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Dino Martellato

Real Interest Rates and the
Crisis: Where are the Rates
Headed?

Real Interest Rates and the Crisis: Where are the Rates Headed?

Dino Martellato

Ca' Foscari University of Venice

Abstract

This paper examines the likely direction of real interest rates in the Euro area and the United States from April 2009 on. It is argued that the crisis that began in 2007 and the ensuing recession changed the descending trend in real interest rates which started a long time ago. If real interest rates were to rise too much, private and public finances, housing markets and stock markets would suffer particularly in the countries where the past credit binge and the crisis response has made debts mount, thus prolonging the current crisis.

Economic theory should help shed light on the likely future direction of long-term real interest rates. In the paper, growth models are briefly discussed and shown to offer disparate predictions about the level of real interest rates in a growing economy and little practical guidance. Monetary theories, i.e. theories explicitly focused on the role of interest rates in balancing supply and demand in the single markets of the economy, make reference to some normal or natural level of real interest rate but obviously suffer from the difficulties of estimating such normal or natural levels both in general and particularly in a unusually dynamic and uncertain situation such as the current one. The more pragmatic approach, consisting in the assessment of the relevant single components of the long-term real nominal interest rate over the cycle, points to the risks of a surge in the risk premium as well as in expected short-term real interest rates and thus to a prolongation of the current economic contraction.

Keywords

Interest rates

JEL Codes

E4, E5, E1

Address for correspondence:

Dino Martellato

Department of Economics
Ca' Foscari University of Venice
Cannaregio 873, Fondamenta S.Giobbe
30121 Venezia – Italy
Fax: (+39) 041 2349157
marteld@unive.it

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INTRODUCTION

A large part of the strongly expansive fiscal and monetary policies implemented during 2008 and 2009 (US, China and Japan) or merely called for (as was the case of the European Economic Recovery Plan) was based on the idea that the world real economy was experiencing a correction in the trend of sustained growth of the past two decades. If this were really so, the unprecedented stimulation would make the correction brief and growth return to the pre-crisis trend. The price to be paid for reducing the impact of the disaster created by the excessive growth of private debt is the rise in public debt, but it is hoped that a return to the high growth regime of old would pay for it. Yet the odds of a quick return to high growth with low inflation – the goldilocks scenario—that the world economy experienced before the crisis are, at best, uncertain as the past experience was characterized by the increase of large imbalances between advanced and emerging economies and sectors. All these imbalances are going to change since the rate of saving is increasing in the private sector in advanced countries, but decreasing in the public sector almost everywhere. A debate is also in progress about the odds of deflation and inflation. One possibility is deflation and some countries, such as Germany, while still stuck in recession, are already experiencing a fall in prices. The other is inflation – not a remote possibility since central banks have delivered a global and unprecedented monetary expansion which may lead to an inflation surge even though employment is far from being full. Commodity prices, the cost of credit and other costs can increase on their own even if central banks start absorbing the existing excess liquidity. There are obvious big differences among the different scenarios envisaged so far. The great moderation, or goldilocks economy, scenario requires low real interest rates¹, but this condition can be hardly be considered as certain. In increasingly indebted economies, deflation would be extremely negative for everybody. In the inflation scenario only some would pay for it. Exchange rates, furthermore, would be unstable². Central banks are trying to inflate out of the current crisis assuming they will be able to stem inflation in due time. This poses the obvious problem of the banks' credibility. Will they have the necessary credibility when required? If not, they must regain it and thus will be forced to raise real interest rates significantly and possibly for a long time. What if real interest rates surge? After the long descent that took place after the inflation of the 1970s and 1980s, we should not be surprised to see inflation return in an environment characterized by rising real interest rates. Deflation would lift real interest rates and deflate all asset values, i.e. collaterals. This would prolong and certainly worsen the problems in the housing market and the banking sector. At first sight, the odds of a surge in real interest rates are thus quite high. Indeed, if debt is poised to rise everywhere, savings must do the same. Shouldn't the saving rate and the real interest rate increase as well? If so, the chances of a quick return to a high growth regime are low and the scenario formed by high inflation and slow growth (not to say of

¹ The most important concept in the explanation of macroeconomic phenomena according to Kennedy (2000).

