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The Impact of VAT Exemption Incentives on the Indonesian Blue Economy

* Email: researchbayu@gmail.com

* Jl. Bintaro Utama 5, Jurang Manggu Tim., Kec. Pd. Aren, Kota Tangerang Selatan, Banten 15222

This study measures the impact of VAT incentives on marine and fisheries activities within the blue economy, focusing on the agriculture, forestry, and fisheries industry in 2023 and 2024. The analysis uses an input–output model based on the 2020 Indonesian IO Table (17 sectors) from Statistics Indonesia (BPS), which was updated to 2023 and 2024 using the RAS method. The Directorate General of Economic and Fiscal Strategy (DJSEF) provided VAT incentive data through the 2024 Tax Expenditure Report. The results show that the agriculture, forestry, and fisheries industry recorded an FL value of 2.681 and a BL value of 1.361 in 2023, increasing to 2.704 (FL) and 1.363 (BL) in 2024. The sector's FLI was 1.438 and its BLI 0.730 in 2023, and 1.446 (FLI) and 0.729 (BLI) in 2024, placing it in priority level III. In 2023, VAT incentives for marine and fisheries activities totaling IDR 22,155 billion generated an output multiplier of IDR 30,155.04 billion across all sectors. In 2024, incentives amounting to IDR 23,598 billion are projected to produce an output multiplier of IDR 32,159.37 billion. These multipliers correspond to potential VAT generation of IDR 2,330.90 billion in 2023 and IDR 2,485.83 billion in 2024. The results are expected to support the government's decision to maintain and expand incentive policies and encourage the optimization of the blue economy through complementary policy measures.

Keywords: blue economy, tax incentive, input-output model, VAT, RAS, Indonesia

JEL Classification : C67, H25, Q22, Q28, O41

1. INTRODUCTION

Global Maritime Axis is a grand ambition to realize Indonesia as a sovereign nation based on marine resources (Dahuri, 2023). Indonesia's marine resources are extraordinary, with a sea area of 6.4 million km2, making Indonesia the fifth-largest maritime nation in the world (Kementerian Koordinator Bidang Kemaritiman dan Investasi, 2018). Indonesia's marine wealth offers numerous opportunities, including marine biological and non-biological resources, industry, tourism, transportation, and logistics (Pane et al., 2021). Some particularly promising marine resources are in the fisheries sector, which includes fish farming and fishing. According to data from Statistics Indonesia (2025a), total capture fisheries and aquaculture production in 2023 reached 7,845,600 tons and 15,361,420 tons, respectively.

Indonesia's abundant marine resources offer significant development potential. Based on its contribution to the Indonesian economy, the maritime sector contributed an average of 7.71% of Gross Domestic Product (GDP) from 2017 to 2021 (Badan Pusat Statistik, 2023). Meanwhile, Indonesia has a relatively high target for 2045: to achieve a per capita income equivalent to that of developed countries, with a maritime GDP contribution of 15% (Sekretariat RPJPN 2025-2045, 2025). On the other hand, the utilization of existing marine resources shows low activity sustainability due to unsustainable fishing practices (Pane et al., 2021). This is demonstrated by the Ocean Health Index (OHI), which ranks Indonesia 168th out of 220 countries with a score of 66 out of 100, which is lower than the global average of 72 (Ocean Health Index, 2026).

To address this challenge, the concept of a blue economy emerged amidst Indonesia's abundant marine resource potential. The blue economy encompasses the sustainable use of marine resources for economic growth, improved livelihoods, and employment, while maintaining the health of marine ecosystems (World Bank, 2017). The blue economy has the potential to transform the Indonesian economy, encompassing both biological and non-biological sectors such as fisheries, aquaculture, processing, chemical, and shipbuilding industries, which drive added value, job creation, integration into global value chains, and contribute to climate change mitigation (Pane et al., 2021). In line with this, the Indonesian government is providing a Value Added Tax (VAT) exemption on goods produced from marine and fisheries business activities. This incentive is based on Government Regulation (PP) Number 49 of 2022, which aims to encourage the growth and development of business activities in the marine and fisheries sector, thereby contributing significantly to Indonesia's GDP. This VAT exemption is granted for imports and/or deliveries of fishing and cultivation activities, including shrimp, ornamental and non-ornamental fish, seaweed, shellfish, oysters, mussels, crabs, blue swimming crabs, sea cucumbers, lobsters, squid, cuttlefish, octopus, snails, and artemia (Peraturan Pemerintah Nomor 49 Tahun 2022, 2022).

