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Abstract

This paper quantitatively evaluates the economic consequences of Armenia's withdrawal from the Eurasian Economic Union (EEU) amid prospects for closer European Union (EU) integration. I develop a static multi-sector, multi-country Computable General Equilibrium (CGE) model calibrated to a newly constructed 2022 Social Accounting Matrix for Armenia. Five scenarios capture key transmission channels, including higher Russian import prices, reduced access to Russian markets, lower remittances, and strengthened EU ties. Results indicate that, under the assumed shocks, the costs of EEU withdrawal outweigh the gains from EU integration, reducing GDP, employment, fiscal revenues, and household welfare. Nevertheless, export-oriented sectors, particularly Mining and Food & Accommodation, benefit from stronger European demand and currency depreciation. Higher trade substitution elasticities mitigate adverse effects, highlighting the importance of diversification and adaptability. Given Armenia's long-run EU membership objective, the feasibility of transition critically depends on EU support through market access, regulatory support, and targeted financial assistance to mitigate adjustment costs.

Keywords: Small Open Economy, Armenia, CGE, SAM, EU Integration

JEL Classification: C68 , E16 , F15 , F17

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1 Introduction

Recent regional and global geopolitical developments have placed Armenia in a new strategic environment and strained its relations with its historical trading partner, Russia, thereby intensifying debates over the country's long-term economic and geopolitical orientation. Efforts to reopen borders and normalize relations with Türkiye, the initiation of a peace process with Azerbaijan, and increased U.S. involvement through long-term investment initiatives – such as the proposed Trump Route for International Peace and Prosperity (TRIPP) – have the potential to reduce Armenia's geographic isolation, but may also weaken Russia's influence on Armenia's political and economic positioning.

Domestic political debate in Armenia reflects growing divergence over the country's future economic alignment. While some policymakers advocate maintaining close ties with Russia, others support a gradual reorientation away from Russia's sphere of influence. Armenia has been a member of the Eurasian Economic Union (EEU) since 2015 – an economic bloc led by Russia and comprising Belarus, Kazakhstan, and Kyrgyzstan. Given the existing political tensions with Russia and Armenia's efforts to deepen relations with the European Union (EU), several observers have suggested that a formal withdrawal from the EEU may eventually become a realistic scenario. Such a development would constitute a major economic shock, with profound implications across virtually all sectors of the Armenian economy, affecting prices, production, employment, and household welfare.

Uncertainty surrounding this possibility has intensified amid rapid regional and global developments. Government signals have been mixed: while Armenian officials continue to emphasize cooperation within the EEU, they have simultaneously reaffirmed a long-term commitment to joining the EU. As part of this process, a visa liberalization dialogue with the EU was launched in September 2024, and in early 2025 the government officially supported a path toward EU membership[1]. This orientation was further demonstrated with the signing of the Strategic Agenda for the EU–Armenia Partnership in December 2025, signaling a shared commitment to deeper political and economic cooperation (Ministry of Foreign Affairs of RA, 2025)[2]. Meanwhile, Russian officials have repeatedly warned that disengagement from the EEU could result in sharp increases in energy and food prices in Armenia, as well as substantial declines in exports, estimated at 70–80%[3]. Recently, in fact, right before the 2026 Armenian parliamentary elections in June, Russia has introduced trade restrictions on several Armenian export products (agricultural, alcohol, mineral water, flower) citing irregularities[4], but many have interpreted this as a political pressure. In response, EU has prepared a support financial package for Armenia, and trade measures that aim to help Armenian exporters accessing European markets by liberalising around 80% of Armenian exports to the EU, including those sectors directly affected by the Russian trade restrictions[5]. Moreover, recent Eurasian Intergovernmental Council report

[1] See: https://euronews.com
[2] See: https://mfa.am
[3] See: https://azatutyun.am
[4] See: https://caucasuswatch.de
[5] See: https://commission.europa.eu

estimated a decline of 15.6% in GDP and an inflation rise of 14.9% p.p should Armenia leave the EEU bloc[6], results that have been called "exaggerated" by Armenian officials, who in turn predicted a 0.65% p.p slowdown in economic growth[7].

What if Armenia leaves the EEU and gets closer to EU? Setting political considerations aside, such a decision would inevitably generate a combination of economic gains and losses, confronting the economy with a trade-off between the costs of exiting the EEU and the potential benefits associated with deeper integration with the EU. Quantitative assessment of these opposing forces is therefore essential. Given Russia's role as Armenia's principal trading partner, withdrawal from the union would eliminate preferential access to Russian markets and significantly alter existing trade patterns, likely increasing the costs of both imports from and exports to Russia[8]. In addition, Armenia would likely experience a decline in foreign cash inflows, as the majority of remittances and external transfers received by households originate in Russia. At the same time, such a shift may be accompanied or followed by closer economic ties with the EU. This paper aims to systematically evaluate the economic and welfare impacts of these exogenous changes under a hypothetical withdrawal of Armenia from the EEU, accompanied with closer ties with the EU.

To address this question, I employ a static multi-sector, multi-country Computable General Equilibrium (CGE) framework, which is well suited to capturing economy-wide effects and intersectoral spillovers arising from exogenous shocks. I constructed a new Social Accounting Matrix (SAM) for Armenia for the year 2022, which is used to calibrate the model's structural parameters. I assume that Armenia is a price taker small open economy, thus a potential withdrawal from the EEU combined with closer integration with the EU would expose Armenia to changes in import and export prices, as well as shifts in external income inflows. Accordingly, my objective is to quantify the effects of these developments on sectoral outputs, commodity prices, trade patterns, GDP, employment, fiscal revenues, and household welfare. I simulate five scenarios designed to reflect the most relevant exogenous shocks associated with such a transition. In addition, I assess the role of economic adaptability and trade diversification in mitigating the negative impacts by conducting sensitivity analysis with respect to trade substitution elasticities within the model.

Under the assumed shocks, the main finding is that the economic costs of exiting the EEU dominate the gains associated with deeper integration with the EU. This outcome reflects Armenia's current economic structure, which is characterized by strong dependence on Russia for imports, exports, and remittance inflows, as well as significant exposure to energy imports. On net, key aggregate macroeconomic indicators – including GDP, employment, and tax revenues – decline, accompanied by a substantial loss in consumer welfare, while the prices of essential commodities such as energy and water rise on impact. The simulations further illustrate that higher trade substitution elasticities generally mitigate these losses, underscoring the importance of trade diversification and economic flexibility. At the same time, some export-oriented industries and services – most notably Mining and Food & Accommodation – emerge

[6]See: https://en.armradio.am
[7]See: https://arka.am.
[8]Since EEU follows a common external tariff, withdrawal from the union also means abandoning the unified rates and setting new tariff rates on goods, depending on the countries of origin.

as relative winners, as the results highlight growth in their outputs following stronger European demand and depreciation of the domestic currency. Given that these results depend on the assumed sizes of the underlying shocks, they should be interpreted with caution. The key takeaway is that Armenia's path toward deeper EU integration or eventual membership is likely to be sustainable only if the EU supports Armenia in restructuring its economy to overcome the high costs of leaving the EEU. Reduced regulatory and market-access barriers by the EU could enhance Armenia's capacity to reorient trade toward European markets, therefore lowering the effective costs of transition away from EEU. Such support could include incorporating Armenia into free-trade agreements as with the countries in the Deep and Comprehensive Free Trade Area (DCFTA), as well as extending financial assistance mechanisms similar to the Instrument for Pre-Accession Assistance (IPA) programs.

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature; Section 3 provides an overview of Armenia's economy and descriptive trade analysis; Section 4 describes the data and modeling framework; Section 5 presents and discusses the simulation results; and Section 6 concludes.

2 Literature Review

To the best of my knowledge, the Computable General Equilibrium (CGE) approach has not previously been applied to assess trade-related policies or shocks in the context of Armenia. Nevertheless, a substantial body of applied literature has examined the economic and welfare implications of trade liberalization, tariff changes, and shifts in trade policy across a range of countries and regions.

For instance, Balistreri et al. (2009) employed a static CGE model for Kenya in order to assess the effects of service liberalization. The model features 55 sectors and is characterized as a small open economy. Their results suggest economy-wide gains of approximately 9% of GDP from trade-related reforms, with even larger benefits in the long run once capital accumulation is taken into account. Similarly, Rutherford and Tarr (2003) developed both static and dynamic CGE models for Chile to evaluate the country's engagement in free trade agreements with NAFTA or MERCOSUR. They found that welfare estimates derived from both frameworks are not statistically different, highlighting the robustness of the results to model dynamics.

Using a dynamic CGE model for Senegal, Annabi et al. (2005) analyzed the effects of trade liberalization on poverty and inequality. Their findings indicate that, despite initial contractions in agricultural and industrial activities, trade liberalization contributes to poverty and inequality reduction in the short run, with substantial long-run poverty declines accompanied by recovery in industrial and service sectors. In a related but distinct framework, Caliendo and Parro (2015) estimated the impact of NAFTA's tariff reductions using a Ricardian model with sectoral linkages and trade in intermediate inputs. They documented a significant increase in intra-bloc trade volumes and welfare gains for both Mexico and the United States.

The CGE framework has also been widely used to assess import bans and retaliatory tariff measures. Kutlina-Dimitrova (2017) analyzed the effects of the Russian food embargo introduced in 2014 as a response to Western sanctions. While the aggregate

impact on total EU and U.S. exports was found to be negligible — declines of 0.02% and 0.03%, respectively — the disaggregated results revealed substantial export losses in specific EU sectors, including vegetables, fruits, meat, and dairy products. Similarly, Boulanger et al. (2016) found that the import ban had stronger negative impact on Russian income, while EU's loss was mitigated by export expansion to other markets.

On the other hand, Aydın and Acar (2010) investigated a potential Turkish accession to the European Union using a modified GTAP model[9]. The authors evaluated several scenarios, including free mobility of labor and capital and compliance with EU environmental standards. Their simulations suggest that free labor mobility would lead to Turkish labor migration flows to the EU equivalent to about 0.8% of the labor force. while free capital mobility could raise Turkish GDP by approximately 4.16%.

3 Descriptive Analysis from Armenia's Trade Database

3.1 Trade Dynamics with EEU Members

Armenia joined the EEU in 2015 and conducted trade activity through economic cooperation with the member states, with Russia being its main trade partner ever since. The EEU was formed to ensure free movement of goods and services, capital, and labor between the member states, and to guide common policies in macroeconomic matters, foreign trade, competition, and regulation. Within this framework Armenia's total imports with EEU partners have shown a steady upward trajectory after 2015, with particularly sharp growth since 2021 (left panel in Figure 1). Exports' total volume has followed a similar trend, expanding significantly in recent years (right panel in Figure 1). However, it is important to note that trade with Russia accounts for the overwhelming share of Armenia's trade within the EEU block as a whole. While Belarus, Kazakhstan, and Kyrgyzstan remain trade partners with Armenia with their respective shares, their volumes remain marginal when compared to the scale of Armenia–Russia bilateral trade flows.



Fig. 1 Armenia's imports and exports with EEU Partners (2013-2024). Source: Statistical Committee Republic of Armenia (Armstat).

[9]Many other CGE applications in international trade are based on the pioneering GTAP models by Hertel (1997) and Corong et al. (2017).

