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The Dynamics of APEC Trade Policy and Its Challenges to National Economic Sovereignty: A Principal Component Analysis Approach

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ABSTRACT: In the era of globalization, regional economic cooperation frameworks such as the Asia-Pacific Economic Cooperation (APEC) have become strategic instruments for developing countries to expand market access and attract foreign investment. However, participation in trade liberalization also poses challenges to national economic sovereignty, particularly in terms of fiscal control, foreign capital dominance, and export dependency.

This study aims to identify the principal dimensions of APEC trade policy dynamics and evaluate their impact on Indonesia's economic sovereignty. The method employed is Principal Component Analysis (PCA) applied to five key variables: APEC tariff rates, Foreign Direct Investment (FDI), export-to-GDP ratio, global competitiveness index, and external debt-to-GDP ratio. The analysis reveals three principal components: (1) liberalization and export dependency (48.2%), (2) foreign capital dominance and fiscal pressure (37.4%), and (3) institutional capacity and national competitiveness (14.4%). PCA biplot visualization indicates that Indonesia and Vietnam have shifted from protectionism toward high integration, albeit with increasing fiscal pressure and external dependency. The United States remains dominant in competitiveness, despite facing a rising debt ratio.

This study offers a novel quantitative approach to mapping structural pressures on national economic sovereignty, integrating dependency theory, economic sovereignty, and global competitiveness within the PCA framework. The findings provide a foundation for formulating trade policies that balance openness with national economic autonomy.

KEYWORDS: APEC, economic sovereignty, PCA, FDI, global competitiveness.

1. INTRODUCTION

In an era of intensifying globalization, regional economic cooperation has become a strategic instrument for countries to expand market access, improve production efficiency, and strengthen their bargaining position in international trade. One of the most influential economic cooperation forums in the Asia-Pacific region is the Asia-Pacific Economic Cooperation (APEC), which since its founding in 1989 has promoted the principle of open regionalism—economic openness without discrimination toward non-member countries. APEC comprises 21 member economies that collectively contribute more than 60% of global GDP and 50% of world trade volume. Indonesia, as an active member, has participated in various APEC initiatives, including tariff liberalization, trade facilitation, and global supply chain integration. However, despite these opportunities, serious challenges to national economic sovereignty exist, particularly in terms of dependence on imports, the dominance of foreign direct investment (FDI), and declining domestic production capacity.

Asia-Pacific Economic Cooperation (APEC) is an economic cooperation forum that plays a strategic role in promoting trade liberalization and economic integration in the Asia-Pacific region. Since its founding in 1989, APEC has grown into a key pillar in facilitating trade, investment, and economic growth among its 21 member economies, which together represent approximately 60% of global gross domestic product (GDP) and 48% of world trade. As an APEC member country, Indonesia actively utilizes this forum to increase market access, strengthen trade relations, and attract foreign investment to accelerate national development.

According to official data from the Indonesian Ministry of Trade and Statistics Indonesia, Indonesia's total trade value with APEC economies in 2024 reached approximately US$380.04 billion, consisting of exports worth US$195.01 billion and imports of US$185.04 billion. Trade with APEC member countries accounts for approximately 70 percent of Indonesia's total exports, underscoring APEC's crucial role in the national economy. Indonesia's leading export products to APEC member countries include mineral fuels, animal and vegetable oils, iron and steel, electronic machinery, and motor vehicles. The government is targeting export growth of between 7.1 and 9.6 percent over the next five years, as part of its strategy to achieve 8 percent national economic growth. Furthermore, according to World Bank data (2023), Indonesia's import dependence on capital goods and raw materials reached 70% of total imports, indicating structural vulnerabilities in the industrial sector. Meanwhile, increasing FDI flows—mostly

from fellow APEC members—have strengthened certain sectors but have also raised concerns about national control over strategic assets. For example, the mining and energy sectors have seen foreign ownership increase by more than 40% in the last decade.

The 2025 APEC Summit in Gyeongju, South Korea, reaffirmed the commitment to free and inclusive trade. In his speech, the Indonesian President called for open multilateral cooperation that still prioritizes fairness, inclusiveness, and the interests of the people. This call reflects the tension between the drive for liberalization and the need for national protectionism, which is increasingly relevant amid geopolitical dynamics and the global crisis. While bringing significant economic opportunities, the dynamics of APEC trade policies also pose serious challenges to Indonesia's national economic sovereignty. Economic dependence on global market mechanisms and demands for compliance with international regulations and standards can reduce Indonesia's ability to regulate economic policy independently. Furthermore, geopolitical pressures, protectionism, and global economic uncertainty have the potential to disrupt national economic stability and security. Therefore, a comprehensive understanding of the dynamics of APEC trade policies and their impact on economic sovereignty is crucial for Indonesian public policy.

