



THE ROLE OF INSTITUTIONS AND E-GOVERNMENT IN MOBILIZING VALUE-ADDED TAX REVENUE IN ASIA-PACIFIC MID-SIZE ECONOMIES

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Abstract

This study examines how the informal economy, law enforcement, and e-government interact to affect value-added tax (VAT) revenue in middle-income countries in Asia Pacific in the period 2002-2018. Panel data regression analysis is used to estimate this relationship. The results show that the informal economy significantly reduces VAT revenue, while e-government implementation has a negative effect. E-government dampens the negative impact of informality on revenue. However, it strengthens the negative relationship between law and revenue, contrary to expectations. These findings underscore the importance of balanced tax reforms that take into account country-specific constraints. The expansion of e-governance should be accompanied by capacity building and efforts to reduce the informal economy. This study makes an empirical contribution by examining the joint impact of informality, governance, and technology on tax performance in developing countries.

Keywords: Corruption, Industry, Informal Economy, Shadow Economy, Value Added Taxes

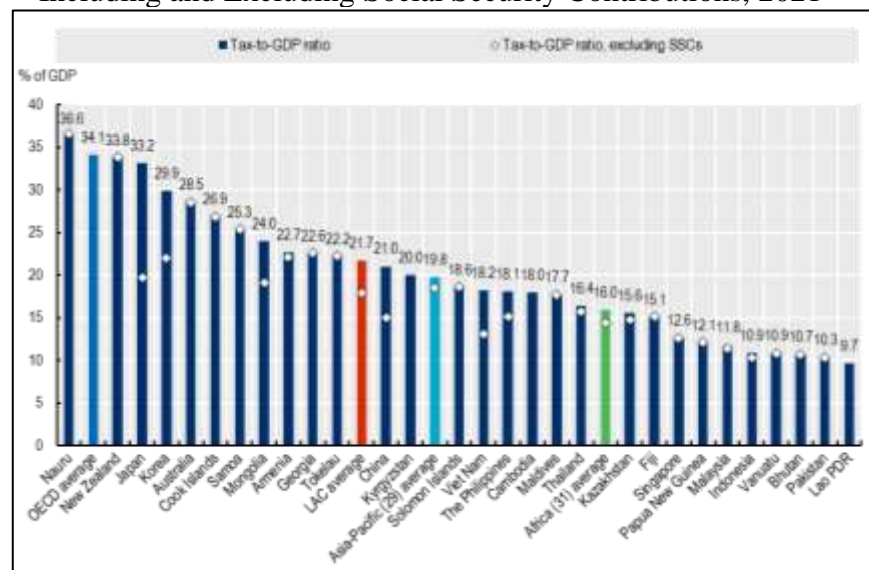
INTRODUCTION

Increasing tax revenue is a tremendous challenge for various governments, whether they are governments of developed countries or governments of developing countries. Tax revenue, when calculated as a percentage of GDP in lower middle-income countries, on average shows that the percentage of tax revenue is small, the smaller the economy of a country the smaller the tax ratio (Fuest et al., 2022). This is consistent with data derived from the OECD (2023) in figure 1, showing that Nauru has the highest overall ratio at 36.6%. The OECD average is 34.1%. As developed countries, New Zealand, Japan, Korea and Australia also have overall ratios above 28%. Meanwhile, the average for countries in the Asia-Pacific Region is 19.8%. Partially, countries such as Solomon Islands, Vietnam, Philippines, Cambodia, Maldives, and Thailand, which are medium-sized economies, have ratios between 16% and 18%. This low source of state revenue will have a fiscal impact on allocating government funds to development and economic growth in the country (Suryadi & Subardjo, 2019). This problem further emphasizes the need to increase domestic resource mobilization in regions that have low tax ratios, especially the Asia Pacific region to achieve Sustainable Development 2030 (Mosquera Valderrama et al., 2018).

Value Added Tax (VAT) simply taxes various sales of transactions of goods and services in a country, even it can tax transaction that is conducted digitally (Investopedia, 2023). In general. VAT is a source of income that can generate revenue and provide stability to a country's fiscal capacity and strength (Hassan, 2015). With the high disparity of state revenue collection between developed and developing countries, it is necessary to know what things affect state revenue.



Figure 1 - Tax-to-GDP Ratio in Asia and Pacific Economies and Regional Average, Including and Excluding Social Security Contributions, 2021



source: OECD (2023)

One of the main factors hindering VAT revenue productivity is the large informal economy sector that dominates developing economies (Kodila-Tedika & Mutascu, 2014). The informal economy generally consists of unregistered economic actors that tend not to want to comply with government regulations in general, and in particular do not want to pay taxes (Williams et al., 2016). When viewed with an optimistic perspective, the informal economy also has a good effect on unemployment, because it increases employment opportunities (Huynh & Nguyen, 2020). However, in the long run, it can reduce the sustainability of a country, as more and more people do not want to pay taxes (Williams et al., 2016). Thus, the culture of non-compliance in the informal sector reduces the tax base and poses a major challenge for tax authorities to collect VAT.

