

The Impact of Trump's Reciprocal Tariffs on the Economies of Indonesia and the United States: A Computable General Equilibrium (CGE) Analysis

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The reciprocal tariff policy implemented by the Donald Trump administration against various countries has triggered new dynamics in international trade and has the potential to impact economic stability. This study aims to analyze the impact of this policy on the Indonesian and United States economies, with a focus on changes in real gross domestic product, terms of trade, labor demand, welfare, and sectoral output. The research method uses the Computable General Equilibrium (CGE) Model with the Global Trade Analysis Project (GTAP) version 11. The analyzed scenarios are divided into three: (1) the implementation of a unilateral US baseline tariff of 10%, (2) the addition of Indonesia's reciprocal tariff of 32% above the baseline tariff, and (3) an effective tariff 19% accompanied by the exemption of US import tariffs on Indonesia. The simulation results show that all three scenarios have an impact on the economy. The higher the tariffs the US sets, the greater the impact on the economy.

Keywords: CGE Analysis; International Trade; Reciprocal Tariff.

Kebijakan tarif resiprokal yang diterapkan Pemerintahan Donald Trump terhadap berbagai negara memicu dinamika baru dalam perdagangan internasional dan berpotensi memengaruhi stabilitas perekonomian. Penelitian ini bertujuan menganalisis dampak kebijakan tersebut terhadap perekonomian Indonesia dan Amerika Serikat dengan fokus pada perubahan produk domestik bruto riil, *terms of trade*, permintaan tenaga kerja, kesejahteraan, serta output sektoral. Metode penelitian menggunakan Model Computable General Equilibrium (CGE) dengan Global Trade Analysis Project (GTAP) versi 11. Skenario yang dianalisis dibagi menjadi tiga: (1) penerapan tarif dasar unilateral AS sebesar 10%, (2) penambahan tarif resiprokal Indonesia sebesar 32% di atas tarif dasar, dan (3) tarif efektif sebesar 19% disertai pembebasan tarif impor AS terhadap Indonesia. Hasil simulasi menunjukkan bahwa ketiga skenario tersebut berdampak pada penurunan perekonomian. Semakin besar tarif yang ditetapkan AS, semakin besar pula dampak yang dialami perekonomian.

Kata kunci: CGE; Perdagangan Internasional; Tarif Resiprokal.

JEL Classification: C68.

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1. INTRODUCTION

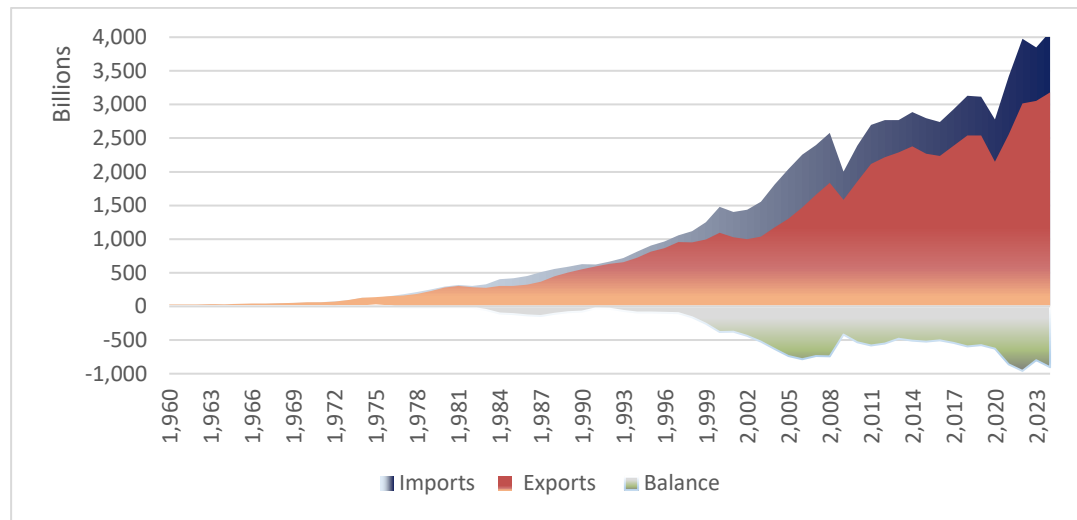
International trade is a cross-border economic activity involving the exchange of goods, services, and capital between global entities. Since post-World War II, the volume of global exports and imports has continued to experience exponential growth due to technological advances and trade liberalization, with values reaching 45 times higher than those of the General Agreement on Tariffs and Trade (GATT) in 1947 (Harmes-Liedtke *et al.*, 2024). According to the World Trade Organization (WTO) (2025), global trade volume surged from approximately USD 63 billion in 1950 to over USD 24 trillion in 2024. One of the reasons driving this increase is the increasingly connected global economic organizations through global value chains (GVCs) and support from international institutions such as the WTO and the World Bank (Gereffi, 2019). This impacts economic growth and income distribution for countries involved in this process. A study by Irwin and Tervio (2002) found that trade liberalization positively impacts a country's gross domestic product (GDP) growth by an average of 1% to 2% per year.

Import tariff policy is a protectionist instrument that can be used to address problems arising from international trade. Import tariffs are essentially taxes imposed on imported goods, either specific (a fixed amount per unit of goods) or *ad valorem* (a percentage of the value of goods), to increase the relative price of imported goods compared to domestic goods, thereby encouraging substitution of domestic products (Armington, 1969). On the one hand, import tariffs can help domestic industries and employment from import pressures and serve as a "second-best" policy instrument when a country faces multiple distortions such as a balance of payments deficit (Lipsey & Lancaster, 1956). On the other hand, high tariffs can raise the price of consumer goods, reduce consumer prosperity and suppress long-term productivity due to reduced competition (Anderson & Van Wincoop, 2004).

For partner countries, import tariff policies can trigger a decline in export demand, resulting in a loss of market share and foreign exchange earnings for producers in partner countries. For example, the tariff increase imposed by the United States (US) on China from an average of 8% to 18.3% in 2018, coupled with a 25% increase in Chinese retailing of several products, has put pressure on exports in both countries across various sectors (Bown, 2021). This decline in exports ultimately lowers exporters' terms of trade (ToT), forcing partner countries to export larger volumes to obtain the same imports (Srinivasan & Bhagwati, 1978). Furthermore, sector-wise, research by Felbermayr & Steininger (2019) found that the trade war caused a 1.22% decline in value-added in both countries. Therefore, while import tariffs are considered to provide protection for domestic industries, their side effects extend to exporting countries through declines in exports, GDP, sectoral value-added, welfare, and disruptions to global production networks.

In the context of international trade, the US is the world's largest economy and exerts a strong influence on global market stability. In 2024, US GDP reached USD 29.2 trillion, equivalent to approximately 26% of total global GDP, with a highly diversified economic structure (World Bank, 2025a). However, total US exports of goods and services were recorded at only USD 3.2 trillion, compared with imports of USD 4.1 trillion, resulting in a trade deficit of approximately USD 9 trillion, as shown in Figure 1 (World Bank, 2025).

Figure 1: United States Trade Balance 1960-2024



Source: World Bank (2025), Processed by the Author

The Trump administration's significant economic strength, coupled with a widening trade deficit, prompted the launch of a new protectionist policy in 2025, known as the Liberation Day Tariffs (Executive Order 14257, 2025). These import tariffs, also known as reciprocal tariffs, were enacted on April 2, 2025, through Executive Order 14257. This reciprocal tariff policy, under which the US imposed a 10% *ad valorem* tariff on nearly all non-essential imported goods, plus special tariffs on imports from certain countries with large trade deficits, including Indonesia (Executive Order 14257, 2025). This policy was enacted in response to a national emergency declared by Trump due to the lack of reciprocity in bilateral trade relations, disparities in tariffs and non-tariff barriers, and the economic policies of US trading partners that depressed wages and domestic consumption (Executive Order 14257, 2025).

For Indonesia, the US holds a significant position in the trade balance structure. According to the Indonesian Foreign Trade Export Statistics (2024), Indonesia's total exports to the US reached USD 28.182 billion, a 9.65% increase from the previous year, making the US its second-largest export market after China. Palm oil (HS 1511) was the commodity with the highest contribution, reaching 5.74% of total exports, followed by leather footwear (HS 6403) and other electrical machinery (HS 8543) at 4.76% and 3.89%, respectively (GTAIC, 2025). Judging from total exports reaching 11%, Indonesia still shows a fairly high dependence on the US market share (Ministry of Trade, 2025). This commodity structure reflects Indonesia's comparative advantage in natural resources and labor-intensive manufacturing capacity, while also emphasizing the importance of trade relations with the US (World Bank, 2025). This resulted in a trade surplus for Indonesia of USD 11.969 billion in 2023, which Trump used as the basis for imposing a 32% reciprocal tariff on Indonesia (Executive Order 14257, 2025).

