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Impact of agricultural sector investment development on national economic output

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Abstract. This study aims to capture the investment performance of the agricultural sector in capital formation and the incremental capital output ratio (ICOR) and its relative contribution to the national economy in the 2011-2020 period. ICOR research method is the ratio of changes in output due to changes in capital as an indicator to measure investment performance. The research data used is secondary data obtained from the Central Statistics Agency (BPS). The results of the study show that the investment performance of the food crop agricultural sector has fluctuated throughout 2011-2020. The impact of the policy on the agricultural sector was generally positive, but in that vulnerable year, investment leakage was found that led to efficiency. The cause of the leakage is the behaviour of rent-seeking which is reflected in the time leading up to the elections, namely in 2014 and 2018 with the leakage rate of the investment budget in that year being very high, namely 74.09% and 84.50%, respectively. The year 2012 was marked by an ICOR value close to 0 (zero) accompanied by the growth and performance of the agri-food sector of 12.80%. In 2013 and 2015 the performance of the food crop sector contributed to the economic growth of the food crop sector by 8.65% and 15.78%. Unfortunately, the potential for loss of income in that year was very high, namely Rp. 8.16 trillion and Rp. 17.45 trillion, respectively. The best period for the performance of the food crop agricultural sector occurred in the rent-seeking behaviour that occurred in 2 motives, namely political and economic motives. Political motives occur through the mechanism of the backing system and lobbying. The economic motive is caused by the emergence of transaction costs for the distribution of subsidized fertilizers so that it leads to an increase in the HET for subsidized fertilizers.

Keywords. agriculture, economy, ICOR, investment

Introduction

ICOR reflects the productivity of capital which has a big relationship with economic growth and economic efficiency. The addition of capital itself is obtained from investment. The higher ICOR number indicates the possibility of inefficiency in the use of investment. A low ICOR indicates an efficiency in the use of capital. Efficiency occurs due to technological improvements, so the lower the ICOR, the more efficient the use of capital and will increase economic growth (Arsyad, 1988; Suparmono, 2021;).

A high ICOR value indicates that the investment is not running efficiently. There are many factors that can cause investment to not run efficiently, including (1) inappropriate budget allocations, causing a lot of sun costs, (2) the existence of rent seeking behavior by irresponsible actors, (3) transaction costs.

Rent seeking causes welfare to be lost due to the rent-seeking behavior of entrepreneurs and rulers through; bribery, lobbying, collusion, backing system, mark up and regulation of laws that benefit and protect entrepreneurs (Tullock, 1967; Krueger, 1974; Del Rosal, 2011; Gyimah-Brempong, 2002; Yustika, 2020). Rent behavior also occurs because of the influence of the market structure used, namely monopoly-oligopoly, and monopsony-oligopsony of strategic commodities (Damanhuri 2010). This behavior directly affects transaction costs so that it has an impact on high economic costs (Yustika, 2020). This causes investment to become inefficient so that it affects the performance of the national economy.

BPS (2020) Indonesia's ICOR for the last five years (2000s) is still at level 7 while the average Southeast Asian country has an ICOR in the range of 3-4. Prior to 2000, to be precise in 1993 Indonesia's ICOR value was around 4.9, which was higher than the ASEAN average. This indicates that investment in Indonesia as a whole has not shown efficiency and is prone to rent-seeking behavior which causes investment to be not on target due to corrupt behavior (Mahmud, 2011).

Indef (2017) during the last five years the ICOR value has increased from 4.1 in 2010 to 6.78 in 2015. This has resulted in economic growth also slowing down during the same period. A high ICOR value means that the government cannot use incoming investment as a stimulus for economic growth efficiently. There are several factors that cause a high level of ICOR, namely technological innovation and the quality of human resources (Romer, 1990). An increasing ICOR value indicates a declining assessment of Indonesia's technological readiness and capacity to innovate in utilizing incoming investment.