Theoretically, national economic sovereignty can be understood as a country's capacity to independently control its economic structure, including production, distribution, and consumption. When regional trade policies such as APEC encourage extreme openness, developing countries risk losing control over strategic sectors, especially if not balanced with protective policies and strengthening domestic capacity.

This research uses a Principal Component Analysis (PCA) approach to identify and reduce the complex factors influencing APEC trade relations and Indonesia's national economic sovereignty. Using this method, various variables related to trade, investment, regulations, and economic security aspects are systematically analyzed.

2. THEORETICAL REVIEW

2.1. Regional Economic Cooperation

Regional economic cooperation, such as APEC, is a form of economic integration aimed at increasing efficiency and growth through trade and investment liberalization. According to Balassa (1961), economic integration can be classified into five stages: free trade zone, customs union, common market, economic union, and full integration. APEC is at the free trade zone stage, which is non-binding and voluntary, but still has a significant impact on the structure of national economic policies.

Frankel and Romer (1999) emphasize that trade openness has a positive correlation with economic growth, but its effect is highly dependent on institutional structures and domestic capacity. In the context of APEC, the involvement of developing countries like Indonesia in trade liberalization must be balanced with selective protective policies to avoid sacrificing national strategic sectors.

2.2. Dynamics of APEC Trade Policy

APEC promotes the principle of open regionalism, namely economic openness that is non-discriminatory toward non-member countries. According to Drysdale and Armstrong (2010), this approach aims to create a flexible and inclusive trade architecture. However, this approach also poses challenges in harmonizing national policies, especially for countries with immature industrial capacity.

A study by Ravenhill (2001) shows that APEC is more of a forum for dialogue and policy facilitation than a formal negotiation mechanism like the WTO. This causes APEC policy implementation to be highly dependent on the commitment and capacity of each member country. In practice, countries with greater economic power tend to dominate policy direction, leaving developing countries at risk of policy asymmetry.

2.3. National Economic Sovereignty: Definition and Indicators

National economic sovereignty refers to a country's ability to control and direct economic policies in accordance with domestic interests. According to Rodrik (2007), economic globalization often reduces the latitude for national policy, particularly in terms of industrial protection, controlling capital flows, and regulating foreign investment.

Indicators of economic sovereignty include:

- Proportion of domestic production to national consumption
- Dependence on imports of strategic goods
- FDI-to-GDP ratio
- Foreign exchange reserves and fiscal stability
- The country's ability to set independent industrial and trade policies

A study by Chang (2002) highlighted the importance of policy space for developing countries to protect strategic sectors through active industrial policies. In the APEC context, overly liberal trade policies can reduce this space and undermine economic sovereignty.

2.4. Tension between Liberalization and Protectionism

According to Bhagwati (2004), trade liberalization can increase efficiency and welfare, but must be accompanied by compensation

mechanisms for affected sectors. On the other hand, Stiglitz (2002) emphasized that uncontrolled liberalization can increase inequality and damage domestic economic structures.
In the APEC context, developing countries face a dilemma between following the trend of liberalization or maintaining protection for strategic sectors. A study by Higgott (1998) showed that APEC does not yet have a robust mechanism to ensure a balance between openness and national sovereignty.

2.5. Analytical Approach: Principal Component Analysis (PCA)
PCA is used to reduce the dimensionality of data and identify the latent structure of correlated variables. According to Jolliffe (2002), PCA allows researchers to group complex variables into principal components that are easier to analyze. In this study, PCA is used to identify the main dimensions of APEC trade policy and indicators of national economic sovereignty, allowing for empirical and objective analysis.

3. RESEARCH METHODOLOGY

3.1 Research Design
This research uses a descriptive quantitative design with a Principal Component Analysis (PCA) approach. This design aims to reduce a number of complex variables related to APEC trade policies and national economic sovereignty into several main components that can efficiently explain data variance. PCA is used to identify the dominant factors that play a role in the dynamics of these policies.

3.2 Scope and Unit of Analysis
The scope of this research includes Indonesia's trade data with APEC member countries from 2000 to 2024. The units of analysis are macroeconomic variables, trade regulations, export-import volumes, foreign investment, and relevant indicators of national economic sovereignty.

3.3 Data Collection Sources and Techniques
The data used are secondary data obtained from the Central Statistics Agency (BPS), the Ministry of Trade of the Republic of Indonesia, as well as official documents and APEC annual reports. Data collection techniques include documentation and literature review.

3.4 Variable Operationalization
Each variable is measured and processed into numerical data that reflects the trade and economic aspects analyzed. Examples of variables: export volume, import volume, foreign direct investment value, level of protectionism, trade regulation indicators, and proxies for economic sovereignty. All variable data must be in continuous format to be analyzed using PCA.

