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Let me start by thanking Governor Noyer for the invitation to participate in this conference. The topic could not be more timely, and it is one that is close to my heart. When I took office as president of the Dallas Fed three years ago, I made it clear that I wanted our signature research issue for the coming years to be the study of the implications of globalisation for the conduct of monetary policy in the US. To this end, we have created a Globalisation and Monetary Policy Institute and have assembled a blue-ribbon advisory board that includes Ken Rogoff among its members.

Let me start by posing a rhetorical question. Should the default framework for thinking about monetary policy in a country like the US or, indeed, in the euro area, be an open economy where capital flows across national borders, goods and services are sourced from the cheapest global suppliers, interest rate movements in one country impact rates in another, and exchange rates factor in firms' pricing and production decisions? Or can we get by thinking in closed-economy terms, where domestic investment is financed with domestic savings, we only consume what we produce, interest rates are determined at home and exchange rates are irrelevant? Nobody who has lived on the planet since the fall of the Berlin Wall and the ascendancy of Deng Xiao Ping would likely testify to the validity of the second proposition. Globalisation means that we can no longer guide policy by ignoring trade and capital flows or the invisible but nonetheless effective links between countries that have been forged through cyberspace. Yet it appears to me that the default framework for thinking about monetary policy continues to be the closed economy model.

Now on to Professor Rogoff's paper. Ken's paper starts with a review of some of the salient facts about globalisation and segues to a discussion about the seeming resilience of the globalised world economy and the important role that better monetary policy plays in ensuring that resilience. He then proceeds with a discussion of the central role that China seems to be playing in the recent acceleration of globalisation, assesses its impact on global commodity prices and then wraps up with a very nice discussion of whether the recent subprime crisis is all that different from previous banking crises.

Globalisation means different things to different people. To the Chinese peasant it may mean the prospect of an end to poverty and steady improvement in his living standards. To the American or French factory worker it may mean the threat of cheap imports and the potential outsourcing of his or her job. To the environmental activist it may mean the despoliation of the Earth's atmosphere as more countries industrialise and pour pollutants into the atmosphere. To the public intellectual it may mean the loss of national identity and the Americanisation of culture. There are many important dimensions to globalisation, but as a central banker, I am most interested in the *economic* dimensions, namely the greater integration of national economies through increased trade of goods and services, investment, migration, and task allocation. All of these facilitate the spread of ideas and technologies that are another key manifestation of globalisation, and indeed contribute to its spread.

However, it is extraordinarily difficult to get a good handle on just how rapidly the world is globalising. As Ken notes, there is a lot of hype out there about how many new workers and consumers have become part of the global economy as a result of the demise of communism and the opening of China, India and other economies. The raw numbers in terms of population are huge –we are talking billions with a "b"– but the true extent to which the workers in these countries are, for want of a better word, substitutable for workers in advanced economies is an open question. It is this substitutability that determines how the coming on line of this new labor force will impact the wages of workers in the advanced economies. It would appear that the number of workers in countries like China and India who possess skills comparable to those found among the workforces of the US, Europe and other advanced nations is a small subset of the headline numbers. It is worth keeping in mind that the nominal per capita income of the average Chinese citizen today is, in inflation-adjusted terms, roughly equivalent to that of an American worker in the early 1900s. And yet, for those workers who possess the skills demanded by a modern economy, wages have rapidly approached advanced economy levels. There are abundant anecdotal reports that the salaries of top programmers in Mumbai are quickly converging

to those of their peers in Silicon Valley. Likewise, there is rapid wage growth for managers in China who can work in Western companies. Indeed, just last week *The Financial Times* reported on million-dollar bonuses paid to certain Chinese executives in the financial sector. But the vast majority of the new workers in the global economy at present bring little more than their raw labor and thirst for betterment.

Technological improvements and policy changes have both been important drivers of globalisation. The information technology revolution has played an important role in breaking down the barrier between those goods and services that were hitherto thought to be tradable across national borders and those that were not. Services that were long considered to be the quintessential nontradable good are increasingly traded internationally. If you do the numbers, you will find that the US exports a lot more services than it imports, and moving up the value-added chain into more service-oriented sectors is key to the continued competitiveness of the US economy.

