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Globalization and Inflation

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Abstract

The Turkish economy, particularly during and after the 1990s, has faced with greater levels of inflation, which began to decline following the 2001 banking crisis due to major shift in policymaking within Turkey's political and economic framework. When the global economy is considered, however, substantial globalization has transpired, resulting in a worldwide disinflation trend. Therefore, the question of "How did the global disinflationary period affect the overall performance of Turkey's price stability policy?" has gained prominence as a pertinent one. The primary objective of this article is to examine the impact of globalization on inflation in Turkey within this paradigm. In addition to analyzing volatile patterns in Turkish inflation from 2003 to 2020, the relevance of domestic and international factors will be empirically investigated through structural VAR analysis. Our findings reveal that, domestic prices are explicitly correlated with the globalization through global demand circumstances, imported input costs and foreign currency shifts all of which contribute significantly to price fluxes. Nevertheless, it is imperative to stress that inflation inertia is a crucial aspect of measuring inflation.

Keywords: *Globalization, Inflation, Global Output GAP, Structural Autoregression (SVAR).*

Küreselleşme ve Enflasyon

Öz

Türkiye Ekonomisi, özellikle 1990'lı yıllar ve sonrasında yüksek enflasyonla karşı karşıya kalmıştır. 2001 krizinden sonra enflasyon oranlarının hızla düştüğü görülmektedir. Bunun üzerinde şüphesiz yaşanan radikal politika dönüşümünün etkisi bulunmaktadır. Ancak, aynı dönemlerde ekonomik küreselleşmede önemli bir artış söz konusudur ve küresel dezenflasyon süreci hemen hemen bütün ülkelerde enflasyon oranlarını düşürmektedir. Bu noktada, "küresel dezenflasyon sürecinin Türkiye'de enflasyon hedeflemesi rejiminin başarısında katkısı ne kadar olmuştur?" sorusu ile karşılaşılmaktadır. Bu çerçevede, çalışmanın temel amacı Türkiye ekonomisinde küreselleşmenin enflasyon üzerindeki etkisini ortaya koymaktır. Böylece, söz konusu dönemde enflasyon oranlarında aşağı ve yukarı yönlü hareketlerin açıklanmasında yerel ve küresel faktörlerin nispi önem düzeylerine ilişkin çıkarımlarda bulunulabilecektir. Çalışmada bu çerçevede 2003-2020 dönemine ilişkin yapısal VAR yöntemi kullanılarak ampirik analiz gerçekleştirilmektedir. Elde edilen sonuçlar, küreselleşmenin hem küresel talep değişiklikleri hem de üretimde kullanılan girdi fiyatlarındaki gelişmeler ve döviz kuru dalgalanmaları yoluyla Türkiye'deki fiyat gelişmeleri üzerinde önemli bir etkiye sahip olduğunu göstermektedir. Buna ek olarak, enflasyon üzerinde belirleyici temel ekonomik göstergenin enflasyon ataleti olduğu altı çizilmesi gereken bir noktadır.

Anahtar Kelimeler: *Küreselleşme, Enflasyon, Global Çıktı Açığı, Yapısal VAR.*

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INTRODUCTION

Price instabilities have emerged as one of the most essential and obligatory policy subjects that governments throughout the world have begun to pursue since the 1990s, owing to the damage they inflict on economies. In Turkey, correspondingly, after experiencing annual price increases of 77 percent between 1974 and 2001, inflation became an unavoidable concern. A major turning point in the Turkish economy was observed following the 2001 crisis. Annual inflation levels declined from 44 percent to 9 percent between 2002 and 2005, and to mere 8 percent between 2006 and 2016. However, inflation accelerated to double digits in 2017 (WorldBank [WB], 2021).

A thorough analysis of the factors responsible for the reduction of inflation levels following the 2001 banking crisis emphasizes the importance of the introduction of "price stability" policies, as well as the structural changes resulting from reforms. During the economy's transition period between 2002 and 2006, the Central Bank of the Republic of Turkey (CBRT) adopted an "implicit inflation targeting" policy, and the Central Bank underwent structural changes to enhance its credibility, independence, and transparency, all of which pushed inflation down to acceptable levels. Yet, adopting explicit inflation targeting policies after 2006 failed to replicate the previous policy's success and hindered the deterioration of inflation statistics (Cinel, 2018; Durmuş, 2018).

Due to the abrupt change in inflation trends following 2006, economists have been debating two issues in order to establish the reasons and consequences of this momentous change. The first concern is the instability of prices that has emerged from the dismantling of post-2001 structural changes. Second, because prices are mainly dependent on global conditions, the pass-through of global inflation into domestic prices has been considerable. Additionally, CBRT reinforces the second reason by referring to the influence of international factors in monthly or annual reports in cases where the "price stability" objective is not met (Central Bank of the Republic of Turkey [CBRT], 2008; 2020). In Kara and Orak (2008)'s analysis, the decrease in inflation numbers ought not to be attributed to implicit or explicit inflation-targeting policies since such policies have not been evaluated under international economic shocks. Increasing pressure on domestic prices and the "price stability" goal, which has been brought about by global shocks, have raised inquiries regarding the determinants of inflation as well as the viability of inflation targeting policies.

The advancement of globalization during the 1990s ushered in a dramatic shift in both production and trade, as well as the financial markets worldwide. Thus, as the frequency of bilateral and multilateral agreements between nations in the aforementioned areas has increased, so has the mobility of goods and capital. By strengthening relationships with other countries through carrying out international agreements or even trade deals, countries have become dependent not only on other countries but also on world events. Due to the extraordinary levels of dependency engendered by economic globalization, independent decision-making on domestic conjuncture was not feasible, as developments in the global economic context prevented economies from becoming economically independent when compulsory. This lack of autonomy also extends to governments' inflation policies. As it can be seen from Figure 1, during specific economic conjunctures, the inflation rate in the World and Turkey has exhibited similar trends. This parallelism has prompted various empirical research to ascertain the feasibility of the association between inflation and economic conditions (Ball, 2006; Borio & Filardo, 2007; Brouillette & Savoie-Chabot, 2017; Ciccarelli & Mojon, 2010; Hałka

& Kotłowski, 2017; Hakkio, 2009). This paper, thereby, seeks to determine the fundamental rationale for Turkey's declining inflation rates from 2002 to 2006 and analyses the interconnections between globalization and inflation as well as the role of domestic and international variables.