The VAT exemption incentive on marine and fisheries products is intended to encourage blue economy activities by allocating tax expenditures to the agriculture, forestry, and fisheries sectors (GDP by business sector). Based on data from the 2024 Tax Expenditure Report, tax expenditures for these incentives constitute the third-largest share of VAT and Sales Tax on Luxury Goods tax expenditures, after exemptions for MSMEs and VAT exemptions for necessities. This figure is quite impressive, reaching IDR 23,598 billion, a 6.5% increase compared to IDR 22,155 billion in 2023 (Direktorat Jenderal Strategi Ekonomi dan Fiskal, 2025).

The government's increased attention to the blue economy places a significant burden on this sector to contribute more to the economy. This is because the greater the government's incentives, the more tax revenue it collects that is not earned. On the other hand, Indonesia's tax revenue currently faces several challenges, such as (1) Indonesia's less than ideal tax ratio, which is 10.14% in 2023 and 10.43% in 2024 (minimum 15% according to the IMF) (Badan Pusat Statistik, 2024); and (2) Indonesia's VAT c-efficiency value is recorded at only 0.53, 0.17 points lower than the average of neighboring countries (The Prakarsa, 2024). This means Indonesia can collect only 53% of the total

VAT that should be collected. Furthermore, if this incentive is removed, there is actually a potential increase in VAT revenue by 0.7% of GDP.

Given these issues, study into the economic impact of providing VAT exemptions for marine and fisheries business activities on the blue economy in Indonesia is urgent. This is so the government can determine whether this policy is appropriate and has a tangible impact on the economy, given the significant potential for uncollected VAT revenue. To evaluate the economic impact, this study uses input-output analysis for several reasons. First, input-output analysis can measure short-term economic impacts (Ariutama et al., 2021). Second, input-output analysis can comprehensively illustrate the interrelationships among economic sectors, using statistical data that demonstrate reciprocal relationships between sectors. Third, input-output analysis can illustrate the multiplier effect a policy has on one industrial sector on other industrial sectors. Fourth, simulation results and economic analysis from input-output analysis can provide important information for planning and policymaking for Indonesia's economic development (Badan Pusat Statistik, 2025b).

Input-output research in the blue economy sector (agriculture, forestry, and fisheries) has been conducted several times in Indonesia. However, there are still research gaps that need to be addressed. Furthermore, research specifically addressing VAT exemption incentives for goods produced by marine and fisheries businesses nationally is scarce and/or has never been conducted in Indonesia. Anggraeni et al. (2020) examined the role of the fisheries sector in Natuna Regency's economy using a scalogram and the 2017 Input-Output Table. The results indicate that the fisheries sector is not yet a leading sector capable of directly driving the economy in Natuna Regency. Meanwhile, Tipka & Silooy (2022) examined the impact of the fisheries sector on Maluku's economy. The results showed that the fisheries sector significantly impacts the Maluku Province economy. Furthermore, these studies do not reflect the current situation in the respective years of the research because they did not use the most recent Input-Output Table.

This study uses the 2020 Input-Output Table, processed using the Recursive Algorithm Substitution (RAS) method. The RAS method is a technique for estimating the technology matrix for a given year by referring to the previous year's matrix (Stone & Brown, 1962). By applying this method, an Input-Output (IO) Table can be generated that reflects the economic conditions in the analysis year (Zendrato et al., 2020). This research period covers 2023 and 2024, with the primary focus on evaluating the impact of incentives after the enactment of Government Regulation No. 49 of 2022. In addition, this study aims to examine economic conditions after the COVID-19 pandemic amid the dynamics and turmoil of the global economy. Thus, this study is expected to answer several main questions, namely: (1) How is the analysis of the linkage of the agriculture, forestry, and fisheries sectors in 2023 and 2024? (2) How is the analysis of the distribution of the agriculture, forestry, and fisheries sectors in 2023 and 2024? (3) How is the analysis of the output multiplier of the agriculture, forestry, and fisheries sectors after the VAT exemption incentive for marine and fisheries products in 2023 and 2024? Moreover, (4) How is the potential VAT on the economic impacts that will arise in 2023 and 2024?