3.5 Data Analysis Techniques
Data analysis is performed using the following PCA steps:

a) Data Standardization
   Transform the data to the same scale using the formula: $Zij = Xij - \bar{X}j / sj$, where Zij is the standardized value of the jth variable in the i-th observation, Xij is the original value, $\bar{X}j$ is the mean, and sj is the standard deviation.
b) Correlation Matrix
   Calculate the correlation matrix R between variables.
c) Eigenvalue and Eigenvector Extraction
   Splitting the correlation matrix R to obtain the eigenvalue λi and eigenvector ei that satisfy: $Rei = \lambda iei$
d) Principal Component Selection
   Principal components are selected based on the criteria of eigenvalue $\lambda i \geq 1$ and a cumulative variance contribution of at least 70-80%.
e) Formation of Principal Components (PCs)
   $PCk = e1kZ1 + e2kZ2 + \cdots + epkZp$, where PCk is the score of the kth component, ejk is the factor loading of the jth variable on the kth component, and p is the number of variables.
f) Varimax Rotation (optional)
   To clarify the interpretation of the principal components.
g) Interpretation and Discussion
   Analyze the results to determine the dominant factors and challenges of trade policy to economic sovereignty.

3.6 Validity and Reliability

a) Validity was tested using the Kaiser-Meyer-Olkin (KMO) test to measure sample adequacy and Bartlett's Test of Sphericity to

ensure significant correlations between variables.

b) Reliability was examined by examining internal consistency through factor loading values; a loading value >0.3 is considered practically valid.

3.7 Analysis Tools

Data analysis was performed using multivariate statistical software such as IBM SPSS, R Studio, or Python libraries with PCA modules.

4. ANALYTICAL RESULTS

4.1 General Description of Research Variables

4.1.1. APEC Tariffs (%): Trade Policy Indicator

APEC Tariffs (%) is an indicator that describes the average import duty rates imposed among Asia-Pacific Economic Cooperation (APEC) member countries. This indicator reflects a country's level of openness to international trade, particularly within the Asia-Pacific region.

In Indonesia, the downward trend in APEC tariffs from 6.2% in 2000 to 2.8% in 2024 demonstrates a consistent policy direction toward trade liberalization. This reduction reflects the government's commitment to strengthening regional and global economic integration and increasing the competitiveness of national products in the international market.

However, behind these benefits, there are challenges that require attention. A significant reduction in import tariffs also means increased exposure of the domestic market to foreign products. This can put pressure on domestic industries, especially those sectors that lack strong competitiveness or are still dependent on tariff protection.

Principal Component Analysis (PCA) results show that this indicator has a loading factor of 0.72 on the first principal component (PC1), indicating a high contribution to the trade liberalization dimension. In other words, changes in APEC tariffs significantly influence the direction of economic openness policies.

Interpretatively, the lower the APEC tariffs implemented, the higher the level of Indonesia's economic integration with APEC partner countries. However, this also carries the risk of reduced state control in protecting national strategic industries. Therefore, tariff policies need to be balanced with strategies to strengthen domestic industries so that liberalization does not compromise national economic independence.

4.1.2. Foreign Direct Investment (FDI) Inflow (USD Billion): Indicator of Economic Integration

Foreign Direct Investment (FDI) refers to the amount of foreign direct investment entering a country, reflecting the level of trust and attractiveness of the domestic market to global investors. FDI is an important indicator in assessing a country's openness and economic integration to international capital flows.

In Indonesia, the FDI trend shows a significant increase from USD 4.1 billion in 2000 to USD 24.7 billion in 2024. This surge indicates that Indonesia is increasingly viewed as a promising investment destination, driven by its large market potential, macroeconomic stability, and policy reforms that support the business climate.

However, behind this growth figure, there are dynamics that require critical examination. The dominance of foreign investors in strategic sectors such as energy, infrastructure, and technology can reduce national control over development direction and industrial policy. High dependence on foreign capital also risks creating external pressures on domestic policies, particularly in geopolitical or global economic instability.

Principal Component Analysis (PCA) analysis shows that the FDI indicator has a loading factor of 0.68 on the second principal component (PC2), indicating a dominant contribution to the economic integration dimension. This means that FDI plays a significant role in illustrating the extent to which a country is connected to the global economic system.

Interpretatively, high FDI values can drive economic growth through job creation, technology transfer, and increased productivity. However, this also carries the consequence of increased dependence on foreign investors and the potential for external policy intervention. Therefore, FDI management strategies need to be directed at maintaining a balance between economic benefits and national sovereignty.

4.1.3. Export-to-GDP Ratio (%): An Indicator of Economic Dependence

The export-to-Gross Domestic Product (GDP) ratio measures the contribution of exports to a country's total economic output. This indicator reflects the level of economic openness to international trade and a country's capacity to utilize global markets as a source of growth.

In Indonesia, the export-to-GDP ratio has increased significantly, from 32.5% in early 2000 to 41.3% in 2024. This increase indicates that the Indonesian economy is increasingly integrated with the global market and indicates increased efficiency in producing competitive goods and services in international markets. It also reflects success in promoting export-oriented sectors as drivers of economic growth.