By some measures, financial globalisation has proceeded even more rapidly than the "real" –for want of a better word– globalisation that is rooted in trade flows. In some sense, this is not too surprising. While innovations in transportation technology –such as the inventions of container shipping and the jumbo jet that Ken mentions in his presentation– have helped reduce the effective geographic distance between countries, making it easier to trade goods, distance in a very fundamental sense still matters for trade. However, the information technology revolution has effectively eliminated the idea of geographic distance in financial and several other service transactions. Financial trades can be executed at any time of the day in any part of the world at the click of a mouse. Architectural renderings can be performed thousands of miles from the firm that commissions them. X-rays and CAT scans of patients in Dallas or Paris can be analysed in Sydney or Delhi while their Texan or French doctors sleep. As long as the Earth rotates on its axis and satellite and Internet connections are maintained, technology never sleeps in a globalised world, nor does the production of other goods and services.

Globalisation is not new. Some of the key technical innovations that make today's globalisation possible are a half century old or older. But it is perhaps worth emphasizing that much of the globalisation that went on in the immediate post-World War II period was simply getting us back to where we were on the eve of World War I. As is well known, by the early 1970s, trade flows had gotten back to where they were in 1913, but other key dimensions of globalisation, capital flows and migration, were still well below their pre-World War I levels. Indeed, the reversal of globalisation in the interwar period is something we should never forget and serves as a reminder that we cannot take a liberal international economic order for granted. Writing shortly after the end of World War I, John Maynard Keynes commented on how thoroughly "internationalised" (his expression) the world was in 1913. It is worth repeating what he said, which was as follows: "The inhabitant of London could order by telephone, sipping his morning tea in bed, the various products of the whole earth, in such quantity as he might see fit, and reasonably expect their early delivery upon his door-step; ...[and] at the same moment and by the same means adventure his wealth in the natural resources and new enterprises of any quarter of the world, and share, without exertion or even trouble, in their prospective fruits and advantages; or he could decide to couple the security of his fortunes with the good faith of the townspeople of any substantial municipality in any continent that fancy or information might recommend. He could secure forthwith, if he wished it, cheap and comfortable means of transit to any country or climate without passport or other formality, could dispatch his servant to the neighboring office of a bank for such supply of the precious metals as might seem convenient, and could then proceed abroad to foreign quarters, without knowledge of their religion, language, or customs, bearing coined wealth upon his person, and would consider himself greatly aggrieved and much surprised at the least interference". Most important of all, this average inhabitant of London "...regarded this state of affairs as normal, certain, and permanent, except in the direction of further improvement, and any deviation from it as aberrant, scandalous, and avoidable". That rather bucolic description of globalisation as it once was practiced was penned by Keynes in "The economic consequences of the peace" in 1919. It seems unlikely that the unique set of circumstances that led to the collapse of globalisation between the great wars of the twentieth century will ever be repeated, but newer twenty-first century challenges could just as easily impede the progress of globalisation.

Taking a very long-term perspective on globalisation, looking at it from the perspective of centuries and not just decades, also teaches us something about the role of the monetary standard in promoting international economic integration. The nominal stability associated with the gold standard played an important role in fostering globalisation in the nineteenth century. The transition to a fiat, or "faith based," standard created some challenges for central bankers, but in recent years central bankers have come to a better understanding of how they need to conduct monetary policy under a fiat standard and have done a good job at delivering price stability. Ken is right: high inflation is much rarer now, with only two countries currently experiencing what might be considered very high or hyperinflations. This greater nominal stability is a key factor underlying the surge of globalisation over the past decade and a half and remains vital to continued progress.

But how resilient are the new monetary frameworks? Is the adoption of formal or informal inflation targeting the key to central bank successes in recent years, or have they been the beneficiaries of a dollop of good luck in the form of higher productivity growth? Better monetary policy helped make greater globalisation and faster productivity growth possible, but globalisation and faster productivity growth also made the jobs of central bankers easier. The more challenging circumstances that have developed over the recent past –as the tailwinds that ensued from the addition of new workers to the production side of global output have morphed into headwinds of demand for scarce resources– will serve to stress test the new monetary policy frameworks in ways they have not been tested before.

No discussion of globalisation would be complete without some mention of China's extraordinary growth over the past decade. The raw numbers are staggering, from the rapid urbanization of its population, to the extraordinary increases in output year after year, and the voracious demand for raw materials as it becomes the workshop of the world. Ken asks what would happen to the favorable inflation and productivity environment if internal stresses in Chinese society were to cause the authorities to slow down or even reverse some of the recent market reforms. There can be little doubt that the Chinese authorities face a gargantuan task in managing the transition of the economy to a free-market system. Recent strains have manifested themselves in higher inflation, and the ability of the authorities to control that inflation is clearly hindered by the exchange-rate regime. Greater exchange-rate flexibility will enhance the ability of the People's Bank of China to deliver price stability, the surest contribution any central bank can make to improvements in living standards over the long term.

