

The Effects of Globalization on Inflation in Selected OPEC Member Countries during 1998-2007

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ABSTRACT

Economists have considered globalization as one of effective factors on inflation in recent years. They believe that globalization reduces the role of domestic factors and increases the role of foreign factors. This research evaluates the impact of globalization on inflation in selected OPEC member countries included Iran for the period 1998-2007 and using modern panel data econometric techniques. Results of this research show that globalization and trade openness increase inflation considerably in these countries. Domestic output gap, political instability and GDP per worker as an indicator of development economic have not could affect on inflation significantly but foreign output gap have a weak and significant effect on inflation.

Keywords: Globalization, Openness, Inflation, OPEC

JEL: F01, E31, E58, F13

1. INTRODUCTION

In recent years, many industrialized economies have experienced low and stable inflation, despite a combination of developments, such as declining slack in product and factor markets, protracted monetary and fiscal policy accommodation and rising commodity and industrial raw material prices, that the experience of the late 1960s and the 1970s had led us to associate with the emergence of inflationary pressures.

This unusual combination of events has given rise to the question whether the traditional linkages over the business cycle between inflation and its domestic determinants may have weakened over the past two decades.

Trade openness, international competition in factor markets and financial integration are among the main channels through which globalization is believed to have reduced the sensitivity of inflation to domestic capacity constraints. Interestingly, from the proposition that domestic macroeconomic conditions now matter less for inflation, some authors have derived the corollary that monetary policy-makers aiming to maintain price stability should pay closer attention to measures of global capacity utilization (see e.g. Fisher, 2005). This prescription has become increasingly popular with the press. Thus, The Economist (2005) argues that "in forecasting inflation central banks now need to pay less attention to domestic shifts in unemployment and capacity utilization and much more to the global balance between supply and demand.", while Business Week(2006) dramatically concludes that "the era of a purely domestic monetary policy is over."

Several scholars and policy makers have recently argued that globalization can contribute to explaining the reduced responsiveness of inflation to capacity constraints at home. For instance, BIS (2005, p. 20) notes that "Increased globalization could well mean that domestic factors have become less of a determinant of inflation in individual countries."

In a similar vein, Helbing (2006) argues that "Globalization has contributed to reducing the sensitivity of inflation to domestic capacity constraints in advanced economies over the past couple of decades".

More generally, it has been argued that traditional models of the inflation process that mainly focus on domestic determinants (though they may also allow for external influences through import prices, exchange rates, etc.) have become less relevant in globalised economies. The results of a study by Ciccarelli and Mojon (2005)

arguing that in industrialized countries inflation has become a “global” phenomenon have been interpreted as providing some support to this view. In addition, Dees et al. (2007) find that foreign inflation has a statistically significant impact on domestic inflation in some economies.

2. LITERATURE REVIEW

2.1. Inflation: The rate which the general level of prices for goods and services is rising, and subsequently, purchasing power is falling. Central banks attempt to stop severe inflation, along with severe deflation, in an attempt to keep the excessive growth of prices to a minimum.

2.2. Globalization: is the process of international integration arising from the interchange of world views, products, ideas, and other aspects of culture. Put in simple terms, globalization refers to processes that increase world-wide exchanges of national and cultural resources. Advances in transportation and telecommunications infrastructure, including the rise of the Internet, are major factors in globalization, generating further interdependence of economic and cultural activities.

The term globalization has been in increasing use since the mid-1980s and especially since the mid-1990s. In 2000, the International Monetary Fund (IMF) identified four basic aspects of globalization: trade and transactions, capital and investment movements, migration and movement of people and the dissemination of knowledge. Further, environmental challenges such as climate change, cross-boundary water and air pollution, and over-fishing of the ocean are linked with globalization. Globalizing processes affect and are affected by business and work organization, economics, socio-cultural resources, and the natural environment.

Globalization is inevitable and the huge economic gains it has brought in standards of living are accepted by everyone including left leaning economists like Paul Krugman, who acknowledge its role in lifting millions of people out of poverty.

Globalization is a force that has defined the latter portion of the last century and continues to exert a strong influence on world political and economic affairs today.

Joseph Stiglitz, Nobel laureate and ex–chief economist of the World Bank, defines globalization as: “The closer integration of the countries of the world as a result of the lowering of communication and transportation costs and the elimination of man–made barriers.”

2.3. Inflation and globalization- Different views:

Domestic inflation is impacted by many global factors. Owing to trade expansion there might be domestic inflation. This happens because trade expansion depends to a large extent on cost of goods, which are imported. Another factor, which is taken into consideration is competitive pressure brought forth by globalization. The costs of some goods are internationally integrated. Pressures created for utilizing resources in economies of foreign countries could influence domestic inflation.

