Testing the Globalization of Inflation Hypothesis: Evidence for Developed Countries

Enflasyonun Küreselleşmesi Hipotezinin Test Edilmesi: Gelişmiş Ülkeler için Bulgular

Duygu YOLCU KARADAM, Pamukkale Üniversitesi, Türkiye, dyolcu@pau.edu.tr
Orcid No: 0000-0003-3139-2003

Abstract: Globalization of Inflation hypothesis which is intensively discussed in the past decades mainly suggests that global factors have become dominant over domestic factors for the determination of inflation as economies become more open. This paper investigates whether this hypothesis holds for industrial countries using a panel data for 26 developed countries over 1985-2017 period. Generalized Method of Moments estimates of augmented Phillips equations for different periods reveal that world output gap's effect on industrial countries' inflation rates is not statistically significant. According to the findings, domestic output gap rather than foreign output gap plays a significant role on the dynamics of inflation of advanced economies as the extent of globalization rises. Additionally, import prices have considerable effect on countries' inflation rates in the post-globalization period consistent with the increase in import penetration and globalization of production throughout the world.

Keywords: Inflation, Globalization, Panel Data, Dynamic Models, Industrial Countries
JEL Classification: E31, F62, C23

Öz: Son yıllarda yoğun olarak tartışılan Enflasyonun Küreselleşmesi Hipotezi, ülkeler diğer ülkelerle entegre oldukça enflasyonun belirlenmesinde küresel faktörlerin yerli faktörlere göre baskın hale geldiğini savunmaktadır. Bu çalışma, 26 gelişmiş ülke için 1985-2017 dönemini kapsayan bir panel veri kullanılarak bu hipotezin gelişmiş ülkelerde geçerli olup olmadığını araştırmaktır. Farklı dönemler için Genelleştirilmiş Momentler Metodu yöntemi ile tahmin edilen Genişletilmiş Phillips denklemlerinden elde edilen bulgular, yabancı çıktı açığının gelişmiş ülkelerin enflasyonu üzerinde anlamlı bir etkisinin olmadığını göstermiştir. Tahmin sonuçlarına göre, yabancı çıktı açığı yerine yerli çıktı açığı artan küreselleşme süreci sonrasında da gelişmiş ülkelerin enflasyon dinamiklerinde önemli rol oynamaktadır. Diğer yandan, ülkelerin artan şekilde ithalata maruz kalması ve üretimin dünya çağında küreselleşmesi ile tutarlı olarak, ithalat fiyatlarının küreselleşme sonrası dönemde gelişmiş ülkelerin enflasyonunda ciddi etkisinin olduğu bulunmuştur.

Anahtar Kelimeler: Enflasyon, Küreselleşme, Panel Veri, Dinamik Modeller, Gelişmiş Ülkeler
JEL Sınıflandırması: E31, F62, C23

1. Introduction

Since the early-1990s there exist a remarkable increase in the globalization process which affects all aspects of economic life considerably. Total trade volume (exports plus imports) of the world has risen from around 39% of GDP in 1990 to 60% of GDP in 2016. Cross-border capital flows have reached to incredible amounts in both developed and developing economies.

Inflation rates of the economies are one of the key economic indicators that globalization can significantly affect. Since the past two decades, there has been an intensive argument that the dynamics of inflation has been changing around the world. Inflation has become much lower and more stable in most of the countries since the beginnings of 1990s. Besides, the factors that determine domestic inflation rates are argued to have been changing as countries become more open to trade.

Globalization can affect domestic inflation through a number of channels. First of all, increased trade integration brings price competition to domestic markets reducing the barriers to foreign producers which in turn reduces the mark-ups of domestic producers (IMF, 2006). Especially, increased trade of industrial countries with economies at which costs are low leads to decline in trade prices and increases the imports of the country (Pain et al., 2008). As countries' imports increase, import prices which are highly affected from foreign conditions affect domestic inflation. (Forbes, 2018). Likewise, the rise in the share of exports in GDP for an economy implies that global demand conditions will have greater impact on price-setting behavior of domestic firms. Accordingly, a few prominent policy makers have emphasized the effect of globalization on the U.S economy and the conduct of U.S. monetary policy suggesting that traditional inflation models should account for the impact of globalization (see Rogoff, 2003; Bernanke, 2007; Fisher, 2006). Some economists however do not agree with that argument such as Ball (2006), which argues that globalization does not have a considerable impact on the dynamics of inflation of advanced countries.

