

COMMODITY PRICES AND MACROECONOMIC VULNERABILITY: A DESCRIPTIVE ANALYSIS OF THE TERMS OF TRADE IN THE TURKIC REPUBLICS (2000–2023)

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Abstract. This study descriptively examines the differentiated macroeconomic effects of global commodity price fluctuations on six Turkic Republics—Türkiye, Azerbaijan, Kazakhstan, Uzbekistan, Turkmenistan, and Kyrgyzstan. The primary objective of the study is to reveal the divergence in responses of net commodity-exporting and net commodity-importing economies to common price shocks by focusing on the Net Barter Terms of Trade Index, which represents the direct macroeconomic manifestation of commodity price movements. The dataset is compiled from the World Bank's World Development Indicators and covers the period from 2000 to 2023. It includes indicators related to terms of trade, trade openness, international reserves, GDP growth, external debt stock, and inflation. The analysis employs trend analysis, period (regime) comparisons, volatility measurements based on the coefficient of variation, and descriptive co-movement analysis. The findings indicate that terms-of-trade volatility in commodity-exporting economies (Turkmenistan, Azerbaijan, and Kazakhstan) is approximately four to five times higher than that observed in commodity-importing Türkiye. During the 2022 energy shock, the same global price movement generated substantial gains for exporting economies (reaching +268% in Turkmenistan), whereas Türkiye experienced significant losses (−24%). While a positive descriptive co-movement between terms of trade and economic growth is observed in exporting economies, periods of commodity price collapse are associated with sharp contractions in economic growth. The study offers concrete policy implications, including the establishment of stabilization funds, the adoption of countercyclical policies based on fiscal rules, and the diversification of energy supply sources. Given its descriptive research design, the study does not claim causality; rather, it proposes an econometric research agenda for future investigations.

Keywords: *Commodity Prices, Terms of Trade, Macroeconomic Vulnerability, Turkic Republics, Resource Curse, Descriptive Analysis*

JEL Classification Codes: *F14, Q33, Q43, F43, O53*

1. Introduction

Commodity prices are among the most volatile macroeconomic variables in the global economy and constitute a major source of external shocks, particularly for economies whose production structures depend on a narrow basket of commodities. The commodity supercycle that began with the demand boom led by China in the early 2000s, the abrupt collapse during the 2008 global financial crisis, the high-price plateau of 2011–2014, the sharp decline in oil and metal prices between 2014 and 2016, and, finally, the energy price surge of 2021–2022 following the economic slowdown caused by the COVID-19 pandemic, have collectively generated successive and powerful commodity price regimes over the past quarter century. These regimes have affected commodity-exporting and commodity-importing economies in opposite directions, reshaping external balances, public revenues, exchange rates, and economic growth.

The Turkic Republics provide an exceptionally suitable natural experiment for examining this mechanism. Sharing a common historical and institutional legacy, as well as an increasingly deep framework of regional cooperation through the Organization of Turkic States, these six economies exhibit substantial divergence in terms of commodity dependence. Azerbaijan, Kazakhstan, and Turkmenistan are resource-intensive economies reliant on hydrocarbon (oil and natural gas) exports; Uzbekistan is a moderate resource exporter specializing in gold, natural gas, and cotton; Kyrgyzstan, although a gold exporter, remains dependent on imports of energy and manufactured goods; whereas Türkiye is a relatively diversified, industry- and service-oriented net commodity importer that relies on imports for nearly all of its energy needs. Observing the impact of the same global price shock across these structurally distinct economies simultaneously makes it possible to identify both the direction and magnitude of the relationship between commodity prices and macroeconomic performance.

The existing literature has largely examined the macroeconomic effects of commodity price shocks through single-country case studies or broad panels of developing economies, predominantly employing econometric methodologies. By contrast, studies that systematically and comparatively analyze the Turkic Republics—countries that share a common cultural and institutional framework while occupying contrasting positions in commodity markets—through the lens of terms of trade, which directly reflect commodity price dynamics, remain limited. This study seeks to fill this gap by employing a descriptive analytical framework structured around commodity price regimes and based on a recent and consistent dataset covering the period 2000–2023.

The study addresses the following research questions: (i) How have the terms of trade of the Turkic Republics evolved across different commodity price regimes? (ii) To what extent does terms-of-trade volatility differ between commodity-exporting and commodity-importing economies? (iii) How have common price shocks—particularly the 2022 energy shock—generated divergent outcomes across these economies? (iv) How are movements in the terms of trade descriptively associated with macroeconomic indicators such as economic growth, external debt, international reserves, and inflation?