3.2 Trade Patterns with Key Partners

In this subsection, we present key insights into Armenia's trade openness and merchandise trade flows with its major trading partners. For this purpose, we classify external partners into five regions: Russia, the European Union, China, Iran, and the Rest of the World. These regional aggregates will be used to disaggregate the foreign sector in the Social Accounting Matrix presented in the next section.

Figure 2 illustrates a steady increase in Armenia's trade openness, with a temporary slowdown during the pandemic. Both import and export volumes of goods and services have grown consistently over time, each exceeding 70% of GDP by 2024. The latter pattern partly reflects the increase in import and re-export volumes.

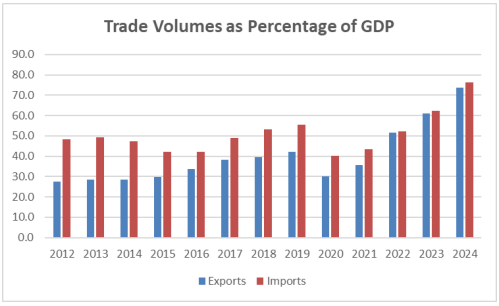


Fig. 2 Trade Volumes as Percentage of GDP in Armenia. Source: Statistical Committee Republic of Armenia (Armstat).

More specifically, as shown in the left panel of Figure 3, the share of good imports originating from Russia has ranged between 25% and 34% over the past decade until 2023, and has reached a peak of 54% in 2024. Since 2020 it has even exceeded the share of imports sourced from the Rest of the World. Imports from the Rest of the World fluctuate within a similar range, approximately 22% to 34%, while the EU's share remains consistently lower, accounting for only 10% to 23% of Armenia's total imports of goods during the same period, and reaching its lowest level in 2024.

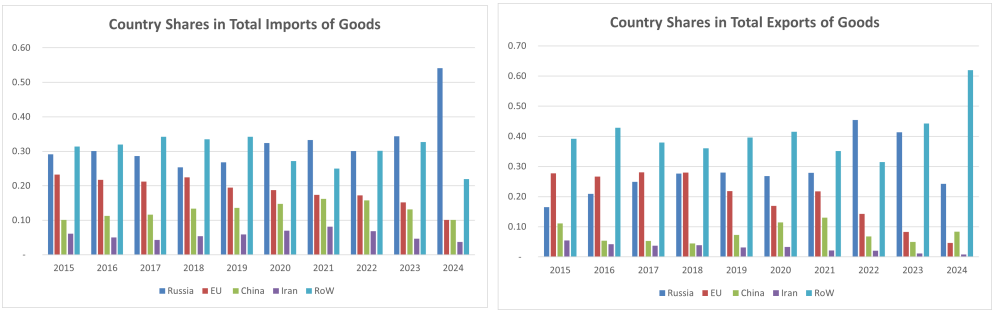


Fig. 3 Country Shares in Total Imports of Goods in Armenia. Source: Author's elaboration based on trade databases from Armstat.

Regarding exports, the share of Armenian goods destined for Russia has risen steadily over the past decade, surpassing 40% in both 2022 and 2023 and reaching a peak of 45% in 2022, as illustrated in the right panel of Figure 3. Over the same period, the EU's share of Armenian exports has declined. This pattern may suggest increasing challenges in accessing European markets or in competing with domestic producers within the EU.

On the other hand, it is important to examine the sources of essential energy imports consumed by Armenian households and industries. It is worth noting that Armenia meets its entire demand for oil and oil products through imports due to the absence of domestic natural resources. As Figure 4 shows, 70% of all imported mineral fuels, oil, and related products in 2024 originated from Russia, while 13% came from Iran, a pattern that has remained largely unchanged over time. The figure also highlights the persistent dominance of Russian supplies, which consistently account for 70% to 80% of total fuel imports. Iran is the second-largest supplier, though its share has remained below 20% throughout the observed period.

The increase in Armenia's trade openness and its heavy reliance on Russian imports – particularly fuel and oil products – implies that withdrawal from the EEU could raise significant energy and national security concerns. At the same time, such a withdrawal would almost certainly disrupt export flows, given the increasing dependence of Armenian firms on the Russian markets over time.

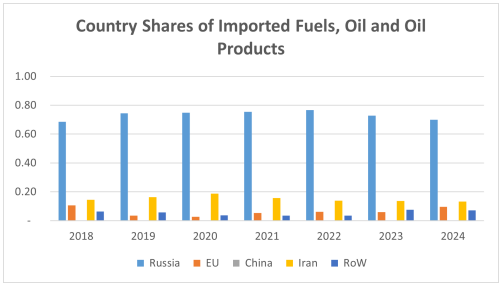


Fig. 4 Country Shares of Imported Mineral Fuels, Oil and Oil Products in Armenia. Source: Author's elaboration based on trade databases from Armstat.

4 Data and Methodology

The analysis in the previous section highlights Armenia's strong exposure to external demand, with a substantial share of domestic consumption reliant on imports. As a result, exogenous price fluctuations arising from changes in trade policies by partner countries could have a significant impact on the country's economic trajectory. To assess this, we employ a static, multi-sector, multi-country CGE model to quantitatively simulate the hypothetical withdrawal of Armenia from the EEU. The model is calibrated using Armenia's Social Accounting Matrix (SAM) for 2022, and in the next subsection, we describe how the matrix was compiled from multiple data sources.

4.1 Data

I constructed Armenia's Social Accounting Matrix (SAM) for 2022 using the Input-Output (IO) table published by the Asian Development Bank (ADB)[10]. The IO table provides information on 35 industries, with a single aggregated account for value added. For most CGE applications however, it is preferable to disaggregate this account into detailed factor returns and taxes. To achieve this, we aggregated certain industries to align with the NACE (Rev. 2) classification of 20 sectors (see Table 1). This aggregation enabled us to use official national statistics to decompose value added into labor compensation (wages), gross mixed income (capital)[11], profit taxes, and taxes on production.

On the other hand, the IO table reports values at basic prices[12], so we converted them to purchaser's prices using the available information on taxes. Additionally, data on final demand and trade in the IO table – including private and public consumption, investment, and imports/exports – were not fully consistent with official statistics from the household survey, government budget, and trade databases. To address these discrepancies, we adjusted the relevant entries and applied the RAS technique to rebalance the table.

To extend the adjusted IO table into a SAM, one-to-one correspondence between activities and commodities is assumed, meaning that each activity produces a single primary output with no secondary outputs. Additionally, we disaggregated the account representing indirect taxes on products into five categories: VAT and excise taxes on domestic products, and VAT, excise taxes, and customs duties on imported products. Data for these tax revenues were obtained from the State Revenue Committee (SRC) of the Republic of Armenia.

The SAM includes three institutions: Households, Government, and the Foreign World. The "social" quadrant of the SAM is populated with transactions between these institutions using multiple data sources, primarily drawn from the National Statistics of Armenia and the World Bank (WBI, 2022).

Finally, the foreign account is disaggregated into five geographic zones: Russia (RUS), the European Union (EU), China (CN), Iran (IRN), and the Rest of the World (RoW). Trade flows of goods by zone were obtained from Armstat. Since no zonal data are available for services trade, we relied on imputed values from the OECD-WTO Balanced Trade in Services (BaTIS) dataset. Additionally, information from the Central Bank of Armenia (CBA) on cash transfers – both commercial and non-commercial – was used to allocate inflows and outflows of primary income and household secondary income across the specified zones. Due to the lack of country-level breakdown for government transfers, we estimated the government's secondary income based on grants received from other governments and international organizations. Finally, the savings account of each zone was used as a residual to balance the institutional account for that zone. Table 2 summarizes the disaggregated accounts in the SAM.

[10] Foundations for estimating SAM can be found in works such as Mainar-Causapé et al. (2018) and Cicowiez and Lofgren (2017).

[11] "Gross" means capital depreciation is not deducted.

[12] Unlike the standard definition of a "basic price", here it represents the producer's price before the application of product taxes, but includes transportation and transaction costs. This adjustment was necessary due to the lack of separate data on margin costs.

In the next subsection, the general structure of the proposed CGE model is briefly presented.

Table 1 Sectoral Disaggregation

Code	**Sectoral Disaggregation**
a1	Agriculture, forestry and fishing
a2	Mining and quarrying
a3	Manufacturing
a4	Electricity, gas, steam and air conditioning supply
a5	Water supply, sewerage, waste management and remediation activities
a6	Construction
a7	Wholesale and retail trade, repair of motor vehicles and motorcycles
a8	Transport and storage
a9	Accommodation and food service activities
a10	Information and communication
a11	Financial and insurance activities
a12	Real estate activities
a13	Professional, scientific and technical activities
a14	Administrative and support service activities
a15	Public administration and defense; compulsory social security
a16	Education
a17	Human health and social work activities
a18	Arts, entertainment and recreation
a19	Other service activities
a20	Activities of private households as employers and production for own consumption

Table 2 SAM Disaggregation

Activities and Commodities	NACE (20)
Factors	Labor, Capital
Taxes	Tax_production, Tax_direct, Tax_indirect *VAT_domestic, Excise_domestic* *VAT_import (5), Excise_import (5), Custom_duty (5)*
Institutions	Household, Government, Foreign World (5) *Russia, European Union, China, Iran, Rest of the World*

4.2 The CGE Model

The mathematical statement of the model is presented in Appendix D. The model's economic structure and mathematical notations closely follow Lofgren et al. (2002).

4.2.1 Households

The representative household's utility is defined using a Constant Elasticity of Substitution (CES) function over an aggregate consumption bundle of 20 commodities ($c = 1, \ldots, 20$). Total household income comprises labor wages, capital returns, and transfers from both the government and the foreign world. The household allocates this income by paying taxes, saving, transferring cash, and consuming, choosing an optimal consumption bundle to maximize utility subject to the budget constraint.

4.2.2 Activities

In each stage of the production structure (see Figure 5) the representative producer a of the sector ($a = 1, \ldots, 20$) maximizes its profits subject to the production function in a perfectly competitive setting. The activity uses labor and capital in CES technology, and then combines the value added with aggregate intermediate input through Leontief specification to produce the gross output.

Nested structure is assumed when modeling the supply decision to domestic vs foreign markets. On the top level, each domestically produced commodity output is optimally allocated between an exporting bundle and domestic sales via Constant Elasticity of Transformation (CET) function. On the next level, CET is used to transform the aggregate export to bundles supplied to the five foreign regions. Similarly, two-level nested aggregation is assumed to model the importing block. First, imports from the five zones are aggregated through CES. Then, on the top level, the resulting aggregate imported bundle is combined with the domestic demand through the Armington function (see Armington (1969)) to produce the final composite commodity for domestic use. It is assumed that world prices of imports and exports are exogenous, given the status of Armenia as a small open economy.