At the same time, the emerging of e-government provides new tools and opportunities for revenue collection authorities to address some institutional weaknesses and integrate informal sector transactions. The use of online tax portals, tax filing and payment systems, invoice monitoring, and taxpayer information E-government also limits bureaucratic discretion and increases transparency. This can reduce the risk of corruption in tax administration. Preliminary evidence suggests that e-tax systems can reduce the negative impact of the informal economy and weak governance on revenue performance if adopted alongside broader administrative reforms (Otekunrin et al., 2021).

This complex relationship between the informal economy, institutions, e-governance and tax performance is particularly important for middle-income countries in Asia Pacific that are undergoing rapid economic, technological and social transitions. The year-on-year GDP value of the informal sector shows a declining trend (Pasovic & Efendic, 2018). Law enforcement and corruption control have also improved across the region. Differences in e-governance adoption and outcomes are also evident. Understanding these dynamics can inform policies to leverage technological change and improved governance for more effective VAT collection.

LITERATURE REVIEW

Informal Economy

The informal economy, also known as the shadow economy, refers to economic activities that are unreported, unregistered, or hidden from public authorities (Schneider &



Enste, 2000). The shadow economy includes illegal activities as well as the production of legal goods and services that are deliberately hidden to avoid paying taxes, complying with regulations, or detecting illegal income (Schneider & Enste, 2000).

Several key features that distinguish the informal sector. First, informal firms and workers operate outside of government regulations, registration requirements, and taxation (International Labor Organization, 2023). Second, the informal enterprises are rarely incorporated and do not comply with business laws (La Porta & Shleifer, 2014). Third, informal jobs lack social protections, rights, and entitlements such as minimum wage, sickness benefits, and pensions (International Labor Organization, 2023).

The shadow economy thrives where institutional weaknesses have made tax evasion and non-compliance possible and where there is insufficient legal protection for informal sector workers. (Knobel & Meinzer, 2014). The causes include excessive bureaucracy, corruption, ineffective rule of law, high tax burden, and poor public services (Cooray et al., 2017). The informal sector is still widespread in many developing countries.

The Effect of Informal Economy on VAT Revenue

Much theoretical and empirical literature examines the relationship between economic informality and tax revenue collection. The informal sector refers to economic activities and income that are unreported, unregistered, and/or hidden from public authorities for various reasons such as evading taxes and other government regulations (Schneider & Enste, 2000). Weak institutions and dilapidated governments lead to opportunities for tax avoidance and the development of the shadow economy (Torgler & Schneider, 2009).

Institutional theory can illustrate the above, asserting the role of formal and informal institutions, such as laws, norms, and customs, in shaping human behavior (North, 1990). Weak institutions and poor governance provide opportunities for tax avoidance and shadow economic growth (Torgler & Schneider, 2009). When regulations lack transparency, consistency, or fairness, individuals and firms will tend to operate informally (Feige, 2016). Endemic corruption erodes tax compliance morale and citizens' sense of responsibility to comply (Alm & Embeay, 2013). If the cost of bribing officials is lower than the tax to be paid, this will encourage tax evasion (Hibbs & Piculescu, 2010).

Lack of trust in government also drives the informal economy, as citizens doubt their tax contributions will fund public goods (Daude et al., 2023). When the social contract and tax reciprocity are broken, voluntary compliance declines (Moore, 2008). Similarly, poor quality public services indicate low state capacity and provide little reward for paying taxes (Kus, 2014). In developing countries, a large informal sector often persists due to a lack of tax administration resources and weak enforcement capacity (Joshi et al., 2014). Even in developed countries, institutional inefficiencies such as complex tax codes create loopholes for evasion (Williams & Horodnic, 2015).

In short, institutional theory examines how formal and informal "rules of the game" shape incentives and norms around tax compliance versus avoidance through the shadow economy. Reforming governance to improve transparency, trust and enforcement can help formalize economic activity.

The Effect of Rule of Law on VAT Revenue

Deterrence theory suggests that the risk of detection and sanctions for non-compliance with tax regulations can prevent avoidance and increase compliance (Misra, 2019). Thus, law enforcement activities such as tax counseling, tax supervision, tax audit, and tax collection are expected to increase tax compliance. Empirical evidence generally supports the positive relationship between law enforcement and compliance in developed countries. For example, Günel & Didinmez (2022) found a significantly high increase in tax revenue in developed countries when the country has trustworthy agencies and strict and good law enforcement.



However, the effectiveness of preventing tax avoidance and tax evasion through law enforcement may be weaker in developing countries with lower administrative capacity. Alm & Embaye (2013) argue that traditional enforcement approaches rely heavily on the probability of detection, which suffers when governments lack the human resources to conduct checks on a large population. Weaker impacts have been found in some studies in developing countries - for example, an experiment in Rwanda found no significant compliance effect from increasing the threat of vetting alone saja (Mascagni et al., 2017). Günel & Dİdİnmez (2022) reiterated that ultimately law enforcement will tend to have a negative impact if the economy of the country is still classified as lower middle class and low. Thus, further research is needed to investigate this interaction in the context of developing countries.