According to the Globalization of Inflation Hypothesis, the role of global factors has been becoming more important relative to domestic factors as the extent of globalization increases. Standard Phillips curve relates domestic inflation rates

to domestic output gap. One of the main implications of Globalization of Inflation Hypothesis is that the effect of domestic output gap in driving inflation is diminishing while global output gap become more effective on the inflation behavior. Therefore, it is argued that Phillips curve model should be extended by a term representing global economic slack (see Ihrig et al., 2010; Borio and Filardo, 2007). The other important implication of the hypothesis is that, as countries' trade openness increases, their inflation becomes more responsive to the changes in import prices. With increased trade integration, the share of imports in consumption rise. Therefore, import prices become more effective on CPI. Furthermore, import prices indirectly affect domestic prices due to increased import penetration and global supply chains.

This paper purposes to offer new empirical evidence on whether globalization process changes the determinants of inflation in industrialized countries. To this aim, we estimate an augmented version of Phillips curve model to analyze whether foreign output gap dominate domestic output gap in explaining domestic inflation as the extent of globalization rises. Also, by estimating an extended version of Phillips equation, we also test whether domestic inflation becomes more sensitive to the fluctuations in import prices as Globalization of Inflation Hypothesis implies. To this end, we estimate a dynamic panel data model for 26 industrial countries over the 1985-2017 period as well as two sub-periods of pre-globalization (1985-1994) and post-globalization (1995-2017). As reviewed in the next section, previous studies that examine the changing inflation dynamics in industrial countries often provide contrasting empirical evidence. For different sets of developed countries, they generally employ individual country regressions or simple panel specifications. First of all, in this study, we utilize from panel data techniques which control for the effects which are specific to countries and the time period. Differently from previous studies, we employ Generalized Method of Moments estimator which copes with endogeneity and simultaneity problems in the regressions and allows to estimate parameters of the dynamic panel data models consistently. By estimating augmented and extended versions of Phillips equation for different time periods, we analyze the importance of domestic output gap, global output gap and import prices on inflation before and after globalization process.

This paper is organized as follows: Section 2 makes a review of the previous empirical studies and their findings. Section 3 presents the stylized facts about the inflation and globalization processes in advanced economies since 1985. Section 4 describes the data and model employed to analyze whether the determinants of inflation have changed since the emergence of globalization in industrial countries. Section 5 reviews the main findings from the estimation of both baseline and extended Phillips curve model for pre- and post-globalization period. Finally, Section 6 summarizes the key results and concludes.

2. Related Literature

Despite the possible change in the inflation dynamics of industrial countries has been focus of a number of empirical studies previously, they often provide contrasting empirical evidence on the effect of globalization on industrial countries' inflation[1]. These studies aim to analyze whether the Globalization of Inflation Hypothesis holds for industrial countries by testing at least one of the three implications of this hypothesis: i) the reduction in the effect of countries' own output gap on inflation ii) the rise in the effect of global output gap on inflation iii) the increase in the response of inflation to movements in import prices.

Among earliest relevant studies, Tootell (1998) finds no effect of global output gap on US inflation using an augmented Phillips curve specification. In contrast, the findings of Gamber and Hung (2001) support Globalization of Inflation hypothesis for US economy showing that the sensitivity of inflation to foreign conditions has increased since the rise in trade integration of US. They show that domestic prices in particular sectors are very sensitive to import prices and this sensitivity is larger in sectors with greater import penetration.

Employing much simple pooled OLS regressions to a panel of G7 countries over the period 1970-2005, Ball (2006) investigates whether the response of inflation to domestic output gap declines as trade openness increases. He finds little reduction in the coefficient of domestic output gap with a marginal statistical significance which implies that globalization has very small effect on the structure of inflation dynamics in advanced economies. According to Ball(2006), the prices affected by trade are the relative prices and there is no serious connection between inflation and relative prices.

IMF (2006) examines the effect of globalization on inflation at both aggregate and sectoral level for 8 industrial countries over the period 1960-2004. From the aggregate perspective, their estimates from Seemingly Unrelated Regressions suggest that trade openness is an important factor that reduces the impact of country's output gap on inflation. They also show that import penetration of a sector and the prices of the manufacturing sectors is negatively related because of the large declines in relative import prices in some sectors.

