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How are the Underground Economy Levels in Indonesia?

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***Abstract*: This study aims to analyze the value of the underground economy in Indonesia and the potential lost taxes due to the underground economy. The method in this study uses a monetary approach by using the variable amount of currency demand, tax burden, opportunity cost, inflation, financial innovation and GDP. The data used in this study are secondary data from quarterly time series for the period 2016 - 2019. The analysis technique used is multiple linear regression with the Ordinary Least Square (OLS) method and also the underground economy measurement equation. The results showed that the factors that have a significant influence are tax burden, financial innovation and also GDP. Meanwhile, the inflation and interest rate variables do not have a significant effect. The nominal value of underground economy in Indonesia during the 2016-2019 period is in the range of 475,634 billion to 750,839 billion or an average of 627,541 billion per quarter or equivalent to 17.65% of nominal GDP. The potential for lost taxes due to underground economic activities in Indonesia during the 2016-2019 period shows an increasing trend. In 2016, the potential tax loss was around 1,229,514 billion to 1,395,872 billion. This value continues to increase until the end of 2019, which means that the potential for state revenue is also reduced due to underground economic activities. These findings indicate that there are still many economic activities that are not detected by the government so that the potential for lost taxes is still high.**

Keywords— Tax Burden, Inflation, Tax Potential, Underground Economy

I. INTRODUCTION

Economic growth in several countries is often measured using the value of Gross Domestic Product (GDP). However, this measurement method is still considered to have weaknesses because it has not included all activities that actually take place in the economy. As a result, the calculation results obtained cannot reflect the actual economic conditions. There are several economic activities that are legal or illegal that are not included in the GDP calculation. These activities are commonly referred to as the unofficially economy or underground economy which since more than a decade has become a global issue [1][2][3].

Underground economy is an inseparable part of the economic activities of most countries. Underground economy is economic activities both legally and illegally that have been missed from the calculation of Gross Domestic Product (GDP) which is also known by another name unofficially economy or black economy has now become a global issue [4][5][6].The existence of underground economy activities also has the potential to cause loss of state revenue through the tax sector [7]. Underground economy is a problem faced by many countries, both developed and developing countries and is generally difficult to detect because the actors of this activity try to avoid government surveillance [8]. Undergorund economy is often used as a vehicle for economic agents to escape inspections and government regulations (Bajada, 2006). Underground economy activities are generally separated from the supervision of the tax authorities so that the potential for state revenue from tax obligations arising from underground economic activities is lost [9][10].

Some examples of underground economy activities in Indonesia include the smuggling of goods into and out of the country, such as wood, fuel oil (BBM), protected rare animals, and illegal goods from China to Indonesia without going through Customs and Excise inspections and supervision. . Even activities that are included in the underground economy also include human trafficking crimes, whose activities are difficult to detect by the government [11][12][13]. In addition, the activities of street vendors who are not registered with the government are also included in the under-fund economy [14].

In calculating the size of the underground economy, difficulties are still found because there is no consensus on the concept of the underground economy itself [15][16].In addition, actors in the underground economy generally do not want to be known and hide their identities [17]. Minimizing the size of the underground economy needs to be done to effectively address the problem of tax avoidance and the subsequent fiscal deficit in the long term [18][19].

The underground economy is the production of goods and services, both legal and illegal, that have been missed from the calculation of Gross Domestic Product (GDP) [20][21]. Illegal activity is an illegal market where goods and services are produced, traded and consumed illegally so that they are not detected by the government. This activity is said to be illegal because it is not legally justified.

Meanwhile, legal activities that are included in the underground economy are in the form of production of goods and services that are legal but are intentionally traded behind closed doors for several reasons, including: (i) to avoid paying taxes; (ii) to avoid paying social protection contributions; (iii) avoiding established standards such as minimum wages, maximum working hours, safety standards, (iv) to avoid agreeing to prescribed administrative procedures.

Several previous studies have found that accurate data from several economic indicators can be used as a proxy to measure the underground economy, one of which is the monetary approach, namely by looking at the elasticity of demand for currency against tax burdens [22][21].

