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Towards a Trade War in 2025: Real Threats for the World Economy, False Promises for the US

Antoine Bouët, Leysa Maty Sall &Yu Zheng

Highlights

- A trade war initiated by a Trump administration in 2025, according to the main proposal from the president campaign, is costly for world GDP (-0.5% in 2030) and world trade (-3.4% in 2030).
- The US and China are the most affected countries, with GDP losses of 1.3% for both countries. The US has also seen an increase of consumption price index.
- Simulation with the MIRAGE-Power model shows a major reallocation of trade flows, with a collapse in trade between China and the United States, and a significant widening of the trade deficits of many countries vis-à-vis China.
- The application of trade retaliation measures by US partner countries implies greater GDP losses for the US. Nevertheless, the retaliation is not, in terms of impact on GDP, positive for all the US partner countries.

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Abstract

Using the MIRAGE-Power model, we simulate a trade war initiated in 2025 by the new US administration. The central scenario consists in a 60 percentage point tariff increase on all US imports from China, a 10 percentage point tariff increase on all products from other partners, except Canada and Mexico, and reciprocal tariff retaliation. World GDP and world trade decrease respectively by 0.5% and 3.4% in volume, with significant losses for the US and China, and gains for Canada and Mexico. A substantial reallocation of bilateral goods trade flows is taking place at global level. Additional scenarios show that: details of the tariff reform matter; the discriminatory tariff treatment of China benefits other trading partners; trade retaliation increases US economic losses; if Non-Tariff Measures are included in this trade war, the consequences are worse; if Canada and Mexico are included in the trade war, both experience significant losses in terms of GDP and trade. Last, we show that the US will not be able to replace the federal income tax with tariff revenues, even with a revenue-maximizing tariff.

Keywords

US Trade Policy, Tariff, Trade Retaliation, Computable General Equilibrium Models.

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Centre d'études prospectives
et d'informations internationales
20, avenue de Ségur
TSA 10726
75334 Paris Cedex 07

contact@cepii.fr
www.cepii.fr – @CEPII_Paris
Press contact: presse@cepii.fr

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RESEARCH AND EXPERTISE
ON THE WORLD ECONOMY

Towards a trade war in 2025: real threats for the world economy, false promises for the US*

Antoine Bouët† Leysa Maty Sall‡ Yu Zheng§

1 Introduction

Tariffs were again central to the 2024 US presidential election debate. Donald Trump, who describes himself as a "Tariff Man", proposed several protectionist measures during his campaign: a 10 (sometimes a 20) percentage points (pp) increase in tariffs on all products imported from every partner; a 60 pp increase in tariffs on all goods from China; the implementation of strict tariff reciprocity by product and country; a major tax reform that would raise US tariffs to a level sufficient to replace federal income tax; finally, a 100% tariff on imports from countries that stop using the dollar in their international transactions. His objectives are numerous: reducing the US trade deficit, re-industrializing the US, supporting national security, preventing countries from abandoning the US dollar, raising revenues to replace taxes on tips, financing a 1% cut in corporate income tax, funding a childcare program.

A trade war initiated by the US would a priori be a major shock to the global economy. In trade terms, an across-the-board increase in US customs duties would apply to around US$ 2,280

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†CEPII. E-mail: antoine.bouet@cepii.fr.

‡Bordeaux School of Economics. E-mail: leysa.maty.sall@gmail.com.

§CEPII. E-mail: yu.zheng@cepii.fr.

bn (value in 2022) if Canada and Mexico are not affected, and more than US$ 3,142 bn if they are[1]. Let us suppose that the US imposes a tariff increase by 10 pp on all products from all partners except China for which the tariff increase is by 60 pp, and that US trading partners impose a reciprocal tariff on their imports from the US. All calculations made, this increase in customs duties would concern 21.8% of world trade, with an increase of tariffs by 10 pp on 18.8% of world trade and by 60 pp on 3.0%. Customs duties of 10%, or worse 60%, are very high: in 2022, the average customs duty in the world was 3.6%, the average customs duty in the United States is 2.2% and 4.7% in China[2].

Such a trade war requires a precise assessment, not only of its impact on world trade, but also on GDP at the world level and for individual countries, on bilateral trade flows, on economic activity by sector, and so on. To provide actionable policy recommendations, several key questions must be addressed. What is the impact of excluding Canada and Mexico from tariff increases? What is the impact of imposing a significantly higher tariff on China? Do retaliatory trade measures by partners harm the US economy? Furthermore, do these measures reduce or increase the GDP losses of US partners? If non-tariff measures are also implemented, are trade and GDP losses worsened, and if so, to what extent? If the U.S. administration wants to finance domestic policies through tariffs, how much public revenue can be generated through tariff increases? In addition, what tariff levels will maximize this revenue?

The purpose of this working paper is to evaluate the potential economic and trade consequences of such a trade war and to answer these questions. Based on the MIRAGE-Power Computable General Equilibrium (CGE) Model, we simulate the adoption of protectionist measures by the US and retaliatory actions by its trading partners. Our central scenario is: on the US side, an augmentation of tariff on all products coming from all countries by 10 pp, except Canada and Mexico for which there is no change, and China for which the US applies a 60 pp augmentation

[1]These calculations are based on the BACI database of CEPII with the latest update for the year 2022. Documentation in Gaulier and Zignago (2010).

[2]In 2017, the average customs duty was 3.9% in the world, 2.1% in the United States, and 6.1% in China. Custom duty computed based on MacMAPs-HS6 2017 and 2022 (Guimbard et al., 2012). Temporary tariff changes, such as the 2018 US-China trade war and sanctions are not included in this database.

of tariffs. On the side of trading partners, we assume that they impose tariff increases on U.S. imports equivalent to the tariff increases imposed on their exports by the US. Further alternative simulations are performed to answer all the previous questions.

Our main conclusion is that a trade war initiated by a Trump administration in 2025, according to the main proposal of the Republican candidate, is costly for world GDP (-0.5% in 2030) and world trade (-3.4% in 2030). The US and China are the most affected countries, with GDP losses of -1.3% for both countries in 2030. Canada and Mexico are the only countries which benefit in terms of economic activity, with GDP increases of 1.3 % and 6.6%, respectively. Trade retaliation has two benefits: it increases the GDP loss for the US, which initiates the trade war, and in some cases reduces the economic losses of retaliating countries compared to a scenario without retaliation. Furthermore, we show that other US trading partners benefit from the discriminatory US policy with respect to China. For example, France's GDP loss is reduced from 0.2% to 0.1% when the tariff increase on China is 60 pp instead of 10 pp. We also show that for Canada and Mexico, whether or not they are targeted by US protectionism has dramatic economic implications. Lastly, we show that US tariff revenues will not offset the federal income tax. The revenue maximizing tariff is estimated to be 80% (on all products coming from all countries), generating a revenue of USD 819 bn, which is far below the amount of public revenue collected through the federal income tax in 2023: USD 2,180 bn.

Section 2 provides a review of the literature. Section 3 presents the methodology. In Section 4, we detail the results from the central scenario: a 10 pp increase in tariffs on all products imported from every partner (except Canada and Mexico) combined with an 60 pp increase on all imports from China. US trading partners retaliate by imposing the same customs duty increases on US imports as those applied to their exports. Section 5 presents other scenarios that bring key policy conclusions. Section 6 concludes.

2 Review of literature

The US administration had already implemented a series of tariff increases on imports during the first mandate of Donald Trump. A number of ex-post studies have assessed the impact of the 2018-19 tariffs on the US economy. Autor et al. (2024) investigate the economic consequences on the US of the Trump administration's 2018-19 tariffs using detailed geographic-level data combining local exposure to domestic imports, US tariffs and retaliatory tariffs by trade partners, and US unemployment compensation programs. The 2018-19 tariffs did not have a significant impact on employment in the sectors concerned, while the retaliatory tariffs had a significantly negative impact, particularly in agriculture. Fajgelbaum et al. (2020) used detailed trade and unit value data to find that world prices for products targeted by the 2018-2019 tariffs did not fall and that the US tariffs and retaliatory tariffs of partners significantly reduced both US imports and exports. They estimated a loss in real national income of 0.04% of the US GDP. Flaaen and Pierce (2019) employ a "difference-in-difference" approach based on detailed US manufacturing and trade data to estimate the protective effect of Trump tariffs on import-substituting industries, alongside the de-protective effect on user industries, as well as the negative effects of retaliatory tariffs. They concluded that the effects of this 2018-19 trade war were overall negative for US manufacturing activity and employment. Amiti et al. (2020) focus on the pass-through from world prices to domestic prices initiated by the 2018-19 tariffs in the US using 2019 unit-value trade data. Their study confirmed that tariffs are generally borne by US households and businesses, with few exceptions such as the steel sector, where exporters absorbed around half of the shock. With the Tax Foundation, Erica York[3] conducts two ex-post evaluations, one on the 2018-2019 US tariffs, another on the retaliatory measures against the US, using the Tax Foundation's general equilibrium model. The tariffs implemented by the Trump administration, and maintained by Biden, reduced long-term US GDP by 0.2%. Retaliation had a very small negative effect on US GDP.

Another strand of the literature provides ex-ante assessments of Trump's proposals announced

[3]https://taxfoundation.org/blog/trump-income-tax-tariff-proposals/; accessed on October, 10th, 2024.

during the 2024 presidential campaign. Erica York[4] evaluates the implementation of an additional 10% universal tariff combined with an additional 60% tariff on imports from China, applied in 2024, using the Tax Foundation's general equilibrium model. The evaluation shows that GDP would fall by 0.8%. Clausing and Obstfeld (2024) estimate the effects of a 10% universal US tariff, coupled with a 60% tariff on imports from China, based on an "equivalent variation" formula already applied by Fajgelbaum et al., 2020. They conclude that the total cost of this policy would be around 1.8% of US GDP. Using the Global Trade Analysis Project (GTAP) model, the US Congressional Budget Office[5] estimates the effect of a 10 percentage points rise of tariffs on all products from all partners, except for imports from China, on which US tariffs are augmented by 60 percentage points. With reciprocal retaliation measures by all US trading partners, US GDP decreases by 0.6%, consumption price index increases by 1%.

An interesting study has been conducted by Felbermayr et al., 2024. Based on the KITE model (a New Quantitative Trade Model calibrated on detailed input-output and trade flow data), this study evaluates the impact of three US policy scenarios: a first one where the US imposes an extra tariff of 10% on all non-FTA partners and of 60% on imports from China, a second one which adds retaliation by affected countries with reciprocal change in trade policy, and a third one where all US trading partners are affected by US protectionism and they all retaliate. In the first scenario, US exports decrease by 13.6%, US GDP by 0.6%, Chinese exports by 8% and Chinese GDP by 0.7%. In the second scenario the negative impact is systematically greater, especially for the US with a decline by 21.9% of exports and by 0.8% of GDP. If FTA US partners are included in this trade war, the impact is slightly milder for China, but US exports are decreased by 38.6% and US GDP by 1.2%. The impact of these different scenarios on European countries is negative, but moderate, with Germany more affected than France.

Our study provides a more comprehensive evaluation than previous estimates of the shock that the global economy could suffer if the new US administration implements protectionist legislation corresponding to what candidate Donald Trump has often announced in 2024. We use

[4]See previous footnote.
[5]https://www.cbo.gov/publication/61112: accessed on December, 30th, 2024.

a dynamic computable general equilibrium model at the frontier of the literature on the subject, with 20 countries or regions and 30 sectors. Our baseline incorporates a number of recent key trade measures (CETA agreement, sanctions against Russia, Brexit) and is based on projections until 2040 of GDP, labour force, current account balances and energetic efficiency provided by a macroeconometric model. We simulate six scenarios to obtain more policy insights and also use the model to estimate the US tariff that would maximise tariff revenues and check if increased US tariff revenues could offset the repeal of the US federal income tax.

3 Methodology

Our ex-ante evaluation is based on the MIRAGE model of the world economy. MIRAGE is a dynamic multi-country multi-sector general equilibrium model. The model is well-suited for evaluating the trade war, as it not only provides sophisticated modeling of international trade, but it also relies on highly detailed protection data at HS6 product level. The first subsection presents the main features of the model, followed by the second subsection, which presents the geographic and sector aggregation selected for this study. The third and fourth subsections describe the macroeconomic and the protection baseline: it has been improved for this evaluation. Last, in the fifth subsection, the six scenarios are presented.