Figure 1: The Comparison of Inflation Levels in the Turkey and World (Log)

Source: World Bank (2021)

In the second chapter, we will discuss the key variables influencing inflation, and in the third chapter, the empirical literature will be reviewed. The fourth chapter of our study will consist of the results of econometric analyses, followed by a discussion of our conclusions in the last section.

2. THEORETICAL FRAMEWORK

The conventional approach adopts a country-centric inflation methodology and, in the context of the Philips curve, evaluates the relationship between inflation and income. From this perspective, inflation is a consequence of domestic economic circumstances, such as excessive demand and stagnation. External factors, on the other hand, are examined solely in terms of exchange rates and import prices, which are not as crucial as domestic determinants (Borio & Filardo, 2007).

Over the past two decades, inflation rates across the globe have progressively declined. Although there is no consensus on the main reason behind this downward trend in inflation, there are two compelling arguments that are substantial while interpreting dwindling inflation numbers since 1990. The first one focuses on the success of measures aimed at containing inflation adopted by central banks worldwide and competition policies enacted by governments. Milton Friedman's definition of inflation as a monetary phenomenon and the subsequent mainstreaming of his theory have led to several "price stability" policies being instituted by central banks following the great inflation of the 1970s. In response to this drastic alteration in policy making, both conventional and monetary tools were formulated and implemented rigidly. This resulted in the consideration that an active monetary policy is an effective tool in combating inflation. Second, advances in technology and regulation of factor markets have augmented competition and productivity in certain sectors of the economy, enabling industries to manufacture low-cost, high-quality commodities (White, 2008). In addition to the various

elements contributing to the downward trend in inflation during the 1990s, scholars have also analysed the impact of external factors. According to this approach, inflation became inelastic in relation to domestic economic circumstances (Blanchard et al., 2015; Borio & Filardo, 2007; Ihrig et al., 2010). Moreover, domestic inflation rates became sensitive to global indicators. This approach indicates that globalization was widely regarded as critical on a global scale, while extended international ties were the leading sources of inflation on a domestic scale. Thus, it is frequently proposed that instead of concentrating on conventional country-specific models when studying the drivers of inflation, comprehensive global models would be particularly appropriate.

Theoretically, inflation indicators can be separated into two categories: domestic and global. In its essence, both domestic and global actors are inextricably interconnected with the prevailing economic conditions. During expansion and recession periods in the domestic economy, a combination of excessive demand and insufficient demand is present, which provides the foundation for both upward and downward trends in inflation. Furthermore, views on the origins of economic business cycles, along with their influence on inflation, are advocated by multiple economic schools, each with their own perspective. The global economic context is also instrumental in predicting the global dynamics of inflation. The implicit implications of prices of goods and commodities ensuing from their extensive interconnection with global macroeconomic fluctuations are extensively discussed within the theoretical framework. To elaborate further, it is reported that in the first stage, there is pressure on international prices of finished and intermediate goods during the expansion and trough stages of the business cycle. The second phase of the cycle entails the expansion and contraction of global supply, thereby altering international prices of final and intermediate goods. In addition, imported goods are used as a basis for estimating the exposure of domestic price changes to global price shifts. The introduction of a transmission mechanism based on whether final or intermediate goods are imported has the tendency to profoundly affect domestic inflation. Inflation is driven directly by explicit transmission mechanisms, which include final goods and exported low-cost consumer goods. In contrast, the indirect transmission mechanism, which encompasses intermediate and commodity goods, has an implicit influence on inflation through producer prices.

During the 1990s and 2000s, China and India's low cost and extensive production levels exceeded business strategies for global demand. This resulted in them both evolving into major global competitors, in addition to contributing to reductions in worldwide trade prices and increases in domestic demand in their respective countries. The escalating proportion of imported final goods in China and India is therefore anticipated to exert a considerable downward pressure on inflation rates in these countries (Kohn, 2006). However, this process has brought about the substitution of energy, raw materials, intermediate products, and other inputs utilized in their production with imported low-cost, high-productivity alternatives. It is evident that price variations in energy, commodities, and intermediate goods accounted for a remarkably higher inflation rate via domestic producer prices. Further, the volatility of demand and supply patterns for energy, commodities, and intermediate goods appeared to be a pivotal aspect when determining prices (Globan et al., 2016; Hałka & Kotłowski, 2017).

The developments that occur in the global economic conjuncture alter not only import but also export values. Consequently, recession and expansion cycles in global supply and demand are reflected in domestic prices through exports. In response to adjustments in international supply and demand that are a direct consequence of global market price trends,

the domestic prices for export-eligible raw materials, final and intermediate goods will be revised accordingly (Hanif et al., 2017). If, for instance, a particular raw material was manufactured domestically, in the event of a global demand surge for the raw material in question, the price and cost of its production would both be elevated rapidly, which in turn would translate into a higher producer cost for industries.

Even though the international trade price of countries is denoted by a variety of variables, the exchange rate can be defined as a fundamental component. Thus, it is equally critical for national price movements. As previously stated, a floating exchange rate manipulates domestic pricing via import and export prices (Globan et al., 2016). The revaluation of the local currency lowers import prices, whereas the devaluation of the local currency has the opposite outcome of making import prices higher. In the case of export prices, however, an appreciation of the local currency makes local goods more expensive for foreigners. On the contrary, devaluation lets national prices fall, thus stimulating an augmented demand from outside the country for domestic products. Revaluations of local currencies consequently have an adverse effect on domestic prices, whereas devaluations raise domestic prices. Despite an excessive amount of supply in several countries during the post-2000 period, demand lagged behind supply growth, which was also the reason investments failed to coincide with savings (White, 2008). Furthermore, the expansionary monetary policies pursued by developed countries generated a global liquidity surplus. Capital outflows to countries such as Turkey were facilitated by an oversupply of liquidity in developed countries. Following capital infusions, Turkey's economy and other developing countries' economies have experienced a rebound in domestic currencies. However, there was also a substantial decrease in import prices and a plunge in foreign demand for local products. As a result, the revaluation of the currency was beneficial to countries in curbing domestic inflation pressures. There are certain mechanisms that influence domestic prices in a relevant manner that merit consideration. They emerge under conditions where global factors are responsible for shaping and initiating structural modifications in domestic pricing of goods and services and competitiveness. After the countries that acquired dominant positions in the world market became more proactive subsequent to the enactment of low-cost production policies in the 2000s, a competitive environment surfaced for domestic companies that manufacture traditionally imported goods and services. For this reason, domestic companies were required to pursue competitive strategies in terms of profit and price margins. To provide further clarification, mark-up pricing and cost-cutting practices employed by local enterprises to attain enhanced competitive levels indirectly contributed to a diminishing inflation rate (Neiss, 2001; Binici et al., 2012). Having been exposed to intensifying international competition, domestic firms have taken several mandatory actions, such as investing in modern technologies and manufacturing processes, expanding production lines to other nations, and finally adopting specialized techniques with the intention of lowering production costs. It is indisputable that productivity gains will have a beneficial effect on inflation provided that the initiatives described above materialize (Manopimoke, 2018).

