THE IMPACT OF CHANGES IN THE PRICE LEVEL ON FINAL CONSUMER EXPENDITURES IN THE BALTIC STATES

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Abstract

The paper investigates linear relationships between changes in the price level and final consumption expenditures across major consumption categories in the Baltic states from 2005 to 2022. Using correlation analysis, the study identifies the strength and direction of these relationships. The results reveal notable correlations for the following categories: (1) clothing and footwear, (2) housing, water, electricity, gas, and other fuels, and (3) transportation. These relationships likely reflect the inherent characteristics of these goods and services, as well as the persistent effects of inflationary shocks that shape household expenditure patterns over time. In contrast, the analysis shows inconsistent correlations for (1) food and non-alcoholic beverages and (2) restaurants and hotels, suggesting that local factors, such as state-level price fluctuations or varying household sensitivity to specific expenditure items, may more strongly influence consumption in these categories. The findings can help better understand how changes in the price level affect consumers' final consumption expenditures.

Key words: Expenditures, inflation, Baltic republic

JEL Code: E12, E21

Introduction

Aggregate demand, defined as aggregate planned consumer expenditures, is a central concept in Keynesian economics. While the Keynesian model assumes a positive relationship between planned consumer expenditures and real income, the growth rate of final goods prices may outpace that of real income. It raises the question of whether changes in the price level influence the volume and structure of planned consumer expenditures.

In this context, changes in the price level are measured by the Consumer Price Index, which is considered the most commonly used indicator of inflation (Stewart & Reed, 1999). As posited by Doepke and Schneider (2006a), fluctuations in price levels, especially those that are unanticipated, can influence the redistribution of consumer wealth. It is attributable to a

diminution in the real value of nominal assets and liabilities. Because inflation can alter households' real wealth and thus their spending decisions, it is necessary to define household consumption expenditures. Household consumption expenditure is the monetary expenditure on goods and services for personal use. Importantly, it does not encompass spending for investment purposes or transfers such as gifts to other households and charitable organizations (Browning et al., 2014). Keček et al. (2019) argue that household final consumption expenditure may play a pivotal role in the creation of gross value added and employment. Furthermore, Jankiewicz and Pietrzak (2019) posit that consumption is one of the most significant drivers of the economy. Jankiewicz and Pietrzak (2019) suggest that fluctuations in the structure of consumption may be indicative of enhancements in living standards and favourable institutional developments within individual economies.

Given these considerations, this paper examines linear relationships between changes in the price level and final consumption expenditures across major consumption categories in the Baltic states from 2005 to 2022.

1 Review of the Literature

As posited by McCully et al. (2007), a negative relationship was detected between changes in the Consumer Price Index and final consumer expenditures. McCully et al. (2007) posit that a greater impact on final consumer expenditures is linked to items characterized by large relative price changes (gasoline and oil; computers, peripherals, and software; medical care services). An extension of this issue to real estate is presented in Dvořáková and Seidler (2012). Dvořáková and Seidler (2012) established a positive correlation between real estate values and Czech household consumption. Dvořáková and Seidler (2012) demonstrated a statistically significant influence on both housing wealth and stock market wealth, particularly regarding the consumption of non-durable goods. As Doepke and Schneider (2006b) emphasize, the effects resulting from wealth redistribution can be exceptionally persistent. As posited by Doepke and Schneider (2006b), the repercussions on final consumption expenditure may persist for decades following the conclusion of the inflationary phase, as the cohorts adversely affected by the redistribution shock may not fully recover.

In addition to Doepke and Schneider (2006b), the role of wealth in relation to final consumer expenditures has also been examined by, for example, Mian et al. (2013) and Hong and Lim Choon Seng (2019). As Mian et al. (2013) emphasized, the sensitivity of household consumption expenditure to income size is significant. In view of the documented high

elasticity of consumption expenditure, it may be hypothesized that inflation can affect the level of real income and, consequently, exert an indirect influence on consumption expenditure. Furthermore, Mian et al. (2013) observe that households with greater indebtedness are more sensitive to changes in disposable income, implying that this factor more significantly influences their induced consumption. The findings of Mian et al. (2013) are supplemented by Hong and Lim Choon Seng (2019). Hong and Lim Choon Seng (2019) view aggregate consumption as independent of economic changes in the long run and consider it a resilient component of economic growth despite its volatility. In the short term, however, a positive effect of economic shocks on final consumption expenditure was found. It suggests that households may perceive economic shocks as transient. Consequently, Hong and Lim Choon Seng (2019) posit that expansionary fiscal policy functions as an effective economic stabilizer during periods of economic turbulence. This assertion is corroborated by Mian et al. (2013), who observe that the aggregate level of household wealth exerts a substantial influence on final consumption expenditure, particularly during periods of financial crises.