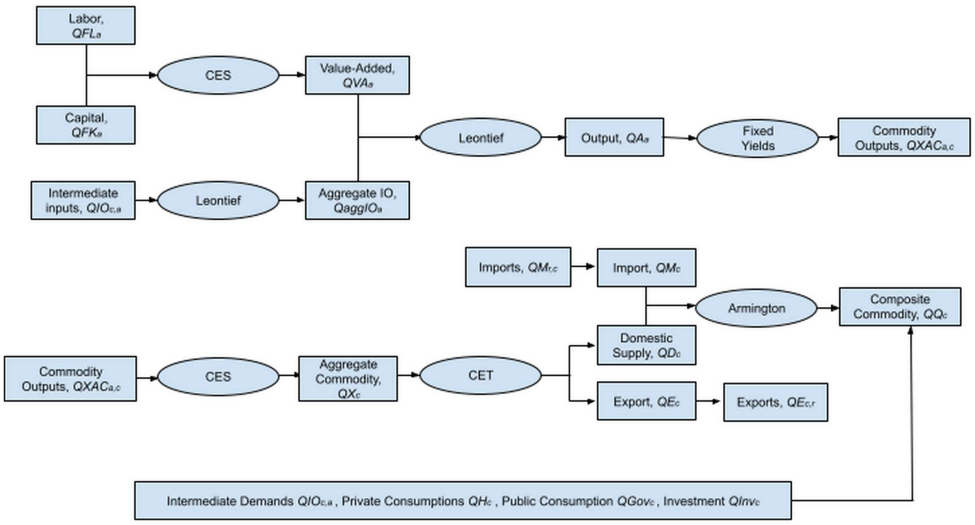


Fig. 5 The Production Side of the CGE Model. Source: Author's illustration.

4.2.3 Markets Clearing

Each commodity market clears when the total supply of a commodity equals total demand, which comprises private consumption, public consumption, investment, and intermediate use in production. Similarly, labor and capital markets clear when total demand by firms equals total supply. Both labor and capital are assumed to be owned by households.

4.2.4 Accounts Balances and Model Closures

The model is closed by assuming that both government savings and foreign savings are fixed. Consequently, the government budget balances when public saving equals the difference between tax revenues and total expenditures, including public consumption and transfers. Government spending on each commodity is assumed to follow fixed budget shares of total public consumption.

External balance is maintained by requiring that the foreign saving of each zone equals the corresponding net inflow, which implies that bilateral exchange rates are determined endogenously. The saving–investment balance is achieved by specifying that investment demand for each commodity is a fixed share of total savings.

Two alternative closures are considered for labor markets: in the first, employment is flexible and wages are fixed, while in the second, household labor supply is fixed allowing wages to adjust endogenously. Finally, total capital endowment is kept constant, and the Consumer Price Index (CPI) is chosen as the numeraire of the model.

5 Simulations

5.1 Scenarios

As discussed above, we assume that Armenia is a small open economy and thus a price taker in world markets for both imports and exports. The simulations are designed to capture the most plausible economic consequences of a hypothetical withdrawal from the Eurasian Economic Union (EEU).

First, such a withdrawal would likely lead to an increase in the domestic prices of goods imported from Russia. This could occur either through the introduction of new trade barriers imposed by Russia as part of a retaliatory policy, or through the removal of preferential pricing arrangements on key Russian exports, such as natural gas, oil, and other fuels.

Second, leaving the EEU would entail the abolition of the current free trade regime and the imposition of tariffs on Armenian exports to Russia. The sectors most adversely affected would be agriculture and manufacturing, as the largest share of their exports is directed to the Russian markets. In the model, this can be represented by an exogenous reduction in the export prices of Armenian goods destined for Russia, which is perceived as a fall in external demand leading to a decline in the revenues of exporting firms.

Third, restrictions on labor mobility would likely reduce the number of Armenian resident workers in Russia, thereby decreasing the inflow of remittances to Armenia. Historically, remittances from Russia have constituted the largest component of Armenia's secondary income from abroad, with a similar pattern observed in the primary income received from abroad and earned by Armenian labor. In the SAM 2022, the share of the households' secondary income received from Russia is almost 70% of the total transfers (see Figure 6).

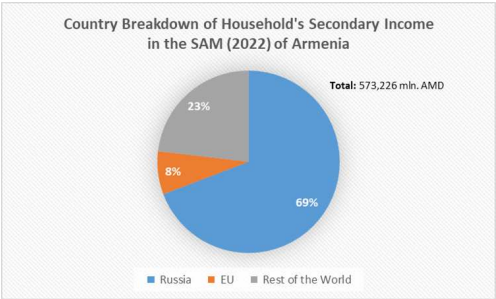


Fig. 6 Households' Secondary Income in the SAM (2022) of Armenia. Source: Author's elaboration.

Armenia lacks domestic fuel resources and relies heavily on imports to meet both consumer and industrial energy needs. This dependence is further amplified by limited diversification of trade partners, as Russia remains the principal supplier of energy. Therefore, a key determinant of the simulation results is the economy's ability to substitute between imports from different regions and between imported and domestically

produced goods. These substitution possibilities are governed by the elasticities of substitution embedded in the two levels of the Armington function within the proposed nested structure of the model. In the absence of country-specific elasticity estimates, studies in the literature commonly adopt values from the behavioral parameters of the GTAP database Aguiar et al. (2019). However, GTAP elasticities tend to be relatively high, reflecting the average global ease of substitution and the presence of diversified trade routes across countries. This assumption is not realistic for Armenia, given its strong dependence on Russian imports for essential goods and on Russian markets for its exports. Moreover, Armenia's geographic and geopolitical conditions further constrain substitution possibilities. As a landlocked country with no direct access to seaports, and with open borders with only two of its four neighboring countries, Armenia faces significant trade and transport limitations. These structural constraints must be reflected in the calibration of trade elasticities used in the model.

Accordingly, we assume relatively low Armington and CET elasticities, a value of 1.2 for commodities a1 to a5 (see Appendix C) at the top levels of the nested structures, and a value of 1.9 for services a6 to a20, consistent with the GTAP database. We further follow the GTAP convention for services a6 to a20 by assuming that substitution elasticities across regional substitutes are twice as large as those between domestic and foreign services. As for commodities a1 to a5, reporting simulation results under several elasticity assumptions is important for policy interpretation: the economic impact of a potential withdrawal from the EEU depends critically on Armenia's capacity to diversify supply chains, trade routes and partners. In other words, the more diversified the country's import sources and export markets, the smaller the adverse effects of any potential economic retaliation by Russia. Therefore, and in order to capture the sensitivity of simulation results to the elasticity of substitution across regional varieties a1 to a5, two values (low and high) are considered: 1.2 and 2.4. Finally, we use the GTAP estimates for the set of substitution elasticities of the CES production functions, while we opt for a value of 0.8 for household's CES utility preference.

Another extension is to examine an EU integration scenario involving free movement of goods, which may result in the removal of tariffs on imports from the European Union and in higher export prices reflecting preferential access to EU markets, and in increased foreign aid to the Armenian government.

To summarize, the five scenarios we consider are the following[13]:

1) Import price effect: exogenous increase in the price of the imported agricultural, mining, and manufacturing Russian products by 10%.

2) Export price effect: exogenous decrease in the price of the exported agricultural, mining, and manufacturing commodities destined to Russia by 10%.

3) Transfer effect: exogenous decrease in the volume of transfers received from Russia – particularly households' primary labor income and secondary income – by 10%.

4) EU integration: elimination of import tariffs on EU products, combined with an exogenous 10% increase in export prices of agricultural, mining, and manufacturing goods that are destined to the EU, with a 10% exogenous increase in EU transfer volumes to the Armenian government.

[13]The code and simulations were performed using GAMS programming language.

5) EEU exit and EU integration: all previous scenarios combined.

Given the static nature of the model, the simulation results should be interpreted as reflecting short to medium-run effects. Two sets of results corresponding to the two model closures are reported. In the first closure, real wages are fixed while employment adjusts, a closure more appropriate for capturing short-run effects, where nominal rigidities prevent immediate wage adjustment. In the second, employment is fixed while wages are flexible, which corresponds more closely to a medium-run setting where labor markets have time to equilibrate.

5.2 Results

In this section, we present the simulated effects of the exogenous shocks described in the five scenarios on commodity market prices, domestic output levels, sectoral reallocation, trade patterns, and key macroeconomic and welfare measures. The table and figures reported in Appendix A summarize the results under two alternative closures and two Armington/CET substitution elasticity assumptions – low and high. All reported outcomes are expressed as deviations from the benchmark equilibrium, allowing for direct comparison between the simulated counterfactual scenarios and the current economic structure.

5.2.1 Scenario 1: Import Price effect

This scenario introduces an exogenous 10% increase in the prices of agricultural, mining, and manufacturing products imported from Russia. This shock mimics the imposition of new trade barriers or the loss of tariff preferences within the EEU. The most pronounced immediate effects appear in the market prices of Mining and Manufacturing commodities, reflecting their high import dependence: imported products account for more than 80% of domestic absorption in these categories, with Russian imports representing roughly 75% of Mining imports and over 20% of Manufacturing imports.

The shock generates important spillover effects in the Energy, Water, and Construction sectors, which rely heavily on mining and manufacturing inputs. Higher input costs translate into rising production costs across these industries. As a result, the increase in imported input prices propagates through the economy, leading to higher producer and market prices, accompanied by a contraction in domestic output (see Table 3).

In contrast, the agricultural sector experiences only a moderate decline in both activity and prices, despite the increase in import prices. This occurs because the dominant share of agricultural consumption is sourced domestically, limiting the direct impact of higher import costs. The observed reductions in output and prices are instead driven by a fall in overall domestic demand and a decline in the producer price, the latter reflecting lower capital rents[14].

[14] In the SAM, roughly 50% of agricultural output consists of mixed income, so a reduction in capital rent significantly lowers production costs.

Table 3 Scenario 1 - Import Price effect

Closure	Fixed Wage		Fixed Employment	
Elasticity	low $\sigma = 1.2$	high $\sigma = 2.4$	low $\sigma = 1.2$	high $\sigma = 2.4$
% Changes in Market Prices and Domestic Outputs				
Agriculture (Δp)	-0.23	-0.14	-0.12	-0.06
Agriculture (Δq)	-0.23	-0.98	0.19	-0.66
Mining (Δp)	6.51	5.77	6.50	5.73
Mining (Δq)	-2.15	0.80	-0.99	1.73
Manufacture (Δp)	1.69	1.89	1.66	1.87
Manufacture (Δq)	-1.07	-3.91	-0.90	-3.85
Energy (Δp)	0.55	0.27	0.50	0.23
Energy (Δq)	-1.60	-1.34	-0.93	-0.80
Water (Δp)	0.46	0.32	0.18	0.10
Water (Δq)	-1.36	-1.26	-0.64	-0.67
Construction (Δp)	0.17	0.16	0.06	0.07
Construction (Δq)	-1.62	-1.06	-1.04	-0.59
% Changes in Macroeconomic and Welfare Indicators				
GDP	-0.78	-0.65	-0.05	-0.04
Employment	-2.04	-1.69	-	-
Wage	-	-	-1.04	-0.84
Utility	-1.69	-1.66	-1.05	-1.13
EV (bln. AMD)	-96	-94	-60	-64
Public Consumption	-1.87	-1.33	-0.39	-0.11

A similar qualitative pattern appears across most service sectors, where the net effect of the shock ranges from modest to substantial contractions. The main exceptions are services, such as Food & Accommodation and Information sectors, whose outputs expand due to their export driven demand allowing them to grow even as domestic conditions weaken.