3. EMPIRICAL LITERATURE

The study of economic globalization and its impact on domestic economies, together with the pass-through of globalization and international variables into internal prices, has seen a tremendous development in research since 2000. Yet, the quantity of literature regarding the Turkish economy and its position within the globalization of economies is still inadequate.

Brouillette and Savoie-Chabot (2017) examined the Canadian economy during 1997-2021 to determine whether the recent lower inflation rates can be traced to global factors comparable to what unfolded in other countries. According to their study covering the period 1997-2012, decreased inflation levels during this period were the outcome of domestic elements. The authors opted to study global price transfer mechanisms, including import prices, global stagnation, and global production chain mechanisms, in their study. Although this preference for transfer mechanisms in Canada was insufficient when explaining low inflation figures, the role of digitalization and other global factors was cited as decisive. Utilizing the conventional Philips curve, Eickmeier and Moll (2008) analysed inflation on a global scale for 24 OECD countries during the period 1980-2017. The analysis conducted by the authors revealed that changes in unit labour costs and import prices of non-commodity goods or services were primary components in driving down inflation numbers in various countries.

Hałka and Kotłowski (2017) assessed the probable repercussions of external developments on domestic prices in eastern and northern European countries such as Czechia, Poland, and Sweden between 2000 and 2014. The findings of their study, which were derived using a structural vector autoregressive (SVAR) model, imply that inflation was a direct consequence of the domestic production gap in the researched nations. Despite the pivotal influence of volatile trends in global commodity prices, the impact of global supply shocks on these countries was quite marginal. The study carried out by Globan et al. (2016) employing the SVAR model as a methodology, included a sample group composed merely of eastern European countries that acceded to the European Union between 2001 and 2013. While the results of this study indicate that short-term inflation predominantly depends on internal shocks, medium-term inflation, on the other hand, is overwhelmingly correlated with external shocks. By reviewing data from five ASEAN economies (Singapore, Malaysia, Philippines, Thailand, and Indonesia) and South Korea, Finck et al. (2019) conducted an analysis through a SVAR model which demonstrated that global shocks are the primary determinant of inflation, whereas monetary policy is of minor significance.

Furthermore, in addition to SVAR analysis, Bayesian Vector Autoregression (BVAR) was also utilized to evaluate inflation indicators. Pop and Murarașu (2018) studied Romania's economy between 2005 and 2017, a period during which Romania's economy experienced lower inflation rates than desired by the nation's inflation targeting policy. Though the study has shown both external and internal factors influence on inflation, it has been emphasized that domestic prices, particularly in the post-2013 period, were susceptible to external factors. In their study, Jovičić and Kunovac (2017) studied the pass-through of global shocks into price volatility in the Eurozone and specifically in Croatia, adopting a BVAR model. According to their study, although price fluctuations can be attributed to external factors, declining global oil prices are equally crucial for elucidating the downward trend in inflation. Through the BVAR model, Hanif et al., (2017) reviewed Pakistan's economy over a twenty-year period from 1992 to 2014 to ascertain to what extent global commodity prices are linked to domestic prices. Additionally, their study's findings established that global commodity prices are more effective than money supply in determining the overall price level.

Aside from BVAR and SVAR analysis, dynamic factor models (DFM), autoregressive distributed lag (ARDL) and ordinary least squares vector error correction models (OLS-VECM) have also been widely implemented by scholars in their efforts to enhance accuracy in their inflation studies.

Regarding the DFM model, Manopimoke (2018) provides an analysis of Thailand's economy between 1993 and 2015. The conclusions of this analysis can be divided into two distinct categories: short-term and long-term. Based on the short-term results, inflation became more vulnerable to external variables as the influence of domestic factors began to wane throughout the examined period. From 2001 to 2017, the global output gap was considerably more influential on domestic prices than oil prices. The long-term findings suggest that although global factors are critical, monetary policy remains the principal indicator of price instability.

The ARDL analysis of Asghar et al., (2013), on the Pakistani economy from 1972 to 2010 indicated that in the short run, solely external factors brought about the alterations in domestic prices, even though in the long run, both external and internal factors contributed significantly to domestic price changes.

Hemmati et al., (2018) highlighted the implications of money supply, exchange rate, and import prices on internal prices in the Iranian economy between 1999 and 2014, illustrating that inflation is intimately related to the aforementioned components using the OLS-VECM approach.

Even though price fluctuations in the Turkish economy have not been widely scrutinized by scholars, there are various noteworthy studies that ought to be mentioned since they offer distinctive approaches. Although they were unable to substantiate their conclusion on the globalization of domestic inflation within the context of the international output gap, Başkonuş & Özçiçek (2011) evaluated the interdependence between globalization and inflation in the Turkish economy. Furthermore, remarking on the pass-through of global output gaps into inflation, Eren and Çiçek (2009) observed that globalization has an explicit impact on domestic inflation, primarily on the commodities and services that are eligible for foreign trade. Atuk et al., (2018) studied the susceptibility of sub-indices of the producer price index to the domestic output gap while carrying out the Philips curve estimation in this respect. The results illustrated that the output gap resulted in a shift of one third (1/3) of the 152 sub-indices of PPI. In addition, changes in industries that are inelastic to the prevailing economic conjuncture have also been reported to coincide with alterations in import prices and exchange rates. In the study by Demir (2018), forty-two countries, including Turkey, were examined via the Global Vector Autoregressive (GVAR) model to explore in detail whether the correlation between globalization and inflation during the period 1992–2017 can be identified. The findings illustrate the pass-through of globalization into inflation is positive. Thus, domestic prices were altered correspondingly. Nonetheless, in terms of the Turkish economy, even though the global output gap has a marginal impact on internal price patterns, the irrefutable significance of global oil prices is stressed. Lastly, Yılmazkuday (2022) studied the fundamental drivers of Turkish inflation. He concluded that inflation levels in Turkey responded positively to exchange rate and global oil price shocks during the period from 2005 to 2021.