2 Data and Methodology

The present study used annual data from 2005 to 2022 to examine the impact of fluctuations in the price level on household final consumption. The selected time period encompasses economic developments following EU accession, the global financial crisis, and the COVID-19 pandemic. Time series data for the Baltic states were obtained from the OECD database. To account for change in the price levels, the year-over-year change in the consumer price index was used. The annual household final consumption expenditure by purpose was categorized into 11 categories for this study. The categories are as follows: (1) food and non-alcoholic beverages; (2) alcoholic beverages, tobacco, and narcotics; (3) clothing and footwear; (4) housing, water, electricity, gas, and other fuels; (5) furnishings, household equipment, and routine household maintenance; (6) health; (7) transportation; (8) communication; (9) recreation and culture; (10) education; and (11) restaurants and hotels. As consumption items are measured similarly to inflation, the year-on-year change was determined as the logarithmic change in final consumption expenditures at time t relative to period t-1.

$$\Delta\text{Final consumption expenditures} = \ln\left(\frac{\text{Final consumption expenditures}_t}{\text{Final consumption expenditures}_{t-1}}\right) * 100 \qquad (1)$$

The focus on the Baltic states is particularly beneficial given their shared history, economic size, geography, demographics, and economic structure (Poissonnier, 2017).

Furthermore, Poissonnier (2017) posits that shared factors and economic linkages predominantly drive the economies of these three countries. However, each country exhibits unique characteristics. For instance, Estonia is most susceptible to international developments, while Latvia is influenced to a lesser extent by regional spillover effects.

The time series were initially subjected to the Augmented Dickey-Fuller unit root test to verify their stationarity. Subsequently, a correlation analysis was performed to estimate the correlation coefficients; specifically, the Pearson correlation coefficient was calculated. The use of the Pearson correlation coefficient facilitates the identification of a linear relationship between the inflation rate and the change in final consumer expenditures, that is, the manner in which the observed variables are interconnected. For the factors X (change in the price levels, i.e. inflation rate) and Y (change in final consumer expenditures), and the T pairs of observations of these variables, the Pearson correlation coefficient can be expressed as follows (Cipra, 2008; Pesaran, 2015):

$$\hat{\rho}_{YX} = \frac{\sum_{t=1}^{T}\left(x_t - \bar{x}\right)\left(y_t - \bar{y}\right)}{\left[\sum_{t=1}^{T}\left(x_t - \bar{x}\right)^2 \sum_{t-1}^{T}\left(y_t - \bar{y}\right)\right]^{1/2}} = \frac{S_{XY}}{\left(S_{YY} S_{XX}\right)^{1/2}} \tag{2}$$

when $\hat{\rho}_{YX} \in \langle -1, 1 \rangle$ and the correlation coefficient between the change in final consumer expenditures and the inflation rate is equal to the correlation coefficient between X and Y, that is $\hat{\rho}_{XY} = \hat{\rho}_{YX}$.

3 Results and Discussion

Initially, the stationarity of the time series was evaluated using the Augmented Dickey-Fuller unit root test. As shown in Tab. 1, the time series for the expenditure items was found to be stationary. Statistical significance at the 1% level is detected for Estonia in the following expenditure categories: clothing and footwear; housing, water, electricity, gas, and other fuels; furnishings, household equipment, and routine household maintenance; health; restaurants and hotels; and education. In the case of Latvia, the aforementioned items encompass food and non-alcoholic beverages; alcoholic beverages, tobacco, and narcotics; clothing and footwear; furnishings, household equipment, and routine household maintenance; transport; education; and restaurants and hotels. For the final Baltic state, Lithuania, statistical significance at the 1% level was confirmed for the following expenditure categories: food and non-alcoholic

beverages; alcoholic beverages, tobacco, and narcotics; clothing and footwear; furnishings, household equipment, and routine household maintenance; health; communication; and recreation and culture.

For the other time series, stationarity was generally detected at a 5% significance level. Specifically, these include the expenditure categories of food and non-alcoholic beverages; alcoholic beverages, tobacco, and narcotics; transport; communication; and recreation and culture for Estonia. Moreover, the expenditure items encompass housing, water, electricity, gas, and other fuels; transport; education; and restaurants and hotels in Lithuania, and recreation and culture in Latvia. The communication item was statistically significant at the 10% level in Latvia.