3.1 The version of MIRAGE

To assess the economic impacts of a potential trade war initiated by a new U.S. administration in 2025, we employ the MIRAGE-Power model, a multi-regional, multi-sector dynamic computable general equilibrium (CGE) model devoted to trade policy analysis and more recently applied to long-term growth and environmental issues and developed by CEPII (CEPII MIRAGE team, 2024[6]). The MIRAGE-Power model is developed from MIRAGE-e (Fontagné et al., 2013) incorporating a detailed representation of electricity generation, including renewable energy and

[6]https://mirage-model.eu/

greenhouse gas emissions. In the model, firms interact either in a monopolistic competition where a number of identical firms in each sector and region compete one with another and charge a markup over marginal costs, or in a perfect competition framework where a representative firm by sector and region charges the marginal cost. For this study, imperfect competition is considered for industrial sectors. Firms use intermediate inputs, value-added and energy for production, with value-added driven by five primary factors including land, natural resources, unskilled labor, skilled labor, and capital. The model features detailed representation of energy use. Energy is made of electricity and fossil fuels. The substituability between capital and energy is low while an energy-capital bundle can be substituted to labor with higher elasticity. While electricity is generated from fossil fuels (coal, oil, and gas), nuclear or renewable energy (hydro, solar, wind, and others), electricity is consumed and traded as an aggregate commodity.

In each region, a representative agent (representing households and government) maximizes its utility under budget constraint. This representative agent saves a part of her income and spends the rest on final consumption, according to a Linear Expenditure System-Constant Elasticity of Substitution (LES-CES) functional form: this functional form implies that income-elasticity of demand is not unitary. Tax revenues are collected from tariff revenue, Non-Tariff Measures (NTM) rent revenue, export tax revenue, production tax revenue, consumption tax revenue, and carbon tax revenue (when a carbon price is imposed).

The model represents greenhouse gas emissions from production and consumption process. CO2 emissions are accounted from the intermediate and final consumption of fossil fuels. Other greenhouse gases (CH4, N2O, fluorinated gases) are introduced in the production process following Hyman et al. (2003). This approach is consistent with methodologies used by "state-of-the-art" large-scale CGE models, e.g., GTAP model (Antimiani et al., 2013), or MIT EPPA model (Paltsev et al., 2005).

Trade follows an Armington assumption, where domestic and imported goods are imperfect substitutes. Similarly, imported goods from different regions are also considered substitutes. Imported goods and services are destined for firms' intermediate consumption and households' final

consumption. Domestic production, on the other hand, can either be consumed locally, or be exported to trade partners. Trade restrictions are modeled with import tariffs, as well as NTMs. Trade costs are in forms of generalized tariff costs, export tax costs, and iceberg trade costs. International transportation cost is modeled through the trade volume demanded by trading partners.

Finally, MIRAGE-Power is a recursive dynamic model in which agents optimize their choices annually with the model solving for each year up to the last year considered in the simulation. A putty-clay formulation captures the rigidity of capital reallocation across periods: the stock of capital is immobile, while investments are allocated each year across sectors according to relative return rates. In other words, structural adjustments result from the inertial reallocation of the stock of capital via depreciation and investment.

For each country, current account is fixed as a share of world GDP at time t, and this ratio remains constant in a policy shock as compared to the baseline. Real effective exchange rate is endogenous to adapt to this constant share.

The model relies on the GTAP-Power 11b database as a global social accounting matrix (SAM) and is accordingly calibrated on the 2017 base year. This database represents the world economy considering 76 sectors in each of the 160 regions of its geographic decomposition. The GTAP 11b satellite non-CO2 GHG emissions database has been used to calibrate the representation of greenhouse (GHG) gases in MIRAGE-Power. Trade elasticities are taken from Fontagné et al. (2022), using the dataset in the GTAP classification from October 2020. Tariffs are supported by highly detailed data on tariff equivalents from MAcMap-HS6 for 2017 (Guimbard et al., 2012), with the base year the same as the GTAP11 database. The ad valorem equivalents of NTMs on goods are based on the estimation from Kee and Olarreaga (2009). The ad valorem equivalents of NTMs on services are based on the estimation from Fontagné et al. (2016) and the estimation has been updated in accordance with the GTAP11 database.

3.2 Geographic and sectoral aggregation

We aggregate the GTAP database into 30 sectors[7] and 20 regions, including key U.S. and Chinese trading partners (see Appendix Table 11 and Table 12). In this study, we also present results at a more aggregated level, i.e. with a distinction between Agrifood, Energy, Industry, Services instead of 30 sectors. The composition of these large sectors are presented in the columns «Mirage labels» in Table 11 and Table 12 in Appendix.

3.3 Macroeconomic baseline

MIRAGE-Power is a dynamic model designed to assess the short-, medium-, and long-term impacts of economic policies. The model is run until 2040. However, in this paper, we evaluate the consequences of the trade war over a five-year horizon through 2030, a time frame that captures the short-term impacts and also allows the economy to adjust for five years following the policy shock.[8] We rely on the EconMap database with the projection from the MaGE model (Fontagné et al., 2022, Fouré et al., 2013) to establish a baseline for macroeconomic growth through 2030 in the absence of a trade war. By comparing each scenario to this baseline, we measure the only impacts of the trade war.

We take GDP, labor force, saving rate, current account, and energy efficiency projections from the MaGE model for each country. Two common exogenous series are used for the two models, which are population taken from the United Nation (UN) central scenario, and oil price projection taken from the U.S. Energy Information Administration (EIA) database. In addition, MIRAGE-Power takes the coal and gas price projections from the EIA database. Last, we adjust the GDP growth between 2017 and 2022, following the Word Bank World Development Indicators, to reflect the impact of the COVID-19 pandemic.

[7] The electricity sector is disaggregated into 6 sub-sectors. These sub-sector activities provide aggregate electricity from the producer side, while from the demand side, electricity is considered as one aggregate commodity.

[8] 2040 (or another year) results may be requested from the authors.

3.4 Protection baseline

In the second step, the macroeconomic baseline is updated to incorporate key trade policy changes implemented between 2017 and 2024. Starting from 2022, tariff data is sourced from the 2022 version of the MacMAPs-HS6 customs duty database, replacing the 2017 tariff (Guimbard et al., 2012). Furthermore, significant trade developments, such as the U.S.-China tariff war, Brexit, the Comprehensive Economic and Trade Agreement (CETA), and sanctions on Russia, are explicitly modeled.

Sanctions on Russia: The sanctions imposed on Russia from 2022 are captured through customs duties or import bans by major sanctioning countries, including Australia, Canada, the United States, Japan, New Zealand, the United Kingdom, and the European Union[9]. Import bans are modeled as equivalent customs duties of 200%. At the country level, U.S. sanctions are based on the Office of Foreign Assets Control (OFAC) data, covering products such as machinery, industrial goods, and luxury items. Canadian sanctions include bans on imports of Russian diamonds, steel, aluminum, petroleum products, and luxury goods, identified at the HS6 level. EU sanctions include energy sector measures, such as price caps on maritime transport of Russian oil and bans on energy goods, alongside trade restrictions like quotas on potassium chloride imports and bans on raw materials enhancing industrial capabilities. Data for EU sanctions related to import tariffs or bans were retrieved from the 32 regulations published before the American election between 2014 and 2024 in the Official Journal of the European Union. Similarly, the UK imposed additional duties ranging from 6% to 35% across various packages, while New Zealand applied a uniform 35% tariff on Russian-origin imports and banned energy imports such as oil, gas, coal, and gold of Russian origin. Japan's sanctions included revoking Russia's "Most Favored Nation" status restricting imports of machinery, wood products, vodka, and gold, and phasing out and banning Russian coal and oil imports. Australia's measures included bans on importing, purchasing, and transporting arms and related materials, energy products, and gold from Russia.

US-China Tariff War: The US-China trade war, initiated in 2018, involved Section 301

[9]Compiled data from all listed sanctions at hs6 level are available upon request

extra tariffs imposed by the US, starting with 25 % on USD 34 bn worth of Chinese imports and eventually targeting over USD 360 bn in goods, including machinery, electronics, and consumer products. In retaliation, China imposed tariffs on USD 110 bn of US exports, focusing on politically sensitive sectors such as agriculture, energy, and automobiles, with rates ranging from 5% to 25%. The escalation peaked before the Phase One Agreement in January 2020, which suspended additional planned tariffs and reduced rates on USD 120 bn of Chinese goods from 15% to 7.5%. However, most tariffs remained under the Biden administration, and in the baseline, the 2020 tariff schedule is assumed to persist, reflecting a continuation of the trade war.

CETA: The baseline incorporates the Comprehensive Economic and Trade Agreement (CETA) between the European Union and Canada, provisionally applied since September 2017. Tariff reductions are staged according to the agreement, with schedules for full tariff elimination varying from four to eight years, depending on the staging category. The CETA agreement includes a list of sensitive products: tariffs on these products are unchanged. The baseline reflects tariff reductions updated to 2024.

Brexit: Post-Brexit tariff rates between the EU and the United Kingdom are assumed to be zero as in MacMAP 2022. We model a "Soft-Brexit" in 2021 by increasing the AVE of NTMs in goods and services between UK and EU27, compared to the calibration year.

Indeed, neither the AVEs of NTMs estimations from the Kee and Olarreaga (2009) or Fontagné et al. (2016) consider a bilateral dimension, meaning that the AVEs of NTM for a given country are the same regardless the origin of the imported products. This is in particular not the case for the EU countries as there is a relatively harmonized product regulations inside the EU. To improve the modeling of NTM, for a EU country, we differentiate its AVEs whether the measure is applied to another EU country or one from the rest of the world, following Emlinger et al. (2010). The Kee and Olarreaga (2009) and Fontagné et al. (2016) AVEs of NTMs are considered as the NTM between a EU country and rest of the world, while the AVEs of NTMs between EU member states are reduced using a sectoral-level frontier effect ratio between intra-EU and extra-EU, estimated by De Sousa et al. (2012). In particular, for the calibration year 2017, UK is considered as a

EU member state: the AVEs of NTMs between UK and EU27 countries are following the same treatment as for intra-EU NTMs. After Brexit, half of the reduction applied in 2017 is removed for the NTMs between UK and EU27 countries. The effects of Brexit are integrated into the baseline scenario starting from 2021, with all other FTAs involving the UK disregarded.

3.5 Scenarios

We simulate 6 scenarios (see Table 1). In the first scenario, called *SMin10*, the United States imposes a minimum tariff of 10% on all goods from all countries in 2025, except those imported from Canada and Mexico. In this scenario, therefore, only tariffs below 10% are increased to meet the minimum threshold, while those above 10% remain unchanged.

In a second scenario, *S+10*, US customs duties on all products from all countries, except Canada and Mexico, are increased by 10 pp. Comparison between *SMin10* and *S+10* will show that "the devil is in the details".

A third scenario, *S+10/60*, builds on *S+10*, but with the US increasing tariffs on imports from China by 60 pp. Comparison between S+10 and S+10/60 will evaluate the impact of a "more anti-China" policy, on other US trading partners. The comparison with *SCentral* will also illustrate the impact of retaliations on the US and other countries.

SCentral is the central scenario. It is based on scenario *S+10/60*: US customs duties on all products from all countries, except Canada and Mexico, are increased by 10 pp, while the US increases tariffs on imports from China by 60 pp. An additional element is that all US trading partners retaliate: they raise tariffs on US goods by the same extent (10 pp or 60 pp in the case of China). Only Canada and Mexico do not change their trade policy. All these tariff changes take place in 2025.

Scenario *SNTM* adds to scenario *SCentral*, on one hand, an increase by the US in the ad valorem equivalent (AVE) of non-tariff measures (NTMs) of 25% on all products from all countries (except Canada and Mexico); on the other hand, US trading partners (except Canada and Mexico) also raise NTMs by 25% (also applied on their AVE) on imports from the US. Comparison between

Table 1: Scenarios description

SMin10	US imposes a minimum 10% import tariff on all goods from all countries except Mexico and Canada. When the current tariff is above 10%, it is unchanged.
S+10	US increases import tariffs by 10 pp on all goods from all partners, except Mexico and Canada.
S+10/60	*S+10* but US increases tariffs by 60 pp on goods from China.
SCentral	US customs duties on all products from all countries, except Canada and Mexico, are increased by 10 pp, while the US increases tariffs on imports from China by 60 pp. All US trading partners retaliate: they raise tariffs on US goods by the same margin (10 pp or 60 pp in the case of China).
SNTM	*SCentral* and US increases AVE of NTMs by 25% on all goods from all partners (except Canada and Mexico), and US trading partners increase AVE of NTMs on US imports by 25%.
SCanMex	*SCentral* with Canada and Mexico also targeted by US protectionism (10 pp) and retaliation by also Canada and Mexico. No change in NTM.

Source: authors' elaboration

SCentral and *SNTM* will show that with non-tariff measures (NTMs) implemented, the impact of this trade war will be even more severe.

Under Scenario *SCanMex*, US customs duties on all products from all countries are increased by 10 pp, while the US increases tariffs on imports from China by 60 pp. All US trading partners retaliate: they raise tariffs on US goods by the same margin (10 pp or 60 pp in the case of China). All these tariff changes take place in 2025. So the only difference between scenarios *SCanMex* and *SCentral* is that in the former, Canada and Mexico are included in the world trade war, whereas in the latter they are excluded.

4 The economic and trade impact of the central scenario

This section presents the results of the central scenario called *SCentral*. All results, except one, are presented for 2030 by a comparison between the central scenario and the baseline.

4.1 World impact

A trade war, as described by the central scenario, would have major economic implications for the US and the rest of the world.