4. ECONOMETRICAL ANALYSIS

4.1. Method and Data

The purpose of this study is to provide insight into correlations between variables through a Vector Autoregression (VAR) model based on Sims's (1980) model of VAR analysis. The VAR approach constitutes an econometrical model in which endogenous evaluation of included variable's lagged (past) values and lagged values of other variables are thoroughly described.

Therefore, the dynamic relationship between the estimated variables will be demonstrated. Due to this characteristic of VAR models, they are frequently used in economic policy studies where dynamic relations between variables are evaluated. Bernanke (1986) and Sims (1999) have stated, however, that postulating contemporaneous correlation between variables in both the short and long runs, despite the above-mentioned advantages of employing the VAR model, would result in erroneous economic conclusions. This situation can be rectified, according to them, through the enactment of structural constraints on coefficient estimations in conjunction with economic theory. This will, consequently, mitigate certain shocks and ensure that conclusions can be derived that are reliable in terms of economic assessment.

Equations (1) and (2) illustrate a VAR model with lagged values. The mutual uncorrelation of white noises associated with error terms in equations is estimated. Equation (3) displays a matrix representation of the previously mentioned models.

If B= $\begin{bmatrix} 1 & b_{12} \\ b_{21} & 1 \end{bmatrix}$, Y_t= $\begin{bmatrix} X_t \\ Z_t \end{bmatrix}$, Γ_0= $\begin{bmatrix} b_{10} \\ b_{20} \end{bmatrix}$, $\Gamma_{1=}$ $\begin{bmatrix} \beta_{11} & \beta_{12} \\ \beta_{21} & \beta_{22} \end{bmatrix}$, u_t=$\begin{bmatrix} u_{xt} \\ u_{zt} \end{bmatrix}$ specifications are integrated in equation (3), closed-from expression of VAR model can be seen in equation (4). In equation (4), B illustrates the matrix of contemporaneous correlation between variables, Γ_0 for matrix of constants, Γ_1 exhibits parameter matrix for lagged variables and u_t displays residuals of the structural model. If $E(u_t)$ is specified as 0, then $E(u_t u_t T)=\sum u$ corresponds to a positive definite white noise covariance matrix (Pfaff, 2008). When both sides of the equation are multiplied by B^{-1} , feasibility of implementing the proposed constraints will be demonstrated via the Reduced Vector Autoregressive (RVAR) model depicted in equation (5).

$$X_t = b_{10} - b_{12}Z_t + \beta_{11}X_{t-1} + \beta_{12}Z_{t-1} + u_{xt} \quad (1)$$

$$Z_t = b_{20} - b_{21}X_t + \beta_{21}X_{t-1} + \beta_{22}Z_{t-1} + u_{zt} \quad (2)$$

$$\begin{bmatrix} 1 & b_{12} \\ b_{21} & 1 \end{bmatrix}\begin{bmatrix} X_t \\ Z_t \end{bmatrix} = \begin{bmatrix} b_{10} \\ b_{20} \end{bmatrix} + \begin{bmatrix} \beta_{11} & \beta_{12} \\ \beta_{21} & \beta_{22} \end{bmatrix}\begin{bmatrix} X_{t-1} \\ Z_{t-1} \end{bmatrix} + \begin{bmatrix} u_{xt} \\ u_{zt} \end{bmatrix} \quad (3)$$

$$By_t = \Gamma_0 + \Gamma_1 Y_{t-1} + u_t \quad (4)$$

$$y_t = A_0 + A_1 Y_{t-1} + \varepsilon_t \quad (5)$$

This study incorporates an econometric model composed of six variables, such as the global output gap, global energy prices, domestic output gap, (U.S dollar) exchange rate, (M2) money supply, and inflation. The global drivers of domestic prices, which consist of global output gaps and global energy prices, exert their influence on prices through foreign trade prices. The global output gap is anticipated to affect internal prices in the Turkish economy in terms of the prices of final and intermediate goods that are suitable for both export and import. Further, increased global demand for goods in response to the positive global output gap will implicitly prompt an upward trend in Turkish internal price levels owing to elevated import prices (Globan et al., 2016; Hałka & Kotłowski, 2017). Aside from internal price volatility, variations in global demand patterns have an impact on the demand for tradable commodities manufactured domestically. Consequently, the prominent levels pass-through effect of fluctuating export

prices can precipitate significant changes in inflation rates (Hanif et al., 2017). Since a positive global output gap will stimulate the demand for tradable goods, except for unprecedented changes in supply circumstances, an upsurge in general prices in Turkey is envisaged. In the model, the global output gap and inflation are deemed to be linearly proportional when theoretically analysed. In addition, the international elements that are forecasted to have a profound influence on Turkish price levels encompass global commodity and energy prices. After 1990, the proportion of imported raw materials in the national manufacturing process grew rapidly in various countries throughout the world, including Turkey. Hence, changes in the prices of raw materials will unavoidably result in implicit cost volatility for enterprises. Global energy prices have been incorporated into the model as a proxy for global input prices since the projected impact is analogous to the effect that prices of raw materials have on costs.

