Economic Sectors and Tax Revenue: A Global Cross-Country Analysis

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ABSTRACT
Several countries have problems in achieving the tax ratio, which is still below the ideal level. The purpose of this study is to examine the effect of economic sector contribution on tax revenue. The research method used is quantitative with balanced panel data from 2002 - 2021 for 129 countries. Tests were conducted on the overall country, income level, and regional area of each country. The results show variation, the contribution of the agricultural sector consistently has a negative effect on tax revenue for the majority of tests, except for the lower income levels and the East Asia and Pacific regions, which both have no effect. Industry sector contribution has a positive effect on tax revenue only for low income levels and the East Asia and Pacific region. The opposite finding, where industry sector contribution has a negative effect on tax revenue, is found in the majority of tests, except for the Middle East and North Africa region and the Sub-Saharan Africa region, both of which have no effect. The contribution of the services sector also consistently has a negative effect on tax revenue for the majority of tests, except for the East Asia and Pacific region, the Middle East and North Africa region, and the South Asia region where all three have no effect. The negative effect of the agricultural sector shows the need for structural transformation towards higher value-added sectors such as agro-industry. Meanwhile, the negative effect of the industrial and service sectors requires tax policy arrangements that reduce tax avoidance and tax evasion.

Keywords: Agricultural sector, Industry sector, Service Sector, Tax Revenue

INTRODUCTIONS
Thuronyi (2003) states that tax can be defined as mandatory payments to the government or state without direct reciprocity and is used to finance state expenditures aimed at serving society. Despite its significant role in meeting state revenues, tax revenue remains suboptimal compared to its economic activity. This can be observed from the tax ratio. A country's low tax revenue can be attributed to a tax gap, which is the difference between taxes that should be paid and the amount of tax actually paid (Slemrod, 2007). The tax gap emerges because there are business processes that fail to be captured by existing regulations, resulting in suboptimal income from the taxation sector (Gemmell & Hasseldine, 2015).

Based on OECD data in 2023 for tax revenue in 2021, the majority of countries have tax revenue ratio comparisons lower than the OECD average of 34.1%. Southeast Asian countries even have tax revenue ratios below 15%, namely Singapore at 12.6%, Malaysia at 11.8%, and Indonesia at 10.9%. This condition contrasts with the tax ratios of European countries, which range from 30% to 50%. Indonesia's tax ratio is significantly lower than the OECD average of 34.1%, Latin America and The Caribbean (LAC) at 21.7%, and Africa at 16.0%.

The trend of tax ratios that have not reached ideal figures and tax revenue realization that has not reached targets indicates the need for efforts to increase tax revenue in Indonesia. To determine appropriate efforts to increase such revenue, it is necessary to identify factors that can influence tax revenue. Factors affecting tax revenue can be statistical determinants such as per capita income, literacy rates, and state expenditure; institutional determinants such as tax administration quality and corruption levels; and tax policy determinants such as tax rates and number of tax types (Tanzi, 1989). According to Rodriguez (2018), tax revenue determinants can also be distinguished based on underlying theoretical literature, including structural determinants, tax morale, political motivations, and tax administration's constraints.

Therefore, with strong performance from various economic sectors and growth potential shown by their contribution to tax revenue, it is clear that services, industry, and agriculture warrant deeper examination in this research. This study will explore how these sectors can be further optimized to increase their contribution to tax revenue and support more inclusive and sustainable Indonesian economic development (Hein, 2018).

The first indicator in economic variables to be studied is the agricultural sector, which based on previous research has a negative effect on tax revenue (Chelliah et al., 1975; Leuthold, 1991; Tanzi, 1992; Ghura, 1998; Piancastelli, 2001; Eltony, 2002; Bird et al., 2004; Gupta, 2007; Keen & Lockwood, 2010; Castro & Camarillo, 2014; Godin & Hindriks, 2015; Rodriguez, 2018). The agricultural sector often receives tax incentives or special treatment to encourage economic growth and investment. The agricultural sector can also face several challenges in increasing tax revenue. One major challenge is that this sector often has many small farmers and producers operating informally or unregistered. This can make tax collection difficult and requires special efforts from the government. Other research proves that the agricultural sector has no effect on tax revenue (Tait et al., 1979; Chaudhry & Munir, 2010). Interestingly, Eltony (2002) found that

for 1994-2000, in 6 oil-producing Arab countries, the agricultural sector had no effect on tax revenue. Meanwhile, in 10 non-oil-producing Arab countries, the agricultural sector had a negative effect on tax revenue.

Besides the agricultural sector, another indicator is the industrial sector's contribution to a country's Gross Domestic Product (GDP), which based on previous research has a positive effect on tax revenue (Piancastelli, 2001). The larger the industrial sector's contribution to GDP, the greater the tax potential that can be obtained by the government. Taxes that can be obtained from the industrial sector can come from several types of taxes, including corporate income tax, worker income tax, and transaction taxes such as value-added tax or VAT. However, there are other findings that suggest different results, where the industrial sector has no effect on tax revenue (Stotsky & Mariam, 1997; Eltony, 2002; Chaudhry & Munir, 2010).

