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ASSESSING THE IMPACT OF NEGATIVE BALANCES IN CURRENT ACCOUNTS AND INFLATION ON THE MINIMUM CONSUMER BASKET: A REGRESSION APPROACH

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ABSTRACT

This paper investigates the interplay between the minimum consumer basket's value, negative current account balances, and inflation rates, as categorized by COICOP, through regression analysis. Using a comprehensive dataset with monthly observations from Macedonia, spanning December 2010 to May 2024, the study employs a multiple regression model to examine the impact of negative balances on personal current accounts and inflation on the minimum consumer basket. The analysis aims to clarify how these economic factors interact to influence consumer purchasing power and the cost of living. By empirically assessing these interconnections, the study reveals how economic imbalances, and inflationary pressures affect the affordability of essential goods and services. The findings provide crucial insights into the dynamics of current account deficits, inflation, and consumer expenditure. These insights are essential for policymakers to develop strategies that mitigate the negative effects of economic instability and inflation, thereby stabilizing consumer expenditure and protecting consumer welfare.

KEY WORDS: Minimum Consumer Basket, Negative Current Account Balances, Inflation (COICOP), Regression Analysis, Consumer Purchasing Power

INTRODUCTION

Understanding the dynamics of economic variables and their impact on consumer well-being is crucial for formulating effective economic policies. This study focuses on the interplay between the minimum consumer basket's value, negative current account balances, and inflation rates in Macedonia from December 2010 to May 2024. These factors are instrumental in shaping the standard of living and overall welfare of the population.

The minimum consumer basket represents the essential goods and services required for maintaining a basic standard of living. The standard of living on its own is also a complex concept. It basically refers to the use and enjoyment of material and spiritual goods and services that are personally acquired or provided by the state (Karadjova & Trajkov, *SERIES A*, 2022, p. 10). It encompasses a range of items, including food, housing, healthcare, and transportation, reflecting the fundamental needs of households. As such, fluctuations in the value of this basket directly influence the affordability of living standards, making it a critical measure for assessing economic health. The question of living standards is not only of interest for economic science and economic policy. Sociology and social policy also analyze the level of living standards and the factors that determines it (Karadjova & Dicevska, *Living Standards and Microinsurance*, 2018, p. 30).

Individual negative current account balances - where personal accounts show more withdrawals than deposits - can have significant implications for economic stability. Persistent personal deficits may force individuals to borrow more, leading to higher debt levels and potentially reducing their financial stability. This personal financial strain can have broader implications, as it can contribute to decreased consumer spending and increased financial stress, which may indirectly affect the overall economic environment. Moreover, widespread individual financial difficulties can place additional pressure on national economic stability, potentially influencing inflation rates and overall consumer purchasing power.

Today we live in economies where the prices tend to rise throughout the entire year and sometimes very fast (Karadjova & Simonceska, 2005). High inflation, driven by various economic factors including pressures from widespread individual financial instability, leads to increased prices for essential goods and services. This erodes the purchasing power of individuals, making it more challenging for them to afford the basic necessities of life. As

inflation rises, the cost of living increases, which can disproportionately affect those with lower incomes who spend a larger share of their income on essential items.

By analyzing these interrelated factors through regression analysis, this study aims to elucidate how negative current account balances and inflation rates impact the value of the minimum consumer basket. Utilizing a comprehensive dataset of monthly observations, the research seeks to provide insights into the broader implications of these economic variables on consumer welfare.

The standard of living is inherently linked to consumer welfare, which encompasses the overall quality of life and economic security experienced by individuals. However, there is a difference between these two indicators, which is not primary in the analysis in this paper. So, standard of living refers to the level of wealth, comfort, material goods and necessities available to a certain socioeconomic class or geographic area, while quality of life is a subjective term that can measure happiness. If they are not correctly determined, the two terms are often mixed and at first glance it may appear to be the same category (Karadjova V. , 2019, p. 29). When inflation rises or individual current account balances become increasingly negative, the resulting economic strain can diminish the quality of life. It is essential for policymakers to understand these dynamics to craft strategies that mitigate adverse effects and enhance economic stability.

