



CONTROL OF CORRUPTION IN MODERATING THE EFFECT OF PER CAPITA INCOME AND SHADOW ECONOMY ON TAX REVENUE

Bhima Chandra Bhuana ¹⁾, Suparna Wijaya ^{2)*}

¹⁾ bhima.chandra.bhuana@kemenkeu.go.id, Ministry of Finance

²⁾ suparnawijaya@upnvj.ac.id, Universitas Pembangunan Nasional Veteran Jakarta

*corresponding author

Abstract

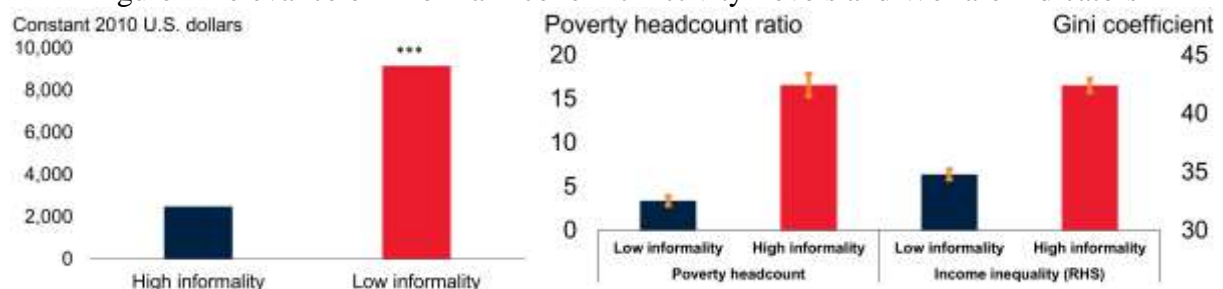
The less optimal tax revenue, the low level of income, the large proportion of shadow economy in the economies and the high level of corruption are problems for development. This study tries to revisit the linkage of these four development problems, and find out how corruption control conducted by the government can strengthen or weaken the impact of per capita income and shadow economy activities on tax revenue. A dataset of eighteen countries in the South Asia and Asia-Pacific region from 2002 to 2017 is analyzed using panel data regression. It was found that per capita income and government efforts to control corruption significantly have a positive effect on tax revenue, while the shadow economy significantly has a negative effect on tax revenue. Furthermore, as a moderating variable, government efforts to control corruption can significantly reduce the negative effect of the shadow economy on tax revenue. This finding suggests the urgency of controlling corruption by the government to optimize tax revenue, thereby overcoming development problems.

Keywords: Control of corruption, Per capita income, Shadow economy, Tax revenue

INTRODUCTION

Shadow economy activity - also known as hidden economy, cash economy, informal economy, etc. - is a development problem in every country. The shadow economy encompasses all economic activities that go undetected by government authorities, in general, to evade tax and social contribution obligations or avoid cumbersome bureaucracy and burdensome regulations (Medina & Schneider, 2018). The size of the shadow economy is associated with low productivity and high poverty and income inequality (Ohnsorge & Shu Yu, 2022). As illustrated in Figure 1 below, the group of countries that have above-average informal economic activity (high informality) empirically have lower gross domestic product per capita. In addition, countries with above-average informal economic activity have high poverty ratios and Gini coefficients.

Figure 1 Relevance of Informal Economic Activity Levels and Welfare Indicators



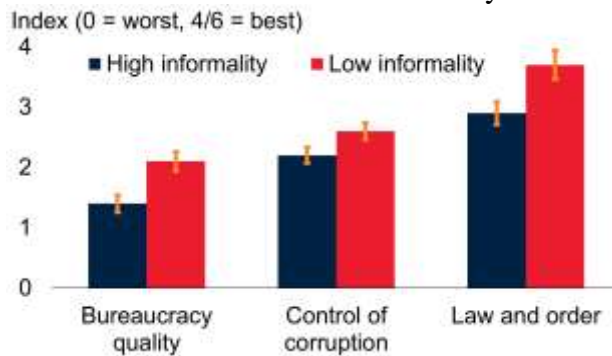
Source: Ohnsorge & Shu Yu (2022)

Ohnsorge & Shu Yu (2022) also suggests that the level of shadow economy activity can also be associated with the quality of governance. This is reflected in Figure 2, where countries that have an above-average proportion of the shadow economy have weaker governance, which consists of aspects of bureaucratic quality, corruption control, and regulation and law enforcement. This data is based on an index released by the World Bank's International Country Risk Guide (ICRG). As we know, corruption is also a problem in development. In various studies, high levels of corruption are associated with low quality of development. In relation to the shadow economy, the average corruption control index only reaches 2.2 in high informality



countries. This achievement is lower than the achievement of low informality countries which reached 2.6.

