



**DETERIORATING PUBLIC FINANCES AND RISING GOVERNMENT DEBT:
IMPLICATIONS FOR MONETARY POLICY**

Prepared by Lillian Cheung, Chi-Sang Tam and Jessica Szeto¹
Research Department

Abstract

The sharp rise in government debt in many major economies following the introduction of large fiscal stimulus measures during the global financial crisis of 2008-09 has triggered concerns over its impact on long-term interest rates and the potential negative consequences for future growth and inflation. This paper uses an error-correction model to assess the effect of growing government debt on long-term real interest rates by drawing on empirical evidence from the US. The results show that in the long run, a one-percentage-point increase in the federal debt-to-GDP ratio raises the equilibrium 10-year real US Treasury yield by about six basis points. We also discuss the economic consequences of a rise in the world long-term interest rates, and draw implications for longer-term growth and the conduct of monetary policy in the Asian economies.

JEL Classification Numbers: E43, E47, E52, E62, H63

Keywords: Public debt, fiscal policy, monetary policy, long term interest rate, real interest rate, error-correction model

Author's E-Mail Address: lcheung@hkma.gov.hk; chi-sang_tam@hkma.gov.hk;
jwkszeto@hkma.gov.hk

The views and analysis expressed in this paper are those of the authors, and do not necessarily represent the views of the Hong Kong Monetary Authority.

¹ The authors are grateful to Hans Genberg, Dong He, and Central Bank Governors at the 14th EMEAP Governors' Meeting, for their valuable suggestions and comments.

Executive Summary:

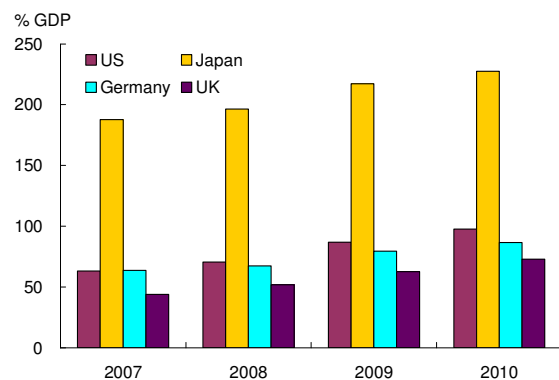
- *The deterioration in public finances in many major economies resulting from the introduction of large fiscal-stimulus packages raised questions over its impact on long-term real interest rates. In particular, issues of fiscal sustainability and the risks of higher future inflation rates have the potential to raise long-term interest rates in the US and other major economies.*
- *This paper uses an error-correction model to assess the effects of growing US government debt on US long-term real interest rates. The results show that in the long run, a one-percentage-point increase in the federal debt-to-GDP ratio raises the equilibrium 10-year real US Treasury yield by about six basis points, in line with other similar studies.*
- *We also explore the economic consequences of higher US long-term real interest rates. Given the weighty influence of the US, “world” real interest rates may also rise, crowding out private investment, and reducing potential output. Consequently, major central banks will likely face a daunting challenge in calibrating the right policy stance as the equilibrium real interest rate might have increased and the output gap may not be as large as previously thought. If so, the same level of policy interest rate would imply a looser policy stance than before the crisis. It will also make it more difficult for central banks to get the timing right in exiting their quantitative easing programmes.*
- *The important question for Asian central banks will be whether and to what extent these economic consequences in the developed world will affect the regional economies. Lower external trade growth in the Asian region as a result of crowding out and thus lower growth potential in the major economies means that the region will be less able to count on external trade as an engine of growth. Meanwhile, those economies that need to raise further funding to finance their expansionary fiscal policy will face the additional pressure of higher cost of financing.*
- *Should the policy stance in the major economies not turn out right leading to rising inflationary expectations not being contained and a depreciation of the dollar, stronger monetary policy reactions may be needed, which could push the major economies back into recession, and lead to boom-bust cycles. The Asian economies would therefore face a much more volatile global economic environment.*
- *As long as concerns over greater indebtedness and fiscal sustainability in the major economies remain, investors will continue to demand a high, if not growing, premium on world long-term real interest rates to compensate for the risks involved. This is going to pose a major challenge to the Asian economies over the medium term.*

I. INTRODUCTION

The extraordinary fiscal measures introduced by many major developed economies during the height of the current financial crisis served to provide support to growth and confidence to financial markets at a critical point in time. The resulting deterioration in public finances, however, has brought about concerns over potential negative consequences for future growth and inflation.

The fiscal situation of major economies is projected to deteriorate in the near term (Chart 1). In the US for instance, where fiscal packages in the size of 1.2% and 5.6% were introduced in February 2008 and February 2009 respectively, and where US\$700 billion was committed under the TARP to address financial sector vulnerabilities, gross public debt is projected by the IMF to rise to 97.5% of GDP in 2010 from 63.1% in 2007.² A similar deterioration in public finances is projected for some other major economies. The IMF projects that the fiscal balances of G-20 advanced countries will weaken by eight percentage points of GDP on average, and government debt will rise by 20 percentage points of GDP in 2008–09, with most of the deterioration occurring in 2009.