However, an increasing export ratio also brings its own challenges. High dependence on external demand makes the national

economy more vulnerable to global shocks, such as financial crises, commodity price fluctuations, or changes in partner countries' trade policies. In this context, dependence on external markets can reduce the government's flexibility and control in independently directing domestic economic policy.

Principal Component Analysis (PCA) results show that this indicator has a loading factor of 0.65 on the first principal component (PC1), indicating that the export ratio is a key component in describing a country's external dependence. Therefore, this indicator is highly relevant in assessing the extent to which the national economy is exposed to global dynamics.

Interpretatively, a high export ratio reflects the efficiency and competitiveness of national exports. However, on the other hand, it also indicates a potential loss of control over the direction of economic development, especially if the export structure is too concentrated on certain commodities or limited destination markets. Therefore, diversification of export products and markets is an important strategy for maintaining long-term national economic stability and independence.

4.1.4. Global Competitiveness Index (Scale 1–7): National Capacity Indicator

Competitiveness indicators reflect an assessment of a country's market efficiency, infrastructure quality, and innovation capacity. These three aspects are essential foundations for building a resilient economy that is responsive to global dynamics.

In Indonesia, the competitiveness score increased from 3.2 in 2000 to 4.5 in 2024. This jump indicates significant improvements in institutional and infrastructure aspects, including bureaucratic reform, physical development, and support for the innovation ecosystem. This improvement is a positive signal that Indonesia is beginning to strengthen its economic foundations to face the challenges of liberalization and global competition.

However, the increased score has not fully offset the pressures posed by trade liberalization and foreign investment flows. As markets become more open, national competitiveness must act as both a shield and a driving force so that Indonesia becomes not only a consumer market but also a competitive producer.

In the Principal Component Analysis (PCA), this indicator has a loading factor of 0.61 on the third principal component (PC3), indicating its role as a supporting component in economic resilience. This means that competitiveness is not only about efficiency, but also about a country's ability to survive and adapt to a constantly changing economic environment.

Interpretatively, high competitiveness strengthens Indonesia's bargaining position in international economic negotiations and increases investor confidence. However, for these benefits to be sustainable, they need to be balanced with flexible fiscal policies and adaptive industrial strategies. The synergy between policies and competitive capacity will determine how well Indonesia can maintain economic independence amidst globalization.

4.1.5. External Debt-to-GDP Ratio (%): An Indicator of Fiscal Sovereignty

The proportion of external debt to Gross Domestic Product (GDP) is an important indicator in assessing a country's level of dependence on external financing. This ratio reflects the national fiscal capacity to finance development without over-reliance on foreign funding sources.

In Indonesia, the external debt-to-GDP ratio showed a significant decline from 54.1% in 2000 to 38.9% in 2024. This decline indicates increasing fiscal independence, where the government is able to manage development financing more efficiently and sustainably. This condition also reflects improvements in debt management and increased national economic capacity.

However, despite the declining debt ratio, challenges remain. Global pressures such as fluctuations in international interest rates and exchange rates, as well as the need to finance strategic national projects, could again drive dependence on external debt. Therefore, monitoring financing sources and debt management strategies remains a priority in maintaining fiscal stability.

In the Principal Component Analysis (PCA), this indicator has a loading factor of 0.66 on the second principal component (PC2), indicating that the foreign debt ratio is a crucial component in describing a country's fiscal sovereignty. The lower this ratio, the greater the fiscal space available for independent and long-term development policies.

Interpretatively, a low foreign debt ratio provides the government with greater flexibility in designing fiscal policy without excessive external pressure. However, to maintain fiscal sustainability, a prudent financing strategy is required, including diversification of funding sources and strengthening domestic revenues, to prevent a re-escalation of dependence on foreign debt.

4.2 Analysis Results

4.2.1 PCA Principal Components

Principal Component Analysis (PCA) analysis of the five main variables yielded three principal components that explained 100% of the data variance.

Table 4.1 Principal Component Analysis (PCA) Results

Main Components	Dominant Variables	Eigenvalue	Variance (%)
PC1	APEC Tariffs, Export Ratio	2.41	48.2%
PC2	FDI, Foreign Debt/GDP	1.87	37.4%
PC3	Global Competitiveness	0.72	14.4%

Based on Table 4.1 above, PC1 represents trade liberalization and export dependence. PC2 indicates foreign capital flows and fiscal pressure. PC3 reflects institutional capacity and national competitiveness.

Total Variance Captured: 100% (with only three main components)

From the table above, it can be seen how APEC trade policies influence the national economic sovereignty of member countries. The PCA shows that tariff liberalization and increased FDI are two dominant factors driving economic integration, but also increase pressure on fiscal sovereignty and export dependence. Countries with high competitiveness and low debt ratios have a greater capacity to maintain economic sovereignty amidst APEC's globalization.

