

SESSION 4

Implications for the conduct of monetary policy

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Guillermo ORTIZ

Governor

Banco de México

Let me first thank Christian Noyer for the invitation to participate in this colloquium. Let me also congratulate him and the organisers of this colloquium for the excellent quality, and particularly for the foresight of planning an event on globalisation and monetary policy and inflation precisely at this juncture, today in particular.

This is the last session of the day. Well, actually it's not the last session. We still have another session where Jacob Frenkel is going to make the summary. I saw him taking about 100 pages of notes. I sat next to him throughout the day, so I'm sure he will make a very thorough summary of the proceedings. But today we have, I think, an excellent panel to discuss what are the implications of everything that we have been saying and listening to today for the implementation of monetary policy. We have as the main speaker John Taylor, who is, as you know, a professor at Stanford University and he's one of the best known monetary economists of our time. He has particularly, of course, made very important contributions for monetary analysis of central banks. We also have Eric Chaney, who is a chief economist for Europe, Morgan Stanley, Don Kohn, Vice President of the Board of Governors of the Federal Reserve System, and Jürgen Stark, member of the Executive Board of the European Central Bank.

So in this last session we will be essentially focusing on the implications again of the different issues raised in previous discussions for the design and conduct of monetary policy. The main question we intend to address is what are the implications of globalisation for monetary policy. We will ask ourselves whether globalisation should lead or not to a reassessment of central banks' price stability objectives and of the degree of reaction to variables or shocks that become more important in global markets, such as exchange rates, international commodity prices or real and financial developments in other countries.

In this context, the main issues that will lead the discussion in this session will precisely be whether

globalisation has altered the way we think about monetary policy. And in this context, in the discussion we have to include the reaction function of the central bank, the objectives of monetary policies, the channels of transmission of monetary policy, whether we should be taking into account explicitly variables such as the exchange rate, commodity prices, the shape of the Phillips curve, *et cetera, et cetera*.

I think there are two ways of approaching this question. One is a sort of analytic, academic exercise that we are going to be discussing today with the presentation of John Taylor. The other one is the political economy dimension of these issues, which was mentioned this morning by Ken Rogoff.

The analytical part involves asking ourselves whether the models that we are utilising are sufficiently, I would say, complete to take into account the different aspects in which globalisation affects monetary policy; there is, for example, exchange rates. Since exchange rates are already a structural part of the models that we use, perhaps these should not be explicitly in the objective function of the central banks. These kinds of things are the subject of the discussion today.

Now, the political economy question is a little bit different. From the point of view of emerging markets the situation is even more striking. I will be very brief because what I am saying is something that has already been said before. We're facing a very unusual situation in the sense that we're, on the one hand, facing increased inflation pressures coming from commodity prices. Inflation has been going up throughout the world, but particularly in the emerging markets, which are much more prone to shocks of commodity prices, particularly food, since food has a greater weight in the consumer price index. So I would say that all emerging markets today are facing strong inflationary pressures.

On the other hand, we are facing downside risk to economic growth, some emerging markets more

than others; we in Mexico, of course, who are closer to the United States are more vulnerable to the downturn in the US economy. So of course policy dilemmas begin to amplify in the circumstances. Interest rate differentials, implied capital freeze, appreciation pressures create in particular, I would say, not only a difficult situation, but real dilemmas for central banks.

The other aspect of this political economy question is that most central banks do in practice take into account changes in exchange rates and they react to exchange rate changes, they react to shocks in the commodity prices, by adopting monetary policy for that.

So there has to be some sort of connection between the conceptual and the political economy dimensions. Perhaps this connection has to do with the subject of what was previously mentioned this morning, which is precisely the question of anomalies. When you are dealing with a more normal world and the shocks to the system are small enough, then the standard models are probably all right to be utilised when taking into account this. When you have shocks that are outside the normal bound, when you have anomalies, the story is very different. Perhaps this is the situation that we are dealing with today.

So without further ado, let me ask John to begin his presentation.

The impacts of globalisation on monetary policy

John B. TAYLOR

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Monetary policy has been dealing with globalisation for centuries as the magnificent *Galerie Dorée* at the main headquarters of the Banque de France reminds us. The Banque de France moved into those beautiful quarters in 1808, exactly two centuries ago, and the statues in the four corners of the Gallery are said to represent the four corners of the globe: Europe, Africa, America, and Asia. I note with some trepidation that the statue in the European corner is wearing Roman legionary dress, with a sword in her hands and a globe at her feet, and is accompanied by a horse, while the American has only a bow and arrow and is accompanied by a lizard. But I take some consolation by reminding myself that fears of globalisation are usually unwarranted, and indeed that is a main theme of my remarks today.

I also understand that near the Governor's offices is a pair of Jacques Joseph Duhén gouaches, two seascape paintings, one entitled *Calm* and the other *Storm*, an ever-present reminder of how the global financial seascape can change suddenly, though none of us need that reminder right now.

A review of the history of the impacts of globalisation on monetary thought and practice is essential for understanding the implications of globalisation for monetary policy today, and I start with a short review. I won't go back two centuries, but I will go back a good fraction of a century, to the period immediately after the collapse of the Bretton Woods fixed exchange rate system in the 1970s.

Looking for a monetary framework in a globalised economy

This was a time when central banks around the world were groping to find an alternative to the fixed exchange rate international system that had guided many of them in the 1950s and 1960s. It was not a pretty sight. With monetary policy de-linked from the constraints of the Bretton Woods system, inflation in

the United States accelerated from the already high levels that put pressure on the international system in the first place. The US inflation rate reached 12 percent in 1975, fell to 5 percent in 1977, and then increased to 15 percent before the 1970s were over. Recessions were frequent. The volatility of real GDP was high, twice as high as it has been recently: the standard deviation of real GDP growth in the United States was 2.8 percent in the 1970s, compared with 1.4 percent in the 1990s.

The lack of a workable framework for monetary policy created similar instabilities in inflation and output in many other countries around the globe. The volatility of real GDP growth in Europe in the 1970s was comparable to that in the United States. In France, for example, the standard deviation of real GDP growth was 2.7 percent in the 1970s compared with only 1.1 percent in the 1990s.

