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# Economic Impact of a Potential Free Trade Agreement (FTA) Between the European Union and the Commonwealth of the Independent States

## Armenia

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# 1 Introduction

After the disintegration of the Soviet Union the EU has become the main trade partner of Armenia. For the EU, Armenia is a very marginal trade partner and trade with Armenia represents a very limited share of total EU trade. The EU exports mainly machinery and transport equipment to Armenia. On the other hand, Armenia mainly exports base metals and products made of them, which represent more than 60% of total exports to the EU, and pearls and precious stones, representing around 25% of total exports.

The framework for the EU bilateral trade relations with Armenia is governed by the Partnership and Cooperation Agreement (PCA), which entered into force in 1999. The agreement implies Most Favoured Nation (MFN) treatment with respect to tariffs and quantitative restrictions are prohibited in bilateral trade. The PCA also envisages progressive regulatory approximation in the most important trade related areas (industrial standards, sanitary and phytosanitary issues, intellectual property rights, customs, public procurement etc). Furthermore, Armenia is a beneficiary of the EU Generalised System of Preferences.

The EU adopted a European Neighbourhood Policy (ENP) Action Plan with Armenia in 2006. The Action Plan various issues and has a specific point on future enhancement of bilateral trade relations between the EU and Armenia which includes a possible establishment of a Free Trade Agreement (FTA).

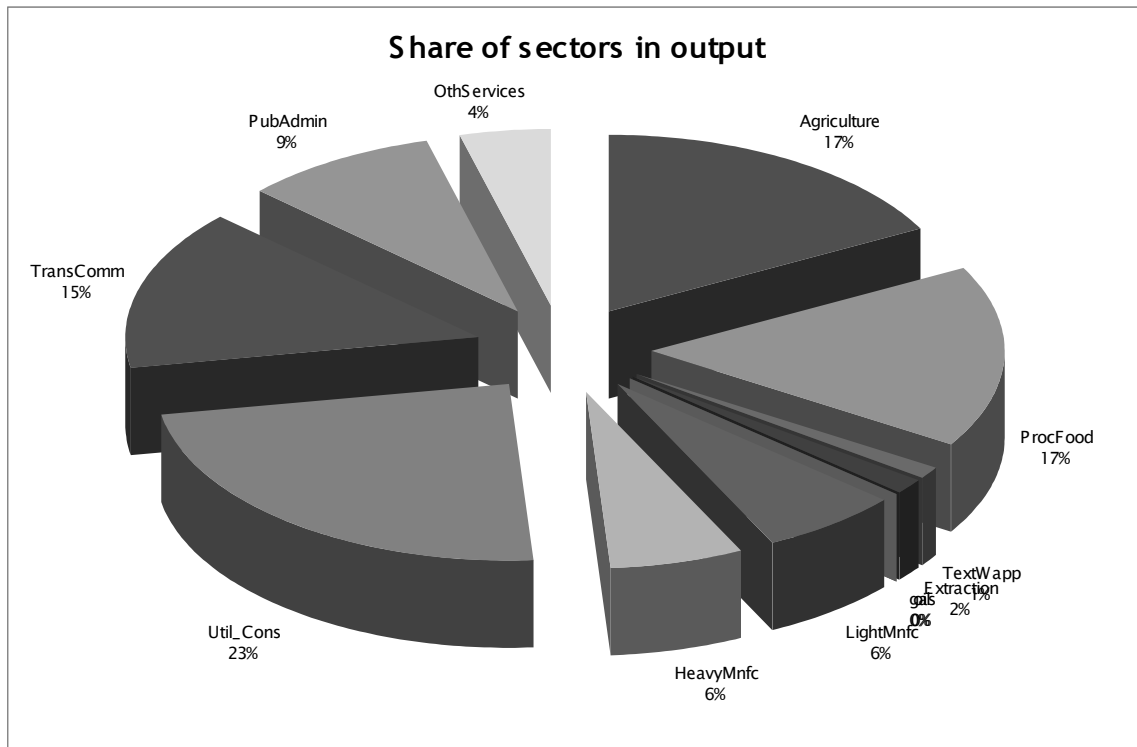
The rest of the study is organized as follows: Chapter 2 offers a general background to the production and trade of Armenia.. Chapter 3 describes methodology, data and the different scenarios. Since the methodology used in this study is the same as the one which was employed looking at the CIS region as a whole and also used for looking at the effects of different FTAs on other individual CIS countries in the different studies undertaken under this project, the description in this chapter is identical to the description of the model and data in the other studies. Therefore we suggest to those readers who are already familiar with this description to skip this section and continue with the discussion

of the results. Chapter 4 discusses the results. Concluding comments can be found in Chapter 4.