The results of this study are expected to provide theoretical benefits by adding to the research literature related to the analysis of the impact of tax incentives in the agriculture, forestry, and fisheries sectors. In practice, this study is expected to assess the economic impact of tax incentives on the blue economy amid Indonesia's tax challenges.

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2. LITERATURE REVIEW

Blue Economy

The concept of the blue economy in Indonesia encompasses four aspects: (1) the economic aspect by improving the safety and efficiency of maritime activities; (2) the social aspect by ensuring a decent and sustainable livelihood for fishermen; (3) the blue economy contributing to sustainable development and the environment; and (4) increasing the resilience and sustainability of marine-based sectors by transforming them into catalysts for long-term shared prosperity (Pane et al., 2021). The blue economy itself encompasses two sector groups: existing sectors, which include capture fisheries and aquaculture, marine-based manufacturing, trade, maritime transportation and logistics, and marine tourism; and emerging sectors, which include renewable energy, biotechnology and the bioeconomy, research and education, and marine ecosystem conservation and services (Sapanli et al., 2018).

Building on Indonesia's vast marine potential, the development of the blue economy emerges as a strategic pathway to transform marine resources into sustainable and inclusive economic growth. However, this potential remains constrained by persistent challenges, including unsustainable fishing practices, limited downstream processing capacity, high production and logistics costs, and low value added in fisheries and marine-based industries (Pane et al., 2021). According to Keynesian theory, fiscal policy, through increased government spending or tax cuts, has a multiplier effect by stimulating aggregate demand (Aruan et al., 2023).Therefore, providing VAT exemptions can lower the tax burden along the production value chain, thereby increasing demand for these goods. As the blue economy develops and becomes more productive, diversified, and integrated into global value chains, it will ultimately broaden the tax base, increase economic activity, and contribute to higher and more sustainable state revenues in the medium to long term.

Tax Incentives

Tax incentives are special provisions within tax regulations that can include tax exemptions, tax credits, tax rate adjustments, or deferrals of tax obligations (Kartiko, 2020). Tax incentives are also part of fiscal policy aimed at reducing the tax burden in specific sectors, with the hope of stimulating economic growth through various positive impacts. These impacts can include increased investment, the development of specific industrial sectors, and increased company competitiveness in the global market. Through tax incentives, the government seeks to stimulate sustainable economic activity and improve overall public welfare (Mohammad et al., 2021). One interesting example of a tax incentive is the VAT exemption for goods produced by fisheries and maritime businesses. The government provides this VAT incentive by allocating the potential VAT exemption as tax expenditure.

General Equilibrium Model and Input-Output Analysis

The applied general equilibrium (AGE) model is an analytical tool that can be used to bridge the relationship between macroeconomics and microeconomics (Hulu, 1995).This role as a "bridge" allows for observation of the impact of government policies at the micro level on the overall market within the macroeconomy (Puspitosari, 2010).This model is considered the most relevant approach for analyzing the influence of government economic policies on the overall economy (Robinson & Roland-Holst, 1988).

Input-output analysis is part of the applied general equilibrium (AGE) model that can be used to assess the impact of government policies. This concept was first proposed by Wassily Leontief in 1952 (Miller & Blair (2009, cited in Silaban & Irawan, 2024)). The purpose of this analysis is to understand the interrelationships between economic sectors and the efforts required to maintain market equilibrium (Suryani (2013), cited in Silaban & Irawan, 2024)).

3. METHODOLOGY

This study uses a quantitative approach based on a general equilibrium model via input-output analysis. The research data includes secondary data: the 2020 Indonesian IO Table (covering 17 sectors) and 2023 and 2024 GDP at current prices, obtained from the Statistics Indonesia (BPS). Meanwhile, VAT exemption data for goods resulting from marine and fisheries business activities was obtained from the 2024 Tax Expenditure Report by the Directorate General of Economic and Fiscal Strategy (DJSEF). In this study, the RAS method was used to adjust the 2020 Indonesian Input-Output (IO) Table to reflect economic conditions in 2023 and 2024. The results of updating the 2023 and 2024 IO Tables using the RAS method provide total output information of IDR 38,268,767.1 billion and IDR 40,748,733.7 billion, respectively. The projection results show increases of 33.34% and 41.98% in total output compared to 2020.

