The Effect of Inflation on Household Expenditures

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ABSTRACT

The study focuses on the effect of household expenditures on the general level of prices. For this purpose, the rate of household consumption expenditures in GDP and the personal loans (housing, vehicles, credit cards, etc.) provided by public and private banks in Türkiye, especially in the period between 2004 and 2022, were preferred as data because it is an important factor that two variables are directly related as measurement indicators of household expenditures. The effect of price increases on household expenditures was examined using Hacker and Hatemi-J (2006) symmetric and Hatemi-J (2012) asymmetric tests. The findings indicate that there is no symmetric causal relationship between inflation rates and both personal loans and household consumption expenditures. Another finding of the study is that positive shocks in personal loans are effective in negative shocks to inflation, while positive shocks in household consumption expenditures are effective in both negative and positive shocks to inflation.

Key Words: *Inflation, Household Expenditures, Personal Loans, Household Consumption*

JEL Classification: *E1, E21, E31, E51*

Enflasyonun Hanehalkı Harcamaları Üzerindeki Etkisi

ÖZ

Çalışma hanehalkı harcamalarının fiyatlar genel seviyesini üzerindeki etkisine odaklanmıştır. Bu amaç güdüsüyle özellikle 2004 ve 2022 yılları arasındaki süreçte GSYH içindeki hanehalkı tüketim harcamaları oranı ve Türkiye'de kamu ve özel bankaları tarafından kullandırılan bireysel krediler (konut, taşıt, kredi kartı vd.) veri olarak tercih edilmiştir çünkü hanehalkı harcamalarının ölçüm göstergesi olarak iki değişkenin doğrudan ilgili olması önemli bir faktördür. Fiyat artışlarının tüketici harcamalarına olan etkisi Hacker ve Hatemi-J (2006) simetrik ve Hatemi-J (2012) asimetrik testleri kullanılarak incelenmiştir. Elde edilen bulgularda, enflasyon oranları ile hem bireysel krediler hem de hanehalkı tüketim harcamaları arasında simetrik bir nedensel ilişki tespit edilememiştir. Araştırmada elde edilen diğer bir bulgu ise bireysel kredilerdeki pozitif şoklar enflasyonun negatif şokunda etki ederken, hanehalkı tüketim harcamalarında yaşanan pozitif şoklar, enflasyonun hem negatif hem de pozitif şoklarında etkili olmaktadır.

Anahtar Kelimeler: *Enflasyon, Hanehalkı Harcamaları, Bireysel Krediler, Hanehalkı Tüketimi*

JEL Sınıflandırması: *E1, E21, E31, E51*

INTRODUCTION

For many years, inflation has been considered as Türkiye's biggest macroeconomic problem. Many different economic policies have been implemented in Türkiye to solve high inflation, sometimes directly and sometimes indirectly. In order to achieve the desired levels of inflation and to develop appropriate policies, it is important to correctly identify the causes of inflation. Due

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to the differences from country to country, it should not be ignored in the economic policies to be implemented. The basic assumption in the literature is that consumption expenditures increase inflation. Since the source of inflation is based on many factors, it is problematic what the share of consumption in inflation is. To what extent do household expenditures contribute to inflation in Türkiye? This is the main question that led to the emergence of this study.

Türkiye switched to implicit inflation targeting in the first phase and to explicit inflation targeting after 2006, especially after the 2001 Crisis. Although inflation rates took single-digit values on average in the 2000s, they shifted to an accelerating process in 2016 and beyond. After the Covid-19 pandemic, inflation rates have been on the rise all over the world. Türkiye has faced high inflation rates especially in recent years due to both the world conjuncture and domestic structural reasons. In this context, the emergence of inflation inertia has made the country's economic policies politically questionable. The main topic of debate has been why high inflation is caused and why it cannot be brought down. The general impression is that the depreciation of the Turkish Lira, combined with rising exchange rates, has led to further increases in production costs and energy dependence. Apart from these, reasons such as the increase in household expenditures in anticipation of inflation and the increase in the minimum wage are frequently cited. Therefore, in order to fighting inflation with the right interventions, it is crucial to identify the main source of the problem. Is the rise in inflation in Türkiye due to household expenditures as argued? This study will attempt to answer this question on the basis of household consumption expenditures and personal loans utilized by households from banks.

The main problem area of the study is whether the expenditures made by household consumers in Türkiye are causal for the increases in the general price level for the period between 2004 and 2022. There are three main objectives and questions in the study. These are;

-What is the connection between household consumption expenditures and price increases in Türkiye?

-What is the connection between consumer loans and price increases in Türkiye?

- Are household expenditures considered among the main sources of inflation in Türkiye?

