



IMPROVING VAT COLLECTION EFFICIENCY THROUGH POLICY DESIGN AND COMPLIANCE IMPROVEMENT AND MODERATED BY CONTROL OF CORRUPTION

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Abstract

Value Added Tax (VAT) is increasingly relied upon by an increasing number of economies, as shown by the global trend of increasing standard tax rates, but raises questions about the efficiency of its levy. This study revisits the determinants of VAT collection efficiency by using the C-efficiency ratio approach. Using a dataset of countries in the SEAO region (East Asia, Southeast Asia, and the Pacific), this study was performed quantitatively using a panel data regression analysis. The results show that the government effectiveness index is unlikely to be an appropriate proxy for the compliance gap. In terms of the policy gap, policy changes by increasing the standard VAT rate might reduce the C-efficiency ratio, whereas lowering the VAT registration threshold might not improve the C-efficiency ratio. However, the control of corruption index as a moderating variable could antagonize the negative effect of the VAT standard rate on the C-efficiency ratio. This finding corroborates previous studies and encourages discussion to find variables that better measure compliance and policy gap.

Keywords: C-efficiency ratio, Control of corruption, Government effectiveness, VAT rate, VAT threshold

INTRODUCTION

Value-added tax (VAT), also known as the Goods and Services Tax, has become increasingly relied upon by more economies as a source of state revenue. VAT is a newcomer to the tax system, first implemented in Côte d'Ivoire in 1954 (when it was still under the French colonial administration). However, the number of economies adopting VAT has multiplied six-fold over the four decades since 1980 (see Figure 1.1). This can also be seen from the increasing average ratio of VAT revenue to global gross domestic product (GDP), from 3.93% in 2000, 4.86% in 2010, and 5.65% in 2020 (Darussalam, 2021). Furthermore, there is a global trend that many economies have lowered their income tax rates and compensated for them by raising VAT rates (Owens, 2012).

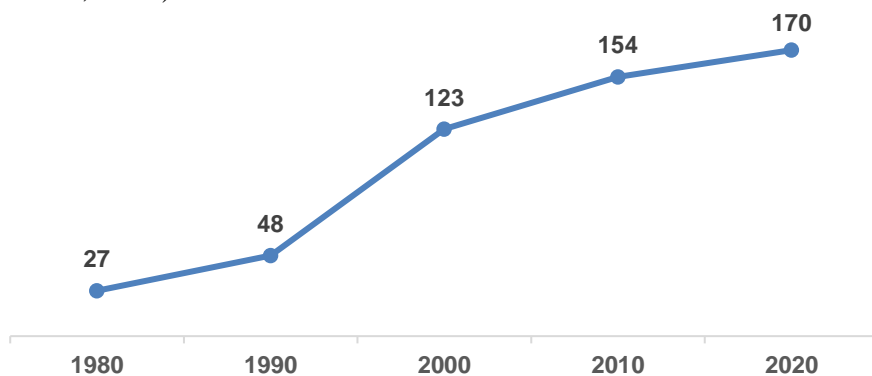


Figure 1.1 Number of Economies Adopting VAT 1980–2020

Source: Prepared from OECD (2020)

There are several reasons for the popularity of VAT. First, it is relatively easy to implement. Second, VAT is neutral because it does not distort economic choice for two reasons: (1) VAT is principally borne by final consumers and (2) it is imposed in an economy where goods and services are consumed. Finally, VAT is a source of government revenue that is more resilient to various economic shocks and that rebounds more rapidly (Ueda, 2017).

Despite its broader adoption and increasing reliance as a source of government revenue, VAT implementation varies from one economy to another. Designing a VAT system for the



government could be challenging. Ideally, VAT should be able to collect revenue from every transaction in every supply chain, from production to sales to end consumers. The government needs to carefully consider formulating policies, tax bases, tax rates, exemptions, and registration thresholds (Feria, 2021; and Zu, 2018). Each economy has diverse policies in terms of these four aspects. For example, members of the Organization for Economic Co-operation and Development (OECD) have a wide range of VAT rates (see Figure 1.2). In addition, many countries apply multirate systems and exemptions for certain transactions, goods, and services in various ways.