Many economists hold different views about inflation and globalization. There are various schools of thought. With regard to inflation and globalization, some economists say that globalization encourages inflation, while few others express their view on the contrary. Globalization has impacted inflation in different ways. Globalization basically means “*the opening up of an economy*”.

Few economists feel that globalization does not affect the rate of inflation. This is because the changes, which globalization has brought forth affect relative costs of services and goods. On the other hand, there are yet others, who feel inflation is after all the change in the overall price level. This can be determined by monetary policies. This (monetary policies affecting inflation) holds true for long term commitments. With regard to short or medium run commitments, it may not hold true.

The potential impact of globalization on inflation has drawn the attention of many policy makers and academics in recent years. Needless to say, the link between those two phenomena has many dimensions.

Thus, some authors have pointed to some channels through which globalization may have a permanent impact on inflation.

Those channels include a reduction in the inflation bias due to the increased degree of competition associated with globalization (Rogoff, 2003), as well as the possibility of “opportunistic disinflations” in the face of favorable movements in international prices (Orphanides and Wilcox 2002).

Whenever, the tariff barriers are lowered and trade barriers are removed, it means that goods from other countries can be availed by residents of another country. There is extensive exchange of goods and services. This is done by lowering the tariff and bringing down other obstacles. What is to be seen next, is the role played by inflation and globalization in the economy of a country.

The impact of financial globalization on the effectiveness of monetary policy is now at the center of international macroeconomics literature with the recent experience of inflation acceleration in a large number of industrial and emerging market countries.

Woodford(2007) proposes global liquidity, world interest rates and the level of world economic activity as the three possible mechanisms through which the effectiveness of monetary policy may be undermined.

The recent literature, the bulk of which is based on advanced industrialized countries often finds that globalization may not weaken the ability of national central banks to control inflation (Bernanke, 2007 and Woodford, 2007). While Rogoff(2006) agrees with this view for the long-term, he states that the capacity of domestic central banks to control real interest rates and asset prices is clearly limited due to globalization.

He further argues that this fact necessitates collective action among individual central banks to stabilize inflation. Given that the world economies have become more interlinked and financial markets around the world have become more tightened, Mishkin(2007) points to the exchange rate channel as the channel that globalization might have affected the most.

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2.4. Globalization can influence inflation through multiple channels

1. Directly through import prices (price effect, share effect)
2. Global competition effect: competition → mark-ups, innovation-productivity → producer prices
3. Changed monetary and fiscal policy incentives
4. Balance of global demand and supply –can change over time
5. Labor markets
6. Capital markets

The current debate on the effects of globalization on inflation distinguishes six main channels:

The *first* channel operates directly through import prices. Low price levels or inflation rates on imports from low-income countries, combined with these countries' rising import shares in high-income countries' overall imports, have been shown to have noticeably dampened import prices and consumer price inflation in the United States and in other high income countries (IMF, 2006, and Chen et al., 2004).

The *second* channel, also known as the global competition effect, refers to the indirect effects on inflation from the integration of the goods and services markets. Price dampening effects emanate from comparative advantage, technological progress and stronger competition. As a result, profit margins are squeezed, productivity goes up and price increases in the sectors concerned are dampened (IMF, 2006, and OECD, 2006).

The *third* channel works through labor markets. The rise in labor supply available for the world economy puts pressure on wages in richer countries. So does increased costcutting pressure, which arises from stiffened product market competition. New labor institutions, whose change was in turn partly triggered by globalization, weaken unions' wage negotiating power. Lower wages imply lower production costs and thus, other things being equal, lower prices for goods and services.

The *fourth* channel works through capital markets. Liberalized capital movements and the global integration of financial institutions and markets can affect inflation in various ways.

For one thing, they can facilitate access to credit, reduce borrowing costs and affect saving behavior (better portfolio choice; reduced need for precautionary savings as credit constraints might be reduced). Aggregate price effects are e.g. conceivable via changes in the cost of capital and through effects on aggregate demand. 5 On the other hand, financial liberalization and integration act as "catalysts" for the integration of goods and labor markets. Foreign direct investment (FDI) in low-cost countries drives up competitive pressure in the

global goods and services markets. It can also dampen wage claims as production relocates to low-cost destinations (or the mere threat production might relocate). The free flow of capital also imposes a “sanctioning” mechanism on monetary and fiscal policies that are considered destabilizing or unsustainable (threat of devaluation; risk premiums; Tytell and Wei, 2004).