In addition to these three main objectives and problems, other objectives of the study include analyzing the nexus between negative and positive shocks in household consumption expenditures and shocks of inflation, as well as the nexus between negative and positive shocks in consumer loans and shocks of inflation.

In this study, the impact of price increases on consumer expenditures in Türkiye since 2004 was examined. For consumer expenditures, data on the share of household consumption expenditures in GDP and personal loans provided by both public and private banks were used. The reason why the data starts in 2004 is because data on personal loans in Türkiye has been published since this year. The latest data is December 2022. For consumer expenditure data, personal loans data

published by the Risk Center (BAT) in Türkiye was used. Personal loans include four basic elements. These are housing loans, vehicle loans, credit card expenses and other types of loans. The Central Bank of the Republic of Türkiye (CBRT) website was used for inflation data. All data covers a quarterly period. In the analysis method, the stationarity of the data was measured with Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit root tests. Hacker and Hatemi-J (2006) test was used to detect symmetric causality between variables, and Hatemi-J (2012) test was used to detect asymmetric causality.

The study proceeds as follows; the theoretical background is presented in the first section of the study, and academic studies on inflation and household expenditures are presented in the next section. The third section presents the data and methodology used for the analysis. The last section presents the results obtained from the econometric analysis and the evaluation of the results.

I. THEORETICAL FRAMEWORK

If there are persistent increase in the prices of predetermined types of goods and services at certain intervals and periods (usually monthly-annually), the existence of inflation phenomenon is in question. The leading causes of the inflation are explained by different reasons in the economic literature. The first of these is aggregate demand-pull inflation. Demand-pull inflation can occur in two different ways. The first one is the increase in the money supply and the second one is the increase in the level of aggregate expenditures (realization above the full employment level). Increases in the money supply increase the amount of money in the market, which lead to an increase in expenditures. According to this argument developed on the axis of the classical economic view, inflation is a monetary phenomenon, so increases in the money supply cause inflation to rise. Classical and neoclassical economic thought explains briefly this situation with the quantity theory of money. The concept of quantity theory of money was first put forward by Irving Fisher. According to Fisher's (1930) point of view, the nominal interest rate is the sum of the real interest rate and inflation.

Briefly as formulation;

$$i = r + u \tag{1}$$

According to the quantity theory of money, a 1% increase in inflation, increases the nominal interest rate by 1%. The equation describing the quantity theory of money is;

$$MV=PY \tag{2}$$

In Equation 2, ‘M’ symbolizes the quantity of money, ‘V’ the velocity of money circulation, ‘P’ the general level of prices and ‘Y’ the level of income.

Government spending without increasing the money supply does not create inflation. According to the Ricardo-Barro equivalence hypothesis, which was first proposed by Ricardo (2007) and then by Barro (1974), government deficits do not

create any negative effects on the general level of prices due to the closure of government deficits through taxation. In this hypothesis, individuals behave rationally and government deficits are financed by taxes in the long run. According to Arthur B. Laffer (2004), who argues the invalidity of this hypothesis in the supply-side approach, possible tax cuts increase expenditures and stimulate demand. Tax cuts cause budget deficits in the first stage, but then these deficits are closed and tax revenues start to increase.

Keynesians have argued that increases in the quantity of money do not always have an expenditure-increasing effect and that factors such as autonomous expenditures, marginal consumption and import propensity, and taxes may also have an effect on aggregate expenditures. There are different views on this issue and it is emphasized that the level of full employment is different for developed and developing countries. Keynes (1936) expressed that effective demand does not always change at the same rate as the amount of money, that prices and wages are sticky in the short run, and that increasing government spending increase aggregate demand, which leads to an increase in prices in the long run. Keynes (1936) also emphasized that the achievement of price stability in the long run depends on the upward trend power of the cost factors of the productive sector.

Another view to explain inflation is the monetarist approach that explains the reason for the increase in prices as a monetary phenomenon. In this theory, which was first put forward by Milton Friedman (1956), it is stated that increases in money supply affect production in the short run and cause prices to rise in the long run. According to this theory, government spending financed by money printing create inflation. According to Friedman and Schwartz (1982), inflation is inevitable as a result of excessive increases in money supply. In the quantity theory in its original form, the only cause of price increases is autonomous increases in the money stock. On the other hand, in his 1956 study[2], Cagan, using a semi-logarithmic model of money demand, stated that an increase in the velocity of circulation will increase inflation even if the money stock does not increase, and that it depends on the elasticity of real money demand with respect to expected inflation rates and the adjustment coefficient of expected inflation rates to actual inflation rates.