The implementation of a 32% reciprocal tariff has the potential to significantly impact the Indonesian economy. According to Indonesian Palm Oil Statistics (2024), the agriculture and plantation sector is a commodity that contributes significantly to Indonesia's GDP, at around 12.53%. In recent years, the Indonesian palm oil industry has faced export restrictions to the European Union, so the imposition of a US reciprocal tariff will further pressure this industry (Saragih & Rahayu, 2022). On the manufacturing side, in the past two years, approximately 60 textile companies in Indonesia have closed, with more than 24,000 workers laid off through 2024 (Toruan, 2025). Furthermore, price competition in export markets also forces Indonesian producers

to maintain thin margins, making it difficult to allocate funds for research and development (R&D). The World Bank noted in 2022 that Indonesia's R&D spending was only 0.28% of GDP, far behind other Asian countries such as Singapore (2.2%), Malaysia (1%), and South Korea (4.8%) (World Bank, 2024). Consequently, product innovation and production process improvements are slow, ultimately weakening Indonesia's ability to compete with high-value-added products in the US market (OECD, 2025). Overall, the combination of rising costs, pressure from global standards, dependence on imported raw materials, inefficiency, and low R&D investment creates a cycle of stagnation that holds back industrial growth and competitiveness. These pressures suggest that, even before facing new challenges like Trump's reciprocal tariffs, the national manufacturing sector already needs structural reforms to increase productivity, efficiency, and innovation capabilities.

Historically, this is not the first time the US has implemented a protectionist tariff policy against another country. In the previous period, from 2017 to 2021, the US government, also led by President Trump, implemented a protectionist tariff policy, particularly for steel, aluminum, and their derivative products originating from China. This policy was contained in Section 232 of March 2018, which stipulated a 25% tariff on steel and a 10% tariff on aluminum. Furthermore, the US also implemented Section 301, which stipulated a tariff of up to 25% on products from China (Erica York, 2025). A study by Palmbach & Kulkarni (2023) found that the imposition of a 25% tariff on steel products regulated by Section 232 resulted in an 8.9% increase in steel prices in the US. Furthermore, the Section 301 policy, which stipulates a 25% tariff on Chinese products, resulted in significant economic losses for both countries, seen in decreased productivity, labor, and product added value (IMF, 2019). Furthermore, research conducted by Felbermayr & Steininger (2019) demonstrated that the imposition of a 25% tariff on all Chinese products resulted in a decrease in real income of up to EUR 9,458 million in the US and EUR 30,350 million in China.

The significant potential impact of Trump's reciprocal tariff policy places a significant urgency on the Indonesian government to quickly find a solution to respond to the policy. In a press release on April 6, 2025, the government stated that it continues to communicate with various stakeholders, including ministries/agencies, other countries, the United States Trade Representative (USTR) and the U.S. Chamber of Commerce, to formulate strategic steps in response to this policy. In the statement, the government also stated that retailing is not a step Indonesia will take, as has been done by several other countries. Furthermore, the government will prepare to open the European market as a solution to the potential decline in Indonesian exports to the US (Coordinating Minister for Economic Affairs, 2025). The negotiations between the US and Indonesian governments resulted in a trade agreement that led to a tariff reduction from the initial 32% to 19%. On the other hand, the US government did not simply lower tariffs for free. Indonesia had to meet several conditions as a result of the agreement, one of which was the preferential elimination of tariff barriers on more than 99% of US products exported to Indonesia.

The purpose of this study is to analyze the impact of Trump's reciprocal tariffs on the economies of Indonesia and the United States. This research is expected to enrich the economic literature, particularly in international trade and macroeconomics, by providing a deeper understanding of the impact of import tariff increases on various economic variables. Furthermore, this research is also expected to provide a basis for policymakers in formulating more effective and efficient mitigation scenarios, taking into account the broader economic impacts of reciprocal tariffs.

2. LITERATURE REVIEW

A. International Trade

International trade is defined as the exchange of goods and services between countries that leverages comparative advantages, thereby increasing global efficiency and the welfare of all parties (Eaton & Kortum, 2002; Krugman, 1979). This activity includes exports/imports, which provide

consumers with access to products not available domestically (Eaton & Kortum, 2002). Through expanding international markets, producers can increase production scale and lower average costs, while consumers gain greater variety and competitive prices (Krugman, 1979). The benefits of international trade extend from increased resource allocation efficiency to economic growth.

Governments implement policy instruments such as tariffs, quotas, and subsidies to maintain domestic market stability. Tariff policy is the imposition of import/export taxes to manage trade flows, protecting local industries while increasing state revenue. Quotas are restrictive policies that limit the import/export of goods/services to a certain volume (Bown & Crowley, 2013). Subsidies, on the other hand, are policies in the form of financial assistance or tax breaks to increase product competitiveness in the global market. Additionally, non-tariff barriers such as import licenses, quality standards, and local content requirements regulate the flow of goods without directly raising tariffs (Handley & Limão, 2017).

B. Mercantilism Theory

The theory of mercantilism emerged in the 16th to 18th centuries, when trade and the accumulation of gold and silver were seen as sources of national power and wealth (Fontanel *et al.*, 2008; King, 2002). In practice, mercantilism gave rise to protectionist policies such as high tariffs, import quotas, and navigation laws that restricted trade to national vessels. These policies aimed not only to protect domestic industries but also to strengthen the nation's capacity to finance navies and armies, thus combining economic and military objectives (Nogués Marco, 2010). In this context, the mercantilist framework was reflected in efforts to cover trade deficits through heavy tariffs on imports, in the hope of fostering a trade surplus. However, modern theory asserts that in an integrated multilateral trading system, a zero-sum approach can actually have long-term negative consequences, such as supply chain disruptions and reduced global productivity.

C. Theory of Absolute Advantage (Adam Smith)

The theory of absolute advantage was first proposed by Adam Smith in his work "The Wealth of Nations" (1776). Smith asserted that a country should specialize in the production of goods that it can produce at a lower cost than other countries, then exchange its excess production for goods produced more efficiently by trading partners (Smith, 1776). This specialization, according to Smith, will increase overall economic efficiency and welfare, so that international trade is no longer a zero-sum game; instead, all parties can benefit in the form of increased consumption or the creation of real profits. In modern economies, although technology, capital, and economies of scale play an increasingly important role, the principle of absolute advantage still guides the analysis of trade in natural resource-based sectors or simple manufacturing, such as palm oil in Indonesia, where productivity differences between countries are very pronounced.

D. Theory of Comparative Advantage (David Ricardo)

The theory of comparative advantage was first formulated by David Ricardo in his work "On the Principles of Political Economy and Taxation". Unlike the concept of absolute advantage, Ricardo showed that even if one country has higher productivity in all goods, there are still economic benefits if each country specializes in the good that has the lowest opportunity cost compared to its trading partners, so that trade becomes a positive-sum game (Ricardo, 1817). Furthermore, Todaro and Smith explained that comparative advantage refers to a country's ability to produce at a lower opportunity cost relative to another good (Todaro & Smith, 2020). Ricardo developed the Ricardian Theory of Comparative Advantage framework with the assumption of two countries producing two goods using homogeneous labor as the sole factor of production, full mobility of goods but immobility of factors of production, zero transportation costs, perfect markets, and constant returns to scale (Ricardo, 1817).

E. Heckscher-Ohlin Theory

The Heckscher-Ohlin (H-O) theory, developed by Eli Heckscher and Bertil Ohlin, extends the Ricardian framework by incorporating two factors of production, capital (K) and labor (L), and differences in factor abundance between countries as determinants of trade patterns (Heckscher, 1919; Ohlin, 1933). The theory essentially states that a country will export goods that utilize its relatively abundant domestic factor and import goods that utilize its relatively scarce factor (Lu, 2024). Thus, international trade reflects comparative differences arising from differences in K/L endowments, not simply from the absolute productivity of labor as in the Ricardian model.

F. Prebisch-Singer Hypothesis

The Prebisch-Singer hypothesis suggests that primary commodity prices tend to decline relative to manufactured goods prices in the long run, leading to a deterioration in the ToT for commodity-exporting countries (Harvey *et al.*, 2010). This hypothesis suggests that developing countries dependent on primary commodity exports will experience a decline in income relative to industrialized countries. Prebisch and Singer explain that the decline in ToT is primarily due to the inelastic structure of global demand for primary commodities, such as palm oil, rubber, and metals, while demand for manufactured goods is more elastic as global income grows.

