COMPARATIVE ANALYSIS OF TAX INCENTIVES FOR ELECTRIC VEHICLE AND ECONOMIC IMPACT ESTIMATION: IO ANALYSIS

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Abstract-The Indonesian government has set a Net Zero Emissions (NZE) target by 2060, requiring a transformation in both the energy and transportation sectors. A key strategy to achieve this goal is the acceleration of the Battery Electric Vehicle (BEV) ecosystem. To support this acceleration, the government has introduced three central tax incentive schemes: PPnBM DPP 0%, PPnBM DTP, and PPN DTP. The coexistence of these incentives raises questions regarding their effectiveness, especially amid budgetary constraints. This study aims to compare the three incentives to identify the most optimal scheme. A mixed-method approach is applied, combining qualitative interviews with quantitative analysis using the 2024 Input-Output Table updated through the RAS method. The findings show that PPnBM DTP as the most effective by yielding the highest economic output impact, aligning with tax authority perspectives and indicating its potential as an effective fiscal policy tool in future budget allocations.

***Keywords*: Electric Vehicle, Tax Incentives, Mixed Method, Input Output Analysis.**

1. INTRODUCTION

1.1 Research Background

Indonesia has set an ambitious Net Zero Emission (NZE) target by 2060, reaffirming its commitment to reducing greenhouse gas emissions and actively participating in the global climate mitigation agenda (Raihan et al., 2022). This commitment has been formalized through the ratification of the Paris Agreement via Law No. 16 of 2016, marking Indonesia's strategic shift towards a low-carbon economy (Utami et al., 2022). As part of this transition, the Indonesian government has undertaken various efforts toward energy transformation, particularly by reducing dependence on fossil fuels and accelerating the adoption of renewable energy and clean technologies.

One of the government's key initiatives in this regard is the issuance of Presidential Regulation No. 55 of 2019 on the Acceleration of the Battery Electric Vehicle (BEV) Program for Road Transportation, later amended by Presidential Regulation No. 79 of 2023 This regulation underscores the importance of accelerating BEV adoption as a central pillar of Indonesia's national energy transition strategy. BEVs are electric vehicles that operate entirely on battery power without internal combustion engines and are already widely available in Indonesia, Unlike other types of electric vehicles, such as Hybrid Electric Vehicles (HEV), Plug-in Hybrid Electric Vehicles (PHEV), and Fuel Cell Electric Vehicles

(FCEV) (Sudjoko, 2021). And thus, BEV is considered the most relevant electric vehicle (EV) technology for NZE realization. In particular, BEVs produce zero direct emissions and rely solely on electric power, making them more aligned with the NZE goal.

To reinforce this regulatory mandate, Presidential Regulation No. 79 of 2023 authorizes the government to provide a range of incentives to support BEV adoption, including fiscal incentives (Peraturan Presiden, 2023). In alignment with this mandate, the government has given three central tax incentives targeting BEVs: (1) the Government-Borne Value Added Tax (PPN DTP) regulated in Ministry of Finance Regulation (PMK) No. 38 of 2023; (2) the Government-Borne Luxury Tax (PPnBM DTP) under PMK No. 9 of 2024; and (3) the 0% Tax Base Luxury Tax (PPnBM DPP 0%) regulated in PMK No. 141 of 2021. These incentives are directed toward the same object, which is BEV, with the primary objective of lowering retail prices, enhancing consumer purchasing power, and expediting the transition to clean energy in the transportation sector.

Electric vehicle development is not only environmentally significant but also economically strategic. The automotive industry is one of Indonesia's largest manufacturing subsectors and plays a key role in the national economy. According to Hartoyo et al. (2023), Indonesia boasts the largest automotive market in ASEAN and has attracted USD 9 billion in foreign direct investment (FDI). In 2023 alone, the automotive sector contributed Rp311 trillion to GDP (approximately 1.5%) (Badan Pusat Statistik, 2025). More broadly, the parent sector, manufacturing, was responsible for 19% of GDP, underscoring its role as one of the primary engines of economic growth (Silaban & Irawan, 2024).