Semi-logarithmic equation of money demand;

$$L = ln\left(\frac{M_t^D}{P_t}\right) = \mathrm{c} + \beta \ln Y_t + \alpha \ln R_1 + u_1 \qquad (3)$$

$\frac{M_t^D}{P_t}$ is the real money demand, 'Y_t' is the real income and 'R_1' is the nominal interest rate.

$R_t = r_t + \pi_t$

$r_t =$ Real interest rate.

[2] Phillip Cagan (1956) analyzed seven hyperinflationary periods between 1920 and 1946. He defined hyperinflation as a period starting from the month in which the monthly inflation rate exceeds 50 per cent for the first time and ending in the month before the monthly inflation rate falls below 50 per cent for at least one year.

π_t = Inflation rate.

$L = ln\frac{M_t^D}{P_t} = c + \beta \ln Y_t + \alpha r_t + \pi r_t + u_1$

$L = c + \pi r_t + u_1$ (4)

As can be seen from the equation, Cagan (1956) accepted expected inflation as the main determinant of inflation by assuming real income and real interest rate constant. This theory, which was first proposed by Phillip Cagan, has been supported by many economists in their studies. On the other hand, Fischer et al. (2002), in their analysis of 25 countries with inflation rates of 100% and above for different years and periods from 1945 onwards, found that there is a negative correlation between high inflation and macroeconomic performance and that hyperinflations (following Cagan's definition) have been rare in market economies since 1947. Fischer et al. (2002) argue that with the development of rational expectations theory, it has become more difficult to sustain the notion that expectations alone can cause hyperinflation.

Vazquez (1956), who opposed the view that inflation can be explained only by monetary factors, argued that inflation cannot be explained only by monetary factors and that some structural problems in the economy can also cause inflation. This approach, which deals with inflation from the supply side, considers price increases in any of the inputs in the production function (labour, capital, natural resources, entrepreneurship) as the main problematic of inflation. Another indicator that is seen as a reason for the rise in inflation is the type of inflation based on expectations. Similar unfavourable situations such as bad indicators, trends, political turmoil in the country's economy create an expectation of price increases on people. The expectation of rising prices causes people to make their future expenditures today and to act with the instinct to protect their income against inflation.

II.LITERATURE REVIEW

The relationship between household consumer expenditures and price increases has been the subject of many national and international studies. Different results have been obtained and discussed by using different methods and different country samples.

Bullock (2023), for Australia, examined the impact of high interest rates on households and concludes that high interest rates do not pose a risk to households as the banking sector has large liquidity buffers and lending in Australia has certain standards. Sheen & Wang (2023) for the USA found that monetary expectations play an important role in households' consumption and that tight monetary policies reduce the purchase of housing and durable goods. Olusola & Chimezie & Shuuya, & Addeh (2022) for Ghana, found a negative relationship between consumers' inflation expectations and inflation. Ryngaert (2022), for USA, concluded that future inflation expectations have a significant impact on household consumption plans and that higher inflation expectations lower real interest rates, which in turn stimulates consumers' current consumption. Taylor (2022) for the USA, used data from the BLS (U.S. Bureau of Labor Statistics) consumer expenditure survey, used

different expenditure categories and conducted a regression analysis based on 361 thousand observations. In his research, he concluded that housing, transportation, gasoline and oil, and personal insurance expenditures are the items most affected by inflation, while inflation has a negative impact on food expenditures, especially for those in the low-income group. Wang (2022) for Australia found that liquidity buffers imposed by banks mitigate adverse shocks to household credit flows and help them maintain and control debt repayments. Burke and Ozdagli (2021) for the USA found that expenditures on durable goods increase with inflation, while expenditures on nondurable goods do not respond to inflation, and that an increase in unemployment reduces expenditures. Tham, Rosli and Yasmin (2021) for Malaysia found that inflation increases increase the risk of non-performing household mortgage loans in the housing market, which may lead to long-term problems. Bergmann (2020) for Australia found that shocks to unemployment increase negative loans. Kearns, Major and Norman (2020) for Australia conclude that banks are highly resilient to adverse shocks in household spending due to high lending standards and high capital levels. Nar (2020) for Türkiye concluded that increases in retail loans do not cause inflation. Obinna (2020) for Nigeria found that there is a positive long-run relationship between household consumption expenditures and inflation. In Nigeria, inflation increases increase household consumption expenditures. Bayır and Güvenoğlu (2019), for Türkiye, found that there is a long and short relationship between consumer loans and inflation and that increases in consumer loans increase inflation.