Figure 1.2 Standard VAT Rate in OECD Countries
Source: OECD (2018)

The taxpayer compliance levels and administrative capacity also vary from economy to economy. The VAT system requires businesses to register and report every transaction and tax collection and remit it to the government. However, especially for small businesses, their limited resources make managing the administrative costs of taxes challenging. In addition, there are many other forms of non-compliance in this consumption tax practice, including understating sales, manipulating transaction values, and splitting business entities to keep revenue below the threshold (Purohit, 2001; Zu, 2018). In this case, the tax authority must have sufficient capability to maintain the integrity of the tax system by conducting effective audits and law enforcement. Unfortunately, not all economies have such a structured and efficient system (Purohit, 2001).

Based on these implementation differences, each economy's capacity to collect state revenue from VAT may differ. There are various tools to measure the VAT performance, one of which is C-efficiency ratio. This measures deviations in the realization of VAT revenues compared to whether the tax was enforced perfectly by charging a uniform standard rate on all consumption without exemptions (Keen, 2013). According to Keen (2013), VAT revenue has increased year by year, not because of an increase in the collection efficiency (C-efficiency ratio), but rather because of the government's policy of increasing the standard VAT rate. Therefore, it is important to discuss the factors that affect the C-efficiency ratio, so that governments do not rely on the rate-increasing policies to impose more revenue.

Several studies have attempted to identify the determinants of the C-efficiency ratio among different economies. Đorđević et al. (2019) based on the European Union dataset from 1997 to 2017 found that the C-efficiency ratio was positively affected by economic growth and the value of goods exports, while the VAT standard rate and household consumption had a



negative effect. Todorović et al. (2019) based on a dataset of developing countries in the European Union from 2000 to 2016 also found that the C-efficiency ratio is negatively affected by the standard rate of consumption tax. Based on a dataset of Greece from 2000 to 2012, Tagkalakis (2014) found that economic growth has a positive impact on the C-efficiency ratio, while the consumption of basic goods is an insignificant factor. Sokolovskyi & Dmytro (2015), based on data from 41 countries in various parts of the world in 2012, suggested that the shadow economy and corruption have a negative effect on the C-efficiency ratio.

Based on the studies above, there are still differences in research results. Additionally, research on VAT revenue performance using the C-efficiency ratio as a proxy in the Asia-Pacific region remains limited. Therefore, this study contributes more evidence related to C-efficiency ratio determinants, especially for economies in East Asia, Southeast Asia, and Oceania. Hopefully, this study can be a useful reference for governments when considering VAT policy formulation.

LITERATURE REVIEW

VAT System Overview

Value Added Tax (VAT) is a tax on consumption that is widely implemented in many economies. Although its main purpose is to tax the final consumption of people in the country, VAT is levied in stages on the added value of goods and services at each stage of the production process and supply chain to the final consumer (multistage levy). This mechanism involves the assignment of entrepreneurs to tax collectors. Usually, the law sets a certain threshold where entrepreneurs with an annual turnover higher than the threshold are required to collect VAT. The multistage levy system was proposed by Wilhelm von Siemens, a German businessman, in 1918 (James, 2011). This proposal emerged as a solution to the simple sales tax system, which led to the imposition of cascading taxes that increased along with the length of the supply chain. This led to differences in the effective tax rates across goods and services at the time of final consumption. Under the VAT system, entrepreneurs can credit taxes paid on business inputs. The system was finally implemented in the tax system, starting with France, on a limited basis in 1954, and then fully implemented in retailers in 1968. As of 2020 170 economies have adopted the VAT system (OECD, 2020).

Although there are differences in the VAT system policies, all economies are still guided by the basic principles of VAT (Cevik et al., 2019). First, the VAT system applies the destination-based collection principle. This means that a jurisdiction only imposes taxes on domestic consumption so that exported goods and services are exempt from VAT, and vice versa for imported goods and services. Second, the VAT system is based on credit invoicing, that is, companies pay tax on all their sales but have the right to credit for the tax paid on purchases of intermediary goods and services. Third, exemptions from the imposition of VAT are determined through a negative list. This means that all goods and services sold are automatically subject to VAT without exemptions, regardless of the type mentioned in the law. Some types of goods and services can be exempted from the VAT system only if they are explicitly listed in the law. These three characteristics make the VAT system more economically neutral than other consumption taxes (Cevik et al., 2019). This implies that VAT implicitly does not distort prices among various economic activities, which ultimately affects people's economic choices for both entrepreneurs and households (Mankiw et al., 2009).