By providing empirical evidence on the interactions between these economic variables and their impact on consumer welfare, this study contributes to a deeper understanding of how economic policies can influence living standards. The findings aim to support the development of effective policy measures that protect and improve consumer well-being, ensuring that essential needs remain affordable, and that economic stability is maintained.

EXPLORING THE INTERCONNECTIONS BETWEEN MINIMUM CONSUMER BASKET VALUE, NEGATIVE BALANCES IN CURRENT ACCOUNTS, AND INFLATION RATES: AN EMPIRICAL ANALYSIS

In this study, a multiple regression model was employed to quantify the relationship between the Minimum Consumer Basket Value, which is the dependent variable, and Negative Credit Balances and Inflation Rates, which are the independent variables. The multiple regression analysis allows for the examination of how changes in Negative Credit Balances and Inflation Rates

simultaneously affect the Minimum Consumer Basket Value, providing insights into the strength and nature of these relationships.

Minimum Consumer Basket Value as Outcome/Dependent Variable

In the analytical model utilized, the Minimum Consumer Basket Value is incorporated as the dependent variable to gauge the standard of living among the population. This variable, which has been computed by the Union of Trade Unions of Macedonia (SSM) since February 2011, provides a measure of essential living costs. Secondary data for this variable were obtained from the official website of SSM (<https://www.ssm.org.mk/en/>). By including this value in the model, we aim to assess how various factors influence the cost of living and, consequently, the quality of life. Quality of life is a more subjective and intangible term than standard of living. As such, it can often be hard to quantify. The factors that affect the overall quality of life vary by people's lifestyles and their personal preferences (Karadjova & Trajkov, SERIES A, 2022, p. 166).

On February 24, 2011, the Union of Trade Unions of Macedonia (SSM) presented its Syndical Minimum Basket. According to the SSM, this basket provides a more accurate model for assessing the cost of living. The Syndical Minimum Basket is derived from the Consumer Basket value calculated by the State Statistical Office. In 2010, the value of the statistical basket, encompassing 63 products, ranged between 11,900 and 12,650 denars. It should be noted that food and beverages alone do not encompass all the necessary expenses for a family's adequate functioning. Those who are unable to meet all the necessary expenses are considered poor, and the poverty can be defined as a condition in which needs are not properly provided, or if households lack resources for meals, activities, and living conditions and arranging, that are commonly or widely supported and approved by the society to which they belong. Living below the poverty threshold, which occurs in a number of citizens, reflects an inability to settle their basic needs, or to cover the cost of normal living (electricity, water, etc.) (Karadjova & Dicevska, 2017, p. 528).

The model assumes a household consisting of four members residing in a 50 square meter dwelling without access to a personal vehicle. The Syndical Minimum Basket comprises seven expenditure categories (Union of Trade Unions of Macedonia, 2011): (1) Food and Beverages; (2) Housing; (3) Hygiene; (4) Transportation; (5) Clothing and Footwear; (6) Culture; and (7) Maintenance and Health.

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- The category of food and beverages is based on the consumption pattern data from the State Statistical Office. Although the 63 products included do not fully capture all dietary needs, they reflect consumption practices, habits, and traditional dietary patterns. The SSM employs this data as a minimal threshold rather than an average.
 - Housing expenses are subdivided into two components: utility costs, which include five items, and household goods, equipment, and maintenance, tracked through 13 items.
 - The hygiene category is divided into personal hygiene, with seven items, and household hygiene, also comprising seven items. These items are quantified in minimal quantities at the lowest available prices.
 - Transportation costs include the minimal required expenses, specifically two monthly transportation passes for workers and students.
 - Clothing and footwear expenses involve the purchase of one item of clothing and one pair of shoes per family member per season.
 - Cultural expenses encompass the cost of three items: one cinema ticket per month and regular purchases of one weekly and one daily newspaper.
 - The maintenance and health category covers basic pharmaceutical costs, excluding medications for chronic conditions.

Expenditures related to recreation, education, hotels and restaurants, and family celebrations are excluded from this basket. This exclusion is not due to their non-essential nature, but rather because the basket focuses solely on essential living costs.