Globalisation does matter for inflation, but not in the ways that are often suggested in the media. The most common fallacy is of course the confusion of relative price with price level changes, the idea that a flood of cheap imports from China must of necessity lower the price level and the inflation rate. The channels whereby globalisation affects inflation are much more subtle, and not always necessarily benign. Furthermore, I believe that different dimensions of globalisation affect the dynamics of inflation in fundamentally different ways.

Let's start with trade. The availability of cheap imports from China and other countries does have a direct and indirect impact on domestic prices and inflation. There has been a significant amount of work in recent years trying to document the size of this effect. The estimates vary, but they are generally significant. But the mechanism whereby the price changes are realised is subtle. Yes, there is a direct effect through the availability of cheaper imports. When those cheaper imports are *inputs* into the production process, we know they directly lower prices at home. The price effect is not just relative, but absolute. But that will be offset to some extent as consumers use their enhanced purchasing power to buy more of other products, putting upward pressure on their prices. The threat of competition also has an effect on the pricing decisions of domestic firms, both for firms producing products that are close substitutes for the imported goods and for firms that use those imports as inputs. Cheaper imports will also have an impact on the wage demands of workers who consume those goods. Of course the effect is not all in one direction, as Ken notes in his paper. The downside of the rapid growth in production in low-wage countries is the upward pressure that this growth has put on commodity prices worldwide. Faster growth in incomes is having a significant effect on global food prices, although some of the recent increases have been driven by policy changes encouraging the production of biofuels and supply-side developments as well.

The thirst of the emerging-market economies for raw materials and the relative inefficiency with which they use these raw materials has propelled industrial commodity prices to record levels. The fact that these increases have been persistent and not quickly reversed has raised difficult questions about traditional measures of core inflation and made it increasingly difficult for central bankers to separate signal from noise in the inflation data. We in Dallas look at not just the traditional measure of core inflation that simply excludes food and energy prices, but also a trimmed mean measure that we think gives a better sense of where trends may be headed. While an improvement on the traditional measure, it too has some shortcomings, and I believe that over the long term, the price stability that matters most to the people who pay our salaries, since they do eat and they do drive, is stability of a comprehensive measure of prices.

Globalisation of labor markets also matters for inflation dynamics. Now, one of the key differences between the current era of globalisation and the one that preceded WWI has to do with the greater restrictions on international movement of labour. We don't see the same mass movements of people as characterised the late nineteenth and early twentieth century, and with more countries providing social safety nets, and the equivalent of "virtual immigration" through cyberspace, we are unlikely to see such mass migrations ever again. Nevertheless, for some countries, recent movements of workers have been quantitatively large enough to affect prices. The recent expansion of the European Union and the freeing of labor mobility has clearly made a difference to wage and price dynamics in Europe. Whether this is a one-off effect associated with a permanent reallocation of labor from low-wage to high-wage countries or a longer-term development whereby workers are more willing to move in search of job opportunities in response to the business cycle, it is too early to say.

The third key dimension of globalisation –that of capital markets– also matters for inflation, but in a way that fundamentally differs from trade flows and migration.

Greater international capital mobility seems to have a disciplining effect on policymakers worldwide by making it costly to engage in reckless fiscal or monetary policies. But again, I think there is two-way causation. Sounder monetary policy in more countries has contributed to the willingness of investors to venture abroad, but the ease with which capital can take flight has also made it more costly for central banks to deviate from the new orthodoxy of price stability.

The fourth dimension is the least understood. That is the global assignment of tasks through nontraditional channels. The US is a high-value-added, services-driven economy; services represent over 80% of our economy. The growth of service sector trade, particularly through fiber optic cable and satellite connections, poses significant measurement issues. It is not as if we can just go down to the docks and count containers coming and going in order to quantify the impact of service sector trade. And, what implication does the increasing trade in tasks with cheap labor pools around the globe pose for pricing of services and, in turn, for inflation?