Borio and Filardo (2007) examines the effect of globalization on inflation estimating conventional and augmented Phillips curve equations for 16 advanced countries. Their findings imply that global factors become more important than domestic factors in explaining industrial countries' inflation after 1990s[2]. On the other hand, even though they use similar country sets and time period, Ihrig et al. (2010) finds little support for the Globalization of Inflation hypothesis for their sample of eleven industrial countries. The coefficient of foreign output gaps is insignificant and their findings do not point

---

[1] A number of studies such as Zhang (2015), Kim, Lin and Wu (2016) and Mazumder (2017) examine the effect of globalization on inflation dynamics of developing countries.
[2] They divide the whole period of 1980-2005 into two subsamples as 1980-1992 and 1993-2005 to compare the coefficients of domestic output gap in conventional Phillips curve equation for each country.

out to an increase in the effect of import prices on inflation. Ihrig et al. (2010) argues that the contradictions in their findings with Borio and Filardo (2007) depends on the differences in their equation specifications[3].

Pain, Koske and Sollie (2008) estimates error correction models of price levels for 21 OECD countries over the period 1980-2005, as well as two sub-periods 1980-1994 and 1995-2005 to analyze the role of globalization on the determination of price level. They find that world output gap does not affect inflation in all periods under consideration. However, they show that import prices significantly affect consumer prices as the main channel of global economic conditions.

Calza (2009) examines the role of global output gap on euro area's inflation. Using quarterly data over the 1979-2003 period, their results do not provide sufficient evidence for the increased role of global output gap in explaining inflation after the globalization process.

3. Recent Trends In Inflation And Globalization In Industrialized Countries

Figure 1 shows the GDP-weighted average inflation rates in industrial countries over 1985-2017 period. Average inflation rate has declined considerably over the past 30 years in industrial countries. Major part of this fall has realized between 1985-1995 dropping from around 6% to nearly 2%. Average inflation has been fluctuating around 2% since 2000s in industrial countries except for the sharp fall in 2009.

Table 1 also represents the mean inflation rates and two main globalization indicator-trade openness and financial openness- of each country in two sub-periods, 1985-1994 and 1995-2017. The level of inflation is lower for all countries in the post-1995 period. The decline in inflation is much larger in a number of countries such as Greece, Iceland and Israel. This fall in inflation in advanced countries can arise due to a number of factors. With the increase of the openness of those economies, inflation rates have been affected increasingly from import prices. With the rise in trade with low-cost countries in Asia and Latin America, import prices have showed very little increase or declined in G7 countries (Pain et al., 2008). Additionally, increased trade integration has risen price competition in domestic markets (IMF, 2006).

Figure 2 shows the two main indicators of countries' exposure to economic globalization, the degree of trade and financial openness of industrial countries during 1985-2015. As illustrated in Figure 2, trade openness of advanced economies remains stable around 40% before 1995. However, there is a notable rise in the trade to GDP of industrial countries during post-1995 period. There is a widespread agreement that globalization has intensified in advanced countries since the beginnings of 1990s (IMF, 2006). After 1995, there exist a gradual rise in the trade integration of these countries which has reached 60% of the GDP in 2015. There is a more striking rise in average financial openness of industrial countries which reaches from around 150% in 1995 to 550% in 2015. The level of trade and financial openness for each country during the pre-1995 and post-1995 periods are also represented in the last two column of Table 1. As evident from Table 1, thirteen of twenty-five countries in our sample display more than 20% increase in their trade to GDP ratio. Hong Kong, Iceland, Ireland, Luxemburg, Netherlands, Singapore, Switzerland and United Kingdom are among the advanced economies with the most remarkable increase in financial integration.
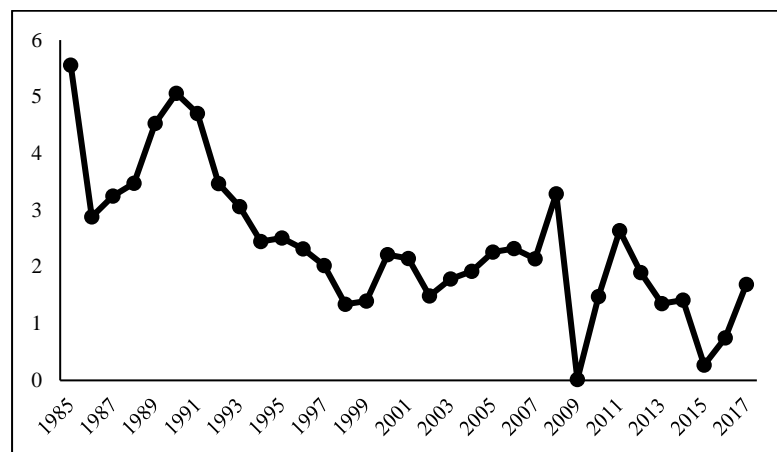

Figure 1. GDP-weighted average inflation rates of industrial countries (%)
Source: World Bank World Development Indicators Database, October 2018.

