



INDUSTRIAL REVOLUTION IN AGRICULTURE AND MANUFACTURING SECTOR 4.0 WHETHER IT HAS THE POTENTIAL TO INCREASE VALUE ADDED TAX REVENUE: CASE STUDY IN BALKAN COUNTRIES

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Abstract

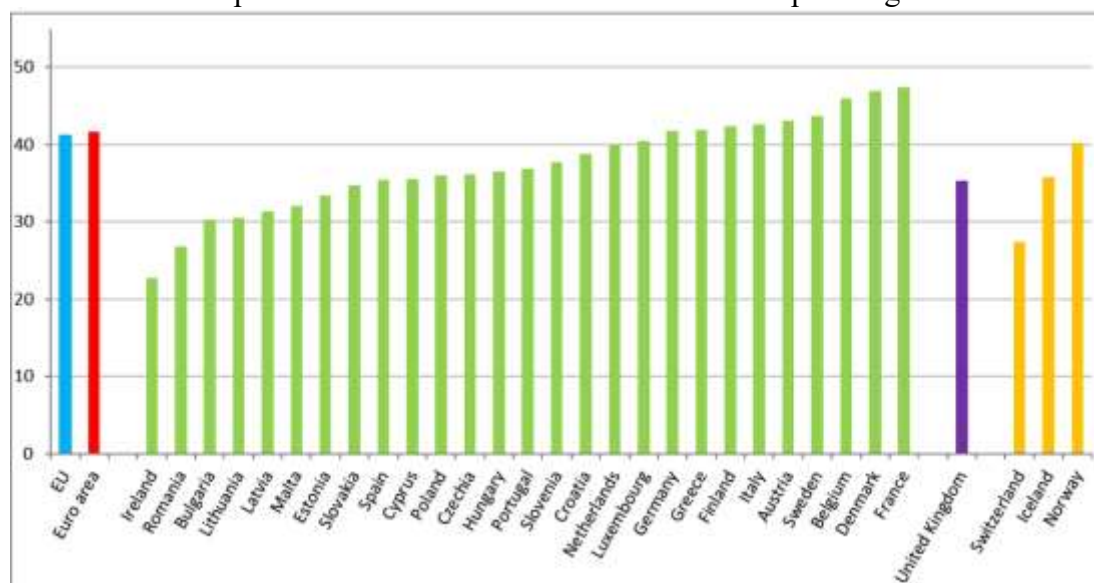
The urgency of tax revenue in a country is something that is emphasized by the government. In this research, Value Added Tax revenue is the focus to be examined because it is related to many economic sectors. Therefore, the government tries to obtain tax revenue from various economic sectors to meet the country's targets and needs. This study aims to determine the impact of the agricultural sector and the manufacturing industry sector on Value Added Tax (VAT) revenues or what we know as Value Added Tax or VAT in the Balkan region on the European continent, with Foreign Direct Investment (FDI) moderation, through descriptive quantitative methods based on data from the World Bank. Through this research, it is found that the agricultural sector hurts VAT revenue, as well as the manufacturing industry sector which hurts VAT revenue. However, for the farming sector and the manufacturing industry sector which are moderated by the Foreign Investment variable, it is found that both do not affect revenue. Then the last moderation variable alone, namely Foreign Investment, does not affect revenue. It is hoped that this research will provide new insights related to the agricultural sector and the industrial sector with its influence on Value Added Tax revenue.

Keyword: Agriculture, Foreign Direct Investment, Manufacture, Value Added Tax

INTRODUCTION

Tax Revenue is the primary milestone of a country's income. Generally, countries in the world place the tax sector as the priority of state revenue. European countries certainly do the same thing related to taxation. In this case, it will be focused on the Balkan countries of Albania, Bosnia & Herzegovina, Bulgaria, Croatia, Kosovo, Montenegro, North Macedonia, Romania, Serbia, and Slovenia (Crampton, 2023). Turkey and Greece. According to Eurostat, the average tax revenue of European countries compared to GDP is 41.4%.

