From the Global Financial Crisis to Global Monetary Rules: a Wicksellian view

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Ricerca per l'Associazione Guido Carli
Dicembre 2011

(Provisional draft)

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The question thus arises whether the object in view could not be obtained far more simply…through monetary institutions of the various countries agreeing among themselves to undertake directly that alteration in their interest rates which is necessary and which alone is effective – the whole purpose, according to our theory, being to bring the average money rate into coincidence with the natural rate…..

It has now to be asked whether a policy of co-operation between the banks of the whole world…lies within the realm of possibility. The banks of any single country, and above all its central bank, must in fixing their rates of discount allow themselves to be directed by the state of foreign trade, of the balance of payments, and of the rate of exchange. How then could they allow to be prescribed by others?.....

This is a serious difficulty, which has to be met in deciding the manner in which our policy should be put through, without constituting any logical objection to its practicability….there can, and should, on occasion come into being a co-operative regulation of the rate of interest, proceeding everywhere in the same direction…

Knut Wicksell, Interest and Prices (1898), pp.188-192 (1936 English edition), passim

Introduction

The recent global financial crisis has been analyzed in detail by several contributors. According to the "conventional wisdom" that emerged, many factors have contributed to the formation of the financial excesses that ultimately led to the creation of a huge bubble and unsustainable debt levels. In spite of the vast and still mushrooming literature produced on the subject, no consensus has been reached on the role of the various aspects that have attracted the attention nor on the links between them. Yet the issue is still hot with the advanced part of the world economy fighting against the prospect of a recession while also worried about the risk that the monetary weapons deployed may be dangerous for the world's financial health engendering a new crisis. It is, in fact, a widely shared opinion that lax monetary policies played a major role in determining the macro-economic roots of the crisis and that new metrics are needed for central bank action.

The rethinking on this subject is also connected with the ongoing discussion on possible International Monetary System reforms. The need is felt of limiting the exacerbation of global imbalances and disorderly capital flows in the future and of solving the deep asymmetries (between surplus and deficit countries) in the international adjustment mechanism. The Triffin dilemma between internal and international requirements of a national currency used as a global reserve has received renewed attention together with concern on the "exorbitant privilege" of the dollar which flooded the world economy with liquidity spurring global imbalances and financial excesses. Proposals are being discussed of solving this dilemma substituting the dollar with alternative international currencies, while also resuming the old Keynes' proposal aiming at establishing an International Clearing Union responsible for the creation of a supranational currency (Bancor).

Any reform of the International Monetary System would entail a monetary discipline at national level. The adoption of a monetary regulation reflecting the behaviour of the world economy has been proposed for this purpose. More specifically central banks should refer to a Taylor global, instead of national, rule. This rule -centred on interest rate control targeted to minimise the inflation and output gap- if implemented for the world economy would hopefully stabilise consumer price inflation without impairing financial stability and would allow for containment of global imbalances.

In the present paper we provide a *unifying* view of the main factors that interacted to produce the global financial crisis, inspired by the work of Knut Wicksell – especially *Interest and Prices*- which deals both with monetary policy rules and a proposal for reform of the international monetary system of his time. We revive Wicksell's theory in a different, and in our opinion more appropriate, way from the Neo-Wicksellian approach now prevailing that has produced the theoretical framework of Taylor's rule. Instead of refining the analysis of the Swedish economist for contemporary use, we found it more fruitful to go back to the basics of the neo-classical theory to which he made a major contribution. This suggestion arose from the observation of two stylized facts of the world economy preceding the outburst of the crisis that should have certainly attracted the attention of Wicksell: growing profit rates and declining real long-term interest rates. In terms of the standard neo-classical model this can hardly be explained by real factors as an excess of savings or shortage of investments. It rather evokes the problem, especially dealt with by Wicksell, of monetary and banking policies not tracking the movements of the return on capital and therefore fixing the rate on loans to such a level that the real long-term rate is below (as it was before the crisis) or above its "natural" level (as in the decades preceding *Interest and Prices*). The widening gap between the real market interest rate and the "natural" one we observe in the first decade of our century indicates a disequilibrium much more fundamental than that signalled by the short-run downward deviations of central banks' policy rates detected by Taylor's rules. Such a disequilibrium did not, however, put in motion the well- known neo-classical mechanism of adjustment- the "cumulative process" in Wicksell's words- driven by inflation. Rather it generated much more dangerous outcomes. It fed asset bubbles and pushed banks and other financial institutions to "search for yield" to align their rate of return, depressed by low interest rates, to that of the real sectors of the economy. Thus, the "cumulative process" turned out to be highly destabilizing, spurring risk taking and leverage and at the same time global imbalances by bubble driven growth till the sudden adjustment brought about by the financial crisis.

By stressing the importance of reference to the long-run of the neo-classical tradition, our reading of the crisis indicates the limits of the short-termism of a monetary policy guided

by Neo-Wicksellian or Taylor rules that provide real time references to central banks. By their nature, these rules are hardly able to detect important changes liable to affect longer term equilibrium. Their use can show, as is actually the case for years preceding the crisis, too lax monetary policies mostly in the United States. Nonetheless it allows interpreting them as transitory deviations motivated by central bankers' perception of current situations instead of alerting to the divergence from the direction that should be taken to avoid fundamental disequilibria. The main lesson we draw from our analysis is the need to move towards less short-sighted monetary policies giving consideration to long-term interest rates and their correspondence to non-transitory tendencies of "thrift and productivity".

It is not the aim of this paper to produce a new model for monetary policy use. Rather, we want to show the direction the research in our opinion should take re-evaluating Wicksell's proposal of a cooperative regulation of the rate of interest. He advised that an agreement be reached between central banks each targeting their policies to the natural rate of interest so that world-wide movements of the rate of profit would be followed by a cooperative restrictive (or expansionary) stance and global equilibrium would result. We think this proposal is still valid to avoid again setting in place the macroeconomic conditions which led to the crisis and meets the needs widely expressed in the "rethinking central banking" debate. Moreover the adoption of Wicksell's rule could be a first step towards the setting up of a new International Monetary System that would necessarily impose a regulation of national policies.

The paper is divided into 5 sections. The first is devoted to the analysis of three features of the world economy that can be seen as omens of the crisis: Great Moderation and its links with globalization, new highs of profits and profit rates and historical lows of interest rates. In the second section we first outline our references to Wicksell's monetary theory in comparison with the contemporary Neo-Wicksellian models and then provide an overview of monetary policy management in the US, EU, Japan and China during the last quarter of the century. The third section focusses on the analysis of global imbalances and their links with monetary policies. The fourth reconsiders the main macro-economic elements in a unique framework that might be considered responsible for the outbreak of the recent global financial crisis. In the final section, as a conclusion, Wicksell's proposal is analyzed

and actualised with some references to the confrontation between the US and China that dominates the future of world economics and politics.

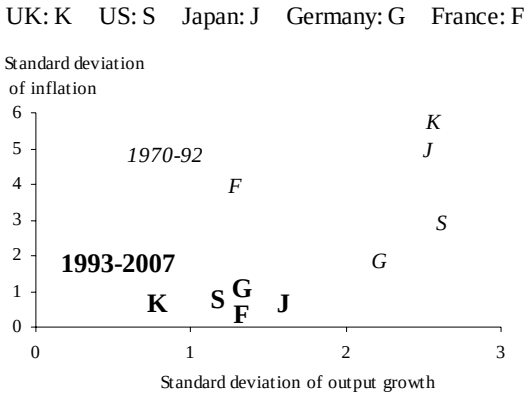
1. Harbingers of crisis

1.1 Great moderation and globalization

On the eve of the outbreak of New Great Crash in 2008, the United States and most of industrial countries had experienced what has been labeled as "Great Moderation". In the previous two decades their economies seemed to have entered on a quite stable path. The inflation rate dropped and the volatility of both inflation and GDP growth ceased to follow the frantic highs and lows typical of the 1970s and early 1980s.
A vivid picture of this age is provided by Figure 1, showing the improvement of the G5 countries' performances in terms of inflation and output growth variability.

Figure 1. Performance in the G5 countries before and after 1992

Output and inflation volatility in the G5



Source: Bean (2010)

The extensive literature on the topic divides the possible explanations into three categories: good macroeconomic policies, good practices and, more candidly, good luck.

The "good-policies" hypothesis stresses the major improvements carried out by central banks in managing monetary policy[1]. According to this view, independence from governments and adoption of transparency helped monetary authorities to focus more

[1] See Clarida- Galì-Gertler (2000), Romer-Romer (2002).

directly on their primary goal of price stability. Advances in economic theory did the rest, by providing central banks with tools to anchor inflation expectations: Taylor rules and inflation targeting.

The "good-practices" hypothesis focuses on structural changes that occurred over the past two decades that may have, by themselves, reduced both inflation and output volatility, thus creating a benign scenario for monetary policy. A common view argues that technology and financial innovation played a large part in the Great Moderation: improved business practices such as "just-in-time" inventory management helped firms to reduce production fluctuations in response to demand shocks, while more efficient credit markets and new ranges of securities enhanced the ability to smooth consumption and to distribute risk, hence spurring flexibility and stability in financial markets. According to Jermann and Quadrini (2009) important financial innovations in the last 25 years have also increased firms' flexibility in the choice of their financial structure. As a consequence, lower financial frictions led to lower macroeconomic volatility.

"Good-luck" supporters claim that a sharp drop in frequency and magnitude characterized the exogenous negative (supply) shocks hitting the Western economies after the macroeconomic turbulence of the 1970s. This idea is based on several empirical findings, most notably the one of Stock and Watson (2002)[2], and on the historical evidence of the disappearance of oil crises for a long period after the 1970s.

All in all, these explanations indicate various factors that have undoubtedly favored a relative stability in both prices and GDP growth, but none of them seems to be satisfactory. In fact, the academic literature has not yet reached a shared opinion on which of the three is to be preferred. The empirical evidence is not conclusive and the issue still debated (see Bean 2010). However, for the scope of the present paper it is enough to look at the Great Moderation as an historical phenomenon initially brought about by the spreading of the

[2] The authors divided various U.S. macroeconomic time series into a permanent and a transitory component; they found that the former became significantly less important since mid-1980s. In other words, inflation became less persistent.

reaction of the American administration to the high inflation of the Seventies and subsequently supported both by the preparation of the European Monetary Union and by the benign effects of globalization on prices. After all, it is hard to believe that central banks' independence from governments has dropped out of the sky or has been the outcome of progress in economic theory. It is more sensible to think that the achievement of greater independence follows from central banks being mandated by governments with a strong commitment to price stability, beginning with Volcker's monetarist turnaround of 1979. Given this commitment, the implementation of monetary policy has been improved by applying new methods: the choice of the short-term interest rate as policy instrument in place of money aggregates that central banks have proved ultimately unable to control, even in the long run; the response to an increase in expected inflation, by raising nominal interest rates by an amount sufficient to increase the real ones, as "Taylor's principle" dictates, that allowed the anchoring of inflation expectations.

On the other hand, it has to be stressed that globalization, starting from the nineties, has contributed to both "good practices" and "good policies". As for good practices, they were favored by the structural changes brought about worldwide by the integration of goods, factors and financial markets. The greater degree of substitution among goods produced in different countries, along with trade liberalization has spurred competition. Furthermore, technological advances in supply-chain management and greater capital mobility have led to a closer integration of labour markets allowing de-location of production processes in low wage countries. Finally, the globalization of finance should have the potential to improve financial intermediation and risk diversification.

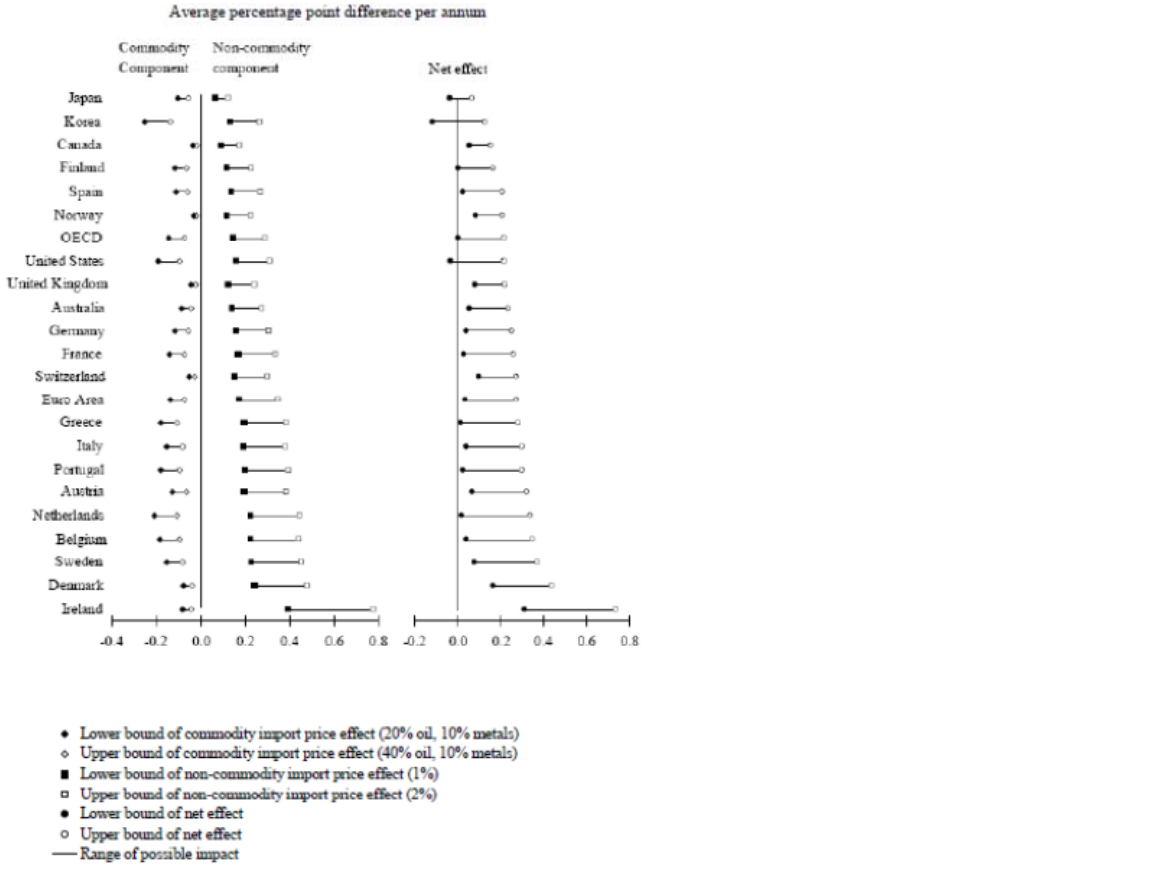
Globalization has also contributed to "good policies" by creating a competitive environment that "made it easier for central banks to reduce inflation, gain credibility and hence also anchor expectations more firmly" (Borio and Filardo 2007) and therefore also smoothed GDP fluctuations due to monetary interventions.