Ken's final point has to do with the scepticism of some academics about the implications of globalisation for monetary policy. He cites a recent important paper by Michael Woodford as a representative example, so let me conclude with two observations related to that paper. First, I think there is an element of talking at cross purposes in some of the exchanges that have taken place on what globalisation may or may not mean for monetary policy. I am in substantive agreement with Woodford that globalisation does not undermine the ability of the Fed, or any other central bank for that matter, to control inflation over an appropriate time horizon, but it does challenge us –you might say it disciplines us– to conduct monetary policy more prudently. In today's world, where investors can move their funds instantly from one currency to another to avoid depreciation, the price central bankers pay for high inflation is much higher than in the past. Understanding this, you can see why I am a steadfast inflation-fighting owl.

Globalisation also makes us change the way we should interpret some of the indicators that have traditionally played such an important role in monetary policy deliberations. Globalisation indeed warrants the examination of a broader array of data in arriving at monetary policy decisions. For example, understanding global capacity utilisation in an industry may be more useful than equivalent measures of domestic capacity. Second, the elegance of Woodford's exposition

notwithstanding, we are still some way from having a consensus model of how the domestic and international economy works. Enormous progress has been made in recent decades, due in no small part to the work of scholars like Ken Rogoff and Michael Woodford, but a lot more remains to be done, and we are spending an enormous amount of time doing it at the Federal Reserve Bank of Dallas. At times of rapid structural change, it is important to keep an open mind and challenge old assumptions and paradigms, within a framework of disciplined, evidence-based scientific inquiry.

John LIPSKY
First Deputy Managing Director
International Monetary Fund

I would like to begin by thanking the Banque de France for organising this timely symposium. It is also a great pleasure to comment on Ken Rogoff's presentation. Ken brought to the fore the international dimensions of the global disinflation of the 1990s and earlier this decade in his widely-cited 2003 Jackson Hole speech.

The combination of surging oil, commodity and food prices –alongside slowing global growth– suggests that the challenges facing central banks are becoming more complicated. In my intervention, I will highlight some key points in Ken's presentation today and then offer some thoughts on commodity price prospects and inflation from a global perspective.

Turning to the presentation, Ken makes three main points.

• First, the two main features of globalisation of relevance for our topic today are the revolution in information and communications technology and the integration of China and India (and smaller Asian countries) into the global market economy. Not just because we are in Europe, I would also emphasise the rapid market integration of the countries of the former Soviet Union and allied countries. Clearly, as Ken notes, industrialisation take-offs and integration of developing economies into the international trading system have occurred before, but few prior episodes of rapid integration have been on the scale we have experienced over the past two decades. The implication for inflation is that the global supply of manufactured goods has increased rapidly, especially that of durable ones. The resulting fall in their relative price –a relative price shock– has had an important disinflationary effect, directly through import prices and indirectly through increased competitive pressures on domestic producers, especially –but not only– in the United States and other advanced economies.

• Second, as Ken emphasises, the global economic system has benefited from generally better economic policies, with improvements both at the macro and the micro levels. In recent years, macroeconomic policy frameworks in emerging economies have improved greatly; let me just mention the increasing use of inflation targeting and Taylor Rule-type monetary policy frameworks, together with increased exchange rate flexibility. At the same time, economic flexibility has increased, partly because of the transition toward market economies, and partly because of structural reforms. As a result, inflation expectations appear to be much more firmly anchored than previously in an increasing number of countries.

• Reflecting these factors, global productivity growth over this period has been impressive, contributing to a global growth surge during 2003-07 that was stronger than during any other 5-year period since the early 1970s. Nevertheless, and this is the third main point of Ken's presentation, strong productivity growth may have made macroeconomic policy frameworks appear to be deceptively strong. And despite better policy frameworks, recent developments have highlighted that significant weaknesses and fragilities remain, including the explosive growth of cross-border capital flows and persistent imbalances in domestic demand gains among key economies. Both of these factors raise questions about sustainability.

Ken's work dovetails well with continuing research at the IMF on the role of global factors in the inflation process. But it is striking how the story line is changing. Until recently, globalisation was widely viewed as providing valuable support to central banks by keeping import prices low. More recently, however, the focus has shifted to inflationary pressures stemming from surging commodity prices that may constrain monetary policy flexibility at the onset of a global slowdown. This is a reminder that the impact of globalisation on price pressures can run in either direction, as global demand factors are important, in addition to global supply trends.

