

## PASS-THROUGH OF EXTERNAL FACTORS INTO PRICE INDICATORS IN TURKEY

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**ABSTRACT** This study analyzes the pass-through of exchange rate and US Dollar denominated import prices into consumer and producer prices in Turkey. To this end, pricing along a distribution chain framework is utilized and it is estimated by Vector Auto Regression (VAR) for the pre-inflation targeting and the inflation targeting periods. Results show that the pass-through of both external factors into producer prices is higher than it is for consumer prices. In addition, the degree of pass-through is significantly lower in the inflation targeting period compared to the previous period. The cumulative exchange rate and import price pass-through coefficients into consumer prices for the recent period are found similar to each other while import price shocks are reflected much faster. For the producer prices, import price shocks are found to be reflected more than the exchange rate shocks. An exercise based on these estimation results shows that during 2007-2009 external factors were influential on consumer prices. Furthermore simultaneous counter movements of exchange rate and import prices at that period limited and sometimes offset the impact of each other on consumer prices.

JEL E31

*Keywords* Inflation, Pass-through, Exchange Rate, Import Prices, VAR Analysis

**ÖZ** Bu çalışmada, döviz kuru ile ABD doları cinsinden ithalat fiyatlarının Türkiye’de tüketici ve üretici fiyatlarına geçişkenliği incelenmektedir. Bu amaçla, tedarik zinciri fiyatlaması çerçevesi enflasyon hedeflemesinin uygulandığı dönem ve daha öncesi için VAR yöntemi kullanılarak tahmin edilmiştir. Sonuçlar, her iki dışsal faktörün üretici fiyatlarına geçişkenliğinin tüketici fiyatlarına geçişkenliğinden daha yüksek olduğunu ortaya koymaktadır. Buna ek olarak, geçişkenliklerin boyutları enflasyon hedeflemesi döneminde enflasyon hedeflemesi öncesindeki döneme kıyasla önemli ölçüde daha düşük çıkmıştır. Yakın dönem incelendiğinde, döviz kuru ve ithalat fiyatlarının tüketici fiyatlarına geçişkenliğinin birikimli olarak birbirlerine benzer olduğu, ancak ithalat fiyatlarına gelen şokların tüketici fiyatlarına döviz kuruna gelen şoklara kıyasla daha çabuk yansıdığı gözlenmiştir. Diğer taraftan, ithalat fiyatlarına gelen şokların üretici fiyatlarına döviz kuru şoklarına göre daha yüksek düzeyde yansıdığı bulunmuştur. Bu tahmin sonuçlarına dayalı olarak yapılan araştırma, 2007-2009 yılları arasında dışsal faktörlerin tüketici enflasyonu üzerinde etkili olduğunu göstermektedir. Bunun yanı sıra, döviz kuru ve ithalat fiyatlarının eş zamanlı zıt yönlü hareketlerinin fiyatlar üzerinde birbirlerinin etkilerini sınırladığı, hatta zaman zaman birbirlerini dengelediği görülmektedir.

**DIŞSAL FAKTÖRLERİN TÜRKİYE’DE FİYAT GÖSTERGELERİNE GEÇİŞKENLİĞİ**

JEL E31

*Anahtar Kelimeler* Enflasyon, Geçişkenlik, Döviz Kuru, İthalat Fiyatları, VAR Analizi

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## 1. Introduction

Turkish economy has experienced extreme levels of inflation for a long period of time until early 2000s. The initiation of inflation targeting (IT) in 2002 as the new monetary policy regime has put inflation into a rapid downward trend, leading inflation rates to (a level) as low as 5 percent in the meantime. En route to these lower levels, however, the fall was majorly interrupted twice by external supply-side factors. The first one was the sudden depreciation of Turkish Lira (TL) in 2006 due to the change in risk perception in global financial markets. The second one was the persistent and strong increase in global commodity prices during 2007 and 2008. Both occasions depicted the vulnerability of prices in Turkey to such external developments. These recent events have increased the attention on the impact of external factors on domestic price indicators in Turkey once more.