As shown in Table 2, world trade decreases by 3.4%. This significant decrease is accompanied by a decrease in world Gross Domestic Product (GDP) and world welfare of 0.5%. World greenhouse gas emissions are reduced by 0.2%, but this environmental benefit is costly as world GDP decreases by much more. This reduction in world greenhouse gas emissions is mostly due to less emissions from international freight.

Table 2: Impact of *SCentral* on global economic and environmental indicators - 2030 - percentage change compared to the baseline

Variables	*SCentral*
Exports (vol)	-3.4
World Welfare	-0.5
World GDP (vol)	-0.5
World GHG emissions (MtCO2-eq)	-0.2
World emissions due to international freight (MtCO2-eq)	-6.2

Source: authors' elaboration based on MIRAGE-Power

4.2 National and regional impacts

Table 3 presents the impact of *SCentral* across countries or regions in 2030.

This trade war would be very costly for the US, leading to a 1.3% decrease in GDP. US exports of goods contract by 22.9% while imports decrease by 17.5%. This trade war also would have severe consequences for China, whose GDP falls by 1.3% with exports decreasing by 8.9%. Indeed, the United States is the largest destination for Chinese merchandise exports, accounting for 20.8% of China's total good exports in 2024.

This trade war is slightly costly for France and Germany. On one side, both countries are hurt by US tariffs, with their exports to the US are decreased by 11.3% and 12.7%, respectively. However, this is not for both countries a first-order shock, as the US accounts for only 9.0%

Table 3: Impact of *SCentral* scenario on exports in volume, GDP in volume, and real effective exchange rate by country or region - 2030 - percentage change compared to the baseline

Region	**Exports (vol)**	**GDP (vol)**	**Real effective exchange rate**
ASEAN	0.4	0.2	0.6
Aus.-NZ	-1.0	-0.1	0.4
Brazil	-2.3	-0.2	0.5
Canada	8.3	1.3	3.0
China	-8.9	-1.3	-2.2
France	-0.5	-0.1	0.0
Germany	-0.6	-0.1	0.0
India	-1.3	-0.3	-0.2
Japan	-1.9	-0.2	0.0
Korea	-1.0	-0.3	0.3
Mexico	26.1	6.6	6.5
MENA	-0.5	-0.1	0.4
Rest of America	-1.0	-0.2	0.2
Rest of Asia	-0.9	-0.2	0.2
Rest of Europe	-0.7	-0.1	0.4
Rest of EU27	-0.4	-0.1	0.0
Rest of Latin Am.	-2.9	-0.2	0.2
SS Africa	-0.8	-0.1	0.2
UK	-1.4	-0.3	-0.1
USA	-22.9	-1.3	0.1

Source: authors' elaboration based on MIRAGE-Power
Note: vol stands for volume; ASEAN for Association of Southeast Asian Nations; Aus.-NZ for Australia-New Zealand; MENA for Middle-East and North Africa; EU27 for European Union 27 countries; SS for SubSaharan

and 8.8% of their total exports. Instead, their exports are concentrated in the European Union (48.9% and 49.5% respectively). On the other side, as Chinese producers partially lose access to the US market, they redirect their exports to other destinations like France and Germany. This reallocation lowers import prices for these countries, improving their terms of trade.

In contrast, this trade war is significantly beneficial for Canada and Mexico. The latter increases its exports by more than 26%, as it benefits from relatively improved access to its first export market, the US, which represents 78.1% of its exports of goods. The US does not decrease customs duties on Mexican products but increases them on Mexican competitors. Furthermore, Mexico benefits from an improvement in its terms of trade on the import side as US producers facing

Table 4: Impact of *SCentral* scenario on factors' compensation by country or region - 2030 - percentage change compared to the baseline

Region	**RR on capital**	**RR on land**	**RR on nat'l resources**	**Skilled real wages**	**Unskilled real wages**
ASEAN	-0.2	0.5	0.1	0.0	0.1
Aus.-NZ	-0.2	1.0	0.7	-0.1	-0.1
Brazil	-0.2	1.7	-0.1	-0.3	0.0
Canada	0.8	-4.1	-4.3	1.4	1.1
China	-0.6	1.3	2.7	-1.6	-1.1
France	-0.2	0.2	1.8	-0.2	-0.1
Germany	-0.2	0.4	2.5	-0.1	-0.1
India	-0.2	0.3	0.9	-0.2	-0.1
Japan	-0.2	2.1	1.0	-0.3	-0.2
Korea	-0.4	2.5	0.2	-0.4	-0.3
Mexico	1.4	-6.8	-11.5	4.7	5.1
MENA	-0.1	0.5	0.8	-0.2	-0.1
Rest of America	-0.6	0.6	1.3	-0.5	-0.4
Rest of Asia	-0.3	1.1	2.0	-0.4	-0.2
Rest of Europe	-0.1	0.5	1.2	-0.1	-0.1
Rest of EU 27	-0.2	0.3	1.4	-0.2	-0.2
Rest of Latin America	-0.2	-0.1	0.0	-0.3	-0.3
Sub-Saharan Africa	-0.1	0.4	0.4	-0.1	-0.1
UK	-0.1	0.3	2.0	-0.3	-0.2
USA	-0.4	-8.4	-3.6	-1.6	-0.9

Source: authors' elaboration based on MIRAGE-Power
Note: RR stands for real return; nat'l for natural; ASEAN for Association of Southeast Asian Nations; Aus.-NZ for Australia-New Zealand; MENA for Middle-East and North Africa

export barriers lower their prices for Mexican and Canadian markets. GDP gains are substantial for Canada (1.3%) and large for Mexico (6.6%).

With respect to the productive factors' compensation, the impact on the return on capital is positive for Canada and Mexico and negative for all other countries and regions (see Table 4).

For the US, the negative impact on wages for both skilled and unskilled labor is an important policy implication, especially as Donald Trump advocates for a "worker-centered trade policy". American protectionism has an expansive effect on activity in few sectors, those which benefit from a higher protection from foreign competition on the American market. However, in many sectors, US firms lose competitiveness on the markets of all partners because of retaliatory tariffs on US goods and higher costs of intermediate goods in the United States. Moreover American

households are also losing purchasing power, due to the increase in import prices (see below). Overall, economic activity declines in many sectors (see subsection 4.4), reducing demand for productive factors, in particular labor and land.

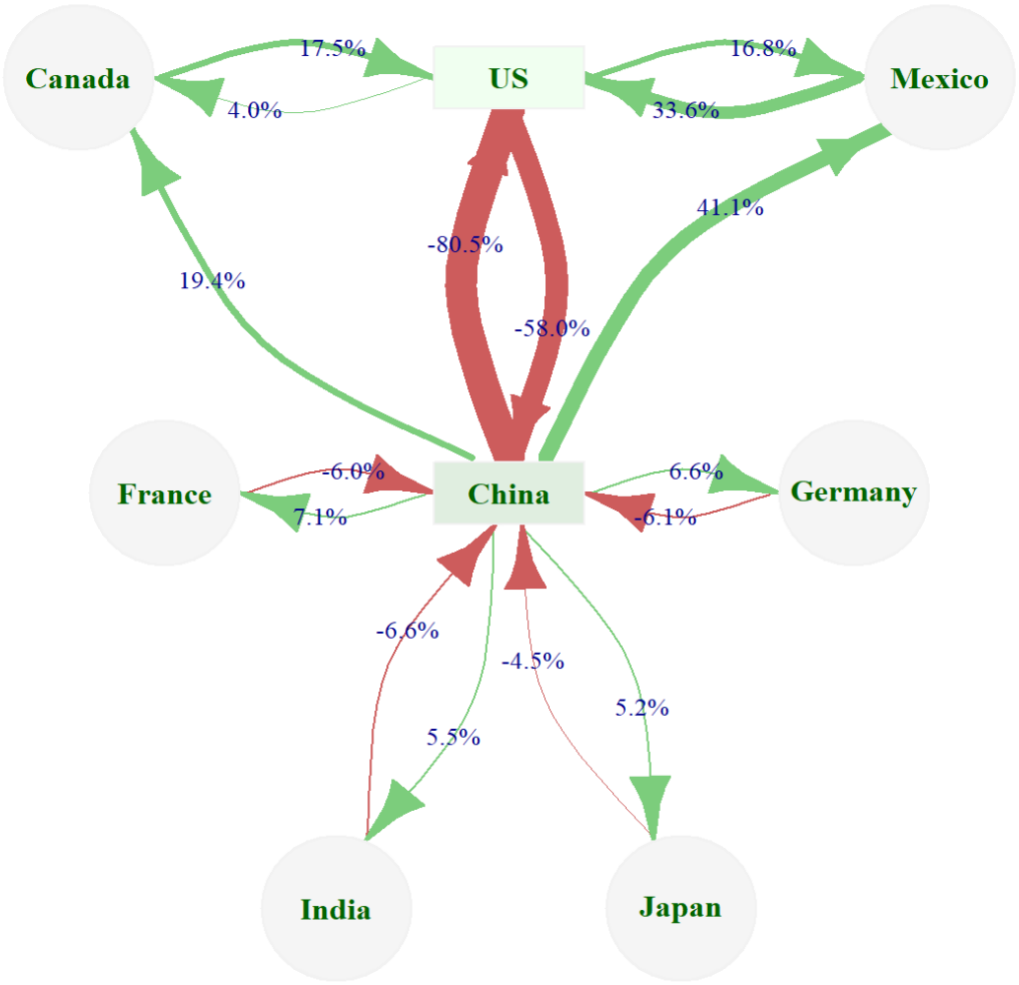
On the contrary, being spared by American protectionism when competitor countries are not is a godsend for Mexican industrial firms, whose exports and production expand significantly (see subsection 4.4) leading to robust growth in industrial labor demand. Consequently, Mexican workers experience substantial gains, particularly in the industrial sectors .

4.3 Impact on the geography of trade flows

What is the impact of this trade war on the geography of trade flows? Since 2021, the issue of the decoupling of the US and Chinese economies has been intensively discussed, with a decrease in bilateral trade between these two trading powers and the issue of "nearshoring"high on the political agenda.

Figure 1 presents the impact of this trade war on several important bilateral trade flows in value in 2030 (for detailed values, refer to Table 13 in the annex). It shows a "Great Reallocation" of trade flows: China's exports to the US decrease by 80.5% while US exports to China fall by 58.0%. Even more strikingly, US exports to all destinations, except countries from the USMCA countries and the Rest of America region, decrease by at least 20%. However, US exports to Canada and Mexico increase by 4.0% and 16.8% respectively, and US imports from Canada and Mexico by 17.5% and 33.6%. It is a significant redirection of U.S. trade toward its close neighbors.

Figure 1: Impact of *SCentral* on bilateral trade flows in value at FOB prices in 2030, percentage change as compared to the baseline



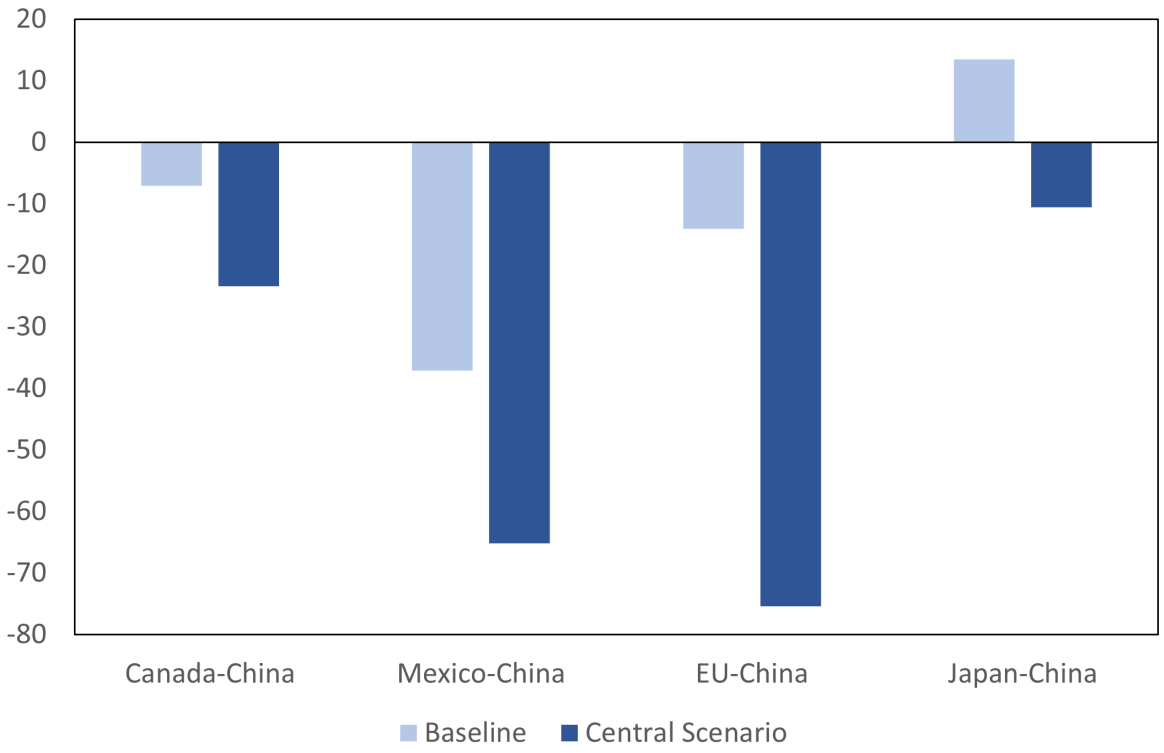
Source: authors' elaboration based on MIRAGE-Power

The impact of this trade war on exports from China to the US is substantial. Chinese producers redirect their exports to other countries than the US, such as France (+7.1% of trade flow in FOB value), Germany (+6.6%), Canada (+19.4%), Mexico (+41.1%). However as China's GDP is also negatively affected, Chinese imports from all sources decrease. With increasing Chinese exports and decreasing Chinese imports, this trade war could lead to a significant widening of several bilateral trade deficits with China, with potentially new protectionist pressure in the EU and big countries such as Japan and the UK. For example, French exports to China decrease by 6.0% while

French imports from China increase by 7.1%.