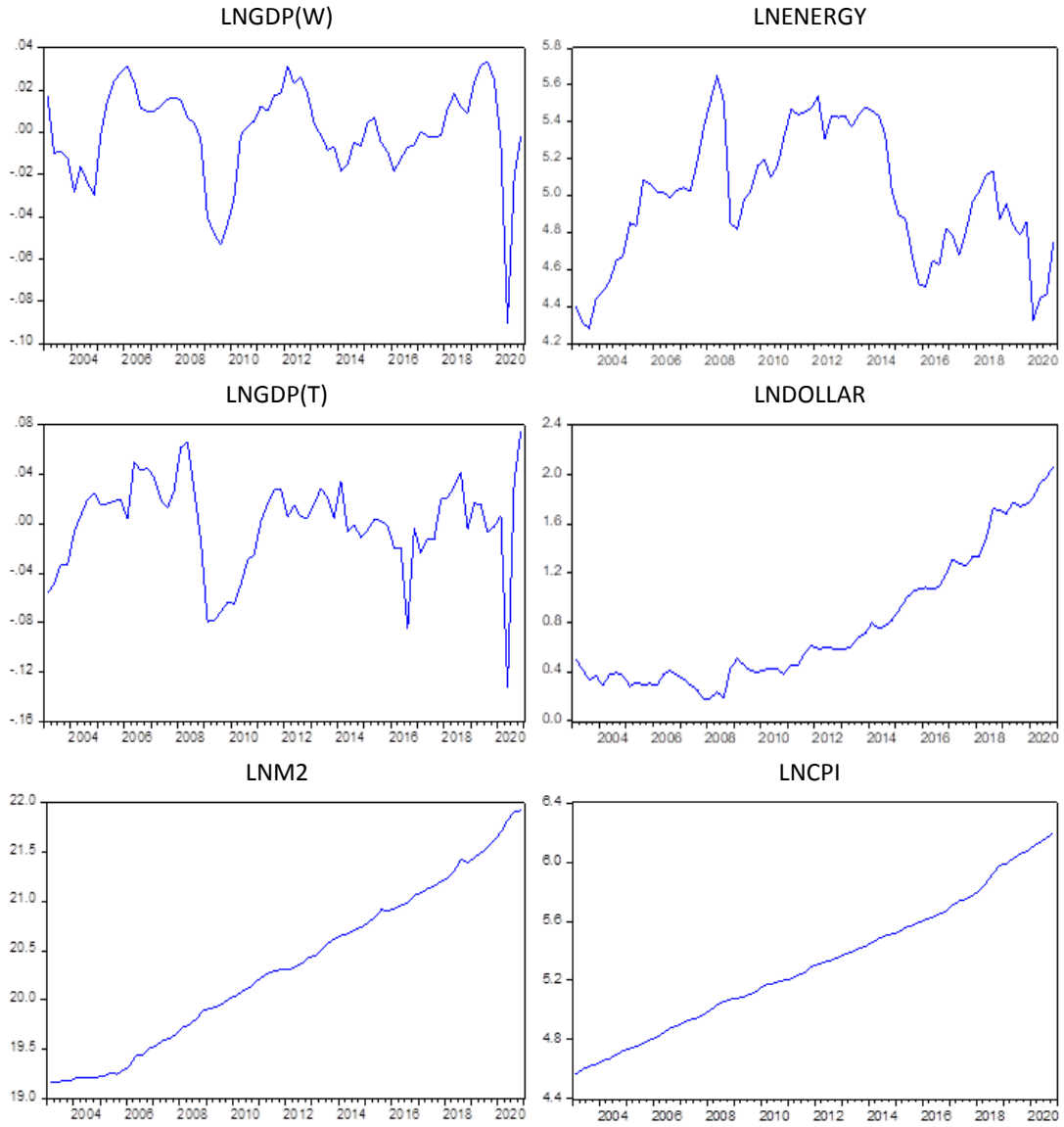
The third variable in the model is the domestic output gap. The theoretical interrelationship regarding the domestic output gap and inflation is examined within the framework of the Philips Curve, which has undergone several revisions throughout history. However, in essence, as a positive domestic output gap results in aggregate demand shifts, general price levels will respond identically. The exchange rate, as the model's fourth variable, will either raise or reduce export and import prices in accordance with domestic currency appreciation or depreciation patterns. Consequently, in countries where raw materials, intermediates, or final goods comprise the majority of imports, depreciation of the domestic currency is certain to drive up domestic prices. Degrading export prices resulting from depreciating a national currency will stimulate demand for export-eligible local products, thereby bringing about a substantial escalation in domestic prices. Therefore, it can be deduced that inflation and exchange rates are explicitly interrelated. The fifth variable in the model, the money supply, is discussed from the perspectives of Monetarist and Neoclassical economic schools of thought. Monetarists and Neo-Classical economists contend that alterations in the money supply can have a noticeable influence on price levels since aggregate demand and inflation expectations are primarily dictated by the money supply. Furthermore, employing the governance of the money supply of nations as a vital function, central banks established price stability as their principal objective and implemented aligned policies within the framework of inflation targeting policies in the post-1990 period. In response to the economic crisis Turkey endured in 2001, CBRT also adheres to inflation targeting policies and has imposed appropriate measures with respect to the monetary aspects of the markets to ensure price stability. The correlation of money supply and inflation variables in the model is, hence, estimated to be interdependent. The Turkish economy has encountered two economic downturns over the analysed period, both of which are predicted to engender structural breaks: the 2008 financial crisis and the current COVID-19 epidemic. Due to this, dummy variables pertaining to these two economic downturns are included in the econometric model.

In the econometric model developed within the framework of the structural VAR model, various constraints derived from the New Keynesian conception of a small economy have been implemented while incorporating economic theory. Having classified the Turkish economy as a small economy, it is reasonable to anticipate that domestic variables are excessively susceptible to global economic indicators, whereas the inverse correlation is presumed to be irrelevant. In addition, the model of this study not only takes the nominal rigidity of the markets (e.g., efficiency wage theory, long-term contracts) into account but also estimates the non-contemporaneous interconnection between macroeconomic and political variables. Finally,

given the menu costs and planning delays associated with New Keynesian economists' interpretations of sticky prices, it is imperative to acknowledge the dilatory influence of price fluctuations on real economic activities (Svensson, 1998; Kim & Roubini, 2000; Clarida et al., 2001)

The empirical analysis of the study was conducted by examining quarterly data covering the period from 2003 to 2020. The Hodrick-Prescott (HP) filter was employed to obtain the global and domestic output gaps, both of which are used in GDP (current, $). Furthermore, the global output gap data is factored in as a trade-weighted average of the individual output gaps of Turkey's trading partners as stated in Çiçek (2012).This paper, therefore, adopts this approach in order to obtain accurate results. Data regarding to global energy prices are taken as an index, while the inflation variable is representative of changes in consumer price index. The model, however, substitutes the nominal exchange rate for the foreign exchange rate while, to demonstrate monetary aggregates, M2 money supply is factored in. The data that is subjected to analysis is acquired from three sources: The World Bank (WB) for GDP data, the International Monetary Fund (IMF) for global energy prices, CBRT for producer price index (PPI) data, the exchange rate (U.S. dollar), and (M2) money supply. The logarithmic transformation is performed on model variables, and quarterly data series are depicted in Figure 2.