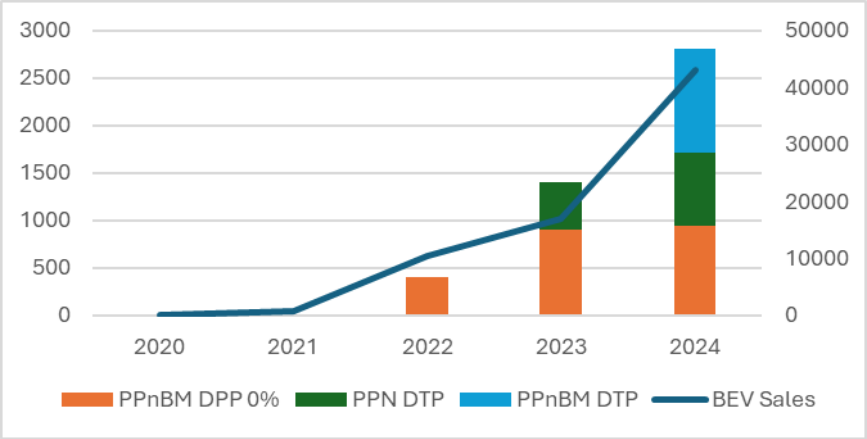

Figure 1. BEV Sales During The 2020–2024 Period In Conjunction With Tax Incentives
Source: (Rajendra, 2025) and DJSEF Ministry Of Finance

The rapid growth of BEV sales within 5 year period in Indonesia as seen in figure 1, illustrates the potential of fiscal incentives to drive consumer behavior and stimulate market development. This increase is expected to be fueled by multiple factors, notably government interventions combined with the entry of firms such as Wuling and Hyundai into Indonesia's BEV market. This phenomenon is in line with the view of Aqmarina & Furqon (2020), who stated that fiscal incentives can influence household consumption and stimulate economic activity as a whole. Consequently, the significant increase in BEV sales represents a compelling subject of study, in understanding how different forms of fiscal incentive contribute to economic outcomes and helped in achieving national agenda to accelerate the use of BEV in Indonesia.

In the implementation of its governance, the Government of Indonesia must operate within constrained fiscal resources, this highlighted the importance of ensuring that every

policy and government expenditure must be both efficient and effective. As tax revenues are the primary source of funding for state budget, excessive or poorly targeted tax expenditures could compromise state budgetary priorities. With this concern in mind, the coexistence of three different central tax incentives for the same policy target raises concerns about their overall effectiveness and efficiency. it prompts the question, is the implementation of multiple fiscal instruments for a single objective optimal and which approach would yield greater impact?

To address these questions, the Input-Output approach, pioneered by Leontief, provides an analytical framework for assessing inter-sectoral relationships and estimating the multiplier effects of policy interventions across the economy (Malba & Taher, 2016). IO analysis could measure both direct and indirect impacts of a policy towards the economy of Indonesia. This methodology has been applied in various policy contexts, including Ariutama et al. (2021) on the 2018 Asian Games and Yusa (2021) on pandemic responses. Furthermore, a qulitative approach through interview with related policy maker could increase the comprehensiveness of the study.

Prior studies has explored the economic effects of fiscal incentives, but few studies have done so in the context of BEVs especially through a comparative approach. For instance, Silaban & Irawan (2024) used IO analysis to evaluate the impact of housing and automotive tax incentives during the COVID-19 recovery period. Meanwhile, Firdiansyah & Gultom (2023) used CGE-GTAP model to evaluate electric vehicle tax incentives. However, studies specifically focused on comparative analyses of BEV tax incentives using mixed methods has not yet been explored. Addressing this research gap, this study aims to evaluate and compare Indonesia's three central tax incentives for BEVs through a mixed methods approach. The qualitative component involves interviews with relevant government officials to understand their policy preferences and rationale. Complementing this, the quantitative component uses the 2024 Input Output table, which updated through RAS method to simulate the economic impact of each incentive to Indonesia's economy. By integrating legal frameworks and macroeconomic analysis, this study aims to provide comprehensive assessment of which fiscal instrument is most effective and in accelerating BEV adoption in Indonesia while still keeping in consideration the impact to Indonesia's economy. The findings of this study are expected to inform policymakers on optimal fiscal strategies and contribute to broader discussions on sustainable development, industrial transformation, and green fiscal policy.

1.2 Literature Studies And Hypothesis

1.2.1 Fiscal Policy

Fiscal policy is an instrument used by governments to regulate the economy through the management of public revenue and expenditure (Silalahi & Ginting, 2020). Fiscal policy can be implemented by increasing public spending, providing subsidies, and reducing tax to stimulate economic activity. Studies have shown that effective fiscal policy could lead to an increase in investment, consumption, and household purchasing power, and thus contribute to a sustainable economic growth (Aqmarina & Furqon, 2020).

