

# **Measuring Regional Impacts of Trade Agreements: The impact of T-TIP in a small regional economy**

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## **Abstract**

The current study analyses the impact on the Azores, a small island regional economy of the Transatlantic Trade and Investment Partnership (T-TIP) between the European Union and the United States of America. A dynamic Computational General Equilibrium (CGE) model detailing six household categories, forty-five sectors, and four trading partners is used. Previous studies used aggregate variables and were largely based on the structure of the national economy. For a small, integrated economy, examination of foreign trade statistics comprises an underestimation, given that a good part, if not most, of the trade is channeled through greater national logistic centers. This limitation is overcome by contemplating the impacts of direct and indirect trade.

Relative to the business-as-usual scenario, gross domestic value is anticipated to be 0.4 to 0.77% higher by 2030. Using an equivalent variation, the estimated welfare impact is positive for all six household categories with relatively higher gains for the middle-income categories. The lowest relative impact is in the lowest and in the highest income categories. Using the change in value added, fisheries are negatively impacted, while agriculture registers ambiguous results depending on the scenario considered. Except for fish processing, the main industrial activities are not hurt. There is a positive impact on the very important dairy industry as well as in retail activities and services associated with tourism and air transportation.

The study underlines the importance of regional and even local analyses of the impact of trade agreements for better economic policies.

**Keywords:** Transatlantic Trade and Investment Partnership; Computational General Equilibrium Model; Azores

## 1 Introduction

The European Union (EU) has undertaken negotiations with the United States of America (USA) to arrive at an agreement for free trade and investment in the two economic blocks. This agreement rests on the elimination of custom duties and on the harmonization of product specification to eliminate regulatory barriers.

Official Transatlantic Trade and Investment Partnership (T-TIP) websites have been set up by both the USA (<https://ustr.gov/ttip>) and the EU (<http://ec.europa.eu/trade/policy/in-focus/ttip/>) to offer public information about the objectives and targets of benefits as well as about the negotiation process.

For the USA, the initiative is “an ambitious, comprehensive, and high-standard trade and investment agreement being negotiated between the United States and the European Union. T-TIP will help unlock opportunities for American families, workers, businesses, farmers and ranchers through increased access to European markets for Made-in-America goods and services. This will help to promote U.S. international competitiveness, jobs and growth”.

For the EU, “The aim of the agreement is to create growth and jobs on both sides of the Atlantic by removing trade barriers. Removing trade barriers would boost and facilitate the buying and selling of goods and services, as well as investment in each of the economies.” It is further expected that “...Making trade easier and removing barriers to trade through the planned agreement could result in a significant boost to growth for the EU”.

These studies underline the interest in understanding the impact of policies down to regional detail. The signing of the CETA trade agreement between the EU and Canada,

for example, was overclouded until the signing date of October 30, 2016, by the disagreement of the Belgian Region of Valónia.

The current study uses a dynamic Computational General Equilibrium (CGE) model of the Azores to assess the detailed impact of the T-TIP agreement on the Azores. It is based on an adaptation of AZORMOD (Ali et al., 2010).

The adaptations of the model involves the development of new specifications of the dynamics (investment) equation, the trade equation, and closure rules. It also involves the use of a Social Accounting Matrix (SAM) updated from 2001 to 2005.

In the sections that follow, we start, in Section 2, by reviewing the previous studies of T-TIP and in particular the one that focused on Portugal and the Azores. Section 3 presents the model to be used. Section 4 lays out the scenarios for the analysis of the impacts of the T-TIP. Section 5 presents the main results and their discussion.

## 2 Literature Review of T-TIP studies

Our review of the most relevant studies for T-TIP identified Ecorys (2009) as an extensive study on the potential economic impact of further trade liberalization focusing on the existence of non-tariff measures and regulatory divergence at the sectoral level. The study quantifies the magnitude of this divergence and the potential economic impact of a reduction or harmonization of these measures.

Another reference study of T-TIP was performed by Francois et al. (2013) to assess the economic impact of reducing transatlantic barriers to trade and investment. This study reviews the importance of the bilateral economic relationship and provides computable general equilibrium-based estimates for the economy-wide impact of reducing both tariff and non-tariff barriers. Estimates are provided with regard to the expected changes in the

GDP, sector output, aggregate and bilateral trade flows, wages, and labor displacement, among other issues.

A discussion of the models used to assess T-TIP is provided in the work of Pelkmans et al. (2014). According to the authors, “the GTAP, a Computable General Equilibrium which was run to assess the potential impacts of the agreement, represents the state-of-the-art in economics. The authors are not aware of any better tool to estimate the long-term impacts of such a complicated trade agreement. This approach also has several advantages. First, CGE allows modeling the behavior of different actors in several markets in the entire economy, including many sectors. Second, the GTAP-8 database (which has been used) provides a powerful and reliable set of data. This matters a lot because the data requirements for many countries (in this case, 40), many sectors (20), several types of markets and the baseline scenario are extremely demanding.”

The EU, in the form of a commission staff working document, also produced an analysis of the “Impact Assessment Report on the future of EU-USA trade relations” ([http://trade.ec.europa.eu/doclib/docs/2013/march/tradoc\\_150759.pdf](http://trade.ec.europa.eu/doclib/docs/2013/march/tradoc_150759.pdf)), which reviews the work done on this issue.

More recently, Francois and Manchin (2014) develop a CGE analysis focused on Portugal. The authors applied the main approach followed in Francois et al. (2013). Given the uncertainty regarding the final outcomes of the negotiations, various scenarios were analyzed.

The main findings of the authors are as follows: In contrast to the EU as a whole, where Non-Tariff Barriers (NTBs) are the most important element of a T-TIP, Portugal tariffs are just as important as NTB cost reductions. Because Portugal benefits proportionately more from tariff reductions than the EU as a whole, Portugal is likely to

benefit earlier, and to a greater extent, from the initial stages of T-TIP implementation. Over the short term, in the case of the initial stages of the implementation assuming a modest scenario, the estimated impact for Portugal was 0.66% of GDP. Long-term impacts for Portugal under core scenarios in the study ranged from 0.57% of the GDP under a shallow agreement to 0.76% of the GDP under a deep agreement.

Francois and Manchin (2014) concluded that, for the Azores, gross value added would increase from about €3279 million to €3289 million under an ambitious scenario, with a 0.35% increase in the Azores' GDP. Parallel to these changes, there would be a substantial increase in bilateral trade in manufacturing with the US, mainly attributable to the increased trade in processed food and primary products.

In terms of the aggregate variables, the GDP rises between 0.19% and 0.35%, while employment falls between 0.19% and 0.08%. Manufacturing exports to the US increase but fall in the case of those to the EU. Imports from the US increase but can either fall or increase marginally in the case of the EU, depending on the scenario. The model thus predicts that lower-income sectors will be hurt while higher-income activities might gain.

These results shed a considerable amount of doubt over the final impacts of T-TIP in the Azores. Particularly worrisome might be the fact that there is a very small increase in GDP, a fall in employment, and a lot of turbulence in the main economic activities of the islands.

It is important to recall footnote 16 of the study by Francois and Manchin (2014) that states “Given data limitations on the availability of detailed data on Azores, we had to make a simplifying assumption in estimating the impact on Azores. We assumed that the same % changes will occur at a sectoral level in Azores as in the corresponding sectors in Portugal as a whole. In other words, for example, if the estimated impact on the output

in primary products in Portugal is a 0,6% reduction, the same is assumed for Azores. In addition, data was available at a different aggregation for Azores, thus this was mapped into the sectors available for Portugal.”

The nature of these results clearly recommends further study. This is done with an extension of a regional CGE model, which we review in the following sections.

### 3 AZORMOD

The present study uses the dynamic general equilibrium model for the Azores, AzorMod, developed by Bayar et al. (2010) as a starting point. AzorMod offers a modeling platform of the Azores economy, represented by a dynamic, multi-sector CGE model that incorporates the behavior of six economic agents: enterprises, families, the regional government, the central government, the European Commission, and the rest of the world.

A detailed explanation of the model can be found in Fortuna et al. (2016), thus we limit the description of the model to its new features. More profound changes were introduced, namely the update of the database to 2005, review of the investment dynamics of the model, review of the closure rules, review of the trade assumptions, and review of mechanisms for scenario setups.

The model is solved using the general algebraic modeling system GAMS (Rosenthal, 2006).

AzorMod has a recursive dynamic structure composed of a sequence of several temporary equilibria. The first equilibrium in the sequence is given by the benchmark year. During each time period, the model is solved for an equilibrium given the exogenous conditions assumed for that particular period. The equilibria are connected to each other

through capital accumulation. Thus, the endogenous determination of investment behavior is essential for the dynamic part of the model. Investment and capital accumulation in year  $t$  depend on the expected rates of return for year  $t+1$ , which are determined by the actual returns on capital in year  $t$ .

In the previous specification, the normal rate of return to capital in each branch was specified as an inverse logistic function of the proportionate growth in the capital stock of sector  $s$  (Dixon and Rimmer, 2002).

The minimum possible growth rate was set at the negative of the rate of depreciation in branch  $s$ . This condition implies that investments in each branch of activity have positive values, such that once installed, capital cannot be shifted from one sector to another except for in the gradual process of depreciation. The maximum possible growth rate of capital stock in industry  $s$  is set as positive in order to avoid unrealistically large simulated growth rates (Dixon and Rimmer, 2002). In the current version, the minimum rate is taken as equal to 6% for all branches. For example, if the historically normal growth rate in an industry is 4%, the upper limit in any year  $t$  would not exceed 10%.

Under static expectations, investors are assumed to anticipate that the asset prices (the cost of buying a unit of capital) and the net rental rates will increase by the current rate of inflation.

The weighted average real return to capital was taken as a proxy for the real interest rate in AzorMod.

