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ORIGINAL SCIENTIFIC PAPER

Transport costs in road transport as a determinant of macroeconomic price trends

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Abstract: Road transport plays a central role in supply chains; without efficient logistics, domestic and international markets cannot function smoothly. Transport and logistics costs affect final prices because changes in service tariffs and energy inputs are transmitted into production and distribution costs. This paper examines how road transport costs influence macroeconomic price formation through supply-and-demand mechanisms, focusing on the effects of fuel prices and demand for transport and logistics services on transport-related price dynamics. The study uses monthly and quarterly secondary data from official sources: the Agency for Statistics of Bosnia and Herzegovina (BHAS), the Statistical Office of the Republic of Srpska (RZS RS), the International Road Transport Union (IRU), Eurostat, and BIHAMK. Data were analysed using descriptive statistics, correlation analysis, and a simple regression model (implemented in Excel) to assess the intensity and direction of the relationship between fuel prices and the Consumer Price Index (CPI). Results indicate a statistically significant relationship between fuel prices and CPI movements, while several logistics variables could not be fully examined due to limitations in data availability and inconsistent time frequencies. Multiple regression was not applied for the same reasons. The model explains 55.6% of CPI variability ($R^2 = 0.556$), highlighting transport costs as an important channel in macroeconomic price dynamics and motivating further empirical research with longer, frequency-aligned logistics series.

Keywords: CPI, PPI, road transport, transport costs, international economics

JEL Classification: E31, R41, R48, C32, F14

INTRODUCTION

The subject of this research is the impact of road transport—with a particular emphasis on transport costs, the efficiency and effectiveness of logistics processes, and the economic factors that shape the capacity of the transport services market—on the formation of macroeconomic prices through supply and demand mechanisms. The main research problem concerns how changes in transport costs are associated with price formation at the macroeconomic level. There is an inseparable link between fluctuations in fuel prices, the costs of transport services and logistics, and their impact on total production and distribution costs. When firms are unable to reduce other categories of expenses, increases in the prices of input components may be transmitted into higher prices of final goods or services. However, the existing literature provides insufficient insight into the effects of road transport on macroeconomic prices in economies such as Bosnia and Herzegovina, particularly through the transmission of fuel-related costs.

This paper examines the effects of road transport on market prices of goods and services, with the influence of transport costs being particularly pronounced in international trade, where logistics and cross-border goods flows directly affect competitiveness and price formation on the global market. Additionally, modern logistics systems are characterized by increasing demands for faster delivery, route optimization, greater reliability, and the reduction of operational delays. These factors, together with regulatory frameworks and administrative border barriers, affect the overall efficiency of the transport sector and can lead to fluctuations in supply, which in turn

influence inflationary pressures and price stability. Although numerous international studies analyse the impact of fuel prices on inflation, very few examine this relationship in the context of transport costs in Bosnia and Herzegovina. Although global supply and demand mechanisms shape prices, in small open economies such as Bosnia and Herzegovina the effects of transport costs are more pronounced due to greater import dependence. The literature contains almost no empirical research examining the transmission of road transport costs to macroeconomic prices in Bosnia and Herzegovina.

In the context of globally integrated markets, any disruption in the supply chain has the potential to spill over into macroeconomic developments, particularly in smaller and open economies. One of the key objectives of this paper is to determine how transport, logistics, and road freight influence price movements at the macroeconomic level and contribute to inflationary processes. In this context, the paper has a multidisciplinary character as it integrates transport sciences, logistics management, and macroeconomics. Their mutual synergy shapes economic developments not only within a single national economy but also at the global level, where transport costs represent a key factor of competitiveness and price stability.

The following sections of the paper present the previous research, methodology, results, discussion, and concluding considerations.

PREVIOUS RESEARCH

The literature review is structured into two thematic segments: (1) logistics- and cost-related mechanisms, and (2) the impact of transport inputs on international trade and prices.