E-government and Tax Administration

The adoption of information and communication technologies such as electronic tax reporting, digital payments, and computerized databases is expected to improve the efficiency and compliance of tax administration (Putri & Wijaya, 2022). In theory, automating processes can reduce costs, improve monitoring of tax liabilities, and enable better targeting of audits. Several empirical studies have found a positive impact of e-government on tax revenue in developing countries. For example, Mascagni et al. (2017) found that the e-filing system in Rwanda helped taxpayers to better understand their obligations and increase self-reported revenue. However, the success of e-government initiatives largely depends on the capacity of the existing bureaucracy and the readiness to implement the system effectively and then promote it so that people actively participate in the digitization of the tax system (Sijabat, 2020). In contexts with limited IT infrastructure and human resources, potential gains may be hampered.

E-government can also help broaden the tax base by enabling the registration and reporting of informal sector actors who were previously outside the system (Night & Bananuka, 2020). However, voluntary compliance from such groups requires trust building and access to finance. Further research needs to be done to see how e-government impacts revenue collection in different institutional environments of developing countries.

In summary, automation and computerization are expected to strengthen tax administration, but the outcome depends on complementary capacities and institutions. Nuanced evidence can guide policies to maximize the benefits of e-government considering country-specific conditions and challenges.

Research Hypothesis

Existing literature has examined the impact of economic informality, law enforcement, e- government on tax revenue and compliance. However, most studies look at these factors separately and do not explore their interactions. A deeper understanding of how the relationships between the informal economy, law enforcement, and e-government programs intersect and jointly affect VAT revenue outcomes is needed.

This research aims to address that gap by examining joint interactions in the context of middle- income Asia-Pacific countries. Understanding these relationships can help guide tax and administrative reforms that are balanced and tailored to the institutional environment in developing Asia-Pacific countries. The hypotheses to be answered from this study are as follows:

1. There is a significant negative effect between the informal economy and value-added taxrevenue, without the moderation of the e-government index.
2. There is a significant positive effect between the law enforcement index and value-added tax revenue, without moderation of the e-government index.
3. There is a positive influence between the e-government index and value-added taxrevenue.



4. There is a significant negative effect between the informal economy and value-added tax revenue, with moderation strengthened by the e-government index.
5. There is a significant positive effect between the law enforcement index and value-added tax revenue, strengthened by moderation of the e-government index.

METHODS

Research Design

This study uses a quantitative research design using panel data regression analysis. The panel data used covers six middle-income countries in the Asia Pacific region over the period 2002 to 2018. Using panel data allows for the examination of causal relationships between key variables while controlling for unobservable heterogeneity across countries (Wooldridge, 2010). In particular, the fixed effects regression model is used to analyze the regression model. Fixed-effects models approach the analysis by processing all-time series from all countries in the sample, thus helping to overcome the bias of missing variables (Robinson Sihombing, 2022).

Variable Identification

This study uses Value Added Tax (Good and Service Tax) as the dependent variable, Informal Economy, Rule of Law as the independent variable, with e-government as moderator. All data comes from the World Bank and is annual, except for the biannual e-government index.

Table 1 - Dataset Variables

Dependent Variable	Definition	Unit	Scale	Symbol
Good and Service Tax	Ratio of value-added tax revenue to GDP	Percentage	Ratio	Y
Independent Variable	Definition	Unit	Scale	Symbol
Informal Economy as % of GDP	Percentage of informal economy value in GDP	Percentage	Ratio	X ₁
Index Rule of Law	An index on a scale of -2.5 to 2.5 that reflects the trust in government agencies and the law in the community.	Points	Ratio	X ₂
E-government index (moderating variable)	An index with a scale between 0 and 1 that describes the development of e-government.	Points	Ratio	Z
Percentage of informal economy value in GDP moderated by E-government (X ₁ .Z)	Percentage of informal economy value in GDP that has been moderated by e-government	Percentage	Ratio	X ₃
Rule of Law Index moderated by E-government Index (X ₂ .Z)	Value index of public trust and regulatory enforcement moderated by e-government development	Points	Ratio	X ₄

source: author, 2023

Data Analysis

In processing and exploring the data, the STATA17 application was used with the following regression model:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 Z + \beta_4 X_1 Z + \beta_5 X_2 Z + \varepsilon$$



Where,

Y = Percentage of value-added tax revenue to GDP

β_0 = Constant

β_1 = Regression coefficient of the percentage of informal economy in GDP

X_1 = Regression of percentage of informal economy on GDP

β_2 = Coefficient of rule of law index

X_2 = Regression of rule of law index

β_3 = Coefficient of e-government index

Z = Regression of e-government index (moderator)

β_4 = Regression coefficient of the percentage of informal economy on GDP after moderated by e-government index

X = Regression of informal economy percentage on GDP after moderated by e-government index variable

β_5 = Regression coefficient of rule of law index after moderated by e-government index variable

X = Regression of rule of law index after moderated by e-government index variable

ε = Residual Value

Clustered robust standard errors are used to address the correlation of errors within countries over time (Wooldridge, 2010). Fixed effects models rely on a strict exogeneity assumption - that the independent variables are uncorrelated with past, current, and future error terms. Violation of this assumption can bias the coefficients (Wooldridge, 2010). This assumption will be tested using post-estimation diagnostics such as the Wooldridge test. To test other assumptions, standard panel data diagnostics will be conducted, including tests for multicollinearity, heteroscedasticity, non-normality, autocorrelation and others.