The new specification of the total investments (ITT) of Azores is given by the following equation:

$$ITT = \sum_s (KSKLAG_s) \cdot \{ \alpha \cdot [(GDPCLAG / GDPDEF) - (GDPCLAG / GDPDEFLAG)] / (GDPCLAG / GDPDEFLAG) - \beta \cdot PRATIOGR - \gamma \cdot [\log(\sum_s KSKLAG_s) - \log(GDPCLAG / GDPDEFLAG) + \phi \cdot \log(\sum_s (KSKLAG_s \cdot (1 + tk_s) + d_s) / GDPDEFLAG)] + erksk \}$$

where:

GDPCLAG	nominal GDP at the previous year (t-1)
GDPDEFLAG	GDP deflator at the previous year (t-1)
PRATIOGR	capital usage cost to GDPDEF ratio (growth rate)
KSKLAG <sub>s</sub>	capital stock at the previous year (t-1)
PKLAG <sub>s</sub>	return on capital at the previous year (t-1)
ITTLAG	total investment for the previous year (t-1)
$\alpha, \beta, \gamma, \phi$	coefficients <sup>1</sup>

The total investments are allocated among branches of activity according to the sectoral share (shINV):

$$shINV_s = [((PK_s / RINT - PKZ_s / RINTZ) + 1)^{\sigma_{I_s}} \cdot (INVZ_s / \sum_{ss} (INVZ_{ss}))] / \sum_{ss} [((PK_{ss} / RINT - PKZ_{ss} / RINTZ) + 1)^{\sigma_{I_{ss}}} \cdot (INVZ_{ss} / \sum_{sss} (INVZ_{sss}))]$$

where:

PK <sub>s</sub>	return to capital by branch of activity
RINT	average return to capital corresponding to firms
INV <sub>s</sub>	investments carried out in different branches of activity
PKZ <sub>s</sub>	return to capital by branch of activity – initial value
RINTZ	average return to capital corresponding to firms – initial value
INVZ <sub>s</sub>	investments carried out in different branches of – initial value

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<sup>1</sup>  $\alpha, \beta, \gamma$ , and  $\phi$  are equal to 0.039, 0.0048, 0.02, and 0.4, respectively. Values are collected from a CGE model of Luxembourg.



$\sigma I_s$	CES investment substitution elasticity by branch of activity <sup>2</sup>
s	a subscript for one of the production activities (45 branches of activity)
ss	the same as ‘s’ (used for exposition purposes)
sss	the same as ‘s’ (used for exposition purposes)

The closure rules refer to the manner in which demand and supply of commodities, the macroeconomic identities, and the factor markets are equilibrated ex-post. Due to the complexity of the model, a combination of closure rules is needed. The particular set of closure rules should also be consistent, to the greatest extent possible, with the institutional structure of the economy and with the purpose of the model.

In mathematical terms, the model should consist of an equal number of independent equations and endogenous variables. The closure rules reflect the choice of the model builder of which variables are exogenous and which variables are endogenous, so as to achieve ex-post equality.

The closure rules of the previous version of AzorMod were modified, since the results from the previous specification needed improvement.

The current closure of the model is defined as follows:

ERML.FX	Fixed exchange rate for Mainland (ERML)
EREU.FX	Fixed exchange rate for EU (EREU)
ERUS.FX	Fixed exchange rate for US (ERUS)
ERROW.FX	Fixed exchange rate for ROW (ERROW)
SUSEXO.FX	Fixed exogenous component of the US savings (SUSEXO)
SG.FX	Fixed Local Government savings (SG)

The elasticities on trade were collected for the new nests and updated and tested.

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<sup>2</sup>  $\sigma I_s$  are set to 1.2

## 4 Scenarios

The main purpose of this study was to measure the impacts of T-TIP on the Azorean economy, considering not only the impacts derived from trade with third countries but also trade with the rest of the country, with sector impacts (for the 45 sectors of the model) and social impacts (for 6 socioeconomic groups).

We present below three simulation scenarios (setups) that achieve the stated objective.

### 4.1 Scenario 1

The first scenario considers setting tariffs with the US to zero. It also considers the impact of reducing non-tariff restrictions, assuming two sub-scenarios: one for the modest case (1A) and one for the ambitious case (1B), as specified in Ecorys (2009).

The scenario was defined as follows:

$\text{expgr} = 0.017$  for ambitious case (0.0135 for modest case)

$\text{tmusc} = 0$

$\text{EDIMLc.FX} = \text{EDIMBAc} \times (1 + \text{expgr});$

$\text{EDIUSc.FX} = \text{EDIUSBac} \times (1 + \text{expgr});$

Where,

Expgr : growth rate of total exports from Ecorys study (modest and ambitious cases)

tmusc: tariffs on commodities from the USA

EDIMLc: export demand from Mainland

EDIUSc: export demand from the USA

EDIMLBac : export demand from Mainland in the baseline

EDIUSBac : export demand from the USA in the baseline

## 4.2 Scenario 2

The second scenario assumes that T-TIP has a direct effect on exports (same increase for all commodities) to the Mainland and the USA and an indirect effect on exports (different growth rates for commodities) to the Mainland, the USA, and the EU. The indirect effect is partially added to the direct effect for the Mainland and the USA, while the EU only accounts for the full indirect effect.

expgr = 0.017 for ambitious case (0.0135 for modest case)

tmusc = 0

$EDIMLc.FX = EDIMBac \times (1 + expgr + 0.8 \times EXMLgrc)$

$EDIUSc.FX = EDIUSBac \times (1 + expgr + 0.2 \times EXUSgrc)$

$EDIEUc.FX = EDIEUBac \times (1 + EXEUgrc)$

Where:

Expgr : growth rate of total exports from Ecorys study (modest and ambitious cases)

tmusc : tariffs on commodities from the USA

EDIMLc : export demand from the Mainland

EDIUSc : export demand from the USA

EDIEUc : export demand from the EU

EDIMLBac : export demand from the Mainland in the baseline

EDIUSBac : export demand from the USA in the baseline

EDIEUBac : export demand from the EU in the baseline

EXMLgrc : growth rate of export demand from the Mainland by commodity

EXUSgrc : growth rate of export demand from the USA by commodity

EXEUgrc : growth rate of export demand from the EU by commodity

In this scenario, we assume that T-TIP increases exports' demand from the USA. Given that exports from the Azores to the Mainland are also composed of exports which have the rest of the world as the final destination and especially the USA, we also increase the exports to the Mainland by the growth rate of total exports. Moreover since the increase of exports to the USA will boost demand for Portuguese products, we assume output of Portugal (the Mainland) will increase and boost demand of Portugal for Azorean products. Therefore the initial effect on exports from the Azores to the USA and to the Mainland will be amplified but a bit limited for first group of exports (the Azores to the USA). This scenario assumes, for the indirect effect, that exports from the Azores to the Mainland will increase by 80% since exports from the Azores to the Mainland represent around 85% of the total exports of the Azores. Since the increase of exports of the Azores to the USA will be captured mainly by the direct effect, we assume only 20% of the increase of exports demand from the USA by commodity will be added as the indirect effect to reduce the double-counting effect. The increase, from the indirect effect, is given by the growth rate of exports demand by commodity and by origin from the Ecorys report.

#### 4.3 Scenario 3

The third scenario assumes T-TIP having direct effect on exports (same increase for all commodities) to the Mainland and the US, and indirect effect on exports (different growth rates for commodities) to the Mainland and the EU. The indirect effect is fully added on the direct effect.

$$\text{expgr} = 0.017 \text{ for ambitious case (0.0135 for modest case)}$$

$$\text{tmusc} = 0$$

$$\text{EDIMLc.FX} = \text{EDIMLBAc} \times (1 + \text{expgr} + \text{EXMLgrc})$$

$$\text{EDIUSc.FX} = \text{EDIUSBAc} \times (1 + \text{expgr})$$

$$\text{EDIEUc.FX} = \text{EDIEUBAc} \times (1 + \text{EXEUgrc})$$

Compared to the previous case, we assume for this scenario that indirect effects are only accounted for exports demand from the Mainland and the EU. The direct effect (increase of total exports) is as the previous case i.e. exports demands from the Mainland and the USA increase following the growth rate of total exports. The indirect effect is given by 100% of the exports' demand increase by commodity from Ecorys study.

## 5 Results and Discussion

In this section, we present the results of the simulations in accordance with the scenarios that were set up. The results are presented for three major scenarios broken up in two sub-scenarios (moderate and ambitious), depending on the intensity of the reduction of the non-tariff barriers.

The resulting scenarios can be described as follows:

Table 1 - Scenario Set-up

Scenario		Reductions		export growth	Indirect Effects		
Designation	Intensity	Tarif	Non tariff	Factors	Mainland	US	EU
Scenario 1A	Modest	100%	20%	0,0135%	None	None	None

Scenario 1B	Ambitious	100%	50%	0,0170%	None	None	None
Scenario 2A	Modest	100%	20%	0,0135%	0.8*EXMLgr	0.2*EXUSgr	EXEUgr
Scenario 2B	Ambitious	100%	50%	0,0170%	0.8*EXMLgr	0.2*EXUSgr	EXEUgr
Scenario 3A	Modest	100%	20%	0,0135%	EXMLgr	None	EXEUgr
Scenario 3B	Ambitious	100%	50%	0,0170%	EXMLgr	None	EXEUgr

## 5.1. Macroeconomic Indicators

For comparison, we recall that Francois and Manchin (2014) estimated an increase of the GDP between 0.57% and 0.76% for the modest and ambitious scenarios, respectively, for Portugal and between 0.19% and 0.35% for the Azores.

The results obtained in the current study vary with the various scenarios. The lowest value that is found for 2030 is an impact of 0.4% relative to BAU in a modest scenario, (2A) and the highest is 0.77%, obtained in an ambitious scenario (3B). All scenarios for all periods point to positive impacts that become larger with time. The results are presented in Table 2.

Table 2 - Impacts on GDP

GDP (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scenario 1A	0.22	0.24	0.27	0.29	0.32	0.34	0.37	0.39	0.42	0.45	0.47	0.50	0.53	0.56	0.58
Scenario 1B	0.27	0.30	0.33	0.36	0.39	0.42	0.45	0.48	0.51	0.55	0.58	0.61	0.64	0.68	0.71
Scenario 2A	0.18	0.20	0.21	0.23	0.25	0.27	0.29	0.30	0.32	0.34	0.35	0.36	0.38	0.39	0.40
Scenario 2B	0.28	0.31	0.33	0.36	0.39	0.42	0.44	0.47	0.50	0.52	0.55	0.57	0.59	0.61	0.63
Scenario 3A	0.17	0.19	0.21	0.23	0.25	0.27	0.29	0.31	0.33	0.35	0.38	0.40	0.42	0.45	0.47
Scenario 3B	0.29	0.32	0.35	0.39	0.42	0.45	0.49	0.52	0.56	0.59	0.63	0.66	0.70	0.73	0.77

These results, when compared with those of François and Manchin (2014), suggest a much higher positive impact than would be expected, given the incorporation of more relevant information to obtain the current results.

