

## GLOBALIZATION AND INFLATION DYNAMICS<sup>1</sup>

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### I. Summary and conclusions

This paper discusses the dynamics of inflation in the OECD countries over the last four decades, and it evaluates whether globalization may have modified inflation dynamics. Globalization is a loosely defined concept. In this paper, we mean by globalization the emergence of China and India as major players in world trade. This process started in the 1990s and should carry on as these two countries reach, in one or two generations, the per capita GDP of OECD countries. The rise of China, and to a lesser extent, India, can be seen as a major positive shock to labor supply. Being currently at the beginning of this process, the supplied labor is cheap relative to labor costs in OECD countries, and the prices of goods produced by China may be an order of magnitude lower than if these goods were produced in more recent OECD members (South Korea, Mexico) or older ones (Europe, North America, Australia and New Zealand).

The major inflow of inexpensive labor in world trade has had many consequences that have received a lot of attention in the media as well as from international organizations (see the *IMF World Economic Outlook*, spring, 2005; or the *BIS Annual Report*, 2006). In this paper we review the theoretical debate and the empirical evidence about the potential impact of globalization on inflation. In so doing we draw on existing research including our own. We also report some preliminary exploration on the possibility that globalization has changed the response of unit labor costs to oil prices.

We proceed in two steps. First, we show that the dynamics of inflation have been generally common across OECD countries way before anybody cared about globalization. This allows us to cast doubt on the conjecture that the stability of inflation, a trend that was strikingly broad-based in the world economy from 1990 to 2007, is the only common factor influencing inflation. In my view, monetary policy and its shift over time have been the dominant force.

Second, we propose a critical review of three potential channels through which globalization may have influenced the dynamics of prices. We call these:

- the “China and Wal-Mart” channel,
- the “foregone bottleneck” channel, and
- the “China and wage-bargaining power” channel.

The first one refers simply to the possibility that importing lower-priced goods, like those typically sold in large retail stores such as Wal-Mart, lowers inflation. The second one was first put forth by Borio and Filardo (2007), who argued that the organization of production on a world scale reduced the relevance of domestic Phillips Curves. A well-known sequence of the business cycle prior to globalization would see inflation accelerating during booms as the national base for factor inputs, such as labor, approached full capacity. These adjustments become less likely if national producers can match surges in demand by drawing on foreign labor. Finally, the third channel relies on changes in the bargaining power of workers in the North, who fear the threat of relocation of production to countries where wages are lower. This threat, which may have become more palatable with the rapid emergence of China, could induce workers to accept fewer wage increases.

We show that the first two channels are weak at best, while a first exploration of the data is somewhat supportive of the third, at least in the manufacturing sector. The effects of terms of trade shocks on unit labor costs have changed in the last 15 years with respect to the 1970-1990 period. Increases in oil prices have not translated into higher unit labor costs (ULC thereafter) since 1991. We also show, however, that, looking at the economy as a whole, ULC, which have also ceased to increase following increases in oil price shocks, have become negatively correlated with decreases in oil price shocks. Hence, in such periods