The input-output analysis in this study is grouped into several stages: updating the 2020 IO Table to the 2023 and 2024 IO Tables, analyzing the linkage and distribution of sectors in the 2023 and 2024 IO Tables, and analyzing the output multiplier and potential VAT from the shock of the VAT exemption incentive on goods produced by marine and fisheries businesses in 2023 and 2024, amounting to IDR 22,155 billion and IDR 23,598 billion, respectively.

Following Silaban & Irawan (2024), the RAS method begins by determining the technology matrix in the original year, $A(0)$, then calculating the number of intermediate inputs required to produce output in each sector and the total output demand between sectors in the target year, $X(1)$. Next, the input-output transaction row $U(1)$ is determined, which describes the total sector output used as input for all sectors. After that, the convergence value $(\varepsilon \leq 0{,}00001)$ is determined, and the calculation $U^1 = [A(0)X(1)]j$ is performed. The value of U^1 compared with $U(1)$ to test whether $|U^1 - U(1)| \leq 0{,}00001$; if it is not met, an adjustment is made with $R(1) = [U(1)][U^1]^{-1}$. The next step is to estimate the technology matrix $A(1) = R(1)A(0)$, then determine $V^1 = [A(1)X(1)]$ and compare it with V^1 to ensure whether $|V^1 - V(1)| \leq 0{,}00001$. If it is not met, an adjustment is made with $S(1) = [V(1)][V^1]^{-1}$. The estimation process then continues by calculating $A(2) = A(1)S(1) = R(1)A(0)S(1)$ and repeating until convergence is achieved. Once the iterations are complete and the results meet the criteria, the technology coefficient matrix containing the inputs is converted into a transaction matrix or Z matrix with $Z(n) = A(n)X(1)$.

After the 2023 and 2024 IO Tables are obtained, an analysis of direct and indirect linkages is performed, both forward linkage (FL) and backward linkage (BL). Linkage analysis is a fundamental concept in formulating economic development strategies, aiming to understand the relationships between sectors within an economic system (Sahara, 2017). The FL equation is decomposed as:

$$FL_i = \sum_{j=1}^{n} l_{ij} \quad \text{..... (1)}$$

meanwhile, the BL equation can be decomposed as:

$$BL_j = \sum_{i=1}^{n} l_{ij} \quad \text{..... (2)}$$

where l_{ij} = the inverse Leontief matrix of row i and column j.

Next, a distribution analysis is performed using the forward linkage index (FLI) and backward linkage index (BLI). Distribution analysis is a development of direct and indirect linkage analysis, both forward and backwards, to overcome the challenges of comparing sectors within the economy (Sahara, 2017). The FLI equation is broken down as:

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$$FLI_i = \frac{\sum_{j=1}^{n} l_{ij}}{\sum_{i=1}^{n} l_{ij} \sum_{j=1}^{n} l_{ij}} n \quad \ldots\ldots\ldots\

to the sector-wide average of 1.865, the BL value is smaller, while the FL value is larger. This condition indicates that the agriculture, forestry, and fisheries sector have a stronger linkage to the downstream sector than to the upstream sector in 2023.

In 2024, the agriculture, forestry, and fisheries sector had a FL value of 2.704. This condition indicates that a IDR 1 billion increase in final demand in this sector would increase total output across all industrial sectors by IDR 2.704 billion, with a direct impact of IDR 0.534 billion on the agriculture, forestry, and fisheries sector. Furthermore, this sector also has a BL value of 1.363. This condition means that a IDR 1 billion increase in final demand in the agriculture, forestry, and fisheries sector would increase output across all industrial sectors by IDR 1.363 billion, with a direct impact of IDR 0.206 billion on the agriculture, forestry, and fisheries sector. Compared to the sector-wide average of 1.869, the BL value is lower, while the FL value is higher. This situation indicates that the agriculture, forestry, and fisheries sector have a stronger linkage to the downstream sector than to the upstream sector in 2024.

The stronger linkage to the downstream sector in both 2023 and 2024 indicates that Indonesia's agriculture, forestry, and fisheries sector have significant potential to drive the downstream product industry. The blue economy, as a potential economic resource within this sector, particularly fisheries, can produce high-value derivative products. For example, we can process tuna, skipjack, and mackerel into fishmeal. Furthermore, seaweed can be processed into carrageenan and into alternative energy sources, such as biofuel, in Germany (Grahadyarini, 2024; Rachman, 2023). This condition will undoubtedly drive economic growth and state revenues, as the output produced is worth more.