Wages have remained low thanks to stronger immigration flows and the (threat of) relocation of production to lower wage countries. More competitive markets and closer substitutability among the goods of different countries have led to global disinflation[3].

[3] See Rogoff (2003).

Pain et al. (2008) examine the impact of globalization on consumer price inflation in OECD countries over the 2000-2005 period. Since domestic producers take increasingly account of foreign competitors in setting prices, import prices have become a crucial determinant of consumer price inflation all over the world. Therefore, the authors look at the net effect resulting from two different (opposite) influences of globalization on inflation: one operating via non-commodity (i.e. goods and services) import prices and the other via commodity (such as oil, metal, agricultural products) import prices. While the first, stemming from higher levels of trade with non-OECD countries, should put downward pressure on inflation, the second - due to commodity-intensive growth in emerging economies – should increase inflation. The net effect, from higher commodity import price inflation and the lower inflation of goods, is found to reduce consumer inflation. In other words, absent globalization inflation in OECD economies would have been higher (see Figure 2).

Figure 2. The impact on consumer price inflation from removing globalization effects 2000-2005



Note: The lower (upper) bound of the total impact is calculated assuming that the prices of non-commodity import price inflation was 1 percentage point (2 percentage points) per annum above baseline and that commodity import prices reflect the 20% (40%) oil price estimate. In both cases the metals price effect is 10%.

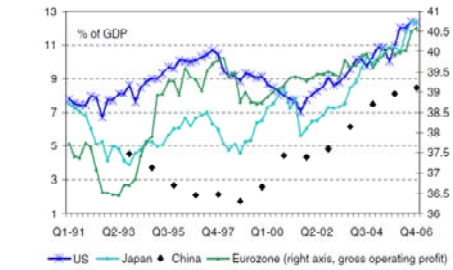
Source: Pain et al. (2008)

The moderating impact of globalization on inflation entered on the stage which prepared the financial crisis in the first half of the 2000s because its neglect has contributed, especially in the United States, to overly lax monetary policies grounded on the conviction of an incoming damaging deflation to be fought by lowering interest rates, thus fuelling the housing and credit bubble. More generally, the experience of the Great Moderation has played its part by spreading the perception of having achieved ground stability of the economy. A peception that eventually proved dramatically false.

1.2 Income (re)distribution and the wedge between return on capital and interest rates.

During the 2000s, before the global financial crisis, a massive redistribution of income took place, with corporate profits having risen both absolutely and relatively to GDP.

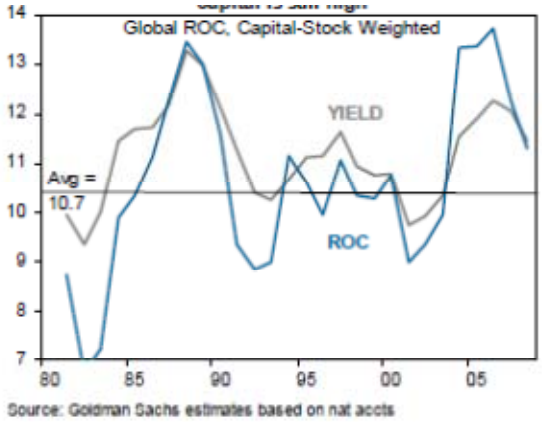
Figure 3. Corporate profits to GDP 1990-2006



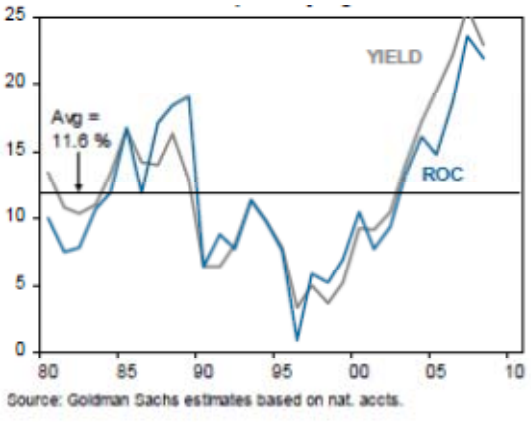
Source: UBS (2007), Eurostat (2007), BEA (2007), CEIC (2007).

Such a profit boom can be seen as a consequence of globalization that led to an increase of returns on capital (ROC) all over the world (see Figures 4a and 4b).

Figure 4a. The global return on physical capital (on the left) and China's return on capital (on the right)

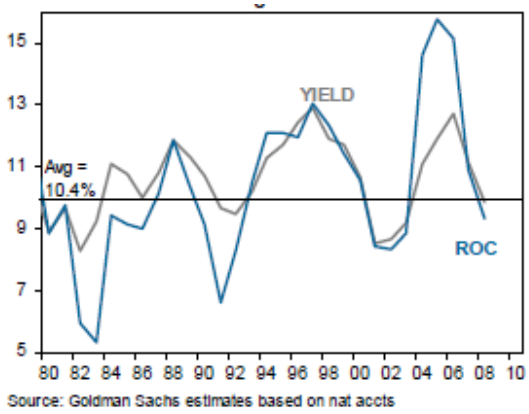


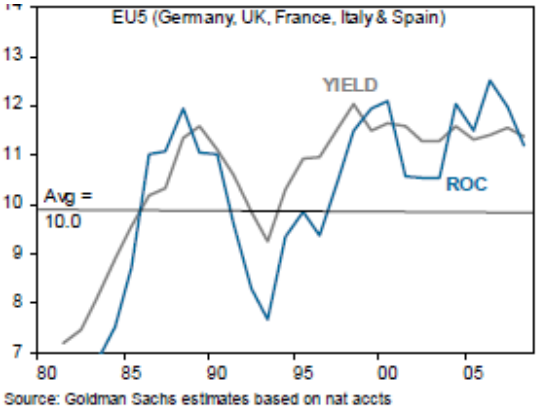
Source: Goldman Sachs estimates based on nat accts



Source: Goldman Sachs estimates based on nat. accts.

Figure 4b. US return on capital (on the left) and the European return on physical capital (on the right)





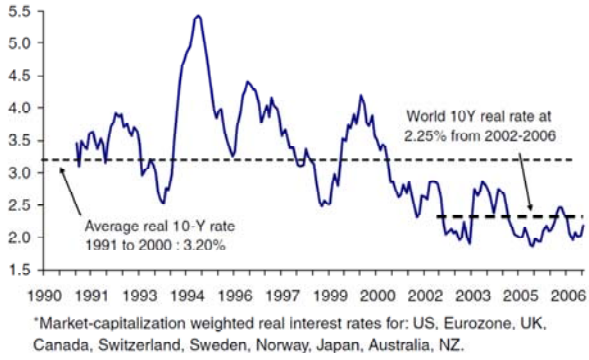
In fact the entry of China, India and other emerging economies into world markets has boosted real incomes in developed countries both by supplying cheaper goods and by spurring productivity growth through increased competition. The integration of the Asian labor force into the global economy has changed the relative returns on labor and capital at the world level. If one considers that the labor force in the global economy had almost doubled since 1990[4] and that poor economies that entered the global economy contributed little to global capital stock, it is easy to understand the downward shift in the capital to labor ratio. This shift modifies the real returns of the two main inputs of global production: the return on capital increases at the expense of that on labor. Freeman (2006) estimates that the capital intensity of production had fallen by 40% with the new integrated world economy. Ferguson and Schularik (2007) calculate that if the global capital labor ratio decreased by 40%, the return on capital should have been 25% higher than in the past[5], a figure roughly in line with the evidence presented by a recent paper published by Goldman Sachs[6] showing that the global return on capital has trended up, moving from about 9% in the first half of the nineties to exceed its long-term average (10.7%), rising to around 13.5%

[4] See IMF (2007) and Freeman (2006).
[5] In their calculations they employ a neoclassical textbook model with complete markets and consider a constant return to scale technology with a capital share of 0.35.
[6] See Daly and Broadbent (2009).

in 2006. The increase of return on capital has been particularly sharp in China where it hit a high of over 25% (Fig. 4a).

According to the neoclassical theory the long term real interest rate should track the return on capital. Hence the rate of interest should have increased of the same magnitude –around 25%- as the return on capital. However, as Fig.5 shows, the rate of interest decreased since 2000, remaining at a level much lower than their long run average.

Figure 5. Global cost of capital, world real interest rate (10Y*)



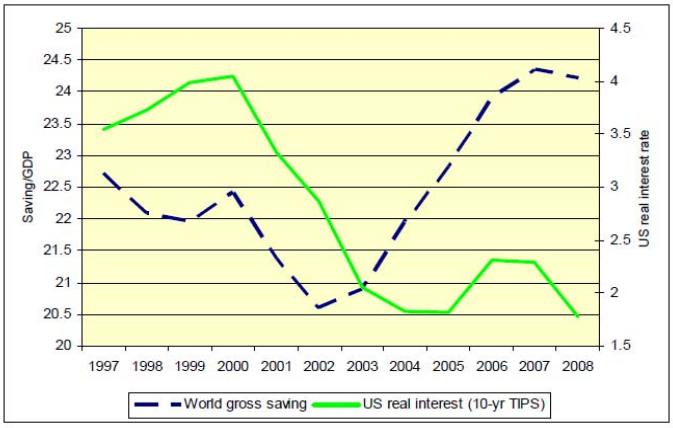
Source: Jen (2006a).

In short, from a global perspective, we observe a wedge between (high) returns on capital and its (low) cost. While decreasing real rates have driven down the cost of debt favoring the non-financial corporate sector, they have hurt the profits of financial intermediation and, in particular, of more traditional banking activities. Therefore, a potential for financial instability has resulted from banks spurring the "search for yield" which led them to increase both their leverage and the demand for riskier assets, as happened before the outburst of the financial crisis which will be examined later on. In the following section we are going to examine the causes of the low level of interest rates.

1.3 The low interest rate level: saving glut, investment slump or money glut?

A greatly debated issue on macroeconomic conditions that led to the crisis concerns the causes of low interest rates. An influential opinion, led by Bernanke (2005), looks at the question through changes in the global saving-investment equilibrium. As shown in Figure 6 , the world gross saving rate (equal to that of world investment) decreases till the mid-2000s before rapidly increasing thereafter.

Figure 6. World saving and the real rate of interest in the United States



Source: Obstfeld (2010a)

These global trends hide a different behaviour between advanced and emerging countries. In the former, savings (in proportion to GDP) have been falling mainly because of a dramatic reduction in the household sector. In fact the great fall in the household saving rate, notably in the US where it fell to 3% over the nineties and reached a low of around 1.5% in 2005, was only partially offset by higher corporate savings. In emerging countries savings have risen steadily but only after the mid-2000s has their growth out-weighed the decrease of those of the advanced countries.

The fall of the US personal saving rate has been viewed by Bernanke (2005) as the ultimate effect of a global saving glut. According to this view, savings increased dramatically in East Asia ultimately leading to a downward shift of the global saving schedule and to a disequilibrium that had to be corrected. The decreasing saving rate of American households was, in Bernanke's opinion, part of this correction. The strength of the US economy, with its technological progress and rising productivity together with the country's long standing advantage coming from the international status of the dollar and advanced financial markets, is supposed to have attracted the excess of savings of emerging economies running current account surpluses. These capital inflows fed the stock market boom in the nineties and subsequently the real estate boom supported by low interest rates, due to a strong demand for American long term Government bonds. The ensuing increase in consumers' wealth led to a reduction in the personal saving rate and boosted the US current account deficit. Thus, instead of being determined by internal factors, the fall in household savings, the reduction of interest rates and the increase in the current account deficit were the outcome of external causes and could be seen as corrections restoring the equilibrium in the global saving market.

A different interpretation, focussed on the role played by reduced investment activity, has been proposed by Rajan (2006) and the McKinsey Global Institute (2010). According to their view, the low level of the real interest rate is explained by a shift in equilibrium due to a large fall in the global investment rate. The global investment slump – resulting from a large investment decline in advanced countries that more than offset the acceleration of investment activity in fast-growing emerging countries – would be the cause of a downward shift of the world investments schedule. Since, at a global level, the investment rate fell more than that of saving, a new lower equilibrium interest rate materialized as well.