Another aggregate variable provides the estimated growth of private consumption, as reported in Table 3. The model predicts higher growth rates when compared to the GDP, because the government budget is restricted and growth is expected to occur through the private sector.

Table 3 - Impacts on Private Consumption

Private Consumption (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scenario 1A	1.58	1.73	1.88	2.04	2.19	2.34	2.49	2.65	2.81	2.96	3.12	3.28	3.44	3.60	3.76
Scenario 1B	2.01	2.20	2.39	2.58	2.77	2.97	3.17	3.37	3.57	3.77	3.97	4.17	4.38	4.59	4.79
Scenario 2A	1.46	1.62	1.78	1.94	2.11	2.29	2.48	2.68	2.89	3.12	3.36	3.63	3.92	4.24	4.59
Scenario 2B	2.08	2.29	2.51	2.73	2.96	3.20	3.45	3.70	3.97	4.25	4.54	4.85	5.18	5.54	5.92
Scenario 3A	1.40	1.54	1.69	1.84	1.99	2.15	2.31	2.48	2.66	2.84	3.02	3.22	3.42	3.63	3.84
Scenario 3B	2.02	2.22	2.43	2.64	2.86	3.08	3.30	3.53	3.77	4.01	4.26	4.52	4.78	5.05	5.33

The trade impacts also turn out to be all positive, resulting in more exports, more imports, and a better external balance, because exports supersede imports.

Tables 4 to 6 provide the impacts relative to the reference base.

Table 4 - Impacts on Foreign Balances

Foreign Balances (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scenario 1A	2.06	2.25	2.45	2.64	2.84	3.04	3.24	3.45	3.65	3.86	4.07	4.27	4.48	4.70	4.91
Scenario 1B	2.62	2.87	3.13	3.38	3.64	3.90	4.16	4.43	4.69	4.96	5.24	5.51	5.79	6.07	6.35
Scenario 2A	1.96	2.18	2.41	2.65	2.90	3.17	3.45	3.76	4.10	4.46	4.86	5.30	5.79	6.34	6.96
Scenario 2B	2.74	3.03	3.33	3.65	3.97	4.32	4.68	5.06	5.46	5.89	6.35	6.84	7.38	7.96	8.59
Scenario 3A	1.87	2.07	2.28	2.49	2.71	2.94	3.18	3.42	3.68	3.95	4.23	4.52	4.82	5.14	5.48
Scenario 3B	2.64	2.92	3.20	3.48	3.78	4.09	4.40	4.73	5.06	5.41	5.77	6.14	6.52	6.92	7.34

Table 5 - Impacts on Exports

Exports (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scenario 1A	2.34	2.58	2.82	3.07	3.32	3.56	3.81	4.07	4.32	4.57	4.83	5.08	5.34	5.60	5.86

Scenario 1B	2.93	3.24	3.54	3.85	4.16	4.47	4.79	5.11	5.42	5.74	6.06	6.39	6.71	7.04	7.36
Scenario 2A	2.03	2.23	2.43	2.63	2.83	3.02	3.21	3.39	3.57	3.74	3.89	4.03	4.16	4.26	4.34
Scenario 2B	2.81	3.09	3.37	3.65	3.93	4.21	4.49	4.76	5.03	5.29	5.55	5.79	6.02	6.23	6.43
Scenario 3A	1.98	2.18	2.38	2.58	2.77	2.97	3.17	3.37	3.56	3.76	3.95	4.14	4.32	4.51	4.69
Scenario 3B	2.78	3.06	3.34	3.62	3.91	4.19	4.47	4.75	5.03	5.31	5.59	5.87	6.14	6.42	6.69

Table 6 - Impacts on Imports

Imports (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scenario 1A	2.17	2.39	2.60	2.82	3.04	3.26	3.48	3.70	3.93	4.16	4.38	4.61	4.84	5.08	5.31
Scenario 1B	2.75	3.02	3.30	3.57	3.85	4.14	4.42	4.71	5.00	5.29	5.58	5.88	6.18	6.48	6.78
Scenario 2A	1.99	2.20	2.42	2.64	2.87	3.11	3.35	3.61	3.88	4.16	4.46	4.77	5.11	5.47	5.86
Scenario 2B	2.77	3.05	3.35	3.65	3.96	4.27	4.60	4.94	5.28	5.64	6.01	6.40	6.81	7.23	7.68
Scenario 3A	1.92	2.12	2.32	2.53	2.74	2.95	3.17	3.40	3.63	3.87	4.11	4.36	4.61	4.87	5.14
Scenario 3B	2.70	2.97	3.26	3.54	3.83	4.13	4.43	4.74	5.05	5.37	5.69	6.03	6.36	6.71	7.06

5.2 Labor Market

Given the positive impacts on GDP, positive impacts are also expected on the labor market. Total employment is expected to increase between 1.05% and 1.67%. If we take a reference of 100,000 employed, this would imply an additional 1,050 to 1,670 new jobs by 2030. The results relative to employment are presented in Table 7.

Table 7 - Impacts on Employment

Employment (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scenario 1A	0.49	0.54	0.59	0.64	0.69	0.74	0.79	0.84	0.89	0.95	1.00	1.05	1.11	1.16	1.22
Scenario 1B	0.62	0.68	0.74	0.80	0.86	0.93	0.99	1.06	1.12	1.19	1.25	1.32	1.39	1.46	1.53
Scenario 2A	0.42	0.47	0.51	0.56	0.61	0.66	0.71	0.76	0.81	0.87	0.93	1.00	1.07	1.14	1.22
Scenario 2B	0.61	0.67	0.73	0.80	0.87	0.93	1.01	1.08	1.15	1.23	1.31	1.40	1.48	1.57	1.67
Scenario 3A	0.39	0.43	0.47	0.52	0.56	0.60	0.65	0.70	0.74	0.79	0.84	0.89	0.95	1.00	1.05
Scenario 3B	0.56	0.62	0.68	0.74	0.80	0.86	0.92	0.98	1.05	1.11	1.18	1.25	1.32	1.39	1.46

The unemployment rate is expected, consequently, to fall. Table 8 provides the estimates of the reduction of these rates.



Table 8 - Impacts on Unemployment rate

Unemployment rate (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scenario 1A	-0.46	-0.50	-0.55	-0.60	-0.64	-0.69	-0.74	-0.79	-0.84	-0.88	-0.93	-0.98	-1.03	-1.08	-1.14
Scenario 1B	-0.58	-0.64	-0.69	-0.75	-0.81	-0.87	-0.93	-0.99	-1.05	-1.11	-1.17	-1.23	-1.30	-1.36	-1.42
Scenario 2A	-0.40	-0.44	-0.48	-0.52	-0.57	-0.61	-0.66	-0.71	-0.76	-0.82	-0.87	-0.93	-1.00	-1.06	-1.14
Scenario 2B	-0.57	-0.63	-0.69	-0.75	-0.81	-0.88	-0.94	-1.01	-1.08	-1.15	-1.23	-1.30	-1.38	-1.47	-1.56
Scenario 3A	-0.37	-0.41	-0.45	-0.49	-0.53	-0.57	-0.61	-0.65	-0.70	-0.74	-0.79	-0.83	-0.88	-0.93	-0.98
Scenario 3B	-0.53	-0.58	-0.64	-0.69	-0.75	-0.80	-0.86	-0.92	-0.98	-1.04	-1.10	-1.17	-1.23	-1.30	-1.37

These results contradict the results obtained by Francois and Manchin (2014), predicting a decrease in employment in the Azores.

5.3 Government Revenues

A higher GDP is expected to generate higher revenues, both from taxes on income and taxes on consumption. Government revenues are expected to increase anywhere between 3.59 and 5.53% relative to the base scenario.

Table 9 - Impacts on Government Revenues

Government Revenues (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scenario 1A	1.56	1.71	1.86	2.01	2.16	2.31	2.46	2.62	2.77	2.92	3.08	3.24	3.39	3.55	3.71
Scenario 1B	2.00	2.19	2.38	2.57	2.76	2.96	3.16	3.35	3.55	3.75	3.95	4.16	4.36	4.57	4.78
Scenario 2A	1.40	1.55	1.70	1.85	2.01	2.18	2.35	2.53	2.73	2.93	3.14	3.38	3.63	3.90	4.19
Scenario 2B	1.99	2.19	2.40	2.61	2.83	3.05	3.28	3.52	3.77	4.02	4.29	4.58	4.87	5.19	5.53
Scenario 3A	1.34	1.47	1.61	1.76	1.90	2.05	2.20	2.36	2.52	2.69	2.86	3.03	3.21	3.40	3.59
Scenario 3B	1.92	2.12	2.31	2.51	2.71	2.92	3.13	3.34	3.56	3.78	4.01	4.25	4.49	4.73	4.98

5.4. Household Welfare

Household welfare is evaluated through equivalent variation. Since the Social Accounting Matrix used in the model disaggregates between six household income categories, welfare impacts are estimated accordingly.

Tables 10 to 15 present the results of equivalent variation for each of the six income groups.

The group that seems to benefit relatively less is the lowest income group, registering the least increases relative to the BAU scenario. The four middle-income groups are those that register the strongest relative increases, vis-à-vis the BAU scenario.