Generally, the substitution effect suggests that households shift expenditure toward services that become relatively cheaper. However, the negative income effect dominates, reducing overall consumption. As a result, welfare declines and utility falls, with the equivalent variation estimated at -96 to -94 billion AMD under fixed wages. Public consumption also contracts by 1.87% to 1.33% reflecting lower tax revenues. When wages do not adjust, employment declines due to reduced demand and weaker economic activity. Meanwhile, output contracts most sharply in highly labor-intensive sectors, such as Education. Overall, real GDP falls by 0.78% to 0.65%. In the longer run under the second closure, wages adjust downward rather than employment, allowing most industries to partially recover due to the relative gains from lower labor costs, therefore mitigating the negative effects.

It is also noteworthy that the expected declines in GDP and tax revenues are somewhat dampened when Armington/CET substitution elasticities are higher. In fact, some sectoral output responses even change sign: export-oriented sectors – most notably Mining Industry – exhibit increases in activity, while Food & Accommodation and Information services expand even further. This suggests that when exporters can more easily redirect sales toward alternative markets, the adverse effects of the

external shock are weaker. Under the high-elasticity assumption however, domestic currency appreciates relative to the Russian, and the manufacturing output declines even further. This is primarily because over half of the manufactures exports are directed to Russia, making it far more exposed to the shock than other sectors.

These dynamics are further reflected in the changes in trade patterns. Under fixed wage and low elasticity, overall trade volumes decline across all regions. In contrast, under high elasticity, import volumes increase from all regions except Russia, indicating that greater substitutability enables Armenia to reorient trade flows away from Russian sellers toward other partners.

5.2.2 Scenario 2: Export Price effect

An exogenous 10% reduction in export prices mimics the loss of preferential access to Russian markets. Export-oriented industries – particularly Mining and Manufacturing – experience this shock as a decline in external demand, leading to immediate contractions in both output and revenue. The agricultural sector also faces a decline on impact, as nearly 90% of its export volume is sent to Russia. Given that roughly 45% of Armenia's total exports are directed to Russia, the shock also triggers a depreciation of the domestic currency relative to the Russian ruble, resulting in a higher bilateral exchange rate. This deterioration in terms of trade makes imports from Russia more expensive, generating economy-wide effects that are qualitatively similar to those observed in the previous scenario, but even more severe in terms of output contractions (see Table 4). For example, across all scenarios, manufacturing output is estimated to decline by 10-13%, mining output by 4-8%, while agriculture output by 1-3%. At the same time, domestic prices in the Energy and Water sectors rise by around 0.4-0.7%, and by 0.2-0.5%, respectively.

Service sectors, by contrast, do not face a decline in external demand under this scenario. As a result, the currency depreciation plays a favorable role by improving their competitiveness, especially for export-oriented services such as Food & Accommodation and Information, where outputs expand by more than 40% and 3% respectively, across all closures and elasticity assumptions. Overall, all macroeconomic deteriorate – more sharply under the fixed-wage closure and even more so when elasticity of substitution is low. Welfare measures also indicate that consumers are worse off, especially under the fixed-wage closure.

5.2.3 Scenario 3: Transfer effect

This scenario evaluates the impact of a 10% reduction in households' primary labor income and in remittance inflows from Russia. The shock reflects policies affecting labor mobility and the volume of foreign transfers. On one hand, the shock has an immediate and substantial negative income effect on Armenian consumers, given that approximately 70% of all foreign transfers originate from Russia. As a result, private consumption declines across all goods and services, utility falls, and the equivalent variation is estimated at -47 to -50 billion AMD (see Table 5).

Holding other factors constant, weaker demand translates into reduced domestic activity across all sectors. On the other hand, in order to achieve current account balance the endogenous bilateral exchange rate increases in response to the reduction

Table 4 Scenario 2 - Export Price effect

Closure	Fixed Wage		Fixed Employment	
Elasticity	low $\sigma = 1.2$	high $\sigma = 2.4$	low $\sigma = 1.2$	high $\sigma = 2.4$
% Changes in Market Prices and Domestic Outputs				
Agriculture (Δp)	0.01	0.07	0.07	0.12
Agriculture (Δq)	-2.04	-2.65	-1.78	-2.45
Mining (Δp)	6.40	5.73	6.40	5.71
Mining (Δq)	-7.53	-4.84	-6.87	-4.36
Manufacture (Δp)	2.12	2.28	2.10	2.27
Manufacture (Δq)	-10.72	-12.89	-10.70	-12.91
Energy (Δp)	0.69	0.43	0.66	0.41
Energy (Δq)	-1.03	-0.78	-0.60	-0.45
Water (Δp)	0.48	0.35	0.31	0.22
Water (Δq)	-0.73	-0.63	-0.28	-0.28
Construction (Δp)	-0.70	-0.66	-0.76	-0.71
Construction (Δq)	-1.77	-1.37	-1.38	-1.07
% Changes in Macroeconomic and Welfare Indicators				
GDP	-0.71	-0.59	-0.23	-0.21
Employment	-1.35	-1.06	-	-
Wage	-	-	-0.63	-0.48
Utility	-0.84	-0.83	-0.41	-0.49
EV (bln. AMD)	-48	-47	-23	-28
Public Consumption	-1.60	-1.09	-0.66	-0.35

in Russian transfers. In the absence of other trade policy distortions present in the earlier scenarios, currency depreciation makes Armenian exports relatively cheaper in Russian markets and boosts the external demand. As a result, agricultural and manufacturing production record net increases in activity, since a substantial share of their exports is directed to Russia. In these sectors, the gains from the weaker currency more than compensate for the initial decline in domestic demand.

5.2.4 Scenario 4: EU Integration

This scenario envisages a reduction in trade barriers with the European Union (EU), potentially representing an initial step toward deeper EU integration and trade liberalization. The simulation assumes the removal of tariffs on imports from the EU, a 10% exogenous increase in export prices for Armenian goods sold in EU markets, and a 10% rise in EU transfers to the government. The tariffs elimination coupled with improvement in terms of trade lowers the import and market prices of goods and services. Together with stronger EU demand, lower production costs for Armenian exports stimulate output in key tradable sectors. The growth in Mining and Manufacturing is estimated to be at least 20% and 5%, respectively (see Table 6). By contrast, many service sectors – particularly export-oriented activities such as Food & Accommodation and Information – experience contractions due to the appreciation of the domestic currency. Furthermore, market prices for essential commodities such as energy and water fall, supporting increases in both private and public consumption.

Table 5 Scenario 3 - Transfer effect

Closure	Fixed Wage		Fixed Employment	
Elasticity	low $\sigma = 1.2$	high $\sigma = 2.4$	low $\sigma = 1.2$	high $\sigma = 2.4$
% Changes in Market Prices and Domestic Outputs				
Agriculture (Δp)	-0.06	-0.04	-0.05	-0.03
Agriculture (Δq)	0.35	0.19	0.38	0.21
Mining (Δp)	0.69	0.57	0.69	0.56
Mining (Δq)	-0.86	-0.44	-0.76	-0.38
Manufacture (Δp)	-0.20	-0.15	-0.20	-0.15
Manufacture (Δq)	3.85	3.24	3.86	3.25
Energy (Δp)	0.21	0.16	0.21	0.15
Energy (Δq)	-0.51	-0.47	-0.46	-0.44
Water (Δp)	0.13	0.11	0.11	0.09
Water (Δq)	-0.30	-0.29	-0.25	-0.26
Construction (Δp)	-0.02	-0.02	-0.03	-0.03
Construction (Δq)	-0.94	-0.83	-0.90	-0.80
% Changes in Macroeconomic and Welfare Indicators				
GDP	-0.06	-0.03	0.00	0.00
Employment	-0.16	-0.10	-	-
Wage	-	-	-0.08	-0.05
Utility	-0.83	-0.83	-0.78	-0.80
EV (bln. AMD)	-47	-47	-44	-46
Public Consumption	-0.59	-0.54	-0.47	-0.46

Overall, GDP and employment rise by approximately 0.5% and 1% under the fixed-wage closure. Meanwhile, under fixed-employment rule, wages adjust and increase by around 0.6%.

5.2.5 Scenario 5: EEU exit and EU integration

This exercise simulates the net impact of EEU exit and EU integration by combining all previous scenarios. The results of this scenario should be interpreted with caution, as their implications and magnitudes depend on the assumed size of the exogenous shocks. Actual outcomes may differ depending on the extent to which political retaliation, trade policies, export prices, remittance flows, and EU market access change following an EEU withdrawal.

Conditional on the assumed shocks, the results indicate that the economy-wide losses from exiting the EEU outweigh the gains associated with deeper integration with the EU, although several industries still experience net benefits. In the short run – under the fixed-wage closure and low Armington elasticity – GDP, employment, and public consumption decline by approximately 1.2%, 2.7%, and 3.5%, respectively, while the welfare loss measured by equivalent variation reaches a staggering 146 billion AMD (see Table 7). Energy and water prices go up by 1.3% and 1%, respectively. These contractions and price increases are more muted when substitution elasticities are higher, highlighting that a more diversified and flexible economy is better positioned to absorb external shocks.

Table 6 Scenario 4 - EU integration

Closure	Fixed Wage		Fixed Employment	
Elasticity	low $\sigma = 1.2$	high $\sigma = 2.4$	low $\sigma = 1.2$	high $\sigma = 2.4$
% Changes in Market Prices and Domestic Outputs				
Agriculture (Δp)	0.46	0.44	0.40	0.38
Agriculture (Δq)	0.66	0.79	0.45	0.59
Mining (Δp)	-3.00	-3.20	-3.00	-3.17
Mining (Δq)	21.37	23.01	20.55	22.11
Manufacture (Δp)	-1.62	-1.68	-1.60	-1.67
Manufacture (Δq)	5.22	5.69	5.10	5.59
Energy (Δp)	-0.18	-0.14	-0.15	-0.11
Energy (Δq)	1.02	1.01	0.67	0.65
Water (Δp)	-0.14	-0.15	0.01	0.01
Water (Δq)	0.90	0.96	0.52	0.57
Construction (Δp)	0.05	0.06	0.11	0.13
Construction (Δq)	0.08	-0.01	-0.23	-0.34
% Changes in Macroeconomic and Welfare Indicators				
GDP	0.49	0.50	0.12	0.12
Employment	1.03	1.07	-	-
Wage	-	-	0.56	0.57
Utility	0.95	1.01	0.63	0.68
EV (bln. AMD)	54	58	36	39
Public Consumption	0.79	0.91	0.02	0.12

Despite the overall reduction in aggregate economic activity and the substantial drop in consumer welfare, some sectors nonetheless register net gains. Driven by stronger EU demand the mining output grows by more than 9%, since it has less dependence on Russian markets for exports compared to other export-oriented industries. Meanwhile Food & Accommodation services benefit from the weakened domestic currency relative to the Russian ruble.

Finally, under the fixed-employment closure, the labor wage adjusts downward, thereby mitigating the fall in both GDP and household welfare. The macroeconomic outcomes under low and high Armington elasticity values become more similar in this closure, with no major differences in aggregate results.