In fact, pass-through has always been a popular topic in economic analyses. There are many distinguished examples of academic work that have led other studies in the worldwide literature. Such studies have elaborated on many aspects of the topic and aimed to identify different stages of transmission mechanism between factors and the price indicators. For example, studies like that of Campa and Goldberg (2002), Irandoust (2000), Pollard and Coughlin (2004) identify the degree of first-stage pass-through, i.e. pass-through of exchange rate to import prices in domestic currency terms, at both micro and macro levels, based on the theory of law of one price. On the other hand, there are those that concentrate on the pass-through of external factors, e.g. exchange rate, on producer and consumer prices (McCarthy, 2000; Hahn, 2003). These types of studies contain more practical aspects. In other words, they are motivated to understand the degree of pass-through so that it makes one foreseen the possible effects of shocks on prices. Besides, there are also studies trying to identify factors affecting the degree of pass-through. Mann (1986), Goldberg and Knetter (1997), Aksoy and Riyanto (2000), McCarthy (2000), Taylor (2000), Choudhri and Hakura (2001), Devereux and Yetman (2002) and Burstein, Eichenbaum and Rebelo (2002) are such examples. These are more theoretical studies and directed towards understanding the dynamics of pass-through. Their findings have shown that the size of the economy, the volatility and the persistency of shocks, exchange rate hedges, the

inflationary environment, the substitutability of imported goods, the structure of the distribution chain, vertical integration of the production processes and determinants of firms' pricing strategy, i.e. market concentration, pricing-to-market effects, the degree of import penetration have influence on the extent of the pass-through of shocks.

When literature on Turkish data is examined, it is seen that most of them are of the first type of aforementioned studies and are limited in number compared to its foreign correspondents. Rossi and Leigh (2002), Arat (2003), Arbatlı (2003), Alper (2003) and Kara *et al.* (2007) are some examples that investigated exchange rate pass-through (ERPT) into consumer prices in Turkey. Except the last one all other studies use data set covering the pre-2001 crisis period. Thus they characterize the dynamics of a different monetary policy regime than today. Their findings conclude that under the fixed exchange rate regime, ERPT was very high. On the other hand, the studies using the IT period data have been limited mostly due to the lack of data for a sufficient analysis. One of the most recent and cited studies in this category is Kara and Ögünç (2008) which estimates imported inflation<sup>1</sup> pass-through into consumer prices both for the IT and the pre-IT periods. They conclude that under the IT pass-through has shown decline.

This summary on Turkish pass-through literature shows that the focus of attention, so far, has been on ERPT. However, the recent experience has also revealed the importance of change in global commodity prices, which reflects itself on Turkey through import prices. In addition, ignorance of change in import prices may lead to misjudgment on the recent ERPT dynamics. Consider the times when exchange rate and commodity prices counter move and offset each other. In such periods if import prices are not included in the analysis, changes in exchange rate may not seem to be passing through.<sup>2</sup>

This misjudgment on the pass-through dynamics of each factor constitutes the main motivation of this study. The intention, here, is to make a broad, simple and practical analysis on the pass-through relationship between both external factors, i.e. exchange rate and import prices, and inflation indicators. In this way, it aims to state the current pass-through dynamics of both external factors in Turkey and to elaborate on whether recent movements of external factors have the power to offset each other. In addition, because a new variable is introduced into such a pass-through

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<sup>1</sup>By imported inflation they mean TL-denominated import prices. Thus, they estimate the impact of TL-denominated import price shocks which cover exchange rate and US dollar-denominated import price shocks. However, these two shocks are treated compositely, not separately.

<sup>2</sup>In many economic notes of the financial institutions during the developments in late 2008 and 2009, it was claimed that exchange rate changes are no longer reflected into price changes, ignoring the simultaneous offsetting role of import price changes.

analysis, the estimations will also be made for pre-IT period to make a periodical comparison. In this sense, this study can also be considered as an extension of Kara and Ögünç (2008) since it measures the import of TL-denominated import prices however, treats import prices in USD terms and exchange rates separately instead of taking the two as a one composite variable.