G. Previous Research

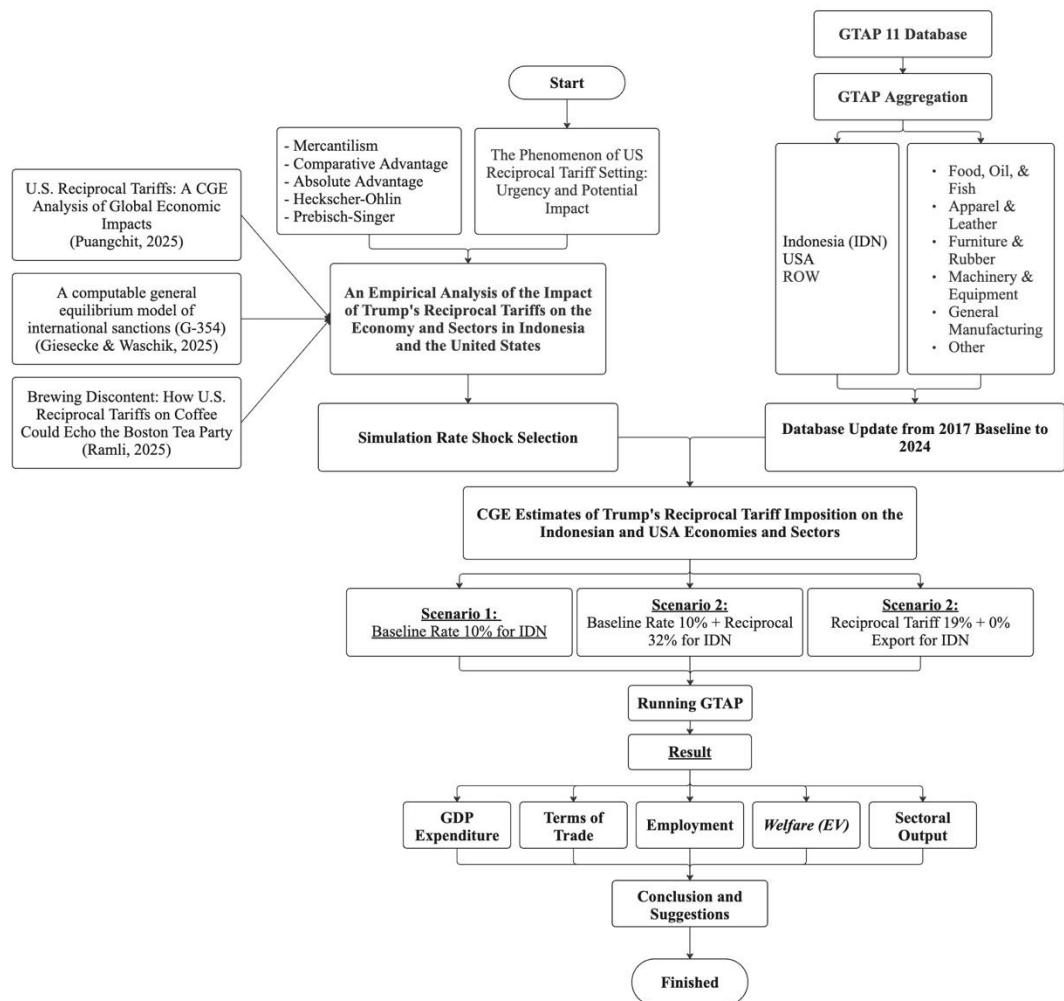
Several recent studies have explored how Trump's retaliatory tariff policy affected the economy. Puangchit (2025) used the GTAP v11c static CGE model to simulate the impact of this policy and found that Indonesia's real GDP was only slightly depressed by 0.01%, but the consumer price index without services jumped by almost 1%. Household consumption fell by about 0.06%, while the ToT weakened by 0.24%. In the labor market, unskilled wages fell by 0.09% even though skilled wages rose by 0.05%. Indonesia's aggregate exports to the US shrank by almost 2%, while imports from the US shrank by 0.35%. In other words, although the macroeconomic impact was relatively small, almost all non-electronic sectors experienced pressure.

Giesecke and Waschik (2025) conducted a study using the GTAP-FIN dynamic CGE model to examine how policy responses such as retaliatory tariffs and fiscal consolidation affected economic outcomes. In a scenario where Indonesia retaliates against US tariffs, real domestic consumption increases by 0.11% and GDP rises by 0.11%, slightly better than the no-retaliation scenario (0.04%). In fact, when the US strengthens its fiscal policy, Indonesian consumption and GDP both increase by 0.15%. In contrast, China, a major trading partner, experiences a deeper contraction of 0.67%, and GDP declines by 0.37%, indicating that economic size and dependence on the US market determine the magnitude of the effect. This study confirms that even with relatively small exposure, Indonesia can still reap the benefits of trade diversion.

Ramli (2025) analyzed the Indonesian coffee sector using a combination of time-series regression and sectoral simulations. This study tested the "discounted reciprocity" hypothesis, which states that the magnitude of US tariffs is not always directly proportional to the impact on exports. A 46% tariff on Vietnamese coffee, for example, is associated with a 34.5% price increase in the US and a nearly 52% decrease in demand in an elastic demand scenario. Indonesia, subject to a lower tariff, did experience a decline in exports, but the effect was much more moderate. The regression results show a coefficient of approximately 0.49 ($R^2=0.975$), supporting this pattern. Ramli concluded that countries with higher economic complexity (such as Vietnam) can more easily withstand tariff shocks, while Indonesia needs a diversification strategy and increased added value to maintain its competitiveness.

H. Research Framework

Figure 2: Framework of Thought



Source: Processed by the Author (2025)

Based on the framework in Figure 2, this study begins with the phenomenon of reciprocal tariff setting by the United States government under the Trump-era trade policy. The theoretical foundations used include mercantilism theory as a historical framework for political economy, absolute advantage theory, comparative advantage theory, Heckscher-Ohlin theory, and Prebisch-Singer theory to explain production allocation. Based on these phenomena and previous research, the scenarios used in this study are divided into three. First, a baseline tariff of 10%, which is the basic tariff imposed on all countries; second, the imposition of a reciprocal tariff of 32% above the baseline of 10% on US imports from Indonesia; and third, a reciprocal tariff of 19% with the condition of exemption from tariff barriers on US goods entering Indonesia. These scenarios are then used as shocks to observe patterns of change in the economy. After the scenarios are established, the study continues with the simulation phase. The simulation results are then analyzed based on economic indicators, namely GDP, ToT, labor, EV, and sectoral output. The final stage is drawing conclusions and formulating policy recommendations. The conclusion is prepared to summarize the main findings of the research according to the variables studied, while policy suggestions are provided so that the research results are not only academic, but also have practical implications.

3. RESEARCH METHODS

A. Computable General Equilibrium (CGE)

CGE is an economic analysis tool that provides a framework for assessing how an economy responds to policy changes, technological advances, and external shocks. Derived from neoclassical economic theory, this model captures the complex interrelationships between various sectors, agents, and markets within an economy. This model ensures that supply and demand are balanced across all markets. The CGE model stems from the pioneering work of Leif Johansen in the 1960s, who developed a multisectoral model to analyze economic growth in Norway. Johansen's framework laid the foundation for subsequent models by integrating input-output relationships with behavioral equations that describe the optimizing behavior of agents (Bjerkholt, 2009).

The core of a CGE model is a comprehensive database reflecting economic transactions within an economy over a specific period. This database typically takes the form of a Social Accounting Matrix (SAM), which provides a snapshot of the flow of funds between producers, consumers, the government, and the outside world. The SAM ensures that all accounts are balanced, serving as a representation of the state of economic activity (Pyatt & Round, 1985). The CGE model incorporates behavioral equations that describe how economic agents respond to changes in prices and incomes, in accordance with the principles of utility maximization for consumers and profit maximization for producers.

B. Global Trade Analysis Project (GTAP)

GTAP is a CGE framework designed to model international trade and the effects of economic policies between countries. GTAP is built on the foundations of Arrow–Debreu general equilibrium theory, in which goods markets, factor markets, and interregional trade are simultaneously addressed to achieve price and quantity equilibrium (Hertel, 1996). GTAP utilizes a comprehensive database, enabling it to capture global trade interdependence in great detail (Aguiar *et al.*, 2022).