## 2 Trade and Production structure of Armenia

The importance of different sectors in Armenia's output is depicted in Figure 2-1. Services represent about 50% of output in Armenia which is lower than in some other CIS countries. Among manufacturing sectors heavy and light manufacturing sectors take up the most important part of total output, each representing about 6% of total output. Armenia has a rather important agricultural and processed food sector which represents together more than 34% of total output. These sectors are much more important in Armenia's economy than in many other CIS countries.

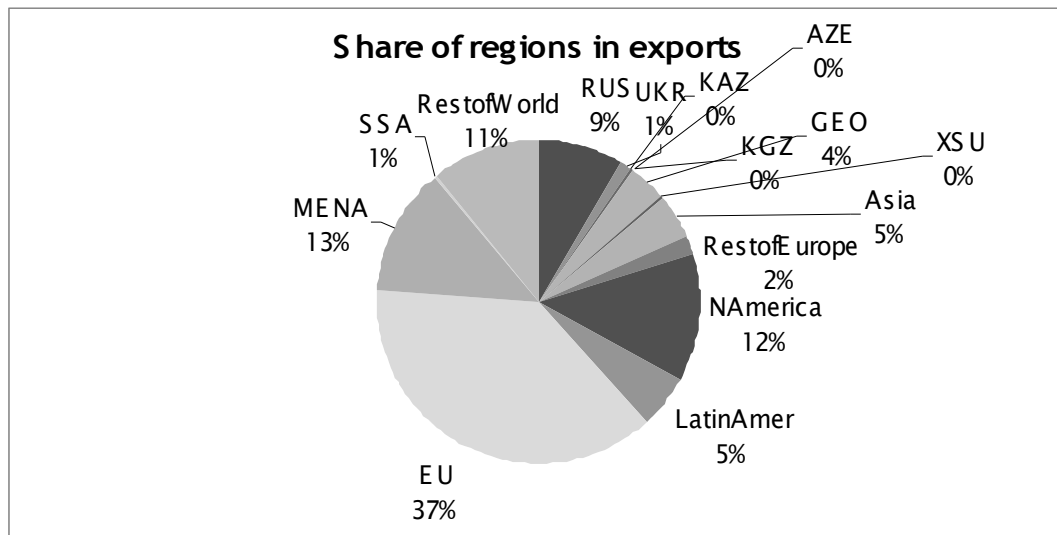
Figure 2-1 Share of sectors in output



Source: own calculations, data come from GTAP database version 7

Figure 2-2 depicts the importance of different regions and countries in Armenia’s exports. The EU is the most important export destination for Armenia. About 37% of all Armenian exports go to the EU. The second biggest export destination is within the CIS region. About 15% of Armenia’s exports go to other countries in the CIS from which 9% go to Russia. The MENA countries also absorb an important share of total exports, about 13% of Armenia’s export go to the region.

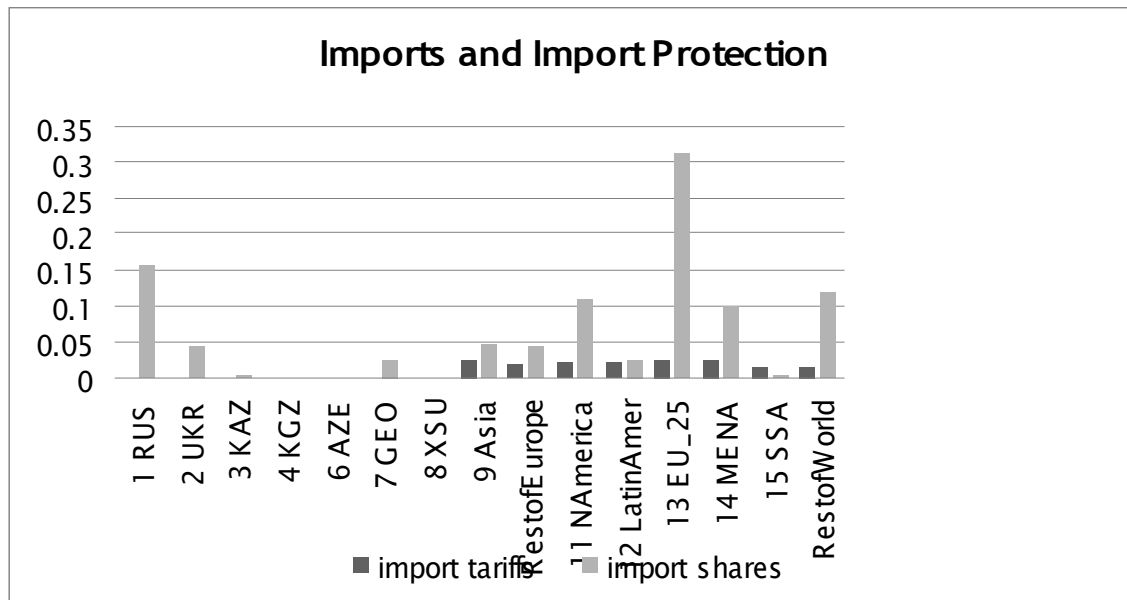
**Figure 2-2 Share of regions in exports**



Source: own calculations, data come from GTAP database version 7

Figure 2-3 depicts Armenia’s imports coming from different destinations and the corresponding import tariffs. For Armenia, the EU is the most important import partner with imports coming from the EU representing about one third of total Armenia’s imports. There are no import tariffs for other countries in the CIS region, nevertheless the share of imports coming from these countries is rather small with the exception of Russia from where a bit more than 15% of total imports originate.