Coibion & Georgarakos & Gorodnichenko, & Van Rooij (2019) for the Netherlands concluded that high inflation expectations reduce household consumption expenditures and that high inflation expectations affect consumers' purchases of durable goods more and more strongly, and nondurable goods less. Duğru et al. (2019) for Türkiye, found no causality relationship between consumer loans and inflation. Korkmaz (2019) for Türkiye found that increases in consumer loans increase the volatility of inflation. Minangsari and Robiani (2019) for South Sumatra, increases in inflation rates negatively affect household consumption and cause it to fall. Dräger and Nghiem (2018) for Germany, households' current consumption levels are positively correlated with high inflation expectations, but negatively correlated with real interest rates. Kılıç and Torun (2018) for Türkiye, found that there is bidirectional causality between personal loans and inflation, especially personal credit cards have an increasing effect on inflation. Bonsu and Muzindutsi (2017) for Ghana examined the relationship between household consumption expenditures and economic growth, inflation and exchange rate. As a result of the research, it was found that there is a long-run relationship between the variables, while in the short run, household consumption expenditures are most affected by inflation. Effah Nyamekye and Adusei Poku (2017) for Ghana found a positive long-run relationship between inflation and household consumption expenditures. Karahan and Gürbüz (2017) for Türkiye found that inflation has a negative effect on retail bank loans and that an increase in bank loans will cause inflation. Ichiue and Nishiguchi (2015) for Japan found that high inflation

expectations lead to an increase in household spending and increase the propensity to consume. D'Acunto, Hoang and Weber (2015) for Germany found that high inflation expectations encourage consumption expenditures. Arslan and Yapraklı (2011) for Türkiye, increases in bank loans lead to an increase in inflation and an increase in inflation negatively affects bank loans. Springer (1977) for USA found that inflation expectations have a negative effect on expenditures on nondurable goods and services and a positive effect on expenditures on durable goods.

Table 1: Brief Summary of Reviews

Author(s)-Year	Time-Country	Modality	Findings
Arslan & Yapraklı (2011)	1983-2007 Türkiye	JH-VECM	The increase in bank loans cause inflation.
Bayır & Güvenoğlu (2019),	2009-2019 Türkiye	JH-VECM	Consumer Loans cause inflation.
Bergmann (2020)	2015-2019 Australia	Proportional Hazards (COX) Model	Shocks in unemployment increase NPL.
Bonsu & Muzindutsi (2017)	1960-2013 Ghana	Granger Causality-VAR	Household consumption expenditures are most affected by inflation.
Bullock (2023)	1990-2020 Australia	Banking Data and Charts	High interest rates do not affect household spending.
Burke & Ozdagli (2021)	2009-2012 USA	RAND's American Life Panel	Inflation increases the durable goods expenditures, but does not affect the non-durable goods expenditures. In addition, the increase in unemployment reduces expenditures.
Coibion & Georgarakos & Gorodnichenko, & Van Rooij (2019)	May-June-July 2018 Holland	Survey Data-Randomized Control Trial	High inflation expectations reduce household expenditures.
Dräger & Nghiem (2018)	2015-2016 Germany	Euler Equation Method	Households' current consumption levels are positively correlated with inflation expectations and negatively correlated with real interest rates.
Effah Nyamekye & Adusei Poku (2017)	1964-2013 Ghana	OLS-JH-VECM	Inflation and household spend effect each other positively.
D'Acunto, Hoang and Weber (2015)	2000-2013 Germany	Survey Data	Inflation expectations increase consumption expenditures.
Duğru & Ktenciler (2019)	2006-2019 Türkiye	Granger Causality Test	Not a causality between consumer loans and inflation.
Ichiue & Nishiguchi (2015)	1993-2008 Japan	VAR	High inflation expectations increase household expenditures.
Karahan & Gürbüz (2017)	2002-2016 Türkiye	JH- VECM	The increase in bank loans cause inflation.

Kearns & Major & Norman (2020)	1980-2018 Australia	Hausman Test	Australian banks are highly resilient to adverse shocks in household spending.
Kılıç & Torun (2018)	2004-2015 Türkiye	JH- Granger Causality	A bidirectional relationship between personnel loans and inflation.
Korkmaz (2019)	2005-2018 Türkiye	ARCH-GARCH- E-GARCH Models	Increases in consumer loans increase the volatility of inflation.
Minangsari & Robiani (2019)	2016-2018 South Sumatra	Panel Data Analysis	Increases in inflation rates reduce household consumption.
Nar (2020)	2005-2020 Türkiye	Granger Causality Test	Increases in personal loans don't cause inflation.
Obinna (2020)	1981-2018 Nigeria	OLS	Inflation increases household consumption expenditures.
Olusola & Chimezie & Shuuya, & Addeh (2022).	1990-2020 Ghana	Engle-Granger Test	Negative relationship between inflation expectations and private consumption expenditures.
Ryngaert (2022)	2013-2021 USA	Probit Regression Analysis	The rise in inflation expectations encourages the consumption of consumers.
Sheen & Wang (2023)	2008-2015 USA	Bayesian Updating	Tight monetary policies cause households to cut back on their spending.
Springer (1977)	1955-1971 USA	OLS	Inflation expectations have a negative relationship with the consumption of non-durable goods and services and a positive relationship with the consumption of durable goods.
Taylor (2022)	2006-2019 USA	OLS	Housing, transportation, gasoline and oil, personal insurance expenditures are the items most affected by inflation.
Tham & Rosli & Yasmin (2021)	2010-2015 Malaysia	VECM	Inflation increases the NPL ratio of housing loans.
Wang (2022)	2003-2018 Australia	SIH-HILDA Survey Data and Charts	Liquidity buffers reduce adverse shocks to household credit flows and alleviate debt burdens.