A comparative analysis with the average net salary for December 2010, which was 20,633 denars, indicates that the average salary covers approximately 70% of the Syndical Minimum Basket's requirements. This suggests that an additional 42% of income is necessary to meet basic living standards. Notably, only 9.1% of employees earn above 20,000 denars, and merely 2.3% earn more than 30,000 denars (Union of Trade Unions of Macedonia, 2011).

Furthermore, price fluctuations, particularly in regulated utilities such as electricity, heating, and water, have exacerbated living costs, reflecting the dynamic nature of the economic environment.

Regressors/Independent Variables

In this study, a regression model with an intercept term was utilized to investigate the relationships among variables. Specifically, the model

incorporates Negative Balances in Current Accounts and Inflation Rates as independent variables (regressors) to assess their influence on the dependent variable. By including these regressors, the analysis aims to elucidate how each factor affects the outcome of interest, thereby offering a detailed understanding of their individual and collective impacts within the framework of the regression analysis.

- Negative Balances in Current Accounts - The data on negative balances in current accounts was sourced from the statistical web portal of the National Bank (NBStat), specifically from the section on Monetary Statistics >> Monetary and Credit Aggregates >> Household Bank Loans. Within this category, the data is detailed under the classification of **Loans to Individuals >> Negative Balances in Current Accounts** (<https://nbstat.nbrm.mk/>). This information provides insights into the negative credit balances held by households, which are essential for analyzing the financial variables in this study. This data is analyzed to evaluate the extent to which the Syndical Minimum Consumer Basket is affected by individuals' need to incur negative balances in their current accounts. Specifically, the investigation aims to determine the relationship between the necessity for individuals to maintain negative balances and the adequacy of the Syndical Minimum Consumer Basket in capturing the cost of living. By examining this relationship, the study seeks to quantify how variations in negative account balances may influence or reflect changes in the minimum consumption requirements for households. Since January 2009, the National Bank has conducted a revision of the time series data due to the implementation of a new methodology. This update aligns with the revised guidelines outlined in the 2016 IMF Manual and Guide for Monetary and Financial Statistics. The revision ensures that the data adheres to the latest international standards for accuracy and comparability. The study utilizes secondary data sourced from the National Bank. The methodology employed by the National Bank for data collection adheres to the **Methodological Explanations** outlined in the publication "**Monetary Statistics and Statistics of Other Financial Institutions**" from November 2007, with the latest revision conducted in July 2018. This methodological framework ensures that the data collection processes are in line with established standards and practices for accuracy and reliability (National Bank of the Republic of Macedonia, (2007) 2018).
- Inflation Rates - In the analysis, monthly inflation rates are used as a regressor, aggregated according to the Classification of Individual Consumption by Purpose (COICOP). The total inflation rates serve as an

independent variable to assess their impact on the dependent variable. This methodological approach facilitates a detailed examination of how overall inflation trends influence the studied outcomes, providing insights into the relationship between inflation and the other variables in the model.

According to the methodology employed by the State Statistical Office (State Statistical Office, 2011), the Classification of Individual Consumption by Purpose (COICOP) serves as an international standard for categorizing personal consumption expenditures. COICOP is utilized by European Union member states for calculating the Harmonized Index of Consumer Prices (HICP), which is a key indicator of inflation. COICOP classifies expenditure based on the purpose of consumption and is used to categorize expenditures made by households and non-profit institutions serving households. This classification system facilitates consistent and comparable measurement of consumption patterns and price changes across different countries, providing a robust framework for analyzing inflation and its impact on economic variables.

The inflation data used in the model were obtained from **Table 4. Inflation and stock exchange prices** of the Statistical Reviews published by the Ministry of Finance (Ministry of Finance, 2024), specifically within the Macroeconomics section. This source provides comprehensive and reliable data on inflation rates, which are crucial for the analysis conducted in the model.

Regression model

The data for the variables in the model span from December 2010 to May 2024, encompassing a total of **162** monthly observations. Reasons for the importance of a long time series include:

- (a) **Enhanced Accuracy**: Captures a broader range of economic conditions, leading to more precise analyses and mitigating the impact of anomalies.
- (b) **Improved Reliability**: Provides a more accurate estimation of relationships between variables, enhancing the robustness of statistical results.
- (c) **Trend Detection**: Enables the identification of long-term trends and shifts in economic patterns, offering deeper insights into variable interactions.
- (d) **Robustness**: Ensures that findings are generalizable and less affected by short-term fluctuations, improving the stability of conclusions.