With this trade war that reallocates Chinese exports from the US towards all trading partners, and which reduces Chinese GDP and aggregate imports, bilateral trade deficits with China increase. This is shown on Figure 2. In 2030, the EU trade deficit with China augments from USD 14 bn to USD 75 bn. This trade reorientation underscores the transformative impact of the trade war on global economic dynamics and highlights the potential for new geopolitical and trade tensions.

Figure 2: Impact of *SCentral* on bilateral trade balances of China at FOB prices - Scenario / Baseline - 2030 - USD bn



Source: authors' elaboration based on MIRAGE-Power

4.4 Impact by sector

Table 5 presents the impact of the trade war on "large"sectors across countries or regions. In China, industrial production is declining, while it is increasing in the agricultural and agri-food sectors. In the United States, production is increasing in industry, but it is decreasing in agriculture and

Table 5: Impact of the *SCentral* scenario on production by sector and region - 2030 - percentage change compared to the baseline

Region	Agriculture and food	Energy and Mining	Industry	Services
ASEAN	0.1	-0.4	0.7	0.0
Aus.-NZ	0.5	-0.8	0.8	0.0
Brazil	0.5	-0.4	-0.3	0.0
Canada	-2.8	-0.7	11.2	-0.3
China	0.3	0.3	-1.3	-0.3
France	-0.1	0.2	-0.1	0.0
Germany	0.2	-0.1	-0.2	0.0
India	0.2	-0.3	-0.4	0.0
Japan	1.1	0.1	-0.4	0.0
Korea	0.7	-0.4	-0.2	0.0
Mexico	-3.5	-1.0	15.4	1.0
MENA	0.2	0.0	-0.1	0.0
R. of Am.	0.8	0.6	0.8	-0.1
R. of As.	0.6	-0.3	-0.1	-0.1
R. of Eur.	0.2	-0.1	-0.6	0.0
R. of EU 27	0.0	-0.2	-0.1	0.0
R. of Lat. Am.	-0.2	0.2	0.6	-0.1
SS Africa	0.2	-0.5	-0.7	0.0
UK	0.0	0.0	-0.9	0.0
USA	-2.5	-0.4	2.2	-0.5

Source: authors' elaboration based on MIRAGE-Power
Note: ASEAN for Association of Southeast Asian Nations; Aus.-NZ stands for Australia-New Zealand; R. of stands for Rest of, Am. for America, As. for Asia, Eur. for Europe, EU27 for European Union27, SS for Sub-Saharan

agri-food, energy and mining, and services. These changes in production do not correspond to the traditional pattern of global comparative advantages where the US typically excels in agriculture, energy and services, while China outperforms in industry.

Notably, industrial production rises significantly in Canada and Mexico, +11.2% and +15.4%. The impacts on industrial production in France and Germany are negative but moderate.

For a more disaggregated analysis, the annex provides the impact of each scenario on value added in volume terms of each of the 30 sectors of activity in the US (Table 16), China (Table 17), France (Table 18), and Germany (Table 19). Considering the *SCentral* column, it is concluded that a trade war initiated by the US administration has a significant positive impact on US activity

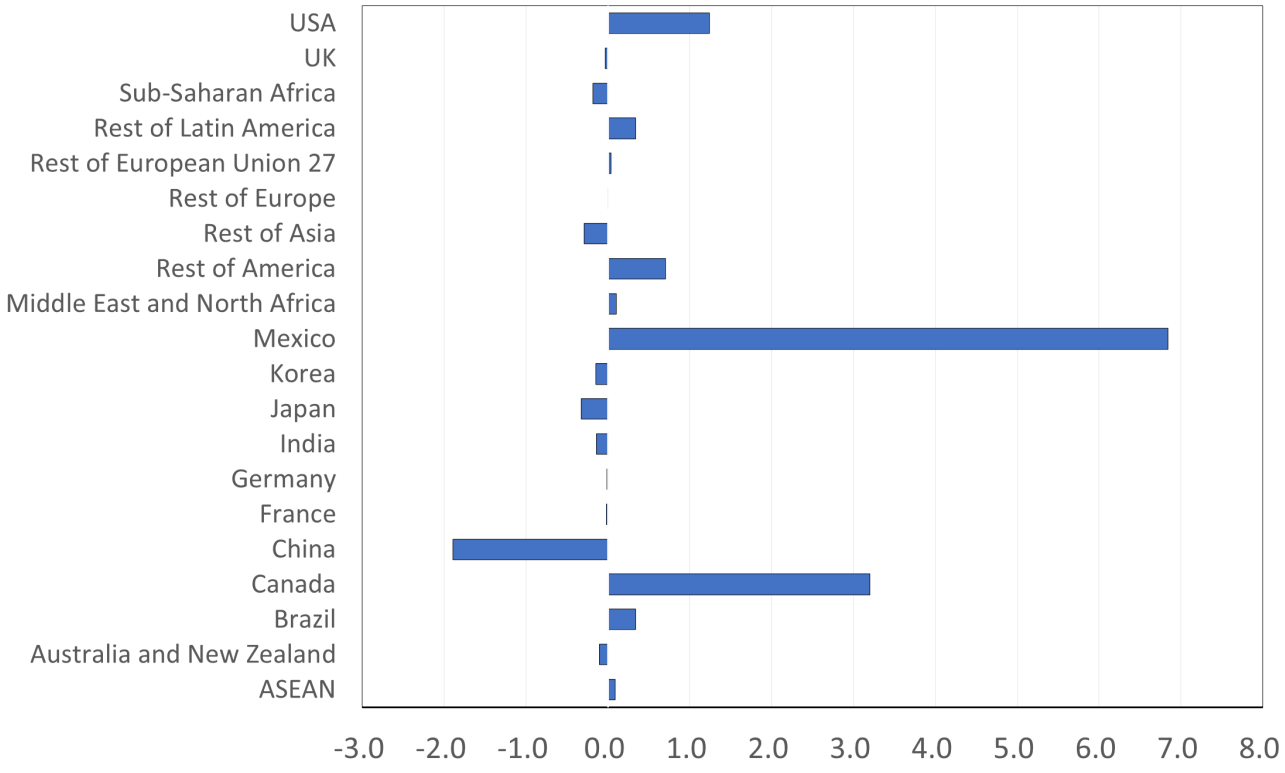
in the textile sector especially, but also in the metals, other manufacture, and the electronic and optical products sectors whereas activity is decreased in agricultural sectors like oilseeds, cereals, and crops. For China, a trade war is detrimental for the textile and the electronic and optical products sectors, but beneficial for the oilseeds sector. Again, the trade war reverses the traditional pattern of global comparative advantages. For France and Germany, the sectoral impacts are comparatively smaller but still noteworthy. In France the textile and vehicles sectors are significantly affected, with reductions in value-added volumes ranging from 1.5% to 1.8%. The value added in the international transportation sector is reduced by 3.7%: it is related to the fall in world trade.

4.5 Impact on US inflation

Figure 4 shows the variation in the consumer price index, measured as Fisher price index, across the 20 countries or regions considered in this study. A question regularly raised during the 2024 American presidential campaign and early 2025 is the potential impact of a universal tariff on inflation in the United States. The simulation of this tariff war indicates a 1.2% rise in the consumer price index: the tariffs implemented increase the price of goods imported from all partners, Canada and Mexico excluded. Imports account for only a minor proportion of all goods purchased by American households and firms located in the US (9.0% in 2024 according to the model - this proportion is much greater in other countries like Mexico, 23.6%, or Germany, 19.9%). Imports from Canada and Mexico represent 30.6% of total US imports; from China 9.8%. So imports from the rest of the world represent 59.6% of total US imports. As the level of tariffs implies a maximum price increase of 10 pp, except for goods coming from China (60 pp), it is not surprising that the consumer price index increases by only 1.2%.

In Canada and especially in Mexico, the central scenario implies increased demand of goods from US firms and households, with a multiplier effect: more activity in both countries generates more revenues distributed to households who demand more goods and intermediate inputs, thereby amplifying production and economic growth. The increase of the consumer price index is 3.2% in

Figure 3: Impact of *SCentral* on Consumer Price Index - 2030 - percentage change compared to the baseline



Source: authors' elaboration based on MIRAGE-Power

Canada and 6.8% in Mexico.

5 Five key policy conclusions

We now use the other five scenarios to formulate key policy conclusions. This will be achieved each time by comparing two scenarios. Table 6 indicates the impact of all scenarios on world exports, world GDP, world GHG emissions, and world welfare. Table 7 shows the impact of all scenarios on all countries' (or regions') GDP, Table 8 on exports.

After exposing these key policy conclusions, we compare our results to those obtained by other evaluations.

Table 6: Impact of all scenarios on four variables at the world level - 2030 - percentage change compared to the baseline

Variable	*SMin10*	*S+10*	*S+10/60*	*SCentral*	*SNTM*	*SCanMex*
Exports (vol)	-1.3	-1.7	-2.3	-3.4	-4.8	-5.0
World GDP (vol)	-0.2	-0.2	-0.4	-0.5	-0.8	-0.7
World GHG emissions	-0.1	-0.1	-0.2	-0.2	-0.2	-0.0
World Welfare	-0.1	-0.2	-0.3	-0.5	-0.8	-0.7

Source: authors' elaboration based on MIRAGE-Power

Table 7: Impacts of all scenarios on national or regional GDPs - 2030 - percentage change compared to the baseline

Region	*SMin10*	*S+10*	*S+10/60*	*SCentral*	*SNTM*	*SCanMex*
ASEAN	-0.5	-0.6	0.3	0.2	-0.7	0.7
Australia and New Zealand	-0.1	-0.1	-0.1	-0.1	-0.2	-0.1
Brazil	-0.2	-0.2	-0.1	-0.2	-0.4	-0.1
Canada	0.5	0.7	1.2	1.3	1.8	-1.8
China	-0.1	-0.2	-1.1	-1.3	-1.3	-1.2
France	-0.1	-0.2	-0.1	-0.1	-0.3	-0.0
Germany	-0.2	-0.3	-0.3	-0.1	-0.3	0.0
India	-0.2	-0.3	-0.2	-0.3	-0.6	-0.2
Japan	-0.1	-0.2	-0.1	-0.2	-0.3	-0.1
Korea	-0.3	-0.3	-0.3	-0.3	-0.6	-0.1
Mexico	1.9	2.3	6.5	6.6	8.7	-1.4
Middle East and North Africa	-0.1	-0.1	-0.1	-0.1	-0.3	-0.1
Rest of America	-0.2	-0.1	0.0	-0.2	-0.7	-0.2
Rest of Asia	-0.4	-0.5	-0.2	-0.2	-0.7	0.2
Rest of Europe	-0.1	-0.2	-0.2	-0.1	-0.3	-0.1
Rest of European Union 27	-0.2	-0.2	-0.2	-0.1	-0.3	-0.0
Rest of Latin America	-0.3	-0.3	-0.2	-0.2	-0.6	-0.2
Sub-Saharan Africa	-0.1	-0.1	-0.1	-0.1	-0.3	-0.1
UK	-0.2	-0.3	-0.2	-0.3	-0.5	-0.2
USA	-0.3	-0.4	-0.7	-1.3	-1.9	-1.7

Source: authors' elaboration based on MIRAGE-Power

5.1 The devil is in the details

This section presents a comparative analysis of scenarios *SMin10* and *S+10*. The former scenario imposes a minimum tariff of 10% on all imported goods imported, except those coming from Canada and Mexico. The latter consists in a 10 pp tariff augmentation on all goods. Given the lack of details in Trump's proposals, this analysis illustrates how the specifics of the tariff schedule could have significant consequences on the impact of these two policies.