In GTAP, each commodity is distinguished by origin and destination using the Armington approach (Armington, 1969), which views domestic and imported goods as substitutes for similar but not identical products. Consumer and producer demand functions use the CES to measure the extent to which consumers switch between domestic and imported goods when tariffs or prices change. The entire economy is divided into production sectors: household consumers, government, and investors, with resource allocation governed by utility functions and nested production functions (nested CES) that illustrate the trade-offs between consumption, investment, and trade (Aguiar *et al.*, 2022). GTAP also applies a closure rule framework to determine which variables are considered exogenous and which are endogenous within a given policy framework. Through the variable shock feature, researchers can simulate various trade policy scenarios and measure their impact on macro and sectoral indicators.

C. GTAP II Database

The Global Trade Analysis Project (GTAP) version II database is an information resource designed to support global economic policy analysis using a CGE modeling approach. GTAP II includes data from 141 countries and 19 aggregated regions, totaling 160 regional entities. The individual countries included in this database represent 99.1% of world GDP and 96.4% of the global population. In terms of economic sectors, GTAP II classifies data into 65 sectors: 20 for agriculture and food, 25 for manufacturing, and 20 for services. The database uses five reference years: 2004, 2007, 2011, 2014, and 2017. This database integrates various data sources, including national input-output tables, bilateral trade data, trade protection information such as tariffs and non-tariff barriers, and macroeconomic data such as GDP, consumption, investment, and international trade (Aguiar *et al.*, 2022).

D. Aggregation

In the data aggregation stage, this study utilizes the GTAPAgg2 tool to reduce the complexity of the GTAPII Database into a three-regional and six-sectoral structure. Regional aggregation consists of Indonesia (IDN), the United States (US), and the Rest of the World (RoW). On the sectoral side, aggregation is carried out on five industrial clusters that have the highest export volume to the US, namely: (1) Food, Oil & Fish including palm oil (HS1511), coconut oil (HS1513), and processed fisheries (HS0304,1605); (2) Apparel & Leather, including rubber and leather footwear (HS6402,6403,6404) and ready-made clothing (HS6104,6204); (3) Furniture & Rubber including processed rubber and tires (HS4001,4011) and furniture (HS9403); (4) Machinery & Equipment, such as light machinery and electrical equipment (HS8543,8517,8443); (5) General Manufacturing, paper and plastic products (HS4412,9404); and (6) Other, accommodating services and tertiary subsectors.

E. Simulation

The simulation in this study aims to analyze the impact of Trump's reciprocal tariff policy on the economies of Indonesia and the United States. The simulation was conducted using a CGE model with the GTAP version 11 database. The first step in the simulation began with the use of the GTAPII database as a secondary data source to capture the structure of international trade. Because the tariff policy that is the focus of the study takes place in 2025, the database baseline was adjusted to approximate the conditions in 2025. This adjustment was made by applying shocks to the variables of real GDP, population, labor force, and capital obtained from the World Bank's World Development Indicator (WDI) as in the study of Aguiar *et al.* (2019), and land use variables obtained from the Food and Agriculture Organization (FAO) through the OECD Portal in the form of harvested area, as also used in the study of Burfisher (2021) to convert data from the 2017 baseline reference year to the 2025 baseline (Boulanger *et al.*, 2016). Thus, subsequent data testing can better reflect conditions prior to the policy change (Boulanger *et al.*, 2016; Diffenbaugh *et al.*, 2012; and Dixon and Rimmer, 2023). During the shock application process, adjustments were also made to the normal closure model by changing the previously endogenous gross domestic product (QGDP) variable to exogenous. After adjustments were made through shocks based on the change values obtained, the simulation results were then used as a new database that will serve as the basis for the reciprocal tariff simulation. The shock values are shown in Table 1.

Table-1: Database Baseline Adjustment Shock

Country	Variable (%)				
	GDP	Population	Capital	Labor	Land
IDN	37,48	6,04	28,04	9,32	-25,97
USA	48,81	4,13	52,95	5,18	-19,00
RoW	31,62	7,09	64,24	7,60	2,79

Source: World Bank and OECD (2025), processed by the author

The simulations in this study were designed to evaluate three main scenarios representing the direction of Trump's tariff policy. All three scenarios were designed to capture the effects of reciprocal tariff policies, as widely discussed in the international trade policy literature during President Trump's administration.

- a) Scenario 1: Baseline 10%.
- b) Scenario 2: Baseline 10% + Reciprocal Tariff 32%.

c) Scenario 3: Reciprocal Tariff 19% + Tariff Exemption on US Imports.

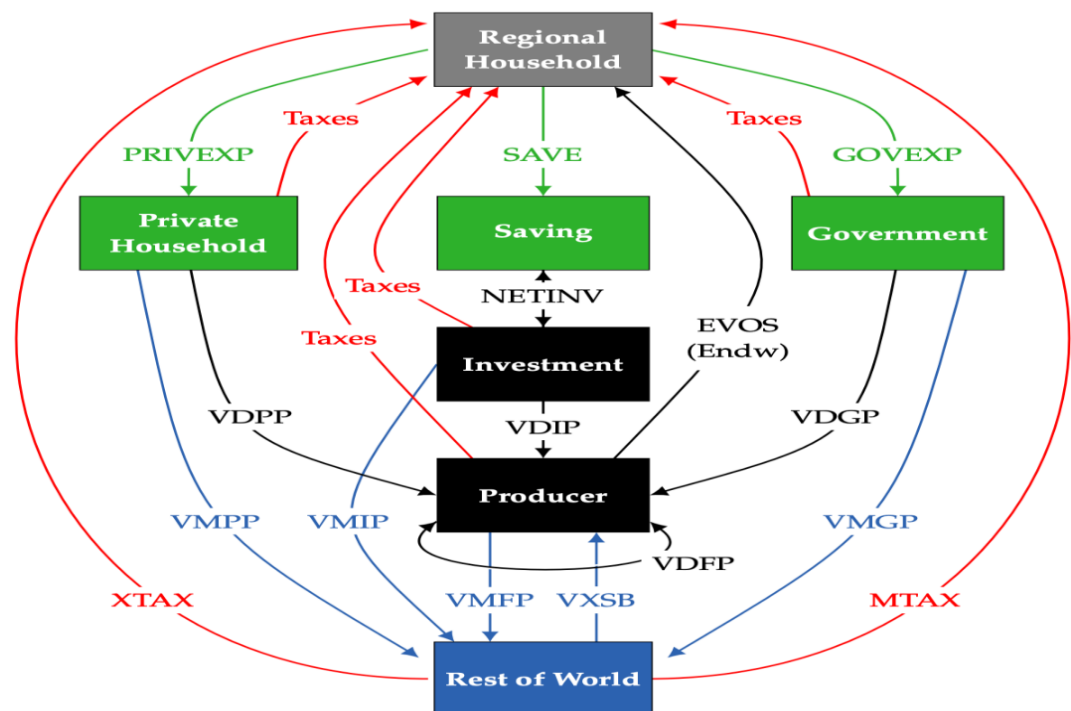
The simulations were run using RunGTAP software. A shock was applied to import tariffs (TMS) for key sectors affected by the policy. The results were analyzed by examining changes in five indicators (real GDP, ToT, labor, welfare, and sectoral output). The selection of these indicators was based on the primary objective of macroeconomic and microeconomic policy analysis in the CGE model, i.e., to assess the distribution of impacts across sectors, economic actors, and countries. The simulations were conducted in a comparative-static setting, meaning the model compares conditions before and after the shock without considering time dynamics. Thus, the simulation results reflect a medium-term estimate of the policy's impact.

F. Research Model

The standard GTAP V7 model can be described using a circular flow of economic activity, which depicts the relationships and interactions between economic agents. Figure III.3 depicts the flow of income and expenditure within a regional general equilibrium framework, where each box represents an economic agent: private households (Private Household), government (Government), and producers (Producer), along with two passive accounts: savings (Saving) and investment (Investment), plus the rest of the world (Rest of World). In the center of the graph, producers receive factors of production (VDFP = value of factor payments), sell domestic goods/services (VDGP) and exports (VMPP), and purchase imported inputs (VMIP) and domestic raw materials (VDPP). This income flows to regional households (top) as wages and rent, and is then subject to domestic taxes (XTAX, red).

Private households allocate their income to private consumption (PRIVEXP), pay consumption taxes (Taxes), and save (SAVE). Savings flow to the investment sector as net investment (NETINV), then return to producers as capital (VDIP). The government (right) collects direct and indirect taxes, then re-channels some of it through public spending (GOVEXP), which also counts as demand for producer output (VDGP).