1.2.2 Theory Of Economic Growth

Economic growth is an indicator used to assess a country's development. It reflects the increase in national production capacity, as demonstrated by the year-over-year rise in Gross Domestic Product (Simanungkalit, 2020). This growth in GDP indicates a country's ability to sustainably provide a wide range of economic goods and services for its citizen (Halim,

2020). Conceptually, the GDP of a country can be calculated using the expenditure approach, and formulated as:

$$Y = C + I + G + NX$$

With household consumption symbolized as C, investment as I, government expenditure as G, net exports as NX, and national output as Y. In this context, fiscal incentives fall under government expenditure, realized through tax expenditure policies. Through this formula, an increase of tax expediture would lead to an increase of national output or GDP. As such, tax incentives will stimulate national output and fostering more sustainable economic growth.

1.2.3 Input Output Model

Input output analysis is a method used to understand the interlinkages between economic sectors within a specific period, that was first introduced by Wassily Leontief in the 1930s (Rahmawan & Angraini, 2021). These intersectoral linkages are crucial, as each sector relies on other sectors either as suppliers of input or as consumers of its output. In the context of economic policy, IO analysis provides deeper insights into the comprehensive impact of a policy intervention on the economy. Based on the established theories, including fiscal policy, economic growth, general equilibrium, and input output model, suggests that government intervention, such as tax incentives can stimulate overall economic activity via intersectoral linkage. The quantitative phase of this study, therefore assumes **H1** : Electric Vehicle incentives would increase the overall economic activity and **H0** : Electric Vehicle incentives would not increase the overall economic activity. The hyphothesis would then be answered through quantitative analysis and suggests which incentives is the most effective by comparing the increase of economic activity.

2. RESEARCH METHODOLOGY

This study adopts a mixed methods approach, integrating both qualitative and quantitative approach within an unified research framework (Puspitasari et al., 2024). Mixed methods are particularly useful when addressing complex phenomena that requires both interpretive and empirical insights. To guide the research process, this study uses Exploratory Sequential Design. A design that begins with qualitative phase to explore and understand the problem in depth, followed by a quantitative phase to validate the findings and estimate the economic impact (Creswell & Clark, 2018).

2.1 Data Source

This study utilized both primary and secondary data sources. The primary data was obtained through expert interviews as listed in Table 1 and conducted during the qualitative phase, providing first-hand insights into the rationale behind fiscal incentives. Meanwhile, the secondary data was collected from various official documents and statistical publications. These included tax expenditure report from Directorate General of Fiscal and Economic Strategy, relevant regulation documents, the 2020 IO table, and the 2024 Gross Domestic Product (GDP) at constant prices as published by the Central Bureau of Statistics.

Table 1 Lists of Informants

No	Position	Code
1	Policy analyst, Directorate General of Taxes	XYZ-DJP
2	Policy Analyst, Directorate General of Fiscal and Economic Strategy	ST-DJSEF

Source: Data Processed, 2025

2.2 Data Analysis

2.2.1 Qualitative Phase

In the qualitative phase, this study aims to understand the rationale and strategic preferences of the three types of central tax incentives for BEV, namely PPN DTP, PPnBM DTP, and PPnBM DPP 0%. To gather relevant insights, data collection was carried out through semi-structured interviews with policymakers related with the fiscal incentive policies for electric vehicles in Indonesia.

The informants were selected using purposive snowball sampling technique. Purposive sampling allows the researcher to select informants with specific characteristics relevant to the study, while snowball sampling enables the expansion of respondents through recommendations by earlier participants (Lenaini, 2021). The interviews continued until data saturation was reached when additional interviews no longer generated new insights.

The data analysis in this study follows the approach developed by Miles and Huberman, as cited in (Yusuf, 2014), which consists of three main stages: data reduction, which involves selecting and filtering relevant information; data display, which organizes information to facilitate the identification of thematic relationships; and conclusion drawing, where interpretations and final insights are derived from the presented data. Throughout this process, Nvivo 12 software was utilized to assist in coding, categorizing, and visualizing qualitative data.

2.2.2 Quantitative Phase

The second phase of this study uses a quantitative approach using input output analysis, a parametric method used to evaluate the macroeconomic impacts of fiscal interventions. Originally introduced by Leontief in the 1930s, this method is designed to examine the intersectoral relationships within an economy and measure how changes in final demand, such as government expenditure influence output across various sectors (Rahmawan & Angraini, 2021). In this study, IO analysis was utilized to estimate the output effects of three types of fiscal incentives applied to the manufacturing sector. The analysis was based on the 2020 IO table, which was updated to 2024 using RAS method to reflect the targeted year economic structure.

RAS method is an estimation model used to update IO tables from a base year to a target year (Zendrato et al., 2020). It works by adjusting the input coefficient matrix also known as technology matrix, so that it remains consistent with the total input and total output of the target year (Yanti, 2015). RAS method relies on the technology matrix of the reference year as a baseline to estimate the updated technology matrix (Mumtaz & Sukarsih, 2022).