Table 8: Impacts of all scenarios on national or regional exports in volume - 2030 - percentage change compared to the baseline

	SMin10	*S+10*	*S+10/60*	*SCentral*	*SNTM*	*SCanMex*
ASEAN	-1.4	-1.7	0.9	0.4	-1.7	-1.9
Aus.-NZ	-0.4	-0.5	-0.8	-1.0	-1.5	-0.9
Brazil	-1.2	-1.2	-1.0	-2.3	-4.0	-2.1
Canada	3.4	4.5	7.9	8.3	11.1	-12.5
China	-1.0	-1.6	-7.6	-8.9	-9.0	-8.5
France	-0.5	-0.7	-0.5	-0.5	-1.2	-0.0
Germany	-0.5	-0.6	-0.5	-0.6	-1.1	-0.2
India	-1.2	-1.5	-0.8	-1.3	-3.2	-0.9
Japan	-1.4	-1.6	-0.9	-1.9	-3.3	-1.1
Korea	-0.8	-0.8	-0.6	-1.0	-2.2	-0.4
Mexico	7.7	9.2	25.8	26.1	33.6	-8.9
MENA	-0.3	-0.4	-0.4	-0.5	-0.8	-0.3
R. America	-0.4	-0.4	-0.3	-1.0	-1.8	-0.9
R. Asia	-1.8	-1.8	-0.5	-0.9	-2.9	0.6
R. Europe	-0.1	-0.5	-0.6	-0.7	-1.1	-0.5
R. EU27	-0.4	-0.5	-0.4	-0.4	-0.8	0.0
R. Latin America	-2.0	-1.7	-1.2	-2.9	-5.3	-2.5
SS Africa	-0.6	-0.6	-0.6	-0.8	-1.3	-0.6
UK	-1.3	-1.5	-1.1	-1.4	-2.6	-0.7
USA	-8.2	-10.7	-15.2	-22.9	-31.4	-32.4

Source: authors' elaboration based on MIRAGE-Power
Note: Aus.-NZ stands for Australia-New Zealand; MENA for Middle East and North Africa; R. for Rest of; EU27 for European Union 27 countries; SS for Sub-Saharan

Table 9 indicates the average level of tariff imposed by the country in the column "Importer" on goods coming from the country in the column "Exporter"[10]. It indicates average tariff on trade flows between the three main trading powers. To simplify the presentation of this analysis, we have grouped the 20 regions or countries in our analysis into 4 trading powers: China, the United States of America (USA), the European Union (EU), and the rest of the world (RoW).

The difference in protection applied by the US is significant between scenarios *SMin10* and *S+10*. On products coming from the rest of the world, e.g., it is 12.0% under *SMin10* and 14.8% under *S+10*. The latter scenario implies systematically more protection on the US side than the

[10]In the introduction we wrote that the average customs duty in the United States is 2.2%. This differs from statistics indicated on table 9, which include temporary protection between 2019 and 2024, in particular customs duties adopted during the first US administration. The 2.2% average does not include them. Furthermore the weighing schemes are different.

former.

These differences in protection applied by the US may result in different impacts on GDP and trade. For illustration, US loss of GDP is 0.4% in S+10 instead of 0.3% in *SMin10* (see Table 7). In S+10, the impact of these new customs duties in the US imply an increase in exports of 4.5% for Canada and 9.2% for Mexico, instead of 3.4% and 7.7% when the scenario *SMin10* is implemented (see Table 8).

Note that, for the United States, these two scenarios of increases in US customs duties without retaliation by its trading partners imply a fall in its imports (-7.1%; figure not apparent in Table 9), but also in its exports. MIRAGE assumes that the real exchange rate adjusts so that the current account balance as a proportion of GDP remains constant as compared to the baseline. Here, the adoption in the US of tariffs on imports leads to an appreciation of the real exchange rate, which implies a sufficient contraction in exports for the current account balance to remain constant as a proportion of GDP as compared to the baseline.

Table 9: Average tariff by Importer on Exporter's goods, in percentage

Exporter	**Importer**	**Baseline**	*SMin10*	*S+10*	*S+10/60*	*SCentral*	*SNTM*
RoW	USA	5.5%	12.0%	14.8%	22.3%	22.3%	22.3%
China	USA	4.1%	10.1%	14.1%	64.1%	64.1%	64.1%
EU	USA	2.9%	10.0%	12.9%	12.9%	12.9%	12.9%
USA	RoW	4.5%	4.5%	4.5%	4.5%	19.2%	19.2%
USA	China	8.8%	8.8%	8.8%	8.8%	68.8%	68.8%
USA	EU	3.3%	3.3%	3.3%	3.3%	13.3%	13.3%

Source: authors' elaboration based on MIRAGE-Power. Average tariffs computed with MacMAPs-HS6 weights aggregated at GTAP level. Baseline tariffs are elaborated using MacMAPs-HS6 2022 version and temporary tariff changes, as explained in the protection baseline section.
Note: RoW stands for Rest of the World; EU for European Union

5.2 An eye for an eye and a tooth for a tooth

We now compare scenarios *SCentral* and *S+10/60*. *SCentral* includes retaliatory measures by all US trading partners (except Canada and Mexico), while *S+10/60* does not.

An important objective of trade retaliation is to punish the initiator of the trade war - here the United States. While under the scenario without retaliation, the loss of GDP in 2030 for the

US is -0.7% in terms of GDP and -15.2% in terms of exports (see Tables 7 and 8), these losses are greater with trade retaliation: -1.3% and -22.9% respectively. This retaliation is severe as the loss of GDP is almost doubled and the loss of exports in volume is increased by more than 50%.

Understanding the reasons why countries retaliate is fundamental. The initial response to this question given by economic analysis is simple: countries retaliate if this decision increases their GDP or their real income.[11] In the academic literature on trade wars, initiated by large countries and motivated by changes in terms of trade, small countries are not supposed to retaliate as this is a costly decision for them. Without monopsony power on the world market, retaliation is costly as it implies distortions while terms of trade are unchanged (see Johnson, 1953 and Syropoulos, 2002). Under monopolistic competition and firm heterogeneity, but also terms-of-trade externality, large and small economies set tariffs at (Nash) equilibrium, but small economies set lower tariffs (see Felbermayr et al., 2013). From the point of view of economic historians, small countries have retaliated against big countries, but have rapidly negotiated a cessation of trade hostilities, even at a significant price for them (see Conybeare, 1987). Following the Smoot-Hawley Tariff Act of June 1930, many US trading partners retaliate. Strategic and dynamic considerations may justify small countries exerting retaliation; the short-term cost may be compensated for by a long-term gain from a "harsh reputation" effect (Bouët, 1991). Political economy considerations may also justify it. In the case of a loss of market access caused by foreign protectionism, a political leader who does not react may look weak to her constituents.

In our simulation, we adopt the simple assumption that all countries targeted by US tariffs retaliate. Of the 17 countries or regions initially affected by US trade policy (over the 20 countries or regions included in this modeling exercise, we exclude from this count the US, Canada and Mexico), the retaliatory decision reduces the loss of GDP of only seven regions or countries: in particular, for Australia-New Zealand, France, Germany, the rest of the European Union, and South Korea.

Among the countries where GDP loss is bigger with worldwide retaliation, China's GDP de-

[11] In terms of game theory, it defines a Perfect Nash Equilibrium.

creases by 1.3% under *SCentral* (scenario with retaliation) against a reduction of 1.1% under *S+10/60* (scenario without retaliation). So, while the European Union benefits from worldwide retaliation, China does not. However, a strategic reason for China could be that this retaliation inflicts a larger decrease of GDP and exports to the US. China might accept being hurt by imposing tariffs on its imports if this hurts the US.

China's positioning in global value chains could explain the finding that the country's GDP is negatively affected by trade retaliation. Given that it is a major importer of intermediate goods and exporter of finished goods, the imposition of tariffs reduces its competitiveness, which in turn affects its economic activity.

For Canada and Mexico, the scenario with retaliation is slightly better than the one without, in terms of both GDP and exports; the implementation of custom duties on US products in all countries worldwide increases the relative competitiveness of Canadian and Mexican products in all these markets.

In a nutshell, it may be argued that, in our simulation, the cost of a trade war is overestimated for the US, but considerations arising from game theory and political science may temper this conclusion.

Donald Trump's proposed protectionist legislation is already difficult to simulate, as we have seen, because there are several ways of interpreting his words and because he has made several proposals. The tariff war scenario is even more difficult to simulate. In the *SCentral* scenario, all the US's partner countries retaliate. We could also simulate that some of the partners retaliate, for example the most important partners in terms of GDP. One difficulty would then be to determine the GDP threshold at which a partner retaliates. We simplify the approach here by adding three scenarios, the results of which are presented in the appendix. In *SReprCh*, only China retaliates; it is therefore *S+10/60* with a Chinese tariff augmented by 60 percentage points on imports of goods from the United States. *SReprEU* and *SReprJap* are similar scenarios, but with the European Union and Japan respectively retaliating against the United States with reciprocal tariffs. The results from this modeling are presented in Annex: on Table 14 for GDP and on Table 15 for

exports.

A comparison of *SReprCh* with *S+10/60* leads to the conclusion that when China is the only country to retaliate, its GDP is reduced by even more than when no country retaliates: -1.34 pp vs. -1.10 pp. Again this may be related to its positioning in global value chains. This indicates that from a purely economic point of view and without any consideration for strategy or political economy, China may not find a benefit in retaliation. We reach a similar conclusion for the European Union (including France and Germany) and for Japan. European retaliation is particularly damaging for Germany, whose GDP decline is 0.31 percentage points in the *SReprEU* scenario and 0.25 percentage points in the *S+10/60* scenario. For France, these variations are respectively -0.18 and -0.13.

These are Chinese retaliation that imply the largest loss of GDP for the United States: -0.85 percent instead of -0.72 percent. The impact of Japanese retorsion is minor: -0.74 percent instead of -0.72 percent.

5.3 One woman's loss is another woman's gain

This subsection compares scenario *S+10* and *S+10/60*. In scenario *S+10*, the US imposes a 10 percentage point (pp) tariff increase on all imports except those from Canada and Mexico. The *S+10/60* scenario differs by the augmentation of US customs duties by 60 pp against China, rather than 10 pp.

From Tables 7 and 8, we see that, in scenario *S+10/60*, China's exports fall much more, as does its GDP. For the 16 other countries or regions, which are only penalized by a 10 pp increase in customs duties on their exports to the United States (other than Canada and Mexico), 12 countries or regions gain from the +60 pp tariff on China, in terms of both GDP and exports. There are four exceptions: Australia-New Zealand, South Korea, the Rest of Europe group, which includes Russia, and Sub-Saharan Africa.

For these 16 countries or regions, this increase in US protection against China, with other tariffs unchanged, has two effects. On the one hand, they gain relative access to an important market (US

tariffs on, e.g., European products are unchanged, but they increase on Chinese goods); this effect should increase their exports. On the other hand, their exports to China are penalized because the increase in US protection on Chinese products reduces Chinese GDP by 1.1% instead of 0.2%. This effect is negative for these countries' exports and activity. It is particularly significant when China accounts for a large proportion of their exports. This is the case for Australia-New Zealand (China accounts for 19.5% of their total goods exports in 2030), Korea (21.0%), the Rest of Europe group (11.9%), and Sub-Saharan Africa (11.4%).

5.4 The worst is not so long as we can say: This is the worst

This quote, from Shakespeare's King Lear, means that there is always a worse situation than the one you think is the worst. The comparison between scenarios *SCentral* and *SNTM* illustrates this point.

The trade war modeled by scenario *SCentral* implies, except for Canada and Mexico, a global crisis in terms of GDP and trade. But an even more disastrous trade war is possible, in the form of an increase in bilateral non-tariff measures, in the US on all products from all exporting countries in the world, except Canada and Mexico, and in all countries in the world, except Canada and Mexico, on US products. We therefore add to the scenario *SCentral* an increase in non-tariff measures in the form of a 25% increase in their ad valorem equivalent, on the flows indicated above. This is the scenario *SNTM*. In practical terms, this could take the form of much stricter administrative surveillance of incriminated products by the customs authorities of the countries concerned. We comment on the results by comparison with scenario *SCentral* in Table 4.

For all countries or regions except Canada and Mexico, the *SNTM* scenario implies even greater losses in GDP and exports. France suffers a reduction in its total exports of 1.2% instead of 0.5% (for GDP it is -0.3% instead of -0.1%), while Brazil, India and South Korea suffer a doubling of their GDP loss. For the US, there is a much sharper reduction in its total exports (-31.4% instead of -22.9%) and a fall in its GDP by almost 2% instead of -1.3%. However, China's economic situation remains relatively unchanged as compared to *SCentral* where it is already highly discriminated.

Meanwhile, Canada and Mexico benefit further from the very strong increase in protection that their main export destination applies to their competitors. This is especially the case for Mexico, whose exports increase by 33.6% instead of 26.1%.

5.5 The higher you climb, the harder you fall

A comparison of the two scenarios *SCanMex* and *SCentral* shows that a trade war from which they are excluded gives them a GDP gain of 1.3% and 6.6% respectively (Table 7). If they are included in the trade war, the trade crisis will result in a loss of GDP of 1.8% and 1.4% respectively.