The study makes three primary contributions. First, it examines the commodity price issue within a common regional cluster—the Turkic Republics—through the exporter–importer distinction and by directly utilizing the terms-of-trade indicator. Second, the analysis is structured around six sub-periods corresponding to major global commodity price regimes, thereby enabling a systematic comparison of crises and structural turning points. Third, all descriptive statistics and visualizations are derived from a single, recent, and consistent data source—the World Bank—thereby providing a transparent and reproducible analytical framework. The study does not employ econometric estimation; rather, it seeks to identify trends, divergences, and patterns through the systematic examination of the available data.

The remainder of the paper is organized as follows. The second section presents the relevant theoretical approaches and contemporary empirical literature in an integrated manner. The third section describes the dataset, variables, and descriptive research design. The fourth section interprets the findings in detail through figures and tables. Finally, the fifth section synthesizes the main conclusions, develops specific policy recommendations, and discusses the limitations of the study as well as directions for future research.

2. Literature Review and Conceptual Framework

The theoretical framework concerning the macroeconomic effects of commodity prices is primarily rooted in two classical strands of economic thought. The first is the Prebisch–Singer hypothesis, which argues that the terms of trade of primary commodity exporters tend to deteriorate over the long run in favor of manufactured goods (Prebisch, 1950; Singer, 1950). This perspective conceptualizes commodity dependence as a structural vulnerability. The

second is the Dutch Disease model, which demonstrates that sudden increases in resource revenues can appreciate the real exchange rate and weaken the tradable manufacturing sector (Corden & Neary, 1982). These two frameworks converge within the broader resource curse literature, which contends that natural resource abundance, when combined with weak institutions and procyclical fiscal policies, may undermine long-term economic growth (van der Ploeg, 2011; Frankel, 2012).

In the empirical literature, the transmission channels of commodity price shocks are largely defined through movements in the terms of trade. Since the pioneering work of Mendoza (1997), a recurring finding has been that terms-of-trade volatility adversely affects economic growth, and recent evidence continues to support this relationship. For example, panel analyses conducted for Sub-Saharan Africa demonstrate that terms-of-trade volatility erodes both the tax base and per capita economic growth (Kweka, 2024). Studies examining the effects of productivity shocks on terms of trade in developing economies suggest that countries with greater technological sophistication may exhibit higher vulnerability in their terms of trade (Tuğan, 2024). On a broader scale, it has been documented that global demand shocks account for approximately 50 percent of commodity price variance, while global supply shocks explain roughly 20 percent. Global macroeconomic shocks have emerged as the principal source of short-term commodity price volatility over the past quarter century, implying that policy responses should be tailored to country-specific terms-of-trade conditions (World Bank, 2022).

The direction of these shocks depends fundamentally on a country's commodity trade balance. Recent evidence indicates that net commodity importers experience stronger inflation pass-through effects and sharper declines in industrial production following commodity supply shocks, whereas net exporters remain partially insulated from such adverse impacts (CEPR, 2026). Evidence from the United States and China further demonstrates that international commodity price shocks are transmitted asymmetrically to macroeconomic fundamentals (Qian, Zhang, & Li, 2023). This asymmetry constitutes the theoretical foundation for the exporter–importer divergence that forms the core focus of the present study.

The regional literature has extensively examined manifestations of the resource curse and Dutch Disease within the resource-rich Turkic Republics. In the case of Azerbaijan, empirical evidence suggests that oil revenues have appreciated the real exchange rate and weakened non-oil tradable sectors (Hasanov, 2013; Niftiyev, 2021). Recent descriptive reviews comparing groups of oil-exporting countries indicate that resource-rich developing economies, particularly those in the Middle East and North Africa (MENA) region and Sub-Saharan Africa, often exhibit weaker performance across various development indicators, although the empirical evidence has yet to reach a definitive consensus (Alssadek & Benhin, 2023). The literature emphasizes that outcomes are largely contingent upon institutional quality. The adverse effects of resource dependence tend to be more severe in countries characterized by weak institutions, ineffective legal systems, and high levels of corruption (van der Ploeg, 2011). Within this context, stabilization funds—particularly sovereign wealth funds—have gained prominence. Panel evidence demonstrates that such funds reduce fiscal volatility associated with commodity price fluctuations and contribute to the stabilization of public expenditures (International Monetary Fund, 2023; Kitano, 2023). Similarly, the World Bank highlights the role of fiscal rules and sovereign wealth funds in enabling countercyclical fiscal policy behavior (World Bank, 2024; Arroyo Marioli & Vasishtha, 2024).