IO analysis used in this study includes both linkage analysis and dispersion analysis, based on the updated 2024 IO table. Linkage analysis was utilized to assess intersectoral relationships within the economy and to understand the degree of economic interdependence reflected in the table (Pitaloka et al., 2020). Dispersion analysis complemented the linkage analysis by normalizing the level of the relationships across sector (Rafiqah et al., 2018).

Thereby, the dispersion analysis could identificate leading sectors within the national economy (Junari et al., 2020).

Additionally, IO analysis also includes output multipliers and economic impact analysis of each fiscal incentive independently. This approach could provide a comparative evaluation of the economic effectiveness of each policies, in order to determine which fiscal instrument holds the greatest impact to stimulate output. The economic impact assessment quantified the total effect of the government's fiscal incentive shocks on the output of each sector and the economy (Silaban & Irawan, 2024).

3. RESULT AND DISCUSSION

3.1 Qualitative Result

3.1.1 Incentives Background

Among the three fiscal incentives examined in this study, the PPnBM DPP 0% incentive was the Indonesian government's initial fiscal policy aimed at accelerating the adoption of battery electric vehicles. This incentive was Enacted through PMK No. 141/2021 and based on PP No. 73/2019 and later amended by PP No. 74/2021. This policy was part of a broader luxury tax restructuring toward environmental alignment and BEV development. Under this restructuring, the tax burden was adjusted based on emissions, engine volume (cc), and fuel efficiency, making BEVs especially those under the Low Carbon Emission Vehicle (LCEV) program subject to the lowest luxury tax (15% with 0% tax base). This was conveyed by ST-DJSEF during the interview, as follows:

- *"Those are two overlapping policies. The first is the restructuring of the PPnBM tariff, which is therefore more inclined towards supporting environmental issues, and the second is also one of the options to support the KBLBB ecosystem..."*

Following a decline in BEV sales in 2022 despite the implementation of the PPnBM DPP 0% policy, the Indonesian government introduced a second fiscal incentive, PPN DTP. This additional measure was intended to accelerate the development of the domestic electric vehicle ecosystem beyond the impact of PPnBM DPP 0%. The PPN DTP scheme was formally enacted through PMK No. 38/2023, targeting domestically produced BEVs and electric buses that meet local content (TKDN) requirements. This rationale and strategic objective were conveyed by ST-DJSEF during the interview, as follows:

- *".... Well, after it was implemented here, the government saw that, oh, apparently to accelerate the aforementioned ecosystem, the existing incentives were not sufficient ... Therefore, in accordance with the President's directive, PMK 38 of 2023 was issued ...."*

The third incentive, PPnBM DTP, is distinct in its scope as it targets completely build up (CBU) imported BEVs and non-LCEV domestic BEVs with TKDN ≥ 20%. This policy emerged in response to stagnant investment in the electric vehicle sector. Notably, the PPnBM DTP incentive is bundled with 0% import duty, as stipulated in PMK No. 9/2024, which refers to PP No. 79/2023. this comprehensive incentive package was designed to enhance Indonesia's appeal to global electric vehicle manufacturers. Beneficiaries are obligated to begin domestic production in 2026–2027 matching the volume and specifications of the imported vehicles, as mandated in the Peraturan Menteri Investasi (2023). This strategic intent was elaborated by ST-DJSEF during the interview, as follows:

- *"However, up until 2024, investment has not increased. ... Thus emerged the PPnBM DTP incentive and 0% import duty. This is a package, for imported electric cars ... So it has already been mandated. It will only be utilized in 2024 and 2025, after which they must produce in accordance with what was imported."*

3.1.2 Comparison Between Incentives

a. Advantages and Disadvantages of the DPP 0% Scheme

The DPP 0% scheme, as a form of fiscal incentive governed under Government Regulation (PP), offers strong legal certainty but is constrained limited flexibility. From a policy standpoint, its primary limitation lies in its rigidity. Because any adjustment to the scheme typically requires amendments at the level of government regulation, the policy lacks adaptability to urgent market dynamics or policy developments. As such, the DPP 0% scheme is better suited for medium to long term incentives rather than short-term interventions.