The next indicator is the service sector's contribution to Gross Domestic Product (GDP), which has a positive influence on a country's tax revenue (Piancastelli, 2001; Sarmento, 2016). The larger the service sector's contribution to GDP, the greater the tax potential that can be obtained by the government from this sector. The service sector covers various fields such as finance, transportation, hospitality, professional services, and the public sector. Taxes obtained from the service sector can come from various types of taxes, such as corporate income tax, service worker income tax, and transaction taxes like value-added tax or VAT. Along with economic growth, the service sector in many countries is increasingly developing and becoming a mainstay in driving economic growth. The government can utilize this development to increase tax revenue from the service sector. However, various studies have found that the service sector has no effect on tax revenue (Chaudhry & Munir, 2010). Even Keen & Lockwood (2010) found that the service sector has no effect on either overall tax revenue or value-added tax. The research objective is to analyze the influence of economic sector contributions on tax revenue.

LITERATURE REVIEW
Tax Revenue
Hyman (2010) defines tax as mandatory payments related to certain activities that are used to purchase inputs needed to produce goods and services provided by the government or to redistribute public purchasing power. According to (Hyman, 2010), there are two components of tax: the tax rate and the tax base.

According to (Tanzi, 1989), several factors that influence tax revenue can be grouped into three categories including statistical determinants, institutional determinants, and tax policy determinants. Statistical determinants are used in various quantitatively oriented literature by testing factors such as per capita income levels, urbanization rates, literacy rates, monetization levels, openness levels, ratio of agricultural or mining sectors to GDP, country size, debt levels, and government expenditure (Tanzi, 1989). According to Musgrave (1969 cited in (Tanzi, 1989)), these factors play an important role in the tax base and will therefore increase state revenue.

Figure 1 Tax Revenue Determinants
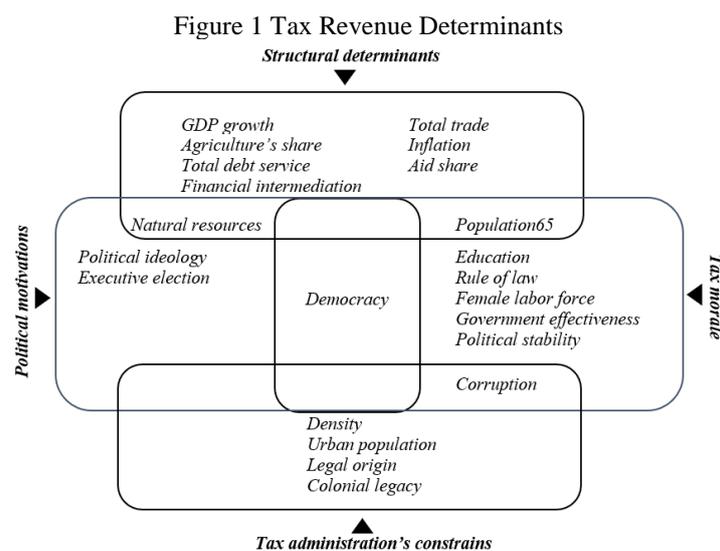
Source: Rodriguez (2018)

Tax revenue determinants are also explained by Rodriguez (2018). According to Rodriguez (2018), tax revenue determinants can be grouped into four categories based on theoretical literature: structural determinants, tax morale, political motivations, and tax administration's constraints. Figure 1 shows the factors in these four groups. However, some

factors exist in gray areas as they can influence more than one aspect. These factors include democracy at the intersection of all four groups, natural resources in both structural determinants and political motivations groups, corruption in both tax morale and tax administration's constraints groups, and population aged 65 and above in both structural determinants and tax morale groups.

Economic growth falls within the structural determinants group. Greater economic growth indicates a larger capacity for tax collection and is associated with a broader tax base (Rodriguez, 2018). Education, which is part of human development, falls under tax morale, while corruption spans two groups: tax morale and tax administration's constraints. According to Rodriguez (2018), societies with higher education levels have a positive effect on tax revenue due to better understanding of government intervention importance and higher income, resulting in lower marginal utility of money with a greater positive effect compared to the possibility of exploiting tax avoidance opportunities. Conversely, corruption has a negative impact because when corruption becomes cultural, people more easily decide to avoid taxes not only due to potentially lower costs but also due to lack of awareness of public funds (Rodriguez, 2015 cited in Rodriguez, 2018).

The Influence of Economic Sector Contributions on Tax Revenue
GDP calculation using the production approach divides GDP into three sectors: Agriculture, Industry, and Services. The agricultural sector generally has the smallest percentage compared to the other two sectors and does not contribute significantly to tax revenue. This is especially true for agricultural products of basic food items such as rice, sugar, and others which receive tax exemptions in several countries. This aligns with research conducted by Chelliah, et al. (1975) which concluded that the agricultural sector significantly negatively impacts tax revenue. Chaudhry & Munir (2010) share this view, noting that Pakistan's excessive dependence on the agricultural sector causes lower tax revenue, suggesting that countries heavily dependent on agriculture tend to have lower tax revenues.

The second sector is Industry. According to the World Bank, the industrial sector contributes to GDP through mining, manufacturing, construction, electricity, water, and gas. Manufacturing, as part of industry, according to Chaudhry & Munir (2010), is easier to tax than agriculture because businesses maintain better accounting records compared to farmers, thus manufacturing significantly positively impacts tax revenue. These findings are supported by Muhammad & Ahmed's (2010) research, which also shows positive results. Tait, et al. (1979) studied mining, also part of industry, finding significant positive impacts on tax revenue.

The service sector generally has a proportion equal to industry in GDP composition. Muhammad & Ahmed (2010) concluded that the service sector has a significant positive impact on tax revenue. Similar results were found by Piancastelli (2001). Services, as defined by the World Bank, are any actions or activities that can be offered by one party to another without physical form and do not result in ownership of anything. Increasing service sector contribution leads to additional income, consumption, and wealth from service sector businesses. The tax base comes from income, consumption, and wealth (Hyman, 2010). Thus, increasing income, consumption, and wealth can result in increased tax revenue.