² With a possible huge depreciation of the US dollar and other deficit countries' currencies.

deflation with recession) is just the opposite of what was called the goldilocks economy.

It seems, therefore, quite interesting to consider real interest rates since the possibilities of a sustainable recovery critically depend on the average level of real interest rates and, furthermore, with government debt on the rise the level of real interest makes income distribution a big issue. Section 2. focuses real interest rates in the US and Europe. The following sections will consider the prediction that can be obtained from economic theory. Section 3. focuses on real factors. Section 4. considers monetary theories Section 5. dwells on the business cycle aspects of the real interest rate oscillations. Section 6. concludes.

REAL INTEREST RATES IN THE US AND EUROPE

Real interest rates – defined as the difference between 10-year Treasury bond yield and the US CPI inflation rate – fluctuated throughout the period January 1983-January 2009, which suggested a prolonged down-trend ([Figure 1](#)). The same is true for all European countries and notably the 10-y German bund, i.e. the benchmark rate in the euro area. [Figure 2](#) displays the average yield of the 10-year European government benchmark bonds computed by the ECB with a changing composition. In the case of the US, the whole period can be divided into three separate sub-periods. During the first, a descending trend can easily be detected from July 1984, when the rate was close to 10%, to December 1990, when it was almost 2% (average 5.6%). The second sub-period was one of stability around the average of 3.7% with dampened short-run oscillations. During the third sub-period the benchmark interest rate headed down again and on average was 1.8%. The average for the whole period was 3,6%, but on the basis of the averages of the 10-year benchmark interest rate in three separate sub-periods the US had a blissful 24-year period as the government and an increasing number of debtors paid less and less in real terms for the use of the savings of others.

As for the Euro area, [Figure 2](#) shows high volatility in the years that followed the German reunification and the crisis in the EMS, but after the start of the first phase of the euro, real yields across Europe started a clear down-trend. The trend

ended with a double dip in January 2006 and in July 2008. The final jump clearly resembles that in the US case. Indeed, the Euro area and the US share the double dip and a final jump. This is not the only similarity since the average real interest rate computed in the Euro area over the period 1991-2009 is 3,6% and coincides with that found in the US in the 1963-2009 period, although not with that in the 1991-2009 period (2.7% in the US)

One strand of thought claims that aggregate demand and supply are brought into balance by the interest rate. The other strand was obviously started by Keynes, who observed that periods of prosperity and periods of recession (and even depression) alternate and who built a theory according to which it is the level of economic activity that keeps in balance the flows of savings and investment. According to Keynes, the rate of interest is the return that individuals get by holding their wealth in the form of bonds instead of liquidity. The progressive reduction in the average real interest rate both in the US and the EU can therefore be explained in two different ways. On the one hand, it may be argued that people were keen to hold bonds – particularly 10-y government securities – at an increasingly lower price, or that the current 10-y real interest rate followed a declining normal real interest rate. Earnings yields, i.e. the returns observed in the stock market, have been consistently higher than bond returns, thus implying a premium of stocks over bonds. On the other hand, savings were surging worldwide because of sustained income growth and this allowed mainstream economists to argue that the equilibrium in the loanable funds market was reached at an increasingly lower natural interest rate. In both cases, therefore, a reduction has taken place in the equilibrium level of the real interest rate, i.e. the rate that has played a key role in contemporary monetary policy ever since the adoption of inflation targeting. This policy is based in one way or another on some interest-rule and some idea of the equilibrium or neutral real interest rate. The equilibrium rate can be conceived as the rate compatible with macroeconomic equilibrium in the sense that if the economy settled at it for some time, output would constantly match the potential and inflation would be low and stable. Central banks, therefore, have merely managed short-term rates to follow a supposedly declining equilibrium level. The equilibrium level is not directly observable and can only be estimated and central banks perhaps discover this step by step in doing their job.

Recent research on the joint estimation of the level of the natural real rate of interest and the level of the output gap (Lauback-Williams, 2003, for the US and Garnier-Wilhelmsen, 2005, for the Euro area) point to the common conclusion that the natural rate has declined gradually over the past forty years. In the case of the Euro area, the decline was from 4% to 2%. One hypothesis is that the large availability of savings, particularly in the emerging economies, was the enhancing factor behind the rate fall.