With regard to Türkiye, the literature largely agrees that energy imports constitute the principal driver of the country's chronic current account deficit. Studies show that Türkiye's current account balance generally records a surplus when energy imports are excluded, whereas a significant deficit emerges when energy imports are included (Central Bank of the Republic of Türkiye, 2023). From the perspective of regional cooperation, the objectives of the Organization of Turkic States to deepen trade and energy integration (Organization of Turkic

States, 2024), together with the increasing economic resilience of Central Asia (International Monetary Fund, 2024), continue to shape the contemporary policy agenda. While the existing literature predominantly relies on single-country econometric analyses or large cross-country panels, there remains a notable absence of studies that comparatively and descriptively integrate these six economies—which share a common institutional framework yet occupy contrasting positions within global commodity markets—through the lens of commodity price regimes. This paper seeks to address that gap.

3. Dataset and Research Design

The dataset employed in this study was compiled from the World Bank's *World Development Indicators* (WDI) database (World Bank, 2026). The sample consists of six Turkic Republics—Türkiye, Azerbaijan, Kazakhstan, Uzbekistan, Turkmenistan, and Kyrgyzstan. The period of analysis is defined as 2000–2023, corresponding to the timeframe for which terms-of-trade data are consistently available across all countries included in the sample. For certain macroeconomic indicators, data extend through 2024, and this extended coverage has been utilized in the relevant figures and visualizations where appropriate. Variable definitions, units of measurement, and data sources are presented in Table 1.

Table 1

Variable Definitions, Units of Measurement, and Data Sources

Variable	Definition	Unit of Measurement	Source
Terms of Trade	Net Barter Terms of Trade Index (ratio of export prices to import prices)	Index (2015 = 100)	WDI (TT.PRI.MRCH.XD.WD)
Trade Openness	Ratio of total trade in goods and services (exports + imports) to GDP	% of GDP	WDI (NE.TRD.GNFS.ZS)
International Reserves	Total reserves, including gold	Current U.S. dollars	WDI (FI.RES.TOTL.CD)
Economic Growth	Annual percentage change in real GDP	Annual %	WDI (NY.GDP.MKTP.KD.ZG)
External Debt Stock	Ratio of total external debt stock to GNI	% of GNI	WDI (DT.DOD.DECT.GN.ZS)
Inflation	Annual percentage change in consumer prices	Annual %	WDI (FP.CPI.TOTL.ZG)

Note: The Real Effective Exchange Rate (REER) indicator (PX.REX.REER) was not included in the analysis due to the absence of consistent WDI data for all sample countries. External debt statistics are available only for low- and middle-income economies and are reported accordingly.

The study adopts the Net Barter Terms of Trade Index as the primary macroeconomic proxy for commodity price movements. This index measures the ratio of a country's export prices to its import prices. Consequently, it tends to increase in commodity-exporting economies as global commodity prices rise, whereas it declines in net commodity-importing economies due to increasing import prices. This characteristic makes the terms of trade a natural indicator for assessing the welfare effects of commodity price shocks at the country level.

The analysis relies exclusively on descriptive methods; no regression analysis, causality testing, or cointegration estimation is conducted. The descriptive tools employed in the study include: (i) time-series trend analysis; (ii) comparisons of period averages across six sub-periods corresponding to major global commodity price regimes—namely, the 2000–2007 commodity supercycle expansion, the 2008–2009 global financial crisis, the 2010–2014 high-price plateau, the 2015–2016 commodity price collapse, the 2017–2019 recovery period, and the 2020–2023 pandemic and energy shock period; (iii) the coefficient of variation (the ratio of the standard deviation to the mean) as a measure of volatility; (iv) percentage-change calculations and inter-period comparisons; and (v) simple correlation coefficients indicating contemporaneous co-movements, used solely for descriptive purposes. All statistical

calculations and graphical representations are derived directly from raw data. No values have been estimated, imputed, or otherwise derived through statistical modeling.

4. Findings and Discussion

This section presents the descriptive findings through five figures and three tables. Each visual element is not only introduced but also evaluated from both economic and institutional perspectives. The analysis begins with the evolution of the terms of trade—the study’s primary indicator—over time, followed by an examination of volatility and period-specific divergences. Finally, the descriptive relationships between the terms of trade and selected indicators of macroeconomic vulnerability are explored.