Forecasting demand and price movements has always played an important role in business operations. By taking all relevant factors into account, predictive accounting enables the anticipation of financial trends and market dynamics (M. Aleksić, 2015). These foundations form the basis for the application of predictive methods in economic analysis, as timely assessment of changes in demand and costs reduces risk and enhances strategic decision-making. Forecasting models serve as a framework for anticipating the dynamics of economic cycles (M. Landika, 2022). Such models are often integrated into predictive accounting, enabling the formulation of hypotheses about cost transmission along the supply chain and the quantification of their impact on price formation.

The frequency of delivery, just like delivery speed, can serve as a source of competitive advantage (A. Y. Ha, 2003). Increasing the frequency and reliability of deliveries improves the level of service and reduces inventory costs along the supply chain, which directly affects prices and profitability. Faster and more frequent deliveries reduce the inventory held by the buyer (A. Y. Ha, 2003). In this context, transport prices become a key managerial lever: transport costs affect the price, sales volume, and profit of participants in the supply chain (V. Mamonov and V. Poluektov, 2020). Therefore, transport cost management policies are directly linked to a company's financial outcomes, as the management of transport expenses determines profitability within the supply chain (V. Mamonov and V. Poluektov, 2020). In parallel with this, customer requirements reshape the design of logistics systems: customers demand fast and reliable delivery, which directly influences logistics systems. Under such conditions, logistics becomes a crucial factor for both financial and operational efficiency (E. Demir A. S., 2022). Additionally, fuel price volatility and rising transport costs affect international trade, trade flows, and import/export prices, highlighting the need to view transport inputs as determinants of macroeconomic price movements and competitiveness.

Overall, the reviewed studies provide theoretical and empirical background for formulating hypotheses H1a–H1c on cost transmission, delivery performance, and demand-driven transport pricing; however, the expected sign and magnitude of these relationships remain an empirical question in the context of Bosnia and Herzegovina. The broader literature also shows that road freight and logistics costs cannot be reduced to fuel prices alone, because total cost structures additionally depend on transport prices charged to shippers, delivery reliability, the value of time, and cross-border delays, which justifies the inclusion of indicators such as transport price per kilometre, waiting times, and service reliability where such data are available.

Numerous studies in the field of international economics indicate that volatility in fuel prices and transport costs affects international trade, trade flows, and import/export prices. Researchers Hummels and Schaur, in their 2013 study *"Time as a Trade Barrier"*, examine the effect of fuel prices on international trade and export prices. They demonstrate in detail that higher levels of transport costs (including fuel costs) increase export prices and reduce the volume of international trade. Transport costs—particularly fuel price fluctuations—significantly affect international trade flows and export competitiveness, especially in open economies (Hummels & Schaur, 2013). The relationship between fuel prices and international trade has also been examined by numerous scholars, among whom Behar and Venables stand out. In their study entitled *"Transport Costs and International Trade"*, they argue that increases and fluctuations in transport costs reshape the structure of international trade and influence the geographic distribution of trade flows. Fuel price volatility is transmitted through transport costs directly into import and export prices, shaping global trade patterns (Behar & Venables, 2011).

Despite the extensive international literature on the impact of fuel prices on inflation, there are no studies

that simultaneously examine logistics costs, demand for transport services, and macroeconomic prices in the context of Bosnia and Herzegovina. This paper partially fills that gap. At the same time, the international literature generally points to a positive transmission mechanism, whereby higher transport and fuel costs increase trade costs, producer prices, and, eventually, consumer prices. In contrast, the present short-sample result for Bosnia and Herzegovina indicates a statistically significant but negative diesel–CPI relationship, suggesting that the domestic finding should be interpreted as context-specific and short-horizon rather than as a direct contradiction of the broader international evidence.

THE MARKET RELATIONSHIP BETWEEN SUPPLY AND DEMAND

Macroeconomic supply and demand mechanisms operate in a very straightforward manner. The greater the supply in the market, the lower the prices, and vice versa. The same applies from the perspective of demand: when demand for a product increases, its price rises, and when demand decreases, the price falls. When demand exceeds supply, prices increase until equilibrium is reached (N. Lipovec, 2013). Macroeconomic equilibrium occurs at the point where supply and demand "meet," that is, where consumers are willing to pay a certain price for a product and producers are willing to supply the required quantity of goods at that same price. When discussing prices, it is important to note that the prices of individual markets and products are not as simple as the basic supply-and-demand relationship suggests, as they depend on additional factors such as product or service quality, brand, consumer utility, and the availability of substitutes. The supply of a product depends on price, production costs, and the organization of the market (N. Lipovec, 2013). In addition to demand as the primary factor determining market prices, prices are also influenced by operating and production costs, as well as by the prices of all input and output components.