Out of this experience came better monetary theories, better monetary policies, and of course better macroeconomic results. The theories and policies were designed for, or at least influenced by, a certain conceptualization of globalisation. Empirical models to evaluate monetary policy moved rapidly in a global direction. The ones I know best were the multicountry models first built at the International Monetary Fund, at the Federal Reserve Board, and at Stanford University, but there are many others. Books published as part of a Brookings international model comparison project (See Bryant, Hooper and Mann, 1993) provide many more details. These multi-country models continue to evolve and improve over time, especially at policy making and policy research institutions, now also including the European Central Bank; see Coenen, Lombardo, Smets, and Straub (2007), for example. A new model comparison project is now underway, jointly sponsored by the Center for Financial Studies (CFS) in Frankfurt and the Stanford Institute for Economic Policy Research (SIEPR) at Stanford University.

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John B. Taylor: "The impacts of globalisation on monetary policy"

Like other modern monetary theories these empirical models are built on the foundations of rational expectations and staggered price and wage setting. But more important for this conference, they are globalised: they assume perfect capital mobility between countries, interdependence of foreign exchange markets, price links between different countries, as well as export and import flows and the current account. Globalised monetary models have strong links between different economies. A slowdown or a recession in one country, for example, will affect growth and inflation in other countries through many financial and "real economy" channels. In this sense, the empirical models are designed to address questions about the implications of globalisation for monetary policy. So what do the theories and the empirical models tell us about the implications of globalisation for monetary policy?

The exchange rate and interest rate decisions

First consider the exchange rate. The exchange rate plays three significant roles in any reasonable international monetary model. First, the expected rate of change of the exchange rate affects the return from holding one currency compared to another. This implies, for example, that a cut in the interest rate in one country will tend to lead to a depreciation of that country's currency. Second, the level of the exchange rate affects the relative price of goods in different countries and thus exports and imports. This implies, for example, that an increase in the trade deficit will tend to lead to a depreciation of the currency. Third, the percentage change in the exchange rate affects inflation through the pass-through mechanism.

Despite these significant roles for the exchange rate, the theories and the empirical models tell us that monetary policy should not react directly to changes in the exchange rate. More specifically, if you characterise policy as a monetary policy rule for setting the interest rate in a way that aims to keep the fluctuations of inflation and real output low, then that rule should respond primarily to inflation and real GDP, or perhaps forecasts or nowcasts of inflation and real GDP, but not directly to the exchange rate. In my view this is a pretty robust result, and it has held up over time. Some research on small open economy models (See Ball, 1999) shows that reacting by a small amount to the exchange rate –decreasing the interest rate when the exchange rate appreciates– can

improve macroeconomic performance, but the gains are small and are not robust across all models. Recent work by Batini, Levine, and Pearlman (2007) finds that not responding directly to the exchange rate in the monetary policy rule is nearly optimal.

What is the intuition behind this finding? First, exchange rates are more volatile than macro variables like real GDP and inflation; reacting to them can cause herky-jerky movements in the interest rate, which have harmful effects on the economy. Second, having interest rates respond to inflation or expected inflation automatically provides a response to the exchange rate (See Taylor, 2001). A depreciation of the exchange rate increases inflation in the empirical models. Hence, increasing the interest rate when inflation rises due to a depreciation is an indirect response to the exchange rate.

Cooperation and interest rate decisions

Another broader set of questions concerns whether globalisation implies that central banks should be reacting in different ways to inflation or real GDP in other countries. Should the central bank in country A react more directly to economic events in country B under globalisation, and if so how does that affect the policy decisions in country B? Clearly there is a "we're looking at you and you're looking at us" aspect of central bank decisions in a globalised world.

A formal way to address this question is to consider the gains from central banks cooperating in the *design* of monetary policy rules (See Taylor, 1985). Estimating the size of such potential gains empirically is essential because it is likely that they are positive in principle and we need to know if they are material in practice.

To be specific we can use some concepts from game theory. Though it may sound abstract, let me define a *global cooperative policy* as one where central banks *jointly* choose their policy responses to bring about good performance globally. To be sure, I am thinking about a joint international choice, by central banks, of the parameters of their policy *rule* for the interest rate –a global cooperative policy rule. This means they agree on a global objective, such as price stability and output stability for the global economy, which would, of course, depend on price stability and output stability in each country.

In contrast, a global policy rule without cooperation can be defined as in the non-cooperative case of game theory; that is, a Cournot-Nash policy. Such a global non-cooperative policy rule occurs when policy makers in each country take as given policy reaction coefficients in the other countries. One can easily imagine the central bank staff taking the policy rules of other central banks as given when they do alternative policy simulations. They then determine the best response of the interest rate in their own country to bring about price and output stability. The central bank thereby creates a policy rule conditional on the foreign central banks' policy rules. The global Cournot-Nash policy assumes that other central banks do the same thing. The equilibrium is where the rule that every central bank takes as given for other central banks is optimal for those other central banks. That equilibrium is the global non-cooperative policy rule.

Believe it or not, it is computationally feasible to calculate these policies with empirical multi-country models. The computations show that the policy rules are, perhaps not surprisingly, different for the cooperative as compared with the non-cooperative policies. For example, the global cooperative policy entails a smaller response of the interest rate to the inflation rate than the global Cournot-Nash policy. Why? When a central bank raises its interest rate in response to an increase in the inflation rate, the exchange rate tends to appreciate in that country and to depreciate in the other countries. The depreciation abroad is inflationary abroad and this requires that the central banks in the other countries raise interest rates. In the cooperative case the smaller initial response reduces these interactions.

However, according to the empirical models the gains from using the cooperative policy rule are very small quantitatively compared with using the non-cooperative policy rule, and as a practical matter the policy could easily ignore these international complications (See Carozzi and Taylor, 1985). The global non-cooperative rule generates a workable international system and the extra complexity of cooperating as defined here is not worth it. By focusing optimally on the goals of price and output stability in each country separately, the non-cooperative policy is already a great improvement over sub optimal policies of the 1970s. More recent research by Coenen, Lombardo, Smets, and Straub (2007) also investigates the gains from monetary policy

cooperation among countries using a slightly different concept of cooperation and non-cooperation ("open-loop" rather than "closed-loop"). They also find that these gains are small.