---

[3] The dependent variable is the difference between headline and core inflation in Borio and Filardo (2007).

Table 1. Inflation and Globalization in Industrial Countries

Country	1985-1994			1995-2017		
	Mean Inflation (%)	Trade Openness (% of GDP)	Financial Openness (% of GDP)	Mean Inflation (%)	Trade Openness (% of GDP)	Financial Openness (% of GDP)
Australia	5.4	33.3	99.1	2.6	41.0	218.0
Austria	2.8	67.2	136.6	1.8	91.8	398.2
Belgium	2.6	115.6	380.8	1.9	144.6	751.9
Canada	3.5	53.3	132.0	1.8	68.8	261.9
Denmark	3.2	66.6	169.7	1.8	89.6	389.3
Finland	4.1	51.1	113.6	1.4	73.8	438.2
France	3.0	42.3	125.8	1.4	54.6	428.0
Germany	2.5	44.3	105.9	1.4	70.0	338.9
Greece	16.7	39.6	72.7	2.9	53.5	225.5
Hong Kong	7.9	223.9	1232.1	2.0	330.1	1733.8
Iceland	15.1	67.2	68.9	4.3	82.7	566.5
Ireland	3.2	108.6	283.5	2.0	171.6	2302.7
Israel	48.0	66.1	114.5	3.0	68.6	168.7
Italy	5.8	37.1	70.7	2.1	51.0	223.9
Japan	1.6	18.3	86.2	0.1	26.2	163.0
Luxembourg	2.4	183.9	7950.5	1.9	301.7	20017.5
Netherlands	1.8	103.2	233.9	1.9	130.9	1247.7
New Zealand	6.9	54.6	132.1	2.1	58.6	219.6
Norway	4.6	69.7	107.7	2.1	70.1	338.3
Singapore	1.8	324.2	339.9	1.5	364.6	1522.5
Spain	6.2	37.3	69.7	2.3	56.0	269.8
Sweden	5.7	58.9	122.5	1.1	82.0	432.6
Switzerland	3.0	83.7	379.5	0.5	104.2	919.9
United Kingdom	4.6	48.0	325.7	2.0	54.5	872.1
United States	3.6	19.0	80.5	2.2	25.9	224.4

Sources: World Bank World Development Indicators Database, October 2018, Lane and Milesi-Ferretti (2007) (updated version)
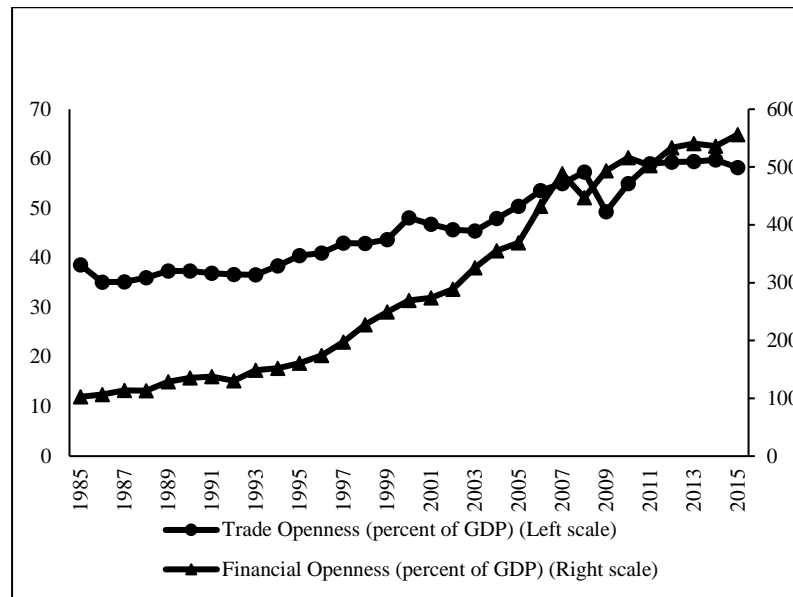
Notes: Trade openness is ratio of the sum of exports and imports to GDP.
Financial openness is the ratio of the sum of foreign assets and
liabilities to GDP.