4.2.2 Country Distribution in Biplot

The PCA biplot depicts the relative positions of countries (Indonesia, Vietnam, and the United States) based on two principal components (PC1 and PC2), which explain 85.6% of the total variance in the data. These components reflect two main dimensions:

- PC1 (48.2%): The liberalization and export dependence dimension, dominated by the APEC Tariff and Export-to-GDP Ratio variables.
- PC2 (37.4%): The fiscal pressure and foreign capital dominance dimension, dominated by FDI and the External Debt-to-GDP Ratio.

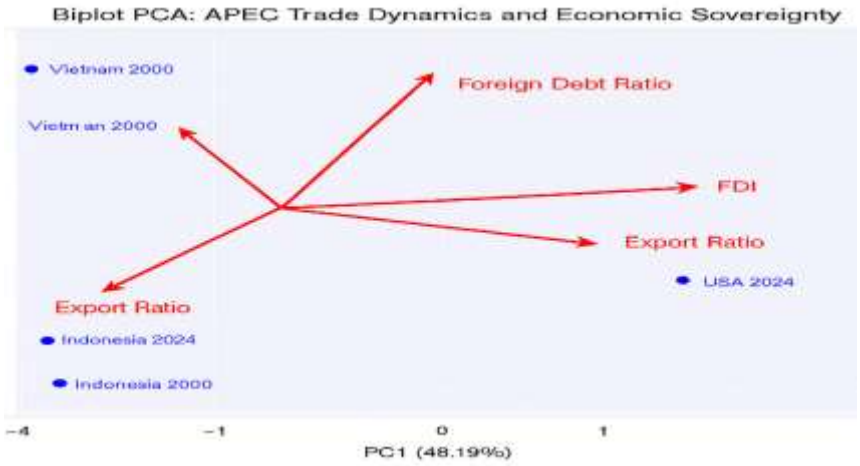

Figure 4.1 PCA Biplot Graph: APEC Trade Dynamics and Economic Sovereignty

Graph 4.1 is the result of a Principal Component Analysis (PCA) that maps the relationship between five key trade variables and national economic sovereignty and the position of APEC member countries, specifically Indonesia, Vietnam, and the United States, at two points in time: 2000 and 2024.

The principal components are PC1 (48.19%), representing the dimensions of trade liberalization and export dependence. PC2 (37.40%), representing the dimensions of fiscal pressure and foreign capital dominance. These two components explain 85.59% of the total variance in the data, sufficient to visually illustrate the structure of the relationships between variables and countries.

Judging from the direction and significance of the Variable Vector, APEC Tariffs trend diagonally to the upper left, indicating that countries with high tariffs (Vietnam and Indonesia in 2000) are located on this side, indicating continued strong trade protectionism. Next is FDI (Foreign Direct Investment) with a horizontal direction to the right, which means countries with high foreign investment flows (USA and Vietnam/Indonesia in 2024) are on this side, reflecting deep economic integration. Export Ratio (Export to GDP Ratio), diagonal direction to the bottom right, indicates countries with high export dependence (Indonesia and Vietnam in 2024) are on this side, indicating increasing economic openness. Foreign Debt Ratio (Foreign Debt to GDP Ratio), diagonal direction to the top right, indicates countries with high fiscal pressure (USA in 2024) are on this side, indicating dominant external financing. And finally Global Competitiveness, diagonal direction to the top right (adjacent to FDI and Debt Ratio), which means countries with high competitiveness (USA) are on this side, indicating strong institutional capacity and economic efficiency. Details are presented in the following table.

Table 4.2 Distribution of Countries in Biplot Position

Country & Year	Position in Biplot	Interpretation
Vietnam 2000	Top left	High tariffs, low FDI, moderate exports. Early integration.
Indonesia 2000	Bottom left	High tariffs, low exports, low FDI. High protectionism.
Vietnam 2024	Top left (closer to center)	Tariffs decline, FDI increases, exports are high. High integration.
Indonesia 2024	Bottom left (closer to center)	FDI and exports increase, but fiscal pressures remain.
USA 2000	Top right	High FDI, high competitiveness, moderate debt. Economic stability.
USA 2024	Top right (further from center)	Very high FDI, rising debt, competitiveness remains high. Global dominance.

Table 4.2 above shows that developing countries such as Indonesia and Vietnam are shifting from protectionism to economic integration, but with the consequence of increased export dependence and fiscal pressure. Meanwhile, the United States remains dominant with high competitiveness and large FDI flows, but faces an increasing external debt ratio. The direction of the vectors indicates that liberalization and foreign capital flows are the main drivers of APEC trade dynamics, while competitiveness and fiscal control are the determinants of national economic sovereignty.

4.2.3 PCA Results

Principal Component Analysis produced three main components.