6 Conclusion

In light of recent political, regional, and global developments, Armenia may eventually face a strategic choice between withdrawing from the Eurasian Economic Union (EEU) and remaining within Russia's sphere of economic influence. Exiting the EEU would entail the loss of free trade benefits within the union, but could also be accompanied by deeper economic integration with the European Union (EU), as suggested by recent bilateral agreements and policy signals from the Armenian government, which may end up with full EU membership. Although official statements indicate that leaving

Table 7 Scenario 5 - EEU exit and EU integration

Closure	Fixed Wage		Fixed Employment	
Elasticity	low $\sigma = 1.2$	high $\sigma = 2.4$	low $\sigma = 1.2$	high $\sigma = 2.4$
% Changes in Market Prices and Domestic Outputs				
Agriculture (Δp)	0.16	0.33	0.30	0.43
Agriculture (Δq)	-1.05	-2.34	-0.54	-2.00
Mining (Δp)	10.85	8.57	10.82	8.51
Mining (Δq)	9.55	19.76	11.32	21.04
Manufacture (Δp)	2.03	2.18	2.01	2.16
Manufacture (Δq)	-1.59	-6.19	-1.47	-6.18
Energy (Δp)	1.30	0.68	1.22	0.63
Energy (Δq)	-2.30	-1.63	-1.41	-1.04
Water (Δp)	0.95	0.61	0.59	0.37
Water (Δq)	-1.72	-1.36	-0.78	-0.72
Construction (Δp)	-0.58	-0.53	-0.72	-0.63
Construction (Δq)	-4.10	-3.06	-3.29	-2.52
% Changes in Macroeconomic and Welfare Indicators				
GDP	-1.18	-0.88	-0.22	-0.22
Employment	-2.68	-1.86	-	-
Wage	-	-	-1.36	-1.27
Utility	-2.57	-2.36	-1.74	-1.77
EV (bln. AMD)	-146	-134	-99	-101
Public Consumption	-3.46	-2.14	-1.52	-0.80

the EEU is not currently on the near-term agenda, public remarks by Armenia's Prime Minister suggest that such a decision may become unavoidable in the future[15].

This paper approaches the issue from a strictly economic perspective by providing a quantitative assessment of the potential gains and losses associated with Armenia's withdrawal from the EEU. To this end, I developed a static multi-sector, multi-country Computable General Equilibrium (CGE) model for Armenia, treating the country as a small open economy and price taker in global markets. I constructed the Social Accounting Matrix (SAM) for the year 2022 using multiple national and international data sources, which was employed to calibrate the CGE model. Using this framework, I simulated five scenarios capturing the most plausible channels through which EEU withdrawal would affect Armenia. The scenarios analyzed the economic and welfare impacts of: the exogenous increase in Russian imports, the higher cost facing the Armenian producers in penetrating Russian markets, the decline in cash flows from Russia, and the enhanced economic ties with the EU.

Taken together, and conditional on the assumed magnitudes of the shocks, the simulation results indicate that the economy-wide costs of leaving the EEU outweigh the gains from closer integration with the EU. The combined scenario predicts net declines in GDP, employment, tax revenues, and a substantial loss in consumer welfare. Market prices for several commodities – including energy and water – increase due to higher input costs, placing additional pressure on households and firms. These results,

[15]See: https://arka.am and https://www.euronews.com

Table 8 Summary of Simulation Results

Scenario	Sc1				Sc2				Sc3				Sc4				Sc5			
Closure	FX.Wage		FX.Emp		FX.Wage		FX.Emp		FX.Wage		FX.Emp		FX.Wage		FX.Emp		FX.Wage		FX.Emp	
Elasticity	low	high	low	high	low	high	low	high	low	high	low	high	low	high	low	high	low	high	low	high
% Changes in Market Prices and Domestic Outputs																				
Agr.(Δp)	-0.23	-0.14	-0.12	-0.06	0.01	0.07	0.07	0.12	-0.06	-0.04	-0.05	-0.03	0.46	0.44	0.40	0.38	0.16	0.33	0.30	0.43
Agr.(Δq)	-0.23	-0.98	0.19	-0.66	-2.04	-2.65	-1.78	-2.45	0.35	0.19	0.38	0.21	0.66	0.79	0.45	0.59	-1.05	-2.34	-0.54	-2.00
Min.(Δp)	6.51	5.77	6.50	5.73	6.40	5.73	6.40	5.71	0.69	0.57	0.69	0.56	-3.00	-3.20	-3.00	-3.17	10.85	8.57	10.82	8.51
Min.(Δq)	-2.15	0.80	-0.99	1.73	-7.53	-4.84	-6.87	-4.36	-0.86	-0.44	-0.76	-0.38	21.37	23.01	20.55	22.11	9.55	19.76	11.32	21.04
Man.(Δp)	1.69	1.89	1.66	1.87	2.12	2.28	2.10	2.27	-0.20	-0.15	-0.20	-0.15	-1.62	-1.68	-1.60	-1.67	2.03	2.18	2.01	2.16
Man.(Δq)	-1.07	-3.91	-0.90	-3.85	-10.72	-12.89	-10.70	-12.91	3.85	3.24	3.86	3.25	5.22	5.69	5.10	5.59	-1.59	-6.19	-1.47	-6.18
Energy(Δp)	0.55	0.27	0.50	0.23	0.69	0.43	0.66	0.41	0.21	0.16	0.21	0.15	-0.18	-0.14	-0.15	-0.11	1.30	0.68	1.22	0.63
Energy(Δq)	-1.60	-1.34	-0.93	-0.80	-1.03	-0.78	-0.60	-0.45	-0.51	-0.47	-0.46	-0.44	1.02	1.01	0.67	0.65	-2.30	-1.63	-1.41	-1.04
Water(Δp)	0.46	0.32	0.18	0.10	0.48	0.35	0.31	0.22	0.13	0.11	0.11	0.09	-0.14	-0.15	0.01	0.01	0.95	0.61	0.59	0.37
Water(Δq)	-1.36	-1.26	-0.64	-0.67	-0.73	-0.63	-0.28	-0.28	-0.30	-0.29	-0.25	-0.26	0.90	0.96	0.52	0.57	-1.72	-1.36	-0.78	-0.72
Const.(Δp)	0.17	0.16	0.06	0.07	-0.70	-0.66	-0.76	-0.71	-0.02	-0.02	-0.03	-0.03	0.05	0.06	0.11	0.13	-0.58	-0.53	-0.72	-0.63
Const.(Δq)	-1.62	-1.06	-1.04	-0.59	-1.77	-1.37	-1.38	-1.07	-0.94	-0.83	-0.90	-0.80	0.08	-0.01	-0.23	-0.34	-4.10	-3.06	-3.29	-2.52
% Changes in Macroeconomic and Welfare Indicators																				
GDP	-0.78	-0.65	-0.05	-0.04	-0.71	-0.59	-0.23	-0.21	-0.06	-0.03	0.00	0.00	0.49	0.50	0.12	0.12	-1.18	-0.88	-0.22	-0.22
Employment	-2.04	-1.69	-	-	-1.35	-1.06	-	-	-0.16	-0.10	-	-	1.03	1.07	-	-	-2.68	-1.86	-	-
Wage	-	-	-1.04	-0.84	-	-	-0.63	-0.48	-	-	-0.08	-0.05	-	-	0.56	0.57	-	-	-1.36	-0.93
Utility	-1.69	-1.66	-1.05	-1.13	-0.84	-0.83	-0.41	-0.49	-0.83	-0.83	-0.78	-0.80	0.95	1.01	0.63	0.68	-2.57	-2.36	-1.74	-1.77
EV (bln. AMD)	-96	-94	-60	-64	-48	-47	-23	-28	-47	-47	-44	-46	54	58	36	39	-146	-134	-99	-101
Public Consump.	-1.87	-1.33	-0.39	-0.11	-1.60	-1.09	-0.66	-0.35	-0.59	-0.54	-0.47	-0.46	0.79	0.91	0.02	0.12	-3.46	-2.14	-1.52	-0.80

Sc1: Scenario 1 - Import Price effect
Sc2: Scenario 2 - Export Price effect
Sc3: Scenario 3 - Transfer effect
Sc4: Scenario 4 - EU integration
Sc5: Scenario 5 - EEU exit and EU integration

however, should be viewed with caution as they are contingent on the assumed shock sizes and the current economic structure of Armenia. Accordingly, these results do not imply that EU integration is economically undesirable per se, but rather that its short to medium-run gains have to be sufficiently large to fully offset the costs of abrupt disengagement from the EEU. At the same time, the shocks induce notable sectoral reallocation: export-oriented industries and services, particularly Mining and Food & Accommodation, expand as they benefit from stronger European demand and a depreciation of the domestic currency.

I considered two alternative closure rules representing short-run and medium-run responses of the labor market. I also examined the sensitivity of the results with respect to a key structural parameter – Armington and CET substitution elasticities governing trade diversification and domestic-foreign substitutability. The results show that the more easily Armenian producers and consumers can switch toward alternative partners and products, the smaller the adverse economic consequences of EEU withdrawal. These findings underscore the central role of trade diversification and structural flexibility in shaping Armenia's resilience to external geopolitical and economic shocks.

Given Armenia's current economic structure and trade dependencies, and my findings on the dominating costs of leaving the EEU and on the mitigated losses when trade substitution elasticities are higher, Armenia's long-term commitment to EU membership critically depends on the role the EU could play in this regard. The EU could help mitigate the transition costs associated with an EEU exit by facilitating a smoother and less costly integration path. Concrete measures could include accelerated regulatory alignment and enhanced market access through deeper trade preferences. In fact, the recent measures taken by the EU – through elimination of custom duties and reduction of non-tariff barriers on 80% of Armenian exports – should help Armenian exporters compensate for the loss of preferential access to EEU markets. Another possible avenue would be Armenia's incorporation into the Deep and Comprehensive Free Trade Area (DCFTA), similar to existing arrangements with Georgia, Moldova, and Ukraine (European Commission, 2016)[16]. In addition, Armenia could be considered for inclusion in funding mechanisms such as the Instrument for Pre-Accession Assistance (IPA) programs, which currently supports EU candidate countries such as Albania and Montenegro (European Commission 2024)[17]. Similar targeted financial assistance programs used in past EU enlargement and eastward expansion proved to be pivotal for countries such as Bulgaria and Romania.

Overall, the economic feasibility of Armenia's European integration is not solely a domestic issue but also depends on the extent to which the EU is willing to lower entry barriers and provide transitional support. Without such measures, the economic costs of leaving the EEU may remain substantial, potentially constraining Armenia's ability to pursue its preferred long-run geopolitical and economic orientation.

Finally, the shocks considered in this study are not exhaustive, and several additional scenarios are worth investigation in future research. In particular, given Armenia's preferential arrangements for natural gas imports from Russia, treating

[16] See: https://trade.ec.europa.eu
[17] See: https://enlargement.ec.europa.eu

natural gas as a separate commodity in the SAM and introducing a substantial gas-price shock could capture an important additional channel through which changes in the country's economic relationship with Russia may affect the domestic economy. Another relevant extension would be to incorporate positive productivity shocks associated with structural improvements and greater economic integration with the EU, which could capture potential longer-term efficiency gains that are not represented in the current framework. These extensions, are part of the ongoing research agenda of the author.