Table 10 - Impacts on Income of Household Income Level 1

Equivalent Variation HH1 (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scenario 1A	0.64	0.69	0.75	0.81	0.86	0.92	0.97	1.03	1.08	1.14	1.19	1.25	1.30	1.36	1.41
Scenario 1B	0.80	0.88	0.95	1.02	1.09	1.16	1.23	1.30	1.37	1.44	1.51	1.58	1.65	1.72	1.79
Scenario 2A	0.63	0.69	0.76	0.83	0.90	0.98	1.06	1.14	1.23	1.33	1.44	1.55	1.68	1.82	1.98
Scenario 2B	0.87	0.95	1.04	1.13	1.22	1.31	1.41	1.51	1.62	1.73	1.84	1.97	2.10	2.24	2.39
Scenario 3A	0.61	0.67	0.73	0.80	0.86	0.93	1.00	1.07	1.14	1.22	1.30	1.38	1.46	1.55	1.64
Scenario 3B	0.87	0.95	1.04	1.13	1.21	1.30	1.39	1.49	1.58	1.68	1.78	1.88	1.98	2.09	2.20

Table 11 - Impacts on Income of Household Income Level 2

Equivalent Variation HH2 (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scenario 1A	1.34	1.47	1.60	1.72	1.85	1.98	2.11	2.24	2.37	2.50	2.63	2.76	2.90	3.03	3.16
Scenario 1B	1.69	1.84	2.00	2.16	2.32	2.48	2.64	2.81	2.97	3.13	3.30	3.46	3.62	3.79	3.95
Scenario 2A	1.25	1.38	1.52	1.66	1.80	1.95	2.11	2.28	2.46	2.64	2.85	3.06	3.30	3.55	3.84
Scenario 2B	1.75	1.92	2.10	2.29	2.48	2.67	2.87	3.08	3.29	3.51	3.74	3.99	4.24	4.51	4.80
Scenario 3A	1.20	1.32	1.44	1.57	1.70	1.84	1.98	2.12	2.27	2.42	2.57	2.73	2.90	3.07	3.25
Scenario 3B	1.70	1.87	2.04	2.22	2.39	2.57	2.76	2.94	3.14	3.33	3.53	3.73	3.94	4.15	4.36

Table 12 - Impacts on Income of Household Income Level 3

Equivalent Variation HH3 (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scenario 1A	1.43	1.56	1.69	1.83	1.97	2.10	2.24	2.38	2.52	2.66	2.80	2.94	3.08	3.22	3.36
Scenario 1B	1.79	1.96	2.12	2.29	2.46	2.64	2.81	2.98	3.15	3.32	3.50	3.67	3.84	4.02	4.19

Scenario 2A	1.32	1.46	1.60	1.75	1.90	2.06	2.23	2.41	2.59	2.79	3.01	3.23	3.48	3.75	4.05
Scenario 2B	1.85	2.04	2.23	2.42	2.62	2.82	3.03	3.25	3.48	3.71	3.96	4.21	4.48	4.77	5.07
Scenario 3A	1.26	1.39	1.53	1.66	1.80	1.94	2.09	2.24	2.40	2.56	2.72	2.89	3.06	3.24	3.43
Scenario 3B	1.80	1.98	2.16	2.34	2.53	2.72	2.92	3.11	3.32	3.52	3.73	3.94	4.16	4.38	4.61

Table 13 - Impacts on Income of Household Income Level 4

Equivalent Variation HH4 (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scenario 1A	1.46	1.60	1.74	1.88	2.02	2.16	2.30	2.44	2.59	2.73	2.87	3.01	3.16	3.30	3.45
Scenario 1B	1.83	2.01	2.18	2.35	2.53	2.70	2.88	3.06	3.23	3.41	3.59	3.77	3.95	4.12	4.30
Scenario 2A	1.35	1.50	1.64	1.79	1.95	2.11	2.28	2.46	2.66	2.86	3.08	3.31	3.56	3.84	4.14
Scenario 2B	1.89	2.08	2.28	2.48	2.68	2.89	3.11	3.33	3.56	3.80	4.05	4.31	4.59	4.88	5.18
Scenario 3A	1.29	1.43	1.56	1.70	1.84	1.99	2.14	2.29	2.45	2.62	2.78	2.96	3.14	3.32	3.51
Scenario 3B	1.84	2.02	2.21	2.40	2.59	2.79	2.99	3.19	3.40	3.61	3.82	4.04	4.26	4.49	4.72

Table 14 - Impacts on Income of Household Income Level 5

Equivalent Variation HH5 (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scenario 1A	1.54	1.69	1.84	1.98	2.13	2.28	2.43	2.58	2.73	2.88	3.03	3.18	3.33	3.49	3.64
Scenario 1B	1.94	2.12	2.30	2.48	2.67	2.85	3.04	3.22	3.41	3.60	3.79	3.97	4.16	4.35	4.54
Scenario 2A	1.43	1.58	1.73	1.89	2.05	2.23	2.41	2.60	2.80	3.01	3.24	3.49	3.75	4.04	4.36
Scenario 2B	2.00	2.20	2.40	2.61	2.83	3.05	3.27	3.51	3.75	4.00	4.26	4.54	4.83	5.13	5.46
Scenario 3A	1.36	1.50	1.65	1.79	1.94	2.10	2.26	2.42	2.59	2.76	2.93	3.12	3.31	3.50	3.70
Scenario 3B	1.94	2.13	2.33	2.53	2.73	2.94	3.15	3.36	3.58	3.80	4.02	4.25	4.49	4.73	4.97

Table 15 - Impacts on Income of Household Income Level 6

Equivalent Variation HH6 (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scenario 1A	1.26	1.38	1.51	1.63	1.75	1.87	1.99	2.12	2.24	2.37	2.49	2.62	2.74	2.87	3.00
Scenario 1B	1.58	1.73	1.89	2.04	2.19	2.34	2.49	2.65	2.80	2.96	3.11	3.27	3.42	3.58	3.73
Scenario 2A	1.16	1.29	1.41	1.54	1.68	1.82	1.97	2.12	2.28	2.46	2.64	2.84	3.06	3.29	3.55
Scenario 2B	1.63	1.80	1.97	2.14	2.32	2.50	2.68	2.87	3.07	3.28	3.49	3.72	3.95	4.20	4.46
Scenario 3A	1.11	1.23	1.34	1.46	1.59	1.71	1.84	1.98	2.11	2.25	2.40	2.55	2.70	2.86	3.02
Scenario 3B	1.59	1.75	1.91	2.07	2.24	2.41	2.58	2.76	2.93	3.12	3.30	3.49	3.68	3.88	4.08

Looking at the equivalent variation in euros (Table 16), we arrive at an estimate of added wellbeing equivalent to 75 to 119 million euros per year by 2030.

A GDP of 3.800 million euros represents an increment of 2 to 3%.

Table 16 - Impacts on Income of Household Income – Aggregate

<b>Total Equivalent Variation (million €)</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Scenario 1A	22.29	25.01	27.88	30.89	34.06	37.39	40.88	44.54	48.38	52.41	56.63	61.06	65.69	70.54	75.62
Scenario 1B	28.19	31.66	35.30	39.14	43.17	47.41	51.87	56.54	61.45	66.60	72.01	77.67	83.61	89.83	96.34
Scenario 2A	20.65	23.40	26.36	29.55	32.99	36.73	40.79	45.21	50.07	55.41	61.32	67.89	75.24	83.50	92.83
Scenario 2B	29.25	33.06	37.14	41.49	46.16	51.16	56.53	62.31	68.54	75.28	82.60	90.55	99.24	108.76	119.24
Scenario 3A	19.70	22.28	25.04	27.98	31.13	34.49	38.08	41.92	46.03	50.43	55.14	60.20	65.61	71.42	77.66
Scenario 3B	28.42	32.08	35.97	40.11	44.52	49.20	54.18	59.47	65.10	71.09	77.46	84.25	91.47	99.17	107.37

## 5.5. Value Added by sector

The impact of T-TIP on the different production sectors can be analyzed through its impact on the value added. Even though the total impact is positive, some sectors are more likely to gain and others to lose relative to the business-as-usual scenario.