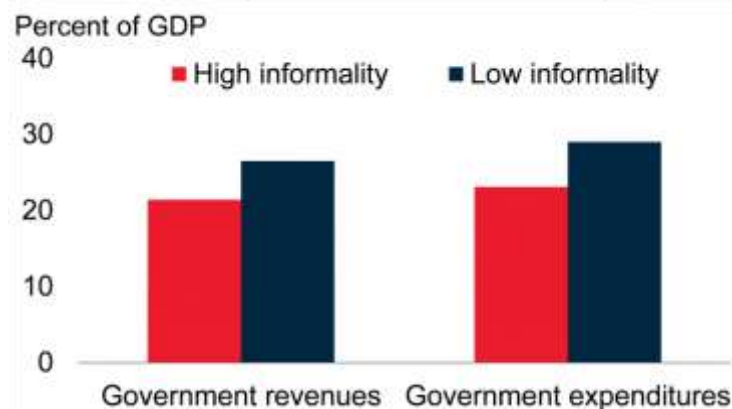
Figure 2 Relevance of Informal Economic Activity Level and Governance



Source: Ohnsorge & Shu Yu (2022)

Next, Ohnsorge & Shu Yu (2022) also relates the relationship between the shadow economy and government fiscal capacity. Figure 3 below shows that in developing countries that have a high proportion of shadow economy, high informality countries have lower government revenues and expenditures. The difference in government revenue between high informality and low informality countries is significant, reaching 5.2 percent of gross domestic product. This can be associated with the lower ability of countries in the high informality group to collect tax revenue as one of the sources of state revenue.

Figure 3 Comparison of Government Revenue and Expenditure in Developing Countries by Level of Shadow Economy



Source: Ohnsorge & Shu Yu (2022)

Not only the amount of shadow economy activity, income per capita and the level of corruption also affect tax revenue. The causal relationship between per capita income and tax revenue still shows different results from one study to another. However, while most studies suggest that per capita income has a positive influence on tax revenue, especially in developing countries. As for corruption, it has a negative influence on tax revenue, among others, as stated in a study conducted based on data in Middle Eastern countries (Imam & Jacobs, 2007) and other developing countries (Bird et al., 2004). Suboptimal tax revenue leaves the government with insufficient funds to provide public infrastructure (Omodero, 2019) and reduces the government's ability to provide adequate public services (Tanzi & Zee, 2000). In fact, tax revenue is an important instrument for the government to develop the country's economy. Gaspar et al. (2016) in the International Monetary Fund working paper recommends that governments in all countries strive to achieve tax revenue beyond the level of 15 percent of their gross domestic product to realize a better level of public welfare.

Therefore, it is interesting to see and highlight further the interaction between the four development problems, namely the shadow economy, per capita income of the community,



control of corruption, and tax revenue. Moreover, there is not much literature that examines the causal relationship between the shadow economy and tax revenue. Controlling corruption is used as a moderating variable, to highlight how the significance of the government's role in controlling corruption moderates the effect of per capita income and shadow economy activity on tax revenue. This study aims to determine how the effect of per capita income and shadow economy on tax revenue. Then, whether corruption control can strengthen or weaken this influence. It is hoped that the results of this study can broaden our perspective and understanding of these development issues.

LITERATURE REVIEW

The government has a fundamental role to play in realizing inclusive, sustainable development and poverty alleviation, namely building the legal foundation, formulating policies and maintaining economic stability, investing in basic social services and infrastructure, protecting the weak, and protecting the environment (World Bank, 1997). To fulfill these roles, of course, the government needs a large budget. Taxes are a common instrument relied upon as state revenue to fulfill these budgetary needs. Optimal tax revenue will facilitate development activities. Whether or not tax revenue is optimal in a country can be measured based on the ratio of the amount of tax revenue collected compared to the country's gross domestic product in the same period or year.