Figure-3: Open Economy Model with Taxes



Source: Corong et al. (2017)

At the bottom, the Rest of the World shows external relations: imports (VMIP) and exports (VMPP, VXSB) interact with producers, and trade taxes (MTAX) and international factor income (VMFP) transfer to households and the government. The arrow colors emphasize functions: green for consumption expenditure, public spending, and savings; blue for the flow of goods/services and factors to and from the outside world; black for the national flow of goods, services, and factors; and red for the flow of taxes. All of these mechanisms work together to enable the model to achieve simultaneous equilibrium between aggregate supply and demand in simulated fiscal policies such as changes in import tariffs.

4. RESULTS AND DISCUSSION

The US's reciprocal tariff policy against Indonesia represents an economic shock that has the potential to impact the economic structure of both countries. The imposition of import tariffs by the US not only has the potential to suppress the competitiveness of Indonesian export products but also impacts the domestic economies of both countries. The impact of this policy can be analyzed through various macroeconomic indicators, such as GDP, ToT, welfare (EV), sectoral output, and demand for labor, both skilled and unskilled. In this study, the analysis was conducted using three policy scenarios. First, a baseline condition with a 10% tariff from the US on Indonesian products. Second, Indonesia's imposition of a reciprocal tariff of 32% above the baseline. Third, the implementation of a 19% reciprocal tariff followed by the elimination of import tariffs on US products. The simulation results will be discussed further in the following subsections.

A. Real GDP

The simulation results of the impact of Trump's reciprocal tariff policy on GDP in Indonesia and the US for each simulation are shown in Table 2 below.

Table-2: Change in GDP (%)

Country	GDP (%)		
	Scenario 1	Scenario 2	Scenario 3
IDN	-1,06	-5,35	-2,27
USA	-0,01	-0,06	-0,03

Source: Processed by the Author with RunGTAP v7

Across all scenarios, the simulation results indicate a decline in GDP in both Indonesia and the US. In the first scenario, Indonesia's GDP declined by -1.06%, while the US only experienced a decline of -0.01%. In the second scenario, Indonesia's GDP declined significantly by -5.35%, while the US's by -0.06%. In the third scenario, Indonesia's GDP contracted by -2.27%, while the US's by -0.03%. Of the three scenarios, the second scenario had the greatest impact, followed by the third scenario, while the first scenario had the smallest impact. This indicates that the higher the tariffs imposed by the US on Indonesia, the greater the economic downturn in both countries. A breakdown of each GDP component affected by reciprocal tariffs is shown in Table 3.

Table-3: Changes in GDP Components (%)

Country	Scenario	Consumption	Investment	Government Spending	Export	Import
IDN	Scenario 1	-1,1	-1,3	-1,1	-7,3	2,3
	Scenario 2	-5,6	-6,7	-5,7	-36,8	11,7
	Scenario 3	-2,4	-2,8	-2,4	-15,6	4,9

USA	Scenario 1	0,0	0,0	0,0	-0,2	0,1
	Scenario 2	-0,1	0,0	-0,1	-1,1	0,3
	Scenario 3	0,0	0,0	0,0	-0,5	0,1

Source: Processed by the Author with RunGTAP v7

In the first scenario, the largest contribution to Indonesia's GDP decline came from a -7.3% decline in exports, largely offset by a +2.3% increase in imports. Consumption and government spending both fell by -1.1%, and investment by -1.3%. Meanwhile, the US, as the country that imposed the tariffs, showed very minor changes in its trade balance, with exports falling by -0.2% and imports increasing by +0.1%. Furthermore, the US also demonstrated resilience in consumption, investment, and government spending. In the second scenario, Indonesia experienced a much deeper contraction, with exports falling by -36.8% and imports rising by +11.7%. This suggests that the double tariff burden is impacting Indonesia's export competitiveness in the US market, as studied by Puangchit (2025), while imports that continue to flow into the country increase the current account deficit and suppress growth. In this scenario, consumption experienced a -5.6% decline, investment -6.7%, and government spending -5.7%. Meanwhile, the US only experienced a -1.1% decline in exports and a +0.3% increase in imports, with consumption and government spending both falling by -0.1%. While the third scenario had a milder impact than the second, the effects were still substantial: exports fell by -15.6% and imports rose by +4.9%, triggering a -2.4% decline in consumption and government spending, and investment by -2.8%. Meanwhile, the US only experienced a -0.5% contraction in exports and a +0.1% increase in imports.

In terms of the trade balance, the combination of the decline in exports and the surge in imports in the second scenario resulted in a widening deficit. Giesecke & Waschik (2025) also explained that reciprocal tariffs worsen the ToT further than unilateral tariffs, because the relative price of imports rises faster than the adjustment in export prices. Import tariffs imposed on Indonesian imports make Indonesian goods more expensive in the US market for US buyers. According to the Armington-type substitution model used in the GTAP, an increase in the relative price of exports reduces the demand for imports from the requesting country (Armington, 1969). In other words, US buyers may switch suppliers to other countries or domestic goods and/or reduce purchase quantities. The combination of these two effects explains the significant decline in Indonesian export volume to the US.

The impact of US tariff increases on household consumption in Indonesia appears quite significant. The price-wedge effect in Armington's (1969) model explains that increases in import costs tend to be passed on to domestic prices, reducing real purchasing power and limiting households' ability to meet daily needs. Furthermore, export contractions also erode income in exporting sectors, leading to lower wages and profits. This effect spreads to other sectors through the input-output relationship, reducing the amount of money available for household spending (Burfisher, 2011). On the other hand, changes in relative prices encourage substitution from imported goods to domestic goods and vice versa. However, when real incomes fall, this substitution does not automatically increase aggregate consumption due to limited purchasing power.

The impact on investment arises from both a decline in demand and increased trade uncertainty. On the demand side, a significant contraction in exports reduces the prospects for future sales and cash flows in export sectors, thus lowering expected returns on investment. When expected demand shrinks, new projects are postponed or canceled due to unprofitability (Amiti *et al.*, 2019). On the uncertainty side, tariff escalations increase uncertainty about market access, imported input prices, and supply chain reliability, prompting investors to delay investment decisions until the uncertainty subsides, leading to a sharp reduction in capital spending in the short term (Bloom, 2009; Handley & Limão, 2017). Furthermore, fluctuations in imported input prices and potential increases in production costs reduce expected margins and increase project risk,

particularly for capital-intensive manufacturing sectors dependent on imported machinery or raw materials (Burfisher, 2011). A study by Handley & Limão (2017) suggests that trade policy uncertainty delays or reduces capital spending due to the waiting option (Bloom, 2009).

A decline in aggregate income directly narrows fiscal space, so that in the equilibrium model, government spending also declines (Baunsgaard & Symansky, 2009). Public spending fell by approximately -1.1% in the first scenario, -5.7% in the second, and -2.4% in the third, indicating that the government tends to maintain key expenditure items while adjusting other items to close the revenue gap (Blanchard, 2004). The mechanisms at work are a combination of reduced tax revenues due to declining output and economic activity and discretionary fiscal adjustments as authorities attempt to balance the budget (Baunsgaard & Symansky, 2009). Consequently, realistic policies typically combine three approaches: prioritizing spending on programs that best protect household consumption or stimulate employment, measures to increase the efficiency of public spending, and the use of temporary financing instruments such as concessional loans or multilateral support to avoid long-term fiscal pressures (Baunsgaard & Symansky, 2009; Burfisher, 2011).

The GTAP simulation results showed that Indonesia's GDP experienced a significant contraction in all tariff scenarios, primarily due to a decline in exports, the primary driver of growth, while import substitution provided only limited compensation. This pattern aligns with Ricardo's theory of comparative advantage, which explains that a country achieves growth when it is able to export goods produced more efficiently than other countries (Ricardo, 1817). When Indonesia's export access to the US market was hampered, its capacity to exploit its comparative advantage in primary commodities and labor-intensive manufacturing was reduced, resulting in a decline in national output. On the other hand, the US experienced a much more moderate GDP contraction due to its more diversified economic structure and the relatively small share of exports to Indonesia. This is consistent with the Heckscher–Ohlin model, which emphasizes that countries with dominant capital and technology production factors are more resilient to trade shocks because they are able to divert resources to domestic markets or alternative trading partners (Deardorff, 1984). Thus, although the US continued to experience a decline in exports and consumption adjustments, the impact on GDP was much smaller than in Indonesia.

B. Terms of Trade (ToT)

The simulation results of the impact of Trump's reciprocal tariff policy on ToT in Indonesia and the US for each simulation are shown in Table 4 below.