A trade war from which they are excluded implies an augmentation by 8.3% of exports in volume for Canada (26.1% in the case of Mexico) (Table 8). If they are included in the trade war, the trade war will result in a loss of exports in volume by 7.5% for Canada and 9.3% for Mexico. The stakes are therefore high for these two countries, especially for Mexico, and this is of course linked to the concentration of their exports towards their American neighbor. This demonstrates the risks of dependence on a single trading partner and illustrates how in a period of geopolitical tensions, diversification of exports and imports partners is a guarantee of resilience.

For the other countries, in general the same result as in the sub-section 5.3 applies: a loss for a country is a gain for another one. Canada's and Mexico's losses in terms of GDP and export volumes reduce the losses of the other trading partners: for GDP, this is the case for Brazil, China, France, Germany, India, Japan, Korea, and UK. For Rest of Asia, with Canada and Mexico included in the trade war, there is a gain of GDP whereas there is a loss if they are excluded (+0.2% and -0.2%). For ASEAN, the gain in GDP is larger when Canada and Mexico are included (0.7% and 0.2%). For Australia-New Zealand, Middle East and North Africa, Rest of America, Rest of Europe, Rest of Latin America, and Sub-Saharan Africa the variations of GDP are identical.

Last not least, the US loss of GDP is more pronounced if its North-American neighbors participate in the trade war: the US GDP decreases by 1.7% if Canada and Mexico are active participants in the trade war and -1.3% when they are excluded. US exports decrease in volume by 32.4% in scenario *SCanMex* and 22.9% in scenario *SCentral*. In the latter scenario, the US partially off-

Table 10: Impact of three scenarios on GDP and exports of 4 countries, according to two studies

		FHL2024 Short run	**FHL2024 Long run**	**BSZ 2025**
S+10/60	US GDP	-0.8%	-0.5%	-0.7%
	US exports	-6.3%	-13.6%	-15.2%
	China GDP	-0.8%	-0.6%	-1.1%
	China exports	-8.0%	-10.1%	-7.6%
	Germany GDP	-0.2%	-0.3%	-0.3%
	France GDP	-0.1%	-0.2%	-0.1%
SCentral	US GDP	-1.1%	-0.8%	-1.3%
	US exports	-11.7%	-21.9%	-22.9%
	China GDP	-1.0%	-0.7%	-1.3%
	China exports	-8.5%	-10.8%	-8.9%
	Germany GDP	-0.2%	-0.3%	-0.1%
	France GDP	-0.1%	-0.2%	-0.1%
SCanMex	US GDP	-1.7%	-1.2%	-1.7%
	US exports	-19.1%	-38.6%	-32.4%
	China GDP	-0.9%	-0.6%	-1.2%
	China exports	-8.1%	-10.0%	-8.5%
	Germany GDP	-0.2%	-0.1%	0.0%
	France GDP	-0.1%	-0.1%	0.0%

Source: authors' elaboration based on MIRAGE-Power and a review of literature
Note: FHL stands for Felbermayr, Hinz, and Langhammer; BSZ stands for Bouët, Sall, and Zheng

set the loss of exports to countries outside North America by increasing exports to Canada and Mexico.

5.6 Comparison with other evaluations

Do our results differ from other evaluations? With the help of the GTAP model, the US Congressional Budget Office evaluates the impact of a US protectionist law corresponding to our *S+10/60* scenario on US GDP as a decrease by 0.6% (our evaluation is -0.7%) and an increase in the consumption price index by 1.0% (our evaluation is 1.2%). Our result concerning the impact of *S+10/60* on US GDP is also similar to those of Erica York (2024), but significantly less than the evaluation by Clausing and Obstfeld (2024): -1.8%. However, their methodology is different and may be considered as a first-order approximation.

The best comparison to be made is with Felbermayr et al. (2024). Table 10 compares results of both studies concerning US GDP and exports, Chinese GDP and exports, and French and German

GDP with respect to three scenarios that are quite similar in both studies: US Policy Scenario 1 in Felbermayr et al. (2024) and *S+10/60* in ours; US Policy Scenario 2 and *SCentral*; US Policy Scenario 3 and *SCanMex*. Felbermayr et al. (2024) distinguish between short run and long run. In the former, the trade policy shock is unexpected and "hit countries unprepared". In the latter, full adjustment of all economies has happened. So our results must be compared to their long-run results.[12]

Results are very close, except for the second and third scenarios for US and China's GDP: Felbermayr et al. (2024) obtain smaller impact of trade war (scenario *SCentral*) on US and Chinese GDP: -0.8% and -0.7% in their evaluation, -1.3% and -1.3% in our study. In our *S+10/60* and *SCentral* scenarios, the USA applies tariffs to all countries including those with which it has a free trade agreement, except Canada and Mexico.[13] So there are more U.S. imports affected by additional protection in these two scenarios in our study than in the Kiel Institute's assessment, but also more retaliation on U.S. exports. It therefore seems normal that US exports should be more reduced, and US GDP more affected, in our study.

6 Can the US replace the Federal Income Tax by customs revenues?

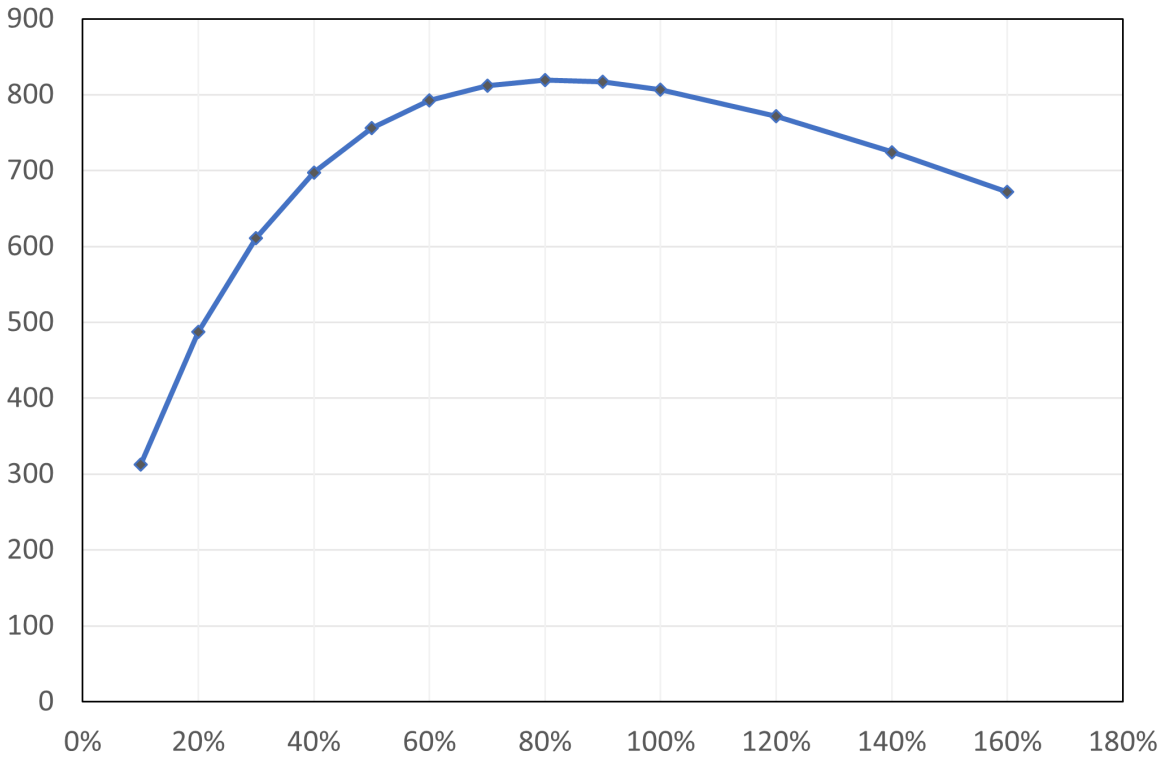
Donald Trump has proposed replacing federal income tax with customs revenue. Is it possible to tax US merchandise imports in such a way as to generate enough revenue to offset the cancellation of the federal income tax? This tax generates over USD 2,000 bn today.

To assess whether customs revenues can reach this sum, we apply a single customs duty in the US to all imported products from all origins (including Canada and Mexico) in the MIRAGE model, and gradually increase it (by 10 pp steps) to assess the customs duty that maximizes

[12] We thank Julian Hinz for giving us access to the detailed results of their study.

[13] In 2024, the US have also signed a FTA with Australia, Bahrain, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Israel, Jordan, Morocco, Nicaragua, Oman, Panama, Peru, Singapore, and South Korea.

Figure 4: US customs revenues with a unique customs duty on all imports - 2030 - Baseline - USD bn



Source: authors' elaboration based on MIRAGE-Power

customs revenues, and the corresponding amount of customs revenues.

The results of these simulations are given in Figure 4. The tariff that maximizes US customs revenues is 80%, generating customs revenues of USD 819.3 bn.[14] This is much less than the actual amount of federal income tax of over USD 2,000 bn. Thus, it is impossible to replace US federal income tax revenues with customs revenues, which increase when a single tariff increases from 0% to 80%, but decrease beyond that.

However, such an 80% tariff on all US imports would have severe economic repercussions and reduce world trade by 10.8%, world GDP by 1.6%, US imports by 41.5% and US GDP by 2.7%.

This result does not differ strongly from a recent assessment by Clausing and Obstfeld, 2024. They conclude that the revenue-maximizing tariff is 50% and it would generate a customs revenue

[14]This is not the welfare-maximizing or GDP-maximizing tariff, but the one that maximizes customs revenue.

of USD 780 bn. However, their method is based on a simple assumption of a unitary elasticity of imports to tariffs.

7 Concluding remarks

This article has carried out an ex-ante assessment of a trade war initiated by the United States in 2025. Using the MIRAGE-Power model of the world economy, we simulate Donald Trump's main proposal from his presidential campaign, with the US's trading partner countries applying trade retaliatory measures. We show that the USA and China are particularly hard hit, with GDP reductions of 1.3 percent. The United States has also seen a 1.2 percent increase in the consumer price index and a significant reduction in the remuneration of labor and capital.

At global level, this trade war would result in a 0.5 percent loss of GDP and a 3.4 percent drop in world trade. The main trade impacts are, on the one hand, a major reallocation of trade flows, with a collapse in trade between China and the United States, and, on the other, a significant widening of the trade deficits of many countries vis-à-vis China. Additional scenarios provide political conclusions, the most important of which are:

- The application of trade retaliation measures by US partner countries implies greater GDP losses for the US.
- The application of trade retaliation measures is not, in terms of impact on GDP, positive for all of the US's partner countries, particularly China and Germany.
- The application of higher taxes by the United States on imports from China is beneficial for other countries.
- The stakes involved in this trade war are particularly high for Canada and Mexico: either they are treated like other countries trading with the US, and their GDP losses are significant, or they are exempt from US tariffs, and their GDP gains are significant.
- Finally, it is impossible for the United States to fully offset federal income tax revenues with customs revenues.

The trade war's impact intensifies with broader participation by affected countries and the use of diverse protection and retaliation measures (e.g., tariffs, non-tariff measures). On the first aspect, the US administration seems to be wavering between launching a universal trade war (an "across-the-board") and a more transactional approach, where tariffs are used to pressure specific countries to make concessions. On the second aspect, some trading partners may use instruments other than tariffs to inflict greater harm on the US. China, for example, may use export restrictions or even export bans, on certain critical raw materials (rare earths, germanium, gallium, graphite, etc.). The European Union may exert retorsion by imposing a significant digital sales tax on big tech US firms (Felbermayr et al., 2024). Last not least, the trade war can have major side effects in terms of the reallocation of world trade, particularly if the United States imposes very different tariffs from one trading partner to another.

On January 2025, it is difficult to predict if the new US administration will adopt such a protectionist trade policy. Given Donald Trump's track record of imposing tariffs in 2018 and 2019 during his previous mandate, these threats may look credible. However, these policies applied only to a specific group of products or partners, while his new proposals made in 2023 and 2024 are far broader, affecting all products from all countries. This raises the question of whether the president of the United States could himself decide on such a policy. Indeed, the US constitution explicitly grants Congress the authority to impose tariffs. If both the Trump and the Biden administrations have implemented tariffs, it was under a selective authorization given by trade laws to the President: the well-known Section 201 (safeguard) tariffs, the Section 232 (national security) tariffs, and the Section 301 (unfair practices of trading partners) tariffs. Under these three sections of US law, the president can implement tariffs on a group of products from a number of countries, but never a universal tariff. Donald Trump may need control of both houses of Congress by the Republican Party to implement such a protectionist law. Elections from November 2024 gave a majority to the Republican Party in both the House of Representatives and the Senate.

What policy recommendations can be made on the basis of this study? There are a priori two possible attitudes for the United States' partners: either negotiate an agreement with the United

States that concedes them something in exchange for an exemption from supplementary customs duties, or use a threat of retaliation. As we have already indicated, this threat must be credible in the sense that the US administration must believe in its application should it decide to apply tariffs, but it must also inflict enough harm on the US that it would prefer not to apply tariffs against this partner.