Note: OLS: Ordinary least square test, JH: Johansen cointegration test, VECM: Vector error correction, VAR: Vector Otoregression Model, SIH: Survey of Income and Housing in Australia, HILDA: The Household, Income and Labour Dynamics in Australia.

In many national and international papers, the general conclusion is that household expenditures are related to price increases. However, in some studies, no causality relationship was found. It is obvious that the reasons for the rise or fall of inflation vary both from country to country and according to the time period analyzed. This is because the impact of many reasons such as the conjuncture structure of each period, political structure, developments in the external world, and differences in human behavior on inflation may vary. The high levels of inflation in Türkiye in recent years have increased the debate on this issue. Therefore, both

the economic policies pursued and the causes of inflation have become the subject of constant debate. Analyzing the link between household expenditures and inflation is thought to be useful in terms of providing a perspective to these debates.

III. DATA AND METHODOLOGY

The study focused on two main motives; to determine the impact of price increases on household consumption expenditures and consumer loans. Data from CBRT and BAT were used in the analysis. Quarterly consumer price index was used for inflation data, and total personal loan amounts used by households from banks were used for household expenditures. Personal credit; It covers housing, vehicle, credit cards and other individual loans. The time range of the data is taken as starting in January 2004 and ending in December 2022. Logarithmic transformations of the data were used in the analysis. ADF and PP unit root tests were used to test stationarity. Hacker and Hatemi-J (2006) test was used to detect symmetric causality between variables, and Hatemi-J (2012) test was used to detect asymmetric causality. Seasonality in inflation and household consumption expenditures has been revealed and corrected.

Table 2: Definition of the Variables

Variables	Symbol	Explanation	Source
Inflation Rate	inf	General (%)	CBRT
Consumer Loans*	loans	Consumer Loans /GDP	BAT
Household Consumption Spends Index	spends	Final consumption expenditure of resident households / GDP (%)	CBRT

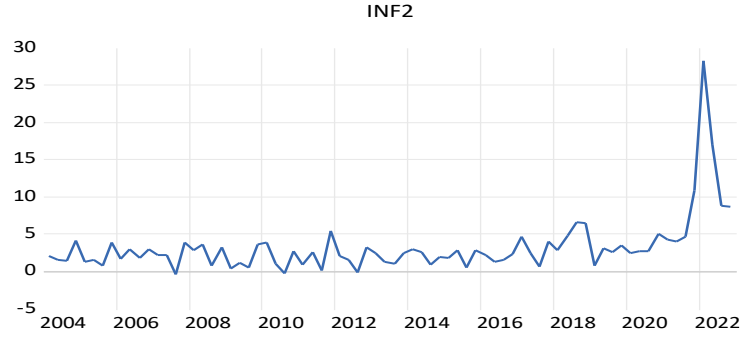
***** Housing, Vehicle, Credit Card, other. Thousand TL-Level

