considerable increase in market interest rates paid by risky (public and private) borrowers.

We can, however, safely expect the return to sustained positive real rates over the medium term when even global growth returns. What we might need to see, though, is the need to develop other safe instruments to store value and provide liquidity in financial markets. Financial markets typically cannot provide sufficient liquidity and tend to over and underprice risk in busts and then booms. This means that we can go from liquidity floods to droughts over the business cycle. In the absence of sufficient marketable assets, this induces both considerable variance in real rates and volatility in asset prices. The global and financial economic cycle will not only return slowly to normality but, in the meantime, other safe savings vehicles must be developed.

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