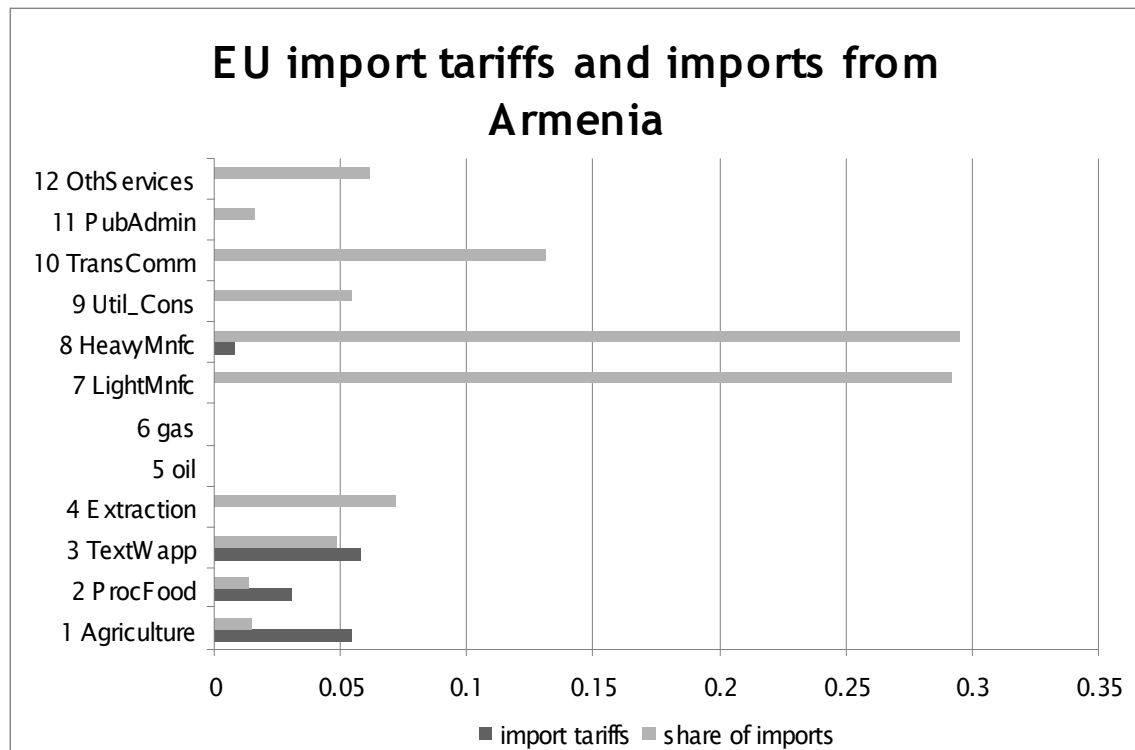
**Figure 2-3 Imports and import protection**



Source: own calculations, data come from GTAP database version 7

Figure 2-4 shows EU import tariffs and import in different sectors originating from Armenia. The highest import tariffs are in the processed food sector, agriculture and in textiles and clothing. The share of imports in processed food and agriculture sector is rather small; imports in these sectors is around 1-2% while in textiles and apparel it is a bit higher amounting to 5% of total imports. The sectors with the highest share of imports are heavy and light manufacturing which both represents about 30% of total imports.

Figure 2-4 EU imports and import tariffs



Source: own calculations, data come from GTAP database version 7

### 3 The Model and the Data

#### 3.1 The CGE model

The methodology is comparable with recent policy analyses of the World Bank, the IMF and the OECD, incorporating a similar quantitative modeling framework. This section provides a brief overview of the global computable general equilibrium (CGE) model used in this study.

The CGE-model is based on an input-output structure (which stem from national input-output tables) which explicitly links industries through chain of value added in production, from primary goods, through stages of intermediate processing, to the final assembling of goods and services for consumption. This inter-sectoral linkage works both through direct linkages, e.g. the use of steel in the production of transport equipment, and



indirect, i.e. via intermediate use in other sectors. These linkages are captured in the model by the usage of firms' use of factors and intermediate inputs. An overview of the model is provided in Box 3.1 below, while a more detailed description is available in the Technical Annex.