A country's economic conditions play a crucial role in determining its tax revenue volume. This is because tax revenue not only reflects economic capacity but also fiscal policy success and tax system effectiveness. Various studies have revealed that strong and stable economic conditions tend to support higher tax revenue levels. This is because a growing economy increases income and consumption, directly contributing to tax revenue from various sources, such as income tax, sales tax, and corporate tax.

Previous research shows that institutional quality has a positive and significant influence on all types of tax revenue except trade taxes in the WAEMU zone (Mourfou & Mohamed Ouedraogo, 2021). This emphasizes that strong economic conditions, supported by quality institutions, can optimize tax revenue. Meanwhile, Simbachawene (2018) found that economic, structural, institutional, and financing factors significantly influence tax revenue performance in Tanzania, showing the importance of broad economic conditions in increasing tax revenue.

In South Asia, previous research (Chettri et al., 2023) found that economic conditions such as trade openness and life expectancy have a significant positive impact on tax revenue, reaffirming that healthy economic conditions support increased tax revenue. Other studies concluded that tax revenue has a positive effect on per capita income, indicating a reciprocal relationship between strong economic conditions and tax revenue (Matitaputty & Adi, 2021).

From these findings, it can be concluded that stable and positively developing economic conditions have a significant influence on tax revenue. The link between economic growth and tax revenue becomes the basis for developing fiscal policies aimed at strengthening economic capacity and improving tax system efficiency. This hypothesis assumes that

improving economic sector contributions will result in increased economic activity, which in turn expands the tax base and overall increases tax revenue. Therefore,

H1: Agricultural sector contribution negatively affects tax revenue.
H2: Industrial sector contribution positively affects tax revenue.
H3: Service sector contribution positively affects tax revenue.

RESEARCH METHODOLOGY

This research aims to analyze Tax Revenue factors from countries worldwide. The objects of this research are 129 countries recognized by the World Bank during the period 2002 to 2021. Country selection was conducted variously from each continent with economic levels ranging from lower income to high income. This approach ensures that the research produces accurate data with a focus not limited to countries in specific regions or economic classes. This research uses panel data.

This research employs two types of research variables: dependent variables, independent variables, and control variables. The dependent variable used is the Tax Revenue to GDP Ratio (TAX). Meanwhile, the independent variables in the research are Agricultural Sector Contribution to GDP (AGRI), Industrial Sector Contribution to GDP (IND), and Service Sector Contribution to GDP (SERV). The control variables in the research are Information, Communication and Technology Infrastructure (ICT), Foreign Direct Investment (FDI), World Economic Crisis (WEC), Country Economic Crisis (CEC), Covid-19 Crisis (COV), Government Effectiveness (GOVEFF), Market Size (SIZE), Per Capita Income (PCI), Exchange Rate (EXCH), and Urban Population (URB).

RESULTS AND DISCUSSION
Descriptive Statistical Analysis
The results of descriptive statistical analysis for dependent and independent variables are as shown in Table 1 below.

Table 1 Descriptive Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
TAX	2580	1.00	152.00	16.1647	7.27281
ICT	2580	.00	319.00	88.2500	46.19739
AGRI	2580	.00	79.00	10.9872	11.06911
IND	2580	3.00	72.00	26.2911	10.31990
SERV	2580	10.00	94.00	54.6880	11.18687
FDI	2580	-58.00	1676.00	7.0287	53.71334
WEC	2580	.00	1.00	.1000	.30006
CEC	2580	.00	1.00	.1337	.34042
COV	2580	.00	1.00	.1000	.30006
GOVEFF	2580	-2.00	2.00	.0915	1.05093
LnSize	2580	13.00	38.00	24.7857	2.49579
PCI	2580	174.00	133590.00	13986.1147	19630.11347
EXCH	2580	.00	42000.00	752.4256	3045.52770
URB	2580	14.00	100.00	59.7903	21.06306
Valid N (listwise)	2580				

Source: Processed Data

Regression Model
Before conducting regression on panel data, identification and selection of the appropriate model among common effects model (CEM), fixed effect model (FEM), and random effect model (REM) must first be performed. After the best model is identified, classical assumption tests are conducted to ensure that the selected model truly provides the best estimation results.

Table 2 Results of Regression Model Selection

	Conclusion
All Countries (WORLD)	REM
Low-Income Countries (LOW)	REM
Lower-Middle-Income Countries (LOWMID)	REM
Upper-Middle-Income Countries (UPMID)	REM
High-Income Countries (HIGH)	FEM

East Asia and Pacific Region (EAPC)	FEM
South Asia Region (SOA)	FEM
Europe and Central Asia Region (EUCA)	REM
North America, Latin America, and Caribbean Region (LNAC)	REM
Middle East and North Africa Region (MENA)	FEM
Sub-Saharan Africa Region (SSA)	REM

Source: Processed Data

Classical Assumption Tests

After selecting the panel data regression model, classical assumption tests need to be conducted. Classical assumption tests aim to meet the Best Linear Unbiased Estimate (BLUE) assumptions (Ghozali, 2013). BLUE assumptions should be satisfied by a regression model to ensure valid prediction results. However, classical assumption tests are not always necessary in panel data analysis because panel data can minimize bias that is likely to emerge in analysis results, providing more information, variation, and degrees of freedom (Gujarati 2012).