Appendix A Summary of Results

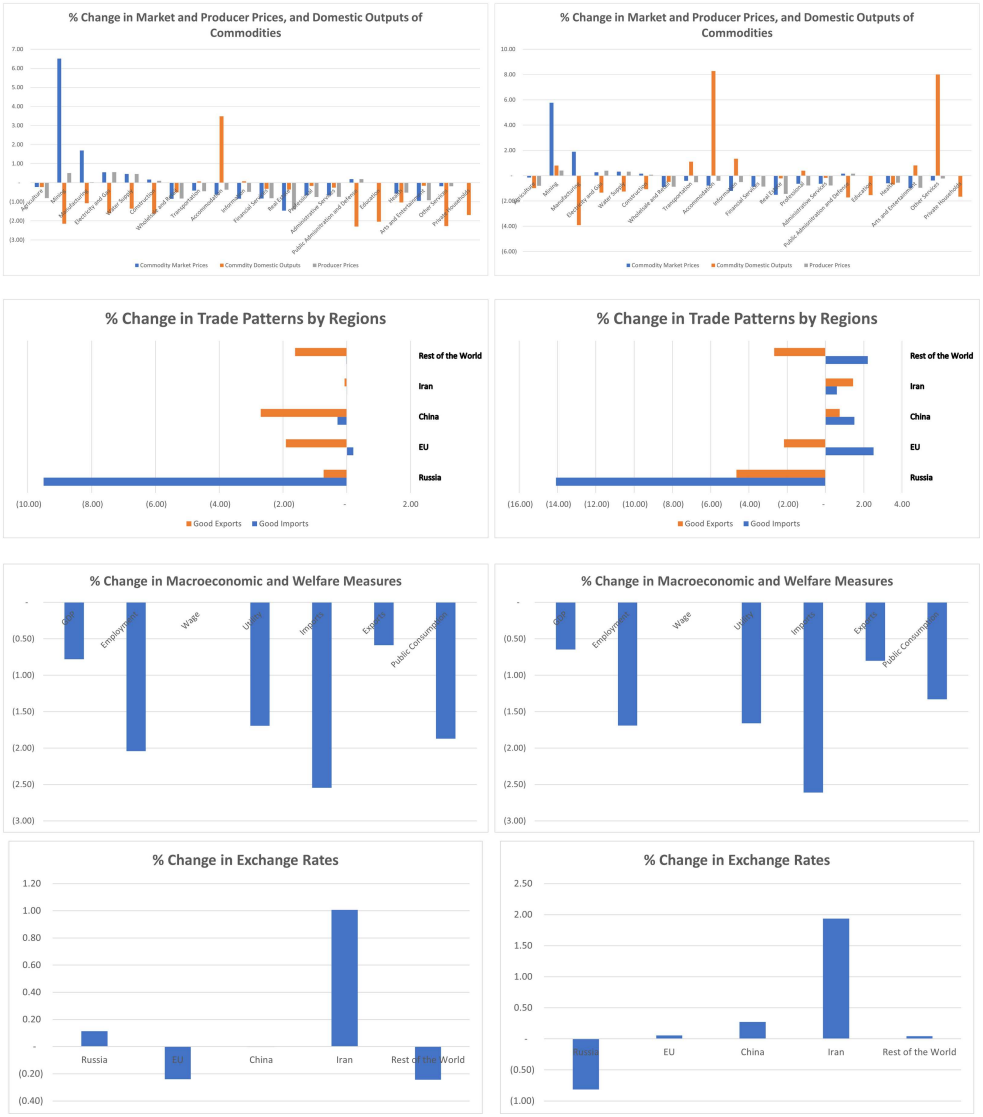


Fig. A1 Scenario 1: Import Price effect, Fixed Wage closure, low $\sigma = 1.2$ (left) vs high $\sigma = 2.4$ (right)

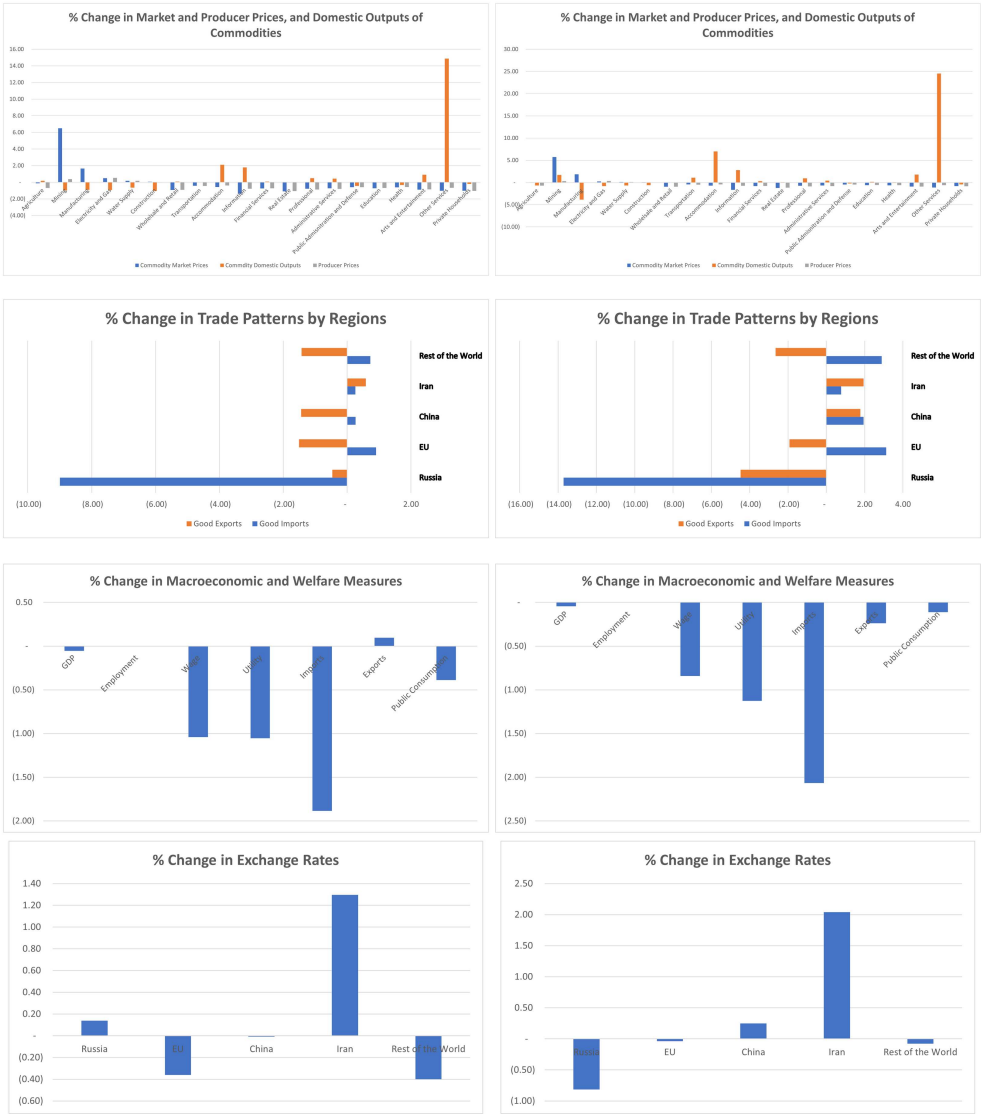


Fig. A2 Scenario 1: Import Price effect, Fixed Employment closure, low $\sigma = 1.2$ (left) vs high $\sigma = 2.4$ (right)



Fig. A3 Scenario 2: Export Price effect, Fixed Wage closure, low $\sigma = 1.2$ (left) vs high $\sigma = 2.4$ (right)



Fig. A4 Scenario 2: Export Price effect, Fixed Employment closure, low $\sigma = 1.2$ (left) vs high $\sigma = 2.4$ (right)

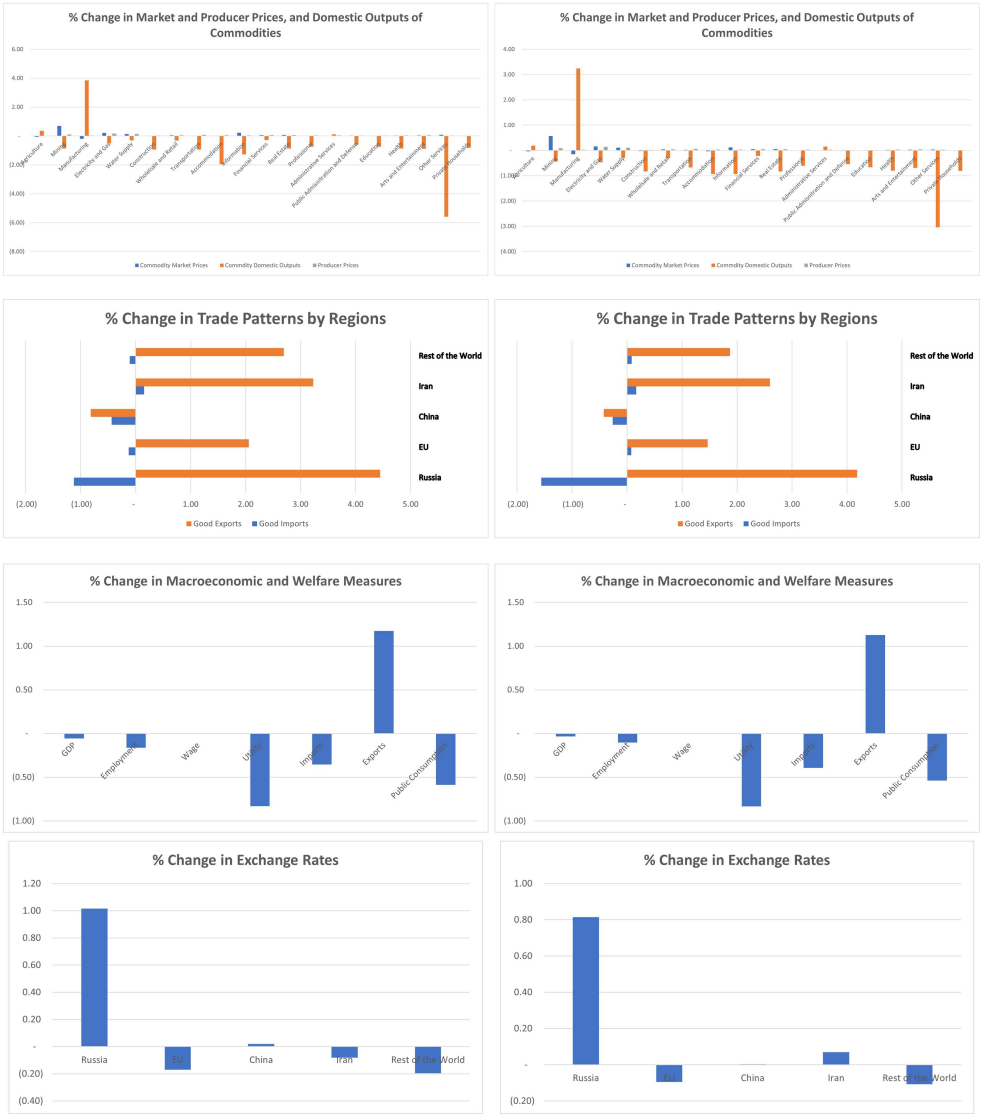


Fig. A5 Scenario 3: Transfer effect, Fixed Wage closure, low $\sigma = 1.2$ (left) vs high $\sigma = 2.4$ (right)