Chart 1: Gross public debt in selected major economies



Source: IMF World Economic Outlook, April 2009.

The fiscal sustainability issue was brought to the focal point by the downgrade of the outlook for the UK's sovereign debt rating by the S&P in May 2009. In its immediate aftermath, there was some speculation about whether the US's AAA rating may be under threat as well. This concern might have driven part of the rise in Treasury yields from March 2009, as investors demand a higher interest rate to compensate for the risk of a loss in the value of its bonds or a potential default, although the risk of the latter outcome is widely perceived to be remote.

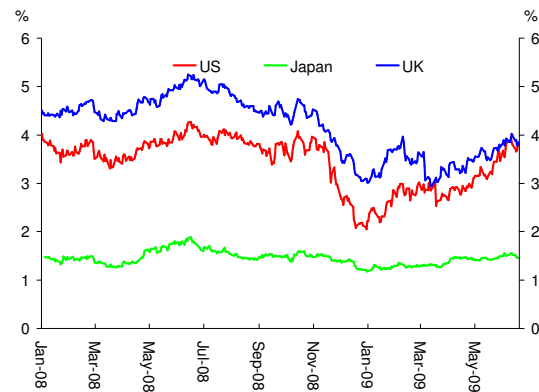
Apart from concerns over fiscal sustainability, fears over the risks of rising future inflation also increased. Given the large amount of public debt issued, there were worries that central banks may face the political pressure to inflate away the debt,

² TARP is accounted for on an accrual rather than cash basis. This means that only the net gain or loss of the assets purchased, on a present value basis, will be counted as the deficit, not the actual initial outlay on the assets bought. Government debt will therefore not rise by the full amount of the \$700 billion but by a smaller amount depending on factors such as the recoverable rate of the assets purchased, discount rate and the time horizon.

by allowing a higher rate of inflation than is otherwise consistent with their price-stability objective. Further, even in the absence of such political pressure or where the central bank is able to withstand such pressure, concerns were raised as to whether central banks are able to exit from their quantitative easing or credit easing policies in a timely manner, as some of the unconventional monetary policies undertaken had been unprecedented and their effects and operations may be less predictable.

All these concerns potentially serve to raise the long-term interest rates in the US and other major economies. Indeed, the 10-year US Treasury yields rose by 96 basis points in July 2009 from its low in March 2009 (Chart 2). The rise might have been driven at least in part by these factors, although other factors such as optimism about the economic outlook and a reversal of flight-to-quality trades might also have played a role. Meanwhile, yields on 10-year UK gilts have also surged 65 basis points from their March lows, and yields on 10-year Japanese government bonds have increased eight basis points from a relatively low base of 1.27% in mid-March.

Chart 2: Ten-year government bond yields in selected major economies



Source: Bloomberg.

As long-term interest rates are an expectation of future short-term interest rates plus a positive or negative premium, according to the expectations theory of the term structure, higher public debt would raise the risk premium required to compensate savers for the uncertainty about the sustainability of government fiscal positions and commitment to monetary discipline. Given the expected accumulation of public debt over the coming years, are long-term real interest rates in the major advanced economies set to rise, and will this result in a change in the equilibrium interest rate?

This paper is organised as follows: The next section looks at the impact of rising government debt on long-term real interest rates using an error-correction model on the determinants of 10-year US Treasury yields. Section III discusses the economic consequences of higher long-term real interest rates in the advanced economies. The implications for the Asian economies and their monetary policy are discussed in Section IV. Section V concludes.

II. THE IMPACT OF RISING PUBLIC DEBT ON LONG-TERM REAL INTEREST RATES – EMPIRICAL EVIDENCE FROM THE US

In order to analyse the potential effect of rising public debt on long-term real interest rates in the advanced economies, we employ an error-correction model which incorporates the long-term and short-term determinants of long-term real interest rates in the US.

In general, it is straightforward to model long-term interest rates by a term-structure model, which can be written as follows:

$$r_t^l = r_t^s + P(f_t) \quad (1)$$

where:

- r_t^l : long-term interest rate;
- r_t^s : short-term interest rate;
- P : the function defining the risk and term premiums of holding a long-term asset
- f_t : a set of factors which determine the premiums in the long-run equilibrium

Equation (1) is a simple term-structure model, implying that under the expectation hypothesis, the return of holding a long-term asset is equal to the return of holding a sequence of short-term assets plus premiums. The selection of variables in the set f_t is well discussed in the literature and an indicator on public finance is commonly included in the set.³ Note that Equation (1) describes the long-run equilibrium interest rate determined only by long-term structural factors independent of short-term cyclical influences. In practice, however, long-term interest rates can diverge temporarily from their equilibrium level from time to time. This feature can be captured by using an error-correction model with the following specification:

$$\Delta r_t^l = \lambda(r_{t-1}^l - r_{t-1}^s - P(f_{t-1})) + \alpha \Delta z_t + \varepsilon_t \quad (2)$$

where:

- z_t : a set of cyclical factors which affect the short-run dynamics of the long term interest rate
- λ : the speed of adjustment of the “short-run error” towards the long-run equilibrium

³ Brook (2003) surveyed the related studies since 1980's.