Table-4: Change in ToT (%)

Country	ToT (%)		
	Simulation 1	Simulation 2	Simulation 3
IDN	-0,01	-0,0507	-0,0215
USA	-0,0004	-0,00002	-0,00009

Source: Processed by the Author with RunGTAP v7

Indonesia's ToT decreased in all scenarios, including scenarios one, two, and three, when the US reciprocal tariff policy was implemented. In the first scenario, Indonesia's ToT decreased by -0.01%. This decrease indicates that the tariff shock imposed by the US was not strong enough to significantly change Indonesia's relative trade prices (Puangchit, 2025). One key factor explaining this is Indonesia's export structure, which remains heavily dependent on primary commodities such as palm oil and rubber. These commodities generally have low demand elasticity in the US market, so even if tariffs are imposed, consumers still demand relatively the same quantities of these products. Consequently, the tariff burden is largely borne by US buyers and does not significantly depress Indonesian export prices (Ramli, 2025). The import substitution mechanism in Armington's

(1969) model explains that the price increase for imported goods from Indonesia is small, and US consumers and producers do not immediately switch to alternative suppliers. The shift in demand remains limited, so pressure on Indonesia's ToT is barely felt (Burfisher, 2011).

This shock can be explained through the substitution framework of Armington's (1969) model. When Indonesian export prices rose due to tariffs, US consumers and importers quickly sought alternative supplies from other countries or even switched to domestic products. The previously relatively low elasticity of demand began to lose its dampening power when tariffs were imposed at a higher scale, resulting in a much greater contraction in export volume (Burfisher, 2011). Consequently, Indonesia's ToT was pressured not only by declining export revenues but also by rising import prices, creating an imbalance that exacerbated the current account deficit (Ramli, 2025). This situation illustrates Indonesia's ToT position when faced with a more aggressive reciprocal tariff policy. Krugman *et al.* (2018) assert that reliance on primary commodities without market diversification makes exporting countries more vulnerable to changes in external tariff policies.

From the US perspective, the impact of tariffs appears much milder than in Indonesia but still indicates a small pressure on ToT. In the first simulation, the US ToT decreased only -0.0004%, indicating that the increase in the relative price of imported goods from Indonesia had little impact on overall US trade prices because Indonesia's share of trade in the US import structure is relatively small. In the second simulation, the decline in the US ToT was even smaller, at only -0.00002%, confirming that even if tariffs were increased, the direct impact on the US trade position was not comparable to the significant contraction experienced by Indonesia. The same trend was observed in the third simulation, where the US ToT decreased slightly by -0.00009%, consistently demonstrating that the main burden of adjustment was not borne by the US but rather shifted to its trading partners. US consumers continued to face higher prices for imported goods, and industrial sectors using raw materials from Indonesia continued to bear the burden of additional costs. This aligns with the concept of deadweight loss in general equilibrium, where total welfare losses still occur, albeit small (Dornbusch *et al.*, 1997).

Overall, the simulation results indicate that changes in Indonesia's ToT were relatively small. The stability of the ToT can be explained by the Prebisch-Singer (1950) theory, which states that primary commodity prices tend to experience long-term declines compared to manufacturing, so that tariff increases do not immediately increase Indonesia's bargaining power in the global market (Prebisch, 1950; Singer, 2012). In this context, the dominance of Indonesia's primary exports, such as palm oil, rubber, and fisheries, makes changes in the ToT relatively limited even though tariffs are imposed because the elasticity of demand for these commodities is quite low in the US market.

C. Labor

The table of changes in skilled and unskilled labor illustrates how each sector responded to the US tariff shock. Simulation results of the impact of Trump's reciprocal tariff policy on labor in Indonesia and the US for each simulation are shown in Table 5 below.

Table-5: Change in Labor Force (%)

Skilled	Country	Sectoral Output					
		Food Oil	Apparel Leath	Furnitur Rubber	Mach Equip	Gen Manufac	Other
Simulation 1	IDN	0,599	0,111	0,834	1,818	1,250	-0,021
	USA	0,001	0,085	0,037	0,058	0,021	-0,002
Simulation 2	IDN	3,3852	0,744	4,428	9,732	6,605	-0,115
	USA	-0,138	0,309	0,143	0,227	0,071	-0,005
Simulation 3	IDN	1,383	0,289	1,845	4,044	2,756	-0,048

USA	-0,038	0,148	0,067	0,105	0,035	-0,003
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Unskilled	Country	Sectoral Output					
		Food Oil	Apparel Leath	Furnitur Rubber	Mach Equip	Gen Manufac	Other
Simulation 1	IDN	0,570	0,071	0,794	1,778	1,210	-0,061
	USA	-0,001	0,083	0,035	0,056	0,018	-0,004
Simulation 2	IDN	3,227	0,527	4,212	9,515	6,389	-0,333
	USA	-0,144	0,301	0,135	0,218	0,063	-0,013
Simulation 3	IDN	1,317	0,199	1,755	3,954	2,666	-0,138
	USA	-0,041	0,144	0,063	0,101	0,031	-0,007

Source: Processed by the author with RunGTAP v7

In the first scenario, it appears that a 10% US import tariff actually provides room for expansion for several domestic Indonesian industrial sectors. Demand for skilled labor in the machinery and equipment sector increased significantly by +1.818%, followed by the general manufacturing sector by +1.25% and the food and oil sector by +0.599%. When export demand to the US declined, some of this demand was diverted to the domestic market or offset by import substitution, resulting in strengthening of substitute sectors such as machinery and equipment, manufacturing, and food processing. These sectors tend to be more labor-intensive, thus absorbing more workers per unit of output (Armington, 1969; Melitz & Redding, 2014). Furthermore, the expansion of substitute sectors triggers backward/forward linkages that increase demand for domestic inputs and supporting services, resulting in a multiplier effect spreading to other sectors and increasing employment despite a decline in aggregate exports (Burfisher, 2011).

A similar pattern is also observed for unskilled labor. The food and oil sector recorded a +0.57% increase in demand for unskilled labor, while the machinery and equipment sector increased +1.778%. These results demonstrate the dual role of labor in the face of tariff policies. Primary and processed commodity-based sectors tend to employ more unskilled labor due to their labor-intensive production processes, while the machinery and equipment sector requires a combination of skilled and unskilled labor in its production chain. This finding is consistent with Ramli's (2025) explanation that a surge in protectionism can trigger an import-substitution industrialization effect that increases domestic labor absorption.

Meanwhile, conditions in the US under the same scenario actually indicate labor stability. The impact of a 10% tariff on US labor is relatively small because the US economy has a more diversified industrial base and its trade share with Indonesia is not particularly dominant. Sectors using imported goods from Indonesia do face increased production costs, but the scale of the disruption is so limited that it does not cause significant changes in labor absorption. This aligns with macro simulation results, which show that shifts in US GDP variables remain virtually unchanged. In other words, tariff policies put more pressure on trading partners such as Indonesia, while the US itself only felt a marginal impact on the domestic labor market, indicating an asymmetry in the burden of adjustment between developed and developing countries (Krugman *et al.*, 2018).

In the second scenario, the demand for skilled labor in Indonesia increased significantly. The machinery and equipment sector recorded a surge in demand for skilled labor of +9.732%, the food and oil sector increased +3.385%, the clothing and leather sector +0.744%, and the furniture and rubber sector +4.428%. This indicates a shift in domestic production, which requires intermediate

to high-skill skills to maintain quality and adapt production processes. The mechanism explaining this pattern stems from import substitution, where high tariffs force import-dependent activities to be shifted to domestic producers, causing local factories to increase capacity, invest in equipment, and employ skilled workers to meet the new technical needs of production (Armington, 1969; Melitz & Redding, 2014). At the same time, the need for unskilled labor also increases because many substitution processes require labor-intensive labor in the assembly, processing, and logistics stages, resulting in a labor-intensive effect that coincides with the increase in skill demand. A similar increase also occurred in unskilled labor, particularly in the machinery and equipment sector, with a +9.515% increase, and in the food and oil sector, with a +3.227% increase. This demonstrates that escalating trade protectionism not only creates jobs for highly skilled workers but also increases the need for labor-intensive in the production process.

On the US side, the impact is quite different. Because the US economy is more diversified and can shift supplies to other countries, the impact of the second scenario on domestic labor absorption is relatively small. Some industries face increased input costs, but the scale of the disruption is not large enough to alter the employment structure broadly (Amiti *et al.*, 2019; Fajgelbaum *et al.*, 2020). In other words, substantial protection of Indonesian exports encourages the relocation of production and labor absorption to Indonesia, while the US is more likely to experience margin and price adjustments than a surge in labor absorption, placing a heavier burden on partner countries with domestic substitution capacity and a larger labor base.