To this end, a VAR model based on pricing along a distribution chain framework, as presented in McCarthy (2000), will be utilized. The advantage of this utilization is that it allows one to observe how external shocks are transmitted from one distribution stage to another. Secondly, unlike its alternatives, it allows shocks to have both direct and indirect effects, the importance of which is also stated by Aksoy and Riyanto (2000). Third it incorporates the dynamics through pricing power and changing mark-up rates. Furthermore, Ganev *et al.* (2002) claims that VAR methodology may be useful for economies with short data. It can be used to analyze short-run dynamics and the speed towards equilibrium and enables to indicate the sources of shocks.

The preview of the results shows that the degree of both ERPT and import price pass-through (IPPT) has significantly decreased under the IT period in comparison to the pre-IT period. In the IT period, the cumulative IPPT and ERPT into consumer prices are close to each other, while IPPT is higher than ERPT into producer prices. In addition, import price shocks are transmitted faster than exchange rate shocks into inflation indicators. Finally, the exercise on inflation realizations during 2007 and 2009 has shown that external factors influenced consumer prices. In addition, simultaneous counter movements of exchange rate and import prices at that period limited and sometimes offset the impact of each other on consumer prices.

The outline of the study is as follows: In the next section, the data set is introduced. In the third section, the specification of the model utilized to estimate the pass-through dynamics is presented in detail. In this regard, setup of the model and the identification scheme are handled. In section IV, empirical results of the estimated model are presented. The results of impulse response functions for the pre-IT and the IT periods and the variance decomposition of consumer and producer prices in the IT period are covered. The next section presents the exercise on the impact of external shocks on realized inflation rates in 2007 and 2009 based on the results given in section IV. The last section presents a summary of the findings and concluding remarks.

## 2. The Data

The choice of the variables for the pass-through analysis is based on the considerations regarding the aim of the study and the pricing along a distribution chain model of McCarthy (2000). Given that the analysis aims to identify the pass-through of external shocks into prices variables that can define such a transmission are selected. The pricing model defines the transmission mechanism by stages along a distribution chain which captures importer, producers and consumers. In this regard, price indicators reflecting consumer, producer and import prices are included. Moreover, Karadaş *et al.* (2008), lists demand conditions, exchange rate developments and cost changes as the main determinants of Turkish firms' monthly price revisions. For this reason, the model also includes variables representing the aggregate demand in the economy and the exchange rate.

To represent demand, output gap is used. Output gap is, by definition, an abstract notion, not directly observed and has to be estimated. Here, it is produced with HP-filter on seasonally adjusted Industrial Production Index data.<sup>3</sup> The exchange rate is the monthly average of nominal TL/USD as the majority of Turkish import is carried out in USD terms and USD may have a higher influence on inflation perception due to the inertia inherited from the era of fixed exchange rate regime. Unit value of import price index in USD terms is representing import prices. This ensures measuring the impact of import price shocks on inflation resulting from global conditions. The manufacturing industry producer price index is chosen to represent producer prices, because manufacturing industry carries out most of the imports in Turkey and its weight in whole Producer Price Index (PPI) is as high as 75 percent. As for the consumer prices, Consumer Price Index (CPI) is chosen so that it can include both direct and indirect effects of shocks. An alternative may be using core inflation indicators. Besides its conceptual advantage, the communication of CPI with public is easier than that of core indicators (Mishkin, 2007).

Analyses in this study cover the monthly data ranging from January 1997 and September 2010. However, in order to make a periodical comparison, subsamples are chosen as the longest possible period that can be considered to be a single monetary policy regime. In this way, the effects of parameter instability that would be likely in estimations over multiple regimes are minimized.<sup>4</sup>

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<sup>3</sup> The reason for using Industrial Production Index data is that it is the only series among the alternatives that can be prepared for the whole sample period that is analyzed.