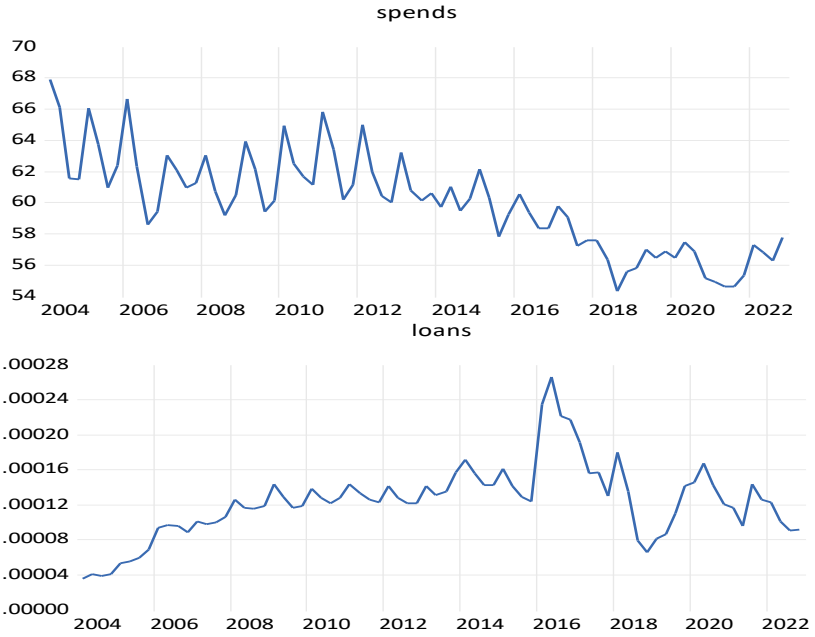
Table 3: Descriptive Statistics

Variable	Mean	St.Deviation	Minimum	Maximum
Inflation	3.237648	3.903255	-0.369884	28.28672
Consumer Loans	2.28E-08	5.70E-09	9.24E-09	3.31E-08
Consumer Spends	1.23E-06	4.27E-07	3.57E-07	2.66E-06

Table 3 show that the descriptive statistics of the variables. It is observed that the highest change among the variables is observed in consumer loans. While the variable with the lowest standard deviation is inflation, the variable with the highest standard deviation is consumer loans.

Fig. 1. Time Series Charts





Modeling the effect of personal loans on inflation and the impact of inflation on individual loans:

$$inf_t = ß_0 + ß_1 loans_t + u_t \quad (5)$$

$$loans_t = \alpha_0 + \alpha_1 inf_t + \varepsilon_t \quad (6)$$

Modeling the effect of household expenditures on inflation and the impact of inflation on household expenditures;

$$inf_t = \gamma_0 + \gamma_1 spends_t + \omega_t \quad (7)$$

$$spends_t = \delta_0 + \delta_1 inf_t + \nu_t \quad (8)$$

A. HACKER - HATEMI-J (2006) SYMMETRIC AND HATEMI-J (2012) ASYMMETRIC TEST

The analysis, which is briefly referred to as the Hacker-Hatemi-J causality test in the literature, is based on the causality test developed by Toda Yamamoto (1995). Hacker and Hatemi-J (2006) developed a causality test using the bootstrap distribution of the Toda-Yamamoto causality test. In this way, the results of Monte Carlo simulation ensure that the "MWALD" (Modified Wald) values obtained based on the bootstrap distribution are less distorted than the asymptotic distribution.

After establishing the VAR model, the optimal lag length is determined and then the lag length of the model (p+ d_{max}) is added to the maximum lag length (d_{max}). Equations (9), (10) and (11) represent the VAR model established for the symmetric test.

$$y_t = \nu + A_1 y_{t-1} + A_p y_{p-1} + \ldots + A_{p+d} y_{t-(p+d)} + \mu_t \quad (9)$$

The models established for the symmetric causal test are included in equations (10) and (11)

$Y_{1t} = Y_{1t-1} + \varepsilon_{1t} = Y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i}^{+}$ (10)

$Y_{2t} = Y_{2t-1} + \varepsilon_{2t} = Y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i}^{+}$ (11)

Y_{1t} and Y_{2t}in equation (13) and equation (14) represent the cumulative values separated into positive and negative shocks. For the determine the delay length, the HJC information criterion developed by Hatemi-J (2003) was used. Hatemi-J (2012) "p" lag VAR model for asymmetric test;

$y_t^{+} = \alpha + A_1 y_{t-1}^{+} + \ldots + A_P y_{p-1}^{+} + u_t^{+}$ (12)

Models established for the asymmetric causal relationship between variables;

$Y_{1t} = Y_{1t-1} + \varepsilon_{1t} = Y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i}^{+} + \sum_{i=1}^{t} \varepsilon_{1i}^{-}$ (13)

$Y_{2t} = Y_{2t-1} + \varepsilon_{2t} = Y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i}^{+} + \sum_{i=1}^{t} \varepsilon_{1i}^{-}$ (14)

Positive shocks;

$\varepsilon_{1i}^{+} = \max(\varepsilon_{1i}, 0)$,

$\varepsilon_{2i}^{+} = \max(\varepsilon_{2i}, 0)$

Negative shocks;

$\varepsilon_{1i}^{-} = \min(\varepsilon_{1i}, 0)$,

$\varepsilon_{2i}^{-} = \min(\varepsilon_{2i}, 0)$

$\varepsilon_{1i} = \varepsilon_{1i}^{+} + \varepsilon_{1i}^{-}, \quad \varepsilon_{2i} = \varepsilon_{2i}^{+} + \varepsilon_{2i}^{-}$

Hypotheses established between inflation and consumer loans;

H_0 = There is no causality from inflation to consumer loans.