Tab. 1: Stationarity of final consumption expenditures time series

Expenditure	Estonia	Latvia	Lithuania
Food and non-alcoholic beverages	-3.6403**	-3.7166*	-5.4809*
Alcoholic beverages, tobacco and narcotics	-3.3705**	-3.8702*	-8.6166*
Clothing and footwear	-3.9946*	-3.1914*	-4.3942*
Housing, water, electricity, gas and other fuels	-4.4782*	N/A	-3.3258**
Furnishings, household equipment and routine household maintenance	-4.0669*	-4.0301*	-5.4809*
Health	-4.5757*	N/A	-7.6900*
Transport	-3.4302**	-6.0491*	-3.6633**
Communication	-3.8352**	-3.0200***	-4.1623*
Recreation and culture	-3.7019**	-3.9454**	-4.4197*
Education	-4.2831*	-5.1498*	-2.2663**
Restaurants and hotels	-4.3873*	-4.2772*	-3.3911**

Source: Authors' calculation. Note: *, **, and *** denote significance at the 1 %, 5 %, and 10 % levels. N/A means missing values.

As with the expenditure time series, the year-over-year changes in the consumer price index time series were tested for stationarity using the Augmented Dickey-Fuller unit root test. The time series were found to be stationary at the 1% statistical level for the items: food and non-alcoholic beverages; transport; and restaurants and hotels, as illustrated in Tab. 2. For the Republic of Latvia, the items in question encompassed alcoholic beverages, tobacco, and narcotics; clothing and footwear; communication; recreation and culture; education; and restaurants and hotels. Meanwhile, for Lithuania, the items were clothing and footwear; housing, water, electricity, gas, and other fuels; and communication.

For the other time series, stationarity was confirmed at the 5% or 10% significance level. Specifically, in Estonia, statistical significance at the 5% level was confirmed for the categories: alcoholic beverages, tobacco, and narcotics; clothing and footwear; health; recreation and culture; and education and communication. In Latvia, this applied to two items: food and non-alcoholic beverages, and transport. Statistical significance of the time series at the 5% level is also evident in Lithuania for the following items: food and non-alcoholic beverages; alcoholic beverages, tobacco, and narcotics; furnishings, household equipment, and routine household maintenance; health; transport; recreation and culture; restaurants and hotels; and education. Furthermore, statistical significance at the 10% level was detected in three cases. The categories of furnishings, household equipment, and routine household maintenance are evident in Estonia and Latvia. In Estonia, this also applies to the categories of housing, water, electricity, gas, and other fuels.

Tab. 2: Stationarity of inflation time series

Inflation	Estonia	Latvia	Lithuania
Food and non-alcoholic beverages	-4.2268*	-3.6678**	-2.8268**
Alcoholic beverages, tobacco and narcotics	-3.2009**	-9.4984*	-3.3459**
Clothing and footwear	-3.7333**	-4.4393*	-3.2392*
Housing, water, electricity, gas and other fuels	-2.8799***	N/A	-2.1413*
Furnishings, household equipment and routine household maintenance	-3.0335***	-2.6940***	-2.2683**
Health	-3.4752**	N/A	-3.8571**
Transport	-4.7268*	-3.4202**	-3.8394**
Communication	-3.3104**	-6.4587*	-5.6521*
Recreation and culture	-3.5473**	-2.7662*	-3.1149**
Education	-3.4568**	-4.0293*	-3.4497**
Restaurants and hotels	-4.4764*	-4.1685*	-3.5986**

Source: Authors' calculation. Note: *, **, and *** denote significance at the 1 %, 5 %, and 10 % levels. N/A means missing values.

The correlation coefficients presented in Tab. 3 were calculated using stationary-time-series correlation analysis. The similarity in both statistically significant and insignificant results could be due to common factors and economic linkages among the Baltic states (Poissonnier, 2017). Statistically significant correlation coefficients were identified between (1) inflation and final consumption expenditure on clothing and footwear, (2) inflation and final

consumption expenditure on housing, water, electricity, gas, and other fuels, and (3) inflation and final consumption expenditure on transportation in Estonia, Lithuania, and Latvia. In all cases, the correlation coefficients were positive, indicating that an increase in the inflation rate should accompany an increase in final consumption expenditures.

In the housing, water, electricity, gas, and other fuels category, the reason could be that prices in this sector rose the most on average during the period under examination. Further, prevailing trends significantly influence transportation prices in the global oil market. The classification of both items as necessities indicates that, despite rising prices, the quantity purchased is likely to have remained relatively constant, which may have contributed to the observed growth in household expenditures. Within the clothing and footwear category, Consumer Price Index values were low or even negative, particularly in Latvia and Lithuania, suggesting that the rise in textile prices was not very pronounced. Alternatively, a certain portion of clothing and footwear may be considered a necessity. Another potential explanation pertains to the enduring impact of inflationary shocks on final consumption expenditure, which can persist for decades after the end of the inflationary phase, as argued by Doepke and Schneider (2006b).