For each US partner, the EU for example, the best response is certainly to propose a bilateral agreement backed up with a credible threat of retaliation. Bercero et al. (2024) propose a US-EU agreement on trade facilitation and economic security. If the deal is not agreed by the US, the European threat would consist in the application of the same import duties as those imposed by the US on European products, except a list of goods imported by the EU from the US, which are identified as crucial for European countries. The advantage of this negative list is that it reinforces the credibility of the European threat. Felbermayr et al. (2024) proposes a trade agreement between the two powers, the United States and the European Union, involving the total elimination of customs duties on trade in industrial products between them. Such an agreement would not only avoid a costly trade war between the two countries, but would also strengthen industries on both sides of the Atlantic, while avoiding a liberalization of the agricultural sector that would be difficult for certain European countries to accept. The European threat of retaliation would consist in a digital sales tax of 25% on US exports of digital services to the EU.

Our study shows that trade retaliation in the form of tariffs on imports from the US exacerbates American GDP losses. Nevertheless, these GDP losses are greater when the retaliation is carried out by China or the EU than when it is carried out by Japan. This confirms a result of economic theory, according to which large countries have the power to retaliate that small countries do not. There are therefore two categories of countries: those that can retaliate and those that cannot. China and the EU belong to the first category, and even have a wider arsenal of retaliation instruments at their disposal, with, for example, export bans on critical minerals for the former, and tax increases on digital trade for the latter.

One of the main victims of a trade war initiated in 2025 by the new US administration will be

the multilateral trading system, the WTO in other words. Tariffs as promised by Donald Trump contravene WTO principles, not only because they establish trade discrimination (e.g. between the EU and China) that does not comply with the Most-Favored-Nation rule (WTO Article 1), but also because they impose tariffs in excess of bound tariffs, i.e. a policy that does not comply with WTO Article 2, which sets out the list of tariff concessions of each member country. Already weakened, the multilateral institution would thus see an increase in the share of world trade not respecting multilateral principles. Beyond the US decision, whether retaliation by US partners will take place within or outside the multilateral framework will matter. The deconsolidation of a significant number of tariffs worldwide would increase the already high level of uncertainty surrounding the stability of international trade relations. Finally, if the United States' partners bring complaints about US policy to the Dispute Settlement Body, the latter could become overwhelmed with trade disputes, and it is hard to see how they would not lead to further condemnations of the United States in the first instance. The likelihood of a definitive US exit from the multilateral trading system would increase, leaving the European Union even more alone in its fight for multilateralism.

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8 Appendix

Table 11: Sectoral aggregation

MIRAGE sector	Mirage sector label	GTAP sector
Animal products	Agrifood	ctl, oap, rmk, wol
Cereals	Agrifood	pdr, wht, gro
Crops	Agrifood	v_f, c_b, pfb, ocr
Forestry	Agrifood	frs, fsh
Meat	Agrifood	cmt, omt
Oil seeds	Agrifood	osd
Other processed food	Agrifood	vol, mil, pcr, sgr, ofd, b_t
Coal	Energy	coa
Electricity	Energy	ely
Electricity coal	Energy	CoalBL
Electricity gas	Energy	GasBL, GasP
Electricity nuclear	Energy	NuclearBL
Electricity oil	Energy	OilBL, OilP
Electricity renewable	Energy	WindBL, HydroBL, OtherBL, HydroP, SolarP
Electricity transmission and distribution	Energy	TND
Gas	Energy	gas, gdt
Mineral and mining	Energy	oxt, nmm
Oil	Energy	oil
Refined oil	Energy	p_c
Chemistry and phama products	Industry	chm, bph
Metals	Industry	i_s, nfm, fmp
Other manufacture	Industry	lum, ppp, rpp, omf
Textile	Industry	tex, wap, lea
International transportation	Services	wtp, atp
Other services	Services	wtr, cns, afs, ros, osg, edu, hht, dwe

Source: authors' elaboration

Table 12: Regional aggregation

MIRAGE region	Mirage region label	GTAP region
ASEAN	AsiaOceania	BRN, IDN, KHM, LAO, MYS PHL, SGP, THA, VNM
Australia and New Zealand	AsiaOceania	AUS, NZL
Brazil	Americas	BRA
Canada	Americas	CAN
China	AsiaOceania	CHN
France	Europe	FRA
Germany	Europe	DEU
India	AsiaOceania	IND
Japan	AsiaOceania	JPN
Korea	AsiaOceania	KOR
Mexico	Americas	MEX
Middle East and North Africa	AfrMENA	ARE, BHR, DZA, EGY, IRN IRQ, JOR, KWT, LBN, MAR OMN, PSE, QAT, SAU, SYR TUN, TUR, XNF, XWS
Rest of America	Americas	HTI, XCA, XCB, XNA, XSM, XTW
Rest of Asia	AsiaOceania	AFG, BGD, HKG, ISR, LKA MNG, NPL, PAK, TWN, UZB WEA, XOC, XSA, XSE
Rest of Europe	Europe	ALB, ARM, AZE, BLR, CHE GEO, KAZ, KGZ, NOR, RUS SRB, TJK, UKR, XEE, XEF, XER, XSU
Rest of European Union 27	Europe	AUT, BEL, BGR, CYP, CZE DNK, ESP, EST, FIN, GRC HRV, HUN, IRL, ITA, LTU LUX, LVA, MLT, NLD, POL PRT, ROU, SVK, SVN, SWE
Rest of Latin America	Americas	AGR, BOL, CHL, COL, CRI DOM, ECU, GTM, HND, JAM NIC, PAN, PER, PRI, PRY SLV, TTO, URY, VEN
Sub-Saharan Africa	AfrMENA	BEN, BFA, BWA, CAF, CIV CMR, COD, COG, COM, ETH GAB, GHA, GIN, GNQ, KEN MDG, MLI, MOZ, MUS, MWI NAM, NER, NGA, RWA, SDN SEN, SWZ, TCD, TGO, TZA UGA, XAC, XEC, XSC, XWF ZAF, ZMB, ZWE
UK	Europe	GBR
USA	Americas	USA

Source: authors' elaboration

	AS	**Au**	**Br**	**Ca**	**Ch**	**Fr**	**Ge**	**In**	**Ja**	**Ko**	**Me**	**ME**	**RAm**	**RAs**	**REu**	**REU**	**RLA**	**SSA**	**UK**	**USA**
AS	0.7	1.5	3.4	10.8	-4.6	1.9	1.6	0.1	0.4	1.8	35.6	1.3	3.5	0.0	0.8	2.1	4.6	-0.8	1.8	1.7
Au	0.9	1.3	5.0	12.7	-4.6	3.6	3.0	1.5	2.9	4.6	27.8	1.7	3.6	0.4	1.3	2.3	3.5	-0.1	2.2	-8.1
Br	-0.3	-0.2	0.0	10.8	-0.1	-0.3	-0.1	-1.2	0.5	0.4	26.1	-0.2	8.2	-0.4	-0.9	-0.1	2.9	-2.2	-0.1	-15.2
Ca	-8.2	-8.0	-7.0	0.0	-10.5	-8.3	-7.7	-8.5	-5.5	-7.6	16.9	-7.7	-5.1	-8.9	-8.5	-9.5	-1.0	-9.3	-7.7	17.5
Ch	6.6	6.7	11.1	19.4	0.0	7.1	6.6	5.5	5.2	5.9	41.1	7.4	15.2	5.7	6.4	7.3	11.7	5.4	7.8	-80.5
Fr	0.7	1.6	3.4	12.6	-6.0	0.0	0.9	0.2	0.7	0.6	29.8	1.4	5.0	-0.4	0.6	1.1	3.6	-0.8	1.1	-11.3
Ge	0.6	2.1	3.8	18.3	-6.1	0.8	0.0	-0.4	1.3	0.2	29.7	0.9	2.7	-0.2	0.8	1.3	4.3	-1.2	1.7	-12.7
In	0.5	1.1	5.7	13.7	-6.6	1.6	1.7	0.0	1.2	-0.4	30.3	0.7	6.3	0.0	1.5	2.1	5.8	-1.0	1.7	-10.4
Ja	1.3	2.6	4.6	22.1	-4.5	1.7	2.3	0.9	0.0	1.2	30.8	1.7	1.8	0.9	1.8	2.1	4.2	-1.0	2.3	-13.7
Ko	1.2	3.4	4.4	22.4	-4.0	1.8	2.0	0.8	0.8	0.0	35.4	2.0	2.1	0.9	2.2	2.6	5.5	-0.3	2.9	-9.4
Me	0.2	-8.4	-18.1	-0.6	-6.6	0.5	-16.5	-17.1	-13.1	-18.3	0.0	-17.1	-15.8	-12.7	-20.6	-16.7	-9.5	-14.0	-16.2	33.6
ME	0.1	0.4	4.9	14.3	-2.2	1.7	1.4	0.6	1.7	1.9	28.8	0.8	6.5	-0.3	0.1	1.8	4.5	-0.7	0.7	-15.4
RAm	-1.4	-1.9	0.1	11.2	-7.9	-1.7	-1.8	-2.0	-2.6	-2.4	26.3	-1.8	4.7	-3.1	-1.8	-1.4	1.4	-3.3	-1.5	0.3
RAs	1.6	0.8	3.8	12.4	-4.7	1.2	1.3	0.9	0.6	1.3	33.6	1.7	4.1	0.6	1.4	1.6	3.8	0.2	1.4	-2.4
REu	-0.4	1.1	4.6	13.5	-3.0	0.5	0.7	0.0	0.7	1.4	30.1	2.0	10.0	-0.2	0.4	1.5	6.0	0.2	1.7	-7.3
REU	0.3	0.9	2.3	13.8	-6.3	0.4	0.5	-0.5	0.3	-0.3	28.3	0.3	4.0	-0.8	0.3	0.8	3.2	-1.1	0.9	-10.2
RLA	0.0	-0.1	2.2	10.9	-5.0	-0.2	0.4	-0.2	-0.4	-0.7	24.0	-0.1	10.1	-1.0	-0.5	0.2	4.5	-1.0	0.3	-14.0
SSA	1.3	1.7	6.0	16.8	-3.7	2.6	2.8	1.4	0.0	0.6	22.3	1.3	2.8	0.0	1.4	2.5	6.6	-0.1	2.6	-14.1
UK	0.1	0.5	2.2	14.6	-6.8	0.2	0.5	0.2	-0.3	-0.7	28.1	0.1	3.6	-1.0	0.0	0.8	3.0	-1.1	0.0	-6.7
USA	-26.8	-27.6	-23.4	4.0	-58.0	-26.8	-29.7	-25.2	-29.4	-30.7	16.8	-27.9	-13.4	-30.8	-23.8	-27.5	-26.0	-21.2	-21.4	0.0

Table 13: Impacts of central scenario on bilateral trade flows of goods in value, FOB prices - 2030 - scenario SCentral / Baseline
Source: authors' elaboration based on MIRAGE-Power
Note: AS stands for ASEAN, Au for Australia-New Zealand, Br for Brazil, Ca for Canada, Ch for China, Fr for France, Ge for Germany, In for India, Ja for Japan, Ko for South Korea, Me for Mexico, ME for Middle East and North Africa, RAm for Rest of America, RAs for Rest of Asia, REu for Rest of EUrope, REU for Rest of European Union 27 countries, RLA for Rest of Latin America, SSA for Sub-Saharan Africa.