There are many factors that can affect tax revenue performance. One of the most comprehensive studies conducted by (Sen Gupta, 2007) using seventeen independent variables based on a dataset of 105 developing countries. These variables are per capita income with purchasing power parity adjustment, the contribution of the agricultural sector in gross domestic product, the proportion of imports to gross domestic product, the proportion of grants to national income, the proportion of state debt to national income, the contribution of indirect taxes to total state revenue, the contribution of taxes on income to total state revenue, the contribution of trade to total state revenue, the contribution of exports to state revenue, the highest marginal rate of individual income tax, the highest marginal rate of corporate income tax, the political stability index, the economic stability index, the corruption index, the law and regulations index, the government stability index, and the average import duty rate. However, in this study the variables used as factors affecting tax revenue are income per capita, shadow economy, and control of corruption index.

Effect of Per Capita Income on Tax Revenue

Per capita income is commonly used as an indicator of development or public welfare. Per capita income is calculated by dividing the total gross domestic product by the population in the middle of the year. To increase the comparability and validity of research, per capita income data that has been adjusted for purchasing power parity is generally used.

In relation to tax revenue, a number of studies have shown that per capita income has a positive effect. One of them is research by Arif & Rawat (2018) on EAGLE Nations based on the 2001 to 2015 data set. Similar results were also presented by Sen Gupta (2007), Lotz & Mores (1965), and Tanzi & Zee (2000) based on their research in developing countries. In Sub-Saharan Africa, this positive effect was found by Stotsky & WoldeMariam (1997) based on their 1990 to 1995 dataset and Ghura (1998) based on the 1985 to 1996 dataset. Similarly, research in Arab countries, both oil and non-oil producing countries, shows a positive effect as found by Eltony (2002) based on 1994 to 2000 data set. In contrast, research by (Chaudhry & Munir, 2010) found a significant negative effect between per capita income and tax revenue in Pakistan.

Meanwhile, a number of other studies did not find a significant effect of per capita income on tax revenue. Most of these research results were found in developing country areas,



namely by Chelliah et al. (1975) from 1969 to 1971 data set, Bird et al. (2004) from 1990 to 1999 dataset, and Tait et al. (1979) from the 1972-1976 dataset. Similar results were also found in Piancastelli (2001) based on the 1985 to 1995 dataset, Leuthold (1991) based on the African dataset from 1973 to 1981, and Rodriguez (2018) based on the dataset of 138 countries in the world from 1976 to 2015.

Effect of Shadow Economy on Tax Revenue

The definition of the shadow economy still differs among researchers. However, the shadow economy is generally defined as all unregistered economic activity that is counted in gross national income (Schneider et al., 2010). Meanwhile, the shadow economy according to Smith (1994) is all goods and services produced in the market, both legal and illegal, that escape the calculation of official estimates of gross domestic product. Medina & Schneider (2018) argues that the shadow economy includes all economic activities that are not detected by government authorities, either for monetary reasons (to avoid paying taxes and social contributions), regulatory (to avoid complicated bureaucracy and burdensome regulations), and institutional (the perception of weak systems and governance).

In accordance with its definition as unregistered economic activity, the proportion of the shadow economy in a country's economy is measured through estimation. The Center for Economic Policy Research (CERP) measures the proportion of the shadow economy in each country based on three approaches, namely the output approach, the labor approach, and the perception approach. In the output approach, there are two estimation models, namely the Dynamic General Equilibrium (DGE) and Multiple Indicators Multiple Causes (MIMIC) models. The MIMIC approach is based on a structural equation model (SEM) that measures latent variables by considering various causes that lead to the existence and growth of the shadow economy, while the DGE uses a two-sector model of the economy based on national income statistics (Elgin et al., 2021).

There has not been much research related to the effect of shadow economy activities on tax revenue. However, various studies show that the shadow economy has a negative effect on tax revenue. This finding, among others, is based on research conducted by Bird et al. (2004) based on data sets from 1990 to 1999 in a number of developing countries, Omodero (2019) based on the 1991 to 2018 dataset in Nigeria, and Khujamkulov (2017) based on 1980 to 2010 dataset in Tajikistan. Meanwhile, according to Indupurnahayu & Walujadi (2019) on average from 1990 to 2018, Indonesia lost potential tax revenue of 0.7% of gross domestic product due to the shadow economy.