H_1 = There is causality from inflation to consumer loans.

Hypotheses established between inflation and household consumption expenditures;

H_0: $\delta_{1i} = 0$, there is no causality from inflation to household consumption expenditures.

H_0 : ß$_{2i}$ = 0, There is no causality from inflation to consumer loans.

If the H_0 hypothesis is rejected, the existence of a relationship between two variables is accepted. In the opposite case, it is concluded that there is no relationship between both variables.

IV.ANALYSIS RESULTS

In the first stage of the analysis, the stationarity level of the variables was determined. ADF and PP unit root tests were performed. As a result of both tests, it was determined that all variables, except the inflation rate, were not stationary at level I (0) values, both at constant and with constant and trend, and became stationary at I (1) values. It has been determined that inflation is stable at its level. Unit root test results are given in Table 2.

Table 4: Unit Root Test Results

	ADF Unit Root Test				PP Unit Root Test			
	Constant		Trend & Constant		Constant		Trend & Constant	
Variable	**t-Stat.**	**Prob.**	**t-Stat.**	**Prob.**	**t-Stat.**	**Prob.**	**t-Stat.**	**Prob.**
inf	-3.64	0.00	-4.26	0.00	-3.61	0.00	-4.19	0.00
lnloans	-4.68	0.00	-3.37	0.06	-5.32	0.18	-3.53	0.04
spends	1.98	0.99	-0.08	0.99	2.38	1.00	0.19	0.99
Δlnloans	-7.43	0.00	-8.38	0.00	-7.58	0.00	-8.40	0.00
Δspends	-8.51	0.00	-8.94	0.00	-8.52	0.00	-8.94	0.00

Note: For stationarity test α= %0.05

The (d_{max}) degree for the symmetry results of the analysis was determined as I (1) as a result of the stationarity test results. The obtained Hacker and Hatemi-J results are shown in Table 3. According to the symmetry test results, it was determined that the variables did not have any causal relationship with inflation at the 5% significance level.

Table 3: Hacker and Hatemi-J (2006) Symmetric Causality Test Results

Hypothesis	**NWALD**	**Critical Value**
loans > inflation	3.739	11.200
İnflation > loans	4.127	4.285
Spends > inflation	3.846	9.880
İnflation > spends	0.092	4.094

Note: Obtained using Bootstrap.

Table 4, which contains the asymmetric test results, includes information on whether the positive and negative shocks of the variables affect each other at the 5% significance level. It is accepted that there is a significant asymmetric relationship from positive shocks of consumer loans to negative shocks of inflation. On the other hand, an asymmetric causal relationship has been identified from positive shocks of household consumption expenditures to both positive shocks and negative shocks of inflation.

Table 4: Hatemi-J (2012) Asymmetric Causality Test Results

H_0 **Hipotezi**	**NWALD**	**Critical Value**
$loans^+ > inf^+$	10.087	11.457
$loans^- > inf^-$	1.139	6.901
$loans^- > inf^+$	10.331	11.801
$\boldsymbol{loans^+ > inf^-}$	**16.447**	**12.469***
$inf^+ > loans^+$	5.871	11.102
$inf^- > loans^-$	1.797	6.691
$inf^- > loans^+$	2.120	6.954
$inf^+ > loans^-$	1.399	6.904
$\boldsymbol{spends^+ > inf^+}$	**20.699**	**12.091***
$spends^- > inf^-$	1.339	9.386
$spends^- > inf^+$	5.581	11.242
$\boldsymbol{spends^+ > inf^-}$	**17.145**	**13.189***
$inf^+ > spends^+$	1.440	11.152
$inf^- > spends^-$	1.233	9.805
$inf^- > spends^+$	2.775	11.347
$inf^+ > spends^-$	3.042	12.833

*There is empirical significance at 5%. Critical values were obtained according to Bootstrap, p=2 and dmax=1

The findings indicate that there is no direct causal relationship from inflation to consumer loans and household consumption expenditures between 2004 and 2022, whereas there is an asymmetric causal relationship from consumer

loans and household consumption expenditures to price increases. An analysis of the time path graphs reveals that while inflation rates have been increasing especially in recent years, both consumer loans and household consumption expenditures have been on a downward trend (inflation has been on an upward trend especially in the last 10 years, while consumer loans and household consumption expenditures have been on a downward trend over the last 10 years). This confirms the symmetric relationship. Hacker-Hatemi-J (2006) causality test results are similar to the results obtained by Burke et. (2021), Nar (2020), Olusola et. (2020) Coibon et. (2019), Duğru et. (2019), Minangsari (2019), and Springer (1977).