Another possibility is that of a deviation from the equilibrium rate of interest and of a slow reversion pace. The downward trend of interest rates over the last twenty years could accordingly indicate that the economy has taken a detour from the equilibrium rate and that it is poised to revert to it sooner or later. Following Wicksellian monetary theory, one could argue that banks and capital markets (i.e. global finance) were able to make the volume of bank loans independent from the flow of national savings thus accommodating the increasing demand for loans at ever lower rates. If rates had increased, rather than decreasing, particularly in deficit countries, the gap between market rates and the equilibrium real rate of interest would have reverted to the equilibrium level. Yet this speculation is not convincing since inflation was subdued everywhere until the surge in commodity prices started to fuel the rise in consumer prices in 2006³.

³ Wicksellian theory predicts inflation when the market rate is lower than the equilibrium rate.

FIGURE 4 - REAL INTEREST RATE GERMANY 2005(X)-2009(IV)
10-year Bund yield

The benchmark real interest rate fell below zero in July 2008 and then resumed to a regime of high volatility just before the onset of the crisis in 2007. The crisis represented a break in the old trend and should give an indication of its future direction. Figure 3 shows that the US real interest rate plunged below zero in 2005. Then it rose again, only to fall below zero just two years later, and then dipped even lower just before the worst weeks of the crisis. After November 2008 the rate rocketed up again. Figure 4 highlights a similar story for Germany's 10-y bund real yield. The only difference is the much smaller range of variance. While in the US case the yield basically goes from -1 to 3%, in the case of Germany the yield hovers in the 1%-3% interval. The profile, however, is rather similar. The yield increased slowly from October 2005 to June 2007, i.e. until the outbreak of the crisis. The crisis brought about a sharp fall to 1% and then a slow recovery until November 2008 and then a steady increase just above the 3% line.

Both cases show that the crisis, in particular from the turning-point September 2008, marked a change of direction in interest rates. Will the surge continue in the future? What can we predict about real interest rates on the basis of theory? What will be the impact of the surge?

REAL GROWTH AND REAL INTEREST RATES

There are at least four different models that are worth considering in order to get an idea of what determines the real yield on productive, i.e. physical, capital. In the Solow and the Ramsey growth models the rate of profit and the equilibrium real rate of interest are closely linked as they reflect the quantity of capital in the economy⁴. In Diamond's model the real interest rate depends on the government budget. In the Pasinetti model of growth and structural change (Pasinetti, 1981) the real interest rate is actually in relation to income distribution rather than to capital and to its real yield as Pasinetti even denies that capital can be conceived as a productive factor of production with a decreasing marginal productivity. Pasinetti asserts that the real rate of interest, therefore, is not a rate return, but

⁴ It is understood that when capital rises, the real interest rate and the rate of profit fall.

rather something inversely related to the real wage, i.e. to income distribution. In this perspective it should be equal to the rate of increase in the productivity of the total amount of labour required to produce the final output,⁵ and income distribution would be constant. Indeed, with a constant rate of profit, real wages would grow at a rate equal to TFP. In the Pasinetti model, therefore, monetary policy is not a neutral instrument of regulation, but rather something that – instead of technology and thrift – drives the real interest rate. From this premise, it is suggested that the rate of increase in TFP should be used as a rule for fixing equilibrium in distributive income shares rather than in the hypothetical market for loanable funds.

Aggregate growth theory disregards short-term fluctuations in business activity and assumes that the real interest rate is always at its equilibrium level. This would be possible only if investments in productive capital yielded a return comparable to that on financial assets and if arbitrage were enough to exhaust all available opportunities. In the Solow and Ramsey models the equilibrium real rate is determined only by real factors with no relation to nominal variables, but the mechanism that lies behind it varies according to the model adopted, but, nevertheless, always reflects the quantity of physical capital in the economy.

In the Solow model, the real interest rate basically depends on the marginal return of capital which depends on the capital stock relative to the labour input. Given the depreciation rate, the rate of interest is: $r = f'(k) - \delta$. In the long run, the capital stock adjusts to a pair of exogenous factors which are labour force and technical progress $\dot{K}(t) = [sY(t) - \delta K(t)] / \delta$.