<sup>4</sup> To represent the pre-IT period, the estimations will be carried out by using the sample until 2001. And for the estimations of IT period, it will start from January 2002. The data belong to 2001, which is the economic crisis year, will not be used because of the noise in the data, which distorts the validity of results.

### 3. The Model

It would be useful first to examine the time-series properties of the variables chosen using the Augmented Dickey Fuller test. The results, which are available upon request, suggest that all variables except the output gap are non-stationary processes. One should note that there is a discussion whether variables should be differenced or not, even if they contain a unit root. Sims (1980) and Sims, Stock and Watson (1990) argue that taking differences lead to information loss, such as a possible cointegrating relationship. To assess the existence of such relationship between variables, Johansen cointegration test is carried out. The results indicate that there is no strong evidence for a significant cointegrating relationship between the variables. This avoids the possibility of information loss in the model. Hence, all variables except output gap enter the model in first differences, whereas output gap enters in levels.

The pass-through analysis is conducted by estimating a monthly Vector Auto Regression (VAR) model based on pricing along a distribution chain framework in McCarthy (2000) for two sampling periods which characterize pre-IT and IT periods respectively. The model includes five variables as mentioned earlier. These are output gap, nominal exchange rate (TL/USD), import prices, manufacturing industry prices and consumer prices. All variables are in logarithms and given the stationarity analyses, except output gap all variables are taken first differences. Each of these 5 variables correspond to one stage of the distribution chain.

It is assumed that exchange rate shocks are directly identified by dynamics of exchange rate. Later, the shock of each stage is the part of the variable at that stage that cannot be explained by shocks of previous stages of the distribution chain and information at period  $t-1$ . There is no contemporaneous feedback in the model, i.e. consumer prices affect variables in previous stages of the chain through its effect on expected inflation in later periods. In the light of this setup, the model can be represented as follows:

$$\Delta e_t = E_{t-1}(\Delta e_t) + \varepsilon_t^{\Delta e} \quad (1)$$

$$\pi_t^{im} = E_{t-1}(\pi_t^{im}) + \alpha_1 \varepsilon_t^{\Delta e} + \varepsilon_t^{im} \quad (2)$$

$$gap_t = E_{t-1}(gap_t) + \beta_1 \varepsilon_t^{\Delta e} + \beta_2 \varepsilon_t^{im} + \varepsilon_t^{gap} \quad (3)$$

$$\pi_t^m = E_{t-1}(\pi_t^m) + \delta_1 \varepsilon_t^{\Delta e} + \delta_2 \varepsilon_t^{im} + \delta_3 \varepsilon_t^{gap} + \varepsilon_t^m \quad (4)$$

$$\pi_t^c = E_{t-1}(\pi_t^c) + \gamma_1 \varepsilon_t^{\Delta e} + \gamma_2 \varepsilon_t^{im} + \gamma_3 \varepsilon_t^{gap} + \gamma_4 \varepsilon_t^m + \varepsilon_t^c \quad (5)$$

where  $gap_t$  is the output gap;  $\Delta e_t$  is the first difference of the logarithm of nominal exchange rate;  $\pi_t^{im}$ ,  $\pi_t^m$  and  $\pi_t^c$  are the first difference of the logarithm of import prices, manufacturing prices and consumer prices respectively.  $\varepsilon_t^{gap}$  represents demand shock;  $\varepsilon_t^{\Delta e}$  is the shock to the nominal exchange rate and  $\varepsilon_t^{imp}$  is the import price shock.  $\varepsilon_t^m$  and  $\varepsilon_t^c$  represent shocks to manufacturing prices and consumer prices, respectively. Finally,  $E_{t-1}(\cdot)$  refers to the expectation of the variable based on the information set available at the end of period  $t-1$ . The shocks are assumed to be serially uncorrelated and orthogonal across equations. Turning back to the setup of the model, the structure of the equations suggests that they are part of a recursive VAR framework. Given this structure of the model, if conditional expectations in equations 1 to 5 are replaced by linear projections of the lags of the five endogenous variables in the system, one can estimate this model as a VAR.