TABLE-1: Results of the linkage analysis calculation for 2023 and 2024

Sectors		2023				2024			
		FL		BL		FL		BL	
		Direct	Total	Direct	Total	Direct	Total	Direct	Total
A	Agriculture, Forestry, and Fisheries	0.539	2.681	0.206	1.361	0.534	2.704	0.206	1.363
B	Mining and Quarrying	0.767	3.220	0.364	1.685	0.700	3.013	0.364	1.691
C	Processing Industry	2.827	6.305	0.614	2.100	2.834	6.403	0.614	2.107
D	Electricity and Gas Supply	0.637	2.263	0.789	2.751	0.640	2.296	0.789	2.785
E	Water Supply, Waste Management, and Recycling	0.012	1.014	0.377	1.792	0.012	1.014	0.377	1.794
F	Construction	0.283	1.374	0.611	2.184	0.289	1.382	0.611	2.193
G	Wholesale and Retail Trade; Automobile and Motorcycle Repair	0.085	1.137	0.299	1.565	0.085	1.139	0.299	1.566
H	Transportation and Warehousing	0.456	1.740	0.532	2.064	0.477	1.776	0.532	2.066
I	Provision of Accommodation, Food and Beverages	0.161	1.194	0.561	2.044	0.167	1.201	0.561	2.048
J	Information and Communication	0.623	2.010	0.380	1.727	0.631	2.034	0.380	1.726
K	Financial and Insurance Services	0.391	1.663	0.233	1.402	0.392	1.672	0.233	1.403
L	Real Estate	0.102	1.143	0.240	1.475	0.099	1.139	0.240	1.476
M,N	Corporate Services	0.414	1.639	0.452	1.838	0.432	1.671	0.452	1.838
O	Government Administration, Defense, and Compulsory Social Security	0.060	1.102	0.484	1.982	0.062	1.106	0.484	1.983
P	Education Services	0.039	1.052	0.298	1.594	0.039	1.053	0.298	1.595
Q	Healthcare Services and Social Activities	0.021	1.029	0.618	2.247	0.021	1.030	0.618	2.250

R,S,T,U	Other Services	0.095	1.139	0.456	1.893	0.099	1.146	0.456	1.894
	Average	**0.442**	**1.865**	**0.442**	**1.865**	**0.442**	**1.869**	**0.442**	**1.869**

Distribution Analysis

Through linkage analysis, we derive indicators that can identify key or leading sectors in a region's economic development. These indicators are the forward and backward linkage index (FLI and BLI). Table 2 presents the results of the distribution analysis for 2023 and 2024. The results of the distribution analysis calculations for 2023 indicate that the agriculture, forestry, and fisheries sector had an FLI of 1.438. Meanwhile, the FLI in 2024 increased slightly to 1.446. An FLI value greater than 1 indicates that, in 2023 and 2024, the agriculture, forestry, and fisheries sector met final demand from other sectors at or above average (Malba & Taher, 2016).

Conversely, the BLI value for the agriculture, forestry, and fisheries sector in 2023 was only 0.730. Meanwhile, the BLI value in 2024 decreased slightly to 0.729. A BLI value of less than one indicates that the final demand of the agriculture, forestry, and fisheries sector is relatively lower than the average for other sectors in stimulating production growth (Malba & Taher, 2016). This condition suggests that this sector will not be strategic in 2023 or 2024 because it lacks sufficient driving force to stimulate economic growth.

Furthermore, Rafiqah et al. (2018) combined the FLI and BLI values to determine priority sectors in the economy. When the FLI value is greater than one and the BLI value is less than one, the sector falls into the third priority category. The third priority sector category indicates that the sector can drive growth in its downstream industries but is less able to drive growth in its upstream industries (Silaban & Irawan, 2024). This condition is understandable considering that most agricultural, forestry, and fisheries commodities are raw materials with low added value.

This situation indicates that the development of the blue economy in the agriculture, forestry, and fisheries sectors remains suboptimal. The relatively small growth potential of this sector, compared to others, indicates that it still relies on other sectors to process its output. Therefore, the government can encourage the agriculture, forestry, and fisheries sectors, particularly by creating high-value blue economy products.