Bappenas (2017) ICOR value is around 6.4 in 2017. The Minister/National Development Planning Agency (Bappenas) recorded the 2019 ICOR value of 6.88. It is suspected that high economic costs will still occur, this needs to be improved in the future so that investment growth is in line with economic growth. The government targets the ICOR value in Indonesia's 2019-2024 National Medium-Term Development Plan (RPJMN) to reach 6.0 (Bappenas, 2020)

Several countries in Asia also experienced the same thing regarding investment efficiency as measured by the ICOR value. In India, the livestock ICOR underperforms, there is excess capital capacity in this sub-sector despite the fact that the Investment Efficiency Ratio (IER) is slightly positive in India. Overcapacity can also arise due to misdirected investment in the livestock sub-sector in some parts of India. (Qureshi et al, 2015)

In Vietnam, investment in the agricultural sector increased rapidly by more than 10% in the period 2000 to 2017, unfortunately the ICOR of agriculture in the period 2000 to 2017 increased from 2.09 in 2000 to 6.4 in 2009 and then fell to 4.49 in 2017 This reflects the efficiency of the use of capital in the agricultural sector to decline. In the period 2000-2005, the average ICOR was at 2.1 to 1, meaning that Vietnam needs to invest 2.1 capital to obtain 1 capital for agricultural growth. During the period 2006 to 2010, the average ICOR increased to 3.8, then increased to 3.5 in the 2011-2013 period (Mai and Van 2019).

In China, high economic growth cannot be achieved if it is not accompanied by an increase in the proportion of investment in Gross Domestic Product (GDP) so that the ICOR value is getting smaller (better). China's ICOR efficiency is reflected in strong rural industrialization and shifts in the labour sector that drive economic growth. Since 1979-2000, China's ICOR value has continued to decline until it reaches 5.1 (Jun, 2003).

Iran has a different character in terms of agriculture. At the beginning of the Iranian revolution, the agricultural sector had the best ICOR value of the oil and mining sectors. Unfortunately, per capita investment in the agricultural sector is still much lower than aggregate investment. Furthermore, there is a negative relationship between per capita investment in the

agricultural sector and the efficiency level of investment in the agricultural sector (infrastructure development). This indicates that there is capital inefficiency in the agricultural sector (Saleh et al, 2008).

The same thing happened in India where the ICOR value of the agricultural sector was very low, namely 1.5, which was very different from the ICOR of the mining sector of 13.8 and the infrastructure sector of 7.6. This shows that capital productivity in the mining and infrastructure sectors is low, causing investment inefficiency (Murty and Soumya 2006).

In contrast to Tunisia, which has an ICOR value close to 3 and continued to increase until the 1980s. Agricultural performance has continued to decline. This indicates that the production system of the agricultural system is inefficient so that it requires government policies and interventions (Thabet, 1994).

The descriptions of several countries in Asia show that inefficient investment management has a major impact on the national economic performance of several countries in Asia. Improperly targeted investment management pushes down economic performance so that it has an impact on national economic growth and welfare.

Investment in the agricultural sector is to encourage the performance and growth of the agricultural sector, but must be supported by targeted investment management (Nasir, 2017). The development of the food crops and plantation sub-sectors has a welfare impact (Faizun, et al, 2014). Efforts to optimize investment performance through simpler, faster and zero-cost transactions can increase efficiency and effectiveness (Susilowati, 2012). The research is expected to be able to measure and reveal the investment performance of the agricultural sector in capital formation and the incremental capital output ratio (ICOR) to the performance of the national economy in the period 2011-2020.

Research Methods

There are 2 basic things to measure investment efficiency and performance, namely the formation of fixed capital (investment) and ICOR (Tambunan, 2001; Saleh, 2014). The ICOR formula is estimated by comparing the investment ratio to changes in the Gross Domestic Product delta (Sukirno, 2004). The smaller ICOR value indicates that investment is getting to a better level of efficiency (Jhingan, 2003). The formula used to identify budget leaks is the ICOR theory (Harrod-Domar), which is formulated as follows:

$$ICOR = \frac{\Delta K}{\Delta Y} = \frac{I}{\Delta Y} \dots \dots \dots (1)$$

Notes:

- ICOR = ICOR Value (ratio)
- I = ΔK = Capital Change (Rupiah)
- ΔY = Output Change (Rupiah)
- I = Infestation (Rupiah)

Nuraini (2013) explains that the investment referred to here can be reflected by the amount of Gross Fixed Capital Formation (PMTB). The amount of PMTB can give an idea of the amount of investment. Investment (I) here is investment by the government or the private sector. The amount of physical investment that has been carried out in a given year can be shown by the amount of PMTB. So the next formula is:

$$ICOR = \frac{PMTB_t - PMTB_{t-1}}{PDB_t - PDB_{t-1}} \dots \dots \dots (2)$$

Keterangan:

- ICOR_t = ICOR Value this year (ratio)

- PMTBt = Pembentukan Modal Tetap Bruto tahun ini (Rupiah)
 (*Gross Fixed Capital Formation this year*)
 PDBt = Produk Domestik Bruto tahun ini (Rupiah)
 (*Gross Domestic Product this year*)
 PDBt-1 = Produk Domestik Bruto tahun sebelumnya (Rupiah)
 (*Previous year's Gross Domestic Product*)
 T = Year

From this ICOR calculation, the estimated GDP leakage in the subsidized fertilizer sector can be calculated. Both in percentage and nominal. This calculation is taken based on the calculation method used by Prof. Dr. Sumitro Djojohadikusumo in 1993 to calculate Indonesia's leakage. The calculation is done by calculating the difference between Indonesia's ICOR and the average ICOR of the Association of Southeast Asian Nations/ASEAN countries (5-3.5 = 1.5). Then the difference in ICOR value is divided by the average value of ASEAN countries so that the amount of leakage is $1.5/3.5 \times 100\% = 30\%$ (Mahmud, 2011). The formula used is as follows.

$$PDB_{bocor}(\%) = \frac{ICOR_t - ICOR_{rata-rata}}{ICOR_t PDB_{bocor}} \dots\dots\dots (3)$$

$$= PDB_{bocor}(\%) \times PDB_t$$

Keterangan:

- $PDB_{bocor}(\%)$ = Estimated Leakage (%)
 PDB_{bocor} = Estimated Leakage (Rupiah)
 $ICOR_t$ = ICOR value this year (rasio)
 $ICOR_{rata-rata}$ = Average ICOR value from all Agriculture sub sectors (ratio)
 PDB_t = This Year's Gross Domestic Product (Rupiah)
 t = Year

Then from the calculation of the estimated GDP leakage of the subsidized fertilizer sub-sector, the lost GDP growth of the subsidized fertilizer sector can be calculated using the formula:

$$PDB_{hilang} = \frac{PDB_t - PDB_{t-1} \times PDB_{bocor}}{100 - PDB_{bocor}(\%)} \dots\dots\dots (4)$$

$$PDB_{hilang} = PDB_{hilang}(\%) \times PDB_t \dots\dots\dots (5)$$

Keterangan:

- $PDB_{hilang}(\%)$ = Estimated Missing GDP Growth (%)
 PDB_{hilang} = Estimated Missing GDP Growth (Rupiah)
 PDB_t = This Year's Gross Domestic Product (Rupiah)
 PDB_{t-1} = Previous Year's Gross Domestic Product (Rupiah)
 $PDB_{bocor}(\%)$ = Estimated Leakage (%)
 t = Year

Discussion

During the period 2011-2020, the ICOR index value fluctuated. The smallest ICOR value occurred in 2012 which was 0.49 accompanied by a leakage rate that was close to 0 (zero). The years 2012 and 2018 were the best momentum for the food crop sector, which grew by

12.8% and 15.78%, respectively. Unfortunately, in 2014 and 2018 the ICOR value reached its lowest point, namely 1.89 and 3.15, which was accompanied by low economic growth in the food crop sector, namely 3.35% and 2.43%, respectively.

Changes in the ICOR index value in 2019 were caused by changes in the estimation of the calculation of the area and production of agricultural food crops. The production calculation method in 2019 is the Sample Area Framework (KSA) method, previously the household-based and eye-estimate tile survey method was accompanied by multi-stage stratified random sampling. This method corrects the previous year's harvested area and rice production. The implication of this new calculation method is that it significantly corrects the estimation of harvested area and national rice production. This is what causes the ICOR value to have a mines value of 11.22 so that the growth of the food crop sector is corrected to 0.68 mines in 2019. In 2020, the ICOR value has again experienced a positive change to 0.97 with a growth of the food crop sector of 6.15%.