We estimate model (2) for the purposes of our study, taking the real 10-year US Treasury bond yield as the long-term interest rate.⁴ Specifically, the model is written as:

$$\Delta r_t = c_0 + \lambda(r_{t-1} - \gamma_1 rffr_{t-1} - \gamma_2 \text{cov}_{t-1} - \gamma_3 \text{debt}_{t-1} - \gamma_4 \text{foreign}_{t-1} - \gamma_5 \pi_{t-1}) + \sum_{i=0}^1 \alpha_{i+1} \Delta \text{gap}_{t-i} + \beta_1 \Delta rffr_t + \varepsilon_t \quad (3)$$

where:

- r_t : Long-term real interest rate, represented by the real 10-year US Treasury bond yield
 $rffr_t$: Real short-term interest rate, represented by the real effective federal funds rate
 cov_t : Covariance between the returns of equity and government bonds
 debt_t : Public debt as a percentage of GDP
 foreign_t : Foreign official holdings of US Treasuries as a percentage of gross federal debt
 π_t : Deviation of long-term inflation expectation from average inflation
 gap_t : Output gap

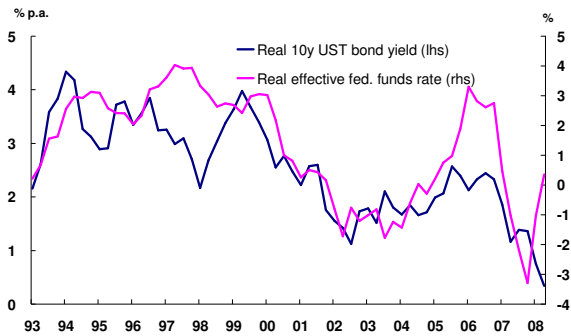
Determinants of long-term real interest rate

There are two sets of explanatory variables in the model—long-run variables that reflect structural factors (f_t) and short-run variables reflecting cyclical factors (z_t). In this model, the *long-run factors* (f_t) include the covariance between the return of government bond and equity, gross federal debt as a percentage of GDP, foreign official holdings of US Treasuries as a percentage of gross federal debt and the deviation of long-term inflation expectation from average inflation. The short-run factors included in the z_t set consist of two commonly cited cyclical economic indicators, including the change in output gap and the real effective Federal Funds rate.⁵ The historical trends of these long-run and short-run variables are depicted in Charts 3 to 7, and details on the definitions and sources of the data are given in the Annex. The following discusses the theoretical relationships between each of these determinants and long-term interest rates.

⁴ Orr et al. (1995) studied the real long-term interest rates of OECD countries by a similar error-correction model.

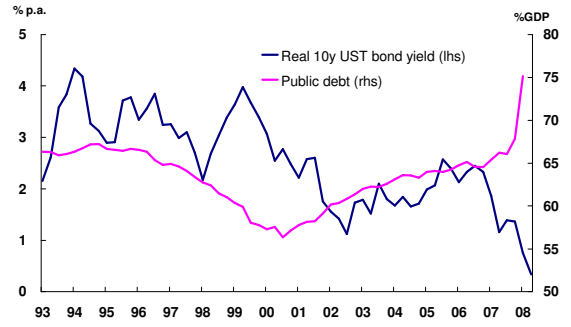
⁵ Other variables, including the lags of the dependent variables and that of the long-run factors are also considered in the initial general setup of the model. By using the general-to-specific approach, variables with insignificant coefficient are removed from the model, resulting in the final specification.

Chart 3: Real short-term interest rate



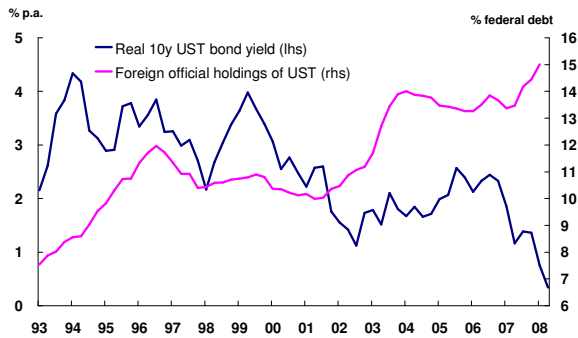
Sources: CEIC, FRB Philadelphia and HKMA estimates