On the basis of this equation it can be argued that an increase in the propensity to save s increases the stock of capital, but reduces the marginal return of capital and thus the real interest rate. A similar argument leads to the conclusion that an increase in the rate of technical progress has an opposite effect on the real interest rate. In conclusion, an acceleration in the rate of technical progress implies an increase in the demand for savings and thus the interest rate, while an increase in the supply of savings yields a reduction in the interest rate.

In the Ramsey growth model, households optimize consumption over time on the basis of their time preference rate ρ , which is exogenous. According the optimum condition, the marginal utility of consumption in two different periods $u'(C_t)$ and $u'(C_{t+1})$ obeys the following rule: $u'(C_t) = u'(C_{t+1})(1+r)/(1+\rho)$. If the rate ρ is high relative to the real interest rate r , consumers are impatient since they weight present consumption more than future consumption, and vice versa. Future consumption increases if current consumption is reduced; and delayed consumption yields a return which is the real rate of interest. By assuming that utility⁶ is: $u(C_t) = C(t)^{1-\theta} / (1-\theta)$, the optimal condition above reads: $1+r = (1+\rho)(1+g)^\theta$ or, more simply: $r \approx \rho + \theta g$. This is a positive relation

⁵ I.e. total factor productivity.

⁶ In the function $C(t)^{1-\theta} / (1-\theta)$ the utility of consumption decreases with $\theta > 1$, but the marginal utility $u'(C_t) = C_t^{-\theta}$ is positive irrespective of the value of θ . The parameter θ determines the degree by which the marginal utility diminishes when consumption increases, i.e. the willingness of households to shift consumption between periods.

between the growth rate of consumption (in the steady state it would be $r = \rho$) and the real interest rate. This equation offers a prescription for the real interest rate: the rate of interest should be positive when the economy expands, but negative when it contracts (as is currently the case). By using the optimal condition as a predictive tool for consumption: $g = (r - \rho) / \theta$, we could argue that consumers will postpone consumption only when there are favourable conditions for investment and only when the marginal utility of consumption does not decrease too much when consumption increases. If consumers were more interested in keeping the current consumption level constant rather than in increasing future consumption, savings would be pointless. Only if the real rate of interest is greater than the time preference rate are consumers willing to postpone consumption. The Ramsey model holds that the real interest rate is a function of the time preference rate (instead of the savings rate as in the Solow model). Thus if consumers become more impatient, i.e. if they increase the rate of time preference, they save less and the real interest rate rises, and vice-versa. A rise in the rate of growth of technical progress and population has also a positive effect on the interest rate, as in the Solow model.

The prediction of the effect on the real interest rate of government purchases in this model is very clear. If the change in government purchases is expected to be permanent, the real interest rate is unaffected; but if it is expected to be transitory, the interest rate will change.

In Diamond's (1965) overlapping generations model the real rate of interest very much depends on government policy. It turns out that without government purchases a clear verdict on the level of the real interest rate is possible only if $\theta = 1$. In the general case where $\theta \neq 1$, there are multiple solutions, i.e. multiple stable levels of the unit capital stock and of the corresponding real interest rate. By considering government purchases, however, the same model gives predictions which are at odds with those of the Ramsey model. If the increase in the government purchases is expected to be permanent, the real interest rate will permanently increase. In the case of a temporary increase in purchases, the real interest rate also increases, but only temporarily. A conclusion which says much about the future level of real interest rates.

To sum up, the existing most well-known growth models give quite disparate predictions about the level of the real interest rate in a growing economy, but, at least in the writings that belong to mainstream economics, the absolutely prevailing wisdom (e.g., 2004) is that an increasing demand for capital produced by an increase in the labour force or by capital intensive technology or by a decrease in thrift has an unambiguous positive effect on the real rate of interest.