Therefore, the benefits of VAT for an economy will be optimum if they adopt a comprehensive tax base policy, which means that all final consumption is taxed uniformly. Discrimination in the VAT treatment of certain goods and services not only distorts consumption choices but also distorts competition and creates a bias towards international trade (Crawford et al., 2010). However, some economies implement policies that deviate from the



ideal VAT system, such as (1) imposing different tax rates or bases from standard rules and/or (2) exempting certain types of goods and services, such as public education and public health services (Cevik et al., 2019).

C-efficiency ratio

Keen (2013) stated that the term C-efficiency ratio originated from Ebrill et al. (2001) and is widely used to evaluate the efficiency of a nation's VAT system. The C-efficiency ratios of each economy were compared with each other year by year. The OECD has consistently used this measure as a proxy to evaluate the tax revenue performance of its member countries. The basic idea of the C-efficiency ratio is that since VAT is levied on the final consumption that occurs within a country, VAT revenue should theoretically equal the product of the VAT rate and the amount of final consumption. For example, if the final consumption in an economy is 50% of the gross domestic product (GDP), with a VAT rate of 10%, the VAT revenue collected by the economy should be 5% of the GDP. However, multiple factors cause the actual VAT revenue of an economy to deviate from ideal conditions. This indicates the government's inefficiency in implementing the VAT systems. The C-efficiency ratio compares the actual VAT revenue collected by the government to the theoretical revenue, where VAT is levied on all final consumption without exemption at a uniform rate. Thus, the C-efficiency ratio is mathematically formulated as follows.

$$E^C = \frac{V}{\tau^S(FC - V)} \dots (i)$$

Keterangan:

E^C = C-efficiency ratio;

V = actual VAT revenue;

τ^S = standard VAT rate; and

FC = final consumption of goods and services in an economy.

Furthermore, Keen (2013) divided the C-efficiency ratio into two components: the policy gap and the compliance gap. This can be formulated as $E^C = (1 - P)(1 - \Gamma)$ where P represents the policy gap and Γ is the compliance gap. According to Ueda (2017), the policy gap is the VAT collection efficiency gap caused by the difference between the potential state revenue based on the current policy and the potential state revenue if they follow the ideal VAT system that applies a uniform rate to all the consumption of goods and services without any exemptions. The policy gap arises from the VAT design set by the state in legislation, such as the provision of tax exemptions for the consumption of certain goods and services, various tax rates, or the lack of law enforcement. Besides affecting the effectiveness of the tax system and contributing to revenue loss for the government, policy gaps can also affect the compliance gap, as they can create loopholes for consumers or producers to evade taxes. The compliance gap occurs when consumers or producers do not comply with their tax obligations through avoidance or evasion. To estimate the policy and compliance gaps, data on VAT revenue, tax rates, and exemptions are required (Keen, 2013). In practice, estimating the gaps can be challenging owing to the data limitations and complexity of the VAT system. However, these estimations can provide useful information for policymakers to identify areas for improvement in the VAT system and increase compliance.

Previous Research

Several studies have attempted to provide scientific evidence of the determinants of the C-efficiency ratio. Ueda (2017) decomposed the discussion of the C-efficiency ratio into two categories: compliance gap and policy gap. He used a dataset from Japan and 26 European countries for the period 2000 to 2014. His study show that the compliance gap and policy gap factors independently influence the value of the C-efficiency ratio.



According to Ueda (2017), several factors influence the compliance gap. First, the weakening of the business cycle, characterized by a decrease in the output gap, causes the compliance gap to widen in the short term. An increase in the standard VAT rate also widened the compliance gap. This is in line with other studies, for example Đorđević et al. (2019), Todorović et al. (2019), and Cevik et al. (2019) show that the VAT rate has a negative effect on the C-efficiency ratio. Thus, if the government increases the standard VAT rate, the VAT system becomes increasingly inefficient.