#### 4. Empirical Results

Identification of the shocks of such a model is achieved by applying Cholesky decomposition. Cholesky decomposition imposes restrictions, which are necessary to identify the structural VAR model that links the reduced form and the structural residuals (Hahn, 2003). Economically, these restrictions imply that some of the structural shocks do not have a contemporaneous impact on some of the variables. Therefore, economic interpretation is obtained through the ordering of the variables.

The ordering of variables in the model is taken as nominal exchange rate, import prices, output gap, manufacturing industry prices and consumer prices. The exchange rate is ranked first in the ordering which reflects the presumption that its monthly innovations are primarily driven by exogenous factors and other variables could affect it only through expectations channel in the future periods. Concerning inflation, the pricing chain from trade prices to producer prices and from producer prices to retail consumer prices motivates the ordering. Lastly, positioning of output gap between import and producer prices is based on the assumption that it may be affected by the current exchange rate and import price conditions.<sup>5</sup>

The diagnostic tests for the system are also performed. First of all, the appropriate lag length is selected as 2 for the first sub-sample and 3 for the second subsample based on the lag length selection criteria. Besides,

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<sup>5</sup> The ordering of variables may have effect on the results of the impulse response functions. In order to check the robustness of the results, an alternative order, taking output gap as the first variable instead of third, has also been tested. The results of the alternative ordering did not differ significantly from that of the baseline model. The results of the alternative ordering are not reported here, due to space limitations, but is available upon request.

diagnostics regarding the residuals indicate that residuals satisfactorily pass all normality, autocorrelation, heteroskedasticity, stability and stationarity tests. After confirming that there is no problem in residual diagnostics, impulse response functions can be utilized to estimate the extent and the speed of pass-through of external factors into both consumer prices and manufacturing industry producer prices.<sup>6</sup>

### **Impulse Responses to Exchange Rate and Import Price Shocks:**

The impulse response functions of the VAR model are estimated over a 24-month horizon. The shocks are orthogonalized using Cholesky decomposition and standardized to one percent shocks. As a result, in the figures presenting pass-through results, the vertical axis indicates the approximate percentage point change in the respective price indicator due to a one percent shock. In other words, it indicates percentage of the pass-through. The pass-through coefficient in a given time period is calculated as the ratio of cumulative change in the price level to the cumulative change in the variables of interest over the same period.<sup>7</sup>

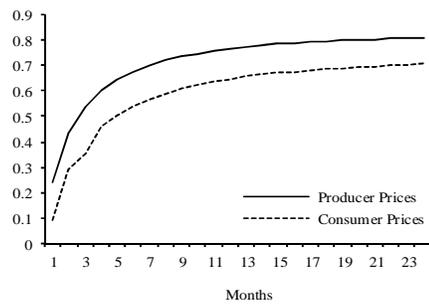
Figure 1 to 4 show the responses of consumer prices and manufacturing prices to 1 percent shocks in exchange rate and import prices in the pre-IT and the IT periods. The empirical findings reveal the following results: First, in both periods both exchange rate and import price shocks are reflected more into producer prices than it is into consumer prices. This not a surprising outcome since one should expect decreasing pass-through of external shocks into price indicators along the distribution chain (McCarthy, 2000). As far as the speed of pass-through is concerned, import price shocks are passed-through into producer prices faster than exchange rate shocks. A possible explanation may be that import prices may comprise a larger share of the production cost of firms compared to that of exchange rate. In addition, firms may have more opportunity to hedge themselves against possible exchange rate fluctuations (Mann, 1986) compared to import price fluctuations. Likewise, ERPT into consumer prices is slower than IPPT into consumer prices. These results imply that, the channels that import prices affect consumer prices contain more direct effects than exchange rates. It is not unreasonable, as the goods directly affected from import prices (mostly energy items) has a larger share in consumption basket than the goods whose prices set in foreign currency (such as high-tech electronic devices). The persistency and volatility of the changes in external shocks may also be clarifying (Taylor, 2000). More volatile and less persistent characteristic of

<sup>6</sup> Since the main focus is on pass-through of external factors, responses for other variables are not reported.