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- (e) Comprehensive Context: Includes various economic events and policy changes, enriching the understanding of their effects on the dependent variable.

In summary, the comprehensive dataset is crucial for robust, reliable, and insightful analysis across varying economic conditions.

To formulate the general regression equation based on the provided output, we use the following components:

1. **Intercept**: The constant term in the regression equation.
2. **Coefficients**: These represent the impact of each independent variable on the dependent variable.

Here is the general formula for a multiple linear regression model:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + e \quad (1)$$

Having in mind that e represents the error term or residuals, and it is assumed that the error e is independent with constant variance (homoscedastic) and the regression line is estimated as:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 \quad (2)$$

Where:

y = the minimum consumer basket value (dependent variable)

x_1 = negative balances in current accounts (first independent variable)

x_2 = inflation according to COICOP (second independent variable)

β_0 = the intercept (constant term)

β_1 and β_2 = the coefficients for the independent variables (the slopes of the regression line corresponding to x_1 and x_2 , respectively)

Excel's data analysis package is used for the purpose of research and for calculating regression output which has three components: (1) Regression statistics table, (2) ANOVA (analyze of the variance) and (3) Regression coefficient table.

Table 1. Regression statistic output

<i>Regression Statistics</i>	
Multiple R	0,603347
R Square	0,364027
Adjusted R Square	0,356027
Standard Error	0,004783
Observations	162

Source: own calculations

Multiple R is the correlation coefficient between the observed values and the predicted values of the dependent variable. In this case, a value of 0.603 indicates a moderate positive correlation, suggesting that there is a reasonably strong linear relationship between the dependent variable and the predictors. The value ranges from -1 to 1, where 1 implies a perfect positive linear relationship and -1 implies a perfect negative linear relationship.

R², or the coefficient of determination, represents the proportion of the variance in the dependent variable that is predictable from the independent variables. An R² of 0.364 means that approximately 36.4% of the variability in the dependent variable can be explained by the model. This leaves 63.6% of the variability unexplained by the model, which might be due to other factors not included in the model.

More important for the research are the values of adjusted R² that represents Coefficient of Determination which explains the intensity of variation of the dependent variable caused by independent variables in the model. **Adjusted R²** adjusts the R² value for the number of predictors in the model, providing a more accurate measure of the goodness of fit when multiple predictors are involved. An Adjusted R² of 0.356 suggests that about 35.6% of the variability in the dependent variable is explained by the model, after accounting for the number of predictors. This adjustment is crucial because adding more predictors to the model generally increases R², but Adjusted R² provides a more reliable measure.

The Standard Error of the estimate measures the average distance that the observed values fall from the regression line. A smaller standard error indicates that the data points are closer to the regression line, meaning the model has a better fit. Here, a standard error of 0.004782583 suggests that the average error in predictions is about 0.00478 units.

Observations is the number of data points used in the regression analysis. With 162 observations, the sample size is reasonably large, which can help ensure the reliability of the regression results.

Testing the model. Considering the results from Regression Statistics, we need to test the model by establishing hypotheses. This process determines whether the observed relationships are statistically significant. Therefore, the following hypotheses were stated:

- H₀: $\beta_1=0$ (there is no relationship between variables),
There is no significant relationship between the independent variables and the dependent variable. In other words, the independent variables do not explain a significant amount of variance in the dependent variable.
- H₁: $\beta_1 \neq 0$ (variables are related),

At least one of the independent variables significantly contributes to explaining the variance in the dependent variable. This implies that the independent variables together have a significant effect on the dependent variable.

Level of significance α is set on 0.05. Testing the hypotheses can be done by using ANOVA to calculate F value and significance F or using t-test statistic to calculate coefficients, “p” and “t” – values. MS Excel software is used for all the calculations. Results of ANOVA are given in table 2. Results indicate that $F > \text{Significance F}$, which confirms that the used model has statistical relevance. It indicates that the likelihood of obtaining the regression output by chance is very low.