The influence of supplier bargaining power is particularly pronounced in the process of forming the prices of final products. Suppliers with stronger market positions have the ability to drive increases in input prices, given that, as stated by Alpha Capitalis, supplier power is determined by the strength of suppliers and their ability to raise the prices of products or services (Alpha Capitalis, 2017).

If supplier prices begin to fluctuate—such as in the case of transport and logistics—we can expect corresponding fluctuations in the prices of other final goods and services, especially those that depend on transport and logistics. From the perspective of international business and international trade, increases in fuel prices negatively affect export volumes and international trade activity.

The structure of the market influences competitiveness and shapes price dynamics (M. Tomić, 2022). Depending on the number of competitors, the extent of their market share, and the possibilities for product differentiation, different patterns of firm behaviour emerge, which directly affect final prices. In highly competitive markets, companies are forced to maintain lower prices in order to retain consumers, whereas in sectors with fewer suppliers, their bargaining power increases, raising their ability to elevate the prices of products or services.

LOGISTICS IN TRANSPORT AS A FACTOR OF LOW-PRICE COMPETITIVENESS STRATEGY

The optimization of logistics processes reduces overall costs. By optimizing routes and logistics operations, fuel consumption, transport time, and total costs are significantly reduced, which directly increases the efficiency and competitiveness of logistics systems (Prasetyo, 2023). **T**he stability and speed of delivery increase market competitiveness. In the article *"The Role of Logistics in Economic Growth and Global Competitiveness,"* the authors emphasize that logistics performance—including delivery reliability and speed—enhances the competitiveness of economies and improves market efficiency, as higher logistics sub-indices contribute to better goods flow and more stable supply (Bugarčić, 2023).

In modern international markets and business environments, transport logistics is no longer merely an operational function but has evolved into a key strategic instrument that enables companies to remain competitive through low-price strategies. With efficient management of transport processes, it is possible to reduce overall operating costs, accelerate the flow of goods and delivery times, thereby strengthening a company's market position — particularly in markets where price plays a crucial competitive role. The analysis of logistics strategy thus becomes a central component in understanding how companies can achieve stable and competitive prices in both domestic and international markets.

Fuel costs, which represent a key component of logistics expenses, influence the formation of final prices. Transport prices fluctuate the most in relation to fuel prices. If transport prices increase due to higher transport costs, final product prices will also rise—unless market participants find alternative ways, such as reducing production or labour costs, to remain competitive through low-price strategies.

Logistics infrastructure and transport capacity affect the efficiency of market flows. The quality of logistics infrastructure directly influences national competitiveness. Logistics infrastructure, delivery speed, and stable fuel prices are directly linked to low prices and international competitiveness. Conversely, inefficient transport and logistics systems, as well as administrative and bureaucratic barriers, significantly increase transport costs

and thus directly affect competitiveness.The integration of logistics and market strategy strengthens the ability of companies to offer lower prices.

RESEARCH METHODOLOGY

The study employed statistical methods that enabled a clearer understanding of the relationship between transport variables and macroeconomic price movements. First, basic descriptive statistics were conducted to provide an overview of the data—average values, ranges, deviations, and similar indicators. This helped us observe the behaviour of the variables and identify any potential irregularities.

Next, a correlation analysis was conducted with the aim of determining the extent of the relationship between fuel prices and total transport costs, as well as between changes in transport and the movements of the CPI and PPI indices. This analysis served as a solid foundation for the subsequent models.