The Effect of Control of Corruption on Tax Revenue

According to Tanzi in Begovic (2005) According to Tanzi in Begovic (2005), corruption is a deliberate non-compliance with the principle of fairness aimed at gaining benefits for oneself or others. Corruption is a development problem that adversely affects the economy. In fact, corruption "taxes" the economy more than taxes because it creates uncertainty in business (Wei, 1997). According to Transparency International's website, corruption is believed to erode public trust in their government.

The Control of Corruption Index published by the World Governance Indicator (WGI) annually captures people's perceptions of the extent to which public power is exercised for private gain, whether corruption is on a small or large scale. The Control of Corruption index ranges from negative 2.5 to positive 2.5. The higher the Control of Corruption index, the better the public perception of the government in controlling corruption.

A number of studies state that the level of corruption has a negative effect on tax revenue. However, the measure used in the corruption level variable is the corruption index published by the International Country Risk Guide, such as research conducted by Ghura (1998) based on the 1985 to 1996 data set in the Sub-Saharan Africa region, Imam & Jacobs (2007)



based on the 1990 to 2004 dataset in the Middle East region, and Ajaz & Ahmad (2010) based on 1990 to 2005 dataset in Pakistan. There are also studies that use the Corruption Perception Index published by Transparency International, for example research conducted by Omodero (2019) based on data sets from 1991 to 2018 in Nigeria and Arif & Rawat (2018) on EAGLE Nations based on 2001 to 2015 dataset.

Meanwhile, not many studies have used the control of corruption index published by WGI to examine the effect of corruption on tax revenue. Two studies that have been conducted still show differences in results. According to Samimi & Abedini (2012) based on data sets from 1991 to 2009 in developing countries, especially in the Middle East and North Africa, control of corruption has a positive influence on tax revenue. In contrast, research (Syadullah & Wibowo, 2015) based on the 2003 to 2012 dataset in the ASEAN region found significantly that control of corruption has a negative effect on tax revenue.

Hypothesis

Countries generally set income tax thresholds and/or progressive tax rates in their income tax policies. The higher the per capita income, on average, the more individuals who have income beyond the threshold, and the higher the tax rate imposed on them. Thus, tax revenue in countries with higher per capita income is more optimized than in countries with lower income.

The shadow economy, as defined, is an economic activity that is not detected by the government. This of course will make it difficult for the government to conduct supervision and regulation, especially in collecting tax revenue. From the people's side, the government's weakness in monitoring people's tax compliance makes them feel safe not to pay taxes. Thus, the smaller the shadow economy activity in a country's economy, the easier it is for the government to collect taxes, so that the ratio of tax revenue to gross domestic product is more optimal.

Meanwhile, corruption is a behavior that can erode public trust in their government. Government control of corruption is something that the government needs to strive for to maintain public trust. The better the public perception of corruption control, the greater the public trust in their government, so that it will increase compliance in paying taxes voluntarily, and tax revenue will be optimized.

Control of corruption - with political will - is in principle a variable that can be controlled by the government more than the other two variables, so the Control of Corruption index in this study is used as a moderating variable. The high public perception of corruption control will strengthen the influence of per capita income and reduce the negative influence of the shadow economy on tax revenue.

Based on these things, the following hypothesis framework is compiled.

- H₁ : Per capita income has a positive effect on tax revenue.
- H₂ : Shadow economy has a negative effect on tax revenue.
- H₃ : Control of Corruption has a positive effect on tax revenue.
- H₄ : Control of Corruption strengthens the positive effect of per capita income on tax revenue.
- H₅ : Control of Corruption reduces the negative effect of shadow economy activities on tax revenue.

METHODS

This study is intended to examine whether government control of corruption moderates the effect of income per capita and shadow economy on tax revenue using quantitative methods. The dataset consists of data from countries in the South Asia and Asia-Pacific region with complete data related to the required variables as referred to in Table 1. Based on these criteria,



18 countries were selected from 2002 to 2017, namely Australia, Bangladesh, Bhutan, China, Philippines, India, Indonesia, Japan, Cambodia, South Korea, Malaysia, Nepal, Pakistan, New Zealand, Singapore, Sri Lanka, Thailand, and Vietnam. Data is processed through the STATA17 application.