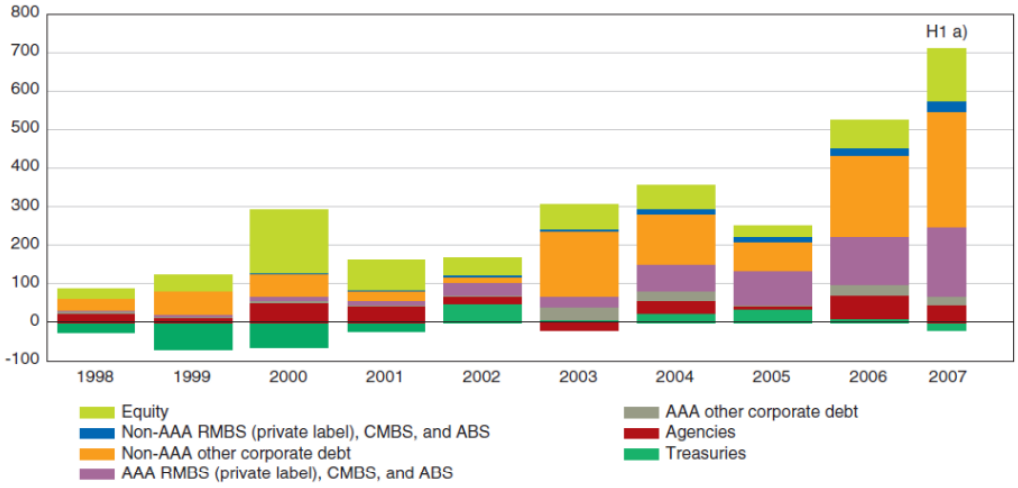
These interpretations share the view of an interest rate determined only by real forces, as in the barter economy at the core of the neo-classical theory where by definition monetary and financial factors do not play any role. In such an economy the rate of interest is fixed at its "natural" level that clears the goods market by equaling saving and investment. Therefore, movements of the real rate of interest should always follow from shifts of either the saving

(as in the case of the savings glut) or the investment (as in the case of the investment slump) schedule caused by factors affecting thrift and productivity.

This view clearly fails to consider the distinguishing characteristics of a monetary economy where financing is different from saving and the market rate of interest is a monetary, not a real, phenomenon (Borio and Disyatat 2010). As a matter of fact, American long-term interest rates were not affected by the net transfer of real resources (excess saving) by countries running a current account surplus detected by net capital flows but, rather, by gross capital inflows. More than 50% of the latter originated in European countries: almost one fourth of the total from the UK (a country running a current account deficit) while almost one sixth came from the Euro area (a region running a balance in its current account).

Figure 7. European Inflows to US securities, by type

(USD billions)



Source: Borio and Disyatat (2010)

In other words the financing structure of the US deficit was heavily dependent on resources coming from countries that could not provide them in net terms, but were nonetheless able to supply them on gross terms thanks to an active involvement in the process of global

financial intermediation. As Bernanke (2011) puts it, European intermediaries financed their purchases of US securities through external borrowing in dollars.

Moreover, commenting on Figure 6, Obstfeld (2010a) observes that "The negative correlation [between world saving and the U.S. real rate of interest] is compelling at best for the years 2003-05, and in those years the fall in the real rate of interest is slight. World saving continues to rise from 2005 but the real interest rate rises." According to the same author the low interest rate was the cause, rather than the effect, of an increase in savings. In fact, "Under the influence of low real interest rates, commodity prices – notably the price of petroleum- began to soar in 2004. China, pegging its currency to the dollar at an undervalued level, battled large speculative capital inflows through energetic sterilization and other measures, but robust income growth directly raised Chinese savings while pushing commodity prices even higher. High commodity prices augmented the world supply of savings through a transfer effect, shifting income to countries in the Middle East and elsewhere that in the short run could not raise consumption quickly enough to keep pace with their higher incomes…"

All in all, the "real" explanation of low interest rates seems (at the minimum) unsatisfactory. Even sticking to the neo-classical model, it is hard to combine a reduction of the real rate of interest due a "saving glut" with the evidence of the growing rate of return on capital that should have determined higher, and not lower, interest rates[7].

Moreover, it should be remembered that the neo-classical theory does not assume that the market interest rate, that follows from the inclusion of money in the model, always tracks the natural one. As especially stressed by Wicksell (1898) monetary policies can bring about deviations from the (neo-classical) equilibrium. These deviations should be temporary, being corrected by movements in the inflation rate. However, applying the same wicksellian logic, they can be non-temporary if the market interest rate is kept at a level different from the equilibrium one and no stabilizing forces of the inflation rate are at work.

[7] The gap between the two above rates cannot be understood, as proposed by Daly and Broadbent (2009), by assuming an increase in the global equity premium determined by the difference of growing equity yields and declining bond yields which is precisely the fact that needs to be explained.

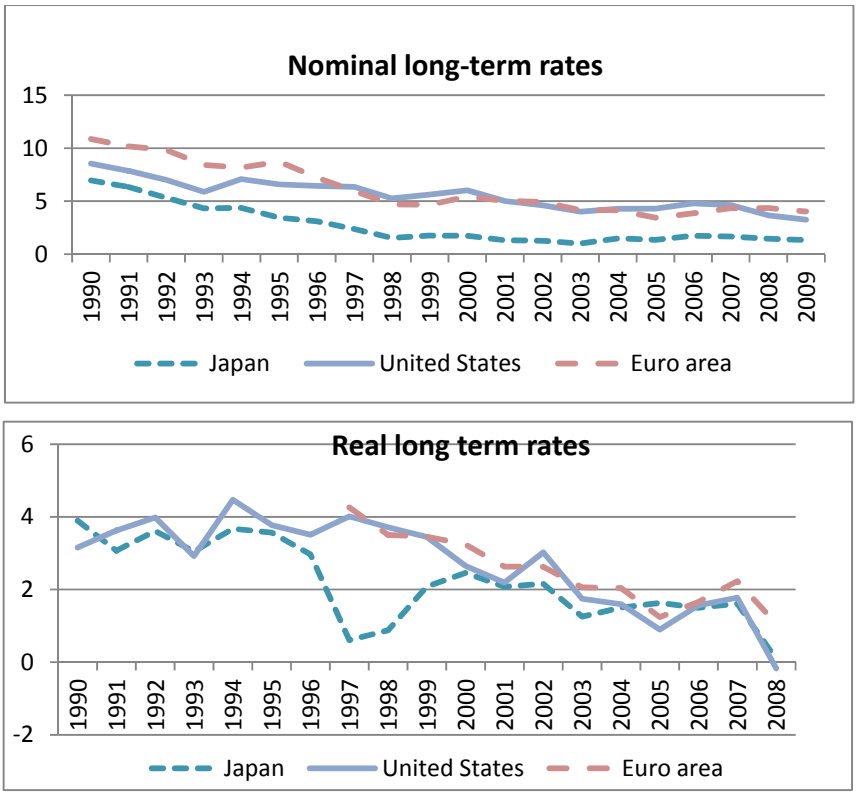
As a matter of fact, a current explanation of the several bubbles (stock market, real estate, credit) that marked the years before the crisis rests upon disequilibria brought about by liquidity injected by central banks, mostly the Fed, that did not cause an increase in the inflation rate. Owing to the downward pressure on conventional consumer price inflation exerted by the opening up of emerging economies, central banks in rich countries could keep an expansionary policy stance while still meeting their inflation goals however actually inflating asset prices. It follows that a low interest rate level is not the outcome of real adjustments towards a new equilibrium but of monetary misalignments, i.e. a money glut that was not corrected by a re-equilibrating increase of consumer price inflation. Sharing this opinion, we think that it was the excess of money created by expansionary monetary policies during the early 2000s that opened up the gap between the (growing) real return of capital and the (decreasing) real rates of interest. When, in the second half of the decade, policies turned to restriction, long term rates initially did not react to increasing policy rates because markets were previously alerted to the risk of deflation and in any case accustomed to low inflation rates. The gap continued to widen and when it finally began to shrink, it was too late. It had widened enough to induce banks' reaction to their poor returns -affected by low interest rates- with respect to the ones of non-financial firms. The search for yield in the banking sector led to investment strategies unable to bear the increase in interest rates needed to fill the gap and that triggered the financial crisis. However, before turning to this conclusion we must look at monetary policies in more detail.

2. The role of monetary policies

2.1 Long and short-term interest rates and their natural levels

As previously stressed, since the beginning of this century global long term rates have been lower than their long run average. Figure 8 shows the trend followed by nominal and real long term rates at country level for the United States, the Euro area and Japan.

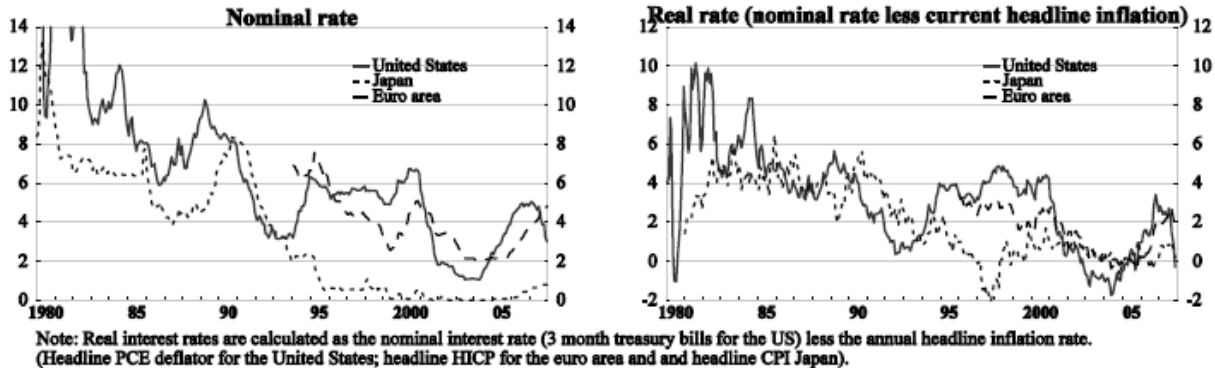
Figure 8. Nominal and real long-term interest rates



Source: our calculations on Oecd Economic Outlook Database

From 2000 up to 2006 we notice a fall in real long-term rates that was particularly abrupt in the United States, with only a modest rise thereafter. As for the short ones (Figure 9), they also exhibit a downward trend. Nominal rates were low everywhere in the 2002-2004 period and, again, the real ones fell more in the United States than in other countries, reaching a negative low of almost 2%. Thereafter, short rates went up but with a lagged effect on the long ones. The advent of the financial crisis put a stop to correcting these extremely accommodating policies – in the US and to a lesser extent in Europe- pursued since the outburst of the stock market bubble in 2001.

Figure 9. Nominal and real short-term interest rates



Note: Real interest rates are calculated as the nominal interest rate (3 month treasury bills for the US) less the annual headline inflation rate. (Headline PCE deflator for the United States; headline HICP for the euro area and and headline CPI Japan).

Source: Ahrend et al. (2008)

Before examining the monetary policies that shaped these trends affecting the world interest rate, in Box 1 we summarize our theoretical references grounded on the work of Knut Wicksell comparing them with contemporary interpretations used to evaluate the behaviour of central banks. We maintain that the current use of Wicksell's theory of monetary policy suffers of a major flaw. In fact the "monetary rule" of the Swedish economist as interpreted by current literature fails to consider the tendency of the profit rate which is the evidence upon which he developed his analysis and also happens to be an important feature of the pre-crisis world economy. Unfortunately nowadays the reference to the long term movements has been lost, which is the basis of the neo-classical theory and Wicksell's great contribution to it, focussing instead on the short period.

BOX 1. The natural rate of interest

The original definition of the natural rate was given by Knut Wicksell:

"*There is a certain rate of interest on loans which is neutral in respect to commodity prices, and tends neither to raise nor to lower them. This is necessarily the same as the rate of interest which would be determined by supply and demand if no use were made of money and all lending were affected in the form of real capital goods. It comes to much the same thing to describe it as the current value of the natural rate of interest on capital*" (Wicksell (1936), p. 102).

In writing this passage the great Swedish economist had in mind the long-term movements of prices and interest rates during the XIX Century. Therefore, his definition of the natural rate should not be referred to the short term where contemporary monetary policies apply. In fact, Wicksell's definition of the natural rate rests upon a factor which moves only slowly: the real return on capital given by its productivity that, according to him, should especially rule the neo-classical equilibrium between investment and saving which represent the demand and supply in the goods market. When money is introduced in this model the current real rate is determined by the nominal one and the variations of the absolute price level. In the "pure credit economy" assumed by Wicksell this is the banking rate on loans, ruled by the central bank's discount rate. However the discount rate is only relevant as regards its effects on the long rate. Wicksell's rule for monetary policy prescribes that the effective rate equals the natural one so that it is also reflecting the rate of profit that is the return on investment expected by entrepreneurs. It has to be noted that, according to this rule, the final objective of monetary policy is to keep the long- term rate as close as possible to the natural one. The divergence between these two rates is signaled by price movements which act as indicators of the unobservable natural rate. Inflation indicates that the effective long-term rate is below the natural one and should be increased, while the opposite holds for deflation.

Since Wicksell's time the concept of the natural rate of interest and its use in policy making has been deeply debated in literature and, after the Keynesian Revolution, has regained influence on monetary theory and policy with the contributions of Friedman (1968) and Phelps (1968)[8]. More recently, the natural interest rate seemed to undergo a sort of renaissance, as being one of the building blocks of the new wave of dynamic general equilibrium models (DSGE). This flowering stream of literature has alternatively been dubbed as New Keynesian, or Neo-Wicksellian thus emphasizing the importance of the natural rate. In the context of these models, however, the concept of the natural rate of interest has lost much of its original Wicksellian character. In fact, it is now considered as the *short-term* real rate that would prevail when output is at its potential and prices are flexible at each period in time (Woodford 2003) without any reference to the long-term rate and to the real return on capital as its determinant. This short term "natural" rate has the

[8] For a theoretical and historical exposition refer to D. Amato (2005).

practical advantage of being suitable for use in comparison with the policy rate of central banks in order to judge monetary policy stances. For the spread between the actual (policy) real interest rate and what is thought of being its (short term) "natural level" indicates whether the short rate targeted by a central bank is stimulating or curbing economic activity with respect to its potential. An actual real interest rate below (above) this natural level—that is, a negative (positive) real policy gap—implies a positive (negative) value of the output gap which tends to increase (decrease) inflation, as can also be seen employing the Taylor rule.

However the measures of monetary policy stance derived from this approach are only able to show the distance of the policy rates from the short term equilibrium defined as a situation without the nominal rigidities that are supposed to generate output and inflation fluctuations. No reference is made to the trends of factors that, according to the neo-classical theory, affect long-term equilibrium and the related natural interest rates. The reference model is in fact that of "real cycles" where casual shocks replace tendencies and the succession of short-term equilibria will in any case move around the long-term one with the long-term natural interest rate in every period given simply by the sum of discounted expected future short-term natural ones.