TABLE-2: Results of the distribution analysis calculation for 2023 and 2024

	Sectors	2023		Information	2024		Information
		FLI	BLI		FLI	BLI	
A	Agriculture, Forestry, and Fisheries	1.438	0.730	Priority 3	1.446	0.729	Priority 3
B	Mining and Quarrying	1.726	0.903	Priority 3	1.612	0.905	Priority 3
C	Processing Industry	3.381	1.126	Priority 1	3.425	1.127	Priority 1
D	Electricity and Gas Supply	1.214	1.475	Priority 1	1.228	1.490	Priority 1
E	Water Supply, Waste Management, and Recycling	0.544	0.961	Priority 4	0.542	0.960	Priority 4
F	Construction	0.737	1.171	Priority 2	0.739	1.173	Priority 2
G	Wholesale and Retail Trade; Automobile and Motorcycle Repair	0.610	0.839	Priority 4	0.609	0.838	Priority 4
H	Transportation and Warehousing	0.933	1.107	Priority 2	0.950	1.105	Priority 2
I	Provision of Accommodation, Food and Beverages	0.640	1.096	Priority 2	0.643	1.096	Priority 2
J	Information and Communication	1.078	0.926	Priority 3	1.088	0.923	Priority 3
K	Financial and Insurance Services	0.892	0.752	Priority 4	0.894	0.750	Priority 4
L	Real Estate	0.613	0.791	Priority 4	0.609	0.790	Priority 4
M,N	Corporate Services	0.879	0.985	Priority 4	0.894	0.983	Priority 4
O	Government Administration, Defense, and Compulsory Social Security	0.591	1.063	Priority 2	0.592	1.061	Priority 2
P	Education Services	0.564	0.855	Priority 4	0.563	0.853	Priority 4
Q	Healthcare Services and Social Activities	0.552	1.205	Priority 2	0.551	1.204	Priority 2

	Sectors	2023		Information	2024		Information
		FLI	BLI		FLI	BLI	
R,S,T,U	Other Services	0.611	1.015	Priority 2	0.613	1.013	Priority 2
	Average	**1.000**	**1.000**		**1.000**	**1.000**	

Output Multiplier Analysis

After conducting a linkage analysis and determining the leading sectors, this study analyzes the output multiplier impact of the VAT exemption incentive stimulus for the agriculture, forestry, and fisheries sectors. Table 3 presents the results of output multiplier calculations for 2023 and 2024. The results indicate that the agriculture, forestry, and fisheries sector have a relatively small output multiplier, ranging from 1.361 to 1.363 in 2023 and 2024, respectively. This implies that every IDR 1 billion increase in final demand in this sector leads to an increase in total economic output of IDR 1.361 billion in 2023 and IDR 1.363 billion in 2024. Compared to the average output multiplier across all sectors—1.86 in 2023 and 1.87 in 2024—the multiplier coefficient of the agriculture, forestry, and fisheries sector remains below the economy-wide average.

If the government provides a VAT exemption incentive for goods produced by marine and fisheries business activities amounting to IDR 22,155 billion in 2023, the simulation results based on the Input–Output Table indicate that this policy would increase total output in the Indonesian economy by IDR 30,155.04 billion, with IDR 24,874.74 billion accruing to the agriculture, forestry, and fisheries sector alone. Similarly, an incentive value of IDR 23,598 billion in 2024 would generate an output impact of IDR 32,159.35 billion, with IDR 26,476.40 billion concentrated in the same sector. These results demonstrate that although the sector exhibits a relatively low output multiplier, the absolute output impact generated by the VAT exemption incentive exceeds the initial fiscal cost.

Empirical studies provide support for these findings, particularly in primary and marine-based sectors that function as upstream suppliers within the production network. Rinaldi (2019) shows that tax expenditures, including VAT exemptions, contribute positively to GDP growth by expanding production capacity and intersectoral demand, even when direct multiplier values appear modest. Furthermore, Nwaeze (2023) shows that fiscal incentives play a crucial role in revitalizing the blue economy by attracting investment, expanding employment, and stimulating output growth across marine-based sectors such as fisheries, maritime transport, renewable marine energy, and marine biotechnology. These empirical findings are consistent with the simulation results of this study, which show that VAT exemption incentives in the agriculture, forestry, and fisheries sector generate output expansion exceeding the initial incentive value.

These calculations indicate that although the output multiplier of the agriculture, forestry, and fisheries sector is lower than the economy-wide average, the provision of VAT exemption incentives remains a viable policy option. Therefore, while VAT exemptions in this sector may result in foregone VAT revenue in the short term, they hold the potential to stimulate broader economic growth, which may subsequently lead to higher VAT collection through increased economic activity. Consequently, VAT exemption incentives for goods produced by marine and fisheries business activities constitute an appropriate policy instrument to encourage sectoral growth and strengthen Indonesia's blue economy, particularly when complemented by additional policy measures implemented in an integrated manner to optimise economic growth potential.