The policy gap is affected by the implementation of policy changes and the business cycle Ueda (2017). The policy gap will be reduced by positive policy changes and strengthening of the business cycle, marked by an increase in the output gap. Ueda (2017) mentioned that policy changes that can worsen the policy gap include increasing the list of goods and services exempted from the VAT system and raising the annual turnover threshold of entrepreneurs required to register to collect VAT. However, these policies have the potential to reduce the compliance gap, as non-compliant taxpayers are excluded from the VAT system and not included in the compliance gap calculation formula.

However, governance was not measured by Ueda (2017). Research performed by Sokolovskyi & Dmytro (2015) and Baum et al. (2017) shows that corruption, using the corruption perception index proxy published by Transparency International, significantly negatively affects C-efficiency. Meanwhile, government effectiveness, as published by the World Governance Indicator, has a significantly positive effect on C-efficiency. This means that the better the public perception of the quality of public services, as well as policy formulation and implementation, the higher the efficiency of VAT collection by the government.

Hypothesis Development

Compliance gap is affected by multiple factors. As the government increases tax rates, taxpayers tend to become non-compliant, which negatively affects VAT collection efficiency. Compliance can also be affected by the quality of public services, policy formulation, and implementation. Effective governance will reduce the gap for taxpayers to disobey laws and regulations so that government effectiveness will have a positive effect on the efficiency of VAT collection. Government effectiveness in this study is used as another proxy to measure the compliance gap because, in the selected research locus, there is no compliance gap measure available, as in the European Union as in research conducted by Ueda (2017). The government effectiveness index is used as a proxy because according to Kaufmann et al. (1999) it is a measure of "... the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies." Thus, effective governance will increase taxpayer compliance due to high taxpayer satisfaction resulting from good public service quality (Dronca, 2016), and at the same time, the surveillance of tax authorities runs optimally to minimize the compliance gap.

Meanwhile, in terms of the policy gap, research on the direct impact of setting the VAT registration threshold on the C-efficiency ratio remains limited. Although Ueda (2017) suggested that the threshold policy is one of the factors of the policy gap, this variable was not directly measured as a factor affecting the policy gap in his study. However, theoretically, the higher the VAT registration threshold, the greater the share of people's final consumption value that is not covered by the VAT system; hence, the lower the C-efficiency ratio. Finally, the control of corruption in this case is a moderating variable for the respective interactions between the VAT standard rate, government effectiveness, and VAT registration threshold on the C-efficiency ratio. Control of corruption positively affects the C-efficiency ratio. As a moderating variable, control of corruption is expected to reduce the negative effect of the VAT standard



rate and VAT registration threshold, and strengthen the positive effect of government effectiveness, on the C-efficiency ratio.

Based on these points, the hypotheses and framework of this study are as follows.

- H₁ : VAT standard rate negatively affects C-efficiency ratio.
- H₂ : government effectiveness positively affects C-efficiency ratio.
- H₃ : VAT registration threshold negatively affects C-efficiency ratio.
- H₄ : control of corruption positively affects C-efficiency ratio.
- H₅ : control of corruption reduces negative impact of VAT standard rate on C-efficiency ratio.
- H₆ : control of corruption strengthens positive impact of government effectiveness on C-efficiency ratio.
- H₇ : control of corruption reduces negative impact of VAT registration threshold on C-efficiency ratio.