From a fiscal perspective, the main drawback of this scheme is the loss of potential revenue. Since the incentive is granted through direct elimination of tax liability, no formal revenue is recorded in the state budget. Both ST-DJSEF and XYZ-DJP highlighted this unrecorded loss constitutes a disvantage compared to the DTP scheme, where revenue is still recorded before expenditure is made:

- *"... as for the PPnBM DPP 0%, it's more like, well, you don't pay, and we don't record it, so it's essentially a potential revenue loss ..."*
- *"The drawback of PPnBM 0% is, as mentioned earlier, the loss, a loss of revenue."*

However, the DPP 0% scheme offers an advantage in terms of legal certainty and policy continuity. its basis at the government regulation level ensures that the scheme is stable and less prone to abrupt changes, which supports long-term investment planning as stated by ST-DJSEF:

- *"The advantage of PPnBM 0%, in my opinion, is that it is legally more secure."*
- *"PPnBM is regulated under the Government Regulation, and that complies with regulation and its long-term nature is also an advantage."*

As highlighted by Dani & Rahayu (2025), legal certainty and consistent policy frameworks are essential for attracting investors, particularly in capital intensive sectors such as electric vehicles (EV). Zahna (2022) further argued that long-term fiscal incentives are more aligned with the goal of stimulating economic growth and investment. within this context, the DPP 0% scheme serves as a strategic policy tool that aligns with the fundamental philosophy of fiscal policy.

b. Advantages and Disadvantages of the DTP Scheme

Unlike the DPP 0% scheme, the DTP scheme is designed as a short-term and flexible policy instrument. It is regulated through Minister of Finance Regulations (PMK), which are comparatively easier to issue and amend. As such, the DTP scheme acts as a "last resort" fiscal policy tool, as stated by ST-DJSEF:

- *"... the DTP incentive is actually a last resort."*

However, this regulatory flexibility comes at the cost of legal certainty and policy sustainability. Since the DTP scheme is determined annually and lacks structural regulatory grounding, its continuity beyond the current fiscal year remains uncertain. A reduction in the certainty and continuity of fiscal policy may lead to a decline in investor interest (Dani & Rahayu, 2025) From an administrative perspective, the DTP scheme presents challenges. Since the incentive must be implemented and completed within a single fiscal year, it imposes additional administrative burden on tax authorities, particularly the Directorate General of Taxes (DJP), which must finalize and report the implementation within a tight timeframe, as stated by ST-DJSEF:

- *"However, since it must be completed within the fiscal year, the administration becomes quite complicated within the government. Later, the DJP must compile the*

records as quickly as possible at the end of the year so that they can be recorded as revenue for that year."

Despite these drawbacks, the DTP scheme offers an advantage with its simplified and flexible mechanism compared to typical fiscal incentives, which often require higher legislative or regulatory amendments. Moreover, from fiscal standpoint, DTP incentives are still recorded as state revenue before being expended as government expenditure, thereby assisting the Directorate General of Taxes in achieving its revenue targets. As noted by XYZ-DJP:

- *"The advantage of the DTP scheme is that it becomes state revenue..., helping the DJP determine whether the revenue target is achieved or not..."*

From a legal standpoint, the flexibility of the DTP scheme constitutes one of its strengths. Because DTP incentives can be granted through Ministerial Regulations, the government is able to deploy policies more rapidly without undergoing lengthy regulatory or legislative procedures. This regulatory agility enhances the responsiveness of fiscal instruments in addressing urgent economic or industrial needs. As emphasized by ST-DJSEF during the interview:

- *"The second, perhaps in terms of the fiscal year..., the advantage is that it can be flexible, we can provide it at any time"*

3.1.3 Conclusion of Qualitative Result

Based on the qualitative analysis of the DPP 0% and Government-Borne Tax (DTP) schemes, each scheme exhibits distinct advantages and limitations that are complementary in nature. The DPP 0% scheme offers greater legal certainty and policy continuity due to its legal foundation in Government Regulations, aligning with the perspectives of Dani & Rahayu (2025) and the fiscal incentive philosophy outlined by Zahna (2022). However, it suffers from fiscal drawbacks, such as loss of potential revenue, since the tax base is reduced directly and limited administrative flexibility due to its high regulatory basis tier.

Conversely, the DTP scheme whether in the form of PPnBM DTP or PPN DTP offers notable advantages in policy flexibility and supports revenue reporting. It can be implemented more promptly without requiring high level legal changes, making it well-suited for urgent fiscal interventions. This was affirmed by XYZ-DJP, who noted:

- *"... Well, from the perspective of the DJP, I think DTP is better."*

Nonetheless, the DTP scheme presents several weaknesses, notably its short-term orientation, as it is implemented through Ministerial Regulations without a stronger legislative basis. Additionally, it imposes an additional annual administrative burden due to the requirement of recording the incentive as fiscal revenue, a challenge that was highlighted during interviews with fiscal policy administrators.