In 2011 the ICOR index value of the food crop sector was 1.06 and it decreased slightly to 0.96. The ICOR value of 1.06 indicates that an additional output of 1 billion rupiah requires an investment of 1.06 billion rupiah. In 2020, the investment requirement to produce an output of 1 billion rupiah is 0.96 billion. The decline in the ICOR value index in 2020 shows that investment in the food crop sector is relatively efficient, accompanied by economic growth in the food crop sector of 6.15%. In detail, the growth of the food crop sector and the ICOR value is presented in Figure 1.

Figure 1 Food crop GDP growth in vulnerable 2011-2020

The relatively fluctuating ICOR value in the 2011 – 2020 period can be predicted because the investment allocation (fertilizer subsidy proxy) has not been well targeted. The highest leaks occurred in 2014 and 2018 with estimated values ranging from 74.09% and 84.50%. This is an allegation of investment inefficiency and investment leakage during that period. This leakage occurred due to 2 allegations, namely (1) elite rent behavior in determining fertilizer distribution quotas from a political perspective, (2) transaction costs from an economic perspective and (3) 2014 and 2018 were political years that were vulnerable to being exploited by certain groups. Elite rent behavior through monopoly motives, lobbying, backing system and transactions before the contract (ex ante). Furthermore, the transaction cost motive arising from

rent-seeking behavior at the distributor level causes a shortage of fertilizers. This pushes fertilizer prices up and fertilizer distribution is not right on target

The after effects of rent behavior and transaction costs lead to investment inefficiency (fertilizer subsidy proxy), market failure and loss of potential domestic product income in the agricultural sector as well as the economic performance of the food sector. Market failures have an impact on price distortions on the producer and consumer side by farmers. On the consumer side, farmers bear relatively higher input costs while on the producer side food prices (especially unhusked rice) do not match the burden of production costs. Farmers are trapped in the impact of the quato system monopoly market and monopsony market on the producer side. This causes the market structure to run asymmetrically so that it has an impact on market failure.

Market failure indicates that farmers' subsidized fertilizer investment is less efficient. The agricultural sector commodity market is experiencing distortions due to price uncertainty. Market distortion interferes with the performance of the agricultural sector in terms of output so that it has an impact on the growth of the national food sector. On the other hand, the institutional structure that plays a role in determining farmers who receive subsidized fertilizers and the institutional structure that regulates the distribution of fertilizers to farmers has not run optimally. The role of government institutions in determining the Definitive Plan for Farmer Group Needs (RDKK) has not been running optimally, as indicated by the distribution of subsidized fertilizers that are not on target. Furthermore, the role of institutions that regulate the operation of subsidized fertilizer distribution has not been optimal, marked by the emergence of transaction costs which have an impact on the increase in HET. Furthermore, backing system-based monopolistic behaviour opens up space for misuse of subsidized fertilizer distribution.

The distribution of fertilizers covering all of Indonesia to remote villages is very vulnerable to being misused by irresponsible parties. Weak monitoring and evaluation and asymmetric HET information at the level of poor farmers open up space for rent behaviour at the distribution level. Deviations and irregularities in the distribution of subsidized fertilizers through the cooperation of actors that result in increased transaction costs.

The interesting thing from the results of this study is that the potential leakage of subsidized fertilizer investment occurs in the year approaching the presidential and legislative elections, namely 2014 and 2018. There may be parties who want to take advantage and take advantage of the distribution of subsidized fertilizers. Profit-taking is carried out from a political perspective by building a backing system and lobbying, while from an economic perspective, increasing the HET for subsidized fertilizers.

The behaviour of rent from a political economy perspective clearly disrupts the performance of the national economy in the food crop sector and causes a high cost economy. Economic growth. In the vulnerable 2011-2020 years, the potential for inappropriate investment losses is an average of IDR 3.8 trillion. The potential for huge losses occurred in 2013 and 2015 amounting to Rp. 8.16 trillion and Rp. 17.44 trillion, respectively. Meanwhile, the lowest performance of the food crop agriculture sector occurred in 2014 and 2018 respectively, growing by 3.35% and 2.43%. The ICOR value in both years was greater than one so that investment in fertilizer subsidies was not efficient. In detail, the ICOR values and the potential for leakage are presented in Table 2.