Panel Data Regression Analysis

The adjusted R-squared value has taken into account the number of data samples and variables used. The results of the coefficient of determination test (R^2) are shown in table 3 below.

Table 3 Results of Coefficient of Determination Test (Adjusted R^2)

Regional/Tingkat Pendapatan	Obs	Model TAX
All Countries (WORLD)	2580	0.119248
Low-Income Countries (LOW)	300	0.444239
Lower-Middle-Income Countries (LOWMID)	740	0.182940
Upper-Middle-Income Countries (UPMID)	680	0.233405
High-Income Countries (HIGH)	860	**0.916234**
East Asia and Pacific Region (EAPC)	280	**0.911878**
South Asia Region (SOA)	120	**0.808669**
Europe and Central Asia Region (EUCA)	820	0.266690
North America, Latin America, and Caribbean Region (LNAC)	500	0.416038
Middle East and North Africa Region (MENA)	200	**0.862156**
Sub-Saharan Africa Region (SSA)	660	0.136996

Source: Processed Data

This test is determined by examining the Prob (F-statistic) value in EViews, where if the value is less than the significance level alpha = 0.05, then H1 is accepted and H0 is rejected, and vice versa. With the overall country sample data or with different regional and income sample data, all Prob (F-statistic) values are 0.0000. This means H1 is accepted and H0 is rejected, or in other words, the independent variables simultaneously affect the dependent variable.

Table 4 One-tailed Probability Values

Model TAX	World	Low MID	UPM ID	Low	HIGH	EAP C	EUC A	LNA C	MEN A	SOA	SSA
	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff
C	26,46	22,08	66,62 05	3,391 2	51,729 2	14,88 98	95,19 41	62,61 53	21,19 76	17,11 64	15,95 39
AGRI	-0,24***	-0,20***	-0,820 7***	-0,034 6*	-0,9404 ***	-0,112 9	1,130 5***	-0,501 3***	-0,840 1**	-0,402 1***	-0,087 6***
IND	-0,12***	-0,13***	-0,389 2***	0,082 0***	-0,4019 ***	0,278 6***	0,897 2***	-0,467 2***	-0,193 7	-0,380 7***	0,014 4
SERV	-0,19***	-0,18***	-0,498 6***	-0,040 3**	-0,4999 ***	0,096 4*	-0,976 4***	-0,643 7***	-0,234 3*	-0,063 0	-0,076 8***
ICT	0,01	0,02	0,005 0	0,041 1	0,0046	0,026 7	-0,006 6	0,016 1	-0,019 1	0,020 6	0,014 5

FDI	0,00	0,05	0,0857	0,0527	-0,0005	-0,0001	0,0036	0,0725	0,1734	0,0368	0,0512
WEC	-0,02	-0,03	0,16	0,0857	-0,5287	0,5656	0,2376	-0,2550	0,7311	-0,2367	0,1615
CEC	-0,37	-0,43	-0,28	0,1068	-0,1344	0,2029	-0,2120	0,1284	0,0888	-0,0438	-0,3098
COV	-0,57	-0,54	-0,74	-0,1813	0,0460	-0,7424	-0,9247	0,0425	3,0787	1,8560	-0,1463
GOVEFF	-0,03	-1,18	0,57	0,0718	-0,8038	1,3854	0,4079	-0,0956	-3,6001	-1,8483	1,0149
LnSIZE	0,10	0,15	-0,02	0,2914	0,0817	-0,1916	0,2099	0,1030	0,5133	0,1783	0,0713
PCI	0,00	-0,00	-0,00	-0,0014	0,0000	-0,0000	0,0000	-0,0001	0,0001	-0,0027	0,0001
EXCH	0,00	-0,00	-0,00	0,0001	-0,0029	-0,0002	-0,0003	-0,0007	0,0002	0,0039	0,0002
URB	0,04	0,06	-0,07	0,0176	0,1401	-0,1533	0,0833	0,0482	0,0638	0,4712	0,0132

Source: Processed Data

Based on the results of the Random Effect Model regression testing that has been carried out, the equation for the overall country model is as follows:

$$TAX = 26{,}4559 + 0{,}0093 \, ICT_{i,t} - 0{,}2407 \, AGRI_{i,t} - 0{,}1213 \, IND_{i,t} - 0{,}1873 \, SERV_{i,t} + 0{,}0001 \, FDI_{i,t}$$
$$- 0{,}0245 \, WEC_{i,t} - 0{,}3693 \, CEC_{i,t} - 0{,}5686 \, COV_{i,t} - 0{,}0153 \, GOVEFF_{i,t} + 0{,}1032 \, LNSIZE_{i,t} + 0{,}0000$$
$$PCI_{i,t} + 0{,}0000 \, EXCH_{i,t} + 0{,}0422 \, URB_{i,t} + \varepsilon_{i,t}$$

The Effect of Agricultural Sector Contribution in GDP (AGRI) on Tax Revenue (TAX)
Based on the t-test results, the one-tailed Prob value of the AGRI variable (agricultural sector contribution to GDP) on TAX (tax revenue) in all test sample data is below 0.05 or below the alpha significance level, except for testing in low-income countries and the East Asia and Pacific region which showed no effect. The coefficient values are all negative, indicating a significant negative effect of the AGRI variable on TAX. This result confirms the hypothesis.

This finding aligns with previous research by Chaudhry & Munir (2010) using Pakistan's time-series data from 1973 to 2009, which concluded that the agricultural sector's contribution to GDP negatively affects tax revenue. This is because developing countries have many small-scale farmers using traditional methods who cannot generate substantial tax surpluses. They also noted that many countries do not tax basic necessities as they are essential for society. This is also applied in Indonesia, where basic food items are not included as taxable goods (BKP) and thus are not subject to value-added tax (VAT).