Interestingly, from the policymakers' perspective, no single scheme is deemed universally superior. As stated by ST-DJSEF:

- *"... Logically, from a policy standpoint, I also cannot say which is the most beneficial ... which one is good—well, actually, all of them are good."*

This emphasizes the strategic function of each incentive PPnBM DPP 0%, PPnBM DTP, and PPN DTP depending on fiscal context and policy objectives. In conclusion, the qualitative findings suggest that these three central government tax incentives collectively support the development of Indonesia's electric vehicle ecosystem, with complementary roles and characteristics. Both informants conveyed conclusions that are generally aligned with the view of DJSEF, reinforcing the perspective of DJP, albeit with some nuances and differences. Both Informants insights serve as the foundation for the subsequent quantitative analysis,

which employs the 2020 IO Table, updated to reflect the economic structure of 2024 using the RAS method. The year 2024 was specifically chosen because all three incentive schemes were simultaneously active. The integration of qualitative and quantitative methods is expected to provide a comprehensive assessment of the effectiveness of fiscal incentives in accelerating the electric vehicle sector in Indonesia.

3.2 Quantitative Result

In order to update the 2020 IO Table, the RAS method was applied through 25 iterations of row and column adjustments. The RAS method estimates the target year technology matrix, representing the economic structure of 2024 in this case using GDP data for the target year and the base year technology matrix (Yanti, 2015). In this context, the technology matrix refers to the ratio of output from one sector used as input in another (Mumtaz & Sukarsih, 2022). Through these adjustments, the RAS method approximates the 2024 economic structure, particularly in terms of inter sectoral input output relationships, though the method remains a projection with inherent limitations. The update utilized constant price GDP data for 2024 to better capture output linkages without inflationary distortion. The adjusted 2024 IO Table projects a total input or output value of Rp 23,707 trillion in 2024.

Table 2 Linkage Analysis, Dispersion Analysis, and Output Multiplier Analysis

Sector	Linkage Analysis		Dispersion Analysis		Output Multiplier	Sector Priority
	FL	BL	FLI	BLI		
Agriculture, Forestry, and Fisheries	2,10280	1,37212	1,14380	0,74635	1,37212	III
Mining and Quarrying	2,53512	1,65943	1,37895	0,90263	1,65943	III
Manufacturing	4,77595	2,06739	2,59783	1,12453	2,06739	I
Electricity and Gas Supply	2,55089	2,86233	1,38753	1,55693	2,86233	I
Water Supply; Waste Management, Remediation, and Recycling	1,01987	1,75218	0,55475	0,95308	1,75218	IV
Construction	1,39627	2,11557	0,75949	1,15075	2,11557	II
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	2,23271	1,53504	1,21446	0,83497	1,53504	III
Transportation and Warehousing	1,86749	2,00550	1,01580	1,09087	2,00550	I
Accommodation and Food Service	1,26315	2,00851	0,68708	1,09251	2,00851	II
Information and Communication	2,55474	1,69633	1,38962	0,92270	1,69633	III
Financial and Insurance Service	1,72865	1,38864	0,94028	0,75533	1,38864	IV
Real Estate	1,19536	1,45472	0,65021	0,79128	1,45472	IV
Business Services	1,66581	1,79451	0,90610	0,97610	1,79451	IV
Public Administration, Defense, and Compulsory Social Security	1,10772	1,94041	0,60253	1,05546	1,94041	II
Education	1,06225	1,56402	0,57780	0,85073	1,56402	IV
Health and Social Work	1,03909	2,18306	0,56520	1,18745	2,18306	II
Other Services	1,15556	1,85372	0,62856	1,00831	1,85372	II

3.2.1 Linkage Analysis

The forward linkage (FL) analysis derived from the 2024 input output Table is presented in Table 2. Forward linkage indicates the extent to which an increase in final demand in one sector stimulates output across other sectors (Salsabila et al., 2022). In 2024, the manufacturing sector recorded the highest FL value at 4.77, indicating that a Rp1 million increase in its final demand would generate a total output increase of Rp4.77 million across the economy. Conversely, the water supply, waste management, and recycling sector exhibited the lowest FL value, at 1.02, suggesting weak downstream integration as its outputs are less utilized by other sectors in production processes. This results are in line with the study done by Silaban & Irawan (2024) which states manufacturing sector as the highest sector in FL Value. The average FL across all sectors stood at 1.83, with ten sectors falling below and seven sectors exceeding this benchmark.

The backward linkage (BL) analysis, presented in Table 2, measures a sector's capacity to stimulate output production from its upstream sectors (Salsabila et al., 2022). Although not the highest, manufacturing sector demonstrated a high BL value of 2.067, exceeding the average. This indicates that a Rp1 million increase in final demand for manufacturing sector would lead to a Rp2.067 million increase in total upstream output in 2024. The highest BL value was observed in the electricity and gas supply sector at 2.86, showcasesing its extensive input demands from other sectors. In contrast, the lowest BL value was observed in the agriculture, forestry, and fisheries sector at 1.37, reflecting its limited interconnection with upstream sectors. The average BL value is 1.83, with nine sectors falling below and eight sectors exceeding this benchmark.