MONETARY THEORIES OF THE REAL INTEREST RATE

Economists have developed theories trying to assess whether the current level of the real interest rate is in line with some reference value. Such a value is reckoned to be able to guarantee some kind of desirable equilibrium: price stability in the case of Wicksell; full employment in the case of Keynes; stability in income distribution in that of Pasinetti. Such theories describe what happens when the actual rate is out of line with the reference value and the mechanism of adjustment. The most notable example of such an idea is Wicksell's (1935) theory of the natural interest rate. According to that theory, the coincidence between the

natural and the actual real interest rates makes current and potential levels of output coincide, thus making the level of prices stable. A difference between the actual and the natural interest rate – instead of that between the supply and demand of money – signals a potentially inflationary or deflationary environment and the resulting adjustment in prices makes the interest rate revert to its natural level. The practical use of the theory is in the possibility of using the deviation from the natural level as an indicator of monetary policy stance and of using the natural rate as a benchmark for guiding the official rate and, possibly, market short-term interest rates. Woodford (2003) reformulated Wicksell's theory in order to precisely investigate the effects of interest rate rules. As contemporary monetary policy, at least until the current crisis, is largely based on the control of interest rates, it can be argued that inflation and deflation risks can be ascribed to wrong interest rates rather than to the quantity of money. On this premise, Woodford builds various models in the spirit of Wicksell showing the relation between the long-run inflation rate and the long-run average of the equilibrium real rates of interest and the long-run average of short-term or policy nominal interest rates. According to one of Woodford's simplest models (2003: 51), if exogenous real factors induce changes in the equilibrium real rate of interest which are not matched by the corresponding adjustment in the central bank's reaction, there will be a change in the equilibrium price level. The Wicksellian rule for the rate of interest is $i_t = \bar{i}_t + \phi p_t$, where p_t is the equilibrium level of the log-price level and $\bar{i}_t$ is a time-varying intercept. The equilibrium price level fluctuates around the long-run average value of the log-price level $\bar{p}$ in an interval bounded by the long-run average of the equilibrium real rate of interest which reflects real factors ($\bar{r}$) and the average of the short-run interest rate which reflects the monetary policy ($\bar{i}$).

$$\bar{p} = \phi^{-1}(\bar{r} - \bar{i}).$$

According to this approach, in the economies where the interest rate gap (i.e. the difference between the actual and the equilibrium real interest rates) is negative, the output gap (i.e. the difference between the actual and the potential levels of GDP) is positive and inflation risks are lower. The policy prescription which follows from the theory is different not only from the traditional quantitative rule for the quantity of money, but also from interest rate rules, such as the Taylor rule, which links the official interest rate to the inflation rate and to the output gap⁷. What emerges from the Wicksell and Woodford approach is that the central bank should be focused on the level of the natural rate of interest and on its changes and be quick in targeting the actual interest rate to that level. In the current situation, where most central banks (and notably the Fed) have enormously expanded the scale of their balance sheets, their primary goal should be to keep the market interest rate in line with the new equilibrium level, rather than to try to reduce securities and liquidity as soon as the economy recovers.

In contemporary dynamic stochastic general equilibrium models private agents are forward-looking, which means that the current levels of the inflation rate and the output gap depend inter alia on their expected levels. In forming their expectations, forward-looking agents are assumed to share the predictions formed on the basis of the model. One of the most well known of such models (e.g. Galí,

⁷ Unlike Woodford, who sees inflation as a consequence of wrong interest rates, Taylor makes interest rates the tool for rebalancing the economy.

2008) is a blend of Keynesian, Wicksellian, Lucasian and Taylorian elements. The interest rate gap, i.e. the difference between the current and the natural real rate of interest, plays a key role in the determination of the current level of the output gap

g_t . The corresponding equation reads: $g_t = -\frac{1}{\sigma} [i_t - E(\pi_{t+1}) - r_t^n] + E(g_{t+1})$

where the equilibrium level of the real interest rate depends on the expected future level of the natural level of output y_{t+1}^n , given the inter-temporal discount factor ρ : $r_t^n = \rho + \sigma E(\Delta y_{t+1}^n)$.

In the remaining two equations of the model, the output gap directly feeds up on the inflation rate, while the current nominal interest rate i_t follows a policy rule à la Taylor. In such a model, fiscal policy is virtual absent and output is basically driven by the interest gap. If the central bank adopts an accommodative stance, the hike in the natural real rate of interest increases the output gap and thus the inflation rate.