4.1. Trends in the Terms of Trade and Descriptive Statistics

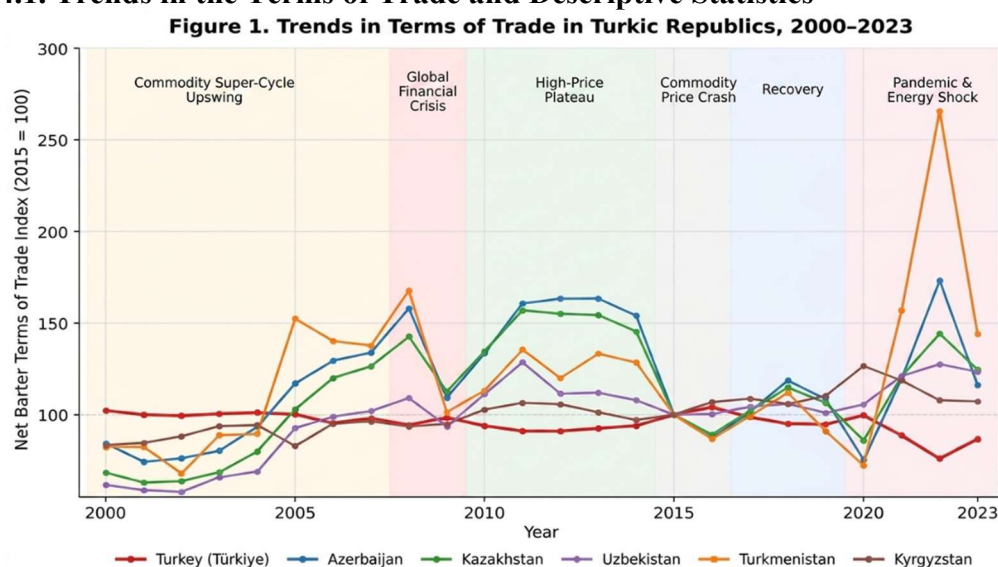


Figure 1. Evolution of the Terms of Trade in the Turkic Republics, 2000–2023. Source: *Compiled and calculated by the author using data from the World Bank’s World Development Indicators (WDI) database.*

Figure 1 demonstrates that the terms of trade of the three commodity-exporting economies—Azerbaijan, Kazakhstan, and Turkmenistan—fluctuate strongly in line with global commodity price movements. The index reaches its peaks during the 2008 oil price surge and the 2011–2013 high-price plateau, declines sharply in 2009 and again during the 2015–2016 commodity price downturn, and rises dramatically once more during the 2021–2022 energy price boom. In contrast, Türkiye’s terms of trade remain at a relatively low level and exhibit a downward trend, consistent with its status as a net commodity importer. Notably, as global energy prices reached their peak in 2022, Türkiye’s index declined to its lowest value of the entire period (76.0). Kyrgyzstan’s terms of trade, by comparison, display a relatively stable trajectory. Particularly noteworthy is the increase observed in 2020, when rising gold prices—driven by safe-haven demand—boosted the country’s terms of trade, while those of other commodity exporters were declining.

Table 2

Descriptive Statistics of Key Variables, 2000–2023

Indicator / Country	Mean	Std. Dev.	Minimum	Maximum	Coefficient of Variation (%)	Observations
Terms of Trade (Index)						
Türkiye	95.7	6.1	76.0	104.0	6.4	24
Azerbaijan	118.0	31.6	74.3	173.3	26.7	24

Indicator / Country	Mean	Std. Dev.	Minimum	Maximum	Coefficient of Variation (%)	Observations
Kazakhstan	111.8	30.2	63.0	157.0	27.0	24
Uzbekistan	98.7	21.2	58.0	128.6	21.4	24
Turkmenistan	119.6	42.0	68.0	265.7	35.2	24
Kyrgyzstan	100.5	10.7	82.9	126.6	10.6	24

Note: The coefficient of variation (CV) is computed as (standard deviation divided by the mean) $\times 100$. All calculations are derived from data obtained from the World Bank's **World Development Indicators (WDI)** database.

Table 2 quantifies the striking divergence in terms-of-trade volatility across the sample countries. The coefficient of variation (a measure of volatility) reaches 35.2% in Turkmenistan, 27.0% in Kazakhstan, and 26.7% in Azerbaijan, whereas it is only 6.4% in net commodity-importing Türkiye and 10.6% in the relatively diversified economy of Kyrgyzstan. In other words, the volatility of the terms of trade in hydrocarbon-exporting economies is approximately four to five times greater than that observed in importing Türkiye. This pattern is fully consistent with the theoretical expectation that commodity dependence constitutes a structural source of volatility (Mendoza, 1997; World Bank, 2022). The average levels are equally informative. While the average terms-of-trade index of the exporting economies remains within the range of 110–120, reflecting the predominance of gain periods, Türkiye records an average value of 95.7, remaining below the base value. This finding further highlights the asymmetrical effects of commodity price movements on exporting and importing economies.