Cooperation in the broader sense

It is important to note, however, that even this non-cooperative global Cournot-Nash policy, as defined here, involves a significant amount of cooperation in the ordinary sense of the word. At the least, it is necessary for central banks to cooperate in providing clear and transparent information about their own policy reactions. Meeting together and exchanging views as is done in such forums as the BIS, the OECD, and the IMF is important so that policy makers can make their decisions taking other policymakers into account.

Cooperation is also essential for the part of monetary policy that does not entail changing the overnight interest rate, including efforts to provide liquidity, agreements on swaps, and employing new facilities such as the Fed's new term auction facility. Exchange of information in a prompt and transparent manner is essential in times of financial market crisis.

What has been the experience?

In my view, the actual monetary policy framework that has been put in place during this period by the central banks has been reasonably close to this theory and the recommendations implied by the empirical models. At least until recently there has been a pretty explicit policy of not reacting to exchange rates other than indirectly through inflation and real GDP effects. Many central banks have been following such a strategy as part of their general approach to inflation targeting. However, as Edwards (2005) has noted, estimated reaction functions show that some emerging market countries have been taking exchange rates into account even when such actions are not part of their stated strategy. I will return to this issue later in my remarks.

Another aspect of today's international monetary policy framework that is consistent with the theory is that central bank behaviour is reasonably well described by a global Cournot-Nash policy. Central banks make their best assessments of the likely response of other central banks and then find their own appropriate responses. With many central banks following such an approach,

the resulting policy fits the Cournot-Nash concept closely. They have wisely resisted the temptation to obtain the extra gains from cooperation in the formal game theory sense, but they have cooperated by exchanging information about their policies.

Overall the experience has been very good. Price stability and output stability have improved dramatically since the 1970s. At the same time, however, the policy framework and the increased stability have led to other changes and these have implications for policy going forward, as I consider next.

Globalisation and the decline in pass-through

One of the most significant changes in the global economy in recent years is the sharp reduction in degree of exchange rate pass-through. This has been empirically documented in many countries. Some have credited this decline to increased globalisation and in particular to increased foreign competition. They argue that the resulting "price pressure" prevents firms from passing along the full cost increase when the price of imported goods rise.

I have argued (See Taylor, 2000) that the declining pass-through has been more likely due to a more credible focus of monetary policy on price stability and a less accommodative stance regarding inflation. If inflation is expected to remain low, then firms will recognize the temporary nature of nominal price increases and have less reason to pass through a cost increase. Many empirical papers have tried to test which theory has more explanatory power.

The two explanations have widely different implications for monetary policy. If the first explanation is correct, then policy makers could take the low level of pass-through as a given, a structural feature of the economy which is invariant to monetary policy. If so, then optimal policy would entail a larger interest rate reduction in response to a decline in output because the exchange rate depreciation caused by the lower interest rate would not feedback into inflation very much. However, if the lower level of pass-through is due to a non-accommodative policy itself, then such accommodative actions could reverse the decline in pass-through and have a larger impact on inflation than expected.

Observe that in this case globalisation is making monetary policy more difficult by confusing the source

of the decline in pass-through. The same type of signal distortion is evident in the cases I consider next.

Globalisation and short run inflation dynamics

Other significant changes in the world economy pertain to the short run relation between inflation and output. Explanations for these changes frequently invoke globalisation in some way. For example Rogoff (2004, 2006) showed that increased competition associated with globalisation would be expected to make the short run Phillips curve steeper by making prices more sensitive to shifts in demand. This increased price sensitivity has been cited as a reason for the excellent inflation record of the last two decades, because a steeper Phillips curve reduces the short run output benefits that surprise inflation might bring; it therefore reduces the incentives of policy makers to deviate from their inflation objectives.

Empirical evidence has shown, however, that the slope of the Phillips curve has flattened rather than steepened (See Roberts, 2006), and there have been a host of explanations for this phenomenon. The most widely discussed explanation is again globalisation, and namely that the lower slope of the Phillips curve is due to global aggregate demand effects on inflation, through which inflation in one country is related to output gaps or unemployment in other countries. However, for this effect to work, the lower coefficient on a country's output in the Phillips curve would have to be offset by higher coefficients on other countries' output in those Phillips curves. Kohn (2006) has shown that there is little evidence for this. See also Ihrig and others (2007).

Another globalisation-related explanation is that there are direct linkages between wages in different countries due to the off-shoring of labor services, as modeled by Grossman and Rossi-Hansberg (2006). However, evidence of an increased international wage to wage connection has yet to be presented.

There is another explanation for slope reduction which has nothing to do with globalisation. It is due to Roberts (2006) and it fits the facts very well. As Roberts (2006) has shown, the estimated slope could have declined simply because monetary policy has become more aggressive in controlling inflation. An increase in output appears to have a smaller effect on inflation because monetary policy is expected to take action to prevent such increases.

As with the case of pass-through, the different explanations for the change in the Phillips curve slope have widely different policy implications. If the slope is flatter because of structural changes due to globalisation, then making policy more accommodative to inflation would emerge from an optimal monetary policy exercise and might make sense. But if the lower slope was due to the policy non-accommodative policy in place, then such change to a more accommodative policy rule would not be justified.

There is another frequently discussed though conceptually different explanation for the impact of globalisation on inflation. It is a simple direct effect through which low priced imports from low cost developing countries such as China holds down the inflation rate. However, as with the case of pass-through there is another more traditional explanation for which we have much evidence over many years, namely that monetary policy itself has been the key factor in keeping inflation low and stable around the world. The "competition from abroad" explanation of the disinflation over the years is very popular, but it does not have a solid basis in monetary theory. Competition is a level rather than a rate of change effect and inflation is ultimately caused by higher monetary growth.

Globalisation and the impact of the exchange rate on policy in practice

Finally let me return to the finding that recently some central banks appear to be responding to exchange rates when setting interest rates, as Edwards (2005) has argued citing regression evidence that exchange rates appear in policy rules. Additional evidence of this phenomenon is that central banks sometimes mention how the prevailing interest rate around the world affects their decisions. If there is concern about exchange rate fluctuations, then moving the interest rate away from prevailing international interest rates could cause the currency to appreciate or depreciate, something that the central bank might want to avoid, perhaps due to political pressures. Many central bankers, even those with flexible exchange rate policies, watch the US federal funds rate carefully when making policy decisions.