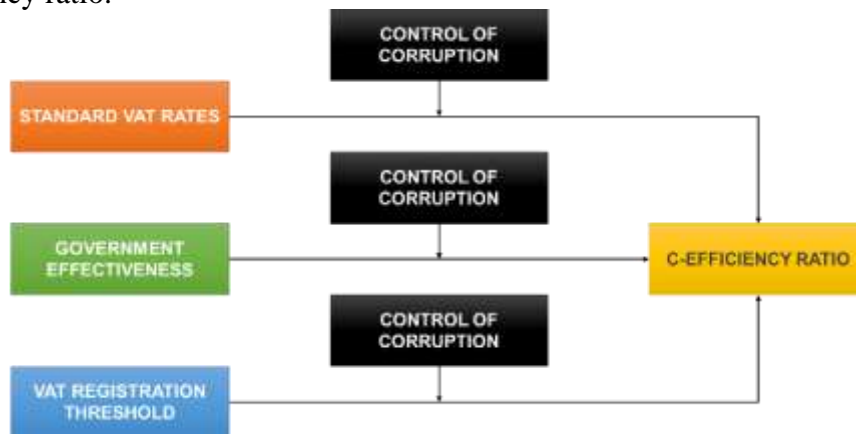


Figure 2.1 Hypotheses Framework
Source: Prepared by Author

METHODS

Quantitative methods were used to achieve the objectives of this study. Countries in Southeast Asia, East Asia, and Oceania (SEAO) regions are the object of this study from 2017 to 2021. However, only nine countries had complete data on the required variables, as shown in Table 3.1. The nine countries are Australia, Indonesia, Malaysia, Mongolia, New Zealand, Philippines, Singapore, South Korea, and Thailand. The data were sourced from the World Development Indicators (WDI) and World Governance Indicators (WGI) by the World Bank, as well as the VAT Guide published annually by EY.

Dependent Variable	Measures	Data Source
C-efficiency ratio (CEFF) = $V \div (\tau^S \times (FC - V))$	Ratio	
<ul style="list-style-type: none"> • Actual Revenue of Goods and Services Tax (V) 	Local Current Unit	WDI EY
<ul style="list-style-type: none"> • VAT Standard Rate (τ^S) 	%	WDI
<ul style="list-style-type: none"> • Final Consumption (FC) 	Local Current Unit	
Independenr Variable	Measures	Data Source
VAT Standard Rate (RATE)	%	EY
Government Effectiveness (GE)	Index	WGI
VAT registration threshold to GDP per capita (THRE) = $T \div Y'$	Rasio	
<ul style="list-style-type: none"> • VAT Registration Threshold (T) 	Local Current Unit	EY
<ul style="list-style-type: none"> • GDP Per Capita (Y') 	Unit	WDI



	Local Current Unit	
Moderating Variable	Measures	Data Source
Control of Corruption (CC)	Index	WGI

Table 3.1 Variable Used

Source: Prepared by Author

The data collected were then analyzed using multiple regression through a series of tests, as shown in Table 3.2, to determine the best panel data regression model for this study. With an α level of 5%, if the probability value is less than α , the decision is H_0 rejected. Multiple regression analysis was modeled using (ii).

Tests	H_0	H_1
Chow Test	Pooled least square model	Fixed-Effect Model
Lagrange Multiplier Test	Random-effect Model	Pooled least square Model
Hausman Test	Random-effect Model	Fixed-Effect Model

Table 3.2 Model Regression Test

Source: Prepared by Author

$$CEFF_{it} = \beta_0 + \beta_1 RATE_{it} + \beta_2 GE_{it} + \beta_3 THRE_{it} + \beta_4 CC_{it} + \beta_5 CC_RATE_{it} + \beta_6 CC_GE_{it} + \beta_7 CC_THRE_{it} + \varepsilon_{it} \dots (ii)$$

Keterangan:

$CEFF_{it}$: C-efficiency ratio

β_0 : constanta

$RATE_{it}$: standard VAT rate (percent)

GE_{it} : government effectiveness index

$THRE_{it}$: VAT registration threshold to GDP per capita

CC_{it} : control of corruption index

CC_RATE_{it} : control of corruption index as moderating variable interacting with standard VAT rate

CC_GE_{it} : control of corruption index as moderating variable interacting with government effectiveness index

CC_THRE_{it} : control of Corruption index as moderating variable interacting with VAT registration threshold to GDP per capita

ε_{it} : Estimation error

In addition to choosing the best regression model, the dataset must be assessed for assumption tests and goodness of fit. Assumption tests require that data are distributed normally, homoscedastic, and there is no autocorrelation. Goodness of fit requires the F test (simultaneously) and the t-test (partially) met the α level of 5%. If the assumptions and goodness of fit of the model are met, the regression results can be interpreted.