Table 1 Variables Used in Research

Dependent Variable	Unit	Data Source
Tax Revenue (TAX)	Ratio	WDI
Independent Variable	Unit	Data Source
Per Capita Income (PCI)	USD	WDI
Estimation of Shadow Economy Size Based on DGE (SE) Model	Ratio	CERP
Moderating Variable	Unit	Data Source
Control of Corruption (CC)	Index	WGI

Source: Processed by the author

The data that has been collected is then subjected to multiple regression analysis. After the regression, a series of tests were conducted as listed in Table 2 below to determine the best panel data regression model for this study. With an α level of 5%, if the Prob value is less than α , the decision taken is H_0 rejected.

Table 2 Series of Regression Model Tests

Regression Model Test	H₀	H₁
Chow Test	Pooled least square model selected	Fixed-effects model selected
Lagrange Multiplier Test	Random-effects model selected	Pooled least square model selected
Hausman Test	Random-effects model selected	Fixed-effects model selected

Source: Processed by the author

After selecting the appropriate regression model, a series of assumption and model accuracy tests were first conducted as described in Table 3 below. If the assumptions and accuracy of the model have been met, interpretation of the regression results can be done.

Table 3 Series of Assumption Tests and Model Accuracy

Assumption Test	H₀	H₁
Normality Test	Data is normally distributed	Data is not normally distributed
Variance Inflation Factor (VIF) Test	No multicollinearity between variables	There is multicollinearity between variables
Breusch-Pagan and Cook-Weisberg test	Homoskedastic data	Heteroscedastic data
Wooldridge test	There is no autocorrelation	There is autocorrelation
Model Accuracy Test	H₀	H₁
F Test (Simultaneous)	Model does not fit, all variables have no effect	Model fit, at least one significant variable
T Test (Partial)	Independent variables have no significant effect	Independent variables have a significant effect

Source: Processed by the author

$$TAX_{it} = \beta_0 + \beta_1 LN_PCI_{it} + \beta_2 SE_{it} + \beta_3 CC_LNPCI_{it} + \beta_4 CC_SE_{it} + \beta_5 CC_{it} + \varepsilon_{it}$$

Description:

TAX_{it} : Tax Revenue (% of Gross Domestic Product)

β_0 : Constant



- LN_PCI_{it} : Gross Domestic Product per capita with purchasing power parity adjustment and (United States dollars transformed into natural logarithm)
- SE_{it} : proportion of shadow economy in the economy estimated based on multiple indicators multiple causes model (% of GDP)
- CC_{it} : Control of Corruption index as moderating variable
- CC_LNPCI_{it} : Control of Corruption index as a moderating variable interacting with income per capita variable transformed into natural logarithm.
- CC_SE_{it} : Control of Corruption index as a moderating variable that interacts with the shadow economy variable.
- ε_{it} : Estimated error

RESULTS AND DISCUSSION

Model Testing and Simultaneous Effect Analysis

Based on data from a total of 18 countries over a span of 16 years, 288 data were observed in this study. As mentioned earlier, the 18 countries are from the South Asia and Asia-Pacific regions (East Asia, Southeast Asia, Australia and the Pacific). The selected countries come from different income groups. Australia, Japan, South Korea, New Zealand, and Singapore are high-income countries, with per capita incomes of at least US\$12,696. China, Malaysia and Thailand are in the upper-middle income group, with per capita incomes of 4,096 to 12,695 US dollars. The remaining countries in the lower middle-income group with per capita incomes of US\$1,046 to US\$4,095 are Bangladesh, Bhutan, the Philippines, India, Indonesia, Cambodia, Nepal, Pakistan, Sri Lanka and Vietnam.