Table 17 - Value Added Impacts by Sector – Scenario 1A

<b>Value added (% change to the BAU)</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Agriculture, hunting and forestry, logging	0.14	0.18	0.22	0.26	0.31	0.35	0.40	0.45	0.50	0.55	0.61	0.66	0.71	0.77	0.82
Fishing	-0.45	-0.49	-0.54	-0.58	-0.63	-0.67	-0.71	-0.76	-0.80	-0.84	-0.88	-0.93	-0.97	-1.01	-1.05
Mining and quarrying	-0.91	-1.01	-1.11	-1.21	-1.31	-1.41	-1.51	-1.61	-1.72	-1.82	-1.92	-2.02	-2.12	-2.23	-2.33
Production of meat and meat products	-0.71	-0.78	-0.85	-0.92	-0.99	-1.07	-1.14	-1.21	-1.28	-1.35	-1.42	-1.49	-1.56	-1.64	-1.71
Processing of fish and fish products	-0.36	-0.39	-0.42	-0.46	-0.49	-0.51	-0.54	-0.57	-0.60	-0.62	-0.65	-0.67	-0.70	-0.72	-0.74
Manufacture of dairy products	5.25	5.79	6.34	6.88	7.44	7.99	8.55	9.12	9.68	10.25	10.82	11.40	11.97	12.55	13.13
Prepared animal feeds	-1.29	-1.39	-1.48	-1.56	-1.65	-1.74	-1.82	-1.90	-1.99	-2.07	-2.15	-2.24	-2.32	-2.40	-2.49
Beverages & tobacco products	0.91	1.00	1.11	1.21	1.31	1.42	1.52	1.63	1.74	1.85	1.96	2.07	2.19	2.30	2.41
Fruits, vegetables, animal oils, grain mill, starches	-2.72	-2.97	-3.22	-3.47	-3.71	-3.96	-4.20	-4.45	-4.69	-4.93	-5.17	-5.42	-5.66	-5.90	-6.14
Textiles and leather	-0.59	-0.67	-0.75	-0.84	-0.92	-1.00	-1.09	-1.17	-1.26	-1.34	-1.42	-1.51	-1.59	-1.67	-1.75
Wood and products of wood and cork	0.69	0.76	0.84	0.91	0.99	1.06	1.14	1.22	1.30	1.38	1.46	1.54	1.62	1.70	1.79
Pulp, paper products; publishing and printing	-3.01	-3.32	-3.62	-3.93	-4.24	-4.54	-4.85	-5.16	-5.47	-5.78	-6.09	-6.39	-6.70	-7.01	-7.32
Coke, refined petroleum products and nuclear fuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Chemicals and chemical products	-0.04	-0.04	-0.04	-0.03	-0.03	-0.02	-0.01	0.00	0.01	0.02	0.04	0.05	0.07	0.09	0.11
Rubber and plastic products	-2.73	-3.01	-3.30	-3.59	-3.88	-4.17	-4.46	-4.75	-5.04	-5.33	-5.62	-5.91	-6.20	-6.49	-6.79
Other non-metallic mineral products	-1.89	-2.09	-2.30	-2.51	-2.71	-2.92	-3.13	-3.34	-3.55	-3.76	-3.97	-4.18	-4.39	-4.60	-4.81
Basic metals and fabricated metal products	-2.26	-2.54	-2.83	-3.12	-3.41	-3.70	-4.00	-4.29	-4.59	-4.89	-5.19	-5.49	-5.79	-6.09	-6.39
Machinery and equipment n.e.c.	-4.94	-5.54	-6.15	-6.76	-7.38	-8.00	-8.62	-9.25	-9.87	-10.49	-11.12	-11.74	-12.36	-12.98	-13.60
Electrical and optical equipment	-8.22	-9.03	-9.86	-10.68	-11.50	-12.32	-13.14	-13.95	-14.77	-15.58	-16.39	-17.19	-17.99	-18.78	-19.58
Transport equipment	-7.48	-8.19	-8.91	-9.62	-10.33	-11.04	-11.75	-12.46	-13.17	-13.87	-14.57	-15.27	-15.97	-16.66	-17.35
Manufacturing n.e.c.	-2.57	-2.89	-3.23	-3.57	-3.92	-4.27	-4.62	-4.98	-5.34	-5.70	-6.06	-6.43	-6.79	-7.15	-7.52
Electricity, gas, steam and hot water supply	0.96	1.05	1.15	1.24	1.34	1.43	1.53	1.62	1.72	1.82	1.92	2.02	2.12	2.23	2.33
Collection, purification and distribution of water	1.12	1.23	1.35	1.46	1.58	1.69	1.81	1.93	2.05	2.17	2.29	2.42	2.54	2.66	2.79
Construction	0.18	0.19	0.21	0.23	0.25	0.27	0.28	0.30	0.32	0.34	0.36	0.38	0.40	0.42	0.44
Sale, maintenance, repair of motor vehicles and motorcycles	1.39	1.52	1.65	1.79	1.92	2.06	2.20	2.34	2.48	2.62	2.76	2.91	3.05	3.20	3.34
Wholesale trade and commission trade, except of motor vehicles and motorcycles	1.31	1.44	1.56	1.69	1.82	1.95	2.08	2.21	2.35	2.48	2.61	2.75	2.89	3.02	3.16
Retail trade, except of motor vehicles and motorcycles	1.36	1.49	1.62	1.75	1.89	2.02	2.16	2.30	2.44	2.57	2.72	2.86	3.00	3.14	3.29
Hotels and restaurants	2.50	2.74	2.98	3.22	3.47	3.71	3.96	4.21	4.46	4.72	4.97	5.23	5.49	5.75	6.02
Land transport; transport via pipelines	0.79	0.87	0.96	1.04	1.13	1.22	1.30	1.39	1.48	1.57	1.66	1.76	1.85	1.94	2.04
Water transport	-0.73	-0.83	-0.93	-1.03	-1.13	-1.23	-1.34	-1.44	-1.55	-1.65	-1.75	-1.86	-1.96	-2.07	-2.17
Air transport	1.49	1.67	1.85	2.03	2.22	2.41	2.60	2.80	2.99	3.19	3.39	3.59	3.79	3.99	4.19
Supporting transport activities; activities of travel agencies	0.95	1.06	1.17	1.29	1.40	1.51	1.63	1.74	1.86	1.98	2.10	2.22	2.34	2.46	2.58
Post and telecommunications	0.91	1.00	1.10	1.19	1.29	1.38	1.48	1.58	1.68	1.78	1.88	1.98	2.08	2.19	2.29
Financial intermediation, excluding insurance and pension funding	-0.20	-0.22	-0.24	-0.26	-0.27	-0.29	-0.30	-0.32	-0.34	-0.35	-0.37	-0.38	-0.40	-0.41	-0.42
Insurance and pension funding, except compulsory social security	0.35	0.38	0.42	0.45	0.49	0.53	0.56	0.60	0.64	0.68	0.72	0.75	0.79	0.83	0.87
Activities auxiliary to financial intermediation	-2.44	-2.77	-3.11	-3.46	-3.81	-4.17	-4.53	-4.89	-5.26	-5.63	-6.00	-6.38	-6.75	-7.13	-7.50
Real estate activities	0.46	0.52	0.57	0.63	0.68	0.74	0.80	0.86	0.92	0.98	1.04	1.10	1.16	1.22	1.28
Renting of machinery and equipment without operator	-0.40	-0.45	-0.51	-0.56	-0.61	-0.66	-0.71	-0.76	-0.81	-0.86	-0.91	-0.96	-1.02	-1.07	-1.12
Computer and related activities; research and development	-0.96	-1.10	-1.23	-1.37	-1.51	-1.66	-1.80	-1.95	-2.09	-2.24	-2.39	-2.53	-2.68	-2.83	-2.97
Other business activities	-0.79	-0.87	-0.95	-1.04	-1.12	-1.21	-1.29	-1.38	-1.46	-1.54	-1.63	-1.71	-1.79	-1.88	-1.96
Public administration and defense; compulsory social security	-0.74	-0.81	-0.88	-0.95	-1.02	-1.10	-1.17	-1.25	-1.33	-1.40	-1.48	-1.56	-1.63	-1.71	-1.79
Education	-0.73	-0.79	-0.86	-0.92	-0.99	-1.06	-1.12	-1.19	-1.26	-1.33	-1.40	-1.47	-1.54	-1.61	-1.68
Health and social work	0.34	0.37	0.41	0.44	0.48	0.52	0.55	0.59	0.62	0.66	0.70	0.74	0.77	0.81	0.85
Other community, social and personal service activities	1.20	1.32	1.44	1.56	1.68	1.80	1.93	2.05	2.18	2.30	2.43	2.56	2.69	2.82	2.95
Activities of households as employers of domestic staff	1.53	1.68	1.82	1.97	2.12	2.27	2.42	2.58	2.73	2.88	3.04	3.20	3.35	3.51	3.67

Focusing on the main sectors of the Azorean economy, the results of this first scenario point to a positive, even if small, impact on agriculture and dairy production and a negative impact on meat production, fishing, and fish processing. None of the major economic activities in the Azores are significantly affected on the negative side. The negative impact of public administration results from the assumptions made with respect to closure rules, which restrict public expenditure. Public policy might eventually determine otherwise. This would imply a different scenario. Still on the positive impacts we would find retail trade, restaurant, and hotel activities and air transport. This conclusion is similar to that obtained by Francois and Manchin (2014), except for the results we find for agriculture and the dairy industry, which is positive.

Scenario 1B provides the same pattern of results, with slightly different impact magnitudes.

Scenario 2A provides a different conclusion for the impact on agriculture, which is now negative, even if small. Otherwise, the same conclusions hold, even if with different magnitudes that are consistent with the aggregate results obtained. This result might be due to the induced effects through the national economy which had a negative variation in the primary sector.

The same conclusion holds for the remaining scenarios. This leads to a general conclusion that critical sectors like dairy will not be negatively affected. On the contrary, this sector will tend to gain with the new context, with impacts by 2030 that vary from 5.55% in scenario 2A to 13.13% in scenario 1B. The results for agriculture are ambiguous, varying from plus 0.82% to minus 1.6%.

The impact on construction is very small, at a maximum of 0.48% in the more favorable scenario.

Retail trade, tourism, and air travel all increase with clearly positive impacts.

Fisheries and fish processing will tend to exhibit negative impacts. This result is consistent in all scenarios and with the results of François and Manchin (2014).

The results of Scenario 2A are presented in Table 18.

Table 18 - Value Added Impacts by Sector – Scenario 2A

Value added (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Agriculture, hunting and forestry, logging	-0.16	-0.18	-0.21	-0.24	-0.28	-0.32	-0.36	-0.42	-0.48	-0.56	-0.64	-0.74	-0.86	-0.99	-1.15
Fishing	-0.40	-0.46	-0.51	-0.57	-0.63	-0.70	-0.77	-0.84	-0.93	-1.02	-1.12	-1.23	-1.35	-1.49	-1.65
Mining and quarrying	-0.77	-0.86	-0.96	-1.06	-1.16	-1.26	-1.37	-1.49	-1.60	-1.73	-1.86	-2.00	-2.15	-2.31	-2.48
Production of meat and meat products	-0.62	-0.69	-0.76	-0.84	-0.92	-1.00	-1.08	-1.17	-1.26	-1.35	-1.44	-1.54	-1.65	-1.76	-1.88
Processing of fish and fish products	-0.59	-0.67	-0.76	-0.84	-0.94	-1.04	-1.15	-1.28	-1.41	-1.57	-1.73	-1.93	-2.14	-2.38	-2.66
Manufacture of dairy products	2.90	3.17	3.44	3.70	3.95	4.19	4.42	4.64	4.84	5.02	5.19	5.33	5.43	5.51	5.55
Prepared animal feeds	-1.14	-1.25	-1.37	-1.50	-1.62	-1.76	-1.91	-2.06	-2.23	-2.41	-2.61	-2.82	-3.06	-3.31	-3.60
Beverages & tobacco products	0.57	0.63	0.68	0.74	0.79	0.84	0.89	0.94	0.99	1.03	1.07	1.10	1.13	1.15	1.16
Fruits, vegetables, animal oils, grain mill, starches	-2.50	-2.75	-3.01	-3.27	-3.54	-3.81	-4.09	-4.37	-4.67	-4.98	-5.30	-5.64	-5.99	-6.36	-6.76
Textiles and leather	15.08	18.06	21.40	25.13	29.29	33.93	39.11	44.88	51.32	58.50	66.51	75.45	85.41	96.51	108.88
Wood and products of wood and cork	-0.66	-0.75	-0.84	-0.93	-1.02	-1.13	-1.24	-1.35	-1.48	-1.61	-1.75	-1.91	-2.08	-2.26	-2.46
Pulp, paper products; publishing and printing	-2.35	-2.62	-2.89	-3.17	-3.47	-3.77	-4.09	-4.42	-4.77	-5.14	-5.53	-5.95	-6.39	-6.87	-7.39
Coke, refined petroleum products and nuclear fuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chemicals and chemical products	-3.05	-3.33	-3.61	-3.90	-4.18	-4.46	-4.75	-5.04	-5.32	-5.61	-5.91	-6.21	-6.51	-6.82	-7.14
Rubber and plastic products	-2.00	-2.22	-2.46	-2.69	-2.94	-3.19	-3.45	-3.72	-4.00	-4.29	-4.59	-4.91	-5.25	-5.60	-5.99
Other non-metallic mineral products	-1.51	-1.69	-1.87	-2.05	-2.24	-2.44	-2.64	-2.85	-3.06	-3.29	-3.53	-3.78	-4.04	-4.32	-4.62
Basic metals and fabricated metal products	-1.83	-2.07	-2.32	-2.57	-2.83	-3.10	-3.38	-3.67	-3.97	-4.27	-4.59	-4.93	-5.28	-5.65	-6.04
Machinery and equipment n.e.c.	-3.56	-4.01	-4.49	-4.97	-5.46	-5.97	-6.49	-7.03	-7.59	-8.16	-8.75	-9.37	-10.02	-10.70	-11.41
Electrical and optical equipment	-5.95	-6.59	-7.24	-7.90	-8.58	-9.28	-9.99	-10.73	-11.49	-12.28	-13.10	-13.96	-14.86	-15.81	-16.82
Transport equipment	-5.41	-5.97	-6.54	-7.12	-7.71	-8.32	-8.95	-9.60	-10.27	-10.97	-11.70	-12.46	-13.26	-14.11	-15.02
Manufacturing n.e.c.	-1.89	-2.15	-2.42	-2.69	-2.98	-3.27	-3.57	-3.88	-4.20	-4.54	-4.88	-5.25	-5.62	-6.02	-6.43
Electricity, gas, steam and hot water supply	0.68	0.75	0.82	0.90	0.97	1.06	1.14	1.24	1.33	1.44	1.55	1.67	1.80	1.95	2.10
Collection, purification and distribution of water	0.72	0.80	0.87	0.95	1.03	1.11	1.20	1.29	1.38	1.47	1.57	1.68	1.79	1.91	2.04
Construction	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20	0.20	0.21	0.22	0.22	0.23
Sale, maintenance, repair of motor vehicles and motorcycles	1.02	1.12	1.23	1.34	1.45	1.56	1.68	1.81	1.94	2.08	2.22	2.37	2.54	2.71	2.90