RESULTS AND DISCUSSION

Descriptive Analysis

This study uses panel data from 6 countries over the period 2002-2018 to examine the relationship between value-added tax (VAT) revenue, economic informality, law enforcement, and e-governance. The data comes from the World Bank and includes 17 annual observations for each country except for the e-government variable, but in modeling, blank years will be left alone as regression can still be performed. It is evident that when the panel data description and declaration analysis is conducted, the data is evenly distributed.

Table 2 – Descriptive Analysis

Variabel	Obs	Mean	Std. Dev.	Min	Max
gst	96	0.0542512	0.0185427	0.02973	0.10598
informal	102	30.83137	13.49882	8.6	49.7
egov	54	0.4863272	0.1149504	0.25927	0.7174
law	102	-0.3628715	0.5078008	-1.27973	0.622811
informal_egov	54	14.6259	6.92548	5.077456	29.26129
law_egov	54	-0.1280198	0.2263422	-0.4182531	0.4468046

source: author, 2023

Based on the results of descriptive analysis, we can understand that VAT (gst) revenue as a percentage of GDP, has 96 observations with an average of 5.4%. The economic



informality index (informal), has 102 observations with an average of 30.8. The e-government implementation index (egov), has 54 observations and an average of 0.49. The law enforcement effectiveness index (law), has 102 observations with an average of -0.36. Furthermore, the interaction between e- government and other moderated variables is informal_egov, the interaction between informality and governance, with 54 observations and an average of 14.6. Furthermore, law_egov, the interaction between law enforcement and governance, with 54 observations and an average of - 0.13.

This descriptive analysis provides preliminary summary statistics on the variables that will be used in the subsequent panel regression analysis. The observed variations in the data will make it easier to determine the relationship between VAT revenue, informality, law enforcement, and e- government implementation across countries and over time.

Model Selection Test Results

Next, a test will be conducted to select the panel data model that can describe the best causal relationship. It is done by using the method as can be seen in table 3.

Table 3 – Hasil Pengujian Pemilihan Model

Model	Test	Prob > chi2	Option
Model Common Effect dan Model Efek Tetap	Chow	0.0000	Model Efek Tetap
Model Efek Tetap dan Model Efek Random	Hausman	0.0000	Model Efek Tetap
Model Common Effect dan Model Efek Random	Lagrange	1.0000	Model Common Effect

source: author, 2023

The Chow test is used to compare the common effect and fixed effect models. The p-value of the Chow test is 0.0000, indicating that the fixed effects model is more suitable than the common effects model. Furthermore, the Hausman test is used to compare which is better between fixed effects or random effects. The results show the p-value is 0.0000, this can be interpreted as the fixed effect is the best model when compared to the random effect. Thus, based on the Chow and Hausman tests, the fixed effects model appears to be the best specification among these options. The Lagrange test does not provide any supporting evidence. Therefore, the fixed effects model is likely to be the preferred approach for analysis based on the results of these specification tests.

Classical Assumption Test Results

Table 4 – Classic Results

Test	Prob. Value	Conclusion
Normalitas	0.3201	Data is normally distributed
Heteroscedasticity	0.0000	There are symptoms of heteroscedasticity
Autocorrelation	0.1729	There are no autocorrelation symptoms

source: author, 2023

The test carried out in classical assumption testing which is generally the first to be carried out is Normality testing, this test serves to determine whether the data is normally distributed. Tests were carried out on 51 observations for residuals (resid). The p-values for skewness and kurtosis are 0.1835 and 0.5304 respectively. Both p-values are greater than 0.05, which indicates that we cannot reject normality in skewness and kurtosis. The combined test of



skewness and kurtosis yields an adjusted chi-square test statistic of 2.28 with a p-value of 0.3201. Thus, the p-value is greater than 0.05, failing to reject normality.

In summary, based on the combined skewness, kurtosis and significance tests on the residuals, there is no evidence against the assumption of normality. The residuals appear to be normally distributed, fulfilling the assumptions of the classical linear model.

The second diagnostic test that should be performed is the multicollinearity check. However, the current academic consensus is that heteroscedasticity and autocorrelation tests are sufficient for analyzing panel data consisting of both cross-sectional and time series dimensions (Satria, 2018). This is because multicollinearity is assumed to be minimal among the variables in a typical panel data structure (Gujarati et al., 2003). Therefore, omitting specific tests for multicollinearity has become standard practice in panel data analysis. The underlying academic rationale is that the model structure and the combination of cross-sectional and longitudinal data in panel data empirically preclude substantial collinearity between the predictor variables (Hashfi et al., 2023).

The heteroscedasticity test yielded a value of 0.0000 which is less than $\alpha = 0.05$, indicating that the dataset has symptoms of heteroscedasticity. To account for this heteroscedasticity, standard errors were calculated using the clustered sandwich estimator at the group level. The fixed effects model is re-estimated with robust standard errors. The coefficients remain the same but the standard errors are larger after using robust estimation. With robust standard errors, e-governance and the interaction between informality and e-governance remain highly significant, while law enforcement loses significance.