Figure 2: Historical Data



4.2. Results and Findings

In the analyses in which time series are employed to ensure the model's consistency and reliability, prior to carrying out further econometric estimation, the time series are required to be stationary. To determine whether the series is stationary, Augmented Dickey-Fuller tests (ADF) and Phillips-Perron (PP) unit root tests are conducted, since unit root tests are one of the principal methods adopted by researchers (Dickey & Fuller, 1981; Phillips & Perron, 1988). Table 1 presents the results of the ADF and PP tests in a format that contains constants and constants combined with trend estimates. The findings of ADF and PP unit root tests reveal that both LNGDP(W) and LNGDP(T) variables are stationary at level when both constants and constants with trend are considered. Based on the performed tests, the first differences of

LNENERGY, LNEXCHANGE, LNM2, and LNCPI variables are stationary. Time series data that is identified as non-stationary by the results of unit root tests is converted into a stationary state through differencing as shown in Table 1.

Table 1: The Results ADF and PP Unit Root Test

ADF Test				
Variables	**(Level)**		**(1st Difference)**	
	Constant	**Constant**	**Constant**	**Constant +Trend**
LNGDP(W)	-3.543***	-4.257***		
LNENERGY	-2.616*	-2.637	-7.295***	-7.391***
LNGDP(T)	-4.285***	-4.283***		
LNCURRENCY	3.380	0.095	-7.213***	-5.156***
LNM2	0.836	-1.018	-8.070***	-8.143***
LNCPI	2.263	-1.591	-5.667***	-6.238***
PP Test				
Variables	**(Level)**		**(1st Difference)**	
	Constant	**Constant**	**Constant**	**Constant +Trend**
LNGDP(W)	-3.543***	-4.257**		
LNENERGY	-2.191	-2.290	-7.296***	-7.312***
LNGDP(T)	-4.253***	-4.243***		
LNDOLLAR	2.768	-1.291	-7.200***	-10.148***
LNM2	0.903	-0.979	-8.070***	-8.146***
LNCPI	2.316	0.956	-5.693***	-6.248***

Note: The lag length of the ADF test is automatically determined according to the Akaike Information Criterion (AIC), whereas for PP tests, the determination is made through the Newey-West Bandwidth Criterion. ***, **, and * markings display statistical significance between %1, %5, and %10 confidence intervals, respectively.

The estimations of structural VAR analysis ought to be constructed in accordance with the optimal lag length selected by taking various information criteria into consideration. The optimum lag length of our model is determined to be one (1), which is computed via the Likelihood-ratio test (LR), Final Prediction Error (FPE), and Hannan-Quinn Information Criterion (HQ). However, the estimations which performed with the optimum lag length of one (1) have auto-correlation and heteroscedasticity problem. Thus, the optimum lag length of two (2) is preferred to carry out the analysis of this paper. Inverse roots of the AR characteristics polynomial of our model with an optimal lag length of two (2) are illustrated in Figure 3. Since all the roots have a modulus of less than one and are within the unit circle, it is evident that the predicted VAR model is stationary and stable.

Figure 3: Inverse Roots of AR Characteristic Polynomial

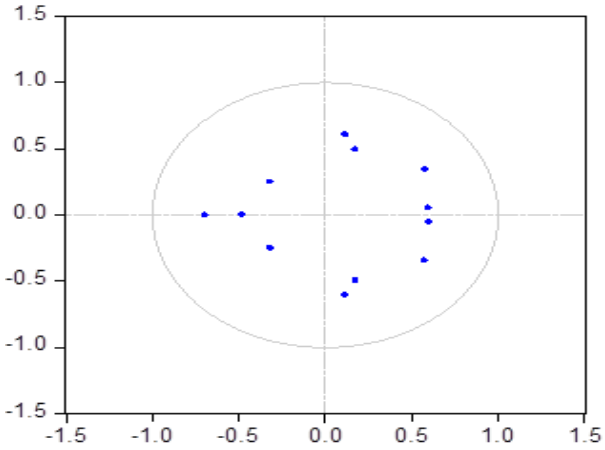


Table 2 summarizes the outcomes of autocorrelation and heteroskedasticity tests applied to model estimations. The Lagrange Multiplier Test (LM) results show that the null hypothesis is accepted since p values of lags are greater than 0.05 and, therefore, there is no serial correlation in the model. The White test results imply the acceptance of the null hypothesis since p values exceed 5%. Therefore, error terms are homoscedastic and the alternative hypothesis that error terms are heteroscedastic in the model is rejected.

Table 2: The Results of Autocorrelation and Heteroscedasticity Tests

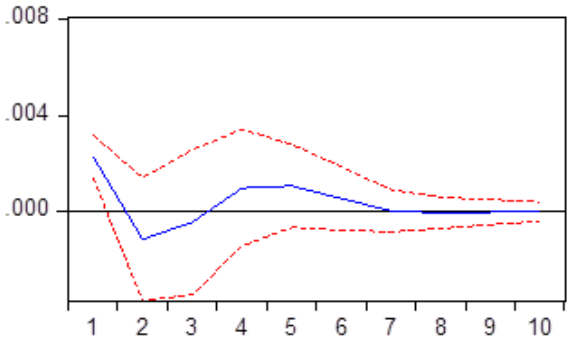
LM Autocorrelation Test			White Test		
Lag.	**LM Stat.**	**P-Values**	**Chi-Squ.**	**df**	**P-Values**
1	43.295	0.1880	557.5307	546	0.3569
2	45.883	0.1252			
3	29.017	0.7890			
4	28.492	0.8092			