Chart 4: Public debt



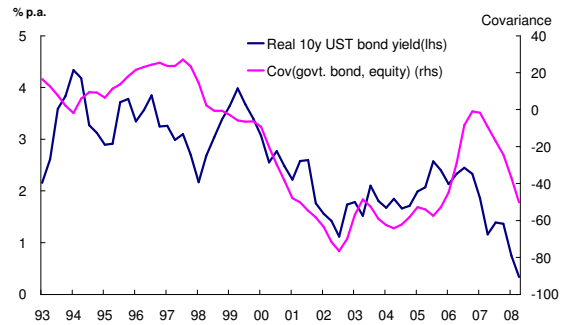
Sources: CEIC, FRB Philadelphia and HKMA estimates

Chart 5: Foreign official holdings of US Treasuries



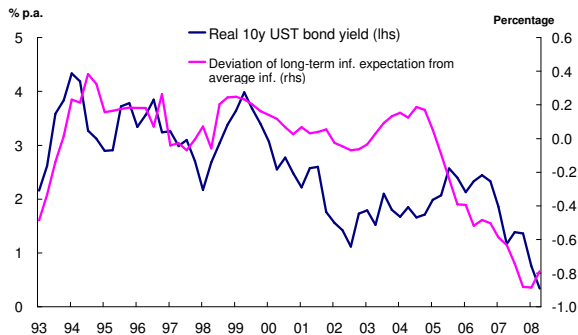
Sources: Bloomberg, CEIC, FRB Philadelphia and HKMA estimates

Chart 6: Covariance between the returns of equity and government bond



Sources: Bloomberg, CEIC, FRB Philadelphia, JP Morgan and HKMA estimates

Chart 7: Deviation of long-term inflation expectation from average inflation



Sources: CEIC, FRB Philadelphia and HKMA estimates

Long-run factors (f_t)

Public debt ($debt_t$). Higher public debt would raise the risk premium required to compensate savers for the uncertainty about the expected sustainability of government fiscal positions and commitment to monetary discipline, as long-term interest rates are an expectation of future short-term interest rates plus a positive or negative premium (the expectations theory of the term structure). However, the relationship between fiscal policy and interest rates may not be linear, in that a given fiscal deterioration may have a small impact on interest rates when the debt level is low but a very large effect once debt reaches higher levels.

Covariance between the returns of equity and government bond (cov_t). Interest rates may also be affected by *portfolio reallocation effects*. Investors may shift out of equities and into the relative safety of bonds when equity markets undergo a correction, and put downward pressure on interest rates. The *covariance of the return of government bond and equity* reflects the ability of government bond to diversify portfolio risk. A positive comovement implies that government bonds are less able to diversify the risk of equity holdings, thus reducing its attractiveness, and resulting in lower government bond price and higher bond yield.

Foreign official holdings of US Treasuries ($foreign_t$). US Treasuries forms a significant part of the risk-free investment in the portfolios of many foreign central banks and international organisations. The lack of direct substitute for the US Treasuries as a reserve currency keeps the elasticity of such demand with respect to its yield relatively low. It is therefore commonly believed that such demand may also have a significant impact on Treasury yields, though there has been little evidence as such. In any case, we have incorporated this factor in testing the effect of foreign official holdings of Treasuries on yields.

Deviation of long-term inflation expectation from average inflation (π_t). Inflation uncertainty may also affect long-term rates. In the face of high inflation variability, a risk premium may be required by savers over and above the market's average inflation expectation. Where low and stable inflation is well established, markets may demand less of an inflation risk premium.

Cyclical factors (z_t)

Output gap (gap_t). A higher rate of economic growth above potential raises the market demand for loanable funds, as higher growth increases the expected return on investment and thus the demand for investment funds. Given an unchanged supply of funds, i.e.

public-sector and private-sector savings, higher growth should give rise to higher interest rates.

Real short-term interest rate ($rffr_t$). A shift in the stance of *monetary policy* has a direct impact on the short-end of the yield curve and affects longer-term yields by changing the expected path of short-term interest rates. It might also have a signalling effect in shaping the expectations of other factors that are important for long-term interest-rate determination, such as growth and inflation. In our estimation, we use the real effective Federal Funds rate as the short-term interest rate.

Estimation results

Quarterly average data are used in this study. Standard unit root test suggests that the real 10-year US Treasury yield, which we have selected here to represent the real long-term interest rate, and the long-run factors discussed above are I(1) in levels and stationary in first difference, supporting the setup of an error-correction model.

We use Engle Granger two-step approach to estimate Equation (3). Table 1 summarises the results of the long-run and the short-run dynamic equations.