The monetary approach assumes that underground economy activities occur because the underground economy players want to avoid the obligation to pay taxes imposed on them [23][24]. This measurement can then see how much potential tax is lost due to the underground economy. This is important because the potential for lost taxes can reduce state revenues which in turn will have an impact on the quality of development. This study aims to analyze the value of the underground economy in Indonesia and the potential lost taxes due to the underground economy.

II. METHODS

This research is a quantitative study that analyzes the value of the underground economy in Indonesia and the amount of potential tax revenue from the underground economy. The estimation method used is the monetary approach, which is one of the most frequently used methods to measure the underground economy. This method was developed by Vito Tanzi which is used to estimate the underground economy in the United States [22]. The method with the monetary approach estimates the underground economy by looking at the elasticity of demand for currency against the tax burden. This is based on the assumption that economic actors in the underground economy prefer to use cash to avoid government control, especially the tax authorities.

The data used in this study are secondary data from quarterly time series for the period 2016 - 2019 sourced from Bank Indonesia (BI), the Directorate General of Taxes, Ministry of Finance (Dirjen Pajak Kemenkeu) and also the Central Statistics Agency (BPS). The variables used in this study are as follows:

a) Total Currency (C)
   This is the amount of currency in the form of banknotes and coins circulating in the public. In order to reflect the actual value, the currency used is real currency, namely nominal currency (M1) which has been adjusted to the general price level.
b) Tax Expense (T)
   The proxy used as tax expense is the ratio between tax revenue to nominal GDP. This is in accordance with the definition of a tax burden according to the Organization for Economic Co-Operation and Development (OECD). In this study, the tax expense variable is expected to have a positive effect on the demand for the money supply.
c) Opportuity Cost (O)
   The 1-month deposit rate is assumed to be the opportunity cost of holding money. The 1-month deposit interest rate in theory has a negative relationship to the demand for currency because the higher the interest rate, the greater a person's desire to save.
d) Inflation (I)
   Reflects changes in the price of a group of goods and services that are consumed by the public or as a proxy for purchasing power. In theory, inflation has a positive effect on the demand for currency.
e) Financial Innovation and Banking Development (F)
   Reflects financial innovation and banking developments as indicated by the number of commercial bank branches. This variable represents banking services. The more the number of bank branches, the better banking services will be. Better service will reduce the cost of obtaining money, which in turn will lead to less demand for money.
f) Gross Domestic Product (GDP)
   Reflects Indonesia's Gross Domestic Product at the quarterly applicable prices from 2016-2019. GDP in this model is expected to have a positive influence on quarterly money demand.

The analysis technique used in this study is multiple linear regression analysis, which is estimated using the ordinary least square (OLS) method. In the initial stage, estimation is carried out to determine the size of the underground economy in the study period. Furthermore, based on the estimation results, the amount of tax potential in the underground economy is determined. As for the estimation stage of the underground economy in this study, it can be explained as follows:

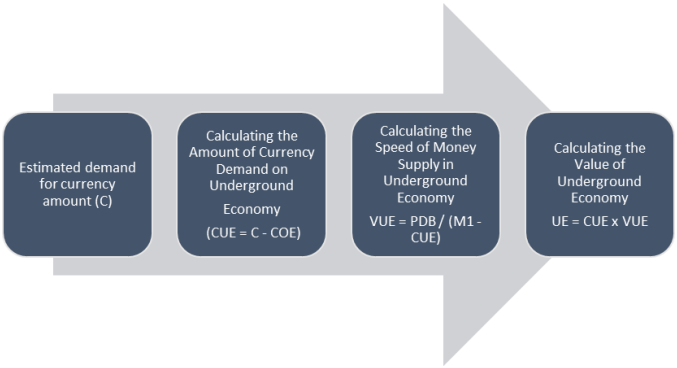

Fig. 1. Stages of calculation of underground economy

The demand for currency is part of the overall demand for money, both in the official economy (OE) and in the underground economy (EU). Therefore, it is assumed that the demand for currency (C) is influenced by the tax burden (T), the price level or inflation (I), the interest rate (BI Rate) as the opportunity cost (O), and national income in the form of GDP. Another factor that also influences the variable financial innovation and banking development (F), which reflects the people's preference for holding currency. In summary, the demand for currency as a whole can be written in the regression function as follows:

$C = f(T, O, I, F, Y)$ …… (1)

or

$LnCt = \beta 0 + \beta 1Taxt + B2Ot + \beta 3LnIft + \beta 4Ft + \beta 5LnYt + et$ ……. (2)

Where C is the amount of currency, Tax is the amount of tax burden, O is the opportunity cost, If is inflation, F is financial innovation and banking development,

Y is the value of GPD, e is error (error rate), β is the value of the coefficient and t is a period of time.

To estimate the demand for currency used in the underground economy, first calculate the demand for currency used in the official economy by using the equation function (1) but by removing the tax burden variable (T) from the model. This is done because when people are faced with the choice to do activities in the official or underground economy, their election decisions are very much influenced by the relative prices between the official economy and the underground economy. One of the factors that causes differences in relative prices is the tax burden (T), so that working in the official economy will be relatively more expensive and people will prefer to work in the underground economy. The difference between the overall demand for currency (C) and the official economy (COE) shows the large demand for currency in the underground economy (CUE).

To determine the value of the underground economy, the currency used in the underground economy is multiplied by the velocity (speed) of the money supply (V). Given that the velocity of money in circulation in the underground economy is relatively difficult to measure, its value is assumed to be the same as the velocity of money in circulation in the official economy. In simple terms velocity of money supply is defined as the ratio of nominal income (GDP) to the legal nominal money supply, which is obtained from the money supply for transactions (M1) minus currency in the underground economy (CUE).

By knowing the money supply (CUE) and velocity (speed) of money in circulation in the underground economy (VUE) from the above calculations, the value of the underground economy (UE) can be obtained by multiplying the two elements (CUE x VUE). After estimating the value of the underground economy, the amount of potential tax contained in the underground economy can be determined using the following formula (Nizar and Purnomo, 2011):

Tax Potential= UE x Average Tax Rate……..…(3)

In this case the average tax rate is determined by using a proxy ratio of total tax revenue to GDP.

Considering that this research uses multiple regression analysis techniques, the classical assumption test is first carried out to obtain regression estimation results that meet the BLUE (Best Linear Unisex Estimator) requirements, which are linear, unbiased, and minimum variance. In short, BLUE means that the resulting parameter estimates will have a minimum variance and it does not mean that the estimation of each sample will be the same in population.

III. RESULTS AND DISCUSSION

Based on the estimation of multiple linear regression analysis in accordance with equation (2), the following results are obtained:

TABLE 1. ESTIMATION RESULTS OF MULTIPLE LINEAR REGRESSION USING THE OLS METHOD

Variable	**Coefficient**	**Std.Error**	**t-statistic**	**Prob.**
(Constant)	39.49839	4.873219	8.105195	0.0000
T	0.580520	0.152032	3.818413	0.0034
O	-0.012852	0.013332	-0.963989	0.3578
Ln IF	0.014689	0.009267	1.585194	0.1440
F	-0.001295	0.000154	-	0.0000
			8.416469	
Ln_Y	0.832924	0.244501	3.406632	0.0067
R-squared	0.956085			
Adjusted R-squared	0.934127			
F-statistic	43.54213			
Prob(F-statistic)	0.000002			
Durbin-Watson stat	2.237341			

Source: Eviews Output, 2020

Based on the results of the multiple linear regression estimation presented in table 1, the following equation is obtained:

LnCt= 39.49839 + 0.580520Tax - 0.012852O + 0.014689LnIf - 0.001295F + 0.832924LnY + e…….(4)

Based on equation 4, it can be explained that the tax burden (T), inflation (If), and GDP (Y) variables have a positive effect on the demand for currency (C), while the opportunity cost (O) and financial innovation (F) variables have a negative effect. .