RESULT AND DISCUSSION

The economies observed vary in their welfare levels from lower-middle to upper-middle to high income. However, the value of the C-efficiency ratio does not always seem to be directly related to the country's income status. Thailand had the highest C-efficiency ratio, followed by Mongolia and Singapore. The Philippines had the lowest C-efficiency ratio (never exceeding 0.5) from 2017 to 2021. The standard VAT rates of the nine countries tended to remain fixed from 2017 to 2021, except for Malaysia, which increased its standard VAT rate from 6% to 10% in 2018. New Zealand applied the highest standard rate of 15%. Despite its low C-efficiency ratio, the Philippines applied a fairly high rate of 12%.



Variable	Mean	Std. Deviation	Min	Max
CEFF	1.023276	0.465537	0.4185537	2.08369
THRE	15.35523	25.44893	0	93.42242
RATE	0.0993333	0.0246245	0.06	0.15
GE	0.885527	0.8241176	-0.4671799	2.32486
CC	0.5738673	1.113071	-0.5851547	2.237047

Table 4.1 Descriptive Statistic Analysis
Source: Results of data ran on STATA17

Regarding the VAT registration threshold, policies varied widely from country to country. Extreme policy comparisons between South Korea and Indonesia. Based on data obtained by the EY, South Korea does not apply a threshold for VAT registration in its VAT system. In contrast, Indonesia set the threshold for VAT registration at IDR4,800,000,000.00. Indonesia's GDP per capita was over 77 times in 2021, which was only approximately 62 million rupiahs. In fact, other countries included in the observation set the threshold in the range of 1 to 17 times the GDP per capita.

In terms of governance, all economies had a positive index, except for Mongolia, which had a negative government effectiveness index for five consecutive years. A different condition was demonstrated by controlling the corruption index. The Philippines, Mongolia, Thailand, and Indonesia consistently scored negatively for five consecutive years. This indicates poor control of corruption in these four countries. As developed countries, Australia, New Zealand, and Singapore have very high achievements in these two areas, indicating that they have established governance.

Model Tests	Prob. Value	Interpretation
Chow Test	0.0000	fixed-effect is favorable
LM Test	0.0000	random-effect is favorable
Hausman	0.7720	random-effect is favorable

Asumption Test	Prob.	Interpretation
Uji Normalitas	0.6171	H ₀ : data distributed normally
Uji Breusch-Pagan and Cook-Weisberg	0.7068	H ₀ : homoscedastic
Wooldridge test	0.3674	H ₀ : no autocorrelation

Table 4.2 Regression Model, Assumption, and Goodness of Fit Tests Result

Source: Results of data ran on STATA17

Panel data regression was performed using pooled least square, fixed-effect and random-effect models. Based on the model test (see Table 4.2), it is concluded that the random effect is the best-fit regression model to be applied in this dataset. Meanwhile, the assumption test showed that the dataset used was normally distributed, showed no symptoms of heteroscedasticity, and no autocorrelation. The results of the panel data regression using the random effects model are presented in Table 4.3. The regression results, with Prob > Chi² = 0.0000, show that the VAT registration threshold, standard VAT rate, government effectiveness, and the moderating variable control of corruption simultaneously and significantly affect the C-efficiency ratio. This regression model had a coefficient of determination of 67.37%; therefore, there was 32.63% contribution from other variables outside this model to explain the determinants of the C-efficiency ratio. Therefore, the results of this study were formulated using the following regression equation.

$$CEFF_{it} = 2.739417 - 15.60407 RATE_{it} - 0.2368976 GE_{it} - 0.0041612 THRE_{it} - 1.013009 CC_{it} + 8.330806 CC_RATE_{it} + \beta_6 CC_GE_{it} + 0.0050063 CC_THRE_{it} + \varepsilon_{it}$$