The main analytical method used in this research was simple linear regression, through which the relationship between fuel prices and movements in the CPI index was examined. In the present model, diesel prices were used as a proxy for transport costs because they were the only frequency-consistent indicator available for the observed period. However, diesel captures only one component of the total logistics cost structure and does not fully reflect operational efficiency, service prices, delivery reliability, or border-related delays. The short time series (n = 22) limits the stability of the regression estimates, particularly the sign and magnitude of the coefficient β□. Multiple regression could not be applied due to the lack of longer time series, inconsistent data frequencies, and the absence of key logistics variables (such as transport price per kilometre, border-crossing waiting times, and delivery reliability indicators). Because of the different frequency levels (monthly CPI and fuel prices versus quarterly logistics series), it was not possible to construct a unified regression specification, as this would compromise the validity of the estimates. For these reasons, descriptive statistics, correlation analysis, and the simple regression model were used as the primary methodological framework for assessing the empirical association between transport-related costs and price movements. Future research should extend the observation period beyond 2024–2025 and incorporate additional logistics indicators in order to improve model specification, reduce omitted-variable bias, and provide a more comprehensive assessment of the transmission mechanism from transport and logistics to consumer prices.

This methodological approach enabled a clearer assessment of the actual contribution of road transport to changes in prices at the macroeconomic level. By including data from international institutions (IRU, Eurostat), a broader insight into the dynamics of transport costs in the international environment was obtained.

RESEARCH OBJECTIVES AND HYPOTHESES

The aim of this research is to identify the key transport-related factors that have a direct or indirect influence on the formation of final product or service prices at the macroeconomic level. One of the ultimate objectives is to determine the actual contribution of road transport to the dynamics of supply, demand, and inflationary movements. In this context, the paper seeks to answer the following questions:

1. In what way do transport costs influence the formation of producer prices?
2. Do changes in logistics—specifically those related to transport time, delivery reliability, and capacity—affect the market supply of products (which, according to macroeconomic principles, consequently influences product prices)?
3. To what extent do fuel prices and depreciation influence the price of transport services?
4. Does the increase in demand for transport services influence inflation?

In accordance with the previously stated research questions, one main hypothesis and four auxiliary hypotheses are proposed:

Main hypothesis:

H1: Road transport costs have a statistically significant contribution to the formation of macroeconomic prices through supply and demand mechanisms. In this study, fuel (diesel) prices are used as a proxy for transport costs due to data limitations.

Auxiliary hypotheses:

H1a: An increase in fuel prices raises total transport costs, which ultimately leads to higher prices of final products at the macroeconomic level.

H1b: Shorter delivery times and greater delivery reliability have a positive effect on reducing the prices of final products and services through macroeconomic mechanisms that increase market supply.

H1c: The increase in demand for transport services has a direct impact on the rise in transport prices, which in turn negatively affects the prices of final goods or services, implying their growth.

For the purposes of this research, secondary data were used, including: the volume of road transport, kilometres driven by freight vehicles, fuel prices, transport costs, the share of fuel in total operating costs, indicators of changes in transport volume, and infrastructure load. The data were collected from the following institutions/web locations: BHAS – Transport 2024 (BiH) (Agency for Statistics of Bosnia and Herzegovina (BHAS), 2025), RZS RS- Road Transport (Q2 2024) (Statistical Office of the Republic of Srpska, 2024), IRU – Foreign Trade Chamber

of Bosnia and Herzegovina (Foreign Trade Chamber of Bosnia and Herzegovina, 2026), BIHAMK – Fuel prices in BiH (BIHAMK, 2026), Costs of road transport– EU vs. BiH (2025) (Logistika.ba, 2025), Eurostat – Transport overview (Eurostat, 2026).

Based on the review of sources and the collected data, the research employed the following dependent and independent variables:

- Dependent variables – CPI – Consumer Price Index (BiH), PPI – Producer Prices
- Independent variables – diesel and gasoline prices (IRU/BIHAMK), ZTransportCost (Logistika.ba), Fightwork (RZS RS/BHAS), Km-Driven – kilometres driven by freight vehicles (RZS RS), InfrastructureIndex – number of vehicles (BHAS/Eurostat), AdminBarriers – border-crossing waiting times (Logistika.ba)

Although logistics variables (t-km, km-driven, administrative barriers) were included in the research framework, limitations in the duration and frequency of the time series did not allow their use in the regression model.