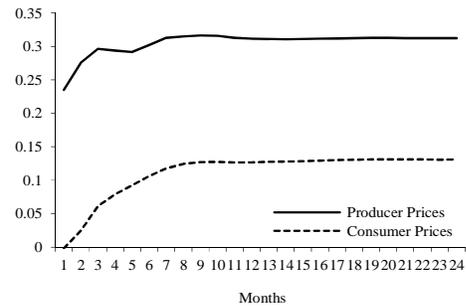
<sup>7</sup> The formal representation is in following manner:  $PT_{t,t+j} = P_{t,t+j} / E_{t,t+j}$ , where  $P_{t,t+j}$  denotes the cumulative change in the price level and  $E_{t,t+j}$  is the cumulative change in the variable whose pass-through will be calculated.

exchange rate compared to import prices lowers pass-through for exchange rate, as firms may behave more eager to adjust mark-ups rather than adjust prices. On the contrary, more persistent and less volatile changes in import prices compared to exchange rate changes reduce the tolerance to resist these shocks and may lead to immediate changes (Yüncüler, 2009). These observations show clearly that the pass-through dynamics of external shocks in Turkey are different from each other. This puts forth the importance of including external factors separately to the analysis.

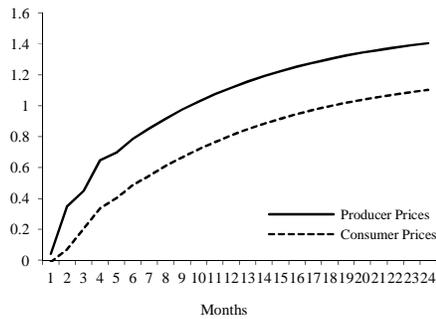
**Figure 1. Cumulative Response of Prices to a 1 percent Exchange Rate Shock in Pre-IT period**



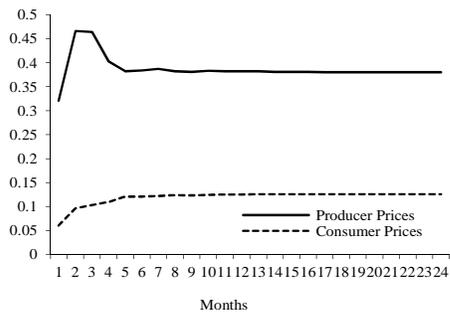
**Figure 2. Cumulative Response of Prices to a 1 percent Exchange Rate Shock in IT period**



**Figure 3. Cumulative Response of Prices to a 1 percent Import Price Shock in Pre-IT period**



**Figure 4. Cumulative Response of Prices to a 1 percent Import Price Shock in IT period**



Another outcome of the impulse responses is that the magnitude of pass-through is significantly lower in IT period compared to pre-IT period. This is in line with the results derived by Kara and Ögünç (2008). The coefficients in this study are also lower than that of Kara and Ögünç (2008). This also shows that as years pass under IT regime, the degree of pass-through falls steadily. There may be several explanations on this outcome, but change in volatility and persistency of external shocks<sup>8</sup> and lower inflation environment achieved during IT seem to be the most explanatory factors.

### **Variance Decompositions:**

Although the impulse responses shed light on the recent extent and the speed of pass-through to domestic price indicators, they do not specify the importance of shocks in domestic price fluctuations. Therefore, investigating the importance of shocks would complement the response analysis. Variance decomposition gives insight on importance of external shocks as it decomposes variations in price indicators into the shocks to the endogenous variables. To this end, variance decompositions of producer and consumer prices in IT period are checked (See Table 1 and Table 2 in Appendix). Variance decompositions show that external shocks account more for the variation in producer prices than consumer prices.