Given the F-value of 45.5053 and a Significance F value of 2.36248E-16, which is extremely small, we reject the null hypothesis. This result suggests that at least one of the independent variables significantly explains the variation in the dependent variable. Therefore, the model with the included predictors is statistically significant, indicating that the independent variables have a meaningful impact on the dependent variable. In summary, the ANOVA results demonstrate that the regression model is effective in explaining the variance in the dependent variable, and the predictors included in the model have a statistically significant relationship with the outcome.

Table 2. ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	0,002082	0,001041	45,50533	2,36E-16
Residual	159	0,003637	2,29E-05		
Total	161	0,005719			

Source: own calculations

The validity of the regression results can be also assessed by comparing the p-value of the statistical tests to the predetermined significance level (α). If the p-value is less than α , the null hypothesis (H_0) is rejected, indicating that the independent variables included in the model have a statistically significant effect on the dependent variable. This comparison provides evidence that the selected predictors contribute meaningfully to the model, validating their relevance and significance in explaining the variance of the dependent variable. Given this, the following conclusions can be drawn:

-
- (a) Intercept:
- P-value: 1.6404×10^{-7}
 - Comparison: Since 1.6404×10^{-7} is much less than 0.05, the intercept is statistically significant. We reject the null hypothesis and conclude that the intercept significantly differs from zero.
- (b) Negative balances in current accounts:
- P-value: 1.6867×10^{-7}
 - Comparison: The p-value of 1.6867×10^{-7} is also much less than 0.05, indicating that this coefficient is statistically significant. We reject the null hypothesis, suggesting that this variable has a significant impact.
- (c) Inflation according to COICOP:
- P-value: 1.79574×10^{-11}
 - Comparison: With a p-value of 1.79574×10^{-11} , which is far below 0.05, this coefficient is statistically significant as well. We reject the null hypothesis, indicating a significant relationship with the dependent variable.

Table 3. Regression coefficient table

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0,016388	0,002991	5,479333	1,64E-07	0,010481	0,022295
Negative balances in current accounts	2,74E-06	5E-07	5,473473	1,69E-07	1,75E-06	3,72E-06
Inflation according to COICOP	0,000617	8,52E-05	7,241522	1,8E-11	0,000449	0,000785

Source: own calculations

The results in Table 3 indicate that:

- The coefficient for Negative balances in current accounts has an estimated standard error of 0.000500, a t-statistic of 5.4735, and a p-value of 1.69E-07. Using the p-value approach, since the p-value is significantly smaller than the significance level $\alpha = 0.05$ ($p < 0.05$), the null hypothesis is rejected, indicating that the variable is statistically significant. The t-value approach also supports this, as the absolute value of the t-statistic (|5.4735|) exceeds the critical value from the t-distribution table (approximately 2.00 for a typical significance level). This confirms that Negative balances in current accounts is statistically significant in the model, as evidenced by both the p-value and the t-statistic.
- The coefficient for Inflation according to COICOP has an estimated standard error of 0.000085, a t-statistic of 7.2415, and a p-value of 1.8E-

11. Using the p-value approach, since the p-value is much smaller than the significance level $\alpha = 0.05$ ($p < 0.05$), the null hypothesis is rejected, indicating that the variable is statistically significant. The t-value approach also supports this, as the absolute value of the t-statistic ($|7.2415|$) is greater than the critical value from the t-distribution table (which is approximately 2.00 for a typical significance level). This confirms that Inflation according to COICOP is statistically significant in the model, as evidenced by the p-value and t-statistic.

Model Summary:

- **Model Fit:** The regression model explains about 36.4% of the variance in the dependent variable ($R^2 = 0.364$), which is moderate. The Adjusted R^2 of 0.356 indicates that the model's fit is relatively good, considering the number of predictors.
- **Overall Significance:** The model is statistically significant (F-statistic = 45.505, p-value ≈ 0), meaning that at least one of the predictors significantly contributes to explaining the dependent variable.
- **Predictors:** Both predictors, "Negative balances in current accounts" and "Inflation according to COICOP" are statistically significant, with very low p-values, indicating that they have a meaningful relationship with the dependent variable.