In the latest *World Economic Outlook*, we have examined both forces. One important finding is that the disinflationary effects of non-fuel import price declines have only been large and economically significant at times of global spare capacity. Our estimates suggest that at the time of the Asian financial crisis of a decade ago, these "globalisation" effects shaved more than 1 percentage point off "headline" inflation in some advanced economies. On average, however, disinflationary supply pressures, as measured by the trend decline in the relative prices of non-fuel goods imports, has been

very small. Our estimates, which are similar to those of others, suggest that globalisation-related supply effects have reduced inflation over 1996-2005 by an average of a ¼ of a percentage point per year in the advanced economies. Such small effects should not come as a surprise; after all, relative price shocks should not have large effects on average inflation.

In the context of the past few years' very strong global growth and the pressumed narrowing of spare capacity margins, the demand side of the globalisation story has come to the fore. Rapidly increasing prices of primary commodities and intermediate goods have added to inflationary pressures since 2005. This is not a new phenomenon. Broad-based commodity price booms and price pressures have emerged toward the end of previous long global expansions, notably in 1973 and again in 1999-2000. This time, however, there is an important difference. While many indicators suggest that growth in advanced economies has begun to slow, commodity prices are still booming. This has led to concerns about potential challenges to policy makers, reflecting a possible decoupling of commodity and raw material prices from the advanced economies' business cycle.

Such a potential decoupling could derive from two sources. First, if emerging economies resist the current slowdown in the major advanced economies, commodity markets could remain strong if emerging economies continue to drive growing commodity demand. Second, sluggish supply increases could keep commodity prices high or increasing, even if commodities demand gains slowed in tandem with global growth.

Let me start by discussing this prospect by examining whether emerging economies can decouple from industrial economies. This is a key issue, as emerging economies have accounted for most, if not all, of the heightened demand growth for key commodities in recent years. Their increasingly important role reflects not only their rapid expansion but also the commodity intensity of their growth. For every percentage point of growth, their commodity demand increases by a greater percentage than that of advanced economies. This explains why news about worsening advanced economy prospects has had less of an effect on commodity prices in recent weeks and months than might have been expected. Indeed, many indicators still point to robust demand gains from emerging economies.

Several factors are helping emerging economies to sustain their growth momentum.

• First, these economies have been less exposed to direct losses from the financial market turmoil than the US economy or Western European economies.

• Second, domestic demand momentum, reflecting the productivity gains of long-run trade integration and industrialisation, has remained very strong.

• Third, with more credible policy frameworks and lower vulnerabilities, many emerging economies appear to be less exposed to sudden stops of capital flows than in the past, and some among them may even have space for counter-cyclical macroeconomic policies.

Nevertheless, emerging economies will be affected by what we are expecting to be a notable growth slowdown in the advanced economies.

• First, trade spillovers will be important. Net exports to advanced economies remain an important source of growth for these economies, even though trade among emerging economies is growing rapidly.

• Second, financial spillovers through equity, bond, or bank market will still play a role, as we have seen in emerging equity markets in recent weeks. Moreover, there are pockets of potential vulnerabilities in countries with large external financing needs, especially in emerging Europe.

On balance, we expect that growth in emerging economies will moderate in 2008-2009, but to a pace that would still be strong by historical standards. What does this imply for commodity prices? Our current projections assume a modest decline in both fuel and non-fuel prices during this period. The underlying reasoning is that while the significant growth slowdown in the industrial countries will lead to further declines in their demand for commodities, demand from emerging countries will continue to increase at a robust pace, given expected growth. As a result, the generally tight market balances for many commodities will improve only slightly.

This brings me to a second key question. Could supply problems sustain commodity prices even in the face of softening demand? Reflecting very rapid demand growth, markets for many commodities have been

beset by chronic capacity shortages in addition to the usual temporary supply problems that range from weather conditions to facilities outages. For some commodities, inventories are at multi-year lows.

Capacity expansion in oil markets has been much slower than expected. Escalating costs and the complex geology of increasingly important nonconventional sources have led to project delays, particularly in non-OPEC producers. At the same time, decline rates in major fields have been faster than expected, partly because production peaks have been reached earlier. This implies that more investment will be needed just to replace declines from existing fields. OPEC production decisions are yet another supply factor to take into account.

As a result, supply problems represent another reason why commodity price declines in the near term are likely to be limited. At the same time, they also create considerable upside risks to prices, as illustrated by the recent rebound in metals prices that were associated with production outages in China.