Figure 1
Comparison of Tax Revenue to GDP in the European region



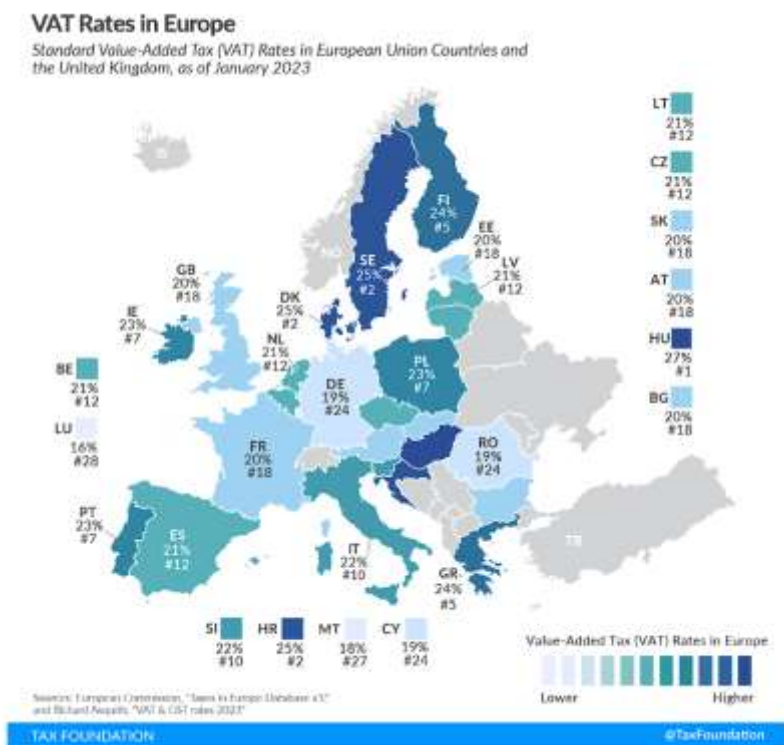
Source: EuroStat



Within Europe itself, however, tax-to-GDP ratios vary widely across Member States, with the highest share of tax and social contributions as a percentage of GDP in 2019 recorded by France (47.4%), Denmark (46.9%) and Belgium (45.9%), followed by Sweden (43.6%), Austria (43.1%), Italy (42.6%) and Finland (42.3%). At the opposite end of the scale are Ireland (22.7%) and Romania (26.8%), with Bulgaria (30.3) recording the lowest ratio.

Based on the data mentioned earlier, Romania and Bulgaria are Balkan countries. From this, it can be seen that the Balkan countries for tax revenue are not very good compared to other countries in Europe (EUROSTAT, 2020). One of the components of taxation is Value Added Tax (VAT) better known as Value Added Tax in Indonesia. For the European Region, VAT rates are quite diverse. As for the standard rate or minimum rate for VAT, each EU country has a standard rate that applies to the imposition of most goods and services. This rate cannot be less than 15%.

Figure 2
VAT Rate in Europe



Source: Tax Foundation

Through the figure, VAT rates in the Balkan countries are not shown in their entirety but can be represented with Romania, Bulgaria, and Greece. From the figure, it can be seen that the Balkan countries have different rates, namely Greece at 24%, Bulgaria at a rate of 20%, and Romania at a rate of 19%. But whether these rates have helped in tax revenue in these countries because the existing rates may not necessarily be able to achieve the desired tax target.

In European Union countries, VAT is one type of tax that is the main support for state revenue. Although its application is applied differently in each European Union country (Your Europe, 2022a). But in general, VAT is levied on all goods and services at all stages of the supply chain, including sales to final consumers. This includes from the beginning to the end of the production process, e.g. shopping, transportation, packaging, insurance, and delivery to the final consumer (Your Europe, 2022b). Therefore, many companies are subject to VAT including the manufacturing and agricultural industries where the company delivers goods and is required to collect Value Added Tax.