Table 1a: Step 1. Long-run equation

$$r_t = \gamma_1 rffr_t + \gamma_2 cov_t + \gamma_3 debt_t + \gamma_4 foreign_t + \gamma_5 \pi_t + e_t$$

Variable	Coefficient (t-stat)
$rffr_t$	0.147 (2.87)
cov_t	0.007 (2.33)
$debt_t$	0.060 (8.82)
$foreign_t$	-0.115 (-2.91)
π_t	1.242 (4.574)
Unit root test on the residual	
ADF test statistics = -2.45	
(5% critical value = -1.95)	
⇒ The residual has no unit root at the 5% level.	
⇒ The long-term interest rate and the set of long-run factors are cointegrated.	

Table 1b: Step 2. Short-run dynamic equation

$$\Delta r_t = c_0 + \lambda \hat{e}_{t-1} + \sum_{i=0}^1 \alpha_{i+1} \Delta gap_{t-i} + \beta_1 \Delta rffr_t + \varepsilon_t$$

Variable	Coefficient (t-stat)
$\hat{e}_{t-1}$ (speed of adjustment)	-0.354 (-4.32)
Δgap_t	0.200 (3.32)
Δgap_{t-1}	0.177 (2.50)
$\Delta rffr_t$	0.102 (1.86)
Constant term	-0.007 (-0.18)

The coefficients of the long-run equation have the expected signs and most of them are statistically significant at the 5% level.⁶ The results of the unit root test on the residual suggest that the real 10-year US Treasury bond yield and the set of long-run factors are cointegrated. Our findings indicate that the deteriorating fiscal position in the US will raise the 10-year US Treasury bond yield in real terms. In the long run, a one-percentage-point increase in the federal debt-to-GDP ratio raises the equilibrium 10-year real US Treasury yield by about six basis points, in line with other similar studies.⁷ The equilibrium interest rate is described by the long-run equation in the error-correction model, and the value of which is determined by long-term structural factors. In addition to the public debt ratio, other long-run factors including the real effective fed funds rate, the covariance between the returns of equity and government bond, inflation risk, and the share of foreign official holdings of US Treasuries also have an impact on the US long-term real interest rate.

Apart from the long-run determinants, short-term dynamic factors also play a role in affecting the US long-term real interest rate. Conforming to theoretical expectations, a widening of the positive output gap (or a narrowing of the negative output gap) and an increase in the real effective fed funds rate will raise the US long-term real interest rate.

⁶ Except for the variable *foreign_t*, which has a p-value equal to 7%.

⁷ Brook (2003) gives a comprehensive survey on the recent literature. Results in some recent empirical studies show that a one-percentage-point increase in domestic government debt (actual or projected) raises domestic long-term real interest rates by a range of one to six basis points.

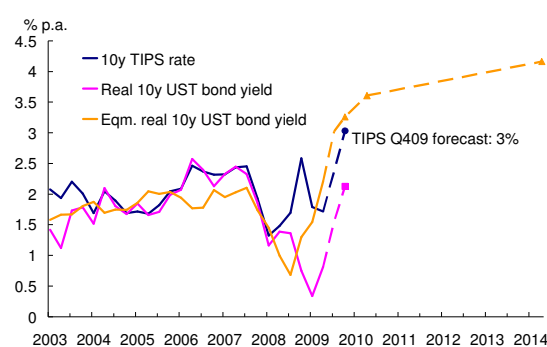
The speed of adjustment (λ) in the short-run dynamic equation is negative and highly significant, implying that the long-term interest rate moves towards its equilibrium value whenever there are any short-run divergences. This parameter (-0.354) suggests that the half-life of shocks on the long-run equilibrium is about six months.⁸ This implies that the divergence between the 10-year real interest rate and its long-run equilibrium value will be halved in six months after the occurrence of an exogenous shock.

Projections for US long-term real interest rate

Based on the estimated error-correction model, we attempt to project the 10-year US Treasury bond yield in real terms. To this end, near-term forecasts for the explanatory variables in the model are taken from various sources as inputs.⁹ According to the IMF's latest projection, the US gross government debt-to-GDP ratio is forecast to increase from the 77% in Q1 2009 to 87% for the year 2009. Based on *Consensus Forecasts*, the effective fed funds rate will stay unchanged at the current target range of 0-0.25%, while the negative output gap implied by the forecast GDP growth rate is projected to widen further before narrowing again by the end of the year, resulting in relatively flat movements from Q1. Without making strong assumptions given the lack of prior knowledge, we assume inflation risk, the covariance between the returns of equity and bonds, and the share of foreign official holdings to remain unchanged from the current level.

The resulting projection for the coming quarters suggests that the real 10-year Treasury bond yield will rise by around 104 basis points in 2010 Q1 from 2009 Q3. With the Treasury Inflation-Protected Securities (TIPS) breakeven rate being a useful proxy for inflation expectations, Chart 8 shows a plot of the projected yields for the 10-year TIPS implied by our projections on the real 10-year Treasury yield.

Chart 8: 10-year TIPS yield, real US Treasury yield and the equilibrium interest rate



Sources: US Federal Reserve Bank, CEIC and HKMA estimates.