Monetary policies inspired by more articulated theory are based on the idea that the market interest rates reflect the balance between demand and supply in the corresponding market. The bond market and the stock market have their own rates of return and it is well known that the bond yield and the earning yield usually differ by a quantity which is higher than that justified by the risk premium on equities. The key element in the money market is money demand or liquidity preference. Keynes departed from the traditional theory by claiming that the interest rate has the capacity to balance the demand for and the supply of money rather than savings and investment. Interest rates, therefore, are determined by the liquidity preference, which depends on the current and the normal level of interest rate. The latter is not determined in the model, but can be defined in various ways. It can be defined as the rate of interest at which full employment investment is balanced by available savings. The chances of full employment chances, therefore, critically depend on the relation between the normal interest rate and the minimum interest rate, i.e. the rate at which people prefer to hold their wealth in liquid form. Lack of confidence, which is a distinct feature of recessions and depressions, increases the minimum to above the normal level. The actual real interest rate cannot stay below the minimum and thus cannot decrease sufficiently to promote full employment investment. Keynes argued that a reduction in wage bills and excessive increase in the money supply – which are often claimed to be necessary to solve recessions – could actually worsen slumps because they have negative effects on market confidence.

One big difference that exists between the Keynesian model and the other models is that while in the Wicksellian and Wicksell-inspired models the current real interest rate is attracted by the natural real rate, in the Keynesian model the current real rate is not necessarily bound to converge to it quickly. Liquidity preference and what lies behind it are much more important than the unknown natural or normal real rate of interest. Arguments more focused on the business cycle, rather than on a hypothetical and unknown natural or equilibrium interest rate, therefore, could offer useful perspectives.

THE BUSINESS CYCLE AND REAL INTEREST RATES

During the latest crisis asset prices and credit mutually reinforced, taking asset prices and credit volumes to historical heights. A central role in the circular process has been played by interest rates, which per se represent the price needed to induce individuals to hold their wealth in the form of bonds, rather than in other assets or in liquid form. Indeed, if interest rates had not decreased so much during the 1990s and beyond, the process of credit creation and asset appreciation would have been dampened down. Real interest rates could move pro-cyclically, i.e. decrease too much during expansions and increase too much in recessions. If this were true, they could rise now and hinder recovery.

The long decline in real interest rates that ended in 2008 reflects various factors. The reduction in actual inflation is the first. By declining from above 10% to around 2%, and almost to zero during the crisis, actual inflation dragged down real interest rates. This took place both directly by reducing inflation expectations and indirectly by inducing central banks to keep short-term real interest rates low. The second factor was the reduction in the risk premium, i.e. the compensation that risk-averse lenders require for longer maturities in relation to higher default risks and lower liquidity. A convenient way of representing the decomposition of the annual nominal interest rate n -year or long-term bonds is the following: $i_{nt} \approx r_{nt} + \pi_{nt}^e + p_{nt}$, where: $r_{nt} \approx (r_{1t} + r_{1t+1}^e + r_{1t+2}^e + \dots + r_{1n}^e)/n$ is the long-term annual real interest rate, i.e. the average of the current and the expected annual short-term real interest rates. π_{nt}^e is the average expected inflation rate over the n -year period and p_{nt} is a risk premium for the same period. For the annual nominal interest rate of risk-free three-month Treasury bills, the decomposition would be: $i_{1t} \approx r_{1t} + \pi_{1t}^e$. Observe that while r_{1t} is the current short-term real interest rate such as the 3-month bills rate – an interest rate which is normally under the indirect control of the central bank – the other short-term interest rates r_{1t+k}^e 's are expectations as to the future level of the same rate. It is well known that during deflation, the central bank actually loses its power on r_{1t} . The link between the official rate and the short end of the yield curve in real terms breaks down when the official interest rate hits the zero percent floor, deflationary expectations ($\pi_{nt}^e < 0$) make short-term r_{1t} and r_{1t+k}^e 's and long-term real interest rates $i_{nt} - \pi_{nt}^e = 0 - \pi_{nt}^e + p_{nt}$ actually increase.