Recent developments in international trade and economic geography focus on the importance of scale economies (e.g. starting from Krugman (1979), (1980), Helpman and Krugman (1989) and onwards) and imperfect competition in determining the patterns of production and trade. In order to incorporate this development into the analysis, our model is expanded to take into account differences in underlying market structures across sectors.

Furthermore, in order to further increase the quality of the analysis, we employ estimates on elasticities as reported in the recent paper by Antweiler and Trefler (2002).

Impediments to trade in services are not as clearly visible as is the case with tariffs for trade in merchandise. Rather, trade barriers in the service sector often entail prohibitions, quantitative restrictions and government regulations, which are designed to limit the market access of foreign suppliers. These are not easy to quantify. In order to remedy this lack of data, we follow Francois (2003) in estimating tariff equivalents for the service sector through the use of a gravity type equation. These estimates are then incorporated into the analysis. Further information about these estimates is available in the Technical Annex.

### **3.2 *Model data***

The GTAP database, version 7, provides the majority of the data for the empirical implementation of the model. The database is the best and most updated source for internally consistent data on production, consumption and international trade by country and sector. For more information, please refer to Dimaranan and McDougall (2006).

The GTAP version 7 dataset is benchmarked to 2004, and includes detailed information on input-output, trade and final demand structures for the whole world this year. However, there are some important changes to the trade policy environment that have

happened since then, that we wish to include in the basic dataset. Therefore, before conducting any policy experiments, we first run a ‘pre-experiment’, where we include the ATC phase-out and EU enlargement. Moreover, several of the CIS countries are currently in the process of joining the WTO. The EU would most probably only negotiate FTAs if the given partner country would already be a WTO member. Therefore, we implement the result from WTO accessions of all non-WTO members of CIS as well in our baseline.

For the purpose of this study, the GTAP database has been aggregated into 16 regions and 12 sectors. The list of sectors and regions is shown in . The detailed mapping between the aggregated sectors and the original GTAP sectors, together with a list of regions used in the model can be found in the Technical Appendix to the main report.

**Table 3.1: Sectors in the model**

Sectors	Regions
Agricultural products, food	Russia
Processed Food	Ukraine
Textiles and Clothing	Kazakhstan
Coals and other minerals	Kyrgyzstan
Oil	Armenia
Gas	Azerbaijan
Light Manufacturing	Georgia
Heavy Manufacturing	Rest of Former Soviet Union
Utilities and Construction	East, Southeast and South Asia
Transport and Communication	Rest of Europe
PubAdmin/Defence/Health/Educat	North America
Other Services	Latin America
	European Union 25
	Middle East and North Africa
	Sub-Saharan Africa
	Rest of World

### ***3.3 Setting up the analysis; baselines and trade liberalization scenarios***

All results are compared to the baseline, which takes into account the effects of a successful WTO accession, the EU enlargement and the phase-out of the ATC.

The core of our analysis is structured around a set of scenarios. We simulate these three scenarios assuming that all CIS countries have the same FTAs with the EU. These scenarios are based on alternative liberalization approaches for agriculture, manufactured goods and services trade, as well as measures to facilitate trade. Trade facilitation measures aim to reduce less transparent trade barriers, such as customs procedures, product standards and conformance certifications, licensing requirements, and related administrative sources of trading costs. The scenarios which we use as basis for our analysis are summarized in the table below.

**Table 3.2: Scenarios**

Nr	Description	Assumptions			
		Food	Non-food	Services	Trade facilitation
1	Partial 1 trade agreement	No tariff reductions	Full bilateral tariff reductions	no reduction	None
2	Partial 2 trade agreement	Full bilateral tariff reductions	Full bilateral tariff reductions	no reduction	None
3	Full FTA	Full bilateral tariff reductions	Full bilateral tariff reductions	Full services liberalisation	2% of value of trade

The partial trade agreements imply more realistic outcomes of the trade negotiations than the Full FTA scenario described above. With regards to the outcome of the bilateral trade agreements on non-food, the assumption is the same as in the full FTA, namely full bilateral tariff reduction. The second partial trade agreement scenario offers a deeper liberalisation between the regions implying full bilateral reduction in not only manufacturing goods but also in the food sector. No trade facilitation is assumed to take place in the partial scenarios.

The Full FTA agreement implies full bilateral tariff reductions for manufacturing goods, full bilateral tariff reductions in the agriculture and processed food sectors, full liberalization of trade in services and trade facilitation measures corresponding to 2 percent of value of trade. From a policy point of view, this scenario can be seen as quite radical in its assumptions. Nonetheless it is very useful in providing an upper benchmark for the effect of potential measures to liberalize trade.