Figure 2. GDP-weighted average Trade Openness and Financial Openness of Industrialized Countries
Sources: World Bank World Development Indicators Database, October 2018, Lane and Milesi-Ferretti (2007)
(updated version)

4. Data and Model

Our sample is an annual panel comprising of 26 developed countries over the period 1985 to 2017.[4] Following Tootel (1998) and Rudebusch and Svensson (1999, 2002), we examine the effect of globalization on inflation using a backward-looking conventional Phillips curve model augmented by foreign output gaps as in Equation 1. There are two versions of Phillips model as backward-looking (see Rudebusch and Svensson, 1999, 2002) and forward-looking (see Gerlach and Svensson, 2003; Gali and Monacelli, 2005) which include the lags and expected future values of inflation to the baseline model, respectively. Forward-looking specification of Phillips model is criticized to be subject to weak instruments problem since they are estimated by instrumental variable method.[5] Moreover, there is strong evidence that backward-looking model empirically better fits for inflation dynamics (Rudd and Whelan, 2007). Accordingly, we prefer to use the backward-looking version and we can write the equation for inflation as follows:[6] [7]

$$Inf_{i,t} = \alpha_i + \beta Inf_{i,t-1} + \delta y_{i,t}^d + \gamma y_{i,t}^f + u_{i,t} \qquad (1)$$

In this model i denotes country for i=1,…,N and t denotes time for t=1,…,T. α_i refers to country-specific effects, $Inf_{i,t}$ is the annual CPI inflation rate, $y_{i,t}^d$ is domestic output gap, $y_{i,t}^f$ is foreign (global) output gap and $u_{i,t}$ is the error term. The model also consists lagged inflation rate to capture the inflation inertia.

Data on CPI inflation are taken from World Development Indicators (WDI) database. We calculate domestic output gap as percentage deviation of HP-filtered real GDP series which are used as a proxy for potential GDP. Real GDP data are from WDI database. Foreign output gap is constructed as the GDP-weighted average output gaps of industrial countries. As the data for GDP weights, we use countries' GDP based on purchasing-power-parity (PPP) share of world total which are taken from World Economic Outlook (WEO) database.

Prior to the estimation, we first analyze the stationarity of the variables in the regression. The results of panel unit root tests which are given in the appendix imply that all variables are stationary. The baseline model in Equation 1 is estimated by Generalized Method of Moments (GMM) estimator developed by Arellano and Bond (1990) and Arellano and Bover (1995). Standard panel data estimators such as pooled OLS and within estimator produce biased and inconsistent parameters in regressions which use lags of dependent variable as regressors. Instead, GMM can yield consistent parameter estimates in dynamic panel data models using a large number of instruments to overcome the endogeneity of lagged dependent variable. In Difference-GMM estimator which is proposed by Arellano and Bond

---

[4] These countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, UK and US.
[5] See Gordon (2011) for a detailed survey on the debate for empirical modelling of Phillips curve model.
[6] See Eijffinger and Qian (2016) , Ahmad and Civelli (2016) and Zhang (2015) among others.
[7] We use only one lag of inflation to capture the inertia in inflation since our data is annual.

(1991), instruments are the lags of variables in the differenced equation. Arellano and Bover and Blundell and Bond (1997) then develop System-GMM estimator to reduce the weak instrument problem emerged by the use of lagged variables. System-GMM utilizes from both regression with differenced variables and regression with level variables. Specifically, this estimator is employed in this study which uses the lags of the differences as well as the levels of the regressors as instruments. System GMM estimator reduces the bias induced by the existence of lagged dependent variable and produces robust parameter estimates[8]. Consistency of GMM estimates depends on the validity of instruments. Two specification tests are suggested for the issue. The first one is Sargan or Hansen Test of Overidentifying Restrictions which tests whether the instruments used are appropriate or not. The other one tests for the autocorrelation of the error term. We report the results of these specification tests together with parameter estimates in the subsequent section. Lastly, time dummies are also added to the egression to control for the effects which are specific to the time periods.

5. Empirical Results

Equation 1 is first estimated for the whole period of 1985-2017. Then, to analyze the effect of globalization on the inflation dynamics of industrial countries, we estimate the inflation equation for two sub-periods, 1985-1994 and 1995-2017. The choice of the break year as 1995 is mainly motivated by the remarkable rise in the trade and financial openness of advanced countries after mid-1990s which are represented in Figure 2. There are also a number of studies and reports which emphasize that the inflation process of developed countries has changed around the mid-1990s and this change coincides with the remarkable increase in globalization (see Pain et al., 2008; IMF, 2006). Finally, according to the parameter stability test we carry out, there is evidence of structural change in the model at 1995[9]. Hence, we additionally estimate the inflation model for two sub-periods as pre-globalization (1985-1994) and post-globalization (1995-2017). Table 2 reports the System-GMM estimates of the baseline inflation model for whole period, pre-1995 and post-1995 periods. The p-values of Hansen test and second order autocorrelation do not point out to any problem about the instruments used and autocorrelation for all estimations. Lag of inflation is significantly positive in all periods but its value increases in the post-globalization period implying a rise in the inflation inertia in industrial countries. Domestic output gap is significantly positive in all periods but it is slightly smaller in magnitude in the post-globalization period. Lastly, foreign output gap is not statistically significant in the pre-globalization period while it is significantly positive in the full-period and post-globalization period. The estimates of baseline model imply that domestic output gap continue to be effective on domestic inflation even after globalization. Additionally, foreign output becomes more effective on inflation process in industrial economies with the rise of globalization process.