3.2.2 Dispersion Analysis

The Forward Linkage Index (FLI), also known as sensitivity index, is presented in Table. This value measures the extent of a sector responses to changes in final demand relative to the average responsiveness across the entire economy (Nugroho, 2021). A sector with FLI value greater than 1 is considered more sensitive than average, indicating a stronger capacity to stimulate downstream economic activities.

In 2024, the manufacturing sector recorded the highest FLI at 2.59. Highlighting the sector's pivotal role in driving forward industrial linkages, as increased final demand for manufacturing products leads to a higher increase in output across other sectors. Studies done by Pitaloka et al. (2020), similar results have been concluded, stating maufacturing sector as the highest sector in sensitivity index, sugesting this sector plays a pivotal role in the economy. In contrast, the water supply, waste management, and recycling sector exhibited the lowest FLI, at 0.55, indicating low downstream integration and limited responsiveness to changes in final demand. Overall, seven out of the 17 sectors had FLI values above the average, while the remaining ten sectors fell below the mean value of 1.

Meanwhile, the Backward Linkage Index (BLI), also referred to as dispersion index, quantifies a sector's ability to stimulate output in its input supplying sectors when its own final demand increases (Mumtaz & Sukarsih, 2022). A BLI value greater than 1 signifies above average backward linkages, reflecting a sector's capacity to foster upstream economic activity.

In 2024, the manufacturing sector exhibited a BLI value of 1.12, indicating moderately strong connections with its upstream suppliers and confirming its positive contribution to upstream economic activity. Although not the highest, this value still places manufacturing above the average benchmark of 1.00, reaffirming its strategic importance within Indonesia's economic structure. The highest BLI value was observed in the electricity

and gas supply sector, with a value of 1.55, highlighting its significant reliance on inputs from other sectors. In contrast, the agriculture, forestry, and fisheries sector had the lowest BLI value at 0.74, suggesting weaker backward linkages and limited capacity to drive upstream production. Of the 17 sectors, eight exceeded the average BLI value, while nine fell below.

Based on both the Forward Linkage Index and Backward Linkage Index, sectors can be classified into four priority groups reflecting their economic significance in terms of dispersion and sensitivity effects. Afandi (2023) categorizes sectors as follows: (1) Priority I, with both FLI and BLI greater than one, indicating strong upstream and downstream linkages; (2) Priority II, with FLI below one but BLI above one, strong in sourcing inputs but weak in stimulating downstream sectors; (3) Priority III, with FLI above one but BLI below one, effective in driving downstream growth but limited in upstream demand generation; and (4) Priority IV, with both indices below one, showing weak intersectoral linkages in both directions.

Table 2 presents the sectoral classification based on this framework. Notably, three sectors fall under Priority I, namely: manufacturing, electricity and gas supply, and transportation and warehousing. These sectors are considered leading sector of the economy, as they not only generate substantial downstream output but also stimulate upstream production more effectively than other sectors (Afandi, 2023). Government intervention in this sector can yield significant multiplier effects throughout the economy. Similar results are stated in studies done by (Nugroho, 2021), which state manufacturing sector and also electricity and gas supply sector as the leading sector of indonesia's economy.

3.2.3 Economic Impact Analysis

Table 3 Economic Impact Analysis (in Million Rupiah)

Sector	Shock			Output Increase		
	PPN DTP	PPnBM DTP	PPnBM 0%	PPN DTP	PPnBM DTP	PPnBM 0%
Agriculture, Forestry, and Fisheries	-	-	-	171.304	241.970	208.585
Mining and Quarrying	-	-	-	118.133	166.865	143.842
Manufacturing	774.700	1.094.280	943.297	1.062.849	1.501.297	1.294.156
Electricity and Gas Supply	-	-	-	26.088	36.850	31.765
Water Supply; Waste Management, Remediation, and Recycling	-	-	-	233	329	284
Construction	-	-	-	6.286	8.879	7.654
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	-	-	-	87.647	123.804	106.722
Transportation and Warehousing	-	-	-	37.911	53.551	46.162
Accommodation and Food Service	-	-	-	3.481	4.917	4.238
Information and Communication	-	-	-	32.961	46.559	40.135
Financial and Insurance Service	-	-	-	28.543	40.318	34.755
Real Estate	-	-	-	4.660	6.583	5.675
Business Services	-	-	-	15.547	21.960	18.930
Public Administration, Defense, and Compulsory Social Security	-	-	-	1.935	2.734	2.357
Education	-	-	-	1.059	1.496	1.290
Health and Social Work	-	-	-	845	1.194	1.029
Other Services	-	-	-	2.120	2.994	2.581
Total Output Increase				1.601.605	2.262.301	1.950.160