The tax burden variable has a probability value of 0.0034 <Alpha (5%), which means that this variable has a significant effect on the demand for currency in Indonesia. While the coefficient on the tax burden of 0.580520 indicates that when there is an increase in the tax burden of 1 unit, it will increase the demand for currency by 0.580520 assuming cateris paribus.

The results of this study are in line with research conducted by Samuda (2016) which also explains that the tax burden has a positive effect on the demand for currency. The motivation to avoid taxes will affect the demand for currency by using more currency to conduct transactions. The use or storage of non-currency money, such as transactions through banking, bonds, or stocks, will be very easily detected, especially by the tax authorities, so that the public tends to reduce it when tax increases occur.

The opportunity cost variable represented by the BI interest rate has a probability value of 0.3578> Alpha (5%), which means that this variable does not have a significant effect on the demand for currency in Indonesia. Meanwhile, the coefficient on the opportunity cost of -0.012852 indicates that when there is an increase in the interest rate of 1 unit, it will reduce the demand for currency by 0.012852 with the assumption of cateris paribus.

The results of this study are in line with previous research which also explains that interest rates have a negative effect on demand for currency [9][25][26]. In theory, when the interest rate is higher, the desire of the public to save money in the bank will increase due to the existence of a higher return on profits that will reduce the demand for currency.

The inflation variable has a probability value of 0.1440> Alpha (5%) which means that this variable has no significant effect on the demand for currency in Indonesia. While the coefficient on inflation is 0.014689 indicating that when there is an increase in the interest rate of 1 unit, it will increase the demand for currency by 0.014689, assuming cateris paribus.

The results of this study are in accordance with the existing theory where when there is an increase in inflation,

then with the same nominal amount, the number of items that can be purchased is less [27][28]. Therefore, when there is an increase in inflation, the demand for currency will be even higher because the demand for holding money in the society is getting higher. Although the inflation variable is not statistically significant, it does not mean that inflation has no effect on demand for currency. This could be due to the relatively small effect of inflation so that it is not statistically significant and it can also be understood that when inflation occurs, the public will not immediately increase the demand for currency.

The variable of financial innovation and banking development has a probability value of 0.0000 <Alpha (5%), which means that this variable has a significant effect on the demand for currency in Indonesia. Meanwhile, the coefficient on financial innovation is -0.001295, indicating that when there is an increase in financial innovation and improvement of 1 unit, it will reduce the demand for currency by 0.001295 with the assumption of cateris paribus.

The results of this study are in accordance with the money demand theory which explains that the more development of financial and banking innovations will further improve the financial transaction services carried out by the public, this will reduce the total cost of holding money so that it will reduce the demand for currency [29][30].

The gross domestic product variable has a probability value of 0.0067 <Alpha (5%), which means that this variable has a significant effect on the demand for currency in Indonesia. Meanwhile, the coefficient on GDP of 0.832924 indicates that when there is an increase in GDP of 1 unit, it will reduce the demand for currency by 0.832924, assuming cateris paribus.

The results of this study are in accordance with Keynes' money demand theory which explains that income has a positive relationship with money demand. When the income owned by the community increases, the willingness to hold money will increase so that this will increase the demand for currency.

A. Underground Economy Measurement

Based on the estimation results from the currency demand equation (equation 4), then the underground economy can be measured. The results of this equation illustrate the demand for currency in the community both in the official economy (COE) and underground economy (CUE) transactions. The results of the estimated amount of currency demanded with tax burdens are then reduced by the estimated total demand for currency without tax burden to obtain an estimate of the total demand for currency in the underground economy in Indonesia for the period 2016-2019 as shown in table 2 as follows:

TABLE 2. ESTIMATION RESULTS OF REAL CURRENCY IN INDONESIA 2016-2019 PERIOD (BILLION RUPIAH)