Table 1
Tax revenue structure, by major tax category, 2019

	Taxes on production and imports	on Value Added Tax	Taxes on individual or household income*	Get Social contributions
Bulgaria	15.6	9.2	3.3	8.9
Greece	17.5	8.4	5.9	14.6
Romania	10.7	6.2	2.3	11.3
Slovenia	13.8	8.0	5.3	16.0
Finland	14.2	9.1	12.2	11.9

Source: European Commission

From the table above, the author presents data on the percentage of tax revenue in the Balkan countries. The value that appears is also not much different between countries. But what needs to be underlined is that with a high tariff like Greece, it does not reflect tax revenue that is good and appropriate when viewed from the table above. It can be seen that Bulgaria gets a higher percentage of VAT contribution than Greece. However, the value is not too low. It can still be interpreted that the pattern of VAT revenue in the region is almost the same. And the figure is quite significant as one of the pillars of tax revenue.

Through the data above, it can be seen that VAT revenue is quite a large portion of overall tax revenue, with its rate and percentage in GDP. And for sectors subject to VAT, such as agriculture, which is one of the sectors subject to tax under applicable regulations (Gruziel & Raczkowska, 2018). The agricultural sector and certain industrial sectors are subject to VAT through trade transactions that reach consumers. With this type of indirect tax, entrepreneurs collect the tax owed and then deposit it into the state treasury.

Table 2
Comparison Of European Economy Characteristic With Other Region

	Unit	Euro area	United States	Japan	China
Population <u>1</u>	millions	343.1	332.2	125.5	1,412.6
GDP (share of world GDP in PPP)	%	11.9	15.7	3.7	18.6
GDP per capita <u>2</u>	€ thousands	33.4 ^{*)}	44.7 ^{*)}	29.4 ^{*)}	13.8
Value added by economic activity					
Agriculture, fishing, forestry	% of total	1.7	1.0	1.0	7.6
Industry (including construction)	% of total	25.0	18.5	28.9	39.4
Services (including non-market services)	% of total	73.3	80.5	70.1	53.0
Current account balance	% of GDP	2.3	-3.6	3.9	1.8

Sumber : (European Commission, 2022)

The table above explains a little in general the economic conditions on a broad scale or macroeconomics in the 4 regions that dominate the world economy today, there are several other indicators of the addition of the value of economic activity in a region that I exclude from the table and only focus on the agricultural sector and the industrial sector, industry.



The agricultural sector is the primary sector and is one of the main economic sectors in a country the data is expected to be one of the driving sectors for state revenue. In several studies related to agriculture, countries in the European region have qualified agricultural management so that they can meet the needs and food reserves of their country and become exporters to other countries and regions. According to dos Santos and Ahmad, the agricultural sector is one of the driving points of GDP with a value of 1.7% of GDP (dos Santos & Ahmad, 2020).

What is striking is the Industrial sector, with its contribution reaching 25% of the total economic movement (GDP) in Europe. Many sectors are engaged in this field such as manufacturing, cyclic consumption, raw materials, and so on. Of course, this value is quite high and can have an impact on tax revenue.

Apart from the table above. Foreign Direct Investment or FDI in Europe has also been running quite well. As data submitted by the European Commission, more than 35% of total EU assets belong to foreign-owned companies (PMA), which shows that the EU investment region is one of the most open regions in the world regarding the economy and foreign investment (European Commission., 2019).

From the explanation above, researchers want to know and explore further whether the Agricultural sector and the Industrial Sector have an impact on tax revenue, then when given a stimulus through Foreign Direct Investment, Is there any effect for the agricultural sector and the industrial sector on the contribution of the sector to Value Added Tax (VAT) revenue. So that in the future it is known whether the sector can be a support for tax revenue where the implication is that the government needs to increase stimulus and incentives in the sector.