This leads to the *fifth* group of channels: changes in policy incentives due to globalization. Globalization can – through various mechanisms – reduce the ability (Romer, 1993) and incentives (Rogoff, 2003, Borio and Filardo, 2006) for monetary policy to temporarily stimulate output through “surprise inflation.” This effect can support central bank credibility and thus facilitate the achievement of low inflation. Furthermore, the trend toward central bank independence can in itself be seen as an expression of globalization in the sense that a global benchmarking process has taken place among legislators. As regards fiscal policy, more open economies themselves benefit less from expansionary domestic fiscal policy; while financing budget deficits might initially be made easier in internationally integrated capital markets, the consequences of unsustainable macroeconomic policies may be all the more severe. Globalization also drives structural policies toward deregulation and liberalization in the attempt of boosting the attractiveness of business locations.

Sixth, globalization can affect the balance between the global demand and supply of goods and services. As long as emerging economies’ production expands vigorously and faster than their demand, inflation would be expected to be dampened globally.

As emerging economies’ demand catches up with production over time, globalization might also accelerate inflation (Gamber and Hung, 2001).

The above channels are interlinked. Many of the effects in fact only concern the relative prices of the sectors involved. The overall price level is ultimately anchored by central banks’ monetary policies. However, to the extent that the objectives of the central banks are influenced by globalization, globalization may ultimately also influence the overall price level and inflation (Rogoff, 2003;Borio and Filardo, 2006).

This study takes a microeconomic view on goods market effects and thus focuses on the effects of globalization via the first two channels(Glatzer/Gnan/Valderrama2006).

3. RELATED STUDIES

There has been mounting evidence that the inflation process has been changing. Inflation is now much lower and much more stable around the globe. And its sensitivity to measures of economic slack and increases in input costs appears to have declined. Probably the most widely supported explanation for this phenomenon is that monetary policy has been much more effective. There is no doubt in our mind that this explanation goes a long way towards explaining the better inflation performance we have observed. The relevance of a more “globe-centric” approach is likely to have increased as the process of integration of the world economy has gathered momentum, a process commonly referred to as “globalization”. In a large cross-section of countries, it was found some rather striking prima facie evidence that this has indeed been the case. In particular, proxies for global economic slack add considerable explanatory power to traditional benchmark inflation rate equations, even allowing for the influence of traditional indicators of external influences on domestic inflation, such as import and oil prices. Moreover, the role of such global factors has been growing over time, especially since the 1990s. And in a number of cases, global factors appear to have supplanted the role of domestic measures of economic slack (Borio,2006).

Badinger (2007) provides a comprehensive assessment of the relation between inflation and globalization, measured in terms of trade and financial openness. Using a large cross section of 91 countries covering the period 1985-2004, we establish two main empirical regularities. Both higher trade and financial openness i) reduce central bank’s inflation bias, yielding lower average inflation, and ii) are associated with a larger output-inflation tradeoff. This evidence is at odds with the standard Barro-Gordon framework, which would require globalization to have a negative effect on the output-inflation tradeoff to yield lower equilibrium inflation, but it is consistent with a recent strand of new Keynesian models emphasizing the role of imperfect competition and wage rigidities. Moreover, our findings do not hold up for the OECD subsample, which suggests that a group of highly developed countries has been successful in creating an institutional framework for central banks that eliminates distortions due to the time inconsistency problem.

Razin (2007) provided a unified analysis of globalization effects on the inflation-output tradeoff and monetary policy, in the New-Keynesian framework. Labor, goods, and capital mobility tend to flatten the tradeoff between inflation and activity. These globalization forces lead monetary policy to be more aggressive with regard to

inflation fluctuations but, at the same time, more benign with respect to the output-gap fluctuations, when policy makers are guided by the welfare criterion of the representative household. The equilibrium response of inflation to supply and demand shocks is more moderate, and the equilibrium response of the output gap to these shocks is more pronounced, when the economy opens up.

Ihrig (2007) evaluates the hypothesis that globalization has increased the role of international factors and decreased the role of domestic factors in the inflation process in industrial economies and estimates standard Phillips curve inflation equations for 11 industrial countries and use these estimates to test several predictions of the globalization and inflation hypothesis. Results provide little support for that hypothesis. First, the estimated effect of foreign output gaps on domestic consumer price inflation is generally insignificant and often of the wrong sign. Second, it is not found no evidence that the trend decline in the sensitivity of inflation to the domestic output gap observed in many countries owes to globalization. Finally, and most surprisingly, econometric results indicate no increase over time in the responsiveness of inflation to import prices for most countries. However, even though it is not found no evidence that globalization is affecting the parameters of the inflation process, globalization may be helping to stabilize real GDP and hence inflation. Over time, the volatility of real GDP growth has declined by more than the volatility of domestic demand, suggesting that net exports increasingly are acting to buffer output from fluctuations in domestic demand.