To sum up, while the modern refinements of the Wicksellian theory maintain the original meaning of the natural rate in terms of neutrality in respect to the price level, they lose the main reference to the forces "thrift and productivity" that ultimately should rule the neo-classical equilibrium over and above short run fluctuations and should be reflected, via the savings and investment schedules, in the financial market where the long-term rate of interest is fixed. In fact, Taylor's rule dominating the scene of monetary policies' analysis before the crisis relates to a given neo-classical long-run equilibrium of a steady state like that of Solow's growth model [9]. The propensity to save and the productivity of capital (rate of profit or natural rate of interest) are thus assumed to remain constant. An assumption particularly stressed by Alan Greenspan in defense of his monetary policy widely criticized for having been too expansionary. According to Greenspan Taylor's rule was unable to detect the shift of long-run equilibrium determined by the savings glut which pushed towards lower interest rates (Greenspan 2009). However, by the same token we could argue that the rule has not detected the long-term increase in the rate of profit we observe before the crisis that should have prompted rates of interest higher than those suggested

[9] See Brancaccio and Fontana (2010)

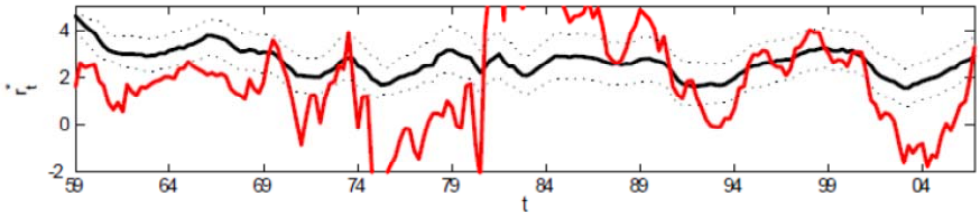
by the rule. Therefore, when looking at monetary policies as they have been practiced before the crisis, as we are going to do in the next paragraphs, it is to be kept in mind that their evaluation according to the Taylor rule underestimates their expansionary stance with respect long run Wicksell's perspective, given the upward trend of the rate of profit.

2.2 The Fed's loose policy.

During the years 2001-2005, according to several opinions (Bernanke, 2010; Taylor, 2009), the Federal Reserve kept an unusually accommodative monetary policy stance for mainly two reasons. First, to avoid a hard landing of the economy following the outburst of the stock exchange bubble which was also followed by 9/11 and, subsequently, to ensure a lasting recovery protecting the American economy against the risk of deflation. In particular, during 2001 the Fed inaugurated an accommodative phase with a reduction of policy rates from 6,25% to 1,75%. Monetary easing went forward during 2002 and 2003. Only in June 2004 did the Fed decide to gradually increase the Fed Funds rate. Was such a loose monetary policy appropriate?

According to econometric measures (Lombardi and Sgherri 2007), in the U.S. the natural short term rate has shown no trend during 50 years and does not detect the rising rate of return on capital of the last 15, thus confirming its different meaning from the Wicksellian one explained in Box 1 (See Fig. 10). Nonetheless, even with respect to this short term rate, the actual one fixed by the central bank has been lower in the United States from 2000 until 2007, lower.

Figure 10. Natural (black) and actual (red) real interest rates for the U.S.



Source: Lombardi and Sgherri (2007)

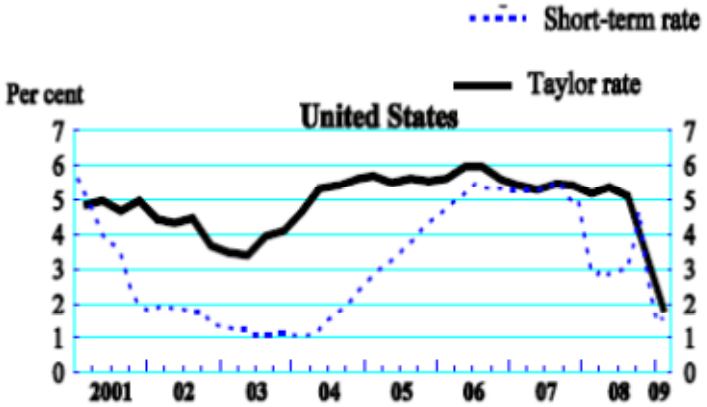
Since the natural (Neo-Wicksellian) rate is, as we have seen, some sort of equilibrium rate that should prevail on markets once transitory shocks are fully absorbed, expected future short-term rates should align to it in the long run and one should observe a resilience of the market to lower yields on long-term government bonds, given the abnormal fall of policy rates during the monetary expansion of 2001-2004. In fact, after the initial fall of the long rates, Alan Greenspan complained about these rates being resilient at a level that was considered too high and used all his famous persuasive ability to bend market expectations downward. Conversely, after 2004, Greenspan complained about the stickiness of long-term rates at a low level despite the turn of monetary policy that had begun to raise the policy rates because of the fear of inflation. Between 2004 and 2006 the Fed policy rate had a cumulative increase of 3 percentage points. This policy shifted the short-term part of the yield curve but the long one not only failed to rise but actually went down, generating the (in)famous Greenspan conundrum[10].

However, this moderate upward reaction of long term rates rather than a "conundrum" can be considered a consequence of Greenspan's previous policy that aimed at lowering long term rates also by alerting markets to the risk of deflation and that did not prove ready to reverse long run expectations as policy rates increased.

The evidence of years of an extremely lax monetary policy is also provided by Fig. 11 comparing policy rates with those predicted by the Taylor rule. The figure shows how, in the United States, in the first decade of this century, policy rates have been significantly and persistently below the level prescribed by the Taylor rule.

[10] Greenspan (2007), Ch.20

Figure 11. Deviation of policy rates from the Taylor rule



Source: OECD

2.3 The ECB: conservative, but not too much so.

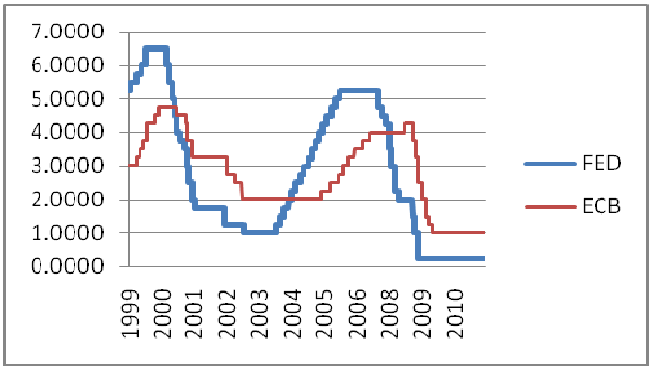
Compared with the FED, the ECB is known –and often criticized- as being particularly conservative in conducting its monetary policy. This fame comes not only from its statutory single goal of price stability, but also from the ways followed to pursue it. Price stability has been translated into the rather low target inflation rate of 2% and the Bank's policy is influenced by the need of anchoring inflation expectations of the Euro area economy, with labour and goods markets less flexible than those in America and therefore requiring more persistent action. Thus, the ECB is less interventionist than the FED in moving its policy rates, as shown in Figure 12. With this attitude, since the beginning of EMU, it has succeeded in keeping not only the inflation rate but also the medium-term inflation expectations very close to 2 per cent. After the outbreak of the financial turmoil in 2007, while the volatility of headline inflation and economic activity has increased, average inflation and inflation expectations have remained anchored to the ECB's price stability objective.

During the 2001-2003 slump, as opposed to the Fed that reacted more abruptly, the ECB moved policy rates with more caution. While the Fed could rely on an already robust

credibility, the ECB had to establish a new one. The slow change of policy rates can also be seen as part of its credibility image.

In the 2001-2005 period the ECB didn't follow the Fed in keeping an unusually accommodative policy to sustain growth and to protect against the risk of deflation. During that period euro area policy rates have been systematically higher than those in the United States (Figure 12). Beside the larger weight given to price stability by the ECB, its more conservative behavior can also be motivated by its greater emphasis on monetary and credit analysis and by its medium-term orientation. Trichet (2009) maintains that excessive money and credit growth in 2004 and 2005 was an important factor in explaining why the main refinancing rate was not lowered below 2 percent in 2004. The ECB's reference to the money aggregate as one of the pillars of its monetary policy, which was mostly seen as a relic of the past, has been revalued after the financial crisis when, with the benefit of hindsight, the excess of liquidity was recognized as an important cause of the turmoil.

Figure 12. Official interest rates for United States and Euro area

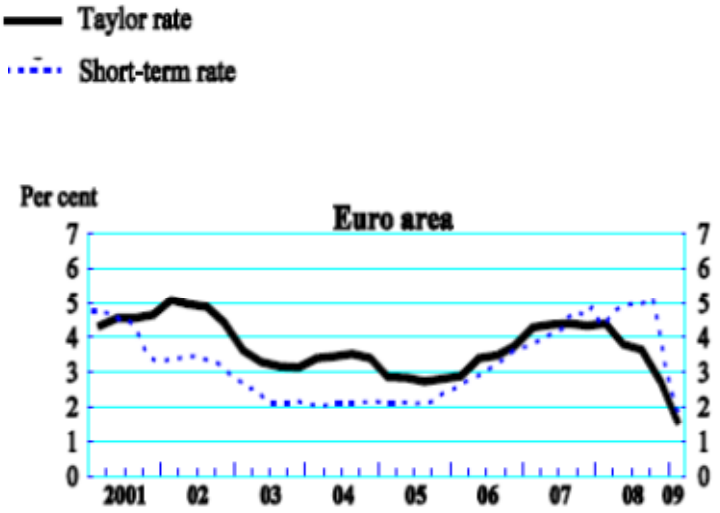


Source: OECD

In spite of its conservative attitude, the ECB maintained its policy rate unchanged at its lowest level before the financial crisis for a long time yet perceiving the risks related to the persistent strong growth of M3, as noted by Obstfeld an Rogoff (2009). In fact, looking at Figure 13 one can realise that, under the Taylor rule perspective, even the euro area monetary policy has been overly loose. During the first half of the last decade, the deviation

from the Taylor rule suggests that policy rates were too low, although the gap between these two rates appears lower if compared to that of the Fed.

Figure 13. Deviation of policy rates from the Taylor rule, Euro area



Source: OECD.

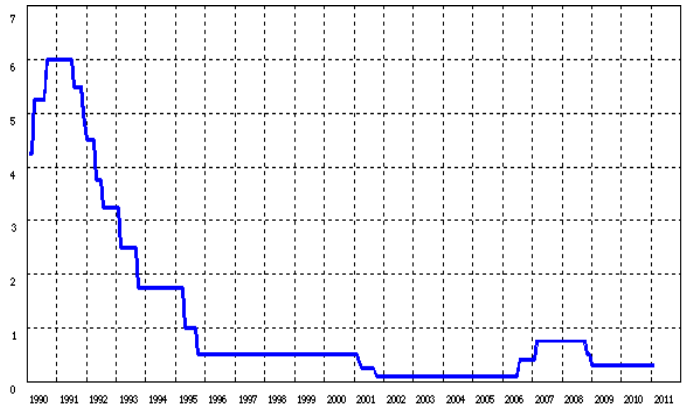
The more cautious and less loose monetary policy, together with the greater attention devoted to money and credit in the ECB monetary policy strategies, did not prevent a fall in long-term rates not too different from that of the American ones (see Fig.8). The ECB case sounds like a good confirmation of the fact that the taming effect on prices of globalisation can make a monetary policy, even if targeted to low inflation and of a conservative attitude, inappropriate to preserve macroeconomic conditions for financial sector stability.

2.4 The strange case of the BoJ.

At the beginning of the nineties, with the burst of the housing bubble and the economic crisis, the Bank of Japan aggressively cut the call rate dropping it from 6% in mid 1991 to 1.75% in the autumn of 1993 (see Fig.14). In order to stimulate the economic recovery after two years of stable rates, in 1995 the BoJ, over a period of six months, took its policy rate to 0.5%. Starting from 1998, with the advent of deflation, the BoJ entered the zero lower

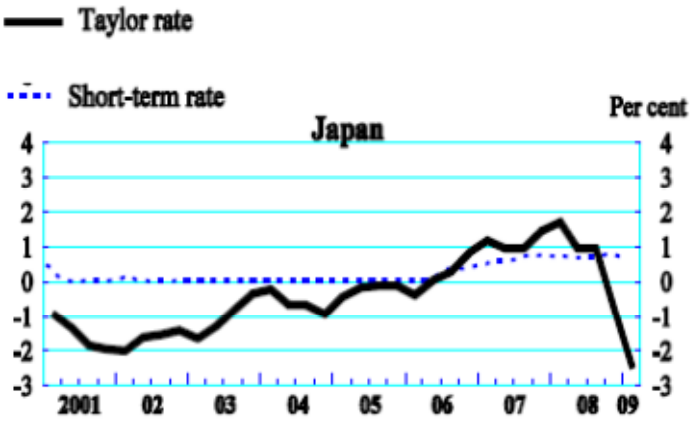
bound zone, fixing (in the February 1999) the call rate at zero. Japan, in order to end deflation and to spur recovery, undertook a host of non-standard monetary policy actions that resulted in pioneering central banks' new behaviour during the more recent crisis. From that moment on Japan has been in a liquidity trap with policy rates at or around zero. When in the spring 2000 the economy seemed to recover, the then governor Hayami, fearing future inflation, increased the policy rate to 0.25%. Unfortunately, the burst of the internet bubble in the United States weakened their economy with obvious spillovers on Japan (given the United States dependence on Japanese exports). As soon as the call rates were raised, Japan fell into a recession and in the March 2001 the BoJ combined a zero interest rate policy (ZIRP) to quantitative easing, thus flooding the system with liquidity and further lowering long- term interest rates (see Figure 8). The fall of the Japanese economy in a persistent liquidity trap is reflected by the Taylor rule that, differently from the other cases we are considering, prescribes lower rates than those fixed by the central bank. Taylor rates appear in a negative terrain for about half of the past decade (Fig.15). As for the long-term rates during the 2000s, they show a behaviour not too different from that of the United States and the Euro area, following a decreasing trend during the first half of the decade (see Fig. 8). The effort to fight deflation brought about a huge expansion of the monetary base which from 2000 to 2005 almost doubled in percentage of GDP, until a positive CPI inflation was reached by the economy and the Bank of Japan increased its call rate in the summer of 2006, (formally) closing the liquidity trap era.