The objectives of this study are (1) Knowing the effect of the service sector and manufacturing industry on VAT revenue; (2) Knowing whether the service sector and the Manufacturing Industry which is moderated by Foreign Investment affect VAT revenue; and (3) Knowing whether the value of Foreign Direct Investment affects VAT revenue.

LITERATURE REVIEW

Industrial Revolution 4.0

The so-called Fourth Industrial Revolution (4IR) is based on the development of fully automated and intelligent production, able to communicate independently with the prime mover (Piccarozzi et al., 2018). In general, automation and Artificial Intelligence processes are important points in the 4IR, and many technological developments occur during the 4IR phase. The research findings of this study show that Industry 4.0 produces a specific quality and quantitative analysis of technology and its implementation in the company's value chain.

Technology in Industrial Revolution 4.0

The fourth industrial revolution is characterized by the introduction of the Internet of Things (IoT) and the concept of Internet services in manufacturing, which enables smart factories that are vertically and horizontally integrated with production systems (Thoben et al., 2017). A journal by (Mabkhot et al., 2018) mentioned are the important changes in 4IR are: (1) Big Data; (2) Cloud Manufacturing; (3) Internet of Things (IoT); (4) Cyber-Physical System; and (5) Smart Factory.

The impact of the 4IR itself is on the manufacturing industry, economic development employment, and social equality (Li et al., 2017). To succeed in the Fourth Industrial Revolution, all economic sectors, both developed and developing, need to seize the opportunities offered by innovation and be able to adapt to the present (Schwab, 2018). Of course, through the 4IR, it is expected that the manufacturing industry can develop better in the economic field and its income and have an impact on tax revenue.



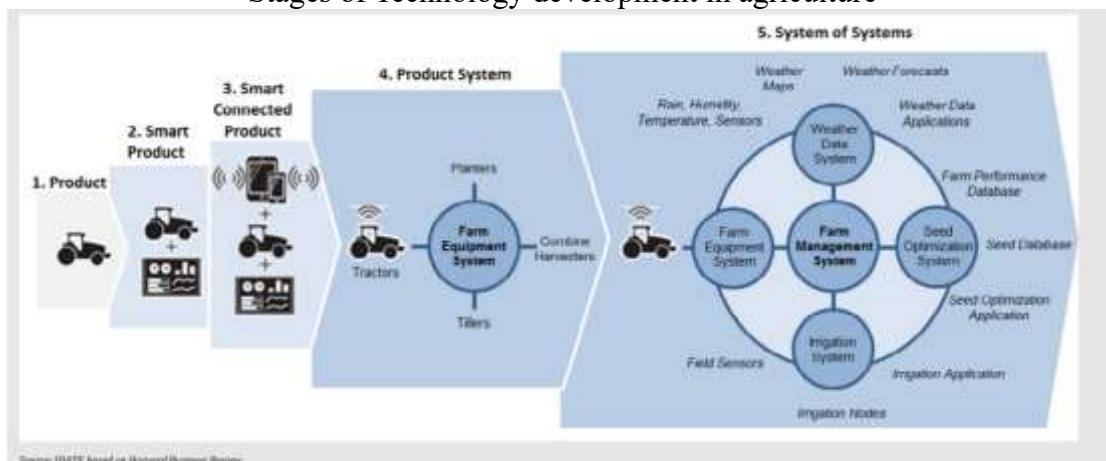
Agricultural Transformation

Transformation in agriculture and the economy in a massive scope, generally takes into account productivity growth in the agricultural sector, the increase and development of the average size of farms, and the migration and gradual transfer of agricultural labor to other sectors, including manufacturing and services (Bokusheva & Kimura, 2016). In this case, the transformation of the agricultural sector is not only related to the number of workers or quantity but is related to productivity and the technology that has been used. working smartly is a good added value.