Period		**C**	**COE**	**CUE (Rill)**	**CUE (Nominal)**
(1)		(2)	(3)	(4) = (2-3)	(5) = (4 x Deflator PDB)
Year	TW				
2016	I	3.563.158,27	3.178.337,18	384.821,09	497.741,00
	II	3.406.095,05	3.038.236,78	367.858,27	480.005,21
	III	3.392.309,37	3.025.939,96	366.369,41	483.365,57
	IV	3.146.545,80	2.806.718,85	339.826,95	455.048,04
2017	I	4.054.712,61	3.616.803,65	437.908,96	594.431,67
	II	3.872.411,93	3.454.191,44	418.220,49	569.254,94
	III	3.863.671,15	3.446.394,67	417.276,48	572.893,61
	IV	3.603.392,98	3.214.226,54	389.166,44	541.446,51
2018	I	4.272.991,12	3.811.508,08	461.483,04	648.550,50
	II	4.179.440,11	3.728.060,58	451.379,53	638.924,63
	III	4.229.557,69	3.772.765,46	456.792,23	653.859,76
	IV	4.039.135,47	3.602.908,84	436.226,63	628.023,71
2019	I	4.622.648,94	4.123.402,85	499.246,09	719.605,54
	II	4.472.164,10	3.989.170,38	482.993,72	699.932,86
	III	4.475.838,18	3.992.447,66	483.390,52	697.485,11
	IV	4.191.071,37	3.738.435,66	452.635,71	656.726,51
Average		3.961.571,51	3.533.721,79	427.849,72	596.081,13

Source: Eviews Output, 2020

Table 2 explains that during the 2016-2019 period, the amount of currency used in the overall economy in Indonesia ranged from 3,563 billion to 4,622 billion or an average of around 3,961 billion in each quarter. Of the total currency in circulation, approximately 89.2% represented the amount of currency used in the official economy. Thus, the amount of currency used in the underground economy (real) ranged from 339,826 billion to 499,246 billion or an average of around 417,849 per quarter. Based on the percentage, the amount of currency in the underground economy is equivalent to 10.8% of the total currency circulating in the community.

After obtaining the amount of currency in the underground economy, the next stage can be determined the value of the underground economy with the assumption that the velocity of money in the underground economy is the same as that in the official economy (VUE = VOE) [7]. The estimation results can be seen in table 3 as follows:

TABLE 3. ESTIMATION RESULTS OF UNDERGROUND ECONOMY VALUE IN INDONESIA 2016-2019 PERIOD (BILLION RUPIAH)

Period		**CUE (Rill)**	**CUE (Nominal)**	**VUE**	**UE (Riil)**	**UE (Nominal)**	**Ratio to GDP**
(1)		(2)	(3)	(4)	(5) = (2x4)	(6) = (3x4)	(7) = (6/PDB)
Year	TW						
2016	I	384.821,09	497.741,00	0,9556	367.729,55	475.634,20	16,24
	II	367.858,27	480.005,21	1,0504	386.394,79	504.192,87	16,40
	III	366.369,41	483.365,57	1,1018	403.658,86	532.563,00	16,62
	IV	339.826,95	455.048,04	1,1867	403.260,44	539.989,18	16,91
2017	I	437.908,96	594.431,67	0,9329	408.534,90	554.558,38	17,18
	II	418.220,49	569.254,94	1,0193	426.276,87	580.220,77	17,23
	III	417.276,48	572.893,61	1,0648	444.331,04	610.037,76	17,41
	IV	389.166,44	541.446,51	1,1400	443.663,56	617.268,25	17,68
2018	I	461.483,04	648.550,50	0,9688	447.091,22	628.324,78	17,89
	II	451.379,53	638.924,63	1,0410	469.877,70	665.108,67	18,05
	III	456.792,23	653.859,76	1,0745	490.832,51	702.585,57	18,29
	IV	436.226,63	628.023,71	1,1138	485.848,23	699.462,58	18,41
2019	I	499.246,09	719.605,54	0,9695	484.001,01	697.631,52	18,44
	II	482.993,72	699.932,86	1,0508	507.529,95	735.489,65	18,55
	III	483.390,52	697.485,11	1,0765	520.367,46	750.839,20	18,46
	IV	452.635,71	656.726,51	1,1371	514.684,49	746.752,73	18,58
Average		427.849,72	596.081,13	1,06	450.255,16	627.541,19	17,65

Source: Eviews Output, 2020

Based on table 3, it can be explained that the nominal value of underground economy in Indonesia during the 2016-2019 period is between 475,634 billion to 750,839 billion or with an average of 627,541 billion per quarter or equivalent to 17.65% of nominal GDP. The value of the underground economy is classified as low because in this study it only tries to see the relationship between the tax burden and the underground economy.