Overall Assessment is that all coefficients in the regression model are statistically significant at the 0.05 significance level, as evidenced by their p-values and t-statistics. This suggests that the model's variables—intercept, negative balances in current accounts, and inflation according to COICOP—are important predictors in the regression analysis. The model appears to be robust and the results reliable.

ANALYZING THE FIT OF THE REGRESSION MODEL: ACTUAL DATA VS. PREDICTED VALUES

Based on provided regression results:

- Intercept (β_0): 0.016387712
- Coefficient for Negative balances in current accounts (β_1): 2.73705×10^{-6}
- Coefficient for Inflation according to COICOP (β_2): 0.000616922

the general regression equation is:

$$y = 0.0164 + 2.74 \times 10^{-6}x_1 + 0.000617x_2 \quad (3)$$

This regression equation models the relationship between the dependent variable y (Minimum Consumer Basket Value) and the two independent variables, providing insights into how changes in Negative balances in current accounts and Inflation affect y . As indicated by the model results, a minor increase in negative balances in current accounts (measured in millions of denars) and inflation rates (as per COICOP), significantly impacts the Minimum Syndical Consumer Basket value.

Specifically:

1. Impact of Negative balances in current accounts: The coefficient for negative credit balances is 2.74×10^{-6} , suggesting that even a small increase in negative credit balances has a measurable, albeit slight, positive effect on the Minimum Syndical Consumer Basket value. This implies that higher negative credit balances might be associated with an increased cost of living or minimum consumption basket, reflecting greater economic strain on households.
2. Impact of Inflation: The coefficient for inflation, at 0.000617, indicates that increases in the inflation rate according to COICOP are positively correlated with the Minimum Syndical Basket value. This result aligns with expectations, as higher inflation generally leads to increased costs of goods and services, thereby raising the minimum amount needed for basic consumption. That is consistent with the economic theory that higher inflation increases the cost of living.

Overall, the results highlight that fluctuations in negative balances in current accounts and inflation rates have a significant effect on the Minimum Syndical Consumer Basket. These findings underscore the sensitivity of the Minimum Syndical Basket to changes in economic variables, illustrating the importance of monitoring credit conditions and inflation to understand their effects on the cost of living.

Given that the regression model accounts for approximately 36.4% of the variance in the dependent variable, as indicated by $R^2 = 0.364$, this represents a moderate level of explanatory power. The Adjusted R^2 value of 0.356 further suggests that the model provides a relatively good fit by adjusting for the number of predictors used. However, to ensure the robustness of the model and to identify any potential issues with its assumptions, it is essential to conduct a thorough analysis of the residuals.

To analyze the residuals, we need to compute the following:

-
- (1) Mean Residual
 - (2) Standard Deviation of Residuals
 - (3) Minimum Residual
 - (4) Maximum Residual

(1) Mean Residual is calculated as the average of all the residuals.

$$\text{Mean Residual} = \frac{1}{n} \sum_{i=1}^n \text{Residual}_i \quad (4)$$

where n is the total number of residuals.

$$\text{Mean Residual} = \frac{\text{Sum of Residuals}}{162} = \frac{2,38004060904018E-15}{162} \approx 1,46916086977789E-17 \quad (5)$$

The mean residual is very close to zero (1.46916×10^{-17}), which is ideal as it indicates that the residuals are centered around zero (the predictions are very close to the actual values). This suggests that the model does not have systematic bias in its predictions.

(2) The standard deviation of residuals measures the dispersion of residuals from the mean.

$$\text{Standard Deviation} = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (\text{Residual}_i - \text{Mean Residual})^2} \quad (6)$$

$$\text{Standard Deviation} = 0,00475278508285497 \quad (7)$$

The standard deviation measures the spread of the residuals. This measures the average magnitude of deviations from the mean residual. A relatively low standard deviation suggests that most residuals are close to the mean, indicating good consistency in prediction.

(3) The minimum residual is the smallest value among all residuals.

$$\text{Minimum Residual} = -0.00391375 \quad (8)$$

The minimum residual of -0.00391375 indicates the largest negative deviation of the model's prediction from the actual values. This suggests that

there are some predictions where the model underestimates the actual values significantly.