Table 2. System-GMM estimation results for the baseline inflation model

	Full period 1985-2017	Pre-globalization 1985-1994	Post-globalization 1995-2017
Lag of inflation	0.175***	0.163***	0.673***
	(0.014)	(0.005)	(0.046)
Domestic output gap	0.172**	0.251***	0.155***
	(0.087)	(0.084)	(0.053)
Foreign output gap	0.347**	0.345	0.509***
	(0.173)	(0.246)	(0.154)
Time dummies	yes	yes	yes
Num. Of obs.	796	225	571
J-test	0.725	0.387	0.685
AC	0.943	0.539	0.273

Note: Robust standard errors in parantheses. ***,**,* refer to significance levels at 1%, 5% and 10% level, respectively. J-test and AC refer to the p-values of Hansen test of overidentified restrictions and second order autocorrelation. Lag of inflation is treated as endogenous and instrumented up to lag three..

Phillips curve equation we estimate in the previous section does not contain any factors other than domestic and foreign output gap. However, cost factors of production such as energy and import prices can create remarkable effect on inflation rates. Especially, it is argued intensively in the literature that import prices can be highly effective on domestic

---

[8] See Roodman (2006) for more details of GMM procedure.

[9] We add a dummy to the model which is equal to unity for 1995 onwards and zero otherwise and interact the dummy with all explanatory variables in the model. The coefficient of the dummy and the interaction terms are found to be jointly significant with an F-statistic of 61.92.

inflation as countries become more open and integrated to each other (see Ihrig et al., 2010). Therefore, following Ihrig et al. (2010) and Eijffinger and Qian (2016), we extend equation 1 with the deviations of import and oil price changes from domestic inflation to capture the effect of cost-push factors on inflation. The extended model can be written as,

$$Inf_{i,t} = \alpha_i + \beta Inf_{i,t-1} + \delta y_{i,t}^d + \gamma y_{i,t}^f + \varsigma_1(P_{i,t}^m - Inf_{,t}) + \varsigma_2(P_{i,t}^o - Inf_{,t}) + +u_{i,t} \qquad (2)$$

where $P_{i,t}^m$ and $P_{i,t}^0$ denote the yearly changes in import and oil prices. Data source of import and oil prices are OECD Main Economic Indicators.

System-GMM estimates of extended Phillips curve equation is shown in Table 3. Similar to the estimates of baseline model, domestic output gap is significantly positive in all periods but with a smaller value in post-1995 period. However, foreign output is no longer significant in all three periods when we add cost-push terms to the model. Instead, import prices are significantly and positively affects inflation in the 1995-2017 period, while they are not statistically

Table 3. System-GMM estimation results for the extended inflation model

	Full period	Pre-globalization	Post-globalization
	1985-2017	**1985-1994**	**1995-2017**
Lag of inflation	0.755***	0.773***	0.643***
	(0.031)	(0.096)	(0.038)
Domestic output gap	0.163**	0.220***	0.127***
	(0.038)	(0.043)	(0.034)
Foreign output gap	0.113	0.032	0.099***
	(0.138)	(0.232)	(0.138)
Import price	0.053*	0.034	0.079**
	(0.029)	(0.030)	(0.031)
Oil price	0.130***	0.012***	0.012***
	(0.002)	(0.004)	(0.002)
Time dummies	yes	yes	yes
Num. Of obs.	703	178	525
J-test	0.812	0.674	0.899
AC	0.395	0.633	0.113

Note: Robust standard errors in parantheses. ***,**,* refer to significance levels at 1%, 5% and 10% level, respectively. J-test and AC refer to the p-values of Hansen test of overidentified restrictions and second order autocorrelation.Lag of inflation is treated as endogenous and instrumented up to lag three..

significant in the 1985-1994 period. Other cost term, oil prices are significantly positive in all periods suggesting that domestic inflation is considerably affected from oil prices.