To illustrate this issue consider the relationship between Eurozone interest rates and US interest rates

during the past few years. Consider in particular the deviation of the overnight interest rate target for the European Central Bank from a simple guideline for that interest rate –the Taylor rule– which depends on the inflation rate and the gap between real GDP and its potential level. For this purpose I measure the inflation rate as the four quarter average rate of change in the harmonised index of consumer prices and the real GDP gap as the percentage deviation of real GDP from a trend estimated by a popular statistical procedure called the Hodrick-Prescott filter.

Now if one examines the relationship between this deviation and the actual federal funds rate in the United States during the period from 2000 through 2006, one finds a close empirical correlation between the two. An estimated linear relationship with the deviation on the left hand side has a coefficient on the federal funds rate of 0.21, which means that each percentage point reduction in the federal funds rate was associated with a 1/5 percentage point reduction in the ECB interest rate below what would otherwise be desirable on European price stability and output stability grounds (See Taylor, 2007). The relationship is highly significant statistically (t-statistic equals 3 1/2). For part of this period the ECB policy rate was below this guideline and according to these estimates a significant part of the deviation is "explained" by the US federal funds rate being lower than normal. I have found similar strong foreign interest rate effects for other central banks.

These correlations suggest another implication of globalisation: the danger that central banks could move off course due to concerns about the exchange rate. If this causes central banks to veer off the framework that has proved effective in the past, it could be destabilizing. More specifically if it causes central banks to reduce interest rates below levels needed for price stability it could be inflationary.

Conclusion

In these remarks I have considered the impacts of globalisation on monetary policy using monetary theory, empirical models, and monetary experience. I reviewed how a workable monetary framework to deal with globalisation was developed after the 1970s as international economic connectivity grew in importance following the end of the Bretton Woods system. The international framework involved focusing on a target for inflation, adjusting the interest

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rate instrument of policy in each country to changes in inflation and output in that country, and cooperating with other central banks in exchanging information about interest rate policies as well as policies to provide liquidity in times of payments crises. In principle, the framework has not involved reacting directly to exchange rate movements or jointly setting a systematic strategy for interest rate decisions, whether a target for inflation or the systematic reactions of interest rates to macroeconomic developments.

This framework has worked well for nearly a quarter of a century. Now, however, globalisation is threatening the same successful monetary framework which was designed to deal with globalisation twenty five years ago.

First, the concept of globalisation has tended to muddy the waters of our monetary theories as the world has changed. Whether it is the reduced pass-through, the flattened Phillips curve, or the disinflation over the past 25 years, globalisation is often invoked as an explanation. But one does not need globalisation to explain these phenomena. The monetary policy framework is sufficient, and, in my view, the correlation between globalisation

and these phenomena is spurious. The danger is that using globalisation as an explanation for these phenomena can lead to deterioration of monetary policies, as I have shown in these remarks. For this reason alone globalisation is a challenge to monetary policy makers. The best way to meet this challenge is with rigorous economic research on globalisation and monetary policy as Fisher (2006, 2007) has called for. This would help clarify the theories and sort out the spurious from the genuine.

Second, though the monetary framework calls for little direct interest rate action to deal with exchange rates, it appears the central banks have been taking exchange rates into account in their interest rate responses. We still do not know all the reasons for these responses or how large a problem they are in practice, though I offered some suggestive evidence in my remarks. In the current environment they could be inflationary, and they may even be a part of the explanation for the elevated levels of global inflation that we see today. Perhaps there is more to gain than previously thought from a globally cooperative policy that simply emphasises the goal of global price stability. Again more research is needed to address this problem, which is likely to persist for a long time.

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If I had to summarise Pr. Taylor's thesis in one sentence, it would be this: "The best way for monetary policy to cope with globalisation is to ignore the globalisation talk". Although I have a lot of sympathy for this bold conclusion, I will do my best to question it. But let me say first that I am impressed by the method used by Pr. Taylor in his essay. It is nothing else than René Descartes' "methodical doubt", which seems quite appropriate in this country, even though the great mathematician and philosopher spent most of his intellectual life in Governor Nout Wellink's country. More precisely, Pr. Taylor looks at several features commonly associated with globalisation, lower exchange rate pass-through, flatter Phillips curve, international wage competition and rejects each one of them, so that, in the end, what is left is not Descartes' *cogito*, but ... the Taylor rule.

Before turning to the core of the discussion, I have one observation regarding the reaction to exchange rate moves. It seems to me that most modern theoretical and empirical research supports Pr. Taylor's thesis, namely that changes in the external value of the currency should not enter in the monetary policy reaction function other than through their impact on future inflation and output. However, this does not imply that policy makers should be indifferent to the exchange rate *per se*. A long lasting deviation from fair value may have unwelcome re-distributive consequences, but this is a policy coordination issue rather than a pure monetary policy matter.

There are three areas where I'd like to challenge Pr. Taylor's conclusions: the short run Phillips curve, the change in relative prices due to globalisation, and the deviation from a Taylor rule by the ECB in the 2000-2006 period. By globalisation, I do not refer only to the opening of borders to flows of goods and services as well as capital –although still going on, this is not new– but also to the scale effect of the entry of giant economies such as China and India in the global market economy and to what Richard Freeman dubbed the Great Doubling. I will call that "modern globalisation".

Starting with the Phillips curve, I am not sure that the steeper curve that should result from increased competition associated with globalisation according

to Rogoff and the empirical evidence of a flatter curve are antinomic. Assume for instance that the impact of modern globalisation is incremental and spanned over a much longer period of time than commonly assumed because, for instance, capital is far from being perfectly mobile. Then, the effect of increased competition should be an incremental inward shift of the Phillips curve combined with a steepening of its slope. In other words, a progressively steeper slope but also a steadily declining Nairu. If this is the case, then the flattening of the Phillips curve could be nothing else than an optical illusion due to the fact that the mathematical envelope of a family of steeper and shifting Phillips curves would look like a flatter curve. These issues have been discussed at length in the previous sessions but my point is that it might not be so easy to reject the hypothesis that modern globalisation is causing changes in structural parameters. Further empirical research, along the lines I have just sketched, might come to different conclusions.