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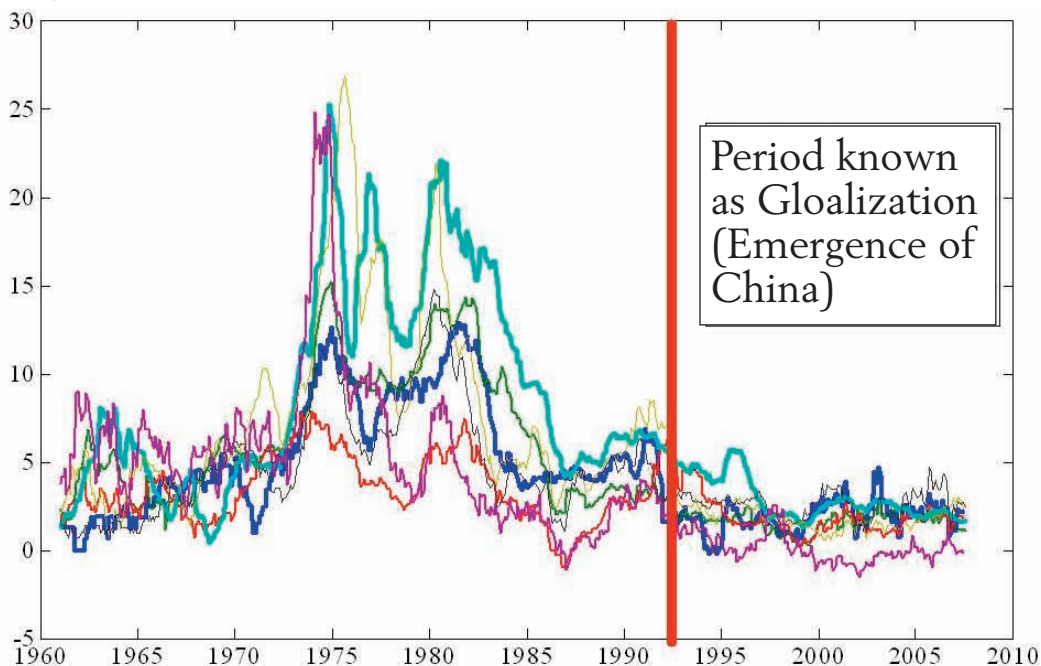
workers rebuild their share of productivity gains. This result may reinforce the view that it is not globalization but monetary policy that explains the lower pass-through of oil prices to core inflation that we have enjoyed since the 1990s. Indeed, one interpretation of our results is that workers may accept temporary deterioration in purchasing power because they expect that inflation will not deviate persistently from the central bank inflation objective. They expect, and actually have, enjoyed higher real wage growth relative to productivity when oil prices have declined.

## 2. The dynamics of inflation since 1960

A first look at inflation rates over the last 50 years is very informative. I gather in *Figure 1* the time series of CPI inflation rates in the G7 countries (Canada, France, Germany, Japan, Italy, the United Kingdom and the United States). The co-movement in these time series is very striking. All countries, including Germany, experienced a “Great Inflation” in the second half of the 1970s. Beyond this common trend, up from 1960 to 1980, and down from then on, a closer look also indicates that inflation in these countries also shares some cyclical fluctuations. We also notice common cycles that peak in 1962, 1970, 1975, 1980, 1992 and 2002. In a previous paper, Ciccarelli and Mojon (2005, 2008) show that a common factor, i.e., a linear combination of these time series, which can be assimilated to their mean, accounts for more than 70 percent of the variance of inflation rates in OECD countries.

These statistics naturally lead one to wonder why inflation rates have moved together and what the forces are that govern their co-movement. This discussion is undertaken in detail in Ciccarelli and Mojon (2008). We conclude in particular that inflation co-movement is due to common shocks rather than to spillovers across countries.

*Figure 1. Consumer Price Inflation in the G7*



For what concerns us here, is it the case that globalization, which is a common shock for all OECD countries, has helped to bring inflation down and keep it there? The answer to this question is probably yes, in the sense that importing lower-priced goods can only help bring the general price level down. However, the perhaps more interesting question is the relative importance of this one factor when compared to other forces. Among these, monetary policy is the main suspect. Some argue that the low level of inflation reflects changes in the monetary policy regime<sup>2</sup>. This is quite clear for the 1990s, a period when 16 OECD countries converged to the low inflation standard of the Bundesbank before adopting the euro.

<sup>2</sup> See Levin and Piger (2004), Benati (2003, 2004), Benati and Wood (2004), Altissimo (2003), Gadzinski and Orlandi (2004) and Goodhart and Hofmann (2003), Cecchetti and Debelle (2004), Robalo Marques (2004) and Dias and Robalo Marques (2004) and Ahmed *et al.* (2002), who review the literature that has debated which share of output and inflation stabilization is deserved by policymakers.