(4) The maximum residual is the largest value among all residuals.

$$\text{Maximum Residual} = 0.024825421 \quad (9)$$

The maximum residual of 0.02482542 indicates the largest positive deviation, meaning that there are some predictions where the model overestimates the actual values significantly.

These values provide the boundaries of the residuals. The fact that the minimum and maximum values are relatively close to zero supports the small range observed.

In addition to the previously mentioned indicators, Table 4 presents a comprehensive descriptive statistical summary of the residuals from the regression model.

Table 4. Residuals Descriptive statistics

Descriptive statistics	
Mean	1,47E-17
Standard Error	0,000373414
Median	-0,000819757
Standard Deviation	0,004752785
Sample Variance	2,2589E-05
Kurtosis	15,59805147
Skewness	3,839391801
Range	0,028739171
Minimum	-0,00391375
Maximum	0,024825421
Sum	2,38E-15
Count	162
Confidence Level(95,0%)	0,000737421

Source: own calculations

Standard Error of Residuals is 0.000373414. This measures the average amount by which the residuals deviate from their mean. Given that the

standard error is very small, it indicates that the residuals are tightly clustered around their mean.

Median Residual have a value of: -0.000819757 . The median is close to zero but slightly negative. This is consistent with the mean being very close to zero, suggesting that there's no major skew in the residuals.

Sample Variance value is 2.2589×10^{-5} . This is the square of the standard deviation. The very small variance indicates low variability in the residuals, which supports the consistency observed from the standard deviation.

Kurtosis = 15.59805147 . Kurtosis measures the "tailedness" of the residual distribution. A high kurtosis (greater than 3, which is the kurtosis of a normal distribution) indicates that the residuals have heavy tails, meaning there are more extreme values (outliers) than would be expected in a normal distribution.

Skewness = 3.839391801 . Skewness measures the asymmetry of the residual distribution. A positive skewness value indicates that the distribution of residuals is right-skewed (i.e., it has a longer tail on the right side). A high positive skewness suggests that there are a few large positive residuals that might be influencing the distribution.

Range = 0.028739171 . The range (difference between the maximum and minimum residuals) is relatively small, indicating that the residuals do not vary widely.

Sum of residuals = 2.38×10^{-15} . The sum being very close to zero reinforces that the mean is effectively zero, confirming that there is no systematic bias in the residuals.

Count value is 162. This is the number of residuals or data points. A larger sample size generally provides a more reliable estimate of residual statistics.

Confidence Level (95.0%) have a value of: 0.000737421 . This likely represents the margin of error around the mean residual or the confidence interval for the standard error. It confirms the precision of the residual statistics provided.

Overall, the descriptive statistics in Table 4 are crucial for diagnosing the fit of the regression model and identifying potential issues. Analyzing these

metrics helps in understanding the residuals' behavior, which is essential for validating model assumptions and ensuring accurate predictions.

Figure 1 illustrates the trend in the real value of the trade union minimum basket (in millions of denars) from December 2010 to May 2024, including the predicted values from the model and the corresponding deviations.

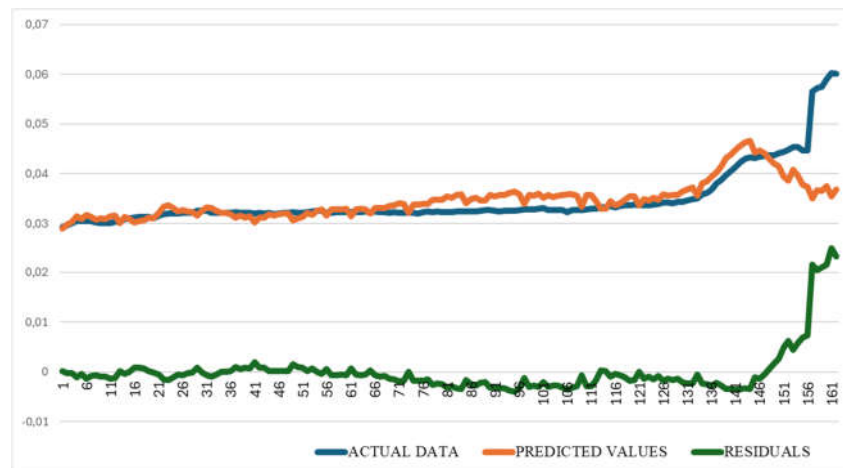


Figure 1. Residuals Plot of the Regression Model: Detection of Largest Discrepancies