Table 2. ICOR value and potential leakage of fertilizer subsidies, potential growth and amount of loss (Billion Rupiah) vulnerable 2010-2020

Year	ICOR	Leakage (%)	GDP Growth Food	Potential Growth	Amount of Potential Loss
2011	1,07	54.15	6,97	7,74	1,956.68

Year	ICOR	Leakage (%)	GDP Growth Food	Potential Growth	Amount of Potential Loss
2012	0,49	0,00	12,80	12,80	-
2013	0,67	26,63	8,65	11,32	8,160.50
2014	1,89	74,09	3,35	3,67	1,048.11
2015	0,58	16,03	15,78	20,86	17,446.13
2016	0,98	50,09	6,92	7,84	3,667.03
2017	2,06	76,27	3,29	3,57	1,177.77
2018	3,15	84,50	2,43	2,59	703.64
2019	-11,23	104,35	-0,68	-0,71	(136.03)
2020	0,97	49,59	6,5	7,10	4,244.81
Average	0.06	53,57	6,57	7,68	3.826,86

Source: BPS 2010-2020

Although the ICOR value was small in 2013 and 2015, the potential for loss of added value of investment is very large. This is due to the very large growth of the sector in the two years but still has the potential for greater growth. The potential growth of the food crop sector in that year was 11.32% and 20.86%, while the real growth was only 8.65% and 15.78, respectively. The difference between real growth and large potential growth which causes the loss of potential income to be even greater is Rp. 8.16 trillion and Rp. 17.45 trillion. Although technically the ICOR value in that year was good, it still had a higher potential for loss. This means that good economic growth and performance and an ICOR value of less than 1 does not necessarily indicate a low nominal loss.

Furthermore, the trigger for the growth of the food crop sector in 2013 was caused by the increase in fuel oil (BBM), which directly had the effect of increasing prices for agricultural food commodities, including rice. At the same time, the government plans to import food to create price stabilization. Loss of growth potential and income can be overcome if the government optimizes domestic food production. The behaviour of rent-seeking enslaves the market as an entry point for importing food commodities, thereby creating food distortion. The same thing also happened in 2015 which caused the potential for loss of income to be quite high.

Conclusion

The development of food fertilizer subsidy investment fluctuated throughout 2011-2020. The impact of the policy on the agricultural sector was generally positive, but in that vulnerable year, investment leakage was found that led to efficiency. Furthermore, in that vulnerable year, a relatively efficient subsidy investment performance was also found, which was indicated by an ICOR value of less than 1 (one). One of the triggers for investment leakage is the existence of rent-seeking behaviour that causes subsidy investment to be less efficient, which is reflected in the ICOR value of more than 1 (one). This pattern of rent behaviour is reflected in the period leading up to the elections, namely in 2014 and 2018. The impact of this rent behaviour causes the leakage rate of the investment budget in that year to be very high, namely 74.09% and 84.50%, respectively.

Furthermore, in 2013 and 2015 the performance of the food crop sector contributed to the economic growth of the food crop sector which was quite high, which grew by 8.65% and 15.78%. Unfortunately, the potential for loss of income in that year was very high, namely Rp. 8.16 trillion and Rp. 17 trillion. .45 trillion. The alleged trigger is the increase in raw materials due to the increase in fuel oil and the lack of domestic food supply. Furthermore, the renters

took profits in that year by opening a gap in food imports so that the potential for income loss was quite high. The best period for the performance of the food crop agriculture sector through investment in fertilizer subsidies occurred in 2012 which was marked by an ICOR value close to 0 (zero) accompanied by the growth and performance of the food agriculture sector of 12.80%.

Rent behaviour occurs in 2 motives, namely political and economic motives. Political motives occur through the mechanism of the backing system and lobbying, while economic motives are caused by the emergence of transaction costs for distributing subsidized fertilizers so that it leads to an increase in the HET for subsidized fertilizers. This rent-seeking behaviour in terms of political economy hampers economic performance and at the same time harms farmers.

The government needs to make resolutions from the institutional side and the rules of the game to minimize the gap in rent-seeking behaviour to take personal profit. The strategic regulation is to improve the tiered RDKK system through strict verification and validation. Farmers receiving subsidies must have a clear identity, especially regarding land area and other personal data. On the political side, fertilizer distributors must involve community participation by opening up space for other economic actors to be involved in the distribution process. The monopoly mechanism is changed through open bidding and does not limit the number of distributors. On the economic side, the government needs to provide sanctions for distributors and agents when selling fertilizer subsidies above the HET price determined by the government.

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