If we assume the federal debt-to-GDP ratio to remain unchanged from first quarter in 2010, the real 10-year

⁸ Half-life is the expected number of years for a shock to decay by 50 %. It is calculated as $\ln(2)/|\lambda|$. In our case, half-life = $\ln(2)/0.354 = 1.96$ quarters, which is about six months.

⁹ Sources include economic survey conducted by Bloomberg, survey of professional forecasters conducted by the Federal Reserve Bank of Philadelphia and the IMF's World Economic Outlook.

Treasury yield will increase by only 80 basis points between 2009 Q3 and 2010 Q1. The projected rise in the federal debt-to-GDP ratio will thus induce an approximately 24 basis-point increase in the real 10-year Treasury yield.¹⁰ Indeed, in the June testimony, the Fed Chairman, Ben Bernanke, acknowledged that concerns over the deteriorating fiscal position have been one of the major reasons for the recent increase in the long-term Treasury bond yield.¹¹ The growing federal debt also means that the equilibrium interest rate will become much higher in the long run. With the federal debt projected by the IMF to reach 106.7% of GDP in 2014, this will imply a surge in the equilibrium interest rate by 114 basis points.¹²

Nevertheless, a few caveats might be in place here. In particular, policy-driven factors other than policy rates are difficult to gauge and are thus not taken into account in the model. On the one hand, the model focuses on demand-side factors, and lacks consideration of the overall supply conditions of the global sovereign bond market. Besides the US, many other advanced economies have also increased the issuance of sovereign bonds in recent quarters to fund their large fiscal-stimulus packages. This is leading to a further surge in the global supply of sovereign bonds in addition to the increase in the issuance of US Treasuries, which may further push up sovereign bond yields globally. Taking this into account, US real long-term interest rates could be higher than the estimates suggest.

On the other hand, although the model captures the effect of monetary policy on long-term interest rates by including the Federal Funds interest rate, impacts from any unconventional policy measures, such as the Fed's "credit easing" policy, are ignored. Most importantly, the model does not take into account the effect of Fed's purchases of US Treasuries and mortgage-backed securities, which may serve to offset part of the upward pressure on real long term interest rates.

Another important point to note is that the model may be more applicable to the situation in the US than to those of other economies. A good example is the case of Japan. The apparent paradox of high public debt and low long-term real interest rates in Japan may to some extent be explained by our model, in that the economy's large excess capacity and low short-term interest rates both serve to lower the long-term interest rates. Also, inflation expectations are relatively well-anchored in Japan, meaning that the deviation of long-term inflation expectation from average inflation is small, which should also help lower long-term interest rates in our model. However, foreign official holding of Japanese government debt is not a relevant factor in the case of Japan, as it is a net creditor country, where the high private-sector savings offset the public-sector dissavings,

¹⁰ The difference between the projected US federal debt ratio in 2009 Q3 and that in 2010 Q1 is around 6.4 percentage points.

¹¹ "Current economic and financial conditions and the federal budget", Bernanke's testimony on 3 June 2009 before the Committee on the Budget, US House of Representatives, Washington, DC.

¹² Assuming that all other factors remain unchanged from 2010 Q1.

and much of its government debt is held by the domestic sector. These factors serve to reduce the risk premium on Japanese government bonds but are not included in our model for the US. Models tailored for different countries will thus be needed to capture factors specific to individual countries' situation.

III. WHAT ARE THE ECONOMIC CONSEQUENCES FOR MAJOR ADVANCED ECONOMIES?

Rising long-term interest rates in the major economies could have important consequences for economic potentials and pose challenges in calibrating the correct monetary policy stance.

Crowding out and lower potential growth

The positive effects of short-term fiscal stimulus will subsequently wane as long-term interest rates rise, and as a result, crowding out consumption and private investment. The resulting fall in investment may slow the pace of innovation, while prolonged joblessness due to continued weakness in domestic demand may cause workers' skill to atrophy, gradually reducing potential output.

Higher “world” real interest rates

Given the weighty influence of the US, other economies' real interest rates may gradually rise to match the increase in their counterparts in the US. As a consequence, the losses in productive potential will be replicated in other industrial economies. The impact on the rest of the world depends crucially on the degree to which the US and foreign asset markets are linked, and hence foreign real interest rates rise following a US fiscal expansion. According to an IMF analysis, correlations between real interest rates for industrialised countries are all positive, significant and sizable, suggesting the existence of a “world” real interest rate.¹³ Furthermore, to the extent that other countries are also increasing public debt, interest rates may face even more upward pressure, and be synchronised across countries.