In summary, the modified Wald test detects the presence of group heteroskedasticity, so robust standard errors are used to ensure valid inference from the fixed effects model. Residual variances differ across groups in the panel.

Hypothesis Results

The results of testing the fixed effects model to determine the significance and direction of the effect of the independent variable on the dependent variable, the effect of the independent variable moderated by the moderator variable on the dependent variable, and the effect of the moderator variable itself on the dependent variable are as shown in table 5. Based on these results, the equation regarding the results of the analysis of this study is obtained as follows:

$$Y = 0.2509531 + (-0.0055848)X_1 + (0.0182128)X_2 + (-0.1932617)Z + (0.0048562)X_1Z + (-0.0699225)X_2Z + \varepsilon$$

Description:

- Y = Percentage of value-added tax revenue to GDP
- X₁ = Percentage of informal economy to GDP
- X₂ = Rule of law index
- Z = e-government index (moderator)
- X₁Z = Percentage of informal economy in GDP after moderated by e-government index variable
- X₂Z = rule of law index after moderated by e-government index variable
- ε = Residual Value

Table 5 – Panel Data Regression Results

Variables	Coefficient	P> z	Influence
Informal Economy	-0.0055848	0.000	Significant
Rule of Law	0.0182128	0.231	Not Significant
E-government	-0.1932617	0.000	Significant
Informal- EGov	0.0048562	0.000	Significant



Rule- EGov	-0.0699225	0.008	Significant
Constant	0.2509531	0.000	Significant
R-squared	0.7948		
Prob > chi2	0.0000		

source: author, 2023

The F-test yields a test statistic of 80.79 with a p-value of less than 0.05. This indicates that we can reject the null hypothesis that all coefficients in the model are equal to zero. In other words, all predictors are jointly significant in explaining VAT revenue. This indicates that, together, informality, e-government, law enforcement, and their interaction significantly predict VAT revenue.

The R-squared value of 0.7948 indicates that the model explains about 79% of the variance in VAT revenue across countries over time. In a fixed effects model, a high R-squared indicates that the model fits the data very well.

Looking at the predictors individually, economic informality has a highly significant negative coefficient ($b = -0.00558$, $p < 0.05$). This means that a 1-unit increase in informality is associated with a 0.00558 decrease in average VAT revenue, holding other variables constant. The highly significant p-value indicates that informality has a statistically significant partial effect on VAT revenue.

E-government implementation also has a highly significant negative coefficient ($b = -0.193$, $p < 0.001$). A 1-unit increase in e-government is associated with a 0.193 decrease in VAT revenue. Again, the highly significant p value means that e-government has an individually significant effect on VAT revenue.

The interaction can be interpreted as a moderator of this main effect. The positive and highly significant interaction between informality and e-government ($b = 0.00486$, $p < 0.001$) indicates that increased e-government dampens the negative relationship between informality and tax revenue. The negative and significant interaction between law and e-government ($b = -0.0699$, $p = 0.008$) conversely increases the negative relationship between law and revenue.

The Effect of Informal Economy on VAT Revenue in Asia Pacific Region Countries

Previous research shows that the size of the informal economy sector in several developing countries will potentially lead to a decrease in VAT revenue due to the large number of people who avoid complete data collection on their assets and public compliance with existing regulations (Williams & Horodnic, 2015). This is in line with the results of this study which show that the larger the informal sector in an economy will result in a decrease in tax revenue.

The cause of the large informal economy in a country can be suspected due to weak institutions or weak rule of law of a country, high rates of corruption, lack of public trust in their own government agencies, and lack of ability of the state to enforce the regulations that have been issued and cause tax avoidance (Alm & Embaye, 2013; Daude et al., 2023; Feige, 2016; Joshi et al., 2014).

The culture of non-compliance with regulations in the informal sector of the economy will be a huge challenge for various countries, especially the tax authorities in the country to collect VAT revenues (Kodila-Tedika & Mutascu, 2014). A possible solution for countries that already have a large informal economy or have a high potential informal economy is to carry out government reforms in order to record informal economic activities and increase VAT revenues in the country (North, 1990; Torgler & Schneider, 2009).

The Effect of Rule of Law on VAT Revenue in Asia Pacific Region Countries

Deterrent theory illustrates that the high risk of getting caught violating and the sanctions that will be faced later when committing a violation compared to complying with tax regulations will be able to anticipate tax avoidance and increase public compliance to pay and



report their taxes (Misra, 2019). One form of increasing the risk of being caught is by enforcing tax law, which can be done by means of, for example, supervision, examination, investigation, and collection activities (Günel & Dİdİnmez, 2022). The results of this study are in line with this theory which shows a positive relationship between law enforcement in a country and public compliance in middle-income countries in the Asia Pacific region, which contains developing countries.