In Europe, small farms have contributed to local, national, and global food supply (Galli et al., 2020), which of course needs to be supported by the latest research related to agriculture and adequate equipment. When linked to national food safety and nutrition (FNS) in Europe, it has been shown that SF is involved in various strategies and business models, providing composite results. So the small farming sector also has an impact on the economic activities of the country.

The growth of food production at an unprecedented level, in the last 30 years (1969-1999) was fast and rapid by applying the agricultural transformation to the green revolution (Euis & Yuliana, 2020). Therefore, the agricultural sector or the agricultural sector is very important in a country. It can be proven by the division of a country's income in the input and output table categorized by sector, agriculture is in the first position. This shows that agriculture is the main sector in the region or country, (Kilmanun et al., n.d.) explain that in recent years the contribution of the agricultural sector has had a major impact on the national gross domestic product (GDP), but is now starting to experience a significant decline. This is true for Indonesia, however, there is a slight difference with the European region.

Figure 4
Stages of Technology development in agriculture



Sumber : (European Commission, 2017)

European countries are already quite good at implementing agriculture 4.0, where they have integrated various technologies in the use of tools and agricultural machinery, not only that, the application of a good and sustainable system is also one of the factors for the success of the agricultural revolution 4.0.

In the European Commission report in July 2017, several indicators show the development of industry 4.0 into agriculture 4.0. (1) Building the foundation of digital transformation; (2) Internet of Things; (3) Big Data; (4) Artificial Intelligence; and (5) Digital training.

Of the five points above, Europe has implemented many of them so that the development of the agricultural world has been quite good. as evidenced by the European



Commission report where Europe has moved quickly in agriculture such as other import requirements of the agricultural industry are IoT capabilities European Commission, 2017).

Agricultural Taxes

The diversity of tax systems in EU countries results in the compilation and comparison of different conditions in carrying out business processes. Agricultural taxation is one aspect of tax policy that is understood as a means of influencing the state in such a way as to ensure a revenue budget that allows the achievement of economic and social goals (Gruziel & Raczkowska, 2018). The fiscal function of taxes certainly aims to provide income to the state, and the importance of taxes is because they are the main source of revenue for the state budget and the basis for its operations.

There are several ways in which taxes on agriculture are applied, for European regions such as Ireland there are four stages to taxing agricultural income. Farmers choose to be assessed in the normal way with a one-year accounting period or based on three years of average income. Farmers can claim the farm buildings allowance for capital expenditure for the construction of farm buildings except buildings used as dwellings. The rate is 15 percent of the capital expenditure in each of the first six years and the remaining 10 percent in the seventh year (Andersen & Norsk institutt for landbruksøkonomisk forskning., 2002).

Foreign Direct Investment (FDI)

Foreign direct investment (FDI) is an integral part of an open and effective international economic system and a catalyst for regional development. However, the benefits of FDI do not accrue automatically and equally across countries, National policies and international investment design are important to attract FDI to more developing countries and to reap the full benefits of FDI for development. The challenges faced are primarily those of the country itself, which needs to establish an enabling policy environment for investment and build the human and institutional capacity to implement it (OECD, 2002). So that foreign countries that will enter are attracted by the conditions of countries that have a good and developing economic climate.

According to IMF and OECD definitions, direct investment reflects the objective of acquiring a lasting interest by an entity resident in one economy (direct investor) in an enterprise resident in another economic stratum (direct investment enterprise). "Lasting interest" implies the existence of a long-term relationship between the direct investor and the investing company (Duce & Espana, 2003).

Foreign investment companies will certainly enter a country if they feel that the country can benefit the investor. FDI itself reflects the level of competitiveness of a country in the international market and shows economic partnerships with other countries (Gaspareniene et al., 2022). This means that countries in the world need to improve their economies to attract partners to invest their capital.