## 4 Results

### 4.1 Real Income Effects

Trade liberalization would have a positive income effect for Armenia under all three FTA scenarios which are shown in Table 4.3. The first two scenarios would result in a rather small increase in real incomes, amounting to 0.12% increase under the first and 0.07% increase under the second scenario which is even smaller than the effect on real income in the EU. The third, full FTA scenario would have the highest positive real income effect with a 0.49% real income increase which is a bit smaller than CIS average real income effects.

**Table 4.3. Real Income Effects** (percentage change from baseline)

Scenario	Partial 1 trade agreement	Partial 2 trade agreement	Full FTA
EU	0.14	0.13	0.21
CIS	-0.53	-0.83	0.62
Armenia	0.12	0.07	0.49

Source: Model simulations.

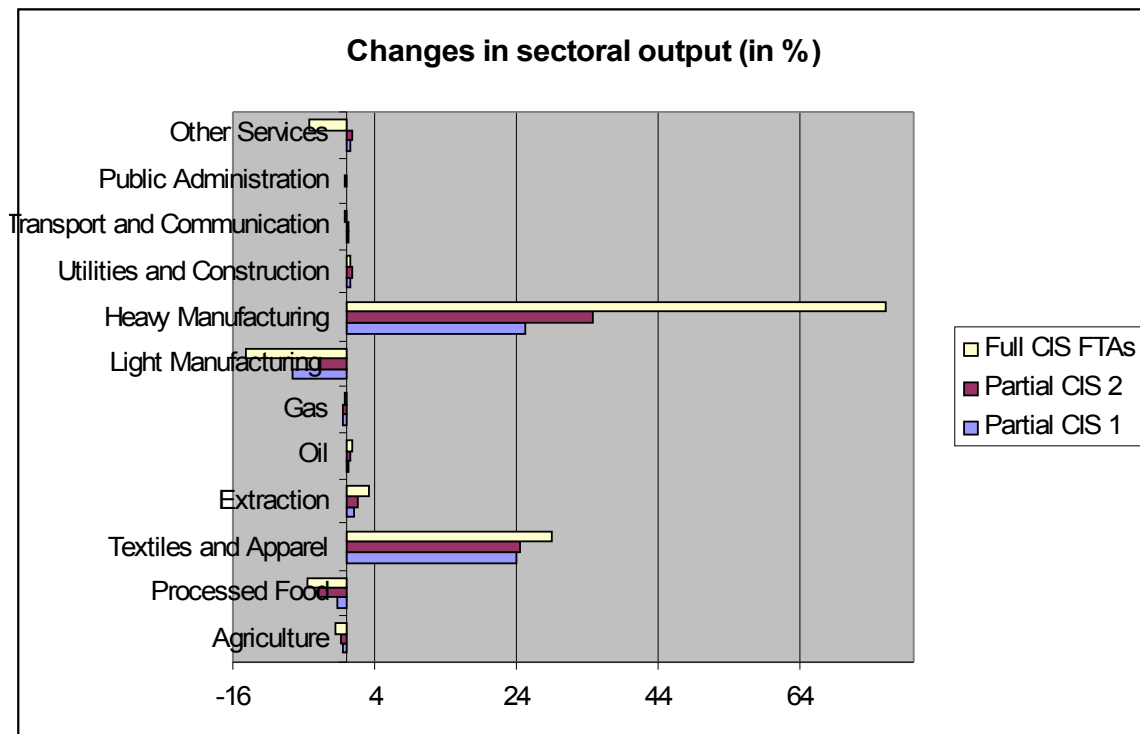
### 4.2 Changes in sectoral output in Armenia

Our analyses of the expected changes in sectoral output as a result of different forms of trade liberalisation show that important changes would occur in the sectoral output of Armenia. Figure 4-1 depicts changes in the output of different sectors in Armenia after the three different FTA would take place.

The most pronounced decrease would take place in the light manufacturing sector. The light manufacturing sector would experience a decrease in output which would be around 4-8% in the case of the first two scenarios and would be somewhat higher, around 15% under the full FTA scenario. Apart from light manufacturing sectors processed food products would also experience a drop in \ output which would be the highest under the third FTA with a magnitude of 6% and somewhat lower under the two other FTA scenarios.

Most other sectors would have only a very limited change in their outputs under the different scenarios. Sectors belonging to heavy manufacturing sectors would experience an important increase in the output representing a 25-35% increase under the first two scenarios and a 76% increase under the third type of FTA scenario which would incorporate liberalization in services. Apart from heavy manufacturing an important increase would occur in textiles and apparel amounting to 24-29% increase depending on the scenario.

**Figure 4-5 Changes in sectoral output**



Source: Model simulations. Note: All results are reported as percentage change compared to baseline.