4.2. Divergent Outcomes of Common Shocks: The 2022 Energy Shock.

Figure 2. Change in Terms of Trade Index in 2022 Energy/Commodity Shock (2020→2022)

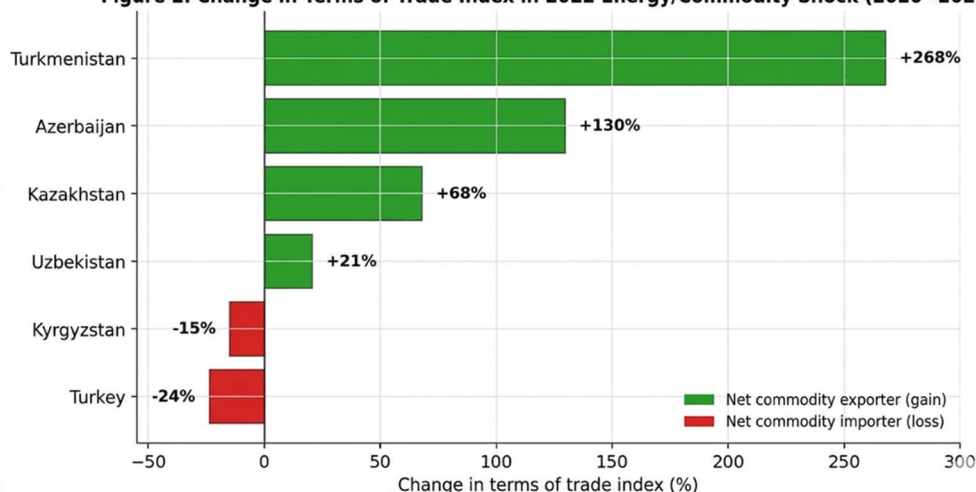


Figure 2. Changes in the Terms of Trade During the 2022 Energy and Commodity Price Shock (2020–2022).

Source: *Compiled and calculated by the author using data from the World Bank's World Development Indicators (WDI) database.*

Figure 2 provides the clearest illustration of how the same global shock can generate divergent outcomes across economies. During the energy price surge triggered by the Russia–Ukraine war in 2022, the terms of trade of natural gas-exporting Turkmenistan increased by 268% relative to 2020, with the index rising from 72.2 to 265.7. Over the same period, the terms of trade increased by 130% in Azerbaijan, 68% in Kazakhstan, and 21% in Uzbekistan. In contrast, the terms of trade of net energy-importing Türkiye declined by 24%, while Kyrgyzstan experienced a decrease of 15%.

This divergence is further corroborated by institutional evidence. Türkiye's energy trade deficit surged from USD 42.4 billion to USD 81.1 billion in 2022, becoming the principal driver

of the country's current account deficit (Central Bank of the Republic of Türkiye, 2023). Consequently, a single global price movement translates into an extraordinary income gain for commodity-exporting economies, while simultaneously generating a cost shock that undermines external balance in importing economies. This finding is consistent with recent evidence indicating that net commodity importers are exposed to stronger inflationary pressures and more severe external balance constraints following commodity price shocks (CEPR, 2026).