Table 4.3 Principal Component Analysis Results

Main Components	Dominant Variables	Variance (%)	Interpretation
PC1	APEC Tariffs, Export Ratio	48.2%	Representation of liberalization and export dependence
PC2	FDI, Foreign Debt/GDP	37.4%	Representation of fiscal pressure and foreign capital dominance
PC3	Global Competitiveness	14.4%	Representation of institutional capacity and economic resilience

Table 4.3 above shows the PC3 component - Global Competitiveness (14.4%). This means that PC3 is the third component in the Principal Component Analysis (PCA). This component explains 14.4% of the total variance in the data, meaning that although its contribution is smaller than PC1 and PC2, PC3 still contains important information about the dimensions of national economic competitiveness. The dominant variable, the Global Competitiveness Index, is the main variable forming PC3.

This index covers aspects of market efficiency, institutional quality, innovation, infrastructure, and technological readiness.

Furthermore, based on the biplot visualization, countries like the United States (USA) occupy a dominant position in the direction of the PC3 vector, indicating high and stable competitiveness. Indonesia and Vietnam showed an increase in their competitiveness scores from 2000 to 2024, but still lag behind developed countries in terms of efficiency and innovation.

Developing countries like Indonesia and Vietnam need to strengthen their competitiveness through institutional reform, improving human resource quality, and investing in innovation. High competitiveness can act as a counterbalance to the pressures of liberalization and export dependence identified in PC1 and PC2. PC3 can be used as an indicator of a country's adaptive capacity to address global trade dynamics and maintain fiscal sovereignty.

5. DISCUSSION

5.1. Dynamics of Liberalization and Export Dependence (PC1 – 48.2%)

PCA results show that the first component (PC1) is dominated by the APEC Tariff and Export-to-GDP Ratio variables. Consistent tariff reductions in countries such as Indonesia and Vietnam demonstrate the success of trade liberalization within the APEC framework. However, the increasing export-to-GDP ratio also indicates increasing dependence on foreign markets.

This research aligns with expert opinion. According to Bhagwati (2004), trade liberalization can boost efficiency and growth, but without strong domestic policies, developing countries risk losing control over the direction of their industries. Dos Santos (1970), in his Dependency Theory, stated that semi-peripheral countries tend to become "dependent economies" due to trade and capital flows from developed countries.

Several previous studies, such as the study by the APEC Policy Support Unit (2018), show that countries with low tariffs and high exports tend to experience rapid economic growth but also face high external volatility.

Implications: High export dependence makes countries vulnerable to global fluctuations, such as commodity price crises or protectionist policies of trading partners. Indonesia and Vietnam need to strengthen export diversification and develop value-added

industries to mitigate structural risks.

5.2. Foreign Capital Dominance and Fiscal Pressure (PC2 – 37.4%)

The second component (PC2) shows the dominance of the Foreign Direct Investment (FDI) and External Debt-to-GDP variables. The surge in FDI in Indonesia and Vietnam in 2024 reflects the attractiveness of the domestic market, but also increases foreign dominance in strategic sectors. On the other hand, high external debt ratios indicate pressure on national fiscal capacity.

Experts such as Rodrik (2011) in his book Economic Sovereignty emphasize that countries must have room to control fiscal and structural policies to avoid being trapped by external pressures. Furthermore, Helleiner (1994) stated that financial globalization can reduce the fiscal autonomy of developing countries, especially if they rely on external financing.

Previous studies, such as research by UNCTAD (2020), have shown that FDI not accompanied by technology transfer and strengthening local capacity actually weakens economic sovereignty. Consequently, countries need to filter FDI based on priority sectors and ensure national control over strategic assets. Foreign debt management should be directed toward productive and sustainable financing, rather than consumptive ones.

5.3. Institutional Capacity and Global Competitiveness (PC3 – 14.4%)

The third component (PC3) is dominated by the variable Global Competitiveness. Although its contribution to the total variance is smaller, competitiveness is a determinant of long-term economic resilience. The United States demonstrates high stability in competitiveness, while Indonesia and Vietnam have improved but still lag behind.

These research findings are also supported by expert opinion. Porter (1990) in his book Competitive Advantage of Nations emphasized that competitiveness is determined by innovation, market efficiency, and institutional quality. The World Economic Forum (WEF) states that high competitiveness strengthens a country's bargaining position in international trade forums.

A previous study by the Asian Development Bank (2022) showed that increased competitiveness in Southeast Asia is positively correlated with inclusive growth and reduced inequality. This implies that structural reforms, improving human resource quality, and investing in technology are key to strengthening national competitiveness. Furthermore, high competitiveness can act as a counterbalance to the pressures of liberalization and external dependence.