Table 14: Impact of *SCentral*, *SReprCh*, *SReprEU*, and *SReprJap* on national or regional GDP in volume - 2030 - percent - scenario/baseline

	SCentral	*SReprCh*	*SReprEU*	*SReprJap*
ASEAN	0,16	0,40	0,29	0,28
Aus.-NZ	-0,11	-0,10	-0,13	-0,13
Brazil	-0,20	-0,17	-0,13	-0,13
Canada	1,27	1,21	1,22	1,21
China	-1,28	-1,34	-1,09	-1,10
France	-0,12	-0,11	-0,18	-0,13
Germany	-0,14	-0,19	-0,31	-0,24
India	-0,26	-0,21	-0,20	-0,21
Japan	-0,15	-0,11	-0,13	-0,23
Korea	-0,25	-0,19	-0,33	-0,34
Mexico	6,61	6,52	6,51	6,52
MENA	-0,12	-0,12	-0,12	-0,14
R. America	-0,22	0,02	0,05	0,04
R. Asia	-0,18	-0,02	-0,14	-0,14
R. Europe	-0,14	-0,15	-0,18	-0,18
R. EU27	-0,15	-0,19	-0,27	-0,22
R. Latin America	-0,22	-0,14	-0,15	-0,15
SS Africa	-0,13	-0,12	-0,12	-0,12
UK	-0,26	-0,21	-0,20	-0,22
USA	-1,26	-0,85	-0,81	-0,74

Source: authors' elaboration based on MIRAGE-Power

Note: Aus.-NZ stands for Australia-New Zealand; MENA for Middle East and North Africa; R. for Rest of; EU27 for European Union 27 countries; SS for Sub-Saharan

Table 15: Impact of *SCentral*, *SReprCh*, *SReprEU*, and *SReprJap* national or regional exports in volume - 2030 - percent - scenario/baseline

Region	*SCentral*	*SReprCh*	*SReprEU*	*SReprJap*
ASEAN	0,4	1,3	1,0	0,9
Aus.-NZ	-1,0	-0,6	-0,8	-0,8
Brazil	-2,3	-1,2	-1,0	-1,0
Canada	8,3	8,0	8,0	8,0
China	-8,9	-9,2	-7,5	-7,6
France	-0,5	-0,4	-0,9	-0,5
Germany	-0,6	-0,4	-0,9	-0,5
India	-1,3	-0,8	-0,7	-0,8
Japan	-1,9	-0,8	-0,9	-2,1
Korea	-1,0	-0,2	-0,5	-0,5
Mexico	26,1	25,8	25,8	25,8
MENA	-0,5	-0,3	-0,3	-0,3
R. America	-1,0	-0,3	-0,3	-0,3
R. Asia	-0,9	0,0	-0,5	-0,5
R. Europe	-0,7	-0,5	-0,6	-0,6
R. EU27	-0,4	-0,3	-0,7	-0,4
R. Latin America	-2,9	-1,1	-1,2	-1,2
SS Africa	-0,8	-0,6	-0,6	-0,6
UK	-1,4	-1,0	-1,0	-1,1
USA	-22,9	-17,2	-16,5	-15,6

Source: authors' elaboration based on MIRAGE-Power

Note: Aus.-NZ stands for Australia-New Zealand; MENA for Middle East and North Africa; R. for Rest of; EU27 for European Union 27 countries; SS for Sub-Saharan

Table 16: Sectoral Impact (Value Added in volume) of the six scenarios - US - 2030 - Percent - Scenario/Baseline

Sector	*SMin10*	*S+10*	*S+10/60*	*SCentral*	*SNTM*	*SCanMex*
Agriculture and food	-0.6	-0.3	-0.8	-3.6	-4.2	-3.9
Animal prod.	-0.4	-0.3	-0.7	-2.7	-3.0	-3.0
Business services	-0.3	-0.4	-0.7	-0.4	-0.6	-0.3
Cereals	-1.1	-1.1	-1.9	-5.5	-7.6	-6.2
Chemistry and phama prod.	-0.2	0.2	-0.9	-4.6	-5.4	-6.8
Coal	-0.8	-1.0	-1.7	-3.8	-5.5	-3.6
Crops	-0.7	-1.1	-2.2	-7.1	-9.0	-7.2
Domestic transp.	-0.2	-0.2	-0.3	-0.3	-0.8	-0.4
Electricity coal	0.2	0.3	0.2	0.2	0.7	0.7
Electricity gas	0.3	0.5	0.7	0.7	0.9	-2.0
Electricity nuclear	0.1	0.1	-0.1	-0.7	-0.7	-0.2
Electricity oil	-2.0	-1.7	-1.5	-4.1	-11.1	-5.1
Electricity renewable	-0.2	-0.1	-0.4	-1.1	-1.7	-0.8
Electricity transm. and dist.	0.1	0.2	0.2	0.0	0.1	-0.4
Electronic and optical prod.	1.1	0.3	6.9	3.4	3.3	3.6
Forestry	0.0	0.0	-0.1	-3.3	-3.3	-3.3
Gas	-0.6	-0.9	-1.6	-2.6	-3.0	1.3
International transp.	-2.7	-3.3	-4.5	-2.8	-6.5	-3.2
Machinery and electric prod.	1.4	0.7	1.9	0.0	-0.3	-2.7
Meat	-0.4	-0.2	-0.4	-1.4	-2.3	-2.1
Metals	2.9	3.2	5.5	5.7	8.5	4.6
Mineral and mining	0.6	0.8	1.4	1.0	1.7	0.4
Oil	1.0	0.6	-0.3	0.3	6.9	1.3
Oil seeds	-1.1	-1.3	-2.5	-14.3	-14.8	-14.4
Other manufacture	1.8	2.3	4.6	4.4	6.1	3.5
Other processed food	-0.5	0.3	0.1	-0.3	-0.1	-0.5
Other services	-0.1	-0.2	-0.5	-0.7	-1.1	-0.8
Refined oil	-2.2	-1.9	-1.4	-4.0	-7.5	-5.7
Textile	-7.5	7.0	17.8	23.0	40.3	18.5
Vehicles	0.3	-0.4	-2.9	-2.5	-1.5	-1.7

Source: authors' elaboration based on MIRAGE-Power

Note: distr. stands for distribution; transm. for transmission; transp. for transportation; prod. for products.

Table 17: Sectoral Impact (Value Added in volume) of the six scenarios - China - 2030 - Percent - Scenario/Baseline

Sector	*SMin10*	*S+10*	*S+10/60*	*SCentral*	*SNTM*	*SCanMex*
Agriculture and food	0.1	0.1	0.4	0.8	0.8	0.8
Animal prod.	0.1	0.1	0.4	0.7	0.8	0.7
Business services	0.0	0.0	0.0	0.0	-0.1	-0.1
Cereals	0.1	0.2	0.5	1.1	1.1	1.0
Chemistry and phama prod.	0.3	0.5	2.6	3.1	3.2	3.2
Coal	0.1	0.1	0.7	0.8	0.9	0.8
Crops	0.1	0.2	0.6	1.2	1.3	1.2
Domestic transp.	0.0	0.0	-0.1	-0.1	-0.1	-0.1
Electricity coal	0.0	0.0	0.3	0.3	0.2	0.3
Electricity gas	-0.2	-0.3	-1.7	-1.7	-1.6	-1.7
Electricity nuclear	0.0	0.0	0.6	0.7	0.7	0.7
Electricity oil	-0.1	-0.3	-1.6	-1.6	-1.2	-1.5
Electricity renewable	0.0	0.0	0.5	0.6	0.6	0.6
Electricity transm. and distr.	-0.1	-0.1	-0.3	-0.3	-0.3	-0.3
Electronic and optical prod.	-0.5	-0.8	-5.6	-5.9	-5.7	-5.7
Forestry	0.0	0.1	0.4	0.5	0.5	0.5
Gas	0.0	0.0	0.0	0.0	0.0	0.0
International transp.	0.2	0.2	1.5	0.7	0.8	0.7
Machinery and electric prod.	-0.2	-0.2	-1.2	-1.1	-1.0	-1.0
Meat	0.0	0.0	-0.1	-0.2	-0.1	-0.2
Metals	-0.1	-0.1	0.4	0.2	0.2	0.3
Mineral and mining	0.0	0.1	1.1	1.1	1.0	1.0
Oil	0.1	0.3	2.2	2.3	1.9	2.2
Oil seeds	0.3	0.5	1.5	5.6	5.7	5.4
Other manufacture	-0.2	-0.4	-1.1	-1.1	-1.1	-1.1
Other processed food	0.0	-0.1	-0.1	-0.6	-0.6	-0.5
Other services	0.0	-0.1	-0.4	-0.5	-0.5	-0.4
Refined oil	0.1	0.0	-0.5	-0.2	0.0	-0.2
Textile	0.5	-0.1	-3.3	-3.8	-4.0	-3.7
Vehicles	-0.3	-0.1	0.4	0.5	0.6	0.6

Source: authors' elaboration based on MIRAGE-Power

Note: distr. stands for distribution; transm. for transmission; transp. for transportation; prod. for products.

Table 18: Sectoral Impact (Value Added in volume) of the six scenarios - France - 2030 - Percent - Scenario/Baseline

Sector	*SMin10*	*S+10*	*S+10/60*	*SCentral*	*SNTM*	*SCanMex*
Agriculture and food	0.1	-0.1	-0.2	0.0	0.1	-0.1
Animal prod.	0.0	0.0	-0.1	0.0	0.1	0.0
Business services	0.1	0.1	0.2	0.0	0.1	0.0
Cereals	0.3	0.3	0.3	0.7	1.3	0.4
Chemistry and phama prod.	-0.2	-0.1	-0.3	0.8	1.8	0.9
Coal	0.3	0.4	0.4	1.3	2.7	1.2
Crops	0.1	0.1	0.1	0.3	0.5	0.2
Domestic transp.	0.0	0.0	0.0	-0.1	0.0	-0.2
Electricity coal	-0.4	-0.5	-0.5	-1.1	-2.3	-0.9
Electricity gas	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3
Electricity nuclear	0.0	0.0	-0.1	0.3	0.5	0.4
Electricity oil	-0.3	-0.4	-0.4	-0.7	-0.8	-0.4
Electricity renewable	0.0	0.0	0.0	0.3	0.5	0.4
Electricity transm. and distr.	-0.1	-0.1	-0.1	0.1	0.1	0.2
Electronic and optical prod.	-0.2	-0.2	0.4	1.4	1.1	2.5
Forestry	-0.1	-0.1	-0.4	-0.2	-0.2	-0.3
Gas	0.2	0.4	0.3	1.7	2.7	2.5
International transp.	-0.5	-0.8	-1.7	-3.7	-4.3	-3.8
Machinery and electric prod.	-0.5	-0.5	-0.4	0.3	0.6	0.8
Meat	0.0	0.0	-0.1	0.0	0.1	0.0
Metals	-0.5	-0.5	-0.7	0.0	0.0	0.3
Mineral and mining	-0.1	-0.1	-0.3	0.0	0.1	-0.1
Oil	0.2	0.3	0.1	0.6	0.7	0.6
Oil seeds	0.2	0.1	0.1	0.3	0.4	0.0
Other manufacture	-0.4	-0.4	-0.3	0.1	-0.1	0.1
Other processed food	0.1	-0.3	-0.4	-0.3	-0.4	-0.3
Other services	0.0	0.0	0.0	0.0	-0.1	-0.1
Refined oil	0.3	0.3	0.3	0.6	1.8	0.6
Textile	-0.6	-0.8	-2.7	-1.6	-1.5	-1.2
Vehicles	-1.5	-2.3	-1.8	-1.6	-4.2	0.5

Source: authors' elaboration based on MIRAGE-Power

Note: distr. stands for distribution; transm. for transmission; transp. for transportation; prod. for products.

Table 19: Sectoral Impact (Value Added in volume) of the six scenarios - Germany - 2030 - Percent - Scenario/Baseline

Sector	*SMin10*	*S+10*	*S+10/60*	*SCentral*	*SNTM*	*SCanMex*
Agriculture and food	0.2	0.1	0.0	0.2	0.4	0.0
Animal prod.	0.1	0.1	0.0	0.1	0.2	0.0
Business services	0.1	0.1	0.2	0.1	0.1	0.1
Cereals	0.4	0.4	0.4	0.8	1.3	0.4
Chemistry and phama prod.	-0.5	-0.4	-0.4	0.8	1.6	0.7
Coal	0.3	0.4	0.5	1.4	2.6	1.2
Crops	0.2	0.3	0.3	0.6	1.0	0.3
Domestic transp.	0.0	0.0	0.0	0.0	0.0	-0.1
Electricity coal	-0.3	-0.4	-0.5	-0.7	-1.5	-0.6
Electricity gas	-0.1	-0.1	-0.1	0.1	0.5	0.1
Electricity nuclear	0.0	0.0	0.0	0.8	1.3	0.8
Electricity oil	-0.1	-0.2	-0.2	0.1	0.8	0.2
Electricity renewable	0.0	0.0	0.0	0.7	1.2	0.8
Electricity transm. and distr.	-0.3	-0.3	-0.3	-0.2	-0.4	-0.1
Electronic and optical prod.	0.0	0.0	0.6	1.5	1.0	2.2
Forestry	0.0	0.0	-0.3	-0.1	0.0	-0.1
Gas	0.8	0.8	0.7	2.2	2.9	2.6
International transp.	-0.6	-0.9	-1.9	-3.6	-4.2	-3.6
Machinery and electric prod.	-0.7	-0.7	-0.4	0.0	-0.1	0.3
Meat	0.1	0.1	-0.2	0.1	0.4	0.0
Metals	-0.4	-0.4	-0.7	-0.5	-0.8	-0.5
Mineral and mining	0.0	0.0	-0.3	0.1	0.2	-0.2
Oil	0.1	0.2	0.0	0.5	0.3	0.3
Oil seeds	0.4	0.3	0.3	0.6	0.8	0.4
Other manufacture	-0.1	-0.1	-0.2	0.2	0.0	0.0
Other processed food	0.3	0.0	0.0	0.1	0.1	-0.1
Other services	-0.1	-0.1	-0.1	0.0	0.0	0.1
Refined oil	-0.1	-0.2	-0.4	-0.5	-0.1	-0.6
Textile	-0.4	0.1	-2.2	-1.5	-1.2	-1.6
Vehicles	-1.1	-1.6	-1.8	-1.8	-2.4	-0.1

Source: authors' elaboration based on MIRAGE-Power

Note: distr. stands for distribution; transm. for transmission; transp. for transportation; prod. for products.