In the third scenario, demand for skilled labor in Indonesia remains positive but consolidated. The machinery and equipment sector grew by +4.044%, general manufacturing by +2.756%, and food and oil by +1.383%, while unskilled labor grew by +3.954% in machinery and equipment and +1.317% in food and oil. This pattern illustrates that protectionism still encourages import substitution, but adjustment capacity is hampered by limited inputs and capital components that still need to be imported or are not easily substituted, resulting in lower labor force expansion than in scenario two (Armington, 1969; Melitz & Redding, 2014).

Meanwhile, the situation in the US presents a stark contrast. Although tariff policies are intended to protect domestic industries, their impact on the labor market is minimal. Increased import costs from Indonesia exert only minor pressure on a few industries that use these raw materials, while the highly diversified US economy makes the aggregate effect almost invisible. However, at the micro level, labor-intensive companies dependent on raw materials from Indonesia face rising production costs, which can depress profits and ultimately reduce employment, particularly for unskilled workers. This situation aligns with a study by Krugman, Obstfeld, and Melitz (2018) that found that protectionism often results in widespread deadweight losses that are difficult to measure in aggregate but are clearly felt at the firm and worker level.

Overall, the labor simulation results indicate that Indonesia experienced an increase in demand for both skilled and unskilled labor. This mechanism can be explained by the Heckscher–Ohlin theory, as Indonesia is relatively labor-rich but capital-poor (Heckscher, 1919; Ohlin, 1933). When trade is disrupted by tariffs, the abundant factor of production, labor, becomes more absorbed by labor-intensive sectors (Deardorff, 1984; Ohlin, 1933). Furthermore, simulation results show that the imposition of tariffs spurs expansion in several sectors and increases labor absorption in the US, which is in accordance with the mercantilist theory of protecting domestic industry and maintaining employment (Magnusson, 2015).

D. Welfare (EV)

The simulation results of the impact of Trump's reciprocal tariff policy on welfare (EV) in Indonesia and the US for each simulation are shown in Table 6 below.

Table-6: Changes in Welfare (million USD)

Country	EV (million USD)		
	Simulation 1	Simulation 2	Simulation 3
IDN	-3.370	-17.085	-7.227
USA	-1.273	-6.754	-2.814

Source: Source: Processed by the author with RunGTAP v7

GTAP simulation results show that Indonesia experiences a deeper decline in welfare than the US in all scenarios. In the first scenario, Indonesia's EV decreased by -3,370 million USD, while the US's was only -1,273 million USD. This difference reflects the asymmetry of tariff burdens, where developing countries with export structures relatively concentrated in primary commodities are more vulnerable to trade shocks than developed countries with diversified production bases (Burfisher, 2011).

In the second scenario, Indonesia's losses are even sharper, reaching -17,085 million USD, indicating the significant impact of tariffs on trade flows and household incomes. The US also experiences a welfare loss of -6,754 million USD, but this is proportionally smaller compared to the scale of its economy. This aligns with the argument of Amiti, Redding, and Weinstein (2019), who show that trade wars increase the prices of imported inputs and suppress consumer surplus, but the aggregate effect is more pronounced for partner countries more dependent on the US market.

In the third scenario, a partial import ban results in a decline in Indonesia's EV of -7,227 million USD and the US's of -2,814 million USD. This figure shows that extreme tariff strategies are detrimental to both parties but reiterates that developing countries like Indonesia face more significant impacts due to limited export market substitution and domestic production capacity (Fajgelbaum *et al.*, 2020).

Table-7: Changes in Welfare Components (million USD)

Simulation	country	Allocative Efficient	Endowment	Terms of Trades	Investment Saving
Simulation 1	IDN	-211	0	175	-3334
	USA	-228	0	-510	-535
Simulation 2	IDN	-1.193	-0,005	889	-1.6782
	USA	-1.205	0	-2.670	-2.879
Simulation 3	IDN	-487	0	376	-7.116
	USA	-503	0	-1.117	-1.194

Source: Processed by the author with RunGTAP v7

The first simulation results show that Indonesia's welfare losses were largely driven by a sharp contraction in the investment-savings balance component of USD 3,334 million. This component reflects the disruption of capital accumulation due to weakened investment incentives, which arises because import tariffs increase input costs, thus reducing the profitability of domestic sectors. In the CGE model, this contraction means that long-term production capacity is also suppressed because capital inflows slow and domestic savings are no longer sufficient to support new capital formation (Burfisher, 2011). In other words, the tariff shock not only reduces current consumption but also erodes intergenerational utility through a decline in the capital stock. On the other hand, Indonesia recorded a slight improvement in the ToT of USD 175 million. This small increase came primarily from an increase in export prices relative to imports due to the substitution of imported goods for domestic production. However, this limited ToT benefit clearly cannot offset the substantial loss from weakened investment. This effect is consistent with the argument of Krugman, Obstfeld, and

Melitz (2018) that ToT improvements are often only temporary in the context of trade protectionism, as investment distortions exert a stronger depressing effect on aggregate welfare. Meanwhile, Indonesia's allocative efficiency component experienced a moderate decline of USD -210 million. This indicates inefficiencies in the distribution of resources across sectors, as tariffs encourage a shift in production to sectors that do not always have a comparative advantage, thus decreasing aggregate productivity (Melitz & Redding, 2014). Interestingly, the endowment component, or factors of production, does not experience significant changes in this scenario, so welfare losses stem more purely from investment imbalances and allocative efficiency. On the other hand, the total loss experienced by the US is smaller at USD -1,273 million, although the pattern of components is somewhat different. The largest burden comes from a USD -510 million decline in the ToT (Total Trade) reflecting that reciprocal tariffs increase the cost of importing commodities from Indonesia, thus suppressing the price competitiveness of US goods in the global market. The investment-saving component also declined by USD -535 million, but the scale of the contraction was relatively more controlled compared to Indonesia's because the US economy has deeper financial markets and a wider diversification of input sources (Amiti *et al.*, 2019). Furthermore, the USD -228 million decline in allocative efficiency indicates that the US is not immune to resource distortions caused by protectionist policies.

In the second scenario, Indonesia's welfare losses surge sharply to approximately USD -17,085 million, with the main source of these losses being the investment-saving component, which fell to USD -16,781 million, while the ToT actually showed a relative increase of USD +889 million, insufficient to offset the investment pressure. Economically, this pattern illustrates two major mechanisms operating simultaneously. First, an improvement in ToT implies a shift in relative prices that benefits Indonesia, resulting in a nominally strengthening effect on external income. However, this ToT effect is partial and often temporary if accompanied by disruptions in the quantity and structure of production (Fajgelbaum *et al.*, 2020). Second, the collapse in investment-saving reflects a serious impact on capital accumulation and investment financing flows. These pressures arise because the escalation of reciprocal tariffs increases the costs of imported inputs, reduces profitability margins, and increases future uncertainty, causing investors to delay or cancel capital projects. Indonesia's allocative efficiency component was also negative at -1,193 million USD, indicating that high protection triggered distortions in resource allocation (Melitz & Redding, 2014).

Although the ToT makes a significant positive contribution, this benefit cannot offset the decline in investment due to its significant impact on capital flows. The reason why the ToT can be positive, but welfare still declines sharply is because the ToT only captures relative price changes, not the decline in future production capacity due to depressed investment. In other words, a country can gain short-term price benefits but lose long-term production capacity and income due to reduced capital formation (Burfisher, 2011; Fajgelbaum *et al.*, 2020). In the US, the pattern is quite different. The US ToT falls by -2,670 million USD, investment-savings also fall by -2,879 million USD, and allocative efficiency falls by -1,205.06 million USD. This indicates that in this scenario, the US bears the burden of rising import prices and also experiences pressure on investment, although proportionally the US aggregate loss is smaller than Indonesia's loss when adjusted for the size of each country's economy. Conceptually, the US faces increased input costs for several industries, resulting in reduced consumer surplus and allocative efficiency. However, the US's ability to spread its impact across the economy makes the macroeconomic impacts relatively more manageable compared to developing countries like Indonesia (Amiti *et al.*, 2019).