4.3. Period-Specific Divergence Across Commodity Price Regimes.

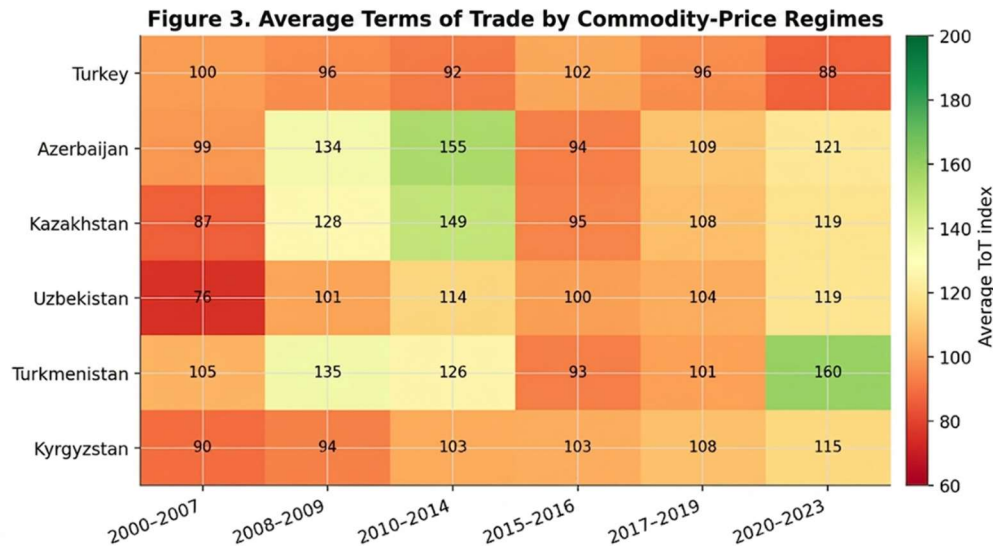


Figure 3. Average Terms of Trade by Commodity Price Regime. Source: *Compiled and calculated by the author using data from the World Bank's World Development Indicators (WDI) database.*

The heat map presented in Figure 3 summarizes the average terms of trade across six distinct commodity price regimes. For the commodity-exporting economies, the high-price plateau period (2010–2014) represents the most favorable phase, with Azerbaijan reaching an average index value of 155 and Kazakhstan attaining 149. During the commodity price collapse period (2015–2016), these values declined to approximately baseline levels (around 93–95). In the pandemic and energy shock period of 2020–2023, the average terms-of-trade index for Turkmenistan surged to 160, whereas Türkiye's average fell to 88—the lowest level recorded across all periods. This contrast clearly illustrates that periods of gain for commodity exporters coincide with periods of loss for commodity importers. More broadly, it demonstrates how commodity price fluctuations can exert opposing effects on the distribution of economic welfare within the region.

Table 3

Period Averages: Terms of Trade and GDP Growth.						
Period	Türkiye	Azerbaijan	Kazakhstan	Uzbekistan	Turkmenistan	Kyrgyzstan
Terms of Trade (Average Index)						
2000–2007	99.7	98.7	86.7	75.9	105.2	89.9
2008–2009	96.4	133.7	127.7	101.3	134.6	94.2
2010–2014	92.5	155.0	149.4	114.2	126.1	102.7
2015–2016	102.0	93.5	94.5	100.2	93.4	103.4

Period	Türkiye	Azerbaijan	Kazakhstan	Uzbekistan	Turkmenistan	Kyrgyzstan
2017–2019	96.1	109.4	107.7	103.7	100.7	108.3
2020–2023	87.7	121.2	119.0	119.4	159.7	115.0
GDP Growth (Annual Average, %)						
2000–2007	5.6	17.2	10.2	5.9	6.7	4.5
2008–2009	–2.0	10.0	2.3	8.5	10.4	5.6
2010–2014	7.5	2.8	5.9	7.3	11.1	4.1
2015–2016	4.6	–1.0	1.2	6.6	6.4	4.1
2017–2019	4.2	1.4	4.2	5.6	6.3	4.4
2020–2023	6.0	1.9	2.5	5.5	6.2	4.1

Note: Period-specific averages are computed from annual observations derived from the World Bank's **World Development Indicators (WDI)** database. Negative values are reported with a minus sign.

Table 3 descriptively illustrates how terms-of-trade regimes are reflected in economic growth performance. In Azerbaijan, the exceptionally high growth recorded during the commodity supercycle years (an average of 17.2% during 2000–2007, with a peak of 34.5% in 2006) coincided with the surge in oil revenues. However, during the commodity price collapse period (2015–2016), average economic growth declined to –1.0%. Turkmenistan similarly achieved strong growth performance both during the supercycle period and in the wake of the 2022 energy shock. In contrast, Türkiye's economic growth fluctuated largely in response to domestic demand conditions and financial factors, displaying a relatively weaker association with movements in the terms of trade. During the 2008–2009 global financial crisis, the country's average growth rate declined to –2.0%. This pattern suggests that economic growth in commodity-exporting economies is closely tied to commodity price cycles, whereas growth dynamics in commodity-importing economies are driven by a different set of underlying factors.