RESULTS OF THE RESEARCH

Table 1. provides a monthly overview of the CPI and diesel prices, allowing us to describe their movements over the observed period. Several phases can be observed in which diesel prices change ahead of, or alongside, changes in the CPI; however, given the short sample and potential lag effects, this descriptive pattern should not be interpreted as a stable transmission mechanism. In periods of stable or declining diesel prices, CPI still shows an upward trend, suggesting that other inflation drivers were present during 2024–2025.

Seasonal oscillations are also possible (e.g., higher fuel demand in certain months), but the overall picture remains the same: changes in diesel prices generally move in line with changes in the CPI, at least partially. This overview served as a motivation to further quantify the relationship through correlation and regression analysis, in order to determine how much of the CPI movement can be explained by transport-related variables. However, the subsequent correlation and regression results for 2024–2025 indicate a negative association between diesel prices and the CPI in this short sample, suggesting that descriptive co-movement patterns should be interpreted with caution.

In short, Table 1 provides a descriptive snapshot that confirms there is a foundation for deeper analysis.

Table 1. Monthly Data: CPI and Diesel Prices

Period	CPI (index)	Diesel (EUR/L, proxy)
2024-01	132.198	1.28
2024-02	132.859	1.28
2024-03	133.258	1.39
2024-04	133.391	1.36
2024-05	133.124	1.43
2024-06	132.459	1.36
2024-07	132.459	1.34
2024-08	133.121	1.34
2024-09	133.254	1.30
2024-10	133.521	1.26
2024-11	134.055	1.20
2024-12	134.591	1.24
2025-01	136.475	1.26
2025-02	137.431	1.29
2025-03	137.431	1.28
2025-04	137.843	1.22
2025-05	138.119	1.15
2025-06	138.533	1.14
2025-07	138.810	1.21
2025-08	138.532	1.21
2025-09	138.809	1.19
2025-10	139.365	1.19

Source: authors

Note: The CPI index is presented on the base '2015 = 100' (according to BHAS methodology).

Table 2. presents the basic descriptive indicators for the observed monthly CPI and diesel price data. This statistics overview provides insight into the average values, variability, and range of the data over the period. Based on the displayed values, it can be seen that the CPI shows relatively stable movement, without major fluctuations, while diesel prices exhibit somewhat more pronounced variability, which is expected given the volatility of the fuel market.

The standard deviation shows that fluctuations in diesel prices are greater compared to the CPI, confirming that fuel is far more sensitive to short-term changes. The minimum and maximum values further indicate the range within which both variables moved. This descriptive analysis served as an important first step, as it provides an overview of the basic structure of the data and helps facilitate the interpretation of later analyses, such as correlation and regression.

Table 2. Descriptive Statistics (Monthly)

Variable	Count	Mean	Std. dev.	Min	25%	50%	75%	Max
CPI	22.000	135.438	2.627	132.198	133.156	134.323	138.050	139.365
Diesel (EUR/L)	22.000	1.269	0.078	1.140	1.210	1.270	1.330	1.430

Source: authors

Table 3. presents the results of the correlation analysis between the CPI index and diesel prices. The obtained correlation coefficient indicates a strong and statistically significant relationship between the CPI and diesel prices; however, the negative sign ($r = -0.746$) suggests that, in the observed sample, higher diesel prices are associated with lower CPI values. This inverse association should not be interpreted as evidence that fuel costs reduce inflation. Rather, it most likely reflects the specific short-run structure of the sample, in which diesel prices broadly normalized after earlier energy-market disturbances while the CPI continued to increase under the influence of other price components, including food prices, regulated prices, and imported cost pressures. In addition, CPI adjustment is typically slower than fuel-price adjustment, so contemporaneous monthly data may capture different phases of the transmission process. For these reasons, the negative sign is better interpreted as a short-horizon empirical pattern than as a stable structural relationship. Although this relationship is not perfect, the value of the coefficient suggests that there is a statistically significant connection, confirming that diesel, as a key input component in transport, plays a role in shaping the broader price structure. This analysis served as a basis for further examination within the regression model.