Our results imply that world output gap does not have a direct significant influence on inflation of industrial countries as Globalization of Inflation Hypothesis suggests[10]. However, domestic output gap continues to be highly effective on domestic prices even after globalization process. More importantly, our findings reveal that the effect of foreign economic conditions work mainly through import prices.[11] Supporting the Globalization of Inflation Hypothesis, domestic inflation become highly sensitive to import prices in advanced countries with the increase in the extent of globalization.

6. Conclusion

Global economic integration has proceeded considerably since the past three decades. It is intensely discussed by policy makers that this globalization process has led to changes in inflation dynamics of industrialized countries. The Globalization of Inflation Hypothesis emphasizes the importance of foreign factors in the determination of inflation. This study mainly examines whether the determinants of inflation in developed economies have changed with the increased

---

[10] The coefficient of foreign output gap is insignificant and wrongly signed in Ihrig et al. (2010).
[11] This result supports the conclusions of Qain et. al. (2008). However, Ihrig et al. (2010) does not find an increase in the effect of import prices on inflation for most of the industrial countries analyzed.

trade and financial integration. Estimating an augmented Phillips equation with foreign output gap, we analyze whether world output gap dominates domestic output gap after the mid-1990s. Moreover, we test whether the sensitivity of domestic inflation to import prices has increased after this globalization period.

Our findings reveal only limited evidence for the Globalization of Inflation Hypothesis in industrial countries. Domestic output gap is highly significant in all periods implying that it is still an important determinant of inflation in developed countries even after globalization process. Foreign output gap is found to have significantly and positively affect inflation after mid-1990s in the baseline model. However, it becomes insignificant when we account for the impacts of cost-push terms on inflation. Therefore, we do not have a strong evidence that world output gap become increasingly effective on inflation rates of advanced economies. On the other hand, we find that import prices have significant influence on inflation in the post-globalization period, consistent with the increased import penetration and internationalization of production throughout the world.

To sum up, for industrial countries, we do not have sufficient evidence that foreign output gap has become dominant over domestic output gap as the world globalizes. Domestic output gap continues to have considerable effect on inflation rates. According to our results inflation in industrial countries become more sensitive to foreign economic conditions as they become more open to trade but this effect works mainly through the channel of import prices instead of foreign output gap.

Our findings are consistent with the arguments of Kohn (2006) and Yellen (2006) which accept that international forces have started to play an increasingly important role on inflation process but conclude that domestic factors keep to play a predominant role. These influential economists stress that floating exchange rates which are adopted increasingly after 1990s by industrial countries allow monetary authorities to control domestic inflation by setting interest rates independently from abroad. Therefore, even though foreign economies are booming and foreign price pressures are rising, domestic prices are not affected if domestic currency gains value against foreign currencies. It can also be argued that monetary policy of industrial countries has been rather successful for managing inflation expectations in recent years which can lead inflation to be less variable and less sensitive to foreign output gaps (Ihrig, 2007). On the other hand, the view that globalization increases the role of import prices on domestic inflation mostly supported by the previous research. It is straightforward that import prices affect the prices of imported goods in the consumption basket and this leads to higher responsiveness of consumer prices to import price changes. High integration of low-cost countries like China and India to the global economy decreased the inflation rates of developed economies by reducing import prices and affecting wage and price setting behavior in these economies.

The arguments such as central bankers should pay more attention to global developments rather than the conditions of domestic economy does not seem to be justifiable by our empirical analysis. Hence, main policy implications of our findings are that monetary policy-makers should continue to focus on the measures of domestic capacity utilization while they keep tracking the foreign economic conditions. Besides, they should closely analyze the movements of import prices and exchange rates as the weight of imported goods in their economies' consumption and production pattern rises.

REFERENCES

Ahmad, S., & Civelli, A. 2016. "Globalization and inflation: A threshold investigation", *Journal of Macroeconomics*, *48*, 283-304.

Arellano, M. and Bond, S. (1991) "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations" *Review of Economic Studies*, 58: 277-297.

Arellano, M. and Bover, O. 1995. "Another Look at the Instrumental Variable Estimation of Error-Components Models"., *Journal of Econometrics*, *68*(1), 29-51.

Ball, L. M. (2006). "Has globalization changed inflation?", *NBER Working Paper,* No. 12687

Bernanke, B.S. 2007. "Globalization and monetary policy", Stanford Institute for Economic Policy Research. Speech at the Fourth Economic Summit.

Blundell, R. and Bond, S. 1998. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models".„*Journal of Econometrics*, *87*(1), 115-143.