The next step after obtaining the value from the underground economy is calculating the amount of potential tax lost due to the underground economy activities, or it can be explained as the potential tax is a tax that is not reported by the players in the underground economy. The results of the estimated potential tax due to the underground economy are presented in table 4 as follows:

TABLE 4. ESTIMATION RESULTS OF UNDERGROUND ECONOMY TAX POTENTIAL IN INDONESIA 2016-2019 PERIOD (BILLION RUPIAH)

Period		**Tax Potential**	**Growth (%)**	**Ratio to GDP**
(1)		(2)	(3)	(4)
Year	TW			
2016	I	1.229.514,40	6,00	0,42
	II	1.303.338,57	5,63	0,42
	III	1.376.675,34	1,39	0,43
	IV	1.395.872,02	-2,07	0,44
2017	I	1.366.986,41	4,63	0,42
	II	1.430.244,20	5,14	0,42
	III	1.503.743,09	1,19	0,43
	IV	1.521.566,23	5,20	0,44
2018	I	1.600.657,38	5,85	0,46
	II	1.694.364,33	5,63	0,46
	III	1.789.836,73	-0,44	0,47
	IV	1.781.880,92	4,73	0,47
2019	I	1.866.164,32	5,43	0,49
	II	1.967.434,81	2,09	0,50
	III	2.008.494,85	-0,54	0,49
	IV	1.997.563,55	-19,17	0,50
Average		1.614.646,07	1,92	0,45

Source: Eviews Output, 2020

Table 4 shows that the potential for lost taxes due to underground economic activities in Indonesia during the 2016-2019 period shows an increasing trend. In 2016, the potential tax loss was around 1,229,514 billion to 1,395,872 billion. However, in 2017 it began to increase to 1,366,986 billion to 1,521,566 billion. The increase in the value of the potential tax continues to increase until the end of 2019, which means that the potential for state revenue is also reduced due to the existence of underground economy activities.

There is an increase in the value of the underground economy which will continuously reduce state revenue, which in turn will affect the quality and quantity of public goods and services that can be provided by the government [6] [3]. This loss of state revenue is further compensated for by increasing the tax rate or by increasing the price of goods of an inelastic nature. An increase in tax rates will trigger tax avoidance and people tend to shift to underground economic activities. Therefore, the government's attention to the potential for tax loss must be increased in order to increase state revenue.

IV. CONCLUSION

Based on the results and discussion in this study, it can be concluded that the amount of demand for currency in Indonesia can be influenced by several factors. The factors that have a significant influence are the tax burden, financial innovation and GDP. Meanwhile, the inflation and interest rate variables have no significant effect. variable tax burden (T), inflation (If), and GDP (Y) have a positive effect on demand for currency (C), while the variable opportunity cost (O) and financial innovation (F) have a negative effect.

The nominal value of the underground economy in Indonesia during the 2016-2019 period was between 475,634 billion to 750,839 billion or an average of 627,541 billion per quarter or equivalent to 17.65% of nominal GDP. The value of the underground economy is classified as low because in this study it only tries to see the relationship between the tax burden and the underground economy.

The potential for lost taxes due to underground economic activities in Indonesia during the 2016-2019 period shows an increasing trend. In 2016, the potential tax loss was around 1,229,514 billion to 1,395,872 billion. However, in 2017 it began to increase to 1,366,986 billion to 1,521,566 billion. The increase in the value of the potential tax continues to increase until the end of 2019, which means that the potential for state revenue is also reduced due to underground economic activities.

The underground economy level in Indonesia is still high due to the many unidentified economic crimes. The level of the underground economy needs to be explored so that the potential for lost taxes from the underground economy can be suppressed so as to increase state revenue. Stakeholders, both government and society, need to work together to reduce underground economic activities for the sake of common welfare.

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