Figure 14. Official interest rate for Japan



Source: Bank of Japan

Figure 15. Deviation of policy rates from Taylor rule, Japan



Source: OECD.

Hence, the Bank of Japan has been maintaining a zero interest rate policy since 1998 and, while the rate has been raised slightly before the 2007-2009 financial crisis, it is still maintained at a level very close to zero.

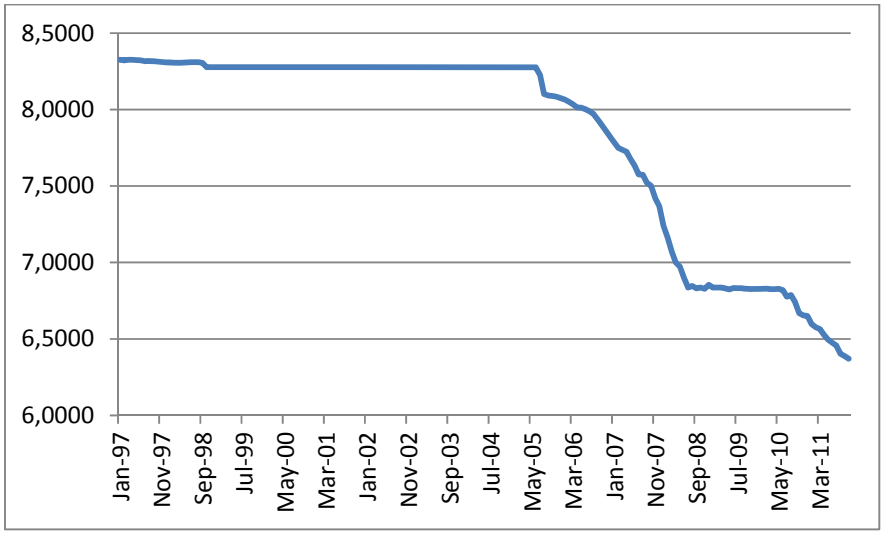
The strange case of Japan, with interest rates at zero, played a not so minor role on the low level of long-term interest rates across the world through the carry trade phenomenon. During the 2000s, in fact, the yen became the principal funding currency: that is, carry trade involved borrowing in the Japanese currency (thus at a near-zero interest rate) and buying higher-yielding assets in other (target) currencies. By early 2007, it was estimated that about US $1 trillion had been invested in the yen carry trade. In periods of economic expansion investors and speculators use leverage to magnify their returns: hence, in these periods, the carry trade has the potential to push asset prices to unsustainably high levels prompting yields to fall. Thus, the low level of short and long-term interest rates in Japan can be held to be responsible for low interest rates even abroad.

2.4 The Central Bank of China and the exchange rate.

If in the United States expansionary monetary policy has supported economic growth mostly via its effects on consumption, in China the same policy has been geared to maintaining a tightly managed exchange rate favoring exports. Extremely export-led Chinese economic development has been the other side of the coin of the consumption-led American growth in a combination labeled as "Chimerica" where investment in US Treasuries of Chinese accumulated reserves in dollars enabled American over-consumption[11].

As can be gauged looking at Figure 16, the Chinese currency was pegged to the US dollar from 1997 to 2005. In the three years to July 2008, China allowed the yuan to rise by 21% against the dollar, but since then it has more or less kept the rate fixed. On June 2010 the Chinese authorities announced a return to a more flexible and more market-based exchange rate regime like the one they had pursued during 2005–08. As of September 2011, the yuan has risen by around 4 percent.

Figure 16 . China's monetary policy and the yuan/dollar rate



Source: Board of Governors of the Federal Reserve System

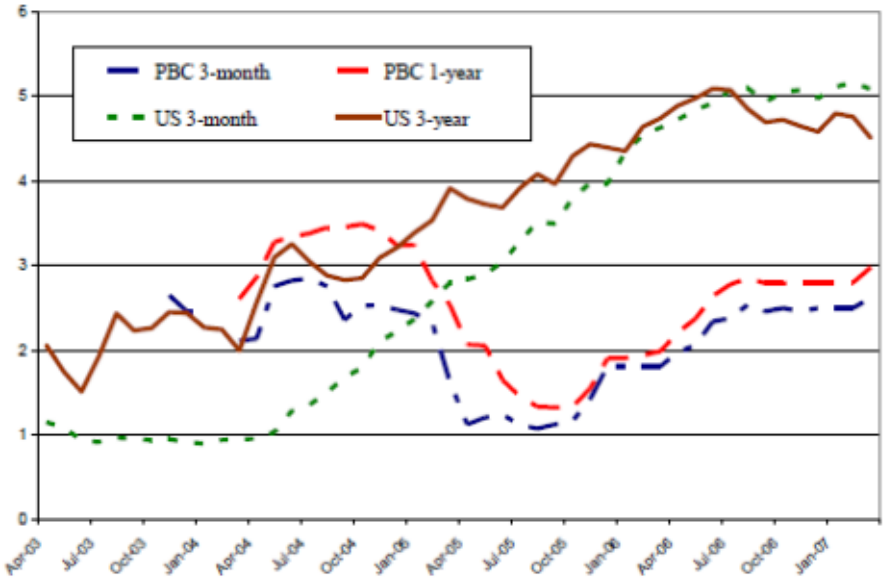
[11] Ferguson and Schularik (2007)

The Chinese currency has been artificially kept undervalued thanks to a massive intervention in foreign exchange markets. The People's Bank of China (PBC) has been prompted to issue large amounts of yuan in order to buy the foreign excess reserves needed to avoid currency appreciation.

Lacking a monetary policy adjustment towards the natural rate of interest, which would have led to a currency appreciation, China has been flooded by hot money inflows driven by expectations of yuan revaluation. Obviously, resisting pressures for exchange rate appreciation prevents an independent interest rate policy by the central bank. Capital inflows have imposed sterilization of ensuing reserve accumulation to avoid a monetary expansion that would have undermined price and financial stability. To sterilize foreign exchange reserves, while avoiding increases of interest rates, the PBC has to use non-market based instruments, as reserve requirements and bonds placed to public banks. In fact, banks collecting high private Chinese savings prefer buying PBC bills (not levied with capital requirements) rather than increasing corporate lending (that carries a 100% capital requirement). Thus, the PBC has been keeping Bill rates lower than those of corresponding US Treasuries (Fig.17). The average lending rate in China during the period 2000-2006 is 5.6%, a figure lower if compared to the same interest rate for the U.S. over the same period (6.2%).

Having low interest rates, the demand of capital is high in such a fast growing economy as China's while sterilization keeps the supply of funds tight. This excess of demand is faced by a rationing of credit exerted by the BPC through the so-called "window guidance" that directs it with a preferential treatment of enterprises vs. households and export enterprises vs. non-export (Schnabl 2010, McKinnon and Schnabl 2011). Thus the resistance to currency revaluation brings about a centrally planned system of capital allocation which keeps in motion a self-sustaining mechanism of current account surplus.

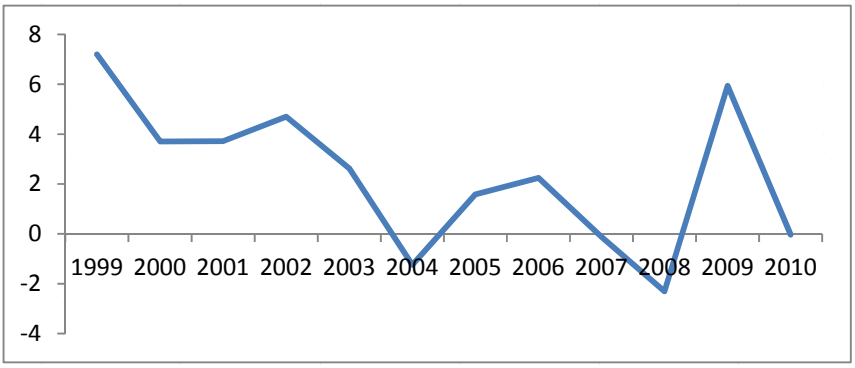
Figure 17. PBC Bill rates vs treasury Yields (in percent, annualized)



Source: Prasad (2008), CEIC, PBC and US Treasury data.

All in all, given the higher average rate of inflation, Chinese monetary policy has been more expansionary than the American, as shown by the downward pattern of the real lending rate during the 2000s (Fig. 17bis) if compared with the higher "natural rate" as represented both by the return on capital (see Fig.4) and by the rate of GDP growth.

Figure 17bis. Real interest rate (%), China, Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator



Source: World Bank data. (IMF, International Financial Statistics and data files using World Bank data on the GDP deflator).

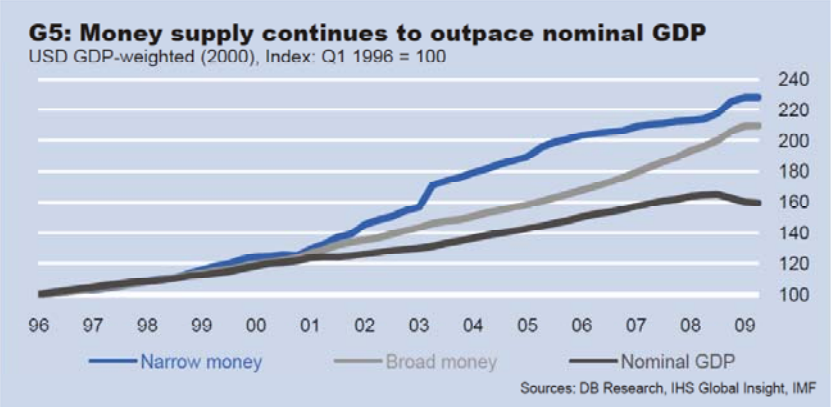
2.4 Summing up

This short survey shows that monetary policies share a common expansionary stance albeit for different reasons. The Fed acted to keep the American economy on a fast growth track, the ECB followed her mandate to defend monetary stability without being too severe, the BoJ tried hard to lead the Japanese economy away from stagnation and the Bank of China spurred Chinese export led growth. The overall outcome has been a world awash with liquidity in excess, that is money not used for real economic transactions but, instead, for financial transactions. As Fig.18 shows, starting from the beginning of the new century, for G5 economies broad and narrow money always increases more than nominal GDP.

Along with the building up of excess liquidity, expansionary policies pushed down long-term market interest rates while the Wicksellian natural rate -as detected by profit rates- picked up quite dramatically. The evidence here collected for the United States and Europe shows that, according to Taylor's rule, policy rates have been, till the beginning of 2007, constantly below the "natural" Neo-Wicksellian short rate and that when, at the end of

2006, this gap was closed, long term rates barely reacted, remaining low. The effect of monetary policy deviations from the Taylor's rule has been much heavier than that of a transitory departure from the short- run equilibrium defined in terms of output and inflation gap signaled by the rule itself. It has in fact opened up a greater and more permanent gap between the market and the natural Wicksellian rate of interest that was at the root of the following crisis.

Figure 18.



Source: Becker (2009)

3. Global imbalances

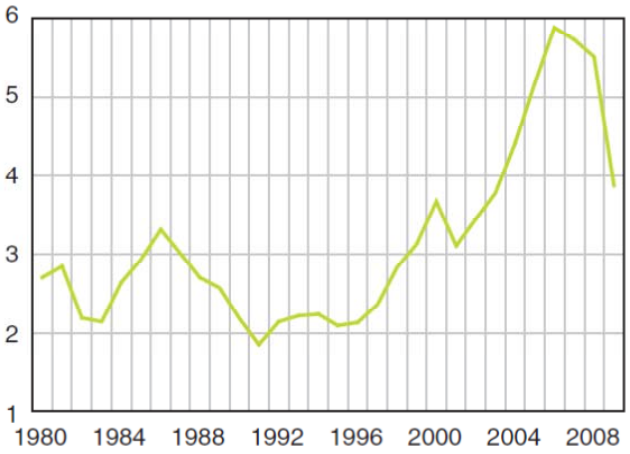
3.1 Some stylized facts

On the eve of the crisis, world imbalances in current accounts had increased to their highest levels both in absolute and relatively to world GDP. The size of global current account deficits was still around 1.0% of world GDP in the early eighties; 30 years later the same

indicator has more than doubled, while the sum of the absolute values of the current accounts of the most important countries have reached 6% of world GDP, with a sharp acceleration during the 2000s (Figure 19).

Figure 19. Current account balances

(sum of absolute values % of world GDP)



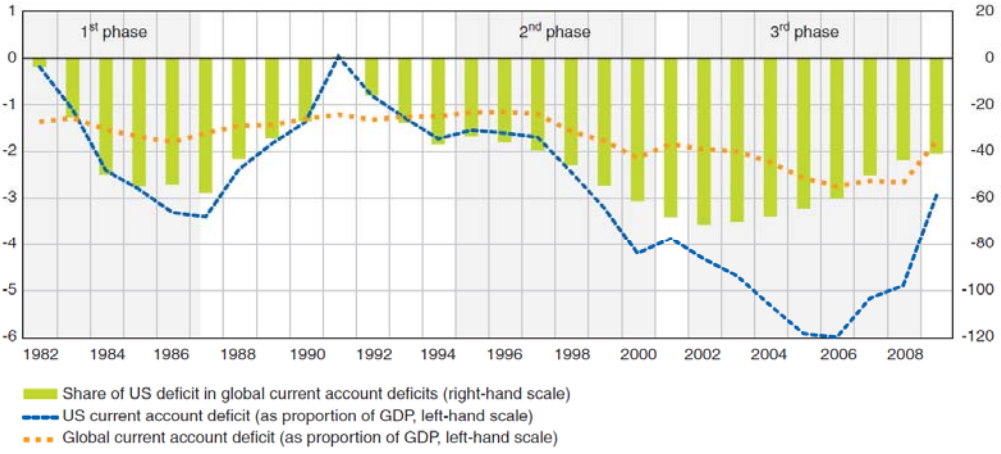
Source: IMF, WEO, Database, October 2010.