## **5. Analysis of Inflation Realizations in 2007-2009 Period**

Central Bank of Turkey claimed that the rise in annual consumer inflation from mid-2007 to the last quarter of 2008 can be attributed to skyrocketing commodity prices, thus import prices (Figure 5). For the following period, annual inflation was on a downward trend, again on the back of import price developments in addition to weak demand conditions, but limited by depreciation in TL.<sup>9</sup> Therefore, this part analyzes the contribution of import price and exchange rate developments to headline inflation from mid-2007 to end-2009 by using the estimated pass-through coefficients.

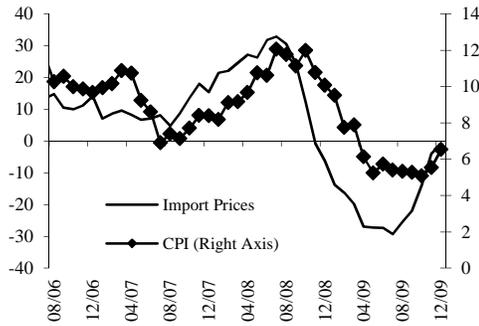
Figure 6 shows the percentage point contribution of exchange rate and import price developments to monthly CPI inflation between 2007 and 2009. It is clear that increase in import prices had significant share in monthly price changes until mid-2008 while exchange rate changes limited inflation to rise further. The outlook changes upside down when it comes to the fourth quarter of 2008. This time, upward pressure on inflation stemming from depreciation of TL after the global crisis hit the Turkish economy, is offset by slump in import prices.

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<sup>8</sup> For an analysis of the volatility and persistency of changes in exchange rate and import prices, see Yüncüler (2009, pp. 41-45).

<sup>9</sup> See corresponding quarterly Inflation Reports of CBRT for further details of inflation analysis.

**Figure 5. Annual Percentage Change of CPI and Import Prices**



**Figure 6. Percentage Point Contribution of External Shocks to Monthly CPI Changes**

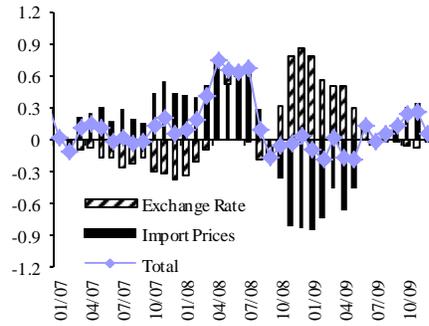
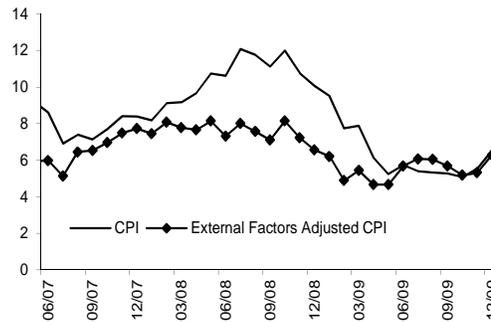


Figure 7 shows the total impact of these monthly contributions to annual inflation and presents information about how annual inflation would follow a path between 2007 and 2009 if there had been no change in external factors.

**Figure 7. Contribution of External Factors to Annual Inflation**



In 2007, external factors have a positive contribution to annual inflation, albeit accounting for a small part of the annual inflation. It seems that rise in import prices were countered by appreciation of TL at that period. In 2008, however, the influence of external factors becomes evident. The margin

between CPI and external factor adjusted CPI reaches to 4.2 percentage points. Later, with the outset of financial crisis, both indicators start to converge at lower levels. This static analysis reports that inflation would have followed a stable and a lower path in 2008 if external factors had not contributed to inflation. This shows that for the last two and a half years it is the factors out of CBRT's control that kept inflation away from lower levels.