In the third scenario, Indonesia's welfare losses were recorded at USD -7,227 million, a significant decrease compared to the second scenario. The investment-saving component remained the main source of pressure, decreasing by USD -7,116 million, reflecting a decline in capital accumulation due to rising imported input prices and increased uncertainty in the investment climate. This situation demonstrates that even though import bans are not complete, capital costs

and barriers to investment flows remain the dominant factors in the decline in welfare (Bloom, 2009; Handley & Limão, 2017). Conversely, the ToT component contributed positively by USD +376 million, reflecting a slight improvement in export prices relative to imports. However, this gain was not large enough to offset the investment contraction, consistent with the findings of Amiti, Redding, and Weinstein (2019) that tariff increases more often depress trade volumes than they enhance welfare through prices. In terms of efficiency, allocative efficiency declined by USD -487 million, indicating a shift in resources to less productive sectors, as explained in the literature by Melitz and Redding (2014), who found that trade protectionism leads to distortions in the allocation of production factors. Meanwhile, the US also experienced losses, albeit much more moderate, at around USD -2,815 million. Unlike Indonesia, the largest US loss stemmed from a fall in the ToT of USD -1,117 million, reflecting weakened export competitiveness and rising import prices that could not be fully passed on to domestic consumers. The US investment-saving component also fell by USD -1,194 million, but on a much smaller scale than in Indonesia. This reflects the resilience of US financial markets and the greater capacity of US capital to absorb tariff shocks (Fajgelbaum *et al.*, 2020). In other words, although the US experienced a decline in trade efficiency due to reciprocal tariffs, its larger and more diversified economic structure limited the welfare losses relatively.

Overall, the EV simulation results indicate that Indonesia experiences significantly greater welfare losses than the US, primarily due to a decline in investment-savings, which suppresses capital accumulation and reduces long-term utility. This pattern aligns with the Heckscher–Ohlin model, where relatively capital-poor developing countries like Indonesia are more vulnerable to tariff shocks that increase input import costs and discourage investment (Heckscher, 1919; Ohlin, 1933). Meanwhile, the capital- and technology-rich US is better able to absorb these shocks, albeit at the expense of losses in terms of the ToT (Deardorff, 1984; Ohlin, 1933). Furthermore, these findings are consistent with the Prebisch–Singer hypothesis, which emphasizes that primary commodity-exporting countries like Indonesia tend to experience long-term welfare declines due to relative price deterioration (Prebisch, 1950; Singer, 2012). Although Indonesia gains a small ToT gain in certain scenarios, this benefit is insufficient to offset the losses from the contraction in investment flows and productivity. In other words, dependence on primary commodities actually increases vulnerability to global tariff wars, so efforts are needed to shift to value-added products (Prebisch, 1950; Singer, 2012).

E. Sectoral Output

The simulation results of the impact of Trump's reciprocal tariff policy on sectoral output in Indonesia and the US for each simulation are shown in Table 8 below.

Table-8: Changes in Sectoral Output (%)

		Sectoral Output					
		Food, Oil, Fish	Apparel Leath	Furnitur Rubber	Mach Equip	Gen Manufac	Other
Simulation 1	IDN	0,497	0,063	0,785	1,770	1,203	-0,061
	USA	0,000	0,084	0,036	0,057	0,019	-0,002
Simulation 2	IDN	2,815	0,484	4,165	9,473	6,348	-0,330
	USA	-0,138	0,304	0,139	0,223	0,067	-0,007
Simulation 3	IDN	1,149	0,181	1,736	3,937	2,650	-0,137
	USA	-0,039	0,146	0,065	0,104	0,033	-0,004

Source: Source: Processed by the Author with RunGTAP v7

In the first scenario, the GTAP simulation results show different sectoral dynamics between Indonesia and the US. In Indonesia, the highest surge was seen in the machinery and equipment sector, which grew by +1.770%, followed by general manufacturing by +1.203% and furniture and

rubber by +0.785%. This pattern indicates domestic trade creation, where domestic production capacity partially replaces imported goods, which have become more expensive due to tariff increases in the US market. This mechanism aligns with Armington's (1969) approach, which explains that product differentiation based on country of origin allows for a shift in demand toward domestic substitutes when import prices rise. Furthermore, the food and oil subsector also showed positive expansion of +0.497%, particularly for Indonesia's leading products, such as palm oil and fishery products, which remained absorbed by the domestic market when export access was disrupted.

In the second scenario, the GTAP simulation results show that Indonesia's sectoral response to tariff policies was stronger and more widespread than in the first scenario. The machinery and equipment sector recorded the most significant output surge of +9.473%, followed by general manufacturing by +6.348% and furniture and rubber by +4.165%. This sharp increase reflects a large-scale import substitution mechanism in which domestic producers leverage trade protection to expand production capacity while simultaneously increasing labor absorption, particularly skilled labor. This phenomenon is consistent with a study by Stolper & Samuelson (1941), which found that protection in certain sectors can increase the returns to the dominant production factors employed in those sectors, in this case skilled labor in capital-intensive manufacturing industries. Meanwhile, the food and oil sector also experienced significant growth of +2.815%, while growth in the clothing and leather sector was +0.483%, and in the furniture and rubber sector +4.165%, although the scale was more moderate compared to the machinery or general manufacturing sectors. This indicates structural constraints, such as limited value-added, low technology adoption, and insufficient investment in export-oriented, labor-intensive sectors (Ramli, 2025). Therefore, the sustainable growth of these sectors is highly dependent on technological modernization, workforce skills improvement, and export market diversification.

In the third scenario, GTAP simulation results show that output in Indonesia's main sectors still grows positively, albeit at a lower intensity than in the second scenario. Machinery and equipment recorded a +3.937% increase in output, while general manufacturing grew +2.650%. This increase reflects that import bans stimulate domestic substitution, but limited access to foreign raw materials and capital components, particularly those that must still be imported from countries other than the US, limits expansion capacity (Anderson & Van Wincoop, 2004). In other words, while protectionism continues to provide a stimulus to capital-intensive sectors, its growth potential is not as sharp as in the second scenario because input factors act as structural constraints. The food and oil sector continued to grow +1.149%, indicating that domestic demand for palm oil, coconut products, and processed fisheries continues to support industrial activity, even as export markets were partially lost due to the US import ban. This finding aligns with a study by Burfisher (2011), which showed that diversification into domestic markets can mitigate negative external impacts, despite relatively lower profit margins compared to exports. The clothing and leather sector only recorded a +0.181% increase, while the furniture and rubber sector grew +1.736%. This lower growth confirms that labor-intensive sectors with complex global supply chains are more vulnerable to disruptions from protectionist policies and require long-term strategies such as increased vertical integration, adoption of production technologies, and improved competitiveness in both domestic and international markets.

5. CONCLUSION AND RECOMMENDATIONS

Based on the simulation of Trump's Reciprocal Tariff Policy on the Indonesian economy using the CGE-GTAP model, the following conclusions can be drawn.

- 1) Indonesia's GDP declines under all tariff scenarios. The decline occurs due to a contraction in exports that is not fully offset by import substitution and increased domestic production. The scenario with the largest tariff escalation results in the deepest GDP decline, while the partial scenario results in a less severe but still negative GDP decline.

- 2) Changes in the ToT are relatively small and heterogeneous across scenarios. In milder scenarios, the ToT is nearly stable or only experiences a marginal decline. Higher tariff scenarios are also associated with larger declines in the ToT.
- 3) Labor absorption increases in many import-substituting sectors. Increases occur in both skilled and unskilled labor, particularly in machinery and equipment, general manufacturing, and food and oil processing. This phenomenon arises from a shift in the composition of production toward more labor-intensive activities and the multiplier effect on domestic suppliers.
- 4) Tariff policies result in a decline in aggregate welfare under all scenarios. This decline is primarily due to a decline in capital accumulation and inefficient resource allocation, while relative price benefits are limited.
- 5) Sectoral output shows strengthening domestic production in import-intensive sectors such as machinery and equipment, general manufacturing, and furniture and rubber due to trade creation.

Based on the simulation results and previous discussions, the author proposes several policy recommendations to mitigate the negative impact of Trump's reciprocal tariff policy on the Indonesian economy:

- 1) Based on the patterns seen in the simulation, the component significantly impacted is investment. To maintain investment and GDP stability, consideration should be given to opening credit facilities for companies in priority sectors such as machinery and equipment, general manufacturing, and food processing, along with an import duty rebate scheme for imports of machinery and critical capital components during the transition period, as well as targeted investment tax credits for technology adoption.
- 2) Consideration should be given to strengthening the quality and absorption of the workforce. This can be achieved by implementing a vocational program that combines in-house training and on-site internships, with internship wage subsidies and incentives for companies that employ graduates. Furthermore, it would be beneficial to accompany this with a conditional tax incentive program for companies that increase wages in line with increased productivity.
- 3) Finally, the government can consider encouraging sustainable import substitution for domestic production and sector transformation. The government can launch a local supplier accelerator program in the form of matching R&D grants for strategic component development, the development of industrial clusters with shared facilities (quality testing, cold chain, logistics), and prioritizing government procurement for certified local products. This will boost domestic demand and increase product added value.

6. THANK-YOU NOTE

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