Globalization has led to greater sensitivity of domestic inflation to the global output gap (the “global output gap hypothesis”) holds for the euro area. The empirical analysis uses quarterly data over the period 1979-2003. Measures of the global output gap using two different weighting schemes (based on PPPs and trade data) are considered. We find little evidence that global capacity constraints have either explanatory or predictive power for domestic consumer price inflation in the euro area. Based on these findings, the prescription that central banks should specifically react to developments in global output gaps does not seem to be justified for the euro area (Calza, 2008).

Martin (2011) documents four main results. First, the elasticity of domestic prices to imported inputs prices is 12%. Second, the transmission is much lower among firms importing inputs from a related party. Third, the sensitivity to movements in imported costs of both domestic and export prices is not statistically different. Last, the estimates imply that on average 9% of the volatility of production prices at the sectoral level is driven by changes in imported inputs’ costs.

In a world with vertical linkages, the international diffusion of shocks depends on the sensitivity of domestic prices to changes in imported inputs’ prices. To measure it, it was exploited a novel set of set of data matching individual production prices and import prices for about 500 French firms(Martin,2011).

4. HYPOTHESES

For studying the effect of Open and Cbi and pinst and gdpwok and Gap and Gap^f on HDI we test the following hypotheses:

H1: Open has a significant effect on π .

H2: CBI has a significant effect on π .

H3: PINST has a significant effect on π .

H4: GDPWOK has a significant effect on π .

H5: GAP has a significant effect on π .

H6: GAP^f has a significant effect on π .

5. RESEARCH METHODOLOGY

In this paper by using this equation we estimate the relationship between the variables:

$$\pi = a_0 + a_1 \text{open} + a_2 \text{cbi} + a_3 \text{pinst} + a_4 \text{gdpwok} + a_5 \text{Gap} + a_6 \text{Gap}^f + U$$

π : inflation rate

open: openness=(X+M)/GDP

CBI: central bank independence

PINST: political instability

GDPWOK: GDP per worker as an economic development index

GAP: domestic output gap

GAP^f: foreign output gap

CBI have been measured with cuckierman index by pollilo(2000) and jabalameli(2007).

Political instability have earned from Earthtrends.wri.org

Other data are from world bank.

$$GAP = y^* - y$$

$$GAP^f = y^{f*} - y^f$$

y^* and y^{f*} have been computed with Hodrick - prescott filter.

6. PANEL DATA

In econometrics, the term panel data refers to multi-dimensional data. Panel data contains observations on multiple phenomena observed over multiple time periods for the same firms or individuals (Wooldridge, 2002).

Hsiao (2003) lists several benefits from using panel data. These include the following:

- 1) Controlling for individual heterogeneity
- 2) Panel data give more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency.
- 3) Panel data are better able to study the dynamics of adjustment
- 4) Panel data are better able to identify and measure effects that are simply not detectable in pure cross-section or more pure time-series data
- 5) Panel data models allow us to construct and test more complicated behavioral models than purely cross-section or time-series data.

6.1. Fixed Effects Model:

A fixed effects model is a statistical model that represents the observed quantities in terms of explanatory variables that are treated as if the quantities were non-random. This is in contrast to random effects models and mixed models in which either all or some of the explanatory variables are treated as if they arise from the random causes. Often the same structure of model, which is usually a linear regression model, can be treated as any of the three types depending on the analyst's viewpoint, although there may be a natural choice in any given situation. In panel data analysis, the term fixed effects estimator (also known as the within estimator) is used to refer to an estimator for the coefficients in the regression model. If we assume fixed effects, we impose time independent effects for each entity that are possibly correlated with the regressors.

6.2. Random Effects Model:

A random effect(s) model, also called a variance components model is a kind of hierarchical linear model. It assumes that the dataset being analysed consists of a hierarchy of different populations whose differences relate to that hierarchy. In econometrics, random effects models are used in the analysis of hierarchical or panel data when one assumes no fixed effects (i.e. no individual effects). The fixed effects model is a special case of the random effects model. Note that this is not the case in biostatistics, where the econometric definition of the fixed effects model encompasses what biostatisticians call both the "fixed" and "random" effects.