The point about the reduction in long term nominal interest rates made above regarded all components included in the RHS of $i_{nt} \approx r_{nt} + \pi_{nt}^e + p_{nt}$. If the central bank predicts a low average inflation rate because people expect low inflation (π_{nt}^e low), it will keep the short-term real interest rate low over the period concerned and consequently expected future short-term real interest rates ($r_{1t+1}^e, \dots, r_{1n}^e$) will be low. Since individuals expect that the central bank will be able to deliver a stable inflation rate and thus an easily predictable one, they will also bear a proportionally low risk of being wrong. By the same token, if they feel that future inflation becomes difficult to predict, they would be less sure about the correctness of their predictions and would feel they are bearing an inflation risk. This feeling makes them ask for a higher compensation p_{nt} . The point above

neglects other influences on risk-aversion. Indeed it is well known that financial innovation and, particularly, the process of securitization that took place in the late 1990s and beyond have induced a massive under-valuation of risks, thus yielding a sharp reduction in default and liquidity premiums, i.e. two components of p_{nt} which added to the contraction in real interest rates. Summing up, it can be argued that the various risks (e.g. inflation risks, default risks and liquidity risks) subsumed in the premium p_{nt} have decreased during the last ten years, as was the case of r_{nt} and π_{nt}^e thus implying that lenders have asked for increasingly lower compensation in nominal terms.

Various factors are at work in shaping the level of interest rates: monetary policy, business cycle, debt issuance. Monetary policy aimed at price stability rather than at keeping short term interest rates i_{1t} at a low level, contributes to the reduction of nominal interest rate i_{nt} because it helps to reduce the expected inflation rate π_{nt}^e , but also the risk premium p_{nt} . In other words, to deliver low nominal i_{nt} and real interest rates r_{nt} in the medium term, monetary policy has to raise i_{1t} and r_{1t} (and possibly i_{nt} and r_{nt}) in the short term. This seems counterintuitive, but there exist various examples of this mechanism, the most evident being Volcker's recession. Fiscal policies aimed at reducing the budget deficit and the government debt also have the effect of keeping real interest rates low. This interpretation proved to be correct particularly during the launch of the euro, when a well-known convergence process among European currencies was able to make long-term real interest rates converge to the low German benchmark. A credible plan of fiscal consolidation has had an effect on long-term real interest rates which was more than proportional to the actual reduction in public debt. By the same token, it makes people believe that by increasing government debt and the risk of inflation, the government raises the various components of long-term interest rates.

The bond market is key as yields act as a balancing mechanism. Normally bond yields rise when confidence takes hold because this diverts savings away from the bond market and into the stock market. At some point, the surge in real interest rates r_{nt} inevitably depresses business activity; this entails a loss in confidence which attracts funds back to the bond market and reduces yields. This is the basic direct connection between the business cycle and the bond market, and thus interest rates. While monetary policy is primarily focused on the left hand of the yield curve; the mechanism described above moves the right side of the curve up or down. Other mechanisms are at work, however. The central banks' direct purchase of bills and bonds and the issuance by the Treasury have obvious effects on market prices. Rising issuance may imply rising yields if the market sees this as a sign of weakening in public finances. Government debt issuance does not need to be in conflict either with corporate issuance or with the credit market in order to see real yields rise. Indeed, even if the economy is not close to full employment, we can see real yields heading up when issuance increases. Increased issuance together with rising unemployment and weak real growth – as is currently the case – combine in creating the problem of debt sustainability and thus increase the risk premium. By bidding up bond prices through debt monetization, the central bank pushes nominal yields i_{nt} down. Only if current and expected inflation is stable and only if the positive effect of increased

issuance by the Treasury just mentioned does not prevail, can the current real yield be dragged down for a long time by the central bank. In the current situation of extra strong monetary expansion, to keep π_{nt} really stable and deliver low real interest rates in the medium term, sooner or later central banks could be forced to raise the real rates r_{1t} to keep inflation expectations in check and thus r_{nt} low.