The economic shock in this analysis is based on the realized fiscal expenditures for three tax incentives in 2024: IDR 774 billion for the PPN DTP, IDR 1.094 trillion for the PPnBM DTP, and IDR 943.297 billion for the PPnBM DPP 0%. All three incentives targeted the same sector, manufacturing. The results demonstrate that these incentives generate greater economic output than the fiscal cost incurred, supporting the theory that government expenditure, such as BEV-related incentives, positively contributes to GDP growth (Mankiw, 2016). Through economic impact analysis, can be seen each electric vehicle incentives have a positive impact in indonesia's economy, fostering growth and can be concluded that H0 is rejected.

The most significant increase in output growth occurred in the manufacturing sector, followed by agriculture, forestry, and fisheries sector, mining and quarrying sector, also wholesale and retail trade; repair of motor vehicles and motorcycles sector. These sectors are, indicating strong intersectoral linkages with manufacturing. Conversely, sectors such as other services sector, public administration, defense, and compulsory social security sector, and education sector experienced the smallest output increases. This outcome is consistent with general equilibrium theory, which posits that shocks in one sector can propagate to others, with the strength of impact determined by intersectoral linkages (Sya'diah, 2021). In this context, the manufacturing sector demonstrated connectivity with all 17 sectors in the 2024 Input Output Table.

For comparative purposes, each incentive was analyzed independently. As stated on Table 3, the PPN DTP incentive generated additional output of IDR 1.601 trillion, PPnBM DTP generated IDR 2.262 trillion, and PPnBM DPP 0% generated IDR 1.950 trillion. These variations are primarily due to the magnitude of the fiscal shock, which depends on both tax rates and the number of eligible taxpayers, as each scheme entails different administrative requirements. The quantitative analysis thus concludes that the PPnBM DTP scheme has the highest impact on economic output, with an additional output of IDR 2.262 trillion or a 0.00954% increase. This result is consistent with the qualitative insights from XYZ-DJP, which also view DTP schemes as generally more favorable than DPP based mechanisms.

4. CONCLUSION

This study finds that both the Government-Borne Tax (DTP) scheme and the 0% Taxable Base (DPP) scheme align with the philosophy of fiscal incentives, which are intended to stimulate economic growth and investment. Conceptually, the DPP 0% scheme provides greater legal certainty and long-term stability for investors. However, qualitative insights reveal differing perspectives among policymakers. informant from the Directorate General of Taxes favored the DTP scheme due to its potential to increase tax revenue, while informant from the Directorate General of Fiscal and Economic Strategy emphasized that each scheme has distinct merits and cannot be compared absolutely. It can thus be concluded that DJSEF's perspective is generally aligned with that of DJP, reinforcing DJP's view, albeit with some differences.

The input output analysis reveals that the manufacturing sector, the primary recipient of incentives studied, are one of the highest intersectoral linkage across Indonesia's economy, with a forward linkage value of 4.77, backward linkage of 2.06, a forward linkage index (FLI) of 2.59, and a backward linkage index (BLI) of 1.12. This indicates that manufacturing effectively drives downstream growth while attracting upstream sectoral activity.

The analysis further confirms that all three incentives, PPN DTP, PPnBM DTP, and PPnBM DPP 0% contribute positively to national economic output with the PPnBM DTP

scheme yields the highest additional output, generating IDR 2.262 trillion or a 0.00954% increase in national output. This result is also supported by the qualitative findings from DJP, which emphasized the relative superiority of DTP-based schemes. In conclusion, while all three incentives contribute positively to the economy, PPnBM DTP stands out as the most effective in driving output growth. Nonetheless, all schemes remain relevant for accelerating the adoption of electric vehicles in Indonesia.

Based on this research results, this study recommends prioritizing the PPnBM DTP scheme as the central fiscal instrument moving forward, as it delivers the highest economic return relative to budgetary cost. In the medium term, the government should consider gradually phasing out less cost-effective incentives, such as PPN DTP if fiscal constraints intensify. Streamlining ineffective schemes would help optimize public spending and ensure the continued focus on economically beneficial incentives.

5. LIMITATION

This study has several limitations that suggest avenues for future studies. The qualitative analysis focuses solely on government perspectives. Future studies should incorporate private sector perspective such as GAIKINDO or firms utilizing the incentives to provide a more comprehensive view of the incentives effectiveness.

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