Furthermore, it is observable that our model, which is estimated with a selected optimal lag length of two (2), is robust. It is thus plausible to interpret the analysis conclusions by employing both impulse response functions and variance decomposition analysis in order to examine the correlation between model variables. Figure 4 demonstrates the impulse response function analysis for model estimates. The positive contemporaneous response of consumer price index (LNCPI) to one-standard deviation shocks to gross domestic product of the world (LNGDP (W)) throughout the investigated time horizon is illustrated in Figure 4.A. This positive feedback generates a statistically significant pass-through effect of the gross domestic product of the world (LNGDP(W)) into the consumer price index (LNCPI). Correspondingly, a statistically significant positive influence of shocks to the gross domestic product of Turkey (LNGDP (T)) on the consumer price index (LNCPI) in the second period is shown in Figure 4.C. The pass-through of GDP in Turkey into CPI is not as contemporaneous as its reaction to global GDP shifts. Furthermore, the consumer price index (LNCPI) is explicitly elastic to a one-standard deviation shock to energy (LNENERGY) and the correlation is statistically significant in the second period, as displayed in Figure 4.B. According to Figure 4.D, the sensitivity of the consumer price index (LNCPI) to a one-standard deviation shock to the dollar exchange rate (LNDOLLAR) is

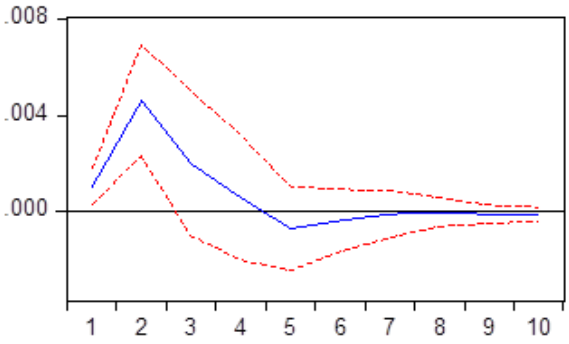
statistically significant and positively related in first two subsequent time periods. In addition, the pass-through of the exchange rate (LNDOLLAR) into the consumer price index (LNCPI) is positive and substantial in comparison to other variables. The response of the consumer price index (CPI) to a one-standard deviation shock to its lagged values is exhibited in Figure 4.F. The emerging shocks in the CPI have a positive, profound, and statistically significant impact on its trend during the first subsequent periods. Figure 4.C demonstrates the sensitivity of the consumer price index (LNCPI) to a one-standard deviation shock to the money supply (LNM2). In contrast to the previous findings, the feedback of LNCPI to LNM2 is statistically insignificant.

Figure 4: Impulse Response Function Analysis

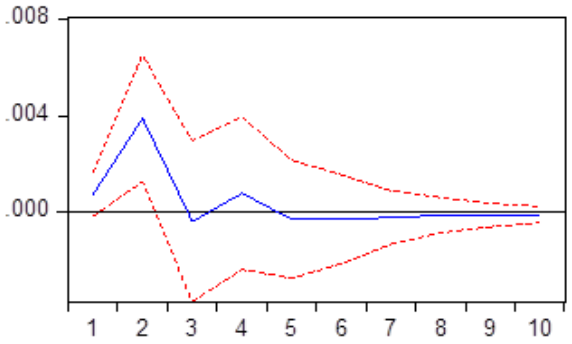
4.A) Response of LNCPI to LNGDP(W)



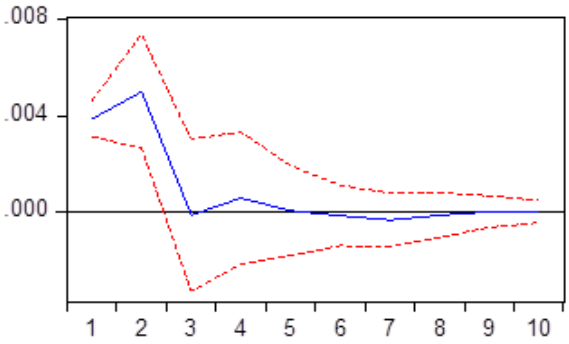
4.B) Response of LNCPI to LNENERGY



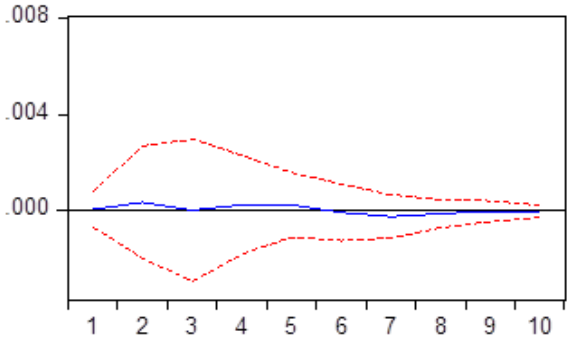
4.C) Response of LNCPI to LNGDP(T)



4.D) Response of LNCPI to LNDOLLAR



4.E) Response of LNCPI to LNM2



4.F) Response of LNCPI to LNCPI

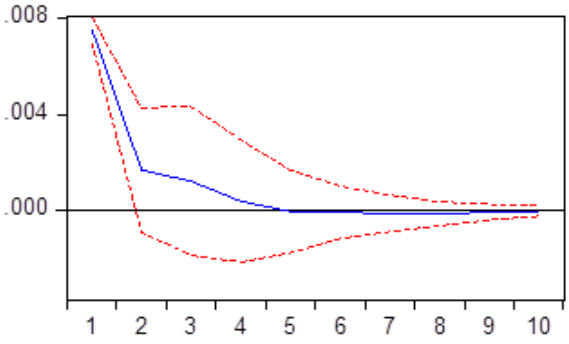


Table 3 summarizes the results of the variance decomposition analysis, the purpose of which is to decompose components of variables and ascertain to what extent the variation of dependent variables can be explained by independent variables. According to the outcome of the consumer price index (LNCPI) decomposition analysis, the major proportion of innovations to the consumer price index (LNCPI) can be explained by its own lagged values. Further, when the magnitude of influence on the LNCPI is evaluated, lagged values of the consumer price index (LNCPI) are sequentially followed by the exchange rate (LNDOLLAR), energy prices (LNENERGY), output gap of Turkey (LND(GDP(T)) and global output gap (LNGDP(W)). In addition, as indicated in the results of impulse response functions, pass through of money supply (LNM2) into the consumer price index (LNCPI) is negligible.