Aside from the countries that are now in the euro area, the 1990s also saw the spreading of “inflation targeting” in such Commonwealth countries as Canada, the UK, Australia, New Zealand, and, beyond, in Sweden, Norway and Brazil to name a few. These monetary policy regimes rest on the objective of maintaining inflation near a point target (typically 2 percent) or within a target range. In the case of the euro area, the European Central Bank, which is not an inflation “targeter,” uses a numerical value for its definition of price stability: inflation should remain close to 2 percent from below over the medium term. These objectives put inflation stability at the center of the mission of monetary policy. They are meant to anchor inflation expectations so that economic agents have a better sense of the real terms of their nominal contracts. The success of these monetary policies is an alternative explanation to globalization for the stability of inflation that we have enjoyed over the last 15 years. Hence the next section will try to assess the contribution of globalization to the stabilization of inflation.

### 3. Three channels from globalization to inflation

#### 3.1 The “China and Wal-Mart” channel

The first channel through which globalization may have impacted inflation is trade and the growing substitution of home-produced goods by goods imported at a much lower price. Let’s take the example of one item to fix ideas. If domestic-made T-shirts cost 10 euros and those made in China cost 2 euros, and the market share of those made in China increases from 10 percent to 90 percent, the average price for T-shirts will go from 9.2 euros to 2.8 euros. If this transition takes 20 years, the associated average yearly deflation would be about 5.6 percent. Hence, to the extent that the market share of imported products at a much lower price level increases gradually, trade of these products would have a negative impact on CPI inflation. However, the consumer basket is composed of a large variety of products, and the retail price of imported ones includes local transportation and retail infrastructure costs. Altogether, this channel is thought to have been limited on the order of 0.2 percent a year on average over the last 15 years<sup>3</sup>.

This is relatively small if compared to the magnitude of the changes in the mean of inflation in OECD countries. Courvoisier and Mojon (2005) show in particular that most OECD countries experienced a drop in the mean of their CPI inflation in the early 1990s on the order of 4 to 5 percent, from 6.6 percent on average before to 2.1 percent on average after the estimated break in the mean of inflation. Hence it seems fair to conclude that the “China and Wal-Mart” channel accounts for only a small share (0.2 in 4.5 percent) in the drop of inflation levels in OECD countries.

#### 3.2 The “foregone bottleneck” channel

A second view of the influence of globalization on inflation dynamics was put forth by Claudio Borio and Andrew Filardo (2007). These economists from the Bank of International Settlements have formulated the hypothesis that the world-wide organization of production has weakened one of the key cyclical engines of inflation. The typical US business cycle used to involve an acceleration of output, which in turn increased the demand for commodities and labor. When unemployment reached below the NAIRU (Non-Accelerating Inflation Rate of Unemployment), i.e., the long-term equilibrium of unemployment, real wages would increase faster than productivity gains in order to attract new workers. This would trigger inflation and, eventually, the Fed would lower money supply and trigger a recession to cap inflation.

Borio and Filardo (2007) have argued that the integration of the world economy raises the ability of firms to draw on labor abroad in case of domestic capacity constraints. They showed in a given specification of an empirical model of inflation that measures of the world-level output gap were better predictors of country-level inflation than measures of the domestic output gap, a result that would support their hypothesis.

This view and these empirical estimates have actually received a lot of attention and have been refuted. On a theoretical ground, Ball (2006) and Woodford (2007) have both shown that the integration of output (i.e., the increase in the opening of the economy) does not imply that the slope of the domestic Phillips Curve would change. On an empirical ground, Ihrig *et al.* (2007) have shown that the significance of the global-output-gap variable in the inflation equations estimated by Borio and Filardo was very sensitive to the specification chosen and, effectively, not robust.

<sup>3</sup> See the *IMF World Economic Outlook* (April, 2006).

### 3.3 The “China and wage-bargaining power” channel

A third channel through which globalization may influence inflation dynamics that has received little attention so far is the indirect impact that the threat of delocalization of jobs has on wage bargaining. Two features of the last 15 years are remarkable, even if few people have stressed their possible connection. First, inflation has become much less responsive to oil prices than in the 1970s and 1980s. Several episodes of oil price acceleration since the trough of oil prices of 2002, when a barrel amounted to as low as \$25, until the peak in July, 2008, of almost \$150, have not triggered persistent and rising inflation such as we observed in the 1970s.