Wholesale trade and commission trade, except of motor vehicles and motorcycles	0.92	1.01	1.11	1.20	1.30	1.41	1.51	1.62	1.74	1.86	1.99	2.13	2.28	2.44	2.61
Retail trade, except of motor vehicles and motorcycles	0.97	1.08	1.18	1.29	1.40	1.52	1.64	1.77	1.90	2.04	2.19	2.36	2.53	2.72	2.93
Hotels and restaurants	1.95	2.15	2.35	2.56	2.78	3.01	3.25	3.50	3.76	4.04	4.34	4.66	5.00	5.38	5.79
Land transport; transport via pipelines	0.58	0.64	0.70	0.76	0.83	0.89	0.95	1.02	1.08	1.14	1.21	1.28	1.35	1.42	1.49
Water transport	-0.25	-0.29	-0.34	-0.39	-0.45	-0.51	-0.58	-0.66	-0.74	-0.83	-0.94	-1.06	-1.19	-1.34	-1.51
Air transport	0.76	0.84	0.91	0.98	1.04	1.09	1.14	1.17	1.19	1.20	1.19	1.17	1.11	1.04	0.92
Supporting transport activities; activities of travel agencies	0.77	0.85	0.93	1.01	1.08	1.16	1.23	1.30	1.37	1.43	1.49	1.54	1.59	1.63	1.66
Post and telecommunications	0.71	0.79	0.87	0.95	1.04	1.13	1.22	1.32	1.42	1.53	1.64	1.76	1.89	2.03	2.19
Financial intermediation, excluding insurance and pension funding	-0.11	-0.12	-0.13	-0.15	-0.16	-0.17	-0.18	-0.19	-0.21	-0.22	-0.24	-0.26	-0.28	-0.30	-0.32
Insurance and pension funding, except compulsory social security	0.29	0.32	0.36	0.39	0.43	0.47	0.52	0.56	0.61	0.67	0.73	0.80	0.87	0.95	1.04
Activities auxiliary to financial intermediation	-1.77	-2.03	-2.29	-2.57	-2.86	-3.15	-3.46	-3.78	-4.10	-4.45	-4.80	-5.17	-5.56	-5.97	-6.40
Real estate activities	0.32	0.36	0.40	0.44	0.48	0.53	0.58	0.62	0.68	0.73	0.79	0.85	0.92	0.99	1.07
Renting of machinery and equipment without operator	-0.29	-0.33	-0.37	-0.41	-0.46	-0.50	-0.55	-0.60	-0.65	-0.70	-0.75	-0.81	-0.86	-0.93	-0.99
Computer and related activities; research and development	-0.28	-0.33	-0.37	-0.43	-0.49	-0.55	-0.62	-0.70	-0.78	-0.88	-0.98	-1.10	-1.24	-1.39	-1.56
Other business activities	-0.57	-0.63	-0.70	-0.77	-0.85	-0.93	-1.01	-1.09	-1.18	-1.27	-1.37	-1.48	-1.59	-1.71	-1.85
Public administration and defense; compulsory social security	-0.52	-0.57	-0.63	-0.68	-0.73	-0.78	-0.84	-0.89	-0.95	-1.01	-1.06	-1.12	-1.18	-1.24	-1.30
Education	-0.51	-0.55	-0.60	-0.64	-0.69	-0.74	-0.78	-0.83	-0.88	-0.93	-0.98	-1.03	-1.08	-1.13	-1.18
Health and social work	0.26	0.29	0.32	0.36	0.39	0.43	0.48	0.52	0.58	0.63	0.70	0.77	0.85	0.94	1.05
Other community, social and personal service activities	0.90	1.00	1.10	1.21	1.32	1.44	1.56	1.69	1.83	1.98	2.14	2.32	2.51	2.72	2.95
Activities of households as employers of domestic staff	1.17	1.29	1.42	1.56	1.70	1.86	2.02	2.19	2.37	2.57	2.78	3.01	3.27	3.55	3.87

## 5.6. Exports by Sector

In Scenario 1A, shown below, total exports exhibit a positive impact except for agriculture, fisheries, and mining and quarrying, and some other small sectors. The same pattern holds for Scenario 1B.

In Scenario 2A, also shown below, total exports exhibit a positive impact, except for agriculture, fisheries and mining and quarrying and a few other less significant sectors.

The same pattern holds for Scenarios 2B, 3A, and 3B.



Looking at regional impacts, exports to the US tend to increase for all sectors except agriculture and fisheries, which are of little absolute weight anyway.

Table 19 - Total Export Impacts by Sector – Scenario 1A

Total exports (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Agriculture, hunting and forestry, logging	-1.35	-1.46	-1.56	-1.67	-1.77	-1.87	-1.97	-2.07	-2.16	-2.26	-2.36	-2.46	-2.55	-2.65	-2.74
Fishing	-1.55	-1.70	-1.85	-2.01	-2.16	-2.31	-2.47	-2.62	-2.77	-2.93	-3.08	-3.24	-3.39	-3.54	-3.69
Mining and quarrying	-1.17	-1.30	-1.43	-1.55	-1.68	-1.81	-1.94	-2.07	-2.20	-2.33	-2.46	-2.59	-2.72	-2.85	-2.98
Production of meat and meat products	1.20	1.29	1.39	1.48	1.58	1.68	1.77	1.87	1.97	2.07	2.16	2.26	2.36	2.45	2.55
Processing of fish and fish products	0.91	0.98	1.05	1.12	1.19	1.26	1.33	1.40	1.47	1.53	1.60	1.67	1.74	1.81	1.87
Manufacture of dairy products	5.14	5.65	6.18	6.70	7.23	7.76	8.29	8.82	9.36	9.89	10.43	10.98	11.52	12.07	12.61
Prepared animal feeds	4.11	4.50	4.89	5.28	5.67	6.07	6.46	6.86	7.26	7.66	8.06	8.47	8.87	9.27	9.68
Beverages & tobacco products	4.13	4.53	4.92	5.32	5.72	6.12	6.52	6.93	7.33	7.74	8.15	8.55	8.96	9.38	9.79
Fruits, vegetables, animal oils, grain mill, starches	2.83	3.08	3.33	3.58	3.83	4.09	4.34	4.59	4.84	5.09	5.34	5.60	5.85	6.10	6.35
Textiles and leather	3.44	3.73	4.02	4.30	4.59	4.87	5.16	5.44	5.72	6.00	6.28	6.56	6.84	7.12	7.40
Wood and products of wood and cork	3.71	4.06	4.41	4.77	5.12	5.48	5.84	6.20	6.56	6.92	7.28	7.64	8.00	8.36	8.73
Pulp, paper products; publishing and printing	2.91	3.14	3.37	3.60	3.82	4.04	4.27	4.49	4.71	4.93	5.15	5.37	5.59	5.80	6.02
Coke, refined petroleum products and nuclear fuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chemicals and chemical products	5.59	6.11	6.64	7.17	7.70	8.23	8.77	9.31	9.86	10.40	10.95	11.51	12.06	12.62	13.18
Rubber and plastic products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other non-metallic mineral products	3.81	4.11	4.40	4.70	5.00	5.29	5.59	5.89	6.18	6.48	6.77	7.07	7.36	7.66	7.95
Basic metals and fabricated metal products	3.87	4.14	4.40	4.65	4.90	5.15	5.40	5.64	5.88	6.12	6.36	6.60	6.83	7.07	7.30
Machinery and equipment n.e.c.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electrical and optical equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Transport equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manufacturing n.e.c.	3.29	3.50	3.71	3.91	4.10	4.29	4.48	4.66	4.84	5.02	5.19	5.37	5.54	5.71	5.88
Electricity, gas, steam and hot water supply	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Collection, purification and distribution of water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sale, maintenance, repair of motor vehicles and motorcycles	3.66	4.02	4.37	4.73	5.08	5.44	5.80	6.16	6.52	6.88	7.24	7.60	7.96	8.33	8.69
Wholesale trade and commission trade, except of motor vehicles and motorcycles	2.70	2.98	3.25	3.53	3.80	4.08	4.36	4.63	4.91	5.19	5.47	5.74	6.02	6.30	6.58
Retail trade, except of motor vehicles and motorcycles	2.81	3.09	3.37	3.66	3.94	4.23	4.51	4.80	5.09	5.37	5.66	5.95	6.24	6.52	6.81
Hotels and restaurants	3.94	4.31	4.68	5.06	5.43	5.81	6.19	6.58	6.96	7.35	7.73	8.12	8.52	8.91	9.31
Land transport; transport via pipelines	1.05	1.17	1.29	1.41	1.53	1.65	1.76	1.88	2.00	2.12	2.24	2.36	2.48	2.60	2.72
Water transport	-0.13	-0.18	-0.23	-0.29	-0.35	-0.41	-0.47	-0.54	-0.60	-0.67	-0.73	-0.80	-0.87	-0.93	-1.00
Air transport	2.49	2.76	3.03	3.30	3.57	3.84	4.11	4.39	4.66	4.94	5.22	5.50	5.78	6.06	6.34
Supporting transport activities; activities of travel agencies	0.98	1.10	1.22	1.34	1.46	1.59	1.71	1.83	1.95	2.08	2.20	2.32	2.45	2.57	2.69
Post and telecommunications	1.26	1.39	1.52	1.65	1.79	1.92	2.06	2.19	2.32	2.46	2.59	2.72	2.86	2.99	3.13
Financial intermediation, excluding insurance and pension funding	-1.75	-1.92	-2.08	-2.25	-2.42	-2.58	-2.75	-2.92	-3.08	-3.25	-3.42	-3.58	-3.75	-3.92	-4.08