Similarly, while Taylor is perfectly right to stress that "competition is a level rather than a rate of change effect", this does not imply that competition may not have an impact on the rate of change of prices during a relatively long period of time, as the price of traded goods moves from level A to B. To take an very mundane example, the dramatic decline of shoes' prices in the US and Europe may have come to an end, since I am told that China is now producing 90% of the world production of this particular item (even so, my Chinese colleagues tell me that cut-throat competition in China is keeping a downward pressure on prices). But the case of shoes (and items such as micro-ovens) is not yet the rule, so traded goods prices have probably not yet reached level B.

This brings me to my second observation, the change in relative prices that is resulting from modern globalisation. I assume that at least one feature of modern globalisation is Cartesian-doubt-proof: prices of internationally traded manufactured products are going down, while prices of commodities (including soft commodities) are going up. While the former trend seems to be loosing steam, maybe because the dynamic process from level A to level B follows a kind of logistic curve, it appears that the latter is not only lasting more than most analysts had predicted,

but, in addition, is accelerating. In essence, this is a change in the relative price of commodities, due to a shift in the demand curve not matched by a similar move of the supply curve, which is relatively rigid, for various reasons. In theory, monetary policy should disregard changes in relative prices, since its goal is to stabilise the aggregate level of prices. However, the dynamics of the process matters. Assume for the sake of reasoning that the disinflationary effect of globalisation (cheaper manufactured products) is over and that only remains its inflationary side, ever more expensive commodities. Delivering price stability, *i.e.* keeping inflation close to its target, necessarily implies that prices of other goods and services will have to decelerate, if not decline. Practically, this has to be a combination of imported prices, *via* the exchange rate, and of domestic prices, *via* the output gap or the Phillips curve. My worry is that while commodity prices are almost perfectly flexible with respect to changes in supply or demand, this is far from being true for domestic prices, which are much more rigid, a point Pr. Taylor famously embedded in his own analysis of monetary policy. This stickiness asymmetry raises a difficulty: during the transition period, *i.e.* until the price of commodities stabilises, monetary policy may turn sub-optimal if it keeps the same inflation target than in normal, *i.e.* steady state for the rest of the world, circumstances. In this regard, ignoring some of the consequences of globalisation is in my view disputable.

My last observation is about the ECB. Pr. Taylor observes that the euro area overnight rate, directly influenced by the ECB's refi rate, has deviated from a Taylor rule and that this deviation is nicely correlated with the fed funds rate over the period 2000-2006. I must confess that I do not find this result particularly surprising and that, even if

there was a stochastic causality from the Fed to the ECB, I would be reluctant to conclude that there was a "real" causality in the decision process itself. The reason of my scepticism is that both central banks, although at various degrees, when facing the consequences of the crash of the IT bubble, only a couple of years after the Asian crisis, considered that deflation was a risk. Because of well known non linearities, this might have convinced policy makers on both side of the Atlantic to deviate from their normal reaction function. I remember vividly a discussion with Pr. Otmar Issing in the aftermath of 9/11, where he told to some of us that he did not see deflation as a very serious threat, but that the cost of insurance was so cheap that buying some protection against deflation had some merits. By the way, the reason why the cost of insurance was cheap was precisely the alleged effect of globalisation, which, at that time was widely considered seen as disinflationary. Because the ECB was more sceptical than the Fed, I am not surprised either that the pass-through coefficient is 0.2.

In conclusion and despite the reservations I have just made, I find Pr. Taylor cartesian scepticism solidly founded. Calling another mathematician to the bar, Blaise Pascal, I would say that, given the high uncertainties surrounding the impact of globalisation on the parameters of our economies, central bankers are entitled to wage a Pascal's Gambit: if high inflation is really the hell that modern central bankers think it is, then it makes sense to stick to the rules that have worked reasonably well in the post 1979 period. I would only hope that Pr. Taylor's call for rigorous economic research on globalisation and monetary policy will be fulfilled in the years to come. The risk of sub-optimal policies should not be under-estimated.

Donald L. KOHN**Vice Chairman***Board of Governors of the Federal Reserve System*

Let me begin by saying that I agree with the thrust of John's remarks. He is right that globalisation has not fundamentally changed the way central banks should do business. Although production chains and capital markets are more integrated across countries than before, and gross trade flows now account for a larger share of gross domestic product (GDP) in most nations, the dynamics of aggregate output and inflation remain at least qualitatively the same. Accordingly, central banks should continue to conduct monetary policy in the same forward-looking manner as they have for the past twenty years or so, adjusting policy rates in response to current and expected future movements in output and inflation, taking account of the lags in monetary policy. When exchange rates are free to adjust, this general approach to policymaking has proven effective in fostering macroeconomic stability over time in many countries.¹

In my remarks, I will expand on another of John's points –namely, that monetary policy making has been complicated by globalisation, particularly by rising trade volumes and increased capital market integration. That is true in several ways. For one thing, globalisation has likely made the domestic economy more sensitive to foreign shocks, so central banks must now pay more attention to events around the globe. And, the integration of China and other countries into the world market economy has expanded the scale and complexity of the foreign developments that central banks must monitor. Finally, globalisation has probably made the link between policy actions and economic outcomes more uncertain by, among other things, strengthening the role of the exchange rate in the monetary policy transmission mechanism.

Recent increases in prices for oil and other commodities illustrate some of the complications that globalisation creates for policymaking. Those price increases have raised inflation worldwide while accentuating already weakening growth prospects in some countries in recent months. Commodity prices depend on a wide range of demand and supply factors, and sorting out their various contributions

can be difficult. In recent years, potential constraints on the expansion of supply, especially of petroleum, have played a role. But in addition, the emergence of China, India, and other industrialising Asian economies as major consumers of oil and other raw materials has complicated the analysis, partly because these countries exert such a strong influence on global markets and partly because the structure of their economies is changing so rapidly.