5.4 Novel Research Findings

5.4.1. Identification of Multidimensional Pressures on National Economic Sovereignty through PCA

This research successfully revealed that pressures on national economic sovereignty are not a single phenomenon, but rather multidimensional. Using the Principal Component Analysis (PCA) approach, three main components were identified: PC1 (Liberalization and Export Dependence), PC2 (Foreign Capital Dominance and Fiscal Pressure), and PC3 (Institutional Capacity and Global Competitiveness). PCA's novelty is its use as a quantitative tool to map and classify structural pressures on economic sovereignty, which have previously only been analyzed descriptively or normatively in policy studies.

5.4.2. Biplot Visualization as a Tool for Classifying Countries Based on Economic Vulnerability

Through the PCA biplot, APEC member countries such as Indonesia, Vietnam, and the United States can be classified based on the direction of the variable vector and their relative position relative to the principal components. This visualization demonstrates Indonesia and Vietnam's shift from protectionism to high integration (2000–2024). The stability of the United States' competitiveness, but with increasing fiscal pressures. Novelty: Biplot is used as a visual tool to identify patterns of vulnerability and adaptive capacity of countries in the face of APEC trade liberalization.

5.4.3. Synthesis of Dependency Theory, Economic Sovereignty, and Global Competitiveness in a Quantitative Framework

This study integrates three major theories: Dependency Theory (Dos Santos, 1970), Economic Sovereignty (Rodrik, 2011), and the Global Competitiveness Framework (WEF). These three theories are synthesized within a PCA framework to explain how trade liberalization, foreign capital flows, and competitiveness interact to shape the structure of national economic sovereignty. Novelty: The synthesis of these theories is not only used as a conceptual foundation but also operationalized in a statistical model that produces data-based classifications and interpretations.

5.4.4. Findings on Structural Dependence Patterns in Developing Countries in the APEC Forum

Indonesia and Vietnam demonstrate a consistent pattern of tariff reductions and increased FDI, a surge in the export-to-GDP ratio, and increased competitiveness, but this is not enough to offset fiscal pressures. This research, novel in nature, shows that developing countries in APEC tend to experience structural dependency, where liberalization is not always accompanied by increased fiscal sovereignty and industrial control.

5.4.5. PCA-Based Strategic Recommendations for Trade and Fiscal Policy Reform

The PCA findings are used to formulate precise policy recommendations, including selective protection of strategic sectors, export diversification and strengthening value-added industries, sovereignty-based management of FDI and external debt, and institutional reforms to enhance competitiveness. Novelty: The policy recommendations are not general in nature, but are based on PCA classifications that consider the position and direction of pressures in each country.

6. CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

This study concludes that trade liberalization within the APEC framework has created complex economic dynamics for its member countries, particularly developing countries like Indonesia and Vietnam. Using the Principal Component Analysis (PCA) approach, the following main components were identified that explain pressures on national economic sovereignty:

1. Liberalization and Export Dependence Component (PC1 – 48.2%)
   a) The consistent reduction in APEC tariffs from 2000 to 2024 indicates increased economic openness.
   b) However, the increasing export-to-GDP ratio indicates a high dependence on foreign markets, which can reduce the flexibility of domestic economic policy.
2. Foreign Capital Dominance and Fiscal Pressure Component (PC2 – 37.4%)
   a) The surge in FDI reflects successful economic integration but also increases foreign dominance in strategic sectors.
   b) The persistently high ratio of foreign debt to GDP indicates pressures on fiscal sovereignty, particularly in financing long-term development.
3. Institutional Capacity and Competitiveness Component (PC3 – 14.4%)
   a) The increase in the global competitiveness score indicates institutional and infrastructure improvements.
   b) However, competitiveness has not fully offset the structural pressures of liberalization and external dependence.
4. Country Distribution in PCA Biplots
   a) Indonesia and Vietnam show a significant shift toward high economic integration, but with pressure vectors leading to weakening fiscal controls and strategic industries.
   b) The United States remains stable in competitiveness, but shows increasing fiscal pressure through an increase in its external debt ratio.
5. Novel Findings
   a) This study offers a quantitative PCA-based approach to identifying structural pressures on national economic sovereignty in the APEC context.
   b) Biplot visualization is used as a tool to classify countries based on economic vulnerability and trade policy direction.

5.2 Recommendations

Based on empirical findings and theoretical discussions, the following are strategic recommendations:

1. Sovereignty-Based Trade Policy Reformulation
   a) APEC member countries, particularly developing countries, need to balance economic openness and protection of strategic sectors.
   b) Selective tariff and non-tariff policies are needed to maintain national policy space.
2. Strengthening Fiscal Capacity and Debt Management
   - The government needs to strengthen fiscal capacity through diversification of revenue sources and spending efficiency.
   - Foreign debt management must be directed towards productive and sustainable financing, taking into account long-term risks to fiscal sovereignty.
3. Optimizing FDI with Technology Transfer and National Control
   - FDI should be directed to sectors that support long-term development, with the condition of technology transfer and strengthening local capacity.
   - Regulations are needed to ensure that foreign investment does not erode national control over strategic sectors.
4. Increasing Domestic Competitiveness as a Counterbalance to Globalization
   - Structural reform, improving human resource quality, and strengthening innovation are key to increasing national competitiveness.
   - High competitiveness will strengthen a country's bargaining position in international trade forums and reduce dependency.
5. Utilizing PCA as a Tool for Evaluation and Mapping Economic Risk
   - Governments and research institutions can use PCA to map structural pressures on economic sovereignty and classify countries based on their level of vulnerability.
   - This is crucial to support the formulation of evidence-based policies that are responsive to global dynamics.