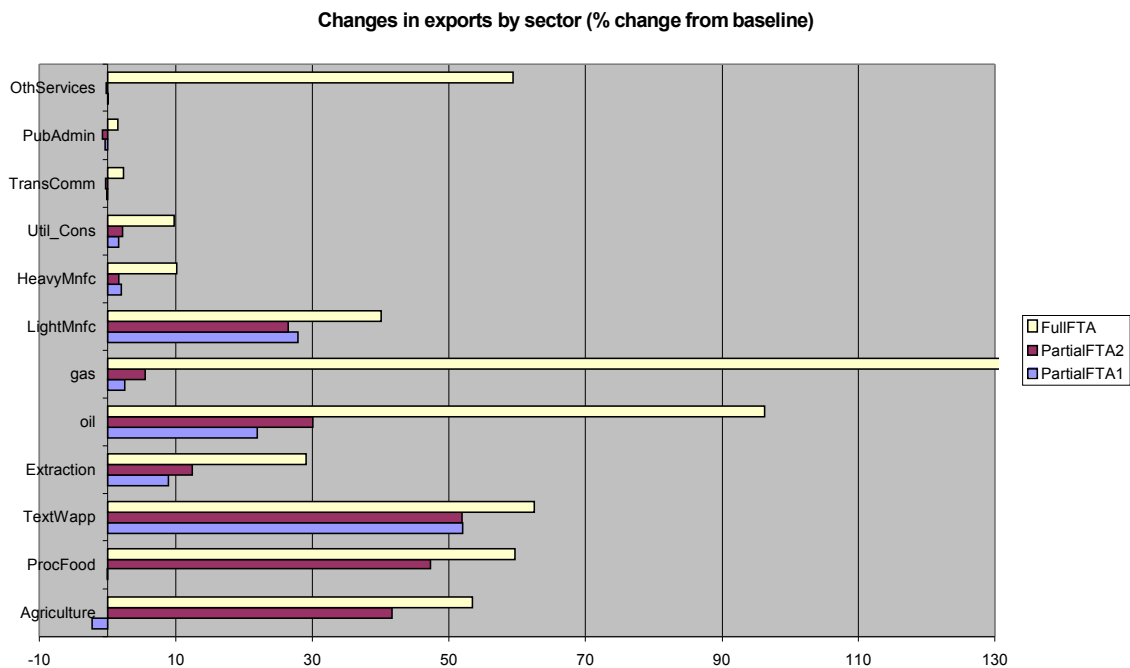
### **4.3 Effects on bilateral trade flows**

In this section we provide detailed results on trade impacts in the three scenarios, and we present the changes in trade flows by sector.

The figure below depicts changes in EU exports towards Armenia after the three different FTA scenarios. The services sectors experience a small reduction in the first two scenarios. Under the third scenario, trade in services sectors belonging to ‘other services’

is liberalised. As a consequence of this there would be an important, about 60% increase in EU exports in other services sectors towards Armenia. An important increase would occur in exports of textiles and apparel under all scenarios, the biggest increase occurring under the third scenario. The exports in these sectors would increase by 62% under the full FTA scenario towards Armenia. Light manufacturing exports would also increase about 27-40% depending on the scenarios. When trade liberalisation would occur also in agriculture and processed food sectors, these sectors would also experience an important increase in their exports towards Armenia. There would be an increase in oil and gas exports, which according to the graph is important in terms of percentage change compared to the baseline scenario. The table below shows the percentage changes compared to the baseline together with the share of exports in each sector. The share of gas and oil sector's exports is very close to zero, thus the increase shown in the graph in the exports of gas Armenia in terms of level is minimal.

**Figure 4-6 Changes in EU exports to Armenia by sector.**



Source: Model simulations. Note: All results are reported as percentage change compared to baseline.