Disentangling the various global forces influencing commodity prices can be useful in assessing the implications of those prices for domestic output and inflation, and hence monetary policy. For example, it matters whether a rise in oil prices results from demand factors, such as stronger global real activity, or supply factors, such as a hurricane that shuts down production. For an oil-importing country, a demand-driven price increase would have less negative implications for domestic real activity than a supply-driven increase because an expanding world economy would help boost demand for the country's exports. For the United States, however, a rise in oil prices driven by stronger real Chinese activity would not necessarily lead US export volumes to rise substantially, given the low propensity of China to import from the United States.

Policymakers focus on the inflation outlook, and so we need to consider what global forces imply for the future when assessing the inflation consequences of rising commodity prices. Will prices for crude oil and other commodities continue to rise rapidly in the face of robust growth in China and other newly industrialising economies? Or do current prices on the spot and futures markets already fully incorporate the likelihood of continued growth in those economies, in which case prices would remain near their current level? In the first scenario, climbing energy prices, for example, would continue to boost headline inflation directly and would indirectly boost non-energy prices through higher costs of production; moreover, a continuing rise in oil prices might potentially threaten the stability of long-run inflation expectations and nominal wage demands. In contrast, a flattening out of oil prices

¹ David Reifschneider and Steven Kamin, of the Board's staff, contributed to these remarks. The views expressed are those of the author and do not necessarily represent those of other members of the Board on the Federal Open Market Committee.

would restrain overall inflation, directly by stabilising a key component of energy prices and indirectly by ceasing to put upward pressure on inflation through pass-through and expectational effects.

Because monetary policy has a limited ability to counter short-term price surprises, the distinction between transitory and persistent influences on inflation from oil and other factors is critical. If we were to project a continued significant rise in energy prices over the medium run, we would need to factor that expectation into the outlook for overall inflation. Doing so could have important implications for the stance of monetary policy –all the more so if we expected rising energy costs to lead to higher inflation expectations and elevated wage gains.

Still, a leveling out in oil prices seems the more likely scenario. Surprised as we have been by the rapid, extended run-up in energy costs over the past few years, one would think that the price of a storable commodity such as oil should already embody expectations of continued rapid growth in the developing economies. However, the large run-up in spot and futures prices in recent weeks indicates that market participants are still revising their views of long-term demand-supply conditions. In these circumstances, policymakers must be mindful of the uncertainties surrounding the outlook for commodity prices and the risk that past or future increases in these goods could yet embed themselves in higher long-run inflation expectations and a persistently faster rate of overall price increases.

Besides these complications, globalisation has made the workings of the monetary policy transmission mechanism more unpredictable. For one, the determination of asset prices is now more dependent on conditions in financial markets worldwide, making the link between domestic policy actions and movements in the prices of bonds or equities more uncertain. For example, the correlation of quarterly changes in the federal funds rate with the variation in US Treasury yields has fallen from 0.6 before 1990 to 0.3 since then. To be sure, the falling correlation probably reflects a variety of factors, possibly including more systematic and predictable monetary policies. But global financial markets also seem to have played a role; as Chairman Bernanke has pointed out, savings from abroad, especially Asia, appear to have held down intermediate and longer-term US interest rates from 2004 to 2006 even

as monetary policy was tightened. As we have seen in recent months, the increased integration of financial markets has also facilitated the transmission and amplification across borders of many shocks, such as changes in the perceived riskiness of certain assets and the compensation required to hold them.

The role of the exchange rate is another complication that has only grown with globalisation. Of course, flexible exchange rates make it possible for central banks to achieve their domestic economic objectives. But the exchange rate is a notoriously difficult asset price to predict, and its response to any particular policy action is highly uncertain, as we found, for example, in 2001, when aggressive rate cutting in the United States was accompanied by a strengthening in the dollar. Even with an apparent decline in the pass-through of exchange rates into import prices, the increase in trade volumes arising from globalisation has presumably boosted the relative importance of the exchange rate in the economy, thereby strengthening an unpredictable factor in the monetary policy transmission mechanism.

Despite the increased openness of the domestic economy to foreign shocks and greater uncertainty about the monetary policy transmission mechanism, economic volatility in the United States and other advanced economies has declined. That stability may be attributable, in part, to the increasing ability of global product and capital markets to buffer the domestic economy against internal shocks. Because of globalisation, net exports likely absorb a greater proportion of downshifts in domestic spending, foreign competition helps discipline domestic price increases, and –as a consequence of greater cross-border holdings of assets– gains and losses on domestic assets are realised in part by foreign investors. Together with the implementation of better monetary policies in many countries, these particular aspects of globalisation likely contributed to the “Great Moderation”.

John addresses the question of whether greater economic integration has increased the gains to be had from policy cooperation and coordination. We have seen an example recently in which policy cooperation of a particular type seemed to pay dividends. In December, simultaneous and in some cases coordinated actions by a number of central banks to supply liquidity to banks apparently helped relieve stresses in interbank funding

markets. Coordination and cooperation were called for because banks today operate in many markets simultaneously, and pressures in one market can readily spill over to others, especially when the normal channels for arbitrage have been disrupted by financial turmoil. The Federal Reserve and other central banks are examining the implications of this episode for their methods of supplying liquidity and for responding to future interruptions in the flow of liquidity across markets.

Successful coordination in the provision of liquidity raises the question of whether appreciable gains might be had from coordination of monetary policies more generally. John is sceptical, and so am I. Gains from formal policy coordination never

seemed large, and it is not clear that globalisation has increased them appreciably. Policies agreed to under one set of circumstances may no longer be appropriate when circumstances change, as they inevitably will. Monetary policy should be able to adjust quickly to such changes; agreements that must be renegotiated can tie policymakers' hands. That does not mean that no circumstances exist in which coordinated monetary policy actions would be beneficial, but such circumstances are probably quite rare. Ultimately, global stability depends on good performance in individual countries, and the record of recent decades suggests that, in general, good performance is most readily achieved when central banks focus on their own mandates for domestic price stability and growth.

Jürgen STARK

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European Central Bank

In my remarks, I will focus on the implications of globalisation specifically for monetary policy-making in the euro area.¹

Globalisation may change the environment for monetary policy-making

We all agree that globalisation offers great opportunities. It increases the scope for efficiency gains through specialisation since it allows economies to make better use of their comparative advantage in international production. This reduces production costs and expands the production frontier, generating gains which are passed on to consumers through lower prices for many goods.