Insurance and pension funding, except compulsory social security	-1.06	-1.16	-1.25	-1.34	-1.43	-1.53	-1.62	-1.71	-1.80	-1.90	-1.99	-2.08	-2.18	-2.27	-2.37
Activities auxiliary to financial intermediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Real estate activities	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renting of machinery and equipment without operator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Computer and related activities; research and development	2.47	2.65	2.82	2.99	3.15	3.32	3.48	3.64	3.80	3.95	4.11	4.26	4.42	4.57	4.72
Other business activities	-0.66	-0.75	-0.85	-0.94	-1.03	-1.13	-1.22	-1.31	-1.41	-1.50	-1.59	-1.69	-1.78	-1.88	-1.97
Public administration and defense; compulsory social security	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Health and social work	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other community, social and personal service activities	3.26	3.57	3.88	4.20	4.51	4.83	5.14	5.46	5.78	6.10	6.41	6.73	7.05	7.37	7.69
Activities of households as employers of domestic staff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 20 - Total Export Impacts by Sector – Scenario 2A

<b>Total exports (% change to the BAU)</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Agriculture, hunting and forestry, logging	-1.34	-1.48	-1.63	-1.78	-1.94	-2.10	-2.28	-2.46	-2.65	-2.85	-3.07	-3.30	-3.55	-3.82	-4.12
Fishing	-1.32	-1.47	-1.63	-1.80	-1.97	-2.15	-2.34	-2.54	-2.75	-2.97	-3.22	-3.48	-3.76	-4.07	-4.41
Mining and quarrying	-1.31	-1.47	-1.63	-1.80	-1.98	-2.16	-2.36	-2.57	-2.78	-3.02	-3.26	-3.53	-3.82	-4.14	-4.48
Production of meat and meat products	0.28	0.27	0.25	0.23	0.21	0.18	0.14	0.10	0.04	-0.02	-0.10	-0.19	-0.29	-0.42	-0.56
Processing of fish and fish products	-0.02	-0.08	-0.15	-0.23	-0.32	-0.43	-0.56	-0.70	-0.87	-1.07	-1.31	-1.57	-1.89	-2.25	-2.67
Manufacture of dairy products	3.58	3.90	4.22	4.53	4.84	5.13	5.40	5.66	5.90	6.12	6.32	6.48	6.61	6.70	6.75
Prepared animal feeds	2.38	2.57	2.74	2.91	3.07	3.22	3.35	3.47	3.56	3.64	3.69	3.71	3.69	3.64	3.53
Beverages & tobacco products	3.00	3.25	3.51	3.76	3.99	4.22	4.44	4.65	4.84	5.01	5.16	5.29	5.40	5.46	5.49
Fruits, vegetables, animal oils, grain mill, starches	-3.95	-4.35	-4.75	-5.16	-5.58	-6.01	-6.46	-6.91	-7.38	-7.86	-8.37	-8.90	-9.46	-10.05	-10.67
Textiles and leather	52.41	58.48	64.69	71.00	77.38	83.79	90.18	96.50	102.70	108.74	114.56	120.12	125.39	130.32	134.88
Wood and products of wood and cork	-0.59	-0.70	-0.81	-0.94	-1.08	-1.23	-1.40	-1.58	-1.78	-2.01	-2.26	-2.53	-2.84	-3.19	-3.58
Pulp, paper products; publishing and printing	-0.80	-0.96	-1.13	-1.31	-1.51	-1.72	-1.95	-2.21	-2.49	-2.80	-3.14	-3.52	-3.94	-4.42	-4.95
Coke, refined petroleum products and nuclear fuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chemicals and chemical products	-10.28	-11.18	-12.08	-12.97	-13.85	-14.74	-15.62	-16.49	-17.37	-18.24	-19.12	-20.00	-20.88	-21.77	-22.67
Rubber and plastic products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other non-metallic mineral products	-3.06	-3.42	-3.79	-4.16	-4.55	-4.94	-5.35	-5.77	-6.21	-6.66	-7.14	-7.64	-8.17	-8.73	-9.33
Basic metals and fabricated metal products	-5.65	-6.28	-6.91	-7.56	-8.21	-8.87	-9.55	-10.23	-10.93	-11.64	-12.37	-13.12	-13.89	-14.68	-15.50
Machinery and equipment n.e.c.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electrical and optical equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Transport equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manufacturing n.e.c.	-2.23	-2.55	-2.89	-3.23	-3.59	-3.97	-4.35	-4.76	-5.18	-5.62	-6.08	-6.56	-7.07	-7.61	-8.19
Electricity, gas, steam and hot water supply	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Collection, purification and distribution of water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sale, maintenance, repair of motor vehicles and motorcycles	5.24	5.72	6.20	6.68	7.15	7.62	8.08	8.53	8.98	9.41	9.82	10.22	10.59	10.94	11.27

Wholesale trade and commission trade, except of motor vehicles and motorcycles	4.17	4.55	4.93	5.31	5.67	6.03	6.38	6.71	7.03	7.33	7.61	7.87	8.10	8.29	8.44
Retail trade, except of motor vehicles and motorcycles	4.42	4.83	5.23	5.63	6.02	6.40	6.77	7.12	7.46	7.78	8.08	8.36	8.60	8.81	8.97
Hotels and restaurants	5.03	5.50	5.98	6.45	6.93	7.41	7.89	8.37	8.85	9.34	9.82	10.31	10.80	11.29	11.78
Land transport; transport via pipelines	1.72	1.88	2.03	2.17	2.30	2.43	2.54	2.64	2.72	2.79	2.83	2.85	2.84	2.79	2.71
Water transport	0.58	0.60	0.61	0.62	0.61	0.60	0.58	0.55	0.50	0.44	0.37	0.27	0.15	0.01	-0.17
Air transport	1.75	1.90	2.06	2.20	2.34	2.47	2.58	2.68	2.76	2.82	2.86	2.87	2.85	2.79	2.68
Supporting transport activities; activities of travel agencies	1.67	1.83	1.99	2.14	2.28	2.41	2.53	2.64	2.73	2.81	2.87	2.90	2.90	2.87	2.80
Post and telecommunications	2.09	2.28	2.46	2.64	2.81	2.97	3.11	3.25	3.37	3.47	3.56	3.62	3.65	3.65	3.61
Financial intermediation, excluding insurance and pension funding	-0.40	-0.47	-0.54	-0.62	-0.71	-0.80	-0.91	-1.03	-1.17	-1.32	-1.50	-1.69	-1.92	-2.18	-2.47
Insurance and pension funding, except compulsory social security	-0.01	-0.02	-0.04	-0.06	-0.09	-0.12	-0.17	-0.22	-0.28	-0.36	-0.45	-0.56	-0.69	-0.84	-1.03
Activities auxiliary to financial intermediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Real estate activities	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renting of machinery and equipment without operator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Computer and related activities; research and development	3.96	4.29	4.62	4.94	5.25	5.56	5.86	6.15	6.42	6.69	6.94	7.17	7.38	7.56	7.72
Other business activities	0.20	0.17	0.13	0.08	0.03	-0.03	-0.10	-0.19	-0.29	-0.40	-0.53	-0.69	-0.86	-1.07	-1.31
Public administration and defense; compulsory social security	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Health and social work	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other community, social and personal service activities	2.80	3.05	3.30	3.54	3.77	4.00	4.23	4.44	4.64	4.83	5.01	5.16	5.30	5.42	5.50
Activities of households as employers of domestic staff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## 5.7. Imports by Sector

Total imports and imports from the major trade partners – the EU, the Mainland, and the US – exhibit a positive evolution. In the end, this means that the impact of T-TIP will lead to more imports in all sectors, which is consistent with the increased economic activity in a small open economy that imports just about everything. Because of the homogeneity of the pattern of imports, we only report the values of Scenario 1A.