The second troubling fact is that the number of days of strikes in OECD countries has followed a hump shape with a peak in the mid-1970s. Cecchetti *et al.* (2007) report evidence that the number of days lost in strike has become very small since 1990. This observation may reflect a structural evolution whereby wage earners have lost bargaining power with respect to what they enjoyed before 1985. To some extent, this loss of bargaining power may itself be rooted in the threat of moving jobs toward lower-salary countries. This threat has been reflected both in the media and in political debate in Europe and the US since at least the mid-1990s. Delocalization may actually not involve China so much as Mexico and Eastern Europe. Still, political debate in rich countries has been overwhelmed with the “risk” of large erosions of domestic production. Hence the possibility that the smaller impact of “essentially” positive oil price shocks on nominal wages and core inflation is due indirectly to globalization, which reinforces the risks of losing jobs if not accommodative to terms of trade shocks.

### 4. The other main dominant factor of inflation dynamics: monetary policies

All these conjectures about the effects of globalization on inflation should be put in the broader context of inflation determination. Both theoretical and narrative evidence strongly point to monetary policy as the single determinant of trend inflation. Ball (2006) argues that even in small open economies, central banks retain the ability to stabilize inflation at the level of their choice. Moreover, the narrative evidence on shifts in the practice of monetary policies is compelling. We know for instance that major changes in monetary policies clustered in two periods of a few years in a majority of OECD countries. First, the early 1980s saw both the US disinflation and the European-Monetary-System-based disinflation in Europe. Ten years later, most OECD countries were either embarking on the low-inflation single currency planned by the Maastricht treaty or adopting inflation-targeting at lower inflation rates than those that prevailed in the 1980s. Turning to the United States, Goodfriend (2007) argues that a common understanding that core inflation should be kept near 2 percent arose in the Federal Open Market Committee in 1995. Hence, the 1990s witnessed all countries of our sample setting up monetary policy regimes with an inflation objective gravitating around 2 percent and the central banks adopting an explicit or implicit commitment to keep it there. Ex-post, notwithstanding the acceleration of world inflation in 2007 and 2008, inflation has remained remarkably close to the quantified inflation objective or target of the central banks.

The higher credibility of inflation objectives, either explicit or implicit, at or near 2 percent also provides an alternative explanation for the low pass-through from oil price shocks to core inflation. If wage earners believe that overall inflation will be maintained on average at the inflation target/objective, they can better accept temporary losses in purchasing power due to negative terms of trade shocks (such as oil price increases).

Changes in monetary policies such as inflation targeting and the Maastricht treaty commitment to reach low levels of inflation and stay there after the adoption of the euro can then explain certain features of inflation: its lower mean level that is documented in Courvoisier and Mojon (2005) and the lower pass-through from oil price shocks to core inflation.

### 5. Monetary policy or globalization

In this section, I propose a simple preliminary test of this conjecture. In case wage earners have lost bargaining power, positive oil price shocks can be absorbed by lowering real wages relative to productivity gains. In other words, unit labor costs should become less sensitive to positive oil prices than they used to be. However, negative oil price shocks translate into lower unit labor costs because wage earners cannot get back a higher labor share in such circumstances in order to rebuild their purchasing power.

If, on the contrary, the lower pass-through from oil prices to core inflation is due to better credibility of

the inflation target, then the effects of oil prices on unit labor costs should be nil when oil price shocks increase and negative when oil prices decrease. The larger the drop in oil prices, the larger the share of productivity gains that ends up in real wage increases.

Table 1 compares the effects of positive and negative changes in oil prices on unit labor costs before and after 1991 in Germany, the euro area and the United States. For each of the three economies, we further analyze the response of ULC for the manufacturing sector and for the services sector.

Table 1.