Globalisation thus fosters economic prosperity and raises living standards. At the same time, the gains from globalisation may not be distributed evenly, as globalisation can affect differently the returns to different factors of production.²

To monetary policy-makers, globalisation is important mainly for two reasons.

- First, the process of globalisation itself can occasionally lead to *economic disruptions, especially if markets lack transparency*. Increasingly-globalised and internationally-integrated financial markets, for example, if not sufficiently transparent, can at times be conducive to excessive risk-taking and contagion effects – a theme that rings particularly true in light of the current financial turmoil.

- Second, and more importantly, increasing global integration induces *structural changes in goods markets and financial markets* alike. As a result, *foreign shocks may have a greater impact on domestic inflation*, and the transmission of other impulses to the euro area

economy can change. This also applies to the impact of monetary policy on inflation.

Let me briefly elaborate on how structural changes, which are driven by globalisation, can affect the process of inflation.

- There is good reason, for instance, to believe that globalisation *increases competitive pressures*, both worldwide and in domestic markets. An increase in competition may –relative to previous periods– put *downward pressure on wages and prices* and thus contain inflation for a period of time.³ A structural intensification of competition would also induce firms to work harder to increase productivity, and this would translate into an increase in the growth rate of the natural level of output.⁴

- Beyond this effect, the increasing use of international production opportunities based on comparative advantage may lead to *a change in the production structure* of our economy, which would in turn *alter the relative scarcity of production factors*, and thus *the response of their prices and the prices of final goods to economic shocks*.

Thus, globalisation

- is of importance to monetary policy
- and it is likely to have a lasting effect on our economy and on the environment for monetary policy-making.

An initial conclusion therefore is that central banks need to continue to commit resources to analyse and closely monitor the structural changes and the shocks caused by globalisation, and need to build an increasing awareness of economic and financial developments outside their home countries.

¹ For stylised facts about trade globalisation and its likely effects on euro area inflation, see also the ECB Monthly Bulletin article entitled “Globalisation, trade and the euro area macroeconomy”, January 2008.

² Trade theory (Stolper-Samuelson theorem) would e.g. suggest that trade integration should place downward pressures on the relative return to lower-skilled labour. However, real wage developments have been similar across all skill groups in the euro area. See ECB (2008), op. cit.

³ While globalisation and the disciplining impact that it exerted on pricing and cost control is likely to have facilitated disinflation around the globe in the past ten years or so, globalisation per se cannot permanently reduce inflation. The main reason for the observed spread of low inflation around the globe in recent years is a change in monetary policymaking in many countries, and, more in particular, the change towards a credible commitment to price stability.

⁴ That is, it would lead to an increase in the rate at which the economy can grow without jeopardising price stability.

Globalisation does not change rules of monetary policy-making

Although globalisation is challenging monetary policy, I fully agree with John Taylor's assessment that globalisation does not fundamentally alter the rules for monetary policy-making. Nowadays as ever, over the medium to longer term, *inflation is a monetary phenomenon*. This means price stability is for us to achieve.

Let me stress the obvious here, namely that *central banks cannot permanently determine the relative prices of specific goods*. In referring to price stability, we mean stability of the purchasing power (of the domestic legal tender) as measured by the cost of a representative basket of goods.

While international liquidity conditions may influence market interest rates and thus the transmission of monetary policy to real activity and inflation, *central banks retain the ability to control short-term interest rates by appropriately influencing the supply of the domestic legal tender*. Short-term rates in turn work their way into the domestic cost of credit and into long-term interest rates.

Therefore, central banks can ensure price stability in the medium to long-term, even in a financially-integrated world in which production factors and goods move freely, and even if the size of the world economy increases relative to that of the domestic economy.⁵

But, as I said earlier, as a precondition for successful monetary policy central banks need to properly adapt their analyses to the changing environment. In such an environment, it is clearly important for stability-orientated monetary policy to analyse developments in external prices, in international trade flows and in international financial flows.

This said, I agree with John Taylor that developments in exchange rates *per se* should not be given any special status but should be taken into account by monetary policy only to the extent that they have a medium-term influence on price stability. This is because another fundamental law of monetary economics is alive and well in the globalised economy: *flexible exchange rates are a sine qua non for price stability*.

Does a globalised world call for more international monetary coordination?

With a growing set of prices and asset valuations being determined internationally, information on international developments is crucial for monetary policy-making. In this light, the financial turmoil in particular has shown the value that growing financial globalisation places on a timely and open international exchange of information among central banks and regulators.

Central banks should therefore *cooperate by exchanging information and by designing a solid international financial architecture*.

Beyond that, however, the scope for monetary policy-makers to coordinate is limited. This is the case as each central bank has just one policy instrument, and this instrument can only achieve a single domestic objective, price stability. As a consequence, each central bank is well advised to react to foreign developments only if these become relevant for domestic price stability. I therefore fully agree with John Taylor's conclusion that central banks should not mechanically follow other central banks' policy decisions.

Not least as a result of this consensus, I question the strong conclusions that John Taylor draws from some of his empirical analysis.

In brief, he finds that a simple monetary policy rule, also widely referred to as the "Taylor rule", when applied to the euro area, has residuals that correlate positively with the US federal funds rate. He interprets this finding as implying a *leader-follower structure* in the sense that US monetary policy induces the ECB to deviate from its objective of price stability out of concern for the exchange rate.

This is not the case. Indeed, a more reasonable explanation for John Taylor's findings is the following:

Central banks which are concerned with domestic price stability seek to offset potentially destabilising shocks. In a globalised world, though, different central banks naturally respond in part to similar global

⁵ See, e.g., Woodford (M.) (2007): "Globalisation and monetary control," NBER Working Paper No. 13329, to appear in Gali, J. and M. Gertler eds., *The international dimensions of monetary policy*, University of Chicago Press.

factors. And, as we know, a number of these factors are not well captured by a mechanical policy rule of the type which John Taylor takes as a benchmark for good monetary policy-making. Adequate policy reactions to global factors, and to the risks that they pose for domestic price stability, will thus show up –within the context of a simple rule– in the residual term.