## 6. Concluding Remarks

In this study, pass-through of import prices and exchange rate into consumer and manufacturing industry producer prices are analyzed for Turkey. The results indicate that the cumulative pass-through into producer prices is higher than cumulative pass-through into consumer prices, as expected by the distribution chain theory. In addition, import price shocks are found to be reflected into price indicators quicker than the exchange rate shocks. Compared with the pass-through dynamics in the pre-IT period, pass-through under the IT regime is significantly lower. Change in the persistence and volatility of the shocks and the lower inflationary environment attained during IT are thought to be the reason for this. The results of the inflation analysis based on the estimated pass-through coefficients put forth the relative importance of external factors on inflation developments in the period 2007-2009. It is found that unlike anticipated by some agents, exchange rate changes are still passing through to prices; however, simultaneous counter movements of exchange rate and import prices limit and sometimes offset the impact of each other on consumer prices. These findings show that, Central Bank has to take into account the developments in factors outside of its control and grasp the reflection of such shocks into inflation indicators precisely to implement a better monetary policy. In this regard, this study presents valuable information on recent pass-through dynamics in Turkey and findings can be used as a tool in the inflation analysis.

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*ACKNOWLEDGMENTS* The author thanks Nadir Öcal, H. Burcu Gürcihan, Orhun Sevinç and the anonymous referee for their valuable comments, suggestions and contributions.

## Appendix

**Table 1. Variance Decomposition of Producer Prices in IT period**

Period	Exch. Rate	Imp. Price	Gap	Prod. Price	Cons. Price
1	28.86	19.68	1.33	50.14	0.00
2	26.80	24.16	1.55	44.76	2.73
3	23.89	21.60	2.10	47.42	4.99
4	23.56	21.48	2.91	46.79	5.25
5	23.22	21.18	4.30	46.13	5.17
6	23.08	21.17	4.29	46.10	5.36
7	22.99	21.28	4.31	46.07	5.35
8	22.97	21.24	4.30	46.15	5.34
9	22.95	21.24	4.31	46.14	5.36
10	22.95	21.26	4.32	46.12	5.36
11	22.95	21.25	4.33	46.11	5.37
12	22.94	21.25	4.33	46.10	5.37
13	22.94	21.25	4.33	46.10	5.37
14	22.94	21.25	4.34	46.10	5.37
15	22.94	21.25	4.34	46.10	5.37
16	22.94	21.25	4.34	46.10	5.37
17	22.94	21.25	4.34	46.10	5.37
18	22.94	21.25	4.34	46.10	5.37
19	22.94	21.25	4.34	46.10	5.37
20	22.94	21.25	4.34	46.10	5.37
21	22.94	21.25	4.34	46.10	5.37
22	22.94	21.25	4.34	46.10	5.37
23	22.94	21.25	4.34	46.10	5.37
24	22.94	21.25	4.34	46.10	5.37

**Table 2. Variance Decomposition of Consumer Prices in IT period**

Period	Exch. Rate	Imp. Price	Gap	Prod. Price	Cons. Price
1	0.01	4.76	0.11	1.28	93.84
2	3.61	8.33	1.38	2.04	84.64
3	5.98	7.07	2.43	14.50	70.02
4	6.06	7.59	2.77	19.56	64.02
5	6.24	8.04	3.74	20.30	61.67
6	6.28	7.87	4.23	20.80	60.81
7	6.30	7.93	4.29	20.90	60.58
8	6.28	7.97	4.34	21.00	60.42
9	6.26	7.95	4.34	21.14	60.32
10	6.27	7.96	4.34	21.16	60.27
11	6.27	7.96	4.34	21.18	60.25
12	6.27	7.96	4.33	21.20	60.23
13	6.28	7.96	4.33	21.20	60.23
14	6.28	7.96	4.33	21.20	60.22
15	6.28	7.96	4.33	21.21	60.22
16	6.28	7.96	4.33	21.21	60.22
17	6.28	7.96	4.33	21.21	60.22
18	6.28	7.96	4.33	21.21	60.22
19	6.28	7.96	4.33	21.21	60.22
20	6.28	7.96	4.33	21.21	60.22
21	6.28	7.96	4.33	21.21	60.22
22	6.28	7.96	4.33	21.21	60.22
23	6.28	7.96	4.33	21.21	60.22
24	6.28	7.96	4.33	21.21	60.22