Effects of positive and negative oil price changes on unit labor costs												
1970-1990							1991-2007					
Germany							Germany					
	Total		Manufacturing		Services		Total	Manufacturing		Services		
	Coef	Stu.T	Coef	Stu.T	Coef	Stu.T		Coef	Stu.T	Coef	Stu.T	
own lag	<b>0,8</b>	<b>16,0</b>	<b>0,7</b>	<b>9,3</b>	<b>0,8</b>	<b>18,1</b>	<b>0,9</b>	<b>19,2</b>	<b>0,8</b>	<b>10,8</b>	<b>0,9</b>	<b>15,0</b>
positive dOP	<b>0,04</b>	<b>3,5</b>	<b>0,1</b>	<b>3,0</b>	<b>0,04</b>	<b>4,0</b>	0,01	0,4	0,0	-1,0	0,0	0,4
negative dOP	0,0	-1,2	-0,1	-1,7	0,0	-1,1	<b>-0,04</b>	<b>-1,9</b>	-0,1	-0,9	<b>-0,1</b>	<b>-2,5</b>
Constant	0,1	0,5	0,2	0,4	0,0	0,1	-0,1	-0,6	0,1	0,3	-0,1	-0,4
Euro area							Euro area					
	Total		Manufacturing		Services		Total	Manufacturing		Services		
	Coef	Stu.T	Coef	Stu.T	Coef	Stu.T		Coef	Stu.T	Coef	Stu.T	
own lag	<b>1,0</b>	<b>45,4</b>	<b>0,9</b>	<b>27,7</b>	<b>0,9</b>	<b>46,5</b>	<b>0,9</b>	<b>24,5</b>	<b>0,9</b>	<b>17,6</b>	<b>0,9</b>	<b>24,8</b>
positive dOP	<b>0,0</b>	<b>4,1</b>	<b>0,0</b>	<b>4,0</b>	<b>0,0</b>	<b>5,0</b>	0,0	1,2	0,0	-0,6	0,0	1,4
negative dOP	0,0	-0,5	0,0	-1,0	0,0	-1,1	<b>-0,04</b>	<b>-2,69</b>	0,0	-0,4	<b>-0,05</b>	<b>-3,21</b>
Constant	0,0	0,3	0,1	0,3	0,0	0,2	-0,1	-0,7	0,0	0,2	-0,1	-0,8
United States							United States					
	Total		Manufacturing		Services		Total	Manufacturing		Services		
	Coef	Stu.T	Coef	Stu.T	Coef	Stu.T		Coef	Stu.T	Coef	Stu.T	
own lag	<b>0,9</b>	<b>25,1</b>	<b>0,9</b>	<b>20,3</b>	<b>0,8</b>	<b>9,9</b>	<b>0,8</b>	<b>10,9</b>	<b>0,9</b>	<b>16,1</b>	<b>0,6</b>	<b>5,8</b>
positive dOP	<b>0,03</b>	<b>3,4</b>	<b>0,06</b>	<b>3,4</b>	<b>0,04</b>	<b>1,8</b>	0,0	1,0	0,0	0,4	0,0	-0,9
negative dOP	0,0	-0,3	0,0	-0,2	0,0	-0,2	0,0	0,3	0,0	0,8	<b>0,1</b>	<b>2,1</b>
Constant	0,2	0,7	-0,1	-0,2	0,8	1,3	0,4	1,9	-0,1	-0,4	<b>1,5</b>	<b>2,8</b>

Author's OLS estimates

The first striking result of these estimates is the drop in the effects of positive changes in oil price on ULC from the first sample to the second one. It is all the more striking that this feature is observed for all the nine tests I estimated (three sectors in each of the three economies). Hence, prior to 1991, increases in oil prices triggered an increase in unit labour costs, most likely because wage earners would require and obtain an increase in nominal wages that would maintain their purchasing power. This has no longer been the case since 1991.

However, the effects of decreases in oil prices have also changed over time, though not so unilaterally across countries and sectors. In the euro area and in Germany, ULC in services, and also for the total economy, increase more the larger the drop in oil prices. This is consistent with the view that "what is lost" following adverse shocks to the terms of trade, has been regained when these terms of trade have been more favourable. In other words, these results are compatible with an improved credibility of monetary policy and not so compatible with the hypothesis that wage earners have lost bargaining power.

This however is not the case for the manufacturing sectors in Europe and in the US that are more likely to produce tradable goods and possibly more subject to the threat of low-priced imports. For this sector of the economy at least, we cannot reject that the low pass-through from oil prices to core inflation is in part due to the limited ability of workers, since 1991, to defend their share of productivity gains following adverse terms of trade shocks. Lastly, the coefficients of negative oil price changes on services ULC in the US do not so easily lend themselves to interpretation.

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