However, in developing countries with low administrative capacity, the effectiveness of deterrent theory will not be apparent because law enforcement is weak. Traditional law enforcement systems rely heavily on the likelihood of detection of a rule violation. Thus, when a country lacks qualified human resources to conduct supervision and inspection, it will have difficulty enforcing the laws it has issued (Alm & Embaye, 2013). This weak law enforcement has been seen in studies conducted in several developing countries, for example research conducted in Rwanda, the results do not illustrate an increase in compliance with increasing tax audit pressure (Mascagni et al., 2017). In conclusion, law enforcement will have a negative impact when a country's economy is medium or lower (Günel & Dİdİnmez, 2022). In-depth research on the impact in other developing countries is needed.

The Effect of E-government on VAT Revenue in Asia Pacific Region Countries

The application of communication and information technology such as e-filing, digital payment, and computerization of database storage is expected to improve the performance of tax authorities in a country (Putri & Wijaya, 2022). Automation of taxation business processes in a country will be able to reduce the cost of tax collection, and strengthen the ability for supervision and inspection in the field of taxation (Ismail et al., 2021). This concept is in accordance with the findings in this study which say that e-government will increase VAT revenue.

Empirical research also supports this finding, that there is a significant positive impact of e-government on a country's VAT revenue. For example, what has been done by Rwanda which encourages people to be more familiar with and understand the automation system of tax business processes and reporting obligations results in an increase in the country's tax compliance (Mascagni et al., 2017). E-government will also be able to increase the tax base due to the collection of registration and reporting from all elements of society voluntarily (Night & Bananuka, 2020).

Namun, dampak baik dari e-government ini memiliki syarat yang harus terpenuhi terlebih dahulu. However, the good impact of e-government has conditions that must be met first, namely the capacity of the bureaucracy to run digital business processes and the readiness of the government and society to implement an effective system (Sijabat, 2020). The next thing that must be fulfilled is the existence of a high level of trust in government agencies (Night & Bananuka, 2020). So, if the capacity of the government and society is not ready to accept the digital system, and there is no mutual trust between the government and society, the improvement will be hampered.

The Effect of Informal Economy and E-government on VAT Revenue in Asia Pacific Region Countries

Theoretical and conceptual studies illustrate that adopting e-government systems can help integrate transactions and reduce informal sector actors into the tax system (Otekunrin et al., 2021). By reducing the cost of collecting taxes and improving oversight capabilities, digitized taxation systems can mitigate the negative revenue impacts of informal sector and governance weaknesses if adopted alongside broader administrative and bureaucratic reforms (Ismail et al., 2021; Mascagni et al., 2017). This is in line with the results of this study which indicate that the existence of e-government can provide damping on the negative effects of the informal economy and can increase VAT revenue.



However, voluntary compliance from actors in the previously untaxed informal sector depends on building trust between the government and its citizens. A study in Rwanda found limited revenue benefits generated by informal firms from the e-filing system (Mascagni et al., 2017). To realize the potential synergies between e-government and informal economy reduction, capacity building and complementary bureaucratic and administrative reforms are required.

The Effect of Rule of Law on VAT Revenue in Asia Pacific Region Countries

Conceptually, effective rule of law and tax enforcement capabilities are important complements to realize the potential gains in compliance and revenue from implementing a digital tax system (Alm & Embaye, 2013; Misra, 2019). The positive impact of e-government depends on the ability to reliably identify taxpayers, so if the tax authority is weak, it will create challenges (Joshi et al., 2014). Corruption can also undermine the results achieved if new electronic systems are misused by dishonest officials (Torgler & Schneider, 2009).

Several studies in developing countries have found that e-filing shows greater benefits when combined with enforcement. An experiment in Rwanda found that e-filing paired with increased scrutiny had the most compliance impact (Mascagni et al., 2017). However, the gains may still be constrained by limited administrative capacity. The results of this study show a negative impact of law enforcement even though it has been strengthened by e-government, this can be interpreted that the government is still not ready to implement e-government.

CONCLUSIONS

This study examines the complex relationship between the informal economy, law enforcement, e-government, and VAT revenue performance in middle-income countries in Asia Pacific in 2002-2018. Fixed effects panel data analysis provides some interesting findings.

First, a larger informal sector has a significant negative effect on VAT revenue, consistent with previous literature. Weak governance and institutions sustain informality and erode the tax base. Second, although law enforcement is not significant, e-government has a negative impact on revenue. This highlights the implementation challenges in a developing country context despite the theoretical advantages. Importantly, interactions show a difference. E-government dampens the negative informality-revenue relationship, possibly by enabling the integration of informal transactions. However, e-government surprisingly increases the negative law-revenue relationship, contrary to expectations.

Overall, the results of this study underscore the need for a balanced reform package tailored to country conditions. While e-government and legal institutions are important modernization goals, realizing synergies requires deliberate and sequential efforts that take into account the realities of the informal sector. The interactions and trade-offs between formalization, digitalization, and enforcement require further research using micro-level data.

For policymakers, the findings of this study suggest several areas of focus. First, continue to develop e-governance while building complementary capacity and trust. Second, rationalize the legal framework and strengthen law enforcement selectively in light of constraints. Third, leverage technology to formalize hard-to-tax informal actors through carrots, not just sticks. Addressing economic and institutional informality holistically will grow the VAT base and revenue sustainably.