Further research by Gupta (2007) using panel data from 105 developing countries over 25 years shows significant negative results regarding the agricultural sector's contribution to GDP on tax revenue. According to him, the use of sectoral variables is quite important because certain sectors in the economy are easier to tax than others. The agricultural sector is particularly difficult to tax, especially in countries where most farmers are subsistence farmers. Subsistence farmers are those who only cultivate enough food to meet their own needs.

Research conducted by Chelliah, et al. (1975), Leuthold (1991), Tanzi (1992), Stotsky & Mariam (1997), Ghura (1998), Piancastelli (2001), Eltony (2002), Bird et al. (2004), Gupta (2007), Keen & Lockwood (2010), Gaalya (2015), Godin & Hindriks (2015), Rodriguez (2018), Wijaya & Jamil (2022), Anugerah & Wijaya (2023), Hashfi & Wijaya (2023), Kusuma & Wijaya (2023a), Kusuma & Wijaya (2023b), Pohan & Wijaya (2023), Tri Cahyono & Wijaya (2023), and

Zulfi & Wijaya (2023), also concluded similarly that the agricultural sector's contribution to GDP has a significant negative effect on tax revenue.

The agricultural sector is harder to tax compared to the industrial and service sectors (Gupta, 2007; Rodriguez, 2018). Agricultural land owned by communities represents an informal sector, making tax supervision difficult (Lethold, 1991). The difficulty in taxing the agricultural sector is also due to high administrative costs for tax authorities in regulating and supervising informal subsistence farming compared to its potential revenue (Ghura, 1998). Farmers' lack of knowledge in paying or reporting taxes according to applicable tax regulations leads to non-compliance in fulfilling their tax obligations (Agbeyegbe et al., 2006).

Tax policies in several countries often provide incentives to the agricultural sector, such as tax reductions or 0% tax rates (Rodriguez, 2018). Castañeda Rodríguez's (2018) research shows that the percentage of agricultural sector to GDP will have a significant reciprocal effect on tax revenue. This is because economic activities in the agricultural sector face more challenging taxation issues. In middle-income countries, agricultural production is typically small-scale and difficult to track. Therefore, tax supervision and collection become counterproductive when the agricultural sector increases.

Urbanization also weakens the influence of agricultural sector contribution to GDP on tax revenue. Urbanization encourages the creation of new jobs in urban areas, leading to a gradual decline in rural employment. The large number of workers shifting from the agricultural sector to the industrial sector indirectly causes an increase in state revenue (Tri Cahyono & Wijaya, 2023). Countries with a high ratio of non-agricultural sectors to GDP will generate higher tax revenue (Bird et al., 2004). Countries with a high ratio of agricultural sector to GDP tend to have lower tax burdens, resulting in lower tax revenue (Sarmento, 2016).

Nnyanzi's (2015) research states that the agricultural sector negatively impacts tax revenue because most farmers still practice subsistence farming or farm to meet their daily needs. This results in farmers not having sufficient income to pay taxes. Additionally, the agricultural sector faces many challenges such as lack of access to modern technology and good markets, making it difficult for farmers to increase their productivity and income. Rodríguez (2018) also states that the agricultural sector is negatively related to tax revenue because it is difficult to tax when there are many subsistence farmers.

Furthermore, Minh Ha et al. (2022) state that the agricultural sector has negative effects on tax revenue in Southeast Asian countries. This is caused by several factors, such as most agricultural activities being conducted on a small scale and products being sold in informal markets, making tax collection difficult. Additionally, some countries provide tax incentives for the agricultural sector, such as not imposing taxes on agricultural products or reducing taxes to minimum levels. Then, Gnangnon (2022) found that agriculture's negative effect on tax revenue is because the agricultural sector often has poorly organized structures and is difficult to track, making it hard for governments to collect taxes from this sector. Hamdan & Rana (2021) show that agricultural sector growth has a negative impact on tax revenue in several developing countries, such as China, Malaysia, and Turkey.

This negative influence is also shown in research conducted by Neog & Gaur (2021) studying five BRICS cooperation countries from 1996 to 2017. Their research results show that the percentage of agriculture can decrease tax revenue performance in these five countries. Neog & Gaur (2021) argue that BRICS should start improving the quality of regulations governing agricultural sector taxation to generate state revenue from the agricultural sector more effectively. Kusuma & Wijaya (2023b) conducted research on the effect of agricultural sector contribution on value-added tax revenue using data from BRICS countries (Brazil, Russia, India, China, and South Africa) from 2010-2018. The research results show that agricultural sector contribution negatively affects value-added tax revenue. In developing countries, especially BRICS countries, farmers working in the agricultural sector can only meet their basic needs or their families' needs, resulting in low income and reduced purchasing power. Low income and declining purchasing power lead to suboptimal tax revenue from both income tax and value-added tax. This condition is exacerbated by weak tax supervision systems in the agricultural sector, as in South Africa, resulting in suboptimal tax revenue (Godin & Hindriks, 2015). The negative influence of agricultural sector contribution on value-added tax revenue is also confirmed by Pohan & Wijaya (2024) in their research on countries in the Balkan region. Almost all types of taxes are difficult to impose on the agricultural sector, especially value-added tax (Keen & Lockwood, 2010).