However, it should be noted that distinct trends were also observed among the individual Baltic countries. A statistically significant correlation coefficient between inflation and final consumer expenditures on food and non-alcoholic beverages was identified in Latvia. This phenomenon may be attributable to the observation that Latvia experienced the most substantial average price change for food and non-alcoholic beverages during the period under review. This finding would be consistent with the conclusions of McCully et al. (2007). As McCully et al. (2007) confirmed, inflation significantly affects final consumer expenditures on items that exhibit large relative price changes over time. Moreover, the most substantial price fluctuations occurred during periods of crisis, such as the advent of the global financial crisis (Mian et al., 2013).

Furthermore, a statistically significant correlation coefficient between inflation and final consumption expenditure on restaurants and hotels was detected, but only for Estonia and Lithuania. This phenomenon may be attributable to the higher average prices of services in the hospitality sector, namely restaurants and hotels, in Lithuania and Estonia. To a certain degree, this could indicate disparities in households' sensitivity to this expenditure item relative to their income (Mian et al., 2013).

The remaining correlation coefficients were found to be statistically insignificant. Specifically, the correlation coefficients between inflation and final consumer expenditures were examined for the following categories: alcoholic beverages, tobacco, and narcotics; furnishings, household equipment, and routine household maintenance; health; communication; recreation and culture; and education. This phenomenon has been observed to be consistent across all Baltic states. This phenomenon may be attributed to the diminished proportion of these items within the consumer basket. This finding suggests that the quantities consumed remain relatively stable, irrespective of inflation trends and the nature of the goods. This assertion would be consistent with the findings of Hong and Lim Choon Seng (2019), who argue that certain items may not be sensitive to economic changes.

Tab. 3: Correlation coefficient between inflation and final consumption expenditures

Expenditure	Estonia	Latvia	Lithuania
Food and non-alcoholic beverages	0.2039	0.6493*	0.3663
Alcoholic beverages, tobacco and narcotics	-0.3199	0.2787	0.1298
Clothing and footwear	0.4671***	0.4494***	0.4783***
Housing, water, electricity, gas and other fuels	0.7674*	N/A	0.7424*
Furnishings, household equipment and routine household maintenance	0.0896	0.2673	0.1022
Health	-0.1406	N/A	-0.0851
Transport	0.6819*	0.5477**	0.6488*
Communication	0.0121	-0.2177	0.1077
Recreation and culture	0.3387	0.2620	0.3495
Education	0.2616	0.0688	0.0780
Restaurants and hotels	0.6124*	0.2161	0.4794***

Source: Authors' calculation. Note: *, **, and *** denote significance at the 1 %, 5 %, and 10 % levels. N/A means missing values.

Conclusion

The objective of the present paper was to determine whether fluctuations in the price level influence household consumption behaviour in the Baltic states. The analysis employed time series of annual household final consumption expenditure across 11 categories, as well as year-over-year changes in the consumer price index from 2005 to 2022.

The correlation coefficients found suggest that there may be economic linkages and common factors among the Baltic states that have influenced the results (Poissonnier, 2017). Specifically, positive correlation coefficients were identified between (1) inflation and final

consumption expenditure on clothing and footwear, (2) inflation and final consumption expenditure on housing, water, electricity, gas, and other fuels, and (3) inflation and final consumption expenditure on transportation in all three Baltic states. The results may be indicative of the goods' inherent characteristics and the persistent effects of inflationary shocks (Doepke & Schneider, 2006b). This finding may indicate a potential increase in consumer spending due to rising inflation.

Moreover, variances can be identified between individual states about the categories of (1) food and non-alcoholic beverages and (2) restaurants and hotels. These disparities are attributed to local factors, including state-level price fluctuations or households' sensitivity to particular expenditure items (McCully et al., 2007; Mian et al., 2013). In some cases, no statistically significant linear relationship was found between inflation and final consumer expenditures. This finding could be attributed to the reduced share of these goods in the consumer basket, as well as their potential insensitivity to economic fluctuations (Hong & Lim Choon Seng, 2019). It may suggest that factors beyond price-level changes can influence consumer spending.

Further research in this area could identify causal relationships between the variables under study and directly identify the factors that influence purchasing power and the health of the economy.

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