Table 21 - Total Import Impacts by Sector – Scenario 1A

Total imports (% change to the BAU)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
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Agriculture, hunting and forestry, logging	4.78	5.25	5.73	6.22	6.7	7.19	7.68	8.18	8.68	9.19	9.7	10.2	10.7	11.2	11.8
Fishing	2.94	3.22	3.51	3.8	4.09	4.39	4.68	4.98	5.29	5.59	5.9	6.2	6.51	6.83	7.14
Mining and quarrying	1.41	1.54	1.66	1.79	1.92	2.05	2.18	2.31	2.45	2.58	2.71	2.85	2.98	3.12	3.26
Production of meat and meat products	5.68	6.24	6.8	7.37	7.94	8.51	9.09	9.67	10.3	10.8	11.4	12	12.6	13.2	13.9
Processing of fish and fish products	5.09	5.58	6.08	6.59	7.1	7.61	8.13	8.65	9.18	9.71	10.2	10.8	11.3	11.9	12.4
Manufacture of dairy products	4.43	4.83	5.22	5.62	6.02	6.42	6.82	7.23	7.65	8.06	8.48	8.9	9.33	9.76	10.2
Prepared animal feeds	4.53	4.96	5.39	5.82	6.26	6.71	7.15	7.6	8.06	8.51	8.97	9.44	9.91	10.4	10.9
Beverages & tobacco products	5.45	5.96	6.47	6.98	7.5	8.02	8.55	9.08	9.61	10.1	10.7	11.2	11.8	12.3	12.9
Fruits, vegetables, animal oils, grain mill, starches	2.68	2.94	3.21	3.47	3.74	4	4.27	4.54	4.81	5.09	5.36	5.64	5.92	6.2	6.48
Textiles and leather	2.09	2.29	2.49	2.69	2.89	3.09	3.3	3.51	3.71	3.92	4.13	4.34	4.56	4.77	4.98
Wood and products of wood and cork	7	7.64	8.28	8.93	9.59	10.2	10.9	11.6	12.3	12.9	13.6	14.3	15	15.7	16.4
Pulp, paper products; publishing and printing	3.36	3.7	4.04	4.39	4.74	5.09	5.44	5.8	6.16	6.52	6.89	7.25	7.62	7.99	8.37
Coke, refined petroleum products and nuclear fuel	1.28	1.4	1.53	1.65	1.77	1.9	2.02	2.15	2.28	2.41	2.54	2.67	2.8	2.93	3.06
Chemicals and chemical products	1.21	1.32	1.44	1.55	1.66	1.78	1.89	2.01	2.13	2.24	2.36	2.48	2.6	2.72	2.84
Rubber and plastic products	1.4	1.54	1.67	1.81	1.95	2.08	2.22	2.36	2.5	2.65	2.79	2.93	3.08	3.22	3.37
Other non-metallic mineral products	3.19	3.53	3.87	4.22	4.57	4.93	5.28	5.64	6	6.36	6.73	7.1	7.47	7.84	8.21
Basic metals and fabricated metal products	2.07	2.31	2.56	2.81	3.06	3.32	3.58	3.84	4.11	4.37	4.64	4.91	5.19	5.46	5.74
Machinery and equipment n.e.c.	1.33	1.48	1.65	1.81	1.98	2.14	2.31	2.48	2.66	2.83	3	3.18	3.35	3.53	3.71
Electrical and optical equipment	0.58	0.64	0.7	0.76	0.81	0.87	0.93	0.99	1.05	1.11	1.17	1.23	1.3	1.36	1.42
Transport equipment	1.22	1.34	1.45	1.57	1.69	1.81	1.92	2.04	2.17	2.29	2.41	2.53	2.66	2.78	2.9
Manufacturing n.e.c.	1.14	1.26	1.37	1.49	1.6	1.72	1.84	1.96	2.08	2.2	2.32	2.44	2.57	2.69	2.82
Electricity, gas, steam and hot water supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Collection, purification and distribution of water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sale, maintenance, repair of motor vehicles and motorcycles	6.7	7.31	7.93	8.56	9.19	9.82	10.5	11.1	11.8	12.4	13.1	13.8	14.4	15.1	15.8
Wholesale trade and commission trade, except of motor vehicles and motorcycles	7.99	8.71	9.43	10.2	10.9	11.6	12.4	13.1	13.9	14.7	15.4	16.2	17	17.8	18.6
Retail trade, except of motor vehicles and motorcycles	8.55	9.32	10.1	10.9	11.7	12.5	13.3	14.1	15	15.8	16.6	17.5	18.4	19.2	20.1
Hotels and restaurants	5.5	6.01	6.52	7.04	7.56	8.09	8.62	9.15	9.69	10.2	10.8	11.3	11.9	12.4	13
Land transport; transport via pipelines	7.64	8.33	9.03	9.73	10.4	11.2	11.9	12.6	13.4	14.1	14.9	15.6	16.4	17.2	18
Water transport	6.58	7.24	7.91	8.59	9.27	9.97	10.7	11.4	12.1	12.8	13.5	14.3	15	15.8	16.5
Air transport	4.44	4.84	5.24	5.65	6.05	6.46	6.87	7.29	7.71	8.13	8.55	8.98	9.41	9.84	10.3
Supporting transport activities; activities of travel agencies	8.11	8.84	9.59	10.3	11.1	11.9	12.6	13.4	14.2	15	15.8	16.6	17.4	18.3	19.1
Post and telecommunications	7.5	8.19	8.88	9.58	10.3	11	11.7	12.5	13.2	13.9	14.7	15.4	16.2	17	17.8
Financial intermediation, excluding insurance and pension funding	6.31	6.93	7.55	8.18	8.81	9.45	10.1	10.7	11.4	12.1	12.7	13.4	14.1	14.8	15.4
Insurance and pension funding, except compulsory social security	5.81	6.35	6.9	7.45	8.01	8.58	9.14	9.72	10.3	10.9	11.5	12.1	12.7	13.3	13.9
Activities auxiliary to financial intermediation	1.01	1.11	1.21	1.31	1.42	1.52	1.63	1.74	1.85	1.96	2.07	2.18	2.29	2.41	2.52

Real estate activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renting of machinery and equipment without operator	6.36	6.99	7.62	8.26	8.91	9.56	10.2	10.9	11.5	12.2	12.9	13.6	14.3	15	15.7
Computer and related activities; research and development	0.67	0.74	0.8	0.87	0.94	1.01	1.08	1.15	1.22	1.29	1.36	1.43	1.51	1.58	1.66
Other business activities	4.65	5.12	5.61	6.09	6.58	7.08	7.58	8.08	8.58	9.09	9.61	10.1	10.6	11.2	11.7
Public administration and defense; compulsory social security	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Health and social work	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other community, social and personal service activities	7.2	7.87	8.55	9.23	9.92	10.6	11.3	12	12.7	13.5	14.2	14.9	15.7	16.4	17.2
Activities of households as employers of domestic staff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

## 6. Conclusions

The current work focused on the estimation of the impacts of the T-TIP agreement on the economy of the Azores, a very small open economy, totally integrated into the Portuguese economy. A dynamic CGE model – AZORMOD – was used to undertake the exercise and to try to overcome some of the shortcomings of a similar study undertaken by Francois and Manchin (2014).

The conclusions at which the current study arrives are not, overall, inconsistent with previous estimates, even if different, providing finer estimates and more specific detail.

Six scenarios were used to obtain results, varying according to two factors: one was the assumptions about indirect impacts, given that we are considering a small integrated open economy and, as such, it was considered desirable to study potential indirect impacts coming from the US, the Mainland, and the EU; the other was the intensity of reduction of non-tariff barriers.

For the major aggregate variables analyzed, the current study concludes that, by 2030, depending on the scenario that is chosen, the GDP will rise between 0.4% relative to BAU in a modest scenario (2A), and a higher limit of 0.77% will be obtained in an ambitious

scenario (3B). All scenarios, for all periods, point to positive GDP impacts that become larger with time; private consumption will be higher, between 3.70% and 5.92%; foreign balances will be improved in the presence of intensified trade both in imports and exports; employment will rise between 1.05% and 1.67%, meaning additional jobs; the unemployment rate will fall as much as 1.56%; and government revenues will rise by as much as 5.5%.

One major concern of the T-TIP agreement, however, is its impact on different sectors. For the Azores, that would mainly imply the milk value chain, the fish value chain, and the tourism value chain. This was analyzed resorting to the measured impacts on value-added. The main conclusion was that the overall positive impact was unevenly distributed, with some sectors gaining and some losing. The main negative impact, even if small, is in fisheries and fish processing. The results for agriculture are ambiguous (positive in some scenarios and negative in others). None of the major economic activities in the Azores, however, are significantly affected on the negative side.

The negative impact of public administration results from the assumptions made with respect to closure rules, which restrict public expenditure. Public policy might eventually determine otherwise. The main gainers are the dairy industry and all of the activities associated to tourism.

This result, in conjunction with the previous aggregate results, suggests that adhering to T-TIP would provide positive results, even if catering to some areas where the impacts will most likely be negative, is recommendable. For the Azores, this implies looking closely at fisheries, given its importance to the local economy. Agriculture also warrants attention, given its weight in the regional economy and the ambiguity of the results.

Another concern was the distributional impacts of this trade liberalization policy. To assess the impacts, equivalent variation measures were used, distributed by six household income categories. One conclusion is that the overall impact will amount to a value equivalent to between 75 and 119 million euros per year (2 to 3%), by 2030. The income group that will gain the least relatively is the lowest one. The second-lowest gainer, in relative terms, is the highest income group.

Finally, one can break down the aggregate trade impacts by sectors. Imports, as expected, will tend to increase in all sectors for all trading partners.

Exports, however, will have a differentiated impact depending on the sector. Many will gain exports, but some will fall, thus affecting demand. In this case, the main export gainers are the dairy industry, hotels and restaurants, and air transport services. The main export losers are fisheries and fish processing and agriculture.

Given the overall results of the simulations undertaken, the decision to subscribe to the T-TIP agreement is supported, as far as this region is concerned. Care and adequate policies, however, should be designed to mitigate the potential negative impacts in some sectors such as fisheries and agriculture. On the other hand, working on the positive side, sectors with potential positive effects could be a good area of policy incidence to promote growth.

The results of this paper shed some light on the need for more detailed regional trade impact studies. Looking at the global or the national trade impact picture is important, but a lot of local impacts might be ignored. Looking at regional impacts is an important step towards better identification of gainers and losers and a better view of the necessary mitigation, compensation, or associated development policies.

Even though we have tried to carefully identify the shortcomings of the current study, one should still recognize the main areas of improvement of the current work. The main task would be the preparation of a new, more up-to-date Social Accounting Matrix. The current matrix was originally composed of 2001 data and is now updated to 2005. More recent data would provide a better point of reference for the projections. Otherwise, modeling reality is a never-ending task, and other specifications could be tried to relax some of the assumptions made, such as perfect competition.

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