Fig. A6 Scenario 3: Transfer effect, Fixed Employment closure, low $\sigma = 1.2$ (left) vs high $\sigma = 2.4$ (right)



Fig. A7 Scenario 4: EU integration, Fixed Wage closure, low $\sigma = 1.2$ (left) vs high $\sigma = 2.4$ (right)

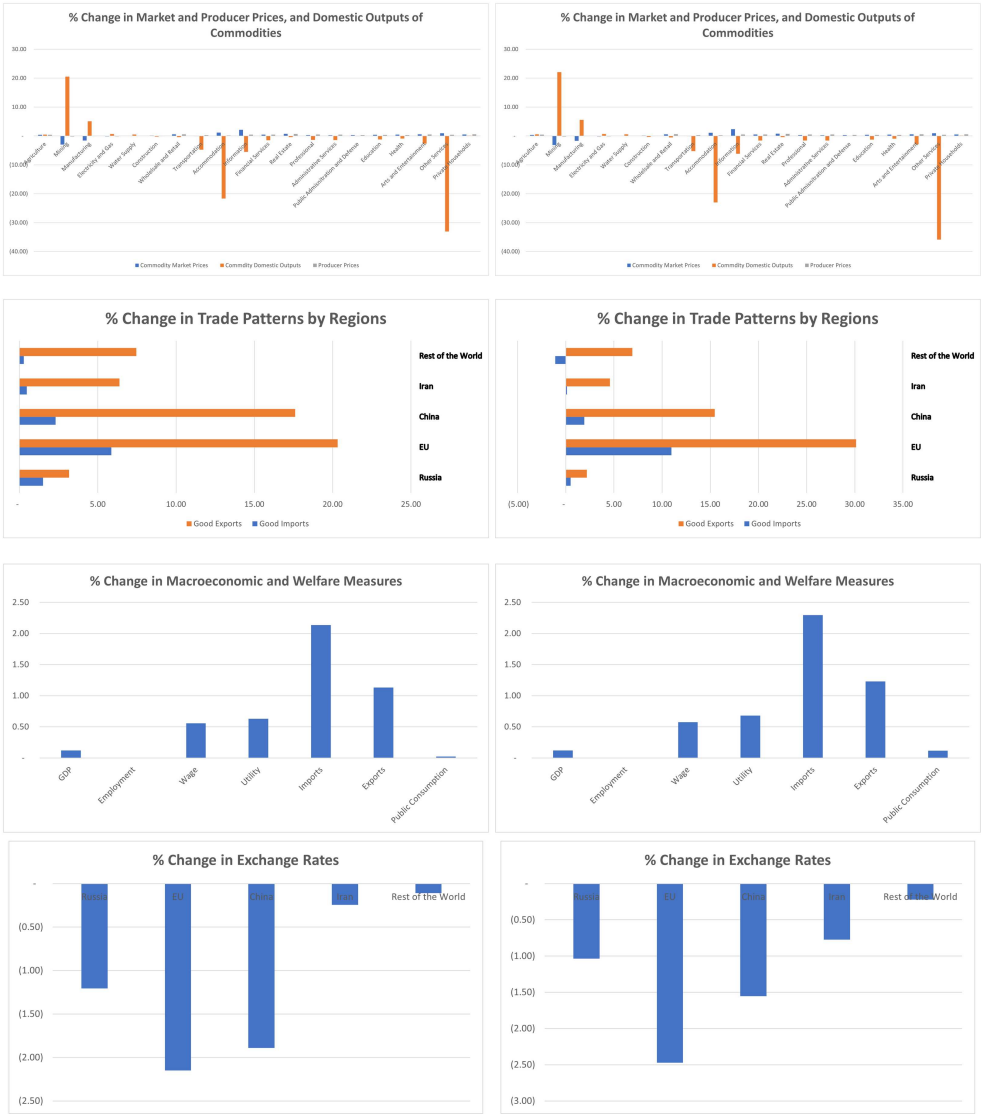


Fig. A8 Scenario 4: EU integration, Fixed Employment closure, low $\sigma = 1.2$ (left) vs high $\sigma = 2.4$ (right)



Fig. A9 Scenario 5: EEU Exit and EU integration, Fixed Wage closure, low $\sigma = 1.2$ (left) vs high $\sigma = 2.4$ (right)



Fig. A10 Scenario 5: EEU Exit and EU integration, Fixed Employment closure, low $\sigma = 1.2$ (left) vs high $\sigma = 2.4$ (right)

Appendix B CGE Parameters and Variables

Table B1 The set of parameters, calibrated using SAM

	Effective Tax and Saving Rates
$t_{r,c}^{EXim}$	Excise tax on imported commodity c from region r
$t_{r,c}^{VATim}$	VAT on imported commodity c from region r
$t_{r,c}^{Duty}$	Duty on imported commodity c from region r
t_{c}^{EXdom}	Excise tax on domestic commodity c
t_{c}^{VATdom}	VAT on domestic commodity c
$t_{a}Prod$	Tax on production by activity a
t_{a}^{Prof}	Profit tax paid by activity a
t^{Y}	Income tax paid by household
mps	Marginal propensity to save by household
	Share Parameters
$\theta_{c,a}^{IO}$	Share of intermediate commodity c in the aggregate intermediate demand by activity a (Leontif)
θ_{a}^{VA}	Share of value-added in gross output by activity a (Leontif)
θ_{a}^{IO}	Share of intermediate inputs in gross output by activity a (Leontif)
$\theta_{a,c}$	Share of commodity c in the output of activity a (Leontif)
θ_{c}^{Gov}	Share of government spending on commodity c
θ_{c}^{Inv}	Share of investment spending on commodity c
sh^{HHYFL}	Share of household in total labor income
sh^{HHYFK}	Share of household in total capital income
γ_{a}^{FL}	Share of labor input in the value-added CES production function of activity a
γ_{a}^{FK}	Share of capital input in the value-added CES production function of activity a
$\gamma_{a,c}^{AD}$	Share of activity a's supply in the CES function of commodity c
γ_{c}^{T}	Share of exports of commodity c in the CET function
$\gamma_{c,r}^{TR}$	Share of exported commodity c to region r in the CET function
γ_{c}^{A}	Share of imports of commodity c in the Armington function
$\gamma_{r,c}^{AR}$	Share of imported commodity c from region r in the Armington function
γ_{c}^{HH}	Share of commodity c in the CES utility function of household
γ_{c}^{CPI}	Weight of the price of commodity c in CPI
	Shift Parameters
a_{a}^{F}	Shift parameter of the value-added CES production function of activity a
a_{c}^{AD}	Shift parameter of the CES function of commodity c
a_{c}^{T}	Shift parameter of the CET function of commodity c
a_{c}^{TR}	Shift parameter of the CET function of commodity c (across regions)
a_{c}^{A}	Shift parameter of the Armington CES function of commodity c
a_{c}^{AR}	Shift parameter of the Armington CES function of commodity c (across regions)

Table B2 The set of exogenous variables, determined using SAM

Exogenous Variables	
$trfFLRoW_r$	Payments from region r for labor use in foreign currency
$trfFKRoW_r$	Payments from region r for capital use in foreign currency
$trfRoWFL_r$	Payments to region r for labor use in foreign currency
$trfRoWFK_r$	Payments to region r for capital use in foreign currency
$trfHHGov$	Transfers from the government to household
$trfHHRoW_r$	Remittances from region r to household in foreign currency
$trfGovRoW_r$	Transfers to the government from region r in foreign currency
$trfRoWGov_r$	Transfers from the government to region r in foreign currency

Table B3 The set of elasticity parameters, calibrated exogenously

Elasticity Parameters	
σ_a^F	Elasticity of substitution across inputs of production in the CES function of activity a
σ_c^{AD}	Elasticity of substitution across activity outputs in the CES function of commodity c
σ_c^{TR}	Elasticity of substitution between exports across regions in the CET function of commodity c
σ_c^T	Elasticity of substitution between domestic sales and export in the CET function of commodity c
σ_c^{AR}	Elasticity of substitution between imports across regions in the Armington CES function of commodity c
σ_c^A	Elasticity of substitution between domestic supply and import in the Armington CES function of commodity c
σ^{HH}	Elasticity of substitution across commodities in the CES utility function of household

Table B4 The set of endogenous variables

	Price Variables
$pwm_{r,c}$	World price of imported commodity c from region r in foreign currency (exogenous)
$pwe_{c,r}$	World price of exported commodity c to region r in foreign currency (exogenous)
$PMR_{r,c}$	Import price of commodity c from region r in domestic currency adjusted for indirect taxes
$PER_{c,r}$	Export price of commodity c to region r in domestic currency
PM_c	Aggregate import price of commodity c in domestic currency adjusted for indirect taxes
PE_c	Aggregate export price of commodity c in domestic currency
PVA_a	Price of value-added by activity a
$PaggIO_a$	Price of aggregate intermediate inputs by activity a
PA_a	Output price of activity a
$PXAC_{a,c}$	Basic price of domestically produced commodity c by activity a
PX_c	Basic price of domestically produced commodity c
PDS_c	Price of domestically produced and domestically supplied commodity c
PDD_c	Price of domestically produced and domestically supplied commodity c adjusted for indirect taxes
PQ_c	Price of the final composite commodity c
WFL	Price of labor use (labor wage)
WFK	Price of capital use
CPI	Consumer Price Index
EXR_r	Exchange rate for currency of region r
	Quantity Variables
$QFLS$	Total labor endowment
$QFKS$	Total capital endowment
QFL_a	Labor demand by activity a
QFK_a	Capital demand by activity a
$QIO_{c,a}$	Intermediate input demand of commodity c by activity a
$QaggIO_a$	Aggregate intermediate input demand by activity a
QVA_a	Value-added by activity a
QA_a	Output of activity a
QQ_c	Composite commodity c
$QXAC_{a,c}$	Quantity of commodity c produced by activity a
QX_c	Quantity of commodity c produced domestically
QD_c	Quantity of commodity c produced and supplied domestically
$QER_{c,r}$	Exported quantity of commodity c to region r
$QMR_{r,c}$	Imported quantity of commodity c from region r
QE_c	Aggregate exports of commodity c
QM_c	Aggregate imports of commodity c
	Income Variables
YFL	Total labor income
YFK	Total capital income
$YFLHH$	Labor income of household
$YFKHH$	Capital income of household
YHH	Total income of household
EH	Expenditure of household
YG	Government income
	Other Variables
GS	Government saving (real)
FS_r	Foreign saving of region r in foreign currency
GDP	Real gross domestic product
U	Utility of household