This research makes an empirical contribution by examining the joint impact of informality, governance, and technology on tax performance. Further research that is more country-specific may provide more specialized insights to leverage these relationships for better VAT collection and revenue mobilization.



REFERENCES

- Alm, J., & Embaye, A. (2013). Using Dynamic Panel Methods to Estimate Shadow Economies Around the World, 1984–2006. [Http://Dx.Doi.Org/10.1177/1091142113482353](http://Dx.Doi.Org/10.1177/1091142113482353), 41(5), 510–543. <https://doi.org/10.1177/1091142113482353>
- Cooray, A., Dzhumashev, R., & Schneider, F. (2017). How Does Corruption Affect Public Debt? An Empirical Analysis. *World Development*, 90, 115–127. <https://doi.org/10.1016/J.WORLDDEV.2016.08.020>
- Daude, C., Melguizo, Á., & Gutierrez, H. (2023). The Political Economy of Tax Incentives for Investment in the Dominican Republic. *Economics and Education*, 24(3), 363–368. https://doi.org/10.55439/ECED/VOL24_ISS3/A57
- Feige, E. L. (2016). Reflections on the Meaning and Measurement of Unobserved Economies: What Do We Really Know About the “Shadow Economy.” *Journal of Tax Administration*, 2. <https://doi.org/10.21236/ADA441579>
- Fuest, C., Hugger, F., & Wildgruber, S. (2022). Why Is Corporate Tax Revenue Stable While Tax Rates Fall? Evidence from Firm-Level Data. *National Tax Journal*, 75. <https://doi.org/10.1086/720704>
- Gujarati, D. N., Burr Ridge, B., Dubuque, I., Madison, I., & New York San Francisco St Louis Bangkok Bogota Caracas Kuala Lumpur Lisbon London Madrid Mexico City Milan Montreal New Delhi Santiago Seoul Singapore Sydney Taipei Toronto, W. (2003). *BASIC ECONOMETRICS FOURTH EDITION*. www.mhhe.com
- Günel, T., & Dİdİnmez, İ. (2022). Relationship between rule of law and tax revenues: dynamic panel data analysis. *Public Sector Economics*, 46(3), 403–418. <https://doi.org/10.3326/PSE.46.3.4>
- Hashfi, H., Wijaya, S., & Keuangan Negara STAN, P. (2023). Pengaruh Agrikultur Dan Industri Terhadap Penerimaan Pajak Dengan Variabel Moderasi Pengendalian Korupsi Di Negara Berpenghasilan Menengah Wilayah Asia Pasifik. *Jurnalku*, 3(3), 269–279. <https://doi.org/10.54957/JURNALKU.V3I3.474>
- Hassan, B. (2015). The Role of Value Added Tax (VAT) in the Economic Growth of Pakistan. *Journal of Economics and Sustainable Development*, 6(13). www.iiste.org
- Hibbs, D. A., & Piculescu, V. (2010). Tax Toleration and Tax Compliance: How Government Affects the Propensity of Firms to Enter the Unofficial Economy. *American Journal of Political Science*, 54(1), 18–33. <http://www.jstor.org/stable/20647968>
- Huynh, C. M., & Nguyen, T. L. (2020). Shadow economy and income inequality: new empirical evidence from Asian developing countries. *Journal of the Asia Pacific Economy*, 25(1), 175–192. <https://doi.org/10.1080/13547860.2019.1643196>
- International Labor Organization. (2023). Informal economy (EMPLOYMENT). <https://www.ilo.org/employment/units/emp-invest/informal-economy/lang--en/index.htm>
- Investopedia. (2023, March 31). Value-Added Tax (VAT). [Investopedia. https://www.investopedia.com/terms/v/valueaddedtax.asp](https://www.investopedia.com/terms/v/valueaddedtax.asp)
- Ismail, I., Shaharuddin, S., Shahroni, N., Ibrahim, N., & Sani, U. (2021). The Effect of Trust and Ease of Use of E-filing on Tax Compliance in the Era of Big Data Analytics. *Proceedings of the First International Conference of Economics, Business & Entrepreneurship, ICEBE 2020, 1st October 2020, Tangerang, Indonesia*. <https://doi.org/10.4108/EAI.1-10-2020.2305611>
- Joshi, A., Prichard, W., & Heady, C. (2014). Taxing the Informal Economy: The Current State of Knowledge and Agendas for Future Research. [Http://Dx.Doi.Org/10.1080/00220388.2014.940910](http://Dx.Doi.Org/10.1080/00220388.2014.940910), 50(10), 1325–1347. <https://doi.org/10.1080/00220388.2014.940910>