Source: Authors calculation and interpretation based on Union of Trade Unions of Macedonia data, (<https://www.ssm.org.mk/mk/sindikalna-minimalna-koshnica>), accessed on 15.05.2024

Mainly, descriptive statistics indicate that the model appears to have a good average performance (mean residual close to zero), suggest that the model is generally performing well with small deviations but may have some extreme values or non-normal distribution characteristics that could be worth investigating further. As can be seen in Figure 1 there are notable extreme deviations (both positive and negative) which suggest that there are certain cases where the model's predictions diverge significantly from the actual values. This variability could be due to outliers or other factors not captured by the model. Other economic and social indicators such as the degree of industrialization, the level of education, health and social protection, the length of life, mortality, infant mortality, and a range of other indicators can be used and specific reports on "human development" are developed within the United Nations (UN), i.e. for overall economic and social development of

the community (Karadjova & Dicevska, 2019, p. 30). The integration of various factors - such as the unemployment rate, GDP growth rate, interest rates, consumer confidence index, average household income, savings rate, retail price index (RPI), as well as demographic and socioeconomic factors, external shocks, subsidies and welfare programs, and technological influences - far exceeds the scope of this study.

These elements encompass a broad array of economic and social variables that could significantly impact the subject matter. Given their complexity and interrelatedness, a comprehensive analysis of these factors would require extensive examination beyond the confines of this research. Consequently, they warrant consideration as potential subjects for future research endeavors, which could further elucidate their effects and interactions within the broader economic framework.

CONCLUSION

This research holds substantial significance for understanding the complex interplay between negative current account balance dynamics, inflation, and the cost of living, specifically through the lens of the minimum consumer basket. By analyzing monthly data from Macedonia between December 2010 and May 2024, the research offers several key benefits:

- (a) Enhanced Policy Formulation: The insights derived from this research can guide policymakers in developing targeted economic policies. Understanding how negative current account balances and inflation affect the minimum consumer basket helps in designing interventions to stabilize prices and manage credit conditions more effectively.
- (b) Improved Economic Planning: The study provides a detailed analysis of how credit and inflation trends impact household expenditures. This information is crucial for economic planning and forecasting, enabling better budget allocation and resource management at both macro and microeconomic levels.
- (c) Informed Financial Management: For individuals and businesses, the research highlights how fluctuations in credit and inflation impact the cost of living. This can lead to more informed financial decision-making, helping households to manage their budgets and anticipate changes in their cost of living.
- (d) Strengthened Economic Resilience: By identifying the relationships between credit conditions, inflation, and living costs, the research contributes to a more resilient economic framework. It aids in

understanding the structural factors affecting consumer prices, thus supporting efforts to mitigate the adverse effects of economic shocks.

- (e) Targeted Support Measures: The findings can assist in formulating targeted support measures for vulnerable populations. Understanding the impact of inflation and negative current account balances on the minimum consumer basket allows for more effective social welfare programs and financial support mechanisms, thereby improving the standard of living.

The regression analysis uncovers significant relationships between credit conditions, inflation rates, and household expenditure costs, offering actionable insights to enhance policy effectiveness, improve financial management, and support economic stability and growth.

The findings demonstrate that both negative current account balances and inflation have substantial effects on the minimum consumer basket, underscoring the importance of monitoring and managing these economic factors to safeguard the standard of living. Specifically, increases in negative current account balances are associated with higher costs in the minimum consumer basket, while inflation also contributes to rising living expenses.

From a policy perspective, these insights are crucial for crafting targeted economic strategies aimed at stabilizing prices and managing credit conditions. Effective policy interventions can mitigate the adverse effects on household finances and enhance economic resilience. Additionally, the research provides valuable information for individuals and businesses, enabling better financial planning and resource allocation.

In summary, this study underscores the need for coordinated economic policies and support measures to address the impacts of credit and inflation on the cost of living. By improving our understanding of these relationships, the research contributes to better-informed decision-making and offers pathways for enhancing the economic well-being and stability of Macedonia.

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