Bond yields i_{nt} could rise also in an entirely different situation, viz. in the case of a fall in confidence in the domestic currency. If investors sell the stocks and bonds they hold because they fear a currency depreciation, yields certainly go up. This regards the countries that keep their currency floating, as is the case of the US and the Euro area as a whole, but in the case of countries which keep their currency strictly pegged – as is particularly the case of the single member countries of the Euro area, or the case of the countries with a currency pegged to the US dollar or the euro – the adjustment mechanism in the internal real exchange rate is the real wage rate. In that case, the required reduction in real wages needs an increase in unemployment and slow output growth, which is usually the result of a slow and painful process. The case for a country inside the Euro area is particularly tough if the euro is appreciating since the that country must adjust its real exchange rate both towards internal and external commercial partners. The alternative to the real exchange rate mechanism could be a rise in government expenditure and government debt for a protracted period of time. Since in both cases, yields will inevitably surge, the problem of debt sustainability will resurface.

In conclusion, the rise in nominal yields can be induced by any component in the definition $i_{nt} \approx r_{nt} + \pi_{nt}^e + p_{nt}$ and to assess the current prospects, one should focus on all of them. Alternatively, one could concentrate on one side only of the relation $i_{nt} - \pi_{nt}^e \approx r_{nt} + p_{nt}$ and argue that a rise in the real interest rate indicates that confidence has returned, but also that confidence in the domestic currency is fading and fiscal sustainability is in doubt.

SUMMARY

This paper examines the likely direction of real interest rates across the Atlantic after their prolonged descent – in particular, from April 2009 on. The basic point is that the crisis and the ensuing deep recession will change the previous trend. The financial crisis hit the banking system, money market, stock market, credit market and the housing market, i.e. the heart of the contemporary global finance – three key markets in the financial sphere and one key market in the real sphere in the US and EU economies. The landing after the expansion after the 1992 recession was quite hard indeed and it suddenly turned the business cycle in 2008 from one of increasing inflationary expectations into one of deflationary recession. The burden of the debt was, and still is, big in the private sector in some places (e.g. the U.S. and the U.K.) and in the public sector elsewhere (e.g. Italy). All this has made the crisis and the slump extraordinary in many respects. Had monetary authorities and governments failed to intervene – sometimes even in a coordinated way – the 2007-8 crisis would have thrown some (perhaps all) economies into something terrible.

Government intervention was obviously necessary and virtually no one questioned it. Central banks were desperate to revive money markets and the whole monetary transmission mechanism using both conventional and unconventional measures. Households quickly turned to the virtuousness of thrift. We now live in an entirely new economic environment in which a complete U-turn has occurred in economic policy. Governments have abandoned the 1990s imperative of balancing the budget as they must now manage rising deficits and debts. Central banks have been obliged to forget their single-minded anti-inflation strategy and have been forced to redesign the range of their targets and instruments. Economic consensus has changed completely after the crisis: government intervention and regulation look necessary again. However, governments and central banks must now find a way out of a budget regime and a monetary regime which were started because they were necessary, but which are abnormal and thus not sustainable indefinitely.

It is thus entirely unlikely that real rates of interest can prolong the old trend and the obvious key question is: after the long descent briefly documented in this paper where are they headed? This is not mere academic curiosity, since if they were really heading up, the economy, the housing market and private and public finances would not be able to bear higher long-term interest rates as the only way to ban default is real growth. Higher real interest rates, therefore, could be very harmful to indebted governments, households and companies. By addressing economic theory, we have argued that highly respectable theories of real growth seem quite unable to offer practical guidance to guess the future direction of long-term real interest rates, at least in this instance. Monetary theories of real interest rates fare no better. Even though it is conceivable that current real rates must gravitate towards some reference value, some norm or average value, the value of that reference value looks like one of the many statistical chimeras that populate the landscape of economic theory. It seems much more practical to look day after day at the very basic elements into which economic theory believes a real interest rate can be decomposed: namely the risk-free cost of capital and the risk premium, or the nominal interest rate and the expected inflation rate; indeed, the two different key mechanisms that are constantly at work on the two sides. In the bond market things are quick and if the inflation rate went out of the central banks' hands, savers would be quick to demand proportionally higher real interest rates no matter what the level of the nominal interest rate was. By the same token, if growth remained subdued, employment would rise too much and the government would be forced to prolong its deficit spending too much, savers would then ask for a higher risk premium. In both cases, interest rates are bound to rise and the only hope is that higher real interest rates will be able to temper the inflation surge. In conclusion, don't count on stable real interest rates nor on easily predictable ones.

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