Variable	Coefficient	Std. Error	z	P > z
THRE	-0.0041612	0.0046467	-0.90	0.371



Variable	Coefficient	Std. Error	z	P > z
RATE	-15.60407	2.249292	-6.94	0.000
GE	-0.2368976	0.1916361	-1.24	0.216
CC	-1.013009	0.4815386	-2.10	0.035
CC_THRE	0.0050063	0.0077335	0.65	0.517
CC_RATE	8.330806	3.640559	2.29	0.022
CC_GE	0.1327795	0.1149234	1.16	0.248
_CONS	2.739417	0.2816427	9.73	0.000
R-squared	0.6737			
Prob > Chi²	0.0000			

Table 4.3 Regression Analysis Results

Sumber: Results of data ran on STATA17

In designing the Value Added Tax (VAT) system policy, one of the considerations for the government is to determine the threshold of VAT registration for entrepreneurs. The threshold is usually determined by the amount of turnover within a certain period. Entrepreneurs who have met the threshold shall be registered in the VAT system, so that they are obliged to collect VAT from customers regarding their business outputs and can credit VAT that has been collected by suppliers regarding their business inputs. Determining the optimal threshold is challenging for the government, as there is a trade-off between revenue and compliance that must be carefully considered (Keen & Mintz, 2004). According to Ebrill et al. (2001), under ideal conditions, the threshold should be zero to ensure that all final consumption of goods and services is subject to VAT without any exemptions, so that it is neutral and does not cause distortions in the business and economic activities of the community while optimizing tax revenue for the state. However, it incurs administrative costs for tax authorities in surveillance and compliance costs for taxpayers, especially for small businesses.

However, the regression results in this study showed that the VAT registration threshold did not significantly affect the c-efficiency ratio at the $\alpha = 5\%$ level. This finding might show that the proxy of threshold proportion to gross domestic product per capita used in this study may not be appropriate for use as a VAT registration threshold variable as a VAT policy gap. Another possibility is that the VAT registration threshold does not affect the efficiency of VAT collection.

However, this finding does not imply that the VAT registration threshold policy is not a concern for the efficiency of the VAT system. For example, in Indonesia, the threshold set is considered too high compared to other economies according to the Organisation for Economic Co-operation and Development and the Asian Development Bank, and raises the issue of non-compliance where there are allegations that many taxpayers arrange to make their business scale seem below the threshold to avoid VAT obligations (Taqiyyuddiin & Wijaya, 2021). A high threshold may lead to distortions, and the VAT objective of taxing the entire final consumption cannot be actualized. Alm (2019) argued that Indonesia has the option of lowering its VAT registration threshold. Another policy option that might be taken is suggested by Taqiyyuddiin and Wijaya (2021), eliminating the threshold for corporate entrepreneurs. If adopted, these proposals may increase the country's tax revenue but need to be carefully considered in terms of possible negative impacts, such as inflation or taxpayer compliance and administrative costs for tax authorities. In addition, although the idea of removing the threshold for corporate businesses is based on the premise that they are perceived to be capable of implementing the VAT system because they are already required by the law to conduct bookkeeping, the different tax treatments between corporate and individual businesses may create distortions and may discourage business actors from establishing business entities, which is counterproductive for economies.



Another area to consider in VAT policy design is tax rates. According to Ebrill dkk. (2001), when deciding on the VAT rate, the state needs to consider the tax base, revenue needs, and ease of law enforcement. When choosing a VAT rate, the state should also balance the VAT and income tax systems to maximize public welfare (Newbery, 1997). In practice, VAT rates determined by each country vary widely. In the EY (2021) report, Hungary set the highest VAT rate among countries in the world at 27%. Moreover, many countries adopt VAT in a multi-rate system. This means that there is some consumption of goods and services charged with VAT rates that deviate from the standard rate. Different policies might have different implications, which may optimize tax revenue. For example, a multi-rate policy may make tax administration complicated and costly for both tax authorities and businesses because of the issue of the classification of goods, while high rates may encourage tax evasion.