The agricultural sector contribution (AGRI) shows no effect on tax revenue (TAX) for testing in low-income countries and the East Asia and Pacific region. This aligns with research by Tait et al. (1979), Eltony (2002), Chaudhry & Munir (2010), Imam (2010) in Kusuma & Wijaya (2023a), and Pascal & Wijaya (2023). Eltony (2002) found that the agricultural sector has no effect on tax revenue in oil-producing Arab countries. This is because these countries' economies are highly dependent on oil to finance economic activities, thus not requiring a sophisticated taxation system. Mahdavi (2008)

elaborates further that the agricultural sector has no effect on overall tax revenue but only affects property tax. In fact, the agricultural sector has become a tax shelter, where income transfers from other sectors to the agricultural sector occur to avoid or reduce taxes (Chaudhry & Munir, 2010).

The Effect of Industrial Sector Contribution in GDP (IND) on Tax Revenue (TAX)
Based on t-test results with one-tailed Prob values below the alpha level of 0.05, effects were found in testing using sample data from all countries, lower-middle-income countries, upper-middle-income countries, low-income countries, high-income countries, East Asia and Pacific region, Europe and Central Asia region, North America, Latin America and Caribbean region, and South Asia region. However, aligned with the research hypothesis, where there is a significant positive effect of industrial sector contribution in GDP (IND) on tax revenue variable (TAX), this only occurred in testing using data from low-income countries and the East Asia and Pacific region. Other findings show significant negative effects of industrial sector contribution in GDP (IND) on tax revenue variable (TAX) in tests using data from all countries, lower-middle-income countries, upper-middle-income countries, high-income countries, Europe and Central Asia region, North America, Latin America and Caribbean region, and South Asia region. Meanwhile, industrial sector contribution in GDP (IND) shows no effect on tax revenue variable (TAX) for testing data from the Middle East and North Africa region, and Sub-Saharan Africa region.

The significant positive effect of industrial sector contribution in GDP (IND) on tax revenue variable (TAX) aligns with research findings by Piancastelli (2001), Gupta (2007), Karagoz (2013), Castro & Camarillo (2014), Minh Ha et al. (2022), Anh & Thinh (2018), Tri Cahyono & Wijaya (2023), and Wiguna & Wijaya (2023). Gupta (2007) adds that the mining sector, which is also part of the industrial sector, is dominated by many large companies that can generate tax revenue surplus. The industrial sector is easier to tax because businesses in the industrial sector have better accounting records than the agricultural sector, making it easier for tax authorities to calculate potential tax revenue (Chaudhry & Munir, 2010). The significant positive effect of industrial sector contribution on tax revenue is due to easier regulations regarding taxation in the industrial sector because it directly relates to production and distribution (Piancastelli, 2001; Karagoz, 2013; Castro & Camarillo, 2014). Research findings from Wiguna & Wijaya (2023) showing positive effects of industrial sector contribution on tax revenue, with research objects being the five Scandinavian countries, which are countries with high Human Development Index (HDI) scores thus more compliant with regulations and able to produce highly competitive products, ultimately increasing tax revenue.

Tri Cahyono & Wijaya (2023) state that industrial sector contribution positively affects tax revenue in the ASEAN region. ASEAN member countries are experiencing a decline in agricultural sector value-added caused by shifts to manufacturing and services industries (Yudhatama et al., 2021). Industry in Southeast Asia has developed rapidly in recent decades and has become one of the main drivers of economic growth in this region. Countries like Indonesia, Thailand, Vietnam, and Philippines have become manufacturing industry centers in this region by attracting foreign investment from multinational companies (Minh Ha et al., 2022). The manufacturing sector has become one of the main drivers of economic growth in ASEAN. The ASEAN region has become a global manufacturing center and is projected to grow with a compound annual growth rate of 6.6 percent between 2016 and 2020 (Gnanasegaran, 2019).

Camara (2023) conducted research showing that industrial value-added has a positive correlation with total tax revenue in developing countries because manufacturing industry becomes a more concentrated and formalized economic activity, making tax collection easier. Saptono & Mahmud (2021) also found that the industrial sector's contribution to GDP has a positive and significant effect on tax revenue compared to the agricultural sector. This can be attributed to the fact that industry tends to generate higher value-added and provides greater contribution to GDP. Furthermore, industry will create broader job opportunities that can increase income and public purchasing power (Febriyanto, 2014), by providing supply for the agricultural sector and growth in the service sector such as financial institutions and others.

A strong industrial sector in a country's economy can expand the tax base through increased formal economic activity (OECD, 2018). The industrial sector generally has higher productivity, potentially generating greater income and profits to be taxed (Rodrik, 2013). Industrial sector growth promotes economic formalization, increasing tax compliance (La Porta & Shleifer, 2014). The industrial sector has strong multiplier effects on the local economy, potentially increasing overall tax revenue (Moretti, 2010). The industrial sector often attracts foreign direct investment, which can increase tax revenue (UNCTAD, 2019). The industrial sector often generates high-value exports, contributing to trade tax revenue (WTO, 2017).

The industrial sector tends to conduct more innovation and R&D, which can generate additional tax revenue from royalties such as copyrights, patents, trademarks, franchises, etc. (Akcigit & Kerr, 2018). The industrial sector generally offers higher wages compared to the agricultural sector, thus increasing potential income tax revenue (ILO, 2020), such as income tax article 21/26. Complex industrial value chains create more points for tax collection (Gereffi & Fernandez-

Stark, 2016), for example multi-stage value-added tax. The industrial sector often creates economic agglomeration, increasing economic activity and tax potential in a region (Glaeser, 2010). The industrial sector tends to provide more stable income compared to the primary sector, enabling more consistent tax revenue (IMF, 2016). Industrial sector growth often drives investment in infrastructure, which can increase tax collection capacity (World Bank, 2020).