We still expect commodity prices to recouple eventually with the advanced economy cycle as emerging economy demand moderates. Nonetheless, the current commodity price boom is unlikely to be fully reversed. According to our base case forecast, inflation pressures should abate gradually over the year ahead, at least those stemming from commodity sources.

However, it would be too early to disregard inflation risks, for two reasons.

• First, second round effects on inflation remain a concern. They are most immediate in emerging and developing countries where food expenditure shares are high and where monetary policy credibility is not yet firmly established. Spillovers from food price increases into core inflation also remain possible in advanced countries, given the large magnitudes of recent increases and limited slack in labor markets. And if near-term price rises deteriorate inflation expectations, the task of restoring credible price stability will be more difficult.

• Second, commodity prices are both volatile and difficult to forecast. In many cases, their behaviour is close to being a random walk, especially over 1 to 2 year periods. With commodity markets small relative to global capital markets, recent increases in financial commitments by market participants to position taking in commodities may have contributed to increased price volatility and price overshooting on occasion, notably when inventories are at low levels. This complicates inflation forecasts at the decision horizons relevant for central banks. The implication is that banking on early relief from commodity price declines could be a risky strategy.

Our main preoccupation today is dealing with the macroeconomic consequences of financial turbulence. At the same time, we must recognise that some of the disinflationary benefits of globalisation have faded and that strong growth in emerging economies and the related high commodity prices can create at least the temporary appearance of an apparent inflation dilemma. While we do not think that emerging and developed economies can remain decoupled for an extended period, nor that commodity prices could remain unaffected by an extended growth slowdown in the advanced economies, we need to bear the shorter-term risks in mind when considering macroeconomic responses to global financial problems.

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I would like to thank the Banque de France for inviting me and giving me the opportunity to discuss this paper.

So Ken told us that we are saturated with facts on globalisation. I'm actually going to add to this saturation and talk about, at least at the beginning, two stylised facts on trade. I'd like to talk about stylised facts on trade, beyond trade growth. We know that trade has grown, but I want to talk about a vast change that has occurred in the composition of international trade. This vast change has gone towards differentiated goods, which are typically characterised by imperfect competition, and these are goods with high mark ups and high prices. If you look at the United States, for example, the share of imports in this type of goods increased from less than half to 75% from 1979 to 2000. This was also the case for US exports (see Table 1).

So I think this is an interesting fact about the nature or characteristic of trade growth in itself, and it has also some implications on the issue of the relation between globalisation and inflation. One possible implication for the debate on globalisation and inflation is that it contradicts, I think, an argument that has been heard that globalisation has had little effect on competition (and inflation) because mark ups on traded goods have not fallen. My point here is simple, this may just be a composition effect: you have more trade in high mark up goods.

So the next stylised fact I want to talk about is that growth in trade actually comes in two ways. You can have trade growth because you have growth in sales of existing goods; that's the usual way we think of trade growth. And you can have growth because you have growth in the number of traded goods, that you're entering new sectors, that there are new firms that are coming into the market.

Table 1 Change in composition of international trade towards differentiated goods (high markup goods)

	1979	2000
In % of US imports	47	75
In % of US exports	62	79

So the first one is the standard way we think of trade growth. And in some sense, when we teach our students about trade, that's the way we think about growth in trade. That's what we call the intensive margin of trade, growing sales of existing goods. The surprising result from recent academic work is that only one third of trade growth comes from the standard intensive margin.

The second one, the extensive margin, that is the fact that there are new goods, new varieties of goods which are entering the market, is actually the largest share in the growth of world trade.

I think again this is an interesting fact about globalisation and it has some implications for our debate on globalisation and inflation because it alters the standard story that we have on the way globalisation may affect relative prices. And again, obviously, the important point here, the important word is "relative".

The standard story is basically the following. Suppose you have a productivity increase in China. Marginal costs of production go down in China. Chinese exports grow because the price of Chinese goods fall. That means terms of trade improve for countries that import those goods, and that means import prices fall in those countries.

Now, if China exports not because sales of a given number of goods increase, but because it exports new goods, this changes a little bit the story. It's not exactly the standard story. In fact, there's some theoretical work that has been done with my colleagues, Giancarlo Corsetti and Paolo Pesenti, that shows that in this case, there is less or no effect, or even reverse effect in terms of the terms of trade. In this case, if China increases its exports through this extensive margin, our terms of trade as the importing countries may actually deteriorate and importing prices may actually increase. Hence, globalisation, if it takes the extensive margin form, more goods being exported, may not lead to imported deflation as in the standard story.