**Table 4 Percentage changes in sectoral exports of the EU**

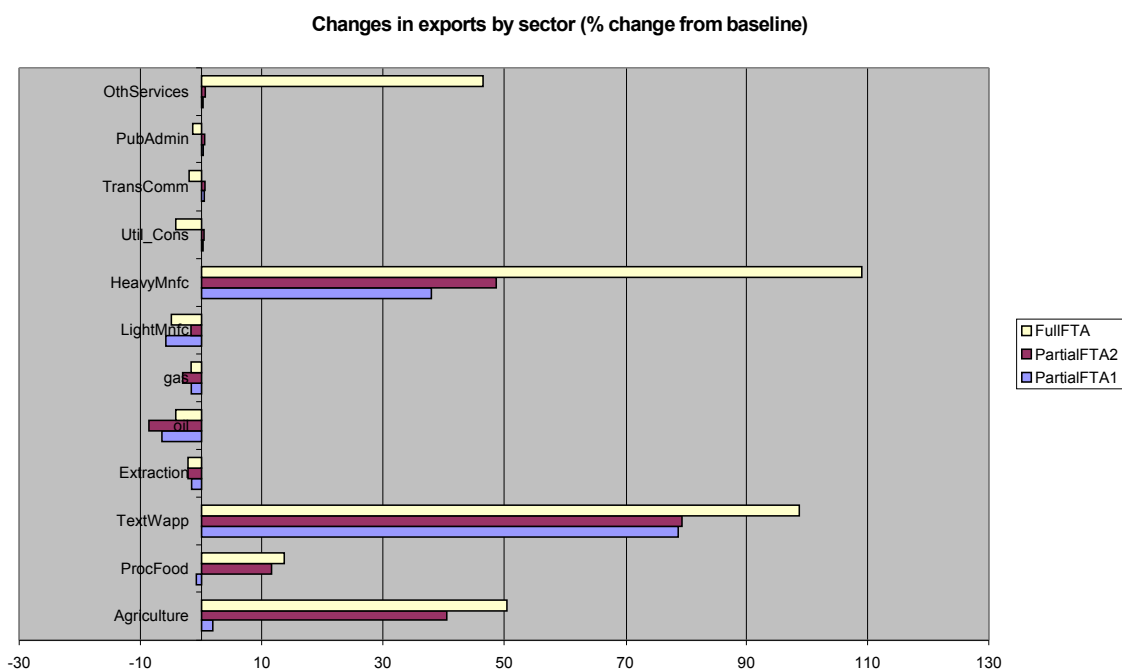
	Partial CIS 1	Partial CIS 2	Full CIS FTAs	share in total exports
Agriculture	-2.26	41.67	53.46	2.21%
Processed Food	-0.03	47.31	59.7	9.17%
Textiles and Apparel	52.03	51.94	62.51	4.64%
Extraction	8.92	12.42	29.08	15.82%
Oil	21.93	30.09	96.27	0.00%
Gas	2.51	5.51	280.15	0.00%
Light Manufacturing	27.9	26.47	40.08	11.76%
Heavy Manufacturing	2.02	1.65	10.12	37.40%
Utilities and Construction	1.63	2.19	9.5	1.76%
Transport and Communication	-0.11	-0.28	2.34	9.91%
Public Administration	-0.37	-0.74	1.51	1.10%
Other Services	0.08	-0.2	59.42	6.24%

Source: Model simulations. Note: All results are reported as percentage change compared to baseline.

Figure 4-3 shows percentage changes in exports of Armenia by each sector towards the EU. Similarly to the case of EU exports in services, an important increase would occur in other services exports if trade would be liberalised between the EU and the CIS in these sectors.

While there would be a small reduction in exports of oil, gas, extractions and light manufacturing exports, important increases would take place in exports of some of the sectors. The most pronounced increase would occur in the textiles and apparel sectors. Under the first and second scenarios, the increase would be around 79% and would be around 99% in case of full liberalisation. Exports in heavy manufacturing would increase by 38-48% under the two first scenarios and by 109% in case of full liberalisation. Increase in exports of processed food and agricultural products would take place mainly under the second two FTAs which would incorporate liberalisation in agricultural and processed goods apart from elimination of tariffs in industrial goods.

**Figure 4-7 Changes in Armenian exports to the EU by sector.**



Source: Model simulations. Note: All results are reported as percentage change compared to baseline.

Table 5 shows the percentage changes in sectoral exports together with the share of each sector in total exports towards the EU in the baseline. Although the most important increase would occur in the textiles and apparel sector with exports to the EU increasing by 78-98% depending on the scenario, this sector only represents a small share of exports in total exports. Less than 5% of exports occur in these sectors. Important increase would occur also in the agricultural sector under the two second scenarios. Again, this sector represents only a very small share of total exports therefore the change after the different FTAs in level would be only very small.

**Table 5 Percentage changes in sectoral exports of Armenia**

	Partial CIS 1	Partial CIS 2	Full CIS FTAs	share in total exports
Agriculture	1.95	40.55	50.49	1.45%
Processed Food	-0.78	11.47	13.75	1.38%
Textiles and Apparel	78.74	79.36	98.72	4.49%
Extraction	-1.55	-2.15	-2.15	7.20%
Oil	-6.44	-8.61	-4.16	0.00%
Gas	-1.59	-3.02	-1.64	0.00%
Light Manufacturing	-5.79	-1.66	-4.89	31.03%



Heavy Manufacturing	38.02	48.72	108.73	27.36%
Utilities and Construction	0.35	0.51	-4.17	5.60%
Transport and Communication	0.45	0.64	-1.96	13.52%
Public Administration	0.36	0.6	-1.38	1.64%
Other Services	0.33	0.71	46.54	6.34%

#### **4.4 Other Macroeconomic Results**

In this section other macroeconomic results, such as changes in wages and GDP are discussed. These results are summarized in Table 4.6 and Table 4.5 below. Armenia would have an increase of 0.51% in its GDP under the full FTA scenario which is shown in Table 4.6. This increase is less than half of the average increase which would take place in the CIS.