Figure 4. Terms of Trade and Economic Growth: Exporter (Turkmenistan) vs. Importer (Turkey)

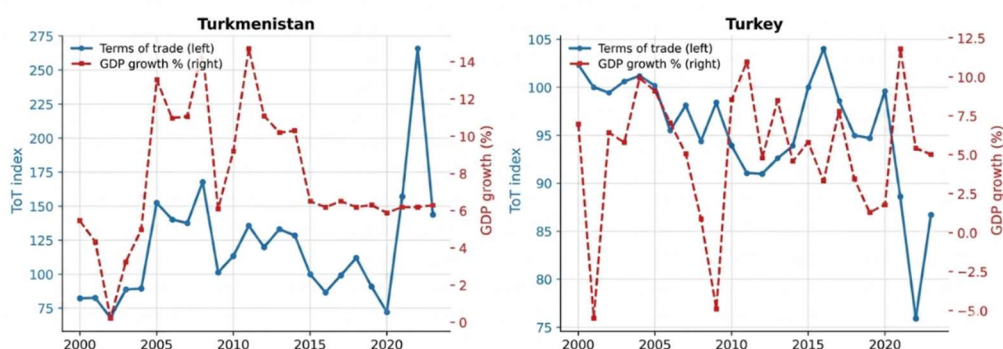


Figure 4. Comparative Dynamics of Terms of Trade and Economic Growth: Turkmenistan (Commodity Exporter) versus Türkiye (Commodity Importer). Source: Compiled and calculated by the author using data from the World Bank's World Development Indicators (WDI) database.

Figure 4 provides a direct comparison between the two extremes of the sample. In Turkmenistan, the terms of trade and economic growth exhibit a clear pattern of co-movement. The contemporaneous correlation coefficient, calculated solely for descriptive purposes, is +0.45 (compared with +0.44 in Uzbekistan). In contrast, this co-movement is weak and negative in Türkiye (–0.18) and Kazakhstan (–0.28).

It should be emphasized that these descriptive correlation coefficients do not imply causality. Nevertheless, they provide a consistent descriptive picture indicating that economic growth in commodity-exporting economies is closely associated with commodity price cycles, whereas this transmission channel appears considerably less pronounced in commodity-importing economies.

4.4. Indicators of Macroeconomic Vulnerability.

Figure 5. Macroeconomic Vulnerability Indicators, 2000–2024

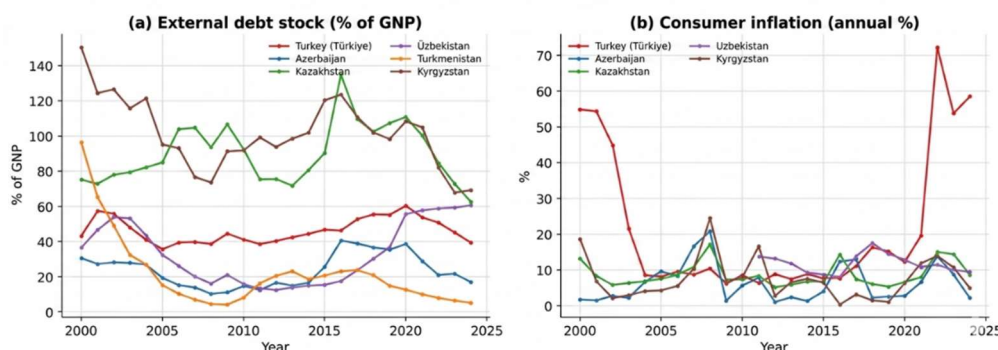


Figure 5. Macroeconomic Vulnerability Indicators: External Debt and Consumer Price Inflation, 2000–2024.

Source: *Compiled and calculated by the author using data from the World Bank's World Development Indicators (WDI) database.*

Figure 5(a) illustrates how commodity revenues shape external debt dynamics. Turkmenistan's external debt declined dramatically from 96.3% in 2000 to 4.2% in 2008 as natural gas revenues were used to repay debt, and it remained at an average of 9.3% during the 2020–2023 period. This pattern suggests that resource revenues were effectively utilized for debt reduction. In contrast, Kazakhstan stands out with persistently high levels of external debt, averaging 91.3% and reaching 134.8% in 2016, reflecting large-scale resource investments financed through borrowing. Uzbekistan's external debt increased sharply during the post-2017 reform and economic liberalization period, rising from 12.5% in 2012 to 59.4% in 2023. Figure 5(b) highlights the divergence in inflation performance across the sample countries. Türkiye experienced notably elevated inflation, driven by country-specific monetary policy conditions and exchange rate developments, reaching 72.3% in 2022 and averaging 39.5% over the 2020–2023 period. This pattern is consistent with the dynamics of a net energy-importing economy, where rising energy import costs contribute to cost-push inflationary pressures (Central Bank of the Republic of Türkiye, 2023).