Borio, C. E., & Filardo, A. J. 2007. "Globalisation and inflation: New cross-country evidence on the global determinants of domestic inflation", *BIS Working Paper*, No. 227.

Eijffinger, S. C., & Qian, Z. 2016. "Trade openness and the Phillips curve: The neglected heterogeneity and robustness of empirical evidence", *International Review of Economics & Finance*, *44*, 13-18.

Fisher, R.W. 2006. "Coping with globalization's impact on monetary policy", Speech at the Allied Social Science Association Meetings, Boston.

Forbes, K. 2018. "Has Globalization Changed the Inflation Process?", In *17th Bank for International Settlements Annual Research Conference, Zurich, June* (Vol. 22).

Gali, J., Monacelli, T. 2005. "Monetary policy and exchange rate volatility in a small open economy", *Rev. Econ. Studies,* 72 (3), 707–734.

Gamber, E. N., & Hung, J. H. 2001. "Has the rise in globalization reduced US inflation in the 1990s?", *Economic Inquiry*, *39*(1), 58-73.

Gerlach, S., & Svensson, L. E. 2003. "Money and inflation in the euro area: a case for monetary indicators?", *Journal of Monetary Economics*, *50*(8), 1649-1672.

Gordon, R. J. 2011. "The history of the Phillips curve: consensus and bifurcation" *Economica*, 78(309), 10–50.

Ihrig, J., Kamin, S. B., Lindner, D., & Marquez, J. 2010. "Some simple tests of the globalization and inflation hypothesis", *International Finance*, *13*(3), 343-375.

Im, K. S., Pesaran, M. H., & Shin, Y. 2003. "Testing for unit roots in heterogeneous panels", *Journal of econometrics*, *115*(1), 53-74.

IMF (2006). "How has globalization affected inflation?", World Economic Outlook (pp. 97–134). Washington, DC: IMF (chapter 3).

Kim, D. H., Lin, S. C., & Wu, Y. C. 2016. "Globalization and inflation: New panel evidence", *Macroeconomic Dynamics*, *20*(1), 1-26.

Kohn, D. L. 2006. "The effects of globalization on inflation and their implications for monetary policy". In *Conference Series;[Proceedings]* (Vol. 51). Federal Reserve Bank of Boston.

Lane, Philip R., and. Milesi-Ferretti, G. M. 2007. "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004", *Journal of International Economics*, Vol. 73, No. 2, pp. 223-50.

Maddala, G. S., & Wu, S. 1999. "A comparative study of unit root tests with panel data and a new simple test", *Oxford Bulletin of Economics and statistics*, *61*(S1), 631-652.

Mazumder, S. 2017. "The Impact of Globalization on Inflation in Developing Countries", *Journal of Economic Development*, *42*(3).

Pain, N., Koske, I., & Sollie, M. 2008. "Globalisation and OECD consumer price inflation", *OECD Journal: Economic Studies*, *2008*(1), 1-32.

Rogoff, K. 2003. "Globalization and global disinflation", *Economic Review-Federal Reserve Bank of Kansas City*, *88*(4), 45-80.

Roodman, D. 2006. "xtabond2: Stata Module to Extend xtabond Dynamic Panel Data Estimator", *Center for Global Development, Washington, DC.*

Rudd, J., Whelan, K. 2007. "Modeling inflation dynamics: A critical review of recent research"*, J. Money, Credit, Bank* 39 (s1), 155–170.

Rudebusch G. D. and L. E. O. Svensson 1999. "Policy Rules for Inflation Targeting", in J. B. Taylor (ed.), *Monetary Policy Rules*, University of Chicago Press, 203-246.

Tootell, G. M. 1998. "Globalization and US inflation", *New England Economic Review*, July/August, 21-33.

Yellen, J. L. 2006. "Monetary policy in a global environment". Speech at the Conference "The Euro and The Dollar in a Globalized Economy" , University of California at Santa Cruz, Santa Cruz, CA, May.

Zhang, C. 2015. "The effect of globalization on inflation in new emerging markets", *Emerging Markets Finance and Trade*, *51*(5), 1021-1033.

APPENDIX

Table A. Panel Unit Root Tests

	Inf	y^d	y^f
IPS	-25.27***	-9.00***	-5.24***
MW	136.30***	229.65***	210.39***

Note: IPS and MW denote the Im, Pesaran and Shin (2003) and Maddala and Wu(1999) panel unit root tests, respectively. *** denotes the significance level at the 1% significance level. The number of lags used in the ADF regressions for the tests are determined by Schwarz Criterion with a maximum lag of 4. Inverse Chi-Square values are represented for MW test.