Table 3. Correlation Between CPI and Diesel Prices

Pair	Correlation (r)
CPI vs Diesel (proxy)	-0.746

Source: authors

The correlation is statistically significant at the level of $p < 0.01$.

Table 4. presents the results of the simple regression model in which the CPI is the dependent variable, while the diesel price is used as the independent variable. The coefficient estimates show that diesel prices are statistically associated with CPI movements, confirming the existence of a linear relationship between these two variables in the observed sample. The R^2 value indicates that part of the variability in the CPI can be explained by changes in diesel prices. However, because the estimated slope is negative and the model is intentionally parsimonious (short sample, no controls), the results should be interpreted as evidence of association rather than a definitive cost-push transmission mechanism.

The coefficient β_1 is statistically significant at the $p < 0.01$ level, and the 95% confidence interval does not include zero, which confirms the existence of a linear relationship.

The negative coefficient should not be interpreted as evidence that higher diesel prices lower consumer prices. A more plausible interpretation is that the result reflects the short time series, the period of diesel-price normalization in 2024–2025, and the omission of other inflation drivers that continued to push the CPI upward even as fuel prices softened. These include food prices, administered or regulated price components, exchange-rate pass-through, and broader imported inflation pressures. In addition, the CPI is a composite index that usually adjusts with a lag relative to energy prices, which means that a contemporaneous regression may identify an inverse short-run co-movement rather than the full cost-push transmission mechanism. For these reasons, the estimated coefficient should be interpreted with caution and as a context-specific short-run result.

Table 5. presents the quarterly indicators of road transport volume in the Republic of Srpska. It is evident that in both observed quarters the index values are below the base level, indicating a reduced volume of transport activities compared to the previous year. Despite slight oscillations, the data show that infrastructure load remains stable. These indicators are important because a decrease in transport volume may signal a decline in economic activity or changes in market structure, which may subsequently be reflected in macroeconomic developments.

Table 5. Quarterly Indicators of Road Transport (RS)

Quarter	Freight t-km (index 2023=100)	KmDriven (index 2023=100)
2024Q2	83.0	98.6
2024Q3	75.5	99.4

Source: authors

These data additionally limit the possibility of testing H1b and H1c, as only two quarters do not allow for the construction of a valid regression model.

Table 4. Regression Results, CPI= β0+ β1*Diesel

Parameter	Estimate (β)	SE(β)	t	Note
β0 (Intercept)	167.358	6.390	26.19	
β1 (Diesel, EUR/L)	-25.152	5.026	-5.00	
R^2	0.556			n = 22

Source: authors

RESULTS DISCUSSION

During the writing of this paper, one main hypothesis and three auxiliary hypotheses were formulated. The following section presents a discussion of the results in relation to the proposed hypotheses. H1: Road transport costs have a statistically significant contribution to the formation of macroeconomic prices through supply and demand mechanisms.

H1: In the model CPI = $\beta_0 + \beta_1 \cdot$Diesel, our coefficient β_1 shows how the CPI moves in relation to changes in diesel prices. In the sample of 22 observations, $R^2 = 0.556$ means that the model explains a substantial part of CPI movements. If β_1 is statistically significant, we can conclude that changes in diesel prices, as one of the main components of road transport costs, influence consumer prices.

H1a is not supported in the observed sample: although the relationship between diesel prices and CPI is statistically significant, the estimated coefficient is negative ($\beta_1 < 0$), which is opposite to the expected cost-push effect; therefore, H1a is not confirmed for 2024–2025 and should be interpreted with caution given the short time series and potential lag/omitted-variable effects.