REFERENCES

1) APEC Policy Support Unit. (2018). APEC regional trends analysis: Structural reform and trade. APEC Secretariat. Retrieved from https://www.apec.org
2) Asian Development Bank. (2022). Asian development outlook 2022: Mobilizing taxes for development. ADB. Retrieved from https://www.adb.org/publications

3) APEC Secretariat. (2023). APEC Economic Policy Report 2023. Singapore: Asia-Pacific Economic Cooperation.
4) Balassa, B. (1961). The Theory of Economic Integration. Homewood, IL: Richard D. Irwin.
5) Bhagwati, J. (2004). In Defense of Globalization. Oxford University Press.
6) BPS–Statistics Indonesia. (2024). Indonesia Trade Statistics with APEC Countries. Jakarta: BPS.
7) Chang, H.-J. (2002). Kicking Away the Ladder: Development Strategy in Historical Perspective. London: Anthem Press.
8) Drysdale, P., & Armstrong, S. (2010). Asia's Response to the Global Financial Crisis. ADBI Working Paper Series.
9) Dos Santos, T. (1970). The structure of dependence. American Economic Review, 60(2), 231–236.
10) Frankel, J. A., & Romer, D. H. (1999). Does Trade Cause Growth? American Economic Review, 89(3), 379–399. https://doi.org/10.1257/aer.89.3.379
11) Global Competitiveness Report. (2023). World Economic Forum. Geneva: WEF.
12) Helleiner, E. (1994). States and the reemergence of global finance: From Bretton Woods to the 1990s. Cornell University Press.
13) Higgott, R. (1998). The Pacific and Beyond: APEC and the New Regionalism. Review of International Studies, 24(1), 91–109.
14) Indonesian Ministry of Trade. (2024). Annual Trade Report. Jakarta: MoT.
15) Indonesian Presidential Secretariat. (2025). Speech at the APEC Summit in Gyeongju. Jakarta: Sekretariat Presiden.
16) Jolliffe, I. T. (2002). Principal Component Analysis (2nd ed.). New York: Springer.
17) Kamaludin, A. (2020). Foreign Investment and Competitiveness in the Asia-Pacific Region. Journal of Economic Policy and Development, 8(3), 210–225.
18) Krugman, P. R., & Obstfeld, M. (2009). International Economics: Theory and Policy (8th ed.). Boston: Pearson.
19) Laporan Tahunan APEC. (2023). Dokumen Resmi APEC. Singapore: APEC Secretariat.
20) Laporan World Bank. (2023). Indonesia Economic Prospects. Washington, DC: World Bank.
21) Mahani, Z. A., & Lim, H. (2002). The APEC Trade Liberalization Agenda: Challenges and Prospects. Asian Economic Papers, 1(3), 1–28.
22) Mankiw, N. G. (2014). Principles of Economics (7th ed.). Boston: Cengage Learning.
23) McKinnon, R. I. (1991). The Order of Economic Liberalization: Financial Control in the Transition to a Market Economy. Baltimore: Johns Hopkins University Press.
24) OECD. (2020). Economic Outlook for Southeast Asia, China and India 2020. Paris: OECD Publishing.
25) Peraturan Presiden Republik Indonesia Nomor 18 Tahun 2020 tentang RPJMN 2020–2024.
26) Piketty, T. (2014). Capital in the Twenty-First Century. Cambridge: Harvard University Press.
27) Porter, M. E. (1990). The Competitive Advantage of Nations. New York: Free Press.
28) Ravenhill, J. (2001). APEC and the Construction of Pacific Rim Regionalism. Cambridge University Press.
29) Rodrik, D. (2007). One Economics, Many Recipes: Globalization, Institutions, and Economic Growth. Princeton University Press.
30) Rodrik, D. (2011). The globalization paradox: Democracy and the future of the world economy. W. W. Norton & Company
31) Santosa, B. (2018). Multivariate Statistical Methods. Yogyakarta: Graha Ilmu.
32) Stiglitz, J. E. (2002). Globalization and Its Discontents. New York: W.W. Norton & Company.
33) Todaro, M. P., & Smith, S. C. (2015). Economic Development (12th ed.). Boston: Pearson.
34) UNCTAD. (2021). World Investment Report 2021: Investing in Sustainable Recovery. Geneva: United Nations.
35) World Bank. (2023). World Development Indicators. Washington, DC: World Bank.

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