- Knobel, A., & Meinzer, M. (2014). Automatic exchange of information: An opportunity for developing countries to tackle tax evasion and corruption. *Tax Justice Network*, 1–57.
- Kodila-Tedika, O., & Mutascu, M. (2014). Shadow economy and tax revenue in Africa. *Economics Bulletin*.
- Kus, B. (2014). The informal road to markets: Neoliberal reforms, private entrepreneurship and the informal economy in Turkey. *International Journal of Social Economics*, 41(4), 278–293. <https://doi.org/10.1108/IJSE-11-2012-0209/FULL/XML>
- La Porta, R., & Shleifer, A. (2014). Informality and Development. *Journal of Economic Perspectives*, 28(3), 109–126. <https://doi.org/10.1257/JEP.28.3.109>
- Mascagni, G., Nell, C., & Monkam, N. (2017). One Size Does Not Fit All: A Field Experiment on the Drivers of Tax Compliance and Delivery Methods in Rwanda. ICTD: International Centre for Tax and Development.
- Misra, F. (2019). TAX COMPLIANCE: THEORIES, RESEARCH DEVELOPMENT AND TAX ENFORCEMENT MODELS. *ACCRUALS (Accounting Research Journal of Sutaatmadja)*, 3(2), 189–204. <https://doi.org/10.35310/ACCRUALS.V3I2.72>
- Moore, M. (2008). Between coercion and contract: competing narratives on taxation and governance. *Taxation and State-Building in Developing Countries: Capacity and Consent*, 34–63. <https://doi.org/10.1017/CBO9780511490897.002>
- Mosquera Valderrama, I. J., Lesage, D., & Lips, W. (2018). Tax and Development: The Link between International Taxation, The Base Erosion Profit Shifting Project and The 2030 Sustainable Development Agenda. *UNU Institute on Comparative Regional Integration Studies*. <https://hdl.handle.net/1887/68769>
- Night, S., & Bananuka, J. (2020). The mediating role of adoption of an electronic tax system in the relationship between attitude towards electronic tax system and tax compliance. *Journal of Economics, Finance and Administrative Science*, 25(49), 73–88. <https://doi.org/10.1108/JEFAS-07-2018-0066/FULL/PDF>
- North, D. C. (1990). Institutions, Institutional Change and Economic Performance. *Institutions, Institutional Change and Economic Performance*. <https://doi.org/10.1017/CBO9780511808678>
- OECD. (2023). Revenue Statistics in Asia and the Pacific 2023. OECD Publishing. <https://doi.org/10.1787/5902C320-EN>
- Otekunrin, A. O., Nwanji, T. I., Eluyela, D. F., Inegbedion, H., & Eleda, T. (2021). E-tax system effectiveness in reducing tax evasion in Nigeria. *Problems and Perspectives in Management*, 19(4), 175–185. [https://doi.org/10.21511/PPM.19\(4\).2021.15](https://doi.org/10.21511/PPM.19(4).2021.15)
- Pasovic, E., & Efendic, A. S. (2018). Informal Economy in Bosnia and Herzegovina – An Empirical Investigation. *South East European Journal of Economics and Business*, 13(2), 112–125. <https://doi.org/10.2478/JEB-2018-0015>
- Putri, A. F., & Wijaya, S. (2022). Kajian Pemungut PPN Lainnya Dalam Mekanisme PMSE Atas Transaksi Digital Domestik: Proposal Untuk Indonesia. *JURNAL PAJAK INDONESIA (Indonesian Tax Review)*, 6(2S), 561–577. <https://doi.org/10.31092/JPI.V6I2S.1901>
- Robinson Sihombing, P. (2022). Aplikasi STATA Untuk Statistisi Pemula. In Gemala. Gamala. <https://www.researchgate.net/publication/358460661>
- Satria, D. (2018). Modul panel data dengan menggunakan STATA.
- Schneider, F., & Enste, D. H. (2000). Shadow Economies: Size, Causes, and Consequences. *Journal of Economic Literature*, 38(1), 77–114. <https://doi.org/10.1257/JEL.38.1.77>
- Sijabat, R. (2020). Analysis of e-government Services: A Study of the Adoption of Electronic Tax Filing in Indonesia. *Jurnal Ilmu Sosial Dan Ilmu Politik*, 23(3), 179–197. <https://doi.org/10.22146/JSP.52770>



- Suryadi, T. L., & Subardjo, A. (2019). PENGARUH KEPATUHAN WAJIB PAJAK, PENAGIHAN PAJAK DAN PEMERIKSAAN PAJAK TERHADAP PENERIMAAN PAJAK. *Jurnal Ilmu Dan Riset Akuntansi (JIRA)*, 8(4). <http://jurnalmahasiswa.stiesia.ac.id/index.php/jira/article/view/2370>
- Torgler, B., & Schneider, F. (2009). The impact of tax morale and institutional quality on the shadow economy. *Journal of Economic Psychology*, 30(2), 228–245. <https://doi.org/10.1016/J.JOEP.2008.08.004>
- Williams, C. C., & Horodnic, I. A. (2015). Explaining and tackling the shadow economy in Estonia, Latvia and Lithuania: A tax morale approach. *Baltic Journal of Economics*, 15(2), 81–98. <https://doi.org/10.1080/1406099X.2015.1114714>
- Williams, C. C., Horodnic, I. A., & Burkinshaw, L. (2016). Evaluating competing public policy approaches towards the informal economy. *International Journal of Public Sector Management*, 29(4), 365–380. <https://doi.org/10.1108/IJPSM-01-2016-0005>
- Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*. 1064.