TABLE-3: Results of output multiplier calculations for 2023 and 2024 (IDR billion)

	Sectors	2023		2024	
		Shock	Output Impact	Shock	Output Impact
A	Agriculture, Forestry, and Fisheries	22,155	24,874.74	23,598	26,476.40
B	Mining and Quarrying	0	567.56	0	541.45
C	Processing Industry	0	3,546.51	0	3,853.40
D	Electricity and Gas Supply	0	108.58	0	116.62

	Sectors	2023		2024	
		Shock	Output Impact	Shock	Output Impact
E	Water Supply, Waste Management, and Recycling	0	1.05	0	1.15
F	Construction	0	147.82	0	164.17
G	Wholesale and Retail Trade; Automobile and Motorcycle Repair	0	40.32	0	44.01
H	Transportation and Warehousing	0	152.79	0	172.94
I	Provision of Accommodation, Food and Beverages	0	14.36	0	16.47
J	Information and Communication	0	97.00	0	109.74
K	Financial and Insurance Services	0	453.06	0	492.07
L	Real Estate	0	11.98	0	12.70
M,N	Corporate Services	0	99.77	0	113.44
O	Government Administration, Defense, and Compulsory Social Security	0	13.46	0	15.25
P	Education Services	0	5.12	0	5.63
Q	Healthcare Services and Social Activities	0	2.94	0	3.34
R,S,T,U	Other Services	0	17.98	0	20.57
	Output Addition (%)		**36.11**		**36.28**

Analysis of Potential Value Added Tax (VAT)

After knowing the magnitude of the economic impact of the VAT exemption incentive stimulus, we estimate the potential VAT from these impacts. Tables 4 and 5 show the results of the estimated potential VAT calculations due to the output multiplier resulting from the shock in the form of a VAT exemption incentive for goods produced by marine and fisheries businesses in 2023 and 2024. Following Setiawan & Ariutama (2023) and Silaban & Irawan (2024), adjustments were made to obtain VAT estimates that approximate the actual situation. The adjustment was made by excluding 22% of the underground economy from the potential VAT calculation. The results indicate that the estimated potential VAT arising in 2023 is IDR 2,330.90 billion, with potential VAT in the agriculture, forestry, and fisheries sector alone amounting to IDR 1,922.750 billion. Meanwhile, the estimated potential VAT in 2024 is IDR 2,485.83 billion, with potential VAT in the agriculture, forestry, and fisheries sector alone amounting to IDR 2,046.554 billion.

Estimates of potential VAT revenue can be over- or underestimated because they are based on assumptions. These calculations do not include definitive data on the number of Taxable Entrepreneurs (PKP) obligated to collect VAT, do not consider the various VAT facilities in effect from 2023 to 2024, and assume a uniform level of taxpayer compliance. Therefore, estimates of potential VAT revenue have numerous limitations and are essentially theoretical (Ariutama et al., 2021). Furthermore, it is understandable that even if the government makes sacrifices by providing VAT exemptions to boost the economy through VAT exemptions on goods produced by maritime activities, there will still be potential VAT revenue. However, the value is not as great as the incentives offered.

TABLE-4: Results of the calculation of potential VAT in 2023 (IDR billion)

	Sectors	Initial Impact	Underground Economy (22%)	Impact After Adjustment	VAT Potential
A	Agriculture, Forestry, and Fisheries	24,874.74	5,472.443	19,402.297	1,922.750
B	Mining and Quarrying	567.56	124.863	442.697	43.871
C	Processing Industry	3,546.51	780.232	2,766.278	274.136
D	Electricity and Gas Supply	108.58	23.888	84.692	8.393