The results of this study show that significantly at the $\alpha = 5\%$ level, the VAT standard rate negatively affects the C-efficiency ratio. Every one percent increase in the standard VAT rate causes a decrease in the C-efficiency ratio by 15.6%, *ceteris paribus*. This means that if the government makes a decision to raise the VAT rate, the tax revenue from the VAT regime might increase (or might decrease) given that $\frac{V}{Y} = \tau^S \times E^C \times \frac{C}{Y}$ (Keen, 2013), but the efficiency of VAT collection (E^C) actually worsens. This finding is in line with previous studies, including Ueda (2017), Đorđević et al. (2019), Cevik et al. (2019), dan Cevik et al. (2019). Ueda (2017) explained that an increase in the VAT rate can indirectly affect the reduction of the C-efficiency ratio because it causes changes in taxpayer behavior so that the compliance gap widens. According to research by Cevik et al. (2019), the negative effect is only significant in the developing country data group, while in the developed country data group it is not significant. This indicates that in developed countries taxpayer compliance is better than in developing countries. Ebrill et al. (2001) and other studies are more concerned with the implementation of multi-rate in the VAT system as a potential factor for policy gaps. Based on these, it can be concluded that increasing the VAT rate is not necessarily an effective policy in increasing revenue.

The government effectiveness index has a p-value of 0.216, which indicates that this variable does not significantly affect the C-efficiency ratio. This can be interpreted that this proxy is not adequate to represent the size of the compliance gap in the VAT systems of countries in the Southeast Asia, East Asia, and Oceanian (SEAO) region. Future research may find a more appropriate measure to represent the compliance gap as one of the two components of the C-efficiency ratio.

The control of corruption index is significant at the $\alpha = 5\%$ level and negatively affects the C-efficiency ratio. The regression results show that any improvement in the control of corruption index by one unit will reduce the C-efficiency ratio by 1.01%. This result contradicts previous studies such as Sokolovskyi & Dmytro (2015) and Baum et al. (2017), who stated that corruption has a negative effect on the C-efficiency ratio. When corruption occurs, taxpayers may be more likely to evade taxes or underreport their income, making it more difficult for tax authorities to accurately estimate VAT revenues. Consequently, the VAT efficiency ratio is lower in countries with higher corruption levels. The differences in the results of this study are due to the different proxies used. The two previous studies used the corruption perception index published by the Transparency International organization, while this study used the control of corruption index published by the World Governance Indicators, World Bank. Further in-depth research is needed to understand this difference in results.

However, the control of the corruption index, according to the results of the regression analysis in this study, shows significance at the $\alpha = 5\%$ level as a moderating variable on the effect of the VAT standard rate on the C-efficiency ratio. The VAT standard rate and the control of corruption index each partially negatively affect the C-efficiency ratio. However, as a



moderating variable, the control of the corruption index opposed the negative effect of the VAT standard rate increase policy on the efficiency of VAT collection. This means that when the government wants to increase the standard VAT rate but citizens have high perceptions and confidence in the government's performance in controlling corruption, people will support such a policy of increasing tax rates, and the policy does not encourage the intention to avoid or evade their business from tax administration. It can also be interpreted that when the government wants to increase the standard rate of VAT, they need to work more efforts to control corruption, so that the efficiency of VAT collection can be increased for optimal government revenue.

CONCLUSION

The C-efficiency ratio (E^c) is the ratio of the deviation of actual VAT revenue collected by the government from the theoretical potential VAT revenue based on the standard VAT rate without exemptions on all consumption of goods and services in an economy. The deviation can be caused by the VAT policy gap and the taxpayer compliance gap. The results of this and previous studies have proven that changes in VAT policy, such as raising the VAT rate or lowering the VAT registration threshold, do not necessarily address the policy gap. Raising the standard VAT rate may encourage taxpayers to avoid or evade taxes, resulting in a more severe compliance gap and reduced VAT collection efficiency. Thus, before deciding to change the VAT policy to increase tax revenue, government should prioritize improving taxpayer compliance by improving the design of tax regulations, increasing the capacity of tax authorities and control of corruption.

This research is expected to trigger further discussion on the factors that affect the C-efficiency ratio to optimize tax revenue, as well as improve a neutral and distortion-free VAT system in business. Future research could refine the model using more complete and extensive data (region and time series) and try other proxies that are more appropriate, particularly to represent the compliance gap. Future research should distinguish between developed and developing countries to determine the differences between them. Additionally, there is an opportunity to quantify or find proxies for VAT exemption variables that represent policy gaps to be included in the model.

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