With regard to international reserves, Türkiye possesses by far the largest buffer in the region, averaging USD 84.7 billion and reaching USD 140.9 billion in 2023. Commodity-exporting economies, by contrast, accumulated their reserves primarily during the commodity supercycle years. Overall, the findings descriptively demonstrate that commodity prices constitute a dual source of macroeconomic vulnerability: in exporting economies, they drive income and debt dynamics, whereas in importing economies they primarily influence external balances and inflationary pressures. This interpretation is consistent with recent evidence emphasizing the role of stabilization funds and countercyclical fiscal frameworks in mitigating macroeconomic vulnerability (International Monetary Fund, 2023; World Bank, 2024).

5. Conclusion and Policy Recommendations

This study descriptively examined the differentiated effects of global commodity price fluctuations on six Turkic Republics through the direct lens of the terms of trade indicator. The findings present a consistent picture. Terms-of-trade volatility in commodity-exporting economies (Turkmenistan, Azerbaijan, and Kazakhstan) is approximately four to five times greater than that observed in net commodity-importing Türkiye. The same global shock—the 2022 energy price surge—generated extraordinary gains for exporters while producing losses that undermined external balances in the importing economy. Furthermore, economic growth in exporting countries is closely linked to commodity price cycles, while resource revenues play a significant role in shaping external debt and reserve dynamics. These patterns are consistent with the structural vulnerability arguments advanced in the Prebisch–Singer hypothesis and the resource curse literature (Prebisch, 1950; van der Ploeg, 2011), as well as with recent empirical

evidence (World Bank, 2024; CEPR, 2026). The principal policy implication of the study is that commodity dependence requires differentiated and targeted policy frameworks according to both its direction (exporter versus importer) and degree.

The following policy recommendations are derived from the findings:

1. Strengthening stabilization and savings funds: Commodity-exporting economies such as Azerbaijan (SOFAZ) and Kazakhstan (National Fund) should tighten price-linked accumulation and withdrawal rules by requiring that a minimum predetermined share of revenues generated during high-price periods be transferred to stabilization funds. Panel evidence suggests that such funds effectively reduce fiscal volatility (International Monetary Fund, 2023).

2. Countercyclical fiscal policy through numerical fiscal rules: Exporting economies should anchor public expenditures to measurable structural balance or expenditure growth rules in order to prevent commodity supercycle gains from translating into procyclical spending patterns (World Bank, 2024; Arroyo Marioli & Vasishtha, 2024).

3. Energy supply diversification and renewable energy investment in importing economies: To reduce terms-of-trade vulnerability, Türkiye should expand renewable energy capacity and domestic energy production (e.g., Black Sea natural gas resources) through clearly measurable targets. The energy trade deficit, which reached USD 81.1 billion in 2022, underscores the urgency of this priority (Central Bank of the Republic of Türkiye, 2023).

4. Diversification of the export base: Hydrocarbon-exporting economies should support non-oil tradable sectors through measurable export diversification targets in order to mitigate the risk of Dutch disease (Hasanov, 2013). This priority is particularly critical for Uzbekistan during its ongoing reform and economic transformation process.

5. Prudent management of external debt and reserve buffers: Kazakhstan, which maintains high levels of external indebtedness, and Uzbekistan, where external debt has increased rapidly, should adopt debt-management strategies that strengthen resilience to export revenue volatility through appropriate maturity structures and currency composition policies. Meanwhile, Türkiye should preserve its reserve buffer, which reached USD 140.9 billion in 2023.

6. Deepening regional cooperation: Within the framework of the Organization of Turkic States, the expansion of energy trade, joint procurement mechanisms, and intra-regional trade (with a target of USD 100 billion by 2025) could enhance collective resilience to common price shocks by fostering complementary linkages between exporting and importing member states (Organization of Turkic States, 2024).

The limitations of the study should be explicitly acknowledged. First, the research design is entirely descriptive; therefore, the observed co-movements and statistical coefficients do not imply causality. Second, the absence of real effective exchange rate data for the sample countries precluded a direct examination of the exchange-rate channel of Dutch disease. In addition, data limitations exist for inflation and reserve indicators in Turkmenistan and for inflation data in Uzbekistan. Third, although the terms of trade serve as an indirect proxy for

commodity price movements, they may not fully capture differences in the commodity export baskets of individual countries.

Future research may address these limitations by: (i) developing econometric models, such as panel ARDL or structural VAR frameworks, matched with country-specific commodity price indices; (ii) testing the lagged and asymmetric effects of terms-of-trade shocks on economic growth, exchange rates, and fiscal variables; and (iii) directly measuring Dutch disease transmission mechanisms through sectoral decomposition analyses. Such efforts would enable the current descriptive findings to be extended into a causal analytical framework.

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