In the eighties the US current account deficits made up almost 60% of the world total, while on the other hand Germany and Japan were producing most of the surpluses. Hence, in those times the issue of current account (or global) imbalances was basically a "north-north affair". It is not a case that in that decade this problem was solved by means of cooperative policy actions taken at the G3 or G5 level.

Afterwards the situation has changed. Since the late '90s, the US current account deficit - that has reached more than 70% of world savings - has been met by a Chinese surplus, quite modest until the beginning of the new millennium but since 2002 showing a rising trend that has undergone a sharp acceleration after 2005. In the same period high current account surpluses were enjoyed by oil exporters (such as the OPEC countries and Russia) and other commodity-exporting countries: in rough terms, since the eruption of the Asian crisis, the growing US current account deficit (Figure 20) has been increasingly matched by

a growing current account surpluses in emerging market countries. Hence, in recent times not only the size but also the geographical composition of global imbalances has changed dramatically, leading to an increased dispersion of imbalances between some (developed and emerging) countries suffering deficits and some others (again both developed and emerging economies) enjoying surpluses. Notably the largest deficit (US deficit) is a multiple of that of all other countries, another factor that adds a critical dimension to the problem of global imbalances and the related (possible) disorderly adjustment. Moreover, the whole structure of international borrowing and lending was (and still is) much larger and more complex than what appears from the mere consideration of net capital flows associated with current account imbalances. As previously seen, not only emerging countries - such as China and other far eastern Asian countries – have played an important role in funding the US deficit; EU countries played an active role as well, through the large (gross) capital flows inside the US economy (Acharya and Schnabl, 2010; Bernanke, 2011, Borio and Disyatat, 2011).

Figure 20. Global Imbalance trends (%)



Source: IMF WEO database, April 2010.

Only the sudden and sharp recession caused by the first global financial crisis of the 21st century stopped an (apparently) relentless process. In a short time the working of different

elements caused an abrupt contraction of deficits and surpluses[12]. However, as soon as the world economy seemed to recover, with cyclical conditions approaching normality, global imbalances started widening again.

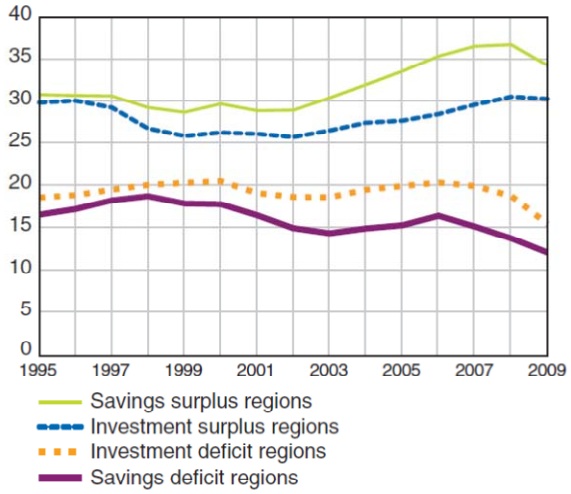
3.2. Monetary policies and global imbalances

A simple representation of the causes leading to the emergence of global imbalances rests upon their national accounts definition as a real phenomenon, determined by the difference between savings and investments (Figure 21a,b).

[12] Among the others, it is worth mentioning: the strong decline in oil prices, that limited both the surpluses of oil exporting countries and the deficits suffered by oil-importing countries; the negative wealth effects on the demand side of several countries severely affected by the burst of the asset price bubble; the dramatic collapse in world trade flows – almost five times larger than the drop in GDP (Freund, 2009) – as a consequence of a massive synchronization of a "wait and see attitude" that led to a huge reduction in world trade and production of postponable consumptions (Baldwin and Taglioni, 2009).

Figure 21

a. Saving and Investment rates in current account deficit and surplus regions (%)



(a) Surplus regions are those with current account surpluses greater than 1% of GDP in 2008 and include Commonwealth of Independent States and Mongolia, Developing Asia, Japan, Middle East and Newly Industrialised Asia; deficit regions are those with current account deficits greater than 1% of GDP and include Central and Eastern Europe, Sub-Sahara Africa, United Kingdom and United States.

Note: percent of GDP shown as percent of surplus regions' GDP and percent of deficit regions' GDP.

Source: IMF World Economic Outlook.

b. Net national savings trends of major surplus and deficit countries (% of GDP)

	1996	1998	2000	2002	2004	2006	2008
China	2.0	4.2	2.4	2.5	2.5	7.5	7.9
Germany	-0.6	-0.8	-1.6	2.2	4.8	6.5	6.7
United States	-1.8	-1.4	-2.8	-4.1	-5.2	-4.2	-5.7
United Kingdom	-0.8	-0.4	-2.7	-1.7	-2.1	-3.4	-1.6

Note: Net National Savings = saving rate – investment rate.
Investment rate = [(Gross domestic fixed capital formation + increase in stocks)/GDP] × 100.

Source: Bank of Korea, Economic Statistics System (ECOS).

Using this simple analytical framework, several authors proposed alternative explanations of rising global imbalances, whose most celebrated version is the already mentioned savings glut hypothesis by Bernanke (2005) who identified the origin of global imbalances in the huge amount of savings within emerging economies that was eventually transferred to the US via the purchase of Treasury Bonds, exerting a downward pressure on interest rates and the American saving rate [13].

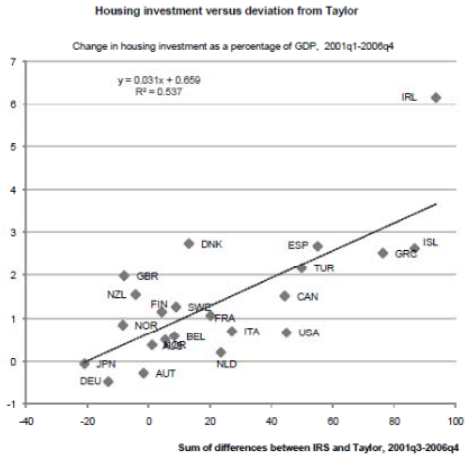
We have already critically considered this view that has two major shortcomings. First, it identifies financial flows with the amount of net savings – a gross oversimplification of reality, given the complex structure of international borrowing and lending, made up of large two-way gross flows across countries. Second, it (almost) totally neglects the role played by monetary policy. In our opinion this is the major weakness, since it overlooks the relevant effects - due to the divergence between the natural rate of interest and the market one– on financial excesses and global imbalances. As for the latter, Obstfeld and Rogoff (2009) and Obstfeld (2010) accordingly argue that their explosion during the 2000s cannot be understood without reference to the policies which kept the world real interest rate low, the dollar overvalued and the Yuan undervalued, with a major role played by the Fed.

[13] Bernanke implicitly underlined how the presence of several distortions in the Chinese economy might cause a very high level of precautionary savings. Blanchard and Giavazzi (2005) provide three different explanations for this large amount of savings: a lack of a social security system providing a safety net for the retirement age, the inefficient public health system and the poor quality of the educational system. High savings inside emerging market economies (especially in Far Eastern countries) might also be the effect of another kind of distortion: poor firm governance (Blanchard and Milesi Ferretti, 2009). In fact, opaque corporate management and inadequate corporate governance might limit access to financial funds, pushing companies to retain their earnings with a higher level of corporate savings. Alternatively, the huge amount of savings inside emerging economies might be due to a precautionary attitude shown by public authorities aiming at reducing the risk of major financial crises - like those of the late nineties hitting the Far East region- or the costs stemming from their occurrence by accumulating reserves (Aizenmann and Lee, 2008). Others, like Dooley, Folkerts Landau and Garber (2003) offered a different view centred on the pursuit of a neo-mercantilist strategy. Caballero et al. (2008) stressed the lack of investment opportunities in emerging countries due to the underdevelopment of their financial markets and Rajan (2005; 2006a; 2006b) sees the global imbalances as a consequence of the already mentioned “investment slump” especially in emerging Asia .

As already noted, in the U.S. low real interest rates ensuing from their monetary policy generated a housing bubble that fuelled consumption –via home equity extraction- and fed the current account deficit. Outside the U.S., lax monetary policies –and also the historical correlation of the long-term rates of major economies together with those of America- rendered the housing boom global. In fact, OECD countries show a positive correlation between housing (and construction) investment and the deviations of policy rates from Taylor's rule (Fig. 22). Moreover a positive relation between rapid real estate appreciation and increasing external deficits has also been detected (European Central Bank 2007, Aizenman and Jinjriak 2009, Laibson and Mollerstrom 2010)

Keeping to our Wicksell's version of the neo-classical model we can thus conclude that, during the 2000s, the deviation from "natural" equilibrium exacerbated by lax monetary policies has also contributed to the increase of global imbalances by exerting an upward pressure on home and commodity prices which did not bring about the due upward correction of the real rate of interest. As previously seen, the rise of commodity prices, together with real estate bubbles, contributed to widen current account imbalances. The global financial crisis we are now going to examine can be seen as the final outcome of the fundamental disequilibrium determined by the wedge between the market and "natural" world rates whose long postponed correction has been abrupt and particularly severe because of financial excesses produced by this disequilibrium.

Figure 22. Deviation from the Taylor rules versus housing investments in OECD countries (2001-2006)



Source: OECD, Ahrend et al. (2008)

4.The global financial crisis

The Great Crash that exploded at the beginning of the new Century was not the result of casual shocks but the outcome of an explosive cocktail mixing the ingredients so far considered – Great Moderation, monetary policies and global imbalances- with the addition of the financial developments they were producing. We start by reconsidering Great Moderation to subsequently connect the other ingredients with the aim of showing how the financial crisis and global imbalances share a common cause and can be explained by the fundamental disequilibrium between the actual world real rate of interest and the natural one brought about by monetary policies.

4.1 Great moderation and the financial crisis

Great Moderation has been perceived by policy makers and market participants as a result of a progress achieved both by economic systems and their governance instead of an outcome of specific historical circumstances. Such a perception has obscured the fundamental fact of the instability of capitalism that cannot change these characteristics analyzed since the time of Classical Economists. It has also, less emphatically, led to neglecting that a low inflation environment is not free from financial instability problems. As recently reminded by Frankel (2009) "many of the worst economic collapses of the last one hundred years have occurred after excessively easy monetary policy had shown up in asset prices but not in inflation: the United States in 1929, Japan in 1990, East Asia in 1997, and now the United States 2007".

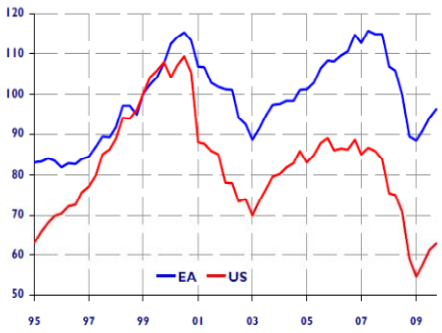
While the curbing effect of globalization on (consumer price) inflation has made it easier for central banks to reach their primary goal of price stability, in the much debated question of responding to asset price movements they chose to neglect them (see for instance Bernanke and Gertler (2001), Cecchetti et al (2002)). The increased confidence in the capabilities of monetary governance has on the other hand led to prevail Greenspan's view of letting asset prices soar and prepare for prompt intervention only when they fall: "It is far from obvious that bubbles, even if identified early, can be pre-empted at lower cost than a substantial economic contraction and possible financial destabilization –the very outcome we would be seeking to avoid……Instead of trying to contain a putative bubble by drastic actions with largely unpredictable consequences, we chose…to focus on policies to mitigate the fallout when it occurs and, hopefully, ease the transition to the next expansion"[14].

Following this approach Greenspan has set a sort of regime made by repetitive bubbles that has spread also in Europe as shown by Fig. 23 where the two boom-bust episodes appear evident. This regime lasted for more than a decade, bringing about an increasingly higher American current account deficit. Yet at the same time it spurred the confidence of the rest

[14] A. Greenspan (2004), pag.4

of the world in the U.S. economy, first by enhancing its growth and second, by stimulating the already superior capability of its financial markets in offering worldwide investment opportunities. Thus, Greenspan's regime was able, at least till its final collapse initiated in 2007, to be self-sustainable with large capital inflows well in excess of the current account deficit that in turn contributed to pushing interest rates downward and widening financial intermediation.

Figure 23. Aggregate asset prices over nominal GDP



Sources: BEA, BIS calculations based on national data, Eurostat, ECB calculations.
Note: 1999Q1=100. The Quarterly Aggregate Asset Price Index encompasses prices for equity, residential real estate and commercial real estate. The euro area index is composed from national series of the eight largest countries (DE, FR, IT, ES, NL, BE, FI, IE), normalised in 1999Q1=100 and weighted by their relative real GDP.

Notwithstanding the progress seemingly achieved with Great Moderation reinforced by the increasing benign effects of globalization on inflation, the eventual collapse of the regime followed, in its general lines, the well known pattern historically studied by Kindleberger and modeled by Minsky[15]. More recently, and with special reference to asset price bubbles, Allen and Gale (2000) have stressed how these are often followed by financial crises. Studying the occurrence of these types of crisis they find they have three distinct phases in common. In a first phase, financial deregulation takes place or the monetary authority expands liquidity. The resulting surge in credit makes the asset prices soar and this

[15] See for instance: Kindleberger (1978), Minsky (1978)

phenomenon goes on for several years thus eventually feeding an asset price bubble[16]. During the second phase the bubble bursts but, contrary to the expansionary phase (phase one), the collapse of asset prices collapse often takes a very short period of time. The third phase is characterized by the defaults of the agents who got indebted giving their increased wealth as collateral and also by banking and/or foreign exchange crises. These (financial) crises have the potential and, actually, cause severe recessions given the tight links between financial and real variables.