H1a: We would expect a positive coefficient sign (a cost-push effect), but in our sample β_1 is negative. This finding differs from the dominant pattern in international studies, where higher fuel and transport costs are usually associated with rising trade costs, higher producer prices, and inflationary pressure. A deeper interpretation suggests that the negative coefficient is not economically counterintuitive once the structure of the observed period is taken into account. First, diesel prices in 2024–2025 partly reflected a normalization phase after earlier energy-market disruptions, whereas the CPI continued to rise due to broader inflationary pressures that are not fully captured by fuel prices alone. Second, CPI is a composite indicator and often reacts more slowly than fuel prices, so monthly contemporaneous estimates may capture asynchronous adjustment rather than the true direction of medium-run transmission. Third, diesel is only a proxy for transport costs and does not fully reflect service pricing, logistics bottlenecks, border delays, or the pricing behaviour of firms. Finally, the model does not include other relevant inflation determinants such as food prices, regulated prices, or exchange-rate effects, which may dominate CPI dynamics in a short sample. Therefore, the negative sign should be interpreted as a short-run, context-specific, and partially incomplete estimate rather than as evidence against the broader cost-transmission mechanism. To obtain stronger confirmation of H1a, the time period should be extended and additional variables included, such as food prices, regulated prices, and the exchange rate.

The H1b and H1c hypotheses could not be quantitatively tested due to the lack of longer and frequency-aligned logistics time series (€ / km, waiting times, t-km).

H1b: Shorter delivery times and greater delivery reliability would theoretically be expected to have a positive effect on reducing prices through increased market supply. The quarterly t-km indicators in the Republic of Srpska are lower in Q2 and Q3 2024, indicating a lower volume of transport and reduced pressure on supply. Over a longer period, the expected relationship would be the opposite, as higher t-km values signal more efficient logistics flows and potentially lower prices. For a formal test of H1b, longer and consistent quarterly time series are required (e.g., CPI/PPI ~ diesel + t-km + km-driven).

H1c: Theoretically, an increase in the demand for transport services raises transport prices, which negatively affects the final prices of goods and services. However, H1c could not be quantitatively tested because time series data for transport price per kilometre (€ / km), border-crossing waiting times, and delivery reliability are not available in a sufficiently long and frequency-aligned form. Including these variables would expand the model beyond fuel costs alone and would likely explain a larger portion of the variance in the CPI, because logistics performance depends not only on energy inputs but also on time, reliability, and service pricing. Their omission should therefore be treated as an important limitation of the current specification and a key avenue for future research.

The obtained findings have implications not only for the domestic economy but also for international trade flows, given that transport costs represent a key element of export competitiveness. Overall, the results confirm the existence of a partial transmission mechanism through which fuel costs affect macroeconomic prices, while logistics-related factors remain unassessed due to limitations in data availability. From a policy perspective, these findings suggest three priorities. First, economic authorities and statistical institutions should improve the regular collection of transport and logistics indicators—especially transport prices per kilometre, border-crossing waiting times, and delivery reliability—in order to support evidence-based inflation and competitiveness analysis. Second, transport and trade policy should focus on reducing administrative and border-related delays, since time losses in logistics can raise effective transport costs even when fuel prices are stable or declining. Third, firms and sectoral regulators should treat transport cost management as part of wider price-stability policy, because better route planning, more reliable delivery systems, and lower operational bottlenecks can reduce cost pressures transmitted to final prices.

SCIENTIFIC CONTRIBUTION AND RECOMMENDATIONS FOR FURTHER RESEARCH

Within the conducted research, one main hypothesis and a set of auxiliary hypotheses were defined, guiding the analytical approach and the methodological framework of the study. The obtained results provide additional insight into the degree and direction of the influence of road transport, logistics, and fuel costs on macroeconomic price movements and international trade, highlighting the interconnectedness of logistics and transport with final prices in both the international and domestic economy. This paper represents one of the rare empirical attempts to quantify the relationship between fuel costs and the CPI in Bosnia and Herzegovina using official monthly data.

For this reason, the paper highlights the scientific contribution of the conducted analyses and identifies areas that open the door to new research studies and projects aimed at fully understanding the mechanisms underlying the proposed hypotheses. The paper fills a gap in the literature identified in previous research, as it is the first to integrate transport variables, logistics constraints, and CPI movements for Bosnia and Herzegovina.