Previous Research

The research will be opened with several previous studies related to existing variables. A study conducted in the Southeast Asian Region in 2022 explained that the Manufacturing Industry sector has a positive effect on tax revenue (Minh Ha et al., 2022) and another study conducted by (Chaudhry & Munir, 2010) entitled Determinants of Low Tax Revenue in Pakistan in the year, the manufacturing industry sector with the proxy of the percentage of this economic sector in GDP does not affect tax revenue.

There is research from Godin & Hindriks in 2015 entitled A Review of Critical Issues on Tax Design and Tax Administration in a Global Economy and Developing Countries. In this study, it is stated that the agricultural sector harms tax revenue, especially VAT (Godin & Hindriks, 2015). Based on other previous studies, there is no effect of the agricultural sector on tax revenue, namely by research in 2018 by Rodrigues which states that the agricultural sector



does not affect tax revenue (Rodriguez, 2018) can be interpreted, that the agricultural sector has not affected the economy.

The value of Foreign Direct Investment (FDI) has also been researched and conducted (Inriama, 2020) which resulted in the conclusion that FDI does not affect tax revenue. this is certainly related to the destination theory issued by the OECD in 2011 which explains that Value Added Tax is a tax on consumption paid, at the final stage by consumers and collected by entrepreneurs (CENTRE FOR TAX POLICY AND ADMINISTRATION, 2011). Then there is research conducted by (Mahmood & Chaudhary, 2013) which results in the conclusion that Foreign Investment has a positive effect on Tax revenue.

Hypothesis.

Through previous research, the authors conclude temporary hypotheses as follows:

1. The first hypothesis (H1) is that the agricultural sector hurts Value Added Tax (VAT) revenues in the Balkan countries.
2. Then the second hypothesis is that the Manufacturing Industry sector has a positive effect on Value Added Tax (VAT) tax revenue.
3. The third hypothesis is that the agricultural sector moderated by Foreign Direct Investment (FDI) in the European region does not affect Value Added Tax (VAT) revenue.
4. Furthermore, the fourth hypothesis looks at the effect of the Manufacturing Industry sector, which is moderated by Foreign Direct Investment (FDI) in the European region, not affect Value Added Tax (VAT) revenue.
5. And finally, the Foreign Direct Investment (FDI) variable does not affect Value Added tax revenue (VAT).

METHODS

Research Methods

The research uses Descriptive qualitative methods using panel data regression analysis to be able to see the relationship and influence of each variable driven by moderation variables to see the effect that will strengthen or weaken the Independent variable, using data from the World Bank, namely the contribution of the agricultural sector to GDP, the contribution of the manufacturing industry sector to GDP, both of which are at the same time an Independent variable then the variable contribution of Foreign Direct Investment (FDI) to GDP where this variable becomes a moderating variable and finally the percentage of VAT revenue to GDP in each country as a dependent or dependent variable.

The data will be processed using the Stata application, using several tests such as descriptive analysis tests to see data bias, and whether there is lame data or not. Then the classical assumption test to see the normality of the data and model selection to see the right model for processing this data.

The locus of this research is a country in the Balkan region of continental Europe, but due to data limitations, the author excludes several countries in the region such as Croatia, Kosovo Bulgaria, and Slovenia, so that it will use data from 7 countries with a range of years starting from 2011 - 2019 (9 years). The reason for using this range is related to the start of the Industrial Revolution 4.0 in 2011. So that the author connects the year with conditions in the field related to technological and economic developments.