The industrial sector having negative effects on tax revenue is also supported by research findings from Castañeda Rodríguez (2018), which states that industrial sector contribution to GDP negatively affects tax revenue ratio. This industrial sector can also lead to greater tax avoidance by companies, so that in some models, industrial sector contribution to GDP actually reduces tax revenue.

Countries often offer excessive tax incentives to attract industry, reducing overall tax revenue (Klemm & Van Parys, 2012). Multinational companies in the industrial sector often use transfer pricing to shift profits to low-tax jurisdictions (OECD, 2017). Competition to attract industry can trigger a race to the bottom in corporate tax rates (Devereux et al., 2008). The industrial sector can generate negative externalities whose costs are not fully reflected in tax revenue (Fullerton, 2011). The industrial sector can be more vulnerable to business cycles, causing volatility in tax revenue (Auerbach & Gorodnichenko, 2012). Large industries often engage in lobbying and political influence for favorable tax treatment (Richter et al., 2009).

Industry mobility can threaten the tax base through relocation to low-tax jurisdictions (Baldwin & Okubo, 2014). The complexity of global supply chains in industry can complicate effective tax monitoring and collection (UNCTAD, 2015). R&D tax credits for industry can reduce short-term tax revenue, while royalty income is obtained in future years (Hall & Van Reenen, 2000). Environmental costs from industry are often not fully reflected in tax revenue (Bento et al., 2014). Industries dependent on natural resources can cause a "resource curse," potentially reducing long-term tax revenue (Mehlum et al., 2006).

Cases where the industrial sector shows no effect on tax revenue align with previous research by Stotsky & Mariam (1997), Eltony (2002), Chaudhry & Munir (2010), and Hashfi & Wijaya (2023). According to the Head of Center of Trade Investment and Industry Institute for Development of Economics and Finance (Indef) Andry Satrio Nugroho, the decline in tax revenue from the manufacturing sector is linked to symptoms of early deindustrialization occurring due to weakening growth in the processing industry and its contribution to gross domestic product (GDP) (Theodora, 2023). Meanwhile, providing discounts and tax incentives to industrial players to drive downstream industries has not brought commensurate results in the form of state revenue (Theodora, 2023).

Meanwhile, tax researcher from Center for Indonesia Taxation Analysis Fajry Akbar argues that the weakening income from the manufacturing sector is also related to last year's too-high revenue base and this year's commodity price weakening trend (Theodora, 2023). On the other hand, exchange rate appreciation also affects tax revenue from imports (Theodora, 2023).

Finance Minister Sri Mulyani highlights the declining tax growth from the processing industry (Theodora, 2023). According to her, this occurs due to the high tax revenue base in 2022 that reached double digits amid rising global commodity price trends. Another factor is the slowdown in imports and international trade performance that has reduced Value Added Tax (VAT) import deposits (Theodora, 2023).

The relationship between sectoral economic structure and tax revenue is highly complex, and the industrial sector's influence may not be independently significant (Acemoglu et al., 2015). Institutional factors and state capacity may be more determinant of tax revenue than industrial sector contribution (Besley & Persson, 2014). Positive and negative effects of the industrial sector on tax revenue may cancel each other out (Herrendorf et al., 2014). The industrial sector's influence on tax revenue varies significantly between countries, showing no significant universal effect (IMF, 2015). Structural shifts in the global economy can reduce the significance of industrial sector contribution to tax revenue (Rodrik, 2016). Variations in industrial tax policies between countries can produce inconsistent effects on total tax revenue (Bird et al., 2008).

Changes in tax contribution from the industrial sector are often compensated by changes from other sectors (Herrendorf et al., 2013). Globalization and global value chains have blurred sectoral boundaries, making industrial sector contribution to tax revenue less clear (Baldwin, 2016). Technological developments can change the nature of industrial production and its relationship with tax revenue (Brynjolfsson & McAfee, 2014). Macroeconomic factors may be more important in determining tax revenue than individual sector contributions like industry (Tanzi & Zee, 2000). The complexity of modern tax systems can obscure the direct relationship between specific sector contribution and total tax revenue (Slemrod &

Gillitzer, 2014). High heterogeneity in the industrial sector can cause net effects that are not significant on tax revenue (Bartelsman et al., 2013).

The Effect of Service Sector Contribution in GDP (SERV) on Tax Revenue (TAX)
The effect of service sector contribution in GDP on tax revenue variable based on t-test results has one-tailed Prob values below 0.05 for data from all countries, lower-middle-income countries, East Asia and Pacific region, Europe and Central Asia region, Middle East and North Africa region, and Sub-Saharan Africa region. However, positive coefficients only occur in testing with sample data from the Middle East and North Africa region. Thus, there is a positive effect of service sector contribution (SERV) in GDP on tax revenue variable (TAX) or H1 is accepted. While for the rest, H1 is rejected. New findings emerge where negative coefficients occur, resulting in negative effects of service sector contribution (SERV) in GDP on tax revenue variable (TAX) for testing with sample data from all countries, lower-middle-income countries, East Asia and Pacific region, Europe and Central Asia region, Middle East and North Africa region, and Sub-Saharan Africa region. Meanwhile, service sector contribution in GDP shows no effect on tax revenue for testing upper-middle-income countries, low-income countries, high-income countries, North America, Latin America and Caribbean region, and South Asia region.