Table 3: The Results of LNCPI Variance Decompositions Analysis

Period	Std. Er.	LNGDP (W)	LNENERGY	LNGDP (T)	LNDOLLAR	LNM2	LNCPI
1	0.008872	6.804030	1.397792	0.749952	19.19199	0.007487	71.84875
2	0.012036	4.574754	15.52327	10.97589	27.78499	0.093129	41.04796
3	0.012276	4.511464	17.57265	10.63588	26.71411	0.090495	40.47540
4	0.012382	5.088964	17.50610	10.87786	26.49839	0.132694	39.89600
5	0.012454	5.794868	17.60022	10.79882	26.19685	0.174834	39.43441
6	0.012476	5.975099	17.61942	10.80823	26.11754	0.175968	39.30375
7	0.012484	5.969466	17.60095	10.81971	26.14349	0.207584	39.25879
8	0.012485	5.968731	17.59572	10.82358	26.14216	0.214928	39.25488
9	0.012486	5.967927	17.59854	10.82807	26.13965	0.214902	39.25091
10	0.012487	5.967380	17.60136	10.83138	26.13830	0.214917	39.24666

Having reviewed the findings of our study, we conclude that price movements in the Turkish economy can be correlated with both global and national variables. To elaborate, global output gap and global energy prices have positive influence over national prices in Turkey. The domestic variables such as the exchange rate, national global output gap and lagged values of price levels have also directly contributed to the price shifts in Turkey. The price levels in the Turkish economy are immensely susceptible to model variables, including lagged values of prices, the exchange rate, global energy prices, global output gap and domestic output gap. In addition, there is a necessity to emphasize the elasticity of prices to inflation expectations, while exchange rate variations constitute the other fundamental aspect. Hence, the downward trend in inflation rates that occurred since early 2000s can be attributed to the appreciated Turkish Lira and anchored inflation expectations. The economic stagnation that commenced at the end of 2019 and continued into 2020 is anticipated to be ascribed to the depreciating Turkish Lira and increased inflation expectations. Apart from the pivotal drivers discussed above, global energy prices, global and national business cycles encountered in the domestic economic conjuncture are instrumental in inflation, albeit with relatively minor significance.

5. CONCLUSION

Studies pertaining to decreasing inflation trends worldwide after the 1990s are prevalent in the international economic literature. Fundamentally, this argument is substantiated by the abrupt integration of China and India, which are capable of extremely competitive and high-

intensity manufacturing, into the global trade network that resulted in an expedited economic globalization process. Hence, macro, and micro factors in countries have become persistently exposed to global indicators. Globalization and an intensified interdependence among countries have prompted perspectives that relate inflation patterns not only to domestic variables but also to global indicators. In addition, instability in international demand and supply has been cited by policymakers in numerous countries as the underlying reason for erratic domestic inflation in recent years.

The Turkish economy was characterized by secular inflation until the post-2001 period. The introduction of structural reforms and revisions in Turkish monetary policy following the 2001 financial crisis provided the requisite circumstances for a decrease in inflation. However, aside from the futility of endeavours to sustain a downward trend in inflation, overall price levels escalated dramatically in the subsequent years. While examining the determinants of dwindling inflation levels until the middle of the 2000s, contemporary analysis of the Turkish economy particularly addresses national strategies that have been adopted following the 2001 financial crisis. Nevertheless, not only the international but also the domestic propensity for prices to be excessively sensitive to global price movements has raised questions about the existing literature. Therefore, inquires such as “How did the global disinflationary period affect the overall performance of Turkey's price stability policy?” have inevitably surfaced. The recent failures of inflation targeting policies and, thereby, surging inflation numbers have bolstered the argument that external factors are the predominant drivers of inflation. The sole objective of our study is to analyse the pass-through of globalization into domestic price changes in Turkey. Thus, it will be possible to evaluate the relative importance of contributing factors on the domestic and international levels.

The empirical analysis presented in this paper encompasses the period from 2003 to 2020 by adopting the structural vector autoregressive (SVAR) method. The SVAR model is composed of variables such as global output gap, global energy prices, domestic output gap, exchange rate, money supply, and inflation rate. The results indicate that the inflation rate is positively correlated with global energy prices, domestic output gap, exchange rate, and global output gap, whereas the pass-through of the money supply into the internal price level is concluded to be statistically insignificant. When a comparative assessment of the magnitude of variables is carried out, price instability in the Turkish economy can be explained by its own lagged values, which illustrates the relevance of inflation expectations. Further more, except for its lagged values, the exchange rate is the second key determinant, whereas the response of price levels to global energy prices, the global output gap and the domestic output gap are rather marginal in relation to the exchange rate. The pass-through of globalization into price levels in Turkey via both global demand circumstances and imported input prices is indisputable, as the results of this analysis reveal. Additionally, it is imperative to stress the fact that the inflation inertia play a decisive role in inflation.

Furthermore, Atuk et al., (2018), and Demir (2018) observed that prices in Turkey respond proportionally to shifts in the exchange rate and import prices. According to the results of our study, throughout the period 2003–2020, overall prices in Turkey were extremely prone to fluctuations in exchange rates, inferring that the exchange rate's dominant role from prior years continues to persist. The findings of this study reveal that global variables are as influencal as domestic variables though with narrow margin. In this framework, policymakers must address inflation expectations as a priority in order to dissipate elevated inflation rates. Due to the

exponentially escalating integration of imported inputs into production, the domestic price level's vulnerability to the currency rate and global energy prices has been documented to be overwhelming over the analysed period. Although mitigating short-term inconsistency of exchange rates can conduce to reductions in inflation levels in Turkey, long-term structural reforms are mandatory when fighting inflation.

AUTHOR STATEMENT

Statement of Research and Publication Ethics

This study has been prepared in accordance with scientific research and publication ethics.

Author Contributions

The authors contributed equally to the study.

Conflict of Interest

There is no conflict of interest for the authors or third parties arising from the study.

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