6.3. Tests of Fixed Effects, Random Effects and Pooled OLS model

Panel data can be divided into the three types of model, the Pooled OLS, Fixed Effects and Random Effects models. Pooled OLS model has constant coefficients; referring to both intercepts and slopes therefore we could pool all of the data and run an ordinary least squares regression model (in this model there are neither significant country nor significant temporal effects). The Fixed Effects regression models allows the unobserved explanatory variables (either cross-section fixed effects or time fixed effects) to be correlated with the observed explanatory variables. If the unobserved explanatory variables are strictly uncorrelated with the observed explanatory variables, then it might be appropriate to treat the regression model as a random effect model, where cross-section specific constant terms (a different constant term for each cross-section unit) are randomly distributed across cross sectional units (Greene, 2003, p. 293, 299). In modern econometrics "Random Effect" is considered synonymous with zero correlation between the observed explanatory variables and unobserved explanatory variables (Wooldridge, 2002, p. 252).

We have used F-test in order to select the Fixed Effects or Pooled OLS model. The null hypothesis of the fixed effect model is that all time dummy parameters are zero:

$$H_0: \tau_1 = \tau_2 = \dots = \tau_{t-1} = 0$$

This hypothesis is tested by the F-test. We can estimate the F-test with the following formula:

$$F = \frac{\frac{RRSS - URSS}{N-1}}{\frac{URSS}{NT - N - K}} \sim F(T-1, TN-T-K)$$

The results obtained from F-tests (for Fixed Effects) are presented in Table 1. These results indicate that the null hypotheses that we have to use Pooled OLS methods are rejected for that groups of countries at significance levels of at most % 5. Therefore, as it is shown by the results, we cannot estimate the model by using Pooled Ordinary Least Squares method; hence Fixed Effects or the Random Effects must be applied. In order to select Fixed Effects or Random Effects, and also to make sure reliable results are obtained, the Hausman test has been used. Hausman Test for Random Effects is based on comparing the slope estimates of Random Effects regression model and Fixed Effects regression model (Greene, 2003, p. 302; Wooldridge, 2002, p. 288).

6.4. Selected Countries:

In this study we use Selected OPEC Member Countries: Iran, Venezuela, Saudi, Kuwait, Emirate, Qatar, Nigeria during 1998-2007. We selected these countries because social and political structure of these countries is similar.

7. RESULTS WITH TABLES

In this section, the equation is estimated by Eviews and the following results were estimated:

Table1

variables	Pooling(OLS)	Fixed Effects	Random Effects
constant	6.942659	-19.45309(-0.66)	6.942659
open	-0.377939	0.417062(2.52)	-0.0377939
Pop	0.000000031	0.0000000813(0.15)	0.0000000310
Cbi	17.22989		17.22989
pinst	-2.475731	3.418894(0.44)	-2.475731
gdpwok	0.0000719	0.00000127(0.001)	0.0000719
gap	0.00000000134	0.0000000000123(0.28)-	0.0000000134
gapf	-0.00000000134	0.00000000000204(2.41)	0.0000000134-
R ²	0.2907	0.505	0.2188
F (fixed effect)		3.32	
F(Hausman)			22.59

Source: Author`s own calculation

Regarding F, calculated F is greater than critical value of F, so fixed effect method is accepted, to choose between fixed effects of random effects models we use Hausman test.

Calculated χ^2 is smaller than critical value of χ^2 , so random effect method is not accepted.

8. FINDINGS

As expected:

- The coefficient of openness is positive and significant at the 95 percent level for these countries. It can be because of increasing exchange rate or import inflation or decreasing of supply.
- Because of collinearity CBI(central bank independence) has been eliminated.
- The coefficient of PINST (political instability) is not significant. Several political variables used as explanatory variables in earlier studies were relatively poorer measures of political instability (Aisen, 2005).
- The coefficient of GDPWOK (GDP per worker) is not significant for these countries. Increasing wages counteract slack .Changes in GDP per worker cannot affect on inflation significantly and this confirms that the role of domestic factors have decreased.
- The coefficient of gap is not significant at the 95 percent level for these countries. This confirms that the role of domestic factors have decreased, too.
- The coefficient of gap^f is significant at the 95 percent level for these countries. It shows that foreign output gap has a weak but significant effect on inflation.

9. CONCLUSION

The purpose of this paper is to test the openness, political instability, GDP per worker, domestic output gap and foreign output gap on inflation. We used fixed-effects panel data for 7 OPEC selected member countries from 1998-2007. The findings of this paper offer several economic insights. In this research, political instability, GDP per worker and domestic output gap as domestic factors have not a significant effect on inflation but openness and foreign output gap as foreign factors have an significant effect on inflation. This shows that globalization (openness) has decreased the role of domestic factors and has increased the role of foreign factors.

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