Challenges in calibrating the right monetary policy stance

Central banks will likely face a daunting challenge in calibrating the right policy stance because the equilibrium real interest rates will probably have changed and the path of potential output growth may also have changed. For example, if the equilibrium real interest rate has increased and the output gap is not as large as previously thought, then the same level of policy interest rate would imply a looser policy stance than

¹³ See IMF (2004).

before the crisis. It will also make it more difficult for central banks to get the timing right in exiting their quantitative easing programmes. Should inflationary pressure increase if the policy rates were below the equilibrium or if the Fed is not able to exit from their quantitative easing or credit easing policies in a timely manner, this will have important repercussions for monetary and financial stability.

IV. IMPLICATIONS FOR ASIA

The important question for Asian central banks will then be whether and to what extent higher world interest rates, lower growth potential of the global economy, and challenges in calibrating the monetary policy in the developed world will affect the regional economies.

An era of slower growth in external trade

With higher world real interest rates and the resulting lower potential growth path in major economies, this will mean lower demand for foreign goods from these economies. The recession has already brought an end to the asset-dependent spending binge in the developed world. In the US, retail sales fell by 9.1% year on year in the first seven months of 2009. With personal savings averaging less than 1% of personal disposable income before the eve of the credit crisis in 2007, the overstretched household balance sheets are clearly unsustainable. Coupled with reduced incomes, deleveraging by households to repair their balance sheets means sub-normal levels of consumer spending for a few years to come. Higher long-term real interest rates may further delay a recovery of consumer spending. This could bring about lower growth in external trade for a prolonged period of time.

Impact on capital flows and exchange rates

The ultimate effect of higher long-term real interest rates induced by rising public debt on global capital flows and exchange rates is ambiguous. Higher US interest rates are generally considered as leading to an appreciation of the dollar, since it will increase foreign capital inflows to the US in response to higher return on US assets, and will thus potentially lead to smaller capital flows to the Asian region and hence a depreciation of the region's currencies relative to the dollar. However, the impact of an initial rise in interest rates in the US may be offset by similar increases in other economies. In the medium term, the story may even be reversed as the US-dollar exchange rate starts depreciating to rebalance the current account deficit to meet the additional costs of the higher net foreign liabilities accumulated during the fiscal expansion. Evidence for such a negative medium-term relationship between movements in net foreign liabilities and the

real exchange rate can be found in previous empirical studies.¹⁴ In addition, the prospect of a higher government debt in the future can weaken the dollar exchange rate already in the short term if it diminishes foreign investors' appetite for US assets due to concerns over fiscal sustainability and creditworthiness.

Higher cost of financing

The rise in world long-term real interest rates could adversely affect Asian economies with large outstanding external debt denominated in foreign currencies. Economies that have high levels of external debt indexed to US interest rates will be directly affected through higher cost of financing. Fiscal positions in these economies can deteriorate as interest payments increase, and to the extent that higher US interest rates lead to a shift in fund flows away from these other economies to the US, the difficulty in raising fiscal funding may increase. Nevertheless, with Asian economies generally in better fiscal shape than their counterparts in the major economies, the spread between the government bond yields investors demand from the major economies and the regional economies is likely to narrow.

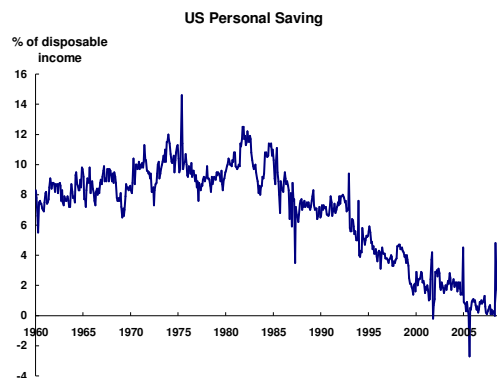
Spillover of incorrect monetary policy stance from the major economies

Given the challenge in calibrating the correct policy stance, should the policy stance in the major economies not turn out right, this could lead to a rise in inflationary pressure, and a depreciation of the dollar. If rising inflationary expectations are not contained, stronger monetary policy reactions may be needed, which could push the major economies back into recession, and lead to boom-bust cycles. The Asian region will therefore face a much more volatile global economic environment.

A silver lining: accelerating the reduction in global imbalances

Higher long-term real interest rates will likely accelerate the pace at which the private savings rate increases in the US. The private savings rate has already been increasing in the US as the household sectors deleverage and restore health to their balance sheets (Chart 9). Coupled with a decline in the private sector savings rate in Asia, this will imply a gradual reduction in the US current account deficit. According to Zhang et al. (2009),

Chart 9: US personal savings rate



Source: US Bureau of Economic Analysis.