RESULT AND DISCUSSION

Data Description

Table 3

Deskriptif Statistic Test

Variable	Obs	Mean	Std. dev.	Min	Max
vatgdp	63	13.69963	2.261473	9.82	17.675
and	63	20.68188	7.010552	9.914104	38.69548
fdi	63	3.711378	2.683844	.3864446	10.00958
agri	63	8.00537	4.892528	3.113752	19.99015
agrifdi	63	39.42815	52.15433	1.203292	192.0574
indfdi	63	72.89443	53.28601	5.555959	226.3767
serv	63	54.97617	7.105215	42.96263	70.60799

Source: own results

Statistical tests show that the data for data is spread quite well or not too lame, this proves that economic structures such as the manufacturing industry, Foreign Direct Investment (FDI), and the Agricultural sector in the Balkan region are almost equal. So that for research, these factors can explain in general the economic conditions that are estimated to be the same in the region. Minimum and Maximum values that show numbers that are not too far away, only in the manufacturing and service industry sectors are slightly distant which also explains that the Balkan countries almost have similar economic structures or economic movements that are not too unequal between periods.

Classical Assumption Test

Table 4

Classical Assumption Test Results

Uji Asumsi Klasik	Hasil	Interpretasi
Normality	Prob>chi2 = 0.0764> $\alpha = 5\%$	Reject H_0 ;
Heteroskedasticity	Prob>chi2 = 0.7200> $\alpha = 5\%$	Reject H_1 ; model is homogeneous
Multikolinearity	VIF = 40.37> 10	Reject H_0 ; model is multikolinearity
Autocorrelation	Not tested because the data is panel	

Source: own results

From the classical assumption test, it can be concluded that in general the data does not pass the classical assumption test, but there are several considerations I still use the same data

1. Maintain the authenticity of the data so that the results that appear are processed from the truly raw.
2. So that the results obtained are by the existing reality

As for the multicollinearity test, it can be ignored because it uses moderation variables which can be ascertained that there is a relationship between independent variables. According to Sihombing, 2022 Multicollinearity indicates a linear relationship between some or all of the independent variables that make up the regression model (Robinson Sihombing, 2021).



Fixed Effect Model Panel Test
Table 5 FEM test

PPN/gdp	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
ind	-.7106028	.1251852	-5.68	0.000	-.9620447	-.459161
agri	-.6214532	.2041556	- 3.04	0.004	-1.031512	-.2113946
agrifdi	.0029016	.0173832	0.17	0.868	-.0320136	.0378167
indfdi	-.0186091	.0116813	-1.59	0.117	-.0420716	.0048534
fdi	.2829484	.215134	1.32	0.194	-.149161	.7150578
serv	-.6956397	.1015278	-6.85	0.000	-.8995643	-.4917151

Determination Coefisien ,Overall	0.3558
(Alpha)	5%

Source: Own processing results

Based on the model test that has been applied based on
 - chow test, Prob> F = 0.0000 does not reject H0.
 - Hausman test, Prob> chi2 = 0.0001 does not reject H0,
 then the model used is the Fixed Random Model.

Discussion

From the test results that have been carried out, it can be seen that the industrial sector harms VAT revenue in the Balkan countries. The results of this study contradict research conducted by Nguyen who conducted research in the Southeast Asian region, explaining that the manufacturing industry sector has a positive effect on tax revenue. the cause is when the industry in the economic sector, especially large companies that run it and adapt to economic development, can get high profits that affect higher taxable income, making it easier to collect tax. Therefore, the higher the added value of an industry, the higher the tax revenue (Minh Ha et al., 2022). Also, research from (Chaudhry & Munir, 2010) explains the industrial sector does not affect tax revenue. This is inversely proportional to the initial hypothesis which explains that the industrial sector will have an impact on VAT revenue, supported by previous research and industrial developments through the Industrial Revolution 4.0 such as smart factories and the Internet of Things. It turns out that it is still unable to make the manufacturing industry in the Balkan countries a driver of VAT revenue.

The same thing also applies to the Agricultural Sector which harms VAT revenue. The relationship between all variables will be explained by previous studies, such as those in the research results stating that the agricultural sector hurts state revenue. In line with other research from (Bird et al., 2008) which states that agriculture harms tax revenue. By the results of the hypothesis at the beginning states that the agricultural sector hurts tax revenue.