In the asymmetric test results of the study, it is found that consumer credit shocks are effective in negative shocks of inflation, but do not create any shock in positive shocks. In other words, consumers' expenditures such as housing, vehicles and credit cards do not exhibit both symmetric and asymmetric causality in general price level increases in Türkiye. The other asymmetric test result is that positive shocks to household expenditures have an effect on both negative and positive shocks to increases in the general level of prices. In other words, increases in household consumption expenditures have an effect on both the uptrend and downtrend of inflation. Asymmetric test results have been reported in the literature, Obinna (2022), Taylor (2022), Burke et al. (2021), Bayır et al. (2019), Korkmaz (2019), Dräger et al. (2018), Kılıç et al. (2018), Bonsu et al. (2017), Effah et al. (2017), Karahan et al. (2017), D'Acunto et al. (2015), Inchiue et al. (2015), Arslan et al. (2011), Springer (1977).

In sum, there is no direct causality between consumer loans and household consumption expenditures and inflation. On the other hand, any inflation shock (increase or decrease) has no effect on household expenditures. However, shocks to increases in household expenditures have an impact on both negative and positive shocks to price increases.

CONCLUSIONS

This study aims to analyze the link between the quarterly price increases and the expenditures of individuals in Türkiye between 2004 and 2022. The variables used for the analysis are the percentage growth rates of the consumer price index (inflation rate), household consumption expenditures and the amount of personal loans extended by both private and public banks (housing, vehicle, credit card and other personal loans). Hacker-Hatemi-J (2006) symmetric and Hatemi-J (2012) asymmetric causality tests were used as the analysis method. Symmetric test results show that there is no causality relationship between inflation rates and both household consumption expenditures and consumer loans. The asymmetric test results, on the other hand, show that there is causality from positive shocks in consumer loans to negative shocks in inflation, whereas there is causality from positive shocks in household consumption expenditures to both positive and negative shocks in inflation.

In the asymmetric test results of Hatemi-J (2012), it is concluded that positive shocks in expenditures have an effect on both negative and positive shocks of inflation, while positive shocks in personal loans have an effect on negative

shocks of inflation. These results suggest that increases in personal loans do not have an effect on the rise in inflation. On the other hand, it can be concluded that increases in household consumption expenditures have an effect on both the decrease and the increase in inflation, however, consumption expenditures may have differed over the years and may be due to the differences in the product group consumed.

Türkiye has entered an inflationary process especially in the post-pandemic period of 2019. In the economic policies implemented against inflation, a heterodox local economic approach was adopted and an economic policy known in the literature as Neofisherian[3], which is the opposite of the approach known as Fisher hypothesis[4] in the world, was put into practice. This perspective, which was criticized by many economists, continued until June 2023. In the period after May 2023, decisions were taken to abandon the Neofisherian economic view and take more rational steps after the changing economic staff. As a matter of fact, the Central Bank's policy interest rate, which was 8%, was increased to 40% by the end of 2023. Therefore, the Central Bank management, which was criticized for the late steps taken, could not make any progress in reducing inflation by applying a high interest rate policy in the new period. Among the reasons for this, rising exchange rates made it inevitable for a country with high import rates to increase costs. The local elections in March 2024 posed an obstacle to the necessary contractionary economic policies to reduce inflation.

In this study, the main sources of inflation are analyzed in terms of expenditures. As a result of the study, it was found that household expenditures do not have a symmetric causality on inflation. On the other hand, asymmetric causality test results show that positive shocks in household expenditures are effective in both negative and positive shocks to inflation. In terms of personal loans, positive shocks are effective in negative shocks to inflation. The results show that household expenditures are not the main source of rising inflation in Türkiye. Emphasizing the existence of structural problems in Türkiye such as the overvaluation of the exchange rate, unstable economic policies, production structure, import dependency especially in high technology, and external dependency in energy is thought to have more lasting effects on the solution to rising inflation. The implementation of such economic policies may not be realized in the short term, but in the long term.

Statement of Research and Publication Ethics

In all processes of the article, the research and publication ethics principles of the Journal of Management and Economics were followed.

Contribution Rates of Authors to the Article

The entire article was written by Assoc. Prof. Tacinur AKÇA.

Declaration of Interest

There is no potential conflict of interest in this study.

[3] Permanent increase in the nominal interest rates causes an increase in inflation not only in the long run but also in the short run.

[4] Irving Fisher (1930) found a one-to-one relationship between nominal interest rates and expected inflation.

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