Table 4 Descriptive Analysis

Variables	Mean	Std. Deviation	Min	Max
TAX	14.31726	4.964643	6.317919	31.98588
PCI	12,378.7	17,436.96	244.7208	68,150.11
SE	25.58368	12.18582	8.720561	49.68798
CC	0.1314473	1.125426	-1.49654	2.391192

Source: Processed by the author

The highest tax revenue relative to gross domestic product is achieved by New Zealand, followed by Australia, for all years studied. Meanwhile Bangladesh is the country with the least optimal tax revenue, and dominates the bottom five percent of the observed data, along with Bhutan and Cambodia. Furthermore, Cambodia and Thailand dominate the top five percent, the countries with the largest shadow economy activity. The size of shadow economy activity in both countries is approximately half the size of their gross domestic income. Meanwhile, Japan and China are the countries that have the highest level of formality in their economic structure. Finally, in terms of the corruption control index, New Zealand has the best performance-almost perfect, while Bangladesh has the worst performance.

Next, panel regression was conducted on the 306 observed data, using either pooled least square, fixed-effect, or random-effect models. Based on the model test as presented in Table 5, it is found that the most appropriate regression model used in this study is random effect. Based on the assumption test results, the data is normally distributed and there are no multicollinearity symptoms between variables. However, it turns out that the model in this study is heteroscedastic and spatially autocorrelated, so the panel-corrected standard errors (PCSE) method is used in the regression analysis. PCSE retains the Prais-Winsten weighting, but uses a sandwich estimator to incorporate cross-sectional dependence when calculating standard errors, thereby correcting for heteroscedasticity and autocorrelation (Greene, 2018).



Table 5 Regression Model Test Results, Assumptions, and Model Accuracy

Model Test	Test Value	Prob value.	Conclusion
Chow Test	97.90	0.0000	Reject H ₀ : fixed-effects model is more appropriate
LM Test	1539.58	0.0000	Reject H ₀ : random-effects model is more appropriate
Hausman	6.70	0.2436	Accept H ₀ : random-effects model selected
Assumption Test		Prob value.	Conclusion
Normality Test		0.0605	Accept H ₀ : data is normally distributed
Variance Inflation Factor Test		3.10	Accept H ₀ : there is no multicollinearity
Breusch-Pagan and Cook-Weisberg test		0.0000	Reject H ₀ : heteroscedastic model
Wooldridge test		0.0000	Reject H ₀ : there is autocorrelation

Source: Processed by the author

The regression results show a coefficient of determination (R-squared) of 59.36 percent. This indicates that there are 40.64 percent of other variables that have not been explained in this research model related to factors that affect tax revenue performance in the countries mentioned above. However, with a Prob > Chi² value of 0.0000 all variables used in this study together significantly affect tax revenue. Table 6 below shows the results of the panel data regression analysis based on the panel-corrected standard errors model.

Table 6 Regression Analysis Results through STATA17

Variables	Coefficient	Std. Error	z	P > z
LN_PCI	0.9428458	0.32605	2.89	0.002
SE	-0.0968818	0.0293119	-3.31	0.001
CC_LNPCI	-0.2640555	0.207079	-1.28	0.101
CC_SE	-0.0693317	0.0362524	-1.91	0.028
CC	4.770996	2.385265	2.00	0.023
_CONS	8.684879	3.097419	2.80	0.003
R-squared	0.5936			
Prob > Chi²	0.0000			

Source: Processed by the author

Based on a series of tests that have been carried out, it can be concluded that this research model is adequate for further analysis. The regression equation in this study is described as follows.

$$TAX_{it} = 8.684879 + 0.9428458 LN_PCI_{it} - 0.0968818 SE_{it} - 0.2640555 CC_LNPCI_{it} - 0.0693317 CC_SE_{it} + 4.770996CC_{it} + \varepsilon_{it}$$

Partial Analysis of Independent and Moderating Variables

Based on Table 4.3, it is known that the P value of the per capita income variable is 0.002. This indicates that the variable is significant at the α level of 5%. The coefficient is 0.9428458. This means that in the South Asia and Asia-Pacific region, every 1% increase in per capita income of a country will increase tax revenue by 0.9428458% of the country's gross domestic product, ceteris paribus.

These results are in line with the results of most previous studies. The higher a country's per capita income level, the more likely people in the country are to have greater taxable income, so the greater their contribution to the government through taxes, and the better the country's ability to collect taxes (Sen Gupta, 2007). The higher the per capita income, the smaller the proportion of people's income that is consumed for basic needs, so there is more



"surplus" that can be used as a tax base (Lotz & Mores, 1965). In addition, countries with higher per capita incomes tend to have more developed and complex tax systems and more sources of tax revenue, while countries with lower per capita incomes have simpler tax systems and rely on certain types of taxes (Tanzi & Zee, 2000). In line with this, higher income levels are also often associated with more developed economies that have more efficient tax collection systems and larger tax bases (Ghura, 1998).