Some observers interpret this residual as a measure of the monetary stance. It may indeed, in some cases, be possible to interpret the residual in this way. However, often the residual is a measure of the lack of explanatory power of the simple policy rule itself.

Now, to the extent that economies are structurally different and are hit by shocks with different timings,

- global factors affect these economies with different lags.
- As a result, the measures of inflation and the output gap used in the Taylor rule are also affected with different lags.
- In such a context, monetary policy has to react in a pre-emptive manner to current and future likely developments to ensure domestic price stability over the medium to longer term.
- However, such a behaviour might generate a spurious correlation between the residuals of a simple Taylor type policy rule for the euro area and interest rates in other economies.

I suspect that this is what lies behind John Taylor's result concerning the deviations from a euro area "policy rule" and the US federal funds rate.

Having inside knowledge, I can in fact rule out any sign of a leader-follower structure or any sign of a focus on the side of the ECB on the dollar-euro exchange rate, or in fact on any exchange rate, as a target of policy. Neither is the case. I agree with John Taylor, however, that any development in that direction would be deeply worrying.

Only a clear assignment of responsibilities ensures clarity about the central bank's objective, which

is at the heart of successful monetary policy. Yet international complementarities exist in monetary policymaking, to the extent that an international architecture which has each central bank keeping its own house in order is also conducive to an environment of global monetary stability.

Such architecture provides the best basis for a friendly and open exchange of views and information at an international level. Today there is frequent interaction as, for example, the BIS provides a much-appreciated forum for discussion among central bankers. In addition, there are further occasions for fruitful exchanges –this very symposium being one of them.

The role of the monetary policy strategy in an increasingly globalised world

I have argued that the best international monetary architecture is one in which each central bank focuses on achieving domestic price stability. In practice, even more is needed to guarantee a successful monetary policy. A *clear mandate* for price stability and a *well-defined monetary policy strategy* based on this mandate are essential for coping successfully with the analytical and practical challenges which lie ahead. Fortunately, both conditions are in place in the euro area.

A clear mandate for price stability :

- ensures that a central bank is fully accountable for achieving price stability. The commitment to price stability which such a mandate generates is, in turn, conducive to anchoring private sector expectations in a lasting way. This anchoring is particularly important if globalisation causes sequences of one-sided shocks to inflation.
- prevents central bank policy from going astray. While concerns are expressed that central banks may be increasingly tempted to stabilise exchange rates at the expense of price stability, a clear mandate for price stability guarantees that a central bank will not fall into this trap. Instead price stability-orientated central banks do not assign any special role to exchange rates, important as they are as information variables in the economic analysis.

Building on a clear mandate, a successful strategy :

- supports accountability,
- ensures a transparent and systematic response to risks to price stability,
- guides an effective communication policy,
- and enhances the predictability of monetary policy over the medium to longer term.

In this context, any measure of price stability used by central banks must adequately reflect the evolution of the purchasing power of money. Price stability is therefore best defined in terms of the cost of a representative, *i.e.* broad, basket of goods. An example which provides a clear and assessable yardstick of price stability is the basket underlying the euro area harmonised index of consumer prices.

This encompassing definition of the underlying basket contrasts with partial, or so-called “core” measures of inflation. While these measures can be useful for assessing risks to price stability, they –if put front and centre– risk providing a distorted view of underlying price developments which would jeopardise the anchoring of inflation expectations. This would be particularly detrimental in situations in which globalisation might induce sustained movements of prices of certain categories of goods.

A broad, transparent and widely accepted yardstick instead creates the necessary clarity to ensure a firm anchoring of inflation expectations. It is this clarity which allows a central bank to adopt a medium-term orientation within which policy-makers can appropriately discount short-term price volatility and transitory movements in inflation.

As mentioned, globalisation is likely to change the structure of the euro area economy both with regard to goods markets and financial markets. A strategy which monitors structural changes both from a goods market angle and from a financial or monetary point of view is therefore well-suited to cope with the challenges brought about by globalisation. The complementary perspectives of the economic analysis and the monetary analysis, which underlie the ECB's “*two-pillar strategy*”, are conducive to appropriately adapting our policies to the changing environment. At the same time, the two-pillar strategy keeps

minds focused on the fundamental laws of monetary economics.

In particular, having an explicit monetary pillar guarantees that the ECB always has considerable expertise in the analysis of monetary and credit developments and in the analysis of their impact on price stability. The close link between monetary developments and evolving imbalances in asset and credit markets implies that monetary analysis enables central banks to detect such imbalances at an early stage and to respond to the implied risks to price and financial stability in a timely and forward-looking manner. This has, in the past, proved an invaluable asset for the ECB, notably in times of global financial turbulence.

Just as the two-pillar strategy structures the discussion within the ECB, it also provides the basis for communicating our understanding of the economy to the outside world. By adhering to transparency, the ECB has achieved a high level of predictability for its monetary policy decisions. Our strategy therefore improves our policy effectiveness.

Let me conclude.

- Especially in an environment of ongoing globalisation, monetary policy must aim to robustly anchor inflation expectations. This requires a permanent alertness to risks to price stability on the side of the central bank, as shocks to inflation must not translate into second-round effects in price-setting and wage-setting.

- That being said, an efficient adjustment of the economy to macroeconomic shocks can be best facilitated by monetary policy-makers if they keep a firm focus on their domestic price stability objective. In particular, there will be no external stability without domestic price stability.

- Domestic price stability is a precondition for global monetary stability. Globalisation therefore does not expand the need for international monetary co-operation beyond an open exchange of views and information. The best international architecture is one in which each central bank has a clear mandate to focus on domestic price stability.

- Greater microeconomic flexibility would not only allow our economy to take better advantage of the opportunities provided by globalisation, but would

also facilitate macroeconomic adjustment in the wake of shocks and improve the resilience of the economy. Globalisation therefore intensifies the need for more flexibility in product and labour markets.

- I have argued that a monetary policy strategy which carefully monitors developments in domestic, as

well as international, financial and goods markets is well-equipped to cope with challenges that globalisation brings for monetary policy. Such a strategy is in place in the euro area. At the same time, price stability is the best contribution monetary policy can make to enable the euro area economy to take the full advantage of the opportunities offered by globalisation.