¹⁴ See Obstfeld and Rogoff (2001), Gagnon (1996), and Lane and Milesi-Ferretti (2002).

a sustainable rise in the US savings rate would improve the US current account significantly.¹⁵

V. CONCLUSIONS

Our findings indicate that the deteriorating fiscal position in the US will raise long-term real interest rates. This would have important implications for monetary and financial stability both domestically and abroad, and for the evaluation of monetary conditions and calibration of the right monetary policy response. How much damage greater indebtedness may cause to economic growth will depend crucially on whether the governments concerned are able to contain their debt burdens through budgetary discipline. There are reasons for concern that a quick turnaround of the fiscal positions will be difficult. Deleveraging by households to repair their balance sheets means a prolonged period of sub-normal levels of consumer spending, and the number of countries involved in the current crisis also makes it less likely that any of them can count on exports to boost their economic recovery. This implies a slow recovery in government revenue in the major economies and the need for expansionary fiscal policy to remain in place for some time. In addition, the current crisis is not the only cause of budgetary strain. Prior to the crisis, there has already been a slow, secular deterioration in many economies' public finances due to the ageing of the labour force and the rise in health care costs.

As long as concerns over greater indebtedness and fiscal sustainability in the major economies remain, investors will continue to demand a high, if not growing, premium on the world long-term real interest rates to compensate for the risks involved. This is going to pose a major challenge to the Asian economies over the medium term.

¹⁵ The exercise uses IMF's GIMF model to study how savings-rate adjustments in the US and China would affect growth and current-account dynamics in the two economies and the rest of the world, and explores how the fiscal stimulus in the US might alter the path of current-account adjustments. By assuming that the deleveraging process leads the private savings rate in the US to return to its post-war average during the five-year period of 2008-2012 (i.e. six percentage points over four years and staying there for a relatively long time), the US current account will have improved by 3.5% of GDP in the fifth year.

REFERENCES

- Brook, A., 2003, "Recent and Prospective Trends in Real Long-Term Interest Rate: Fiscal Policy and Other Drivers," *OECD Economics Department Working Papers*, No. 367, OECD Publishing.
- Gagnon, Joseph E., 1996, "Net Foreign Assets and Equilibrium Exchange Rates: Panel Evidence," International Finance Discussion Paper No. 574 (Washington: Board of Governors of the Federal Reserve System).
- International Monetary Fund, 2004, "The global implications of the US fiscal deficit and of China's growth" in *World Economic Outlook*, April, Chapter II.
- Lane, Philip R., and Gian Maria Milesi-Ferretti, 2002, "External Wealth, the Trade Balance, and the Real Exchange Rate," *European Economic Review*, Vol. 46 (June), pp. 1049–71.
- Obstfeld, Maurice, and Kenneth Rogoff, 2001, "Perspectives on OECD Economic Integration: Implications for U.S. Current Account Adjustment," in *Global Economic Integration: Opportunities and Challenges: A Symposium Sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August 24–26, 2000* (Kansas City, Missouri: Federal Reserve Bank of Kansas City), pp. 169–208.
- Orr, A., M. Edey and M. Kennedy, 1995. "Real long-term interest rates: the evidence from pooled time-series," *OECD Economic Studies*, No.25.
- Zhang, Zhiwei, Wenlang Zhang, and Gaofeng Han (2009), "How does the US credit crisis affect the Asia-Pacific economies? Analysis based on a general equilibrium model," HKMA Working Paper 12/2009.

Data sources and definitions

Variable	Definition	Source
Real long-term interest rate (r_t)	Nominal 10-year US Treasury bond yield minus expected 10-year-ahead CPI inflation	10-year US Treasury bond yield: CEIC Expected 10-year ahead CPI inflation: Survey on professional forecasters, FRB Philadelphia
Real short-term interest rate (r_{ffr_t})	Nominal effective Federal Funds rate minus inflation in the past 12 months	Nominal effective Federal Funds rate: CEIC Inflation in the past 12 months: CEIC and HKMA estimates
Covariance between the returns of equity and government bond (cov_t)	48-month rolling covariance between the year-on-year returns of the MSCI World Index (free) and the JP Morgan US Government Bond Index	MSCI World Index (free): Bloomberg JP Morgan US Government Bond Index: JP Morgan
Public debt ($debt_t$)	Gross federal debt as a percentage of nominal GDP	Gross federal debt: CEIC Nominal GDP: CEIC
Foreign official holdings of US Treasuries ($foreign_t$)	Foreign official and international accounts of US Treasury held in custody at the FRBNY ¹ as a percentage of gross federal debt	Foreign official and international accounts custody holdings of the UST: Bloomberg ¹⁶
Deviation of long-term inflation expectation from average inflation ($\pi_{\mathcal{S}_t}$)	Expected 10-year ahead CPI inflation minus rolling 48-month rolling average of CPI inflation	(As mentioned above)
Output gap (gap_t)	Real GDP minus potential GDP, presented as a percentage of potential GDP Potential GDP is the trend of real GDP derived by the Hodrick Prescott filter ($\lambda = 1600$)	Real GDP: CEIC

¹⁶ Here we use the Federal Reserve Bank of New York's custody holdings owned by foreign officials and international organisations as a proxy for all foreign official holdings. This database provides a much longer time series (starts from 1983) of this variable, while data from the TIC database only begin from 2000.