The obtained results confirm that logistics and transport costs have a direct and dynamic influence on the formation of macroeconomic prices, which makes this paper an important contribution to understanding their interaction with market supply-and-demand mechanisms. Although some of the hypotheses were only partially confirmed, the analyses also indicated the presence of factors whose effects are more subtle or time-lagged, which further highlights the complexity of the relationship between logistics variables and price movements. The key contribution of the paper is the empirical confirmation of transport costs as a determinant of macroeconomic prices in Bosnia and Herzegovina. In practical terms, this means that policy aimed at price stability should not be limited to traditional macroeconomic instruments alone, but should also include measures that improve transport efficiency, lower border frictions, and strengthen logistics performance. More efficient transport systems can support both domestic price stability and external trade competitiveness.

CONCLUSION

The aim of this research is to examine the impact of road transport—with particular emphasis on transport and logistics costs in terms of efficiency—on the formation of macroeconomic prices and prices on international markets through supply and demand mechanisms. In international economics, where supply chains are longer and more complex, changes in transport costs exert an even stronger inflationary effect, which further confirms the relevance of this research.

The research confirms that road transport costs make a statistically significant contribution to macroeconomic price formation through supply-and-demand mechanisms. However, in the observed sample the expected cost-push channel from higher fuel prices to higher consumer prices (H1a) is not supported, because the estimated relationship between diesel prices and the CPI is statistically significant but negative. To verify hypothesis H1b — which states that *"shorter delivery times and greater delivery reliability have a positive effect on reducing the prices of final products and services through macroeconomic mechanisms that increase market supply"* — longer and frequency-aligned time series are required; therefore, this hypothesis remains untested.

Hypothesis H1c referred to the impact of increasing demand for transport services on the rise in transport prices and, consequently, on macroeconomic prices of final products. However, its full empirical verification could not be carried out. The reasons for this lie in the lack of time series for key variables (time series for transport prices per kilometre and border-crossing waiting times), and the variables reflecting transport demand were not available in sufficient scope (they covered only a short period—two quarters). For this reason, it was not possible to construct a regression model that would validly estimate the effect of rising demand on increases in transport and final prices.

Status of hypotheses

- H1: confirmed (statistically significant association between diesel prices and CPI)
- H1a: not supported (estimated coefficient is negative, opposite to the expected cost-push effect)
- H1b: not tested (insufficient time series / frequency mismatch)
- H1c: not tested (no time series for transport price per km and border-crossing waiting times)

Overall, the results confirm that fuel costs represent a key transmission channel through which road transport affects macroeconomic prices in Bosnia and Herzegovina. However, unlike the dominant pattern reported in international studies, the short-sample result for Bosnia and Herzegovina indicates a negative diesel–CPI association. This inverse relationship should not be interpreted as evidence that higher diesel prices reduce inflation; rather, it is more plausibly explained by the short observation period, lagged CPI adjustment, post-crisis diesel-price normalization, and the omission of other inflation drivers that remained active during 2024–2025. The result should therefore be interpreted cautiously as a short-run and context-dependent outcome rather than as evidence against the broader positive cost-transmission mechanism documented in the literature.

In future research, it would be useful to expand the available data, particularly those related to transport prices and border-crossing delays, so that the hypotheses can be fully tested. It would also be valuable to include

longer time series and additional logistics indicators, as this would provide a clearer picture of how transport and logistics influence price movements. In particular, future work should incorporate indicators such as transport price per kilometre (€ / km), freight volume (t-km), kilometres driven, border-crossing waiting times, and delivery reliability wherever such data become available in frequency-aligned form. These variables would allow logistics to be measured more comprehensively than through diesel prices alone and would improve the explanatory power and economic interpretation of the model. These steps would contribute to more reliable analyses and a deeper understanding of the relationships that were only partially confirmed in this study. Future research should focus on extending the observation period beyond 2024–2025 and collecting longer, frequency-aligned logistics time series (€ / km, t-km, waiting times), which would enable the construction of multiple regression models, more robust testing of lagged effects, and the full verification of the auxiliary hypotheses. From a policy standpoint, the findings also indicate that improving logistics statistics, reducing border and administrative delays, and promoting more efficient transport operations could support both inflation monitoring and competitiveness policy in Bosnia and Herzegovina.

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