Furthermore, the P value of the shadow economy variable is 0.001 which indicates that this variable is significant at the α level of 5%. Based on the coefficient value, it can be interpreted that a 1% increase in the proportion of shadow economy in the economies of South Asian and Asia-Pacific countries reduces tax revenue by 0.0968818% of the country's gross domestic product, *ceteris paribus*. Omodero (2019) in his research revealed that the shadow economy affects tax revenue because economic activities are not reported and not taxed. In line with this Khujamkulov (2017) emphasized that shadow economy activities are caused by several factors such as entrepreneurs and businesses that face burdensome tax regulations with weak law enforcement, so that state revenue from business is lost. In addition, the larger the shadow economy, the lower the tax morale of the community, thus reducing people's motivation to pay taxes and move their economic activities to the informal sector (Bird et al., 2004). Thus, management of informal economic activities needs to be done to avoid a decrease in the level of tax revenue.

The control of corruption variable shows a P value of 0.023, making it significant at the α level of 5%. This means that a one-point increase in the control of corruption index in South Asian and Asia-Pacific countries can increase tax revenue by 4.770996% of the country's gross domestic product, *ceteris paribus*. Sen Gupta (2007) who argued that corruption can reduce public trust in the government and the tax system, so that people tend to do tax avoidance. Arif & Rawat (2018) argues that corruption also affects overall economic performance and discourages investment, thereby reducing potential tax revenue. Therefore, improving the quality of governance and controlling the level of corruption in a country can increase tax revenue.

Partial analysis is continued to control of corruption as a moderating variable. When the moderating variable interacts with the per capita income variable, the resulting P value is 0.101 which can be interpreted that at the α level of 5%, control of corruption does not strengthen the effect of per capita income on tax revenue. However, when the moderation variable interacts with the shadow economy variable, the P value is 0.028 with a coefficient value of -0.0693317. This means that at the α level of 5% control of corruption can reduce the negative effect of the shadow economy on tax revenue. Omodero (2019) found evidence that corruption and shadow economy are interconnected. Corruption can increase informal economic activities, while informal economic activities can exacerbate the level of corruption. Informal economic activities can strengthen corrupt practices in the absence of strict supervision and regulation. Conversely, corruption can encourage the intention of business people to avoid taxes and strict regulations. Based on these facts, reducing the level of corruption and managing informal economic activities need to be done simultaneously to achieve sustainable economic growth. (Omodero, 2019). However, further exploration is needed on why control of corruption can reduce the negative effect of the shadow economy on tax revenue.

CONCLUSIONS

The results of this study corroborate previous studies, that income per capita and government efforts to control corruption significantly have a positive effect on tax revenue. In contrast, the proportion of shadow economy in the country's economy significantly negatively



affects tax revenue. As a moderating variable, efforts to control corruption can significantly reduce the negative effect of the shadow economy on tax revenue.

This finding suggests the importance of government control of corruption to address development issues. By improving corruption control, the government can optimize tax revenue, which supports a more sustainable development of the country. As the government's capacity to provide infrastructure and public services increases, economic development can proceed more smoothly, people's incomes increase, and the proportion of the shadow economy in the economy will decrease.

Implications

The size of the shadow economy used in this study uses economic output data estimated based on the dynamic general equilibrium (DGE) model. There are other indicators that describe shadow economy activity in the economy that can be used for further research. Other indicators of the size of the shadow economy that are available include output estimates based on the multiple indicators multiple causes (MIMIC) model, the number of self-employment, the number of informal employment, the number of employment outside the formal sector, the number of labor force without pension security, perception surveys by the World Economic Forum (WEF), perception surveys of business entities by the World Bank Enterprise, and household perception surveys by World Value Surveys (WVS). Future research can also use data from a wider area coverage or be carried out based on income classification criteria.

In addition, with a low coefficient of determination, there is room to improve the research model by adding other variables to better explain the reality discussed in this study. Future research can also further explore how or why control of corruption can reduce the negative influence of the shadow economy on tax revenue.

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