Appendix C Elasticities

Table C5 The model's elasticities

Sector	Value-Added σ_a^F	Armington (top) σ_c^A	Armington (bottom) σ_c^{AR}	CET (top) σ_c^T	CET (bottom) σ_c^{TR}
Agriculture	0.25	1.2	1.2/2.4	-1.2	-1.2/2.4
Mining	0.20	1.2	1.2/2.4	-1.2	-1.2/2.4
Manufacturing	1.22	1.2	1.2/2.4	-1.2	-1.2/2.4
Electricity and gas	1.26	1.2	1.2/2.4	-1.2	-1.2/2.4
Water	1.26	1.2	1.2/2.4	-1.2	-1.2/2.4
Construction	1.40	1.9	3.8	-1.9	-3.8
Trade	1.68	1.9	3.8	-1.9	-3.8
Transportation	1.68	1.9	3.8	-1.9	-3.8
Accommodation and food	1.68	1.9	3.8	-1.9	-3.8
Information & communication	1.68	1.9	3.8	-1.9	-3.8
Financial	1.68	1.9	3.8	-1.9	-3.8
Real estate	1.68	1.9	3.8	-1.9	-3.8
Professional	1.68	1.9	3.8	-1.9	-3.8
Administrative	1.68	1.9	3.8	-1.9	-3.8
Public administration	1.68	1.9	3.8	-1.9	-3.8
Education	1.68	1.9	3.8	-1.9	-3.8
Health	1.68	1.9	3.8	-1.9	-3.8
Entertainment	1.68	1.9	3.8	-1.9	-3.8
Other services	1.68	1.9	3.8	-1.9	-3.8
Private households	1.68	1.9	3.8	-1.9	-3.8

Appendix D CGE Model and Equations

D.1 The Price Block

$$PMR_{r,c} = \left(1 + t_{r,c}^{EXim} + t_{r,c}^{\mathrm{VATim}} + t_{r,c}^{Duty}\right) \cdot pwm_{r,c} \cdot EXR_r$$

$$PER_{c,r} = pwe_{c,r} \cdot EXR_r$$

$$PM_c \cdot QM_c = \sum_r PMR_{r,c} \cdot QMR_{r,c}$$

$$PE_c \cdot QE_c = \sum_r PER_{c,r} \cdot QER_{c,r}$$

$$PDD_c = \left(1 + t_c^{EXdom} + t_c^{VATdom}\right) \cdot PDS_c$$

$$PQ_c \cdot QQ_c = PDD_c \cdot QD_c + PM_c \cdot QM_c$$

$$PX_c \cdot QX_c = PDS_c \cdot QD_c + PE_c \cdot QE_c$$

$$PX_c \cdot QX_c = \sum_a PXAC_{a,c} \cdot QXAC_{a,c}$$

$$PA_a \cdot QA_a = \sum_c PXAC_{a,c} \cdot QXAC_{a,c}$$

$$\left(1 - t_a^{Prod}\right) \cdot PA_a \cdot QA_a = PVA_a \cdot QVA_a + PaggIO_a \cdot QaggIO_a$$

$$PVA_a \cdot QVA_a = WFL \cdot QFL_a + \left(1 + t_a^{Prof}\right) \cdot WFK \cdot QFK_a$$

$$PaggIO_a \cdot QaggIO_a = \sum_c PQ_c \cdot QIO_{c,a}$$

$$CPI = \sum_c \gamma_c^{CPI} \cdot PQ_c$$

D.2 The Production and Trade Block

$$QIO_{c,a} = \theta_{c,a}^{IO} \cdot QaggIO_a$$

$$QFL_a = \left(\frac{QVA_a}{a_a^F}\right) \cdot \left(\frac{\gamma_a^{FL}}{WFL}\right)^{\sigma_a^F} \cdot \left[\left(\gamma_a^{FK}\right)^{\sigma_a^F} \cdot \left(1 + t_a^{Prof}\right)^{1-\sigma_a^F} \cdot WFK^{1-\sigma_a^F} + \left(\gamma_a^{FL}\right)^{\sigma_a^F} \cdot WFL^{1-\sigma_a^F}\right]^{\frac{a_a^F}{1-\sigma_a^F}}$$

$$QFK_a = \left(\frac{QVA_a}{a_a^F}\right) \cdot \left(\frac{\gamma_a^{FK}}{\left(1 + t_a^{Prof}\right) \cdot WFK}\right)^{\sigma_a^F} \cdot \left[\left(\gamma_a^{FK}\right)^{\sigma^F} \cdot \left(1 + t_a^{Prof}\right)^{1-\sigma_a^F} \cdot WFK^{1-\sigma_a^F} + \left(\gamma_a^{FL}\right)^{\sigma^F} \cdot WFL^{1-\sigma_a^F}\right]^{\frac{\sigma^F}{1-\sigma_a^F}}$$

$$QVA_a = \theta_a^{VA} \cdot QA_a$$

$$QaggIO_a = \theta_a^{IO} \cdot QA_a$$

$$QXA_{a,c} = \theta_{a,c} \cdot QA_a$$

$$QXAC_{a,c} = \left(\frac{QX_c}{a_c^{AD}}\right) \cdot \left(\frac{\gamma_{a,c}^{AD}}{PXAC_{a,c}}\right)^{\sigma^{AD}} \cdot \left[\sum_a \left(\gamma_{a,c}^{AD}\right)^{\sigma_c^{AD}} \cdot PXAC_{a,c}^{1-\sigma_c^{AD}}\right]^{\frac{\sigma_c^{AD}}{1-\sigma_c^{AD}}}$$

$$QD_c = \left(\frac{QX_c}{a_c^T}\right) \cdot \left(\frac{1-\gamma_c^T}{PDS_c}\right)^{\sigma_c^T} \cdot \left[\left(\gamma_c^T\right)^{\sigma_c^T} \cdot PE_c^{1-\sigma_c^T} + \left(1-\gamma_c^T\right)^{\sigma_c^T} \cdot PDS_c^{1-\sigma_c^T}\right]^{\frac{\sigma_c^T}{1-\sigma_c^T}}$$

$$QER_{c,r} = \left(\frac{QE_c}{a_c^{TR}}\right) \cdot \left(\frac{\gamma_{c,r}^{TR}}{PER_{c,r}}\right)^{\sigma_c^{TR}} \cdot \left[\sum_r \left(\gamma_{c,r}^{TR}\right)^{\sigma_c^{TR}} \cdot PER_{c,r}^{1-\sigma_c^{TR}}\right]^{\frac{\sigma_c^{TR}}{1-\sigma_c^{TR}}}$$

$$QE_c = \left(\frac{QX_c}{a_c^T}\right) \cdot \left(\frac{\gamma_c^T}{PE_c}\right)^{\sigma_c^T} \cdot \left[\left(\gamma_c^T\right)^{\sigma_c^T} \cdot PE_c^{1-\sigma_c^T} + \left(1-\gamma_c^T\right)^{\sigma_c^T} \cdot PDS_c^{1-\sigma_c^T}\right]^{\frac{\sigma_c^T}{1-\sigma_c^T}}$$

$$QD_c = \left(\frac{QQ_c}{a_c^A}\right) \cdot \left(\frac{1-\gamma_c^A}{PDD_c}\right)^{\sigma_c^A} \cdot \left[\left(\gamma_c^A\right)^{\sigma_c^A} \cdot PM_c^{1-\sigma_c^A} + \left(1-\gamma_c^A\right)^{\sigma_c^A} \cdot PDD_c^{1-\sigma_c^A}\right]^{\frac{\sigma_c^A}{1-\sigma_c^A}}$$

$$QMR_{r,c} = \left(\frac{QM_c}{a_c^{AR}}\right) \cdot \left(\frac{\gamma_{r,c}^{AR}}{PMR_{r,c}}\right)^{\sigma_c^{AR}} \cdot \left[\sum_r \left(\gamma_{r,c}^{AR}\right)^{\sigma_c^{AR}} \cdot PMR_{r,c}^{1-\sigma_c^{AR}}\right]^{\frac{\sigma_c^{AR}}{1-\sigma_c^{AR}}}$$

$$QM_c = \left(\frac{QQ_c}{a_c^A}\right) \cdot \left(\frac{\gamma_c^A}{PM_c}\right)^{\sigma_c^A} \cdot \left[\left(\gamma_c^A\right)^{\sigma_c^A} \cdot PM_c^{1-\sigma_c^A} + \left(1-\gamma_c^A\right)^{\sigma_c^A} \cdot PDD_c^{1-\sigma_c^A}\right]^{\frac{\sigma_c^A}{1-\sigma_c^A}}$$

D.3 The Household

$$YFL = WFL \cdot QFLS + \sum_r trfFLRoW_r \cdot EXR_r$$

$$YFK = WFK \cdot QFKS + \sum_r trfFKRoW_r \cdot EXR_r$$

$$YFLHH = sh^{HHYFL} \cdot \left(YFL - \sum_r trfRoWFL_r \cdot EXR_r \right)$$

$$YFKHH = sh^{HHYFK} \cdot \left(YFK - \sum_r trfRoWFK_r \cdot EXR_r \right)$$

$$YHH = YFLHH + YFKHH + trfHHGov \cdot CPI + \sum_r trfHHRoW_r \cdot EXR_r$$

$$EH = (1 - mps) \cdot \left(1 - t^Y\right) \cdot YHH$$

$$QH = \frac{EH}{\sum_c \left(\gamma_c^{HH}\right)^{\sigma^{HH}} \cdot PQ_c^{1-\sigma^{HH}}} \cdot \left(\frac{\gamma_c^{HH}}{PQ_c} \right)^{\sigma^{HH}}$$

$$U = \left(\sum_c \gamma_c^{HH} \cdot QH_c^{\frac{\sigma^{HH}-1}{\sigma^{HH}}} \right)^{\frac{\sigma^{HH}}{\sigma^{HH}-1}}$$

D.4 The Government

$$PQ_c \cdot QGov_c = \theta_c^{Gov} \cdot \left(YG - GS \cdot CPI - trfHHGov \cdot CPI - \sum_r trfRoWGov_r \cdot EXR_r \right)$$

$$YG = t^Y \cdot YHH + \sum_a t_a^{Prof} \cdot WFK \cdot QFK_a + \sum_a t_a^{Prod} \cdot PA_a \cdot QA_a + \sum_r trfGovRoW_r \cdot EXR_r$$

$$+ \sum_c \left(t_c^{EXdom} + t_c^{VATdom} \right) \cdot PDS_c \cdot QD_c + \sum_r \sum_c \left(t_{r,c}^{EXim} + t_{r,c}^{VATim} + t_{r,c}^{Duty} \right) \cdot pwm_{r,c} \cdot EXR_r \cdot QMR_{r,c}$$

D.5 Saving and Investment

$$PQ_c \cdot QInv = \theta_c^{Inv} \cdot TotINV$$

$$TotINV = mps \cdot \left(1 - t^Y\right) \cdot YHH + GS \cdot CPI + \sum_r FS_r \cdot EXR_r$$

D.6 Markets Clearing and Foreign Balances

$$QFLS = \sum_a QFL_a$$

$$QFKS = \sum_a QFK_a$$

$$QQ_c = \sum_a QIO_{c,a} + QH_c + QGov_c + QInv_c$$

$$\sum_c pwm_{r,c} \cdot QMR_{r,c} + trfRoWFL_r + trfRoWFK_r + trfRoWGov_r =$$
$$\sum_c pwe_{c,r} \cdot QE_{c,r} + trfFLRoW_r + trfFKRoW_r + trfGovRoW_r + trfHHRoW_r + FS_r$$

D.7 Real GDP and Model Closures

$$GDP = \sum_c QH_c + \sum_c QGov_c + \sum_c QInv_c + \sum_r \sum_c QER_{c,r} - \sum_r \sum_c QMR_{r,c}$$

$QFLS = QFLS_0$ or $WFL = WFL_0$

$QFKS = QFKS_0$

$GS = GS_0$

$FS_r = FS_{r,0}$

$CPI = CPI_0$

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