Recent empirical evidence points not only to the frequent occurrence of recessions following financial problems but it even stresses their severity when associated with credit crunches or declines in asset prices. Claessens et al. (2008), for example, study the links between credit crunches, price busts and the severity of recessions in 21 OECD countries over the 1960-2007 period[17]. They find that after the mid-eighties recessions become shorter and milder even if highly synchronized across countries. When they are accompanied by credit crunches and declines in asset prices (as they find it often happens) they are both deeper and longer lasting if compared to other recessions[18].

The last financial and subsequently real crisis is a clear example of the entire evidence above. This crisis has gone through the three phases detected by Allen and Gale with a long lasting expansionary asset price phase accompanied by a surge in credit, a relatively short burst in asset prices and a final phase with defaults that have caused the most severe recession since the Great Depression.

Abundant liquidity, by spurring indebtedness and reducing risk perception, has a key role in explaining the recent recession. The macro conditions of low interest rates together with Great Moderation, in fact, have led to low risk premiums in financial markets.

[16] This is confirmed by Borio and Lowe (2004) who find that asset price bubbles are generally accompanied by strong credit growth.

[17] Recessions, credit contractions, house price and equity price declines that fall into the top quartiles of all recessions, contractions and declines, are respectively defined as severe recessions, credit crunches, house price busts and equity price busts.

[18] See Reinhart and Rogoff (2009).

BOX 2 Low policy rates and low risk margins

Despite some relevant episodes of turmoil on world financial markets that took place at the beginning of the new millennium, risk margins (like BAA-AAA and sovereign spreads) fell to historical lows. The explanation behind this fact may be simply related to the low level of returns on safe (government) bonds that pushed investors towards "a search for yield". The very high demand for other debt instruments (such as corporate debt and emerging market debt) triggered a strong increase in their price with ensuing reduction in yields and hence in spreads. In addition the search for yield also affected the prices of other asset classes (such as equities as well as real estate), contributing to a worldwide boom in asset prices[19] that was the ultimate consequence of "the paradox of diminishing risk (perception) in a dangerous world" (Ferguson, 2008). In other words, the low risk margins can be traced back to either the strong fall in risk perception (Ferguson and Schularick, 2007) or the increase in risk tolerance (Rajan, 2006) that have been sustained by low interest rates.

According to Rajan (2006) several different elements can be considered to provide an explanation of the relation between risk taking and low interest rates.

Firstly, the shifting of risk may have played a crucial role. Pre-contracted liabilities, such as an absolute (relatively high) nominal return envisaged in a financial contract, have pushed several money, investment fund and insurance managers towards the search for higher yield, taking more risks for contractual or institutional reasons (in order to satisfy the clauses of the contract itself) when the risk-free rates are very low.

Secondly, the compensation schemes for fund managers – with the variable part of their salaries related to the size of excess returns over a minimum (risk-free) level - acted as another major factor contributing to the undertaking of risky positions. In fact when risk-free returns are very low (like in situations where interest rates are close to zero) the variable compensation is close to nil. So, in order to increase their salaries, managers will be willing to take more risks once again.

[19] According to Caballero et al.(2008), Xafa (2007) the shortage of financial assets – particularly the shortage of safe high-quality assets –contributed to asset price inflation, compressing risk margins, and to global imbalances as well.

In both cases there is strong pro-cyclicality in risk-taking, ultimately leading to an increase in the degree of risk-tolerance. At a macro level these effects would determine the setting in motion of an additional channel for the transmission of monetary policy: the behavioural or risk-taking channel whose existence has been successfully tested with reference to the EU and US banking sectors (Gambacorta, 2009).

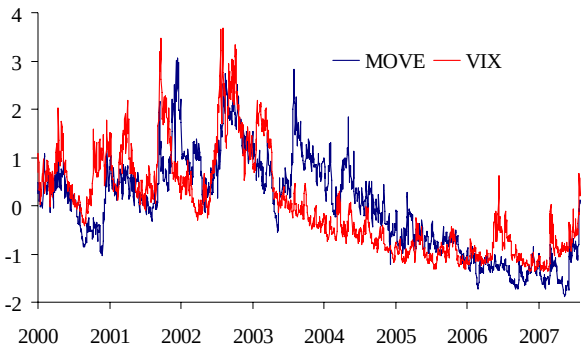
It follows that the expectation that interest rates will remain low for a long time – induced by extended past experience - is going to spread the belief that refinancing is easily available, altering the perception of default risk. Thus, risk margins become compressed by the (wrong) perception that credit risk has been structurally reduced.

The reduced volatility -through less uncertainty over profits and dividends- might have decreased equity risk premiums and increased asset prices; less uncertainty over future inflation might have reduced the risk premium on risk-free bonds thus depressing risk-free interest rates.

Bean (2010) looks at measures of volatility implied from option prices for US equities (VIX in the figure) and treasuries (MOVE) to get a picture of the perceived risk in financial markets: as Figure 24 shows, it reached extremely low levels by 2006.

Figure 24. Implied volatilities from options

standardised to zero mean and unit variance



Source: Bean (2010)

His explanations for the phenomenon are twofold. First, investors could have thought that the benign past experience could have continued indefinitely in the future; second, there was an excessive faith in the Fed's monetary policy as far as steady growth was concerned. The reduction in macro volatility brought about by Great Moderation has in fact received a strong confirmation from the Fed's success in avoiding a "hard landing" of the American economy after the explosion of the stock market bubble at the very beginning of the new Century. This may have led markets to underestimate the risks associated with their actions, thus decreasing prudence.

4.2 Low interest rates, financial excesses and globalization

The severity of the recent crisis is due to the fact that firms involved in excess indebtedness were mainly banks. Its distinctive character that made it so dramatic lies in the fact that banks' high leverage and the risks undertaken were so opaque – being hidden in derivative positions and in off-balance sheets- that the confidence needed to carry inter-bank transactions were seriously in danger of collapse, as finally happened with the apparently minor news that triggered the beginning of the crisis. Banks, especially but not only the largest ones, were driven to such an unsafe position not by a general upsurge in avidity but by the economic environment where they had to carry out their business. As already noted[20], low rates of interest were reducing profit margins in traditional banking activity vis-à-vis the high ones in non-financial firms. As a consequence the banking sector and its stock market valuations should have been hit both by low mark-ups in credit and by a reduced need of it by firms enjoying high self-financing. Hence a "search for yield" was fuelled by means of riskier assets and higher leverage. This demand for higher returns was satisfied by new financial instruments with hidden toxicity promptly prepared especially by the investment banks acting in the most innovative system, that is the U.S., as well by the extreme form of securitization known as "Originate to Distribute". All in all these reactions

[20] See Section 1.3

to an environment of low interest rates and abundant liquidity enhanced the expansionary stance of monetary policy creating a "credit bubble" which further fed the housing bubble.

These new financial practices were devised to unbundle risks that were then traded and distributed towards those in a better position to bear them. This increased risk dispersion should have contributed to a more stable financial system. Furthermore, thanks to financial innovation, borrowers would have had access to a greater array of funding sources, with benefits for the whole economy. This could have allowed banks, firms and consumers to better cushion their respective lending, investment and consumption choices from the impact of interest rate fluctuations. Finally, financial innovation should have permitted borrowers and lenders to hedge and diversify risks.

As a matter of fact financial innovation turned out to have spurred risk allowing a greater scope for risk-taking and encouraging speculative financing on the grounds of the expectations of abundant liquidity at low cost and growing asset prices. The success of banks in enormously increasing their return on capital was reached at the cost of spurring systemic risk and Minsky's "endogenous financial instability" that would have to be paid for dearly with the crisis.[21].

The "search for yield" led to an "orgy of leverage" (Obstfeld 2010) which magnified the interdependence brought about by globalization. As a percentage of world GDP gross capital flows (inflows plus outflows) rose from around 5% in 1998 to over 20% in 2007, dwarfing current account positions and with a sharp acceleration taking place during the years of low interest rates. During this period, and till the outburst of the crisis, the growth of gross flows has been higher for the U.S. and fed mainly by European banks via off-shore centres and the UK. (Borio and Disyatat 2011). Thus, the Fed's policy ended by igniting a credit bubble centered in the U.S. but inflated by a large external contribution of foreign banks, mainly European, taking risks generated in the American economy. By the same token American monetary policy contributed to growing global imbalances because "The United States' ability to finance macroeconomic imbalances through easy foreign borrowing allowed it to postpone tough policy choices (something that was of course true in many other countries as well). Not only was the U.S. able to borrow in dollars at nominal interest rates kept low by a loose monetary policy. Also, until around the autumn of 2008,

[21] More on these aspects on the Report by the Financial crisis inquiry commission (2011).

exchange-rate and other asset-price movements kept U.S. net foreign liabilities growing at a rate far below the cumulative U.S. current deficit" (Obstfeld and Rogoff 2009).

The sharp increase in foreign assets and liabilities on the balance sheet of financial institutions has led to a very high degree of synchronization of real and financial variables that in turn amplified their effects through the working of the financial accelerator (Krugman, 2008) and the emergence of liquidity spirals (Brunnermeier, 2009), especially when financial institutions were highly leveraged. If we add to that the off-balance sheet recording and the opaqueness of new instruments used as assets and liabilities, the stage was set for the burst of the dramatic financial and subsequently real crisis that still heavily affects the world economy triggered by the apparently minor collapse of the American sub-prime market.

5. A cooperative regulation of interest rates

5.1 The need for a new policy framework

We have shown that in the wake of Great Moderation, and under the taming effect of globalization on inflation, overly lax monetary policies with the epicentre in the United States have led to the world real long term interest rate being increasingly behind the natural one. The gap thus opened has spurred global imbalances and, at the same time, set the stage for the global financial crisis. Banks were encouraged to raise their indebtedness and take more risks, assisted by a wave of financial innovation producing toxic instruments that spread on their balance sheets in hidden ways. The ensuing build-up of complex financial interrelations prompted expanding international capital flows that in turn contributed to a further widening of imbalances by postponing the correction of the American current account deficit and the opposite surpluses of the emerging market

economies, mainly that of China. Having been delayed by the support of the attraction of capital exerted by the American financial system, the correction ended up being dramatic and centred in the United States[22].

Indeed, global imbalances widened by low interest rates and financial excesses spurred the growth of the world economy combining Chinese export-led development with American over-consumption, as the Chimerica story tells. However, it has not been a "free lunch" since the bill to be paid, which is enormous, has finally arrived with the crisis. And after the crisis the return to the Chimerican era should be excluded, at least as argued by one of the economists who coined the term (Ferguson 2010).

As a matter of fact the crisis and its outcome have on one hand reduced global imbalances and, on the other, justified very expansionary monetary stances. Yet, there is renewed concern on both the issues of imbalances and of central banks' policies.

As for the first, even if declining, imbalances remain high by historical standards and their correction is more cyclical than structural (BIS 2011). The reason still is that "…while over-spending countries need to reduce domestic demand to de-leverage and thus need net exports to improve, to maintain growth, over-saving countries which are addicted to net exports as a source of growth refuse to reduce their reliance on net exports because they are unable or unwilling to increase domestic demand" (Roubini, 2010). The solution of the problem is far from being found, with pending risks of financial instability and trade wars. The situation is rather one of *policy impasse* where real adjustment is delayed by the

[22] Unsurprisingly, the study of history provides some interesting lessons consistent with our interpretation. Empirical evidence of a link connecting a gap between the effective interest rate and the natural one with the occurrence of important episodes of international financial crises over a time span of 140 years is provided by Jordà, Schularick and Taylor (2010) with the presence of external imbalances enhancing the importance of credit growth. These authors also argue that the terrain for crises was prepared by central banks that might have misinterpreted the absence of inflationary bouts, contributing to keep interest rates "too low for too long", sustaining non-inflationary (real) booms that ultimately led to excessive credit creation, financial excesses and external imbalances. It is not by chance that, in the last three decades – when the degree of interconnectedness increased as a consequence of globalization – the interaction between credit growth and external imbalances has grown, with an increasing correlation between the two.

domestic policies adopted, taking the resistance on the other side as given, and no one has interest in bearing the costs of unilateral adjustment although everybody would profit from a general rebalancing (BIS 2011). As a matter of fact trying to solve global imbalances by manoeuvring interest rates in only one country would be hardly beneficial. Before the crisis the issue has been already tackled with a definitely negative answer: rising interest rates in the US would not be enough to restore current account equilibrium at a global level. Policy adjustment in other countries was deemed necessary. Only a joint effort to reach a new composition of global demand between advanced and emerging countries with an unchanged worldwide demand level would avoid the risk of abrupt adjustments.

On the other hand, *naive* general rules of capping imbalances - such as that of limiting them to 4% of GDP unsuccessfully proposed by the US in the G20 summit meeting in Seoul on November 2010- run into obvious opposition from countries having large surpluses. Clearly the solution lies in policy coordination such as sharing the burden of the adjustment.

Monetary policy is both a pillar of any coordinated framework of regulation of international exchanges and the most important determinant of financial stability. Therefore, agreement on its objectives and rules is preliminary to any discussion on policy coordination aimed at a stable progress of globalization.

Fortunately the recent debate on the issue has led to a rethinking of the pre-crisis dominant theoretical framework of monetary policy that goes in the right direction. Flexible inflation targeting, practically followed by central banks even when not formally endorsed, seems to have lost its appeal due to its supposed benefits essentially consisting in the separation of the goal of price stability from that of financial stability and in the coincidence of national and international macroeconomic stability. Both these advantages are under profound reappraisal (Rethinking Central Banking 2011).

As for the first, for instance Giavazzi and Giovannini (2010) have observed that, being almost uniquely committed to maintaining price stability, central banks disregarded assessing the degree of financial fragility and proved unable to properly gauge systemic risk keeping interest rates too low. After the eruption of the crisis, central banks have been forced to keep interest rates even lower, again inducing excessive risk taking. As an

ultimate consequence a " low interest rate trap" was created, with central banks stuck in it. So it's time to rethink the monetary policy strategy in order to avoid that under-pricing liquidity might cause – sooner or later - another major financial crisis. In this vein the IMF cautions, in September 2011, that low interest rates and abundant liquidity in advanced economies may again push banks to search for yield and to over-leverage (IMF 2011).