	Sectors	Initial Impact	Underground Economy (22%)	Impact After Adjustment	VAT Potential
E	Water Supply, Waste Management, and Recycling	1.05	0.231	0.819	0.081
F	Construction	147.82	32.520	115.300	11.426
G	Wholesale and Retail Trade; Automobile and Motorcycle Repair	40.39	8.870	31.450	3.117
H	Transportation and Warehousing	153.03	33.614	119.176	11.810
I	Provision of Accommodation, Food and Beverages	14.38	3.159	11.201	1.110
J	Information and Communication	97.14	21.340	75.660	7.498
K	Financial and Insurance Services	453.76	99.673	353.387	35.020
L	Real Estate	12.00	2.636	9.344	0.926
M,N	Corporate Services	99.92	21.949	77.821	7.712
O	Government Administration, Defense, and Compulsory Social Security	13.48	2.961	10.499	1.040
P	Education Services	5.13	1.126	3.994	0.396
Q	Healthcare Services and Social Activities	2.94	0.647	2.293	0.227
R,S,T, U	Other Services	18.00	3.956	14.024	1.390
	Total	**30,155.04**	**6,634.11**	**23,520.93**	**2,330.90**

TABLE-5: Results of the calculation of potential VAT in 2024 (IDR billion)

	Sectors	Initial Impact	Underground Economy (22%)	Impact After Adjustment	VAT Potential
A	Agriculture, Forestry, and Fisheries	26,476.40	5,824.808	20,651.592	2,046.554
B	Mining and Quarrying	541.45	119.119	422.331	41.853
C	Processing Industry	3,853.40	847.748	3,005.652	297.857
D	Electricity and Gas Supply	116.62	25.656	90.964	9.014
E	Water Supply, Waste Management, and Recycling	1.15	0.253	0.897	0.089
F	Construction	164.17	36.117	128.053	12.690
G	Wholesale and Retail Trade; Automobile and Motorcycle Repair	44.01	9.682	34.328	3.402
H	Transportation and Warehousing	172.94	38.047	134.893	13.368
I	Provision of Accommodation, Food and Beverages	16.47	3.623	12.847	1.273
J	Information and Communication	109.74	24.143	85.597	8.483
K	Financial and Insurance Services	492.07	108.255	383.815	38.036
L	Real Estate	12.7	2.794	9.906	0.982
M,N	Corporate Services	113.44	24.957	88.483	8.769
O	Government Administration, Defense, and Compulsory Social Security	15.25	3.355	11.895	1.179
P	Education Services	5.63	1.239	4.391	0.435
Q	Healthcare Services and Social Activities	3.34	0.735	2.605	0.258
R,S,T, U	Other Services	20.57	4.525	16.045	1.590
	Total	**32,159.35**	**7.075,06**	**25,084.29**	**2,485.83**

5. CONCLUSIONS AND RECOMMENDATIONS

Based on the results and discussion, we can conclude that the agriculture, forestry, and fisheries sector in 2023 and 2024 showed a higher forward linkage (FL) value than the backward linkage (BL), namely 2.681 and 1.361 in 2023 and 2.704 and 1.363 in 2024, respectively, thus confirming that

this sector has a stronger relationship with the downstream sector than the upstream sector. The distribution analysis also shows that this sector is in the third priority category, with a forward linkage index (FLI) value of 1.438 and a backward linkage index (BLI) of 0.730 in 2023, and an FLI of 1.446 and a BLI of 0.729 in 2024, which indicates its ability to drive the growth of the downstream industry, but less than optimal in driving the growth of the upstream industry. The relatively stable output multiplier value of 1.361 in 2023 and 1.363 in 2024 indicates that the VAT exemption incentive on goods produced by marine and fisheries businesses has a significant output impact of IDR 30,155.04 billion in 2023 and IDR 32,159.35 billion in 2024, with the most significant contribution coming from the agriculture, forestry, and fisheries sector. This output impact then results in an estimated potential VAT of IDR 2,330.90 billion in 2023 and IDR 2,485.83 billion in 2024, including potential VAT for the agriculture, forestry, and fisheries sector of IDR 1,922.750 billion and IDR 2,046.554 billion, respectively.

This study has limitations because the economic impact of the VAT exemption incentive on Indonesia's blue economy is measured based on the incentives provided to the agriculture, forestry, and fisheries sectors. This study generally assumes that all these sectors are part of the blue economy, without specifying the proportions of each sector included. Nevertheless, the tax incentive in the form of a VAT exemption remains an appropriate policy to encourage the growth of this sector, as it is explicitly aimed at maritime affairs and fisheries, which are included in the blue economy. Furthermore, the results of this analysis can inform the government's decision-making process to maintain and expand this incentive policy and to encourage the optimization of the blue economy through other policy stimuli, such as improving the ease of doing business and enhancing blue infrastructure.

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