Service sector contribution shows negative effects on tax revenue. This result aligns with research by Chaudhry & Munir (2010) where the service sector has negative effects because the service sector in many developing countries consists of informal sectors that potentially increase tax avoidance. However, in their research, the service sector's effect on tax revenue was not significant, while based on regression in this research, the service sector shows significant effects across all models. Gupta (2007) adds that countries whose tax sources depend on goods and services taxes show poorer revenue performance. This is because taxes on goods and services are indirect taxes that tend to be regressive.

Several types of services, especially technology-based ones, can be difficult to track and tax, potentially reducing tax revenue (Tanzi & Zee, 2000). Most service sectors in developing countries tend to be informal, avoiding taxes and reducing state revenue (Schneider & Enste, 2000). Multinational companies in the service sector often use transfer pricing to shift profits to low-tax jurisdictions, reducing tax revenue in the country of origin (OECD, 2010). International tax competition in attracting service sector investment can cause a race to the bottom in tax rates, reducing tax revenue (Devereux et al., 2008). Some service subsectors (such as finance) are highly volatile, causing instability in tax revenue (Auerbach & Feenberg, 2000). Complexity in regulating and taxing modern service sectors can increase tax administration costs, reducing collection efficiency (Bird & Zolt, 2008).

However, research by Piancastelli (2001) and Muhammad & Ahmed (2010) concluded differently. According to their research, service sector contribution to GDP significantly positively affects tax revenue. This result was found in testing with data from the Middle East and North Africa region. This is because tax revenue from industrial and service sectors is easier to increase than from the agricultural sector, making sector shifts beneficial from a tax revenue perspective.

Service sector growth correlates positively with increased tax revenue in developing countries (Loayza & Rigolini, 2016). Service sectors that contribute significantly to GDP also tend to increase the tax base and overall tax revenue (Thalassinos et al., 2012). Formal service sector growth can help expand the tax base by encouraging economic formalization (Gaspar et al., 2016). Service sector growth has multiplier effects that can increase overall economic activity, which in turn increases tax revenue (Arnold et al., 2011). Productive service sectors can increase per capita income, which correlates positively with increased tax revenue (Dabla-Norris et al., 2013). Economic diversification through service sector development can stabilize and increase tax revenue (IMF, 2015).

The service sector contribution to GDP can also show no effect on tax revenue. This was found in testing for upper-middle-income countries, low-income countries, high-income countries, North America, Latin America and Caribbean region, and South Asia region. This aligns with research from Stotsky & Marian (1997), Eltony (2002), and Chaudhry & Munir (2010). The service sector is highly diverse, with some subsectors contributing significantly to tax while others do not, so the overall effect may not be significant (Buera & Kaboski, 2012). Service sector growth may be offset by declines in other sectors, resulting in no significant net effect on tax revenue (Keen & Lockwood, 2010).

Tax system effectiveness is more important than sectoral economic composition in determining tax revenue (Bird et al., 2008). Institutional factors and state capacity are more determinant of tax revenue compared to specific economic structures (Besley & Persson, 2014). The relationship between economic structure and tax revenue is very complex and may not be linear, making it difficult to isolate significant effects from the service sector alone (Acemoglu et al., 2015). The service sector's influence on tax revenue varies significantly between countries, showing no universal significant effect (IMF, 2015).

CONCLUSION

The contribution of economic sectors is measured using the contributions of the agricultural, industrial, and service sectors. Agricultural sector contribution consistently shows a negative effect on tax revenue for the majority of tests, except for low-income levels and the East Asia and Pacific region, where both show no effect. The agricultural sector is difficult to tax (hard to tax) compared to the industrial and service sectors. This is due to farmers' lack of knowledge in paying or reporting their taxes in accordance with applicable tax regulations. The majority of farmers still practice subsistence farming or farm to meet their daily needs. There is a weak tax supervision system in the agricultural sector. Almost all types of taxes are difficult to impose on the agricultural sector, especially value-added tax.

Industrial sector contribution shows a positive effect on tax revenue only for low-income levels and the East Asia and Pacific region. The mining sector, which is also part of the industrial sector, is dominated by many large companies that can generate tax revenue surplus. The industrial sector is easier to tax because businesses in the industrial sector have better accounting records than the agricultural sector. Manufacturing industry becomes a more concentrated and formalized economic activity. A strong industrial sector in a country's economy can expand the tax base through increased formal economic activity. Industry is able to create highly competitive products, thus creating high added value. The manufacturing sector has become one of the main drivers of economic growth. Industry will create broader job opportunities that can increase income and public purchasing power. The industrial sector has strong multiplier effects on the local economy. The industrial sector generally has higher productivity, potentially generating greater income and profits to be taxed. The industrial sector often generates high-value exports. The industrial sector tends to conduct more innovation and R&D, which can generate additional tax revenue. The industrial sector generally offers higher wages compared to the agricultural sector. Complex industrial value chains create more points for tax collection. The industrial sector often creates economic agglomeration, increasing economic activity and tax potential in a region. The industrial sector tends to provide more stable income compared to the primary sector. Industrial sector growth often drives investment. Conversely, where industrial sector contribution negatively affects tax revenue, this is found in the majority of tests, except for the Middle East and North Africa region and Sub-Saharan Africa region, where both show no effect. Service sector contribution provides new findings that consistently show a negative effect on tax revenue for the majority of tests, except for East Asia and Pacific, Middle East and North Africa, and South Asia regions, where all three show no effect.

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