Armenia would experience an increase in wages for both the skilled and unskilled workers. This increase would be similar to those reported for the average of CIS for the wages of skilled workers where 1.45% increase would occur. The increase in Armenian wages for unskilled would be somewhat lower, around 1.01%.

**Table 4.6: Macroeconomic results from Full FTA (in %)**

	<b>EU</b>	<b>CIS</b>	<b>Armenia</b>
Change in GDP	0.18	1.19	0.51
Unskilled worker wage	0.26	1.56	1.01
Skilled worker wage	0.24	1.47	1.45

Source: Model simulations. Note: All results are reported as percentage change compared to baseline.

The results with regards to the effect on other macroeconomic variables of the more realistic scenarios of trade agreements are summarized in Table 4.7 below. These results are different in magnitude and represent smaller increases than the full FTA scenario. The first scenario would result in a small, 0.19% increase in the GDP while the second scenario would have a slightly higher positive effect.

Both skilled and unskilled workers in Armenia would experience an increase in their wages similarly to the full FTA scenario although the effects would be lower. The changes in wages in Armenia would be higher than those experienced by workers on average in the CIS or in the EU. The increase in wages in Armenia would be higher for skilled workers and lower for unskilled workers under all three FTA scenarios.

**Table 4.7: Macroeconomic results from Partial 1 & 2 trade agreement**

	Partial 1 trade agreement			Partial 2 trade agreement		
	EU	CIS	Armenia	EU	CIS	Armenia
Change in GDP	0.12	-0.13	0.19	0.10	-0.35	0.30
Unskilled worker wage	0.18	0.22	0.42	0.18	0.16	0.47
Skilled worker wage	0.16	0.32	0.59	0.15	0.36	0.72

Source: Model simulations. Note: All results are reported as percentage change compared to baseline.

#### 4.5 Terms of Trade Effects

The table below shows terms of trade effects in the case of full free trade agreement with liberalization not being limited to only agriculture and manufacturing products but also services trade and technical barriers. While the EU would have small terms of trade improvement amounting to about 0.11%, the CIS on average would experience 0.83% deterioration and the terms of trade deterioration would amount to 1% in the case of Armenia.

**Table 4.8: Terms of trade results from Full FTA (in %)**

	EU	CIS	Armenia
Terms of trade effects	0.11	-0.83	-1.00

Source: Model simulations. Note: All results are reported as percentage change compared to baseline.

The terms of trade effects for the two other forms of trade liberalisation are presented in the table below. Armenia again, similarly to the full FTA case would experience a terms of trade deterioration however it would be slightly lower under the first two FTAs than under full FTA liberalization. The decrease in terms of trade would be slightly smaller in magnitude under the first and second scenarios to the CIS average terms of trade changes. On the other hand the terms of trade gains for the EU would be significantly much smaller than for Armenia and always positive.

**Table 4.9: Terms of trade results from Partial 1 & 2 trade agreement**

	Partial 1 trade agreement			Partial 2 trade agreement		
	EU	CIS	Armenia	EU	CIS	Armenia
Terms of trade effects	0.09	-0.63	-0.31	0.10	-0.76	-0.73

Source: Model simulations. Note: All results are reported as percentage change compared to baseline

## 5 Conclusions

In this study we explore the economic effects of potential measures to liberalize trade between the European Union and Armenia. In so doing, we have a Computable General Equilibrium Model, CGE Model, based on the most recent version of the GTAP data base, i.e. GTAP 7, which is benchmarked to data from 2004. Our CGE model follows recent research in trade theory in taking differences in underlying industry specific market structures and elasticities into account. Furthermore, the model incorporates estimated non-tariff trade barriers to trade in services, stemming from industry-specific gravity equation, which enhances the analysis of the service sector. The results are compared to a baseline which incorporates recent developments in the trade policy environment, i.e. the phase out of ATC, enlargement of the EU and CIS accessions to the WTO. The analysis takes agricultural liberalization, liberalization in industrial tariffs, and liberalization in services trade as well as trade facilitation measures into account.

The EU is a very important trading partner for Armenia. On the other hand, Armenia plays only a marginal role in EU's trade relations. Furthermore, CIS as a region represents only a relatively small share of EU trade. As a consequence of this asymmetric relationship the effects of an FTA between the EU and the CIS would have asymmetric effects on the EU and Armenia. The impact of an FTA would be more pronounced for Armenia and rather marginal for the EU.

Only a rather limited income effect would occur in the EU as a consequence of the FTAs while the income effect in Armenia would be somewhat higher in magnitude but only under the third FTA scenario.

The change in GDP in the two regions reflects similar developments. The change in Armenia's GDP would be positive under all the three FTAs, the effect being rather small under the first two scenarios.