So are we importing low inflation from the rest of the world? We certainly import more goods and services from low cost countries. Cheap imports certainly have an effect on inflation and it's quite remarkable.

Chart 1 Import prices and inflation in the US
1970-2007

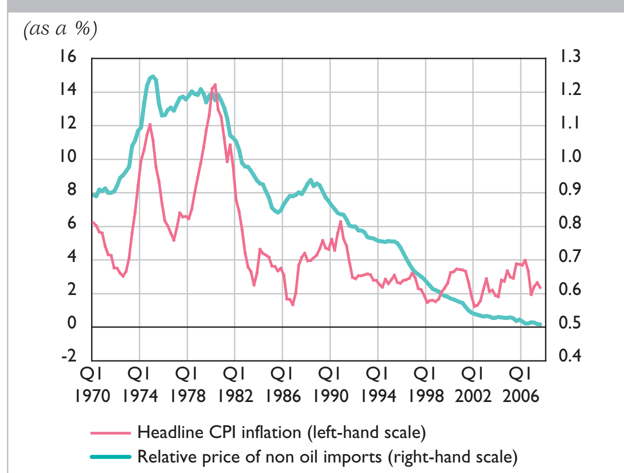

Chart 1 shows the relative price of non-oil imports for the United States on the very long period, and this decrease has been very remarkable. And obviously if you look at headline inflation, you see some kind of relation between the two.

So it's an impressive downward trend in, again, relative import prices, and the important word here is "relative". Relative prices cannot go down forever. In fact, import prices may have already bottomed out. I think this is something that we've already heard this morning, but this is an important point.

So the last question I want to ask is the following: does globalisation make the central banks' job easier, which I guess is an interesting question for many of you in this room. One way to ask this question is what is the impact of globalisation on the sacrifice ratio? So let me remind you of the sacrifice ratio. To bring down inflation by one percent, we need to accept higher than average unemployment, at least for some time, certainly not in a permanent way, and this is the sacrifice ratio. So a low sacrifice ratio means we are able to achieve price stability without much sacrifice for the real economy, at least in terms of high unemployment and negative output gap.

So how does globalisation affect the sacrifice ratio? Obviously, when the sacrifice ratio is higher, that means politically the job of central bankers is more difficult. There are two offsetting effects. More trade increases competition and makes the economy more flexible, and this is something on which Ken has already talked about. In this case, the sacrifice ratio is smaller because a small, cyclical downturn has big negative effect on prices.

There's a second effect. More trade increases the share of imports, and consumption and production, and that makes inflation more sensitive to global production, and less sensitive to the domestic real activity. This actually generates a higher sacrifice ratio. Globalisation makes monetary policy more difficult in some sense, or the job of central bankers, at least from a political point of view, a bit more difficult because you need a larger and longer domestic downturn to bring down inflation.

To estimate the sacrifice ratio, economists put inflation as a function of the domestic output gap and many, many other factors; several studies have looked at this equation:

$$Infl_t = Const + \beta_1 Infl_{t-1} + \beta_2 Domestic\ Gap_{t-1} + \beta_3 Other_{t-1} + \varepsilon_t$$

Here, a high coefficient on the output gap means a lower sacrifice ratio because a small decrease in the domestic output gap generates a big decrease in inflation. The job of central bankers from that point of view is made easier.

Table 2 Recent estimates of the sacrifice ratio over time

	Estimated value of β_2	
	1985-1992	1993-2007
18 countries	0.27	0.09

So let me just report on the latest estimates on this sacrifice ratio from a paper by Stefan Gerlach and Cedric Tille, which is not yet published (see Table 2). They look at 18 OECD countries and what they find is that this estimate has gone down, which means, remember, that the sacrifice ratio has increased. But there is contradictory evidence on this. Maybe for the United States this is not true. But at least from these estimates, and we'll talk more about this this afternoon when we talk about the Phillips curve and the flattening of the Phillips curve, if anything, the sacrifice ratio seems to have increased over time, which may be related with globalisation.

So as a concluding point, I would say that globalisation obviously changes the environment in which central banks have to operate, but I'm afraid I have to report that there's no strong evidence that it makes the job of central bankers easier today and in the future.