The current rethinking is overcoming the objection – that supported the separation between the objective of inflation and that of financial stability - that "interest rates are too blunt an instrument for the effective pursuit of financial stability" according to Greenspan's doctrine and also Bernanke's (Bernanke 2011). This doctrine is now thoroughly criticized. The once losing view of "leaning against the wind" with bubbles has got its revenge by gaining influence among central bankers (Carney 2009, Shirakawa 2009, Trichet 2009). A compromise between the different views of the long-standing debate on bubbles and monetary policy seems to be that, based on Rethinking Central Banking (2011), outlined by Eichengreen and Rajan (2011) "Instead of seeking to identify bubbles, [central banks] should simply ask whether a change in current financing conditions could be disruptive for the economy….This means that when rapid credit growth, or other indicators of financial excess, accompany asset price increases, the authorities should employ stress tests to evaluate the effects of the changes on asset prices, economic activity, and financial stability."

More generally, the fact that it is monetary policy that ultimately rules on the leverage and the risk taken by financial institutions has come under scrutiny (for instance Borio and Disyatat 2011). Although prudential reregulation is obviously important, it is no longer considered as the only appropriate tool to pursue financial stability following Tinbergen's principle adopted to separate this goal from that of price stability assigned to monetary policy. Rather, it is recognized that the two tools have to be used together in the pursuit of both goals "the elegance and analytical appeal of the Tinbergen principle notwithstanding" (Rethinking Central Banking 2011). Financial stability should thus be recognized as an objective of central banks and their monetary policies regarded as a part of the set of macro-prudential policies.

The supposed second benefit assumes that if every central bank pursues its objective of price and output stabilization at home, with floating exchange rates an orderly international

adjustment will follow so as to ensure that the same objective is attained at a global level. The experience which led to the crisis and more recent developments has however shown important cross-border spillovers mostly acting via capital flows. Two cases are worth mentioning, both referring to the effect of excessively expansionary monetary policies in the most important advanced economies (Bis 2011). Before the crisis the extremely low policy rates particularly in the US and Japan have spread at a global level through capital flows to emerging market economies pushing them to resist appreciation of their currency with expansionary monetary policies. Thus, the gap between the current and world natural rate had been magnified with real and financial destabilizing consequences. More recently capital flows to the emerging market economies have been even larger, spurred by the unusually accommodative monetary policy stance of advanced economies. Moreover, this stance has pushed up commodity prices in world markets, notwithstanding a deceleration of global economic growth, as a result of a search for yield triggered by expansionary monetary policies targeted towards national consumer price inflation and considering commodity prices as exogenous while actually endogenous with respect to the collective central banks' action.

These and other spillovers require coordination of monetary policies that should look at their global effects, not only at the domestic ones, particularly in the case of large countries' central banks.

Thus, the current rethinking of central banking asks for overcoming the short-termism of Taylor's rule to take into account longer terms and global factors in monetary policies that are at the core of both financial fragility and global imbalances. The problem is then to find new rules, grounded on more persistent factors.

5.2 Resuming Wicksell's rule

According to our analysis it is quite intuitive that a tighter monetary policy in the US would have avoided the wide misalignment of the real rate of interest from its natural Wicksellian level (to be distinguished from the Neo-Wicksellian one as in Box 1), reduced the incentive

to “search for yield” and high leverage in the financial sector, determined a higher price of risk, and in other words limited the financial excesses that led to the crisis. With reference to the most relevant case of international tensions, US spending would have been lower contributing to a reduction both of the US current account deficit and the Chinese surplus with ensuing smaller global imbalances. On the other hand, had China let its actual rate of interest align to the natural one without the exchange rate control the yuan would have been re-valued and the trade surplus reduced.

This intuitive argument sounds as evocative of the cooperative rule envisaged in Wicksell’s quotation reported at the beginning of our paper. This rule was set forth while the Swedish economist was dealing with the downward movements of prices in Europe during the last three decades of the 19th century and with the debate on bimetallism as a possible cure for it. After reviewing various alternative proposals for stabilizing the value of money, he argued that “..they can attain their objective only in so far as they exert an indirect influence on the *money rate of interest* , and bring it into line with the natural rate, or below it, more rapidly than would otherwise be the case”[23]. In fact he explained the fall of prices as a result of monetary policies keeping their rates too high with respect to the natural ones and in the same vein he saw the rising prices of a previous period as the result of monetary rates lagging behind the natural ones. Hence his general rule of monetary policies targeted to the natural rates so as to stabilise national and world prices and “to maintain in equilibrium the international balance of payments”.

Wicksell assumes that international imbalances are due to different price movements, with countries running deficits experiencing inflation due to a negative gap between the actual and the natural rate of interest and surplus countries experiencing deflation due to a positive gap. If these country-specific price variations were reduced by monetary policies current accounts would tend to balance. However, when he proposed his rule he did not specify if central banks have to refer to the natural rate of their own economy or to the world one. Only later, during the post-World War I debate on the return to the Gold Standard, did he deal with this alternative

[23] Wicksell (1936) p.188

We have actually two systems to choose among or alternatively aim for: fixed exchange rates and for the whole world a stable average price level, from which the price levels of individual countries can deviate more or less in a way that can not be forecasted in advance, nor can be prevented from moving. Or fixed price levels, and thus a stable value of money in every individual country, and as a consequence fluctuating exchange rates within seemingly narrow bounds but without being completely unchanged.[24]

The choice between the two alternatives was presented by Wicksell as a dilemma which he never solved. This perhaps can be explained by the fact that the appropriate solution depends on the heterogeneity of national natural rates. If, as happens nowadays, natural rates of the block of emerging countries are much higher than in the other advanced ones a monetary rule pegged to the world natural rate would be too lax for the former and too restrictive for the latter. Therefore, an actualized Wicksell's rule should prescribe monetary policies targeted to individual natural rates, with flexible exchange rates. World price stability would then be the result, not the objective, of individual monetary policies, and the world rate of interest as well.

It is evident that, according to this view, some kind of a global Taylor rule would not do the job being a one-fit-all. But there is a deeper reason for that. As argued in Box 1, by targeting central banks' policies to the natural rate, Wicksell's rule is different from Taylor's. Even if Wicksell, living in times of infrequent variations of discount and banking rates, seems to have compared policy rates directly with natural ones, it is clear from his theory that his rule means that monetary policies should act in order to align real *long-term* rates to the natural ones. In fact, it is the comparison of the real cost of capital with its return that rules the difference between investment and saving thus determining cumulative processes of inflation and deflation. Therefore, in fixing their policy rates central banks should not be guided, as in the Neo-Wicksellian paradigm of Taylor's rule, by continually checking of deviations from a one-period equilibrium but rather, by the need of moving long-term interest rates in accordance with the trends of factors determining neo-classical equilibrium. These trends relate to the structural changes taking place in the economy as

[24] Wicksell (1922), quoted by Jonung (2002)

opposed to cyclical fluctuations around a steady state assumed by the Neo-Wicksellian theory. Although it is impossible to know the level of the natural rate corresponding to a new equilibrium brought about by structural change, this difficulty should not apply to detecting the direction to address interest rates. Divergence between actual long-term real rates, as determined by the interaction of monetary policy and investors expectations, and the natural ones should be signalled not only by goods and asset price movements but also by the departure of real market rates from the rate of return on capital of non-financial corporations. From a practical point of view, the analysis of profit trends for monetary policy use has been unduly neglected because of the dominance of the short-term view related to Taylor's rule but it could well be developed, even in a forward looking sense, if this rule were to be replaced by that of Wicksell.

Monetary policies aimed at moving long-term interest rates following the indicators of their divergence from the natural ones would provide market expectations with a firmer anchor as they are not limited to price stability –which has proven to be insufficient - but extended to other factors of instability, including those of financial origin. Keeping the reference to natural rates as a medium-term target – as currently happens with inflation objectives- to allow for short-term deviations due to temporary shocks, the new monetary policy regime would respond to the need of overcoming the short-termism of Taylor's rules that emerged from the current debate. Moreover, if every central bank were to apply Wicksell's rule in a cooperative mood the questionable issue of "too lax" or "too restrictive" monetary policies and their spill-over would be fairly settled by an agreed common measure of one's "own house in order" able also to include fiscal policy stances via their effect on the natural rate. Macroeconomic and financial stability would then be strengthened and global imbalances due to opportunistic economic policies –the core of international economic disorder - would tend to disappear.

Had this cooperative approach been followed, world economic growth would have been slower but sustainable, not doped by the building up of huge foreign debt and credit positions together with the enormous amount of money in search of yield that led to the crisis.

However, as we have seen, in the pre-crisis world this rule was patently violated. Natural rates of interest, as expressed by return on capital of the non-financial corporate sector, were generally “uphill”, with particularly high levels in emerging market economies, while real market rates, as expressed by yields on government and corporate bonds, everywhere were declining. While world consumer price inflation has been subdued, asset price inflation has been widespread and in advanced countries, mostly the US, contributed to over-consumption and current account deficits via wealth effects. Global current account imbalances have sharply increased but, contrary to the Wicksellian theory, with a persistent negative gap between the actual and the natural rate even in surplus running economies. In fact, considering the most relevant case of the US and China, both real rates of interest were lower than their natural ones as determined by the return on capital, with the Chinese actual rates standing – roughly because of the difficulties of comparison- not higher, but rather lower than those of America despite a higher return on capital.

This is not a minor detail, but it has been neglected in arguments used during the strong confrontation between these two countries. These arguments are based either on too much consumption in the United States (Chinese position) or on too much exporting by China with the yuan artificially undervalued (American position). In these terms, the conflict between the two envisages one-sided solutions that are difficult to accept by either country. As a matter of fact what was needed in order to reduce both global imbalances and financial excesses is not, as it could seem following the arguments of this confrontation, either a yuan revaluation or a more restrictive American monetary policy, but a common move of the real rates of interest in the two countries towards their natural level. In China the increase in the rate of interest should have been greater (because of the higher natural rate) with a resulting currency appreciation compensating for the American tightening. Thus, a common adoption of Wicksell’s rule would have turned the confrontation between the two main actors of the world economy into a sharing of deflationary policies leading not only to a reduction of American internal demand favouring exports but also a reduction of Chinese exports favouring internal demand. This conduct would have avoided the enormous costs of the financial crisis not only for the economy of the US and the advanced countries but also for the whole world. As for China, it would have reduced both the risks of overheating the

economy and the negative fall-outs of its centrally planned capital allocation. In fact, the complex system of administrative guidance which enables China to keep its currency undervalued while avoiding excessive money creation brings about credit rationing favouring exporting firms, as seen in Section 2. Yet subsidising the export sector with low interest credit induces overinvestment and reduction in capital productivity. On the other hand, fragmentation of financial markets ensuing from the use of administrative instruments for sterilization and from state controlled capital allocation keeps the financial system immature and unfit to back an internationalised yuan that should complete the ascent of China as a primary economic power.

It goes beyond the scope of this paper to enter the current discussion on reforming the International Monetary System (IMS). However, whichever reform needs fixing policy rules, and in our opinion a cooperative adoption of Wicksell's proposal as we have here resumed could constitute the building block of a macroeconomic discipline on which to construct a new IMS. This would also contribute to the solution of a good part of the issues at stake after the financial crisis. As a matter of fact, the need of a reform is grounded on four serious problems: i) inconsistent or imprudent policies among systemic countries, ii) disorderly cross border capital flows, iii) inadequate provision of systemic liquidity iv) structural distortions in supply of safe assets, (IMF 2011 a).

Imprudent policies would not be possible with monetary discipline fixed by an agreed upon common regime of central banks' conduct aimed at moving market interest rates in accordance with the natural Wicksellian equilibrium. National economic policies would be consistent with the trends of the real economy whose differences would be reflected on the movements of exchange rates. Capital flows would not then be following the ever-changing return opportunities offered by the disorderly interplay of different and variable policies but would rather be set in a stable framework grounded on universally accepted and not short-sighted policy rules.

In addition to providing a discipline for macro-economic policies and cross-border capital flows, our proposal would pave the way for the solution of the two remaining problems related to international liquidity and the availability of safe assets. In fact the new monetary regime would scale down the role of the dollar as an international reserve currency because its issuance would be

constrained. Thus a major source of *structural* instability would disappear, due to the incentive for the US to adopt an overly lax monetary policy when possible, with destabilizing effects on the world. However, by the same token, it could bring about scarcity of means of payment for international trade, as was especially feared by Robert Triffin when dealing with his dilemma. The issue raised by Triffin, in the wake of Keynes' Bancor, of delinking the global currency from that of the US -which led to the creation of Special Drawing Rights (SDR)- has received renewed attention after the crisis. The reason is simply stated by Padoa Schioppa (2010) " We can safely state today that Triffin's analysis transcends the particular system for which it was formulated and applies to every possible system in which the global economy does not have a genuine monetary order".

Enhancing the role of SDR to supplement the dollar would entail clearing several hurdles, a part from the revision of the composition of the basket of currencies to make it more representative of the main world economies (Saccomanni 2010). Many hurdles arise from the fundamental problem of SDR not being an international currency, but rather only "a potential claim on the freely usable currencies of IMF members" according to the definition of the IMF itself. Costs and benefits of reforming this artificial unit of account with respect to other solutions, as a supernational bank money (Alessandrini and Fratianni 2009) are under review. But any option apt to provide a good substitute for a national currency to be used as international reserves could both reduce the extent and the cost of their accumulation and provide liquidity and safe assets. Monetary policies of the block of advanced countries would thus be freed of the duty of providing systemic liquidity – as has happened for the Fed and the BCE during the financial crisis. Last, but not least, the world economy would be endowed with new risk-free assets which became rare after the euro sovereign debt crisis and the downgrading of US treasury bonds.

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