When viewed from the economic development in Europe itself, the value of agriculture in the economic structure, in this case, the Gross Domestic Product, is small, only 1.7% in 2021. From this, it can be concluded that the agricultural sector has not been able to become a promising sector to support state income in the field of taxation, even though in the past few years, especially since 2013, technology and digitalization have supported very well, so that its development is also growing rapidly. However, what is seen is that these things are not enough to create progress to support tax revenue.

Another reason is that some countries in Europe provide incentives to farmers related to land or building taxation so that they are more productive in agricultural processing but on the other hand, income tax will still be imposed (Veen, 2007) Indirectly it can be said that these incentives can reduce tax revenue.



The majority of developing countries exempt the agricultural sector which is called "Hard to Tax" when compared to non-agricultural sectors (Bird et al., 2008). In addition, economic growth and openness have increased the potential revenue to be collected by a country. In contrast, large natural resource revenues such as agriculture and part of its value-added are not favorable for non-resource tax collection (Brun & Diakite, n.d.). From this explanation, it certainly appears that the agricultural sector is a tax burden with the incentives provided but is classified as a sector that is difficult to tax. It becomes different when the industrial sector moderated by FDI has no effect on VAT revenue. However, in accordance with research by the Influence of Economic Growth, Foreign Direct Investment and Tax Rate on Corporate Income Tax Revenue of ASEAN Countries which states that Foreign Direct Investment has no effect on revenue). This is related to the destination principle, namely goods are subject to VAT when consumed not when produced. where when FDI enters a country, generally the sale of goods will be directed abroad and not consumed in the producing country, which directly means export. it is concluded that the country does not get any VAT from the transaction (CENTRE FOR TAX POLICY AND ADMINISTRATION, 2011).

The Agricultural sector moderated by FDI has no effect. Similar to the industrial sector, although the value of agriculture is categorized as having a small impact on tax revenue, the condition of the VAT that is not obtained is the main point that causes the state to be unable to collect taxes. In addition, the factor of the contribution of the agricultural sector which is not comparable to other sectors such as industry and services is the cause of the lack of influence of the agricultural sector on revenue.

Even with the development of the agricultural sector which is getting better with the use of internet-integrated technology, it is still not able to make this sector a revenue driver, it backfires on the government with various incentives given to this sector without adequate contribution to VAT revenue. The building incentives for farmers that they can attract are certainly one of the deducting factors from tax revenues, especially on Value Added Tax (Andersen & Norsk institutt for landbruksøkonomisk forskning., 2002).

By the initial hypothesis explains that the FDI sector itself does not affect VAT revenue. In line with research (Inriama, 2020) The Effect of Economic Growth, Foreign Direct Investment, and Tax Rate on Corporate Income Tax Revenue of ASEAN Countries states that Foreign Direct Investment does not affect Revenue. This is again related to the destination principle conveyed by the OECD, where when FDI investors enter a country, they have the principle of seeking profit. generally, they plan the sale of goods to be directed abroad, which means that they are consumed outside the Investment area and directly exported. So that these countries do not get any VAT from existing transactions including these exports.

CONCLUSION AND SUGGESTION

Based on this research, the author concludes that the agricultural sector and the industrial sector harm VAT revenue, but when the two sectors are moderated by the value of Foreign Direct Investment (FDI), the results obtained by the two economic sectors do not affect VAT revenue, as well as FDI which does not affect VAT revenue. Of course, this applies in the Balkan region so there is no empirical evidence that the same thing applies to other regions of the world.

This research is expected to be a new insight related to the influence of the agricultural sector, and the industrial sector on VAT revenue, The limitations that the authors experience are related to data that has a small span of 9 years, then the number of countries that do not represent all countries in the Balkan region. the author considers that it has not fully described the conditions related to the agricultural sector and the manufacturing industry. Future suggestions



for other researchers to be able to change the research locus, increase the number of years, and related references.

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