Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6, 8718-8728
2024
Publisher: Learning Gate
DOI: 10.55214/25768484.v8i6.3863

The impact of the shadow economy on taxation in Cambodia

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Abstract: A multiple regression analysis was conducted to assess the influence of the shadow economy, inflation rate, and GDP growth rate on tax revenue. The regression model utilized level data, and the two-step Engle and Granger cointegration test confirmed the absence of spurious relationships between the dependent and independent variables. Various diagnostic tests associated with OLS methods were performed, including assessments for multicollinearity, heteroscedasticity, and serial autocorrelation. To ensure the robustness of the standard errors, the HAC standard errors and covariance were applied. The empirical findings of this research demonstrated that the growth of the shadow economy has a statistically significant negative impact on tax revenue in Cambodia. Furthermore, the results indicated a negative relationship between inflation and tax revenue, while a positive correlation was found between real GDP growth and tax revenue.

Keywords: *GDP, Inflation rate, OLS method, Shadow economy, Tax revenue.*

1. Introduction

In the past ten years, Cambodia has witnessed significant economic advancement, with tax revenue serving as a fundamental component in bolstering development efforts. Throughout this timeframe, the nation has recorded a consistent rise in its gross domestic product (*GDP*), frequently achieving growth rates surpassing 7% each year, propelled by industries including garments, construction, tourism, and agriculture. Nevertheless, the capacity of the country to generate tax revenue has been essential in sustaining and promoting this economic growth (Eng and Lim, 2023).

Cambodia's tax revenue generation remained comparatively modest when assessed against other nations in Southeast Asia, largely due to a considerable segment of the informal economy functioning outside formal regulations. Acknowledging the critical need to enhance revenue for sustainable development, bolster public services, and diminish dependence on foreign assistance, the government initiated substantial reforms aimed at refining the tax system and enhancing the efficiency of revenue collection. A significant reform was the implementation of the Revenue Mobilization Strategy (*RMS*) in 2015, which sought to boost domestic revenue by strengthening the capabilities of the General Department of Taxation (*GDT*). This initiative encompassed the establishment of new tax policies, including a digital tax filing system, enhanced enforcement of tax regulations, and greater transparency in tax administration. Furthermore, Cambodia's initiatives to combat corruption within tax agencies and enhance compliance contributed to a rise in revenue (Taing and Chang, 2021).

Notwithstanding the advancements made, Cambodia continues to encounter obstacles, including tax evasion and a significant informal economy. Nevertheless, in the last ten years, there has been a consistent increase in tax revenue, which has facilitated greater investment in public infrastructure, healthcare, education, and initiatives aimed at alleviating poverty. As the economy progresses, enhancing tax collection is a primary objective for the Cambodian government to guarantee enduring economic growth. (International Labour Organization, 2023).

The shadow economy, encompassing unreported earnings and illegal activities, significantly undermines the potential for tax revenue generation. Operating beyond the reach of established regulatory systems, it erodes the taxable base, leading to a decline in government income. This decrease

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in revenue has detrimental effects on the funding available for crucial public services, infrastructure development, and welfare programs (Fleming et al., 2000). Businesses that function within the shadow economy often avoid fulfilling their tax responsibilities, resulting in an imbalanced competitive environment for lawful enterprises that comply with tax laws. As a result, the financial burden of taxation is unfairly transferred to those who do adhere to regulations, exacerbating income disparity. Furthermore, governments may face challenges in implementing tax laws and maintaining fiscal stability, which ultimately hinders economic progress and development (Giedraitis et al., 2023).

The aim of this study is to address the research question regarding whether the expansion of the informal economy, often referred to as the shadow economy, leads to a decrease in tax revenue in Cambodia. To investigate this question, a multiple regression analysis will be employed to provide insights through hypothesis testing. The research has developed three essential hypotheses: first, that the shadow economy exerts a significant negative influence on tax revenue; second, that the inflation rate negatively affects tax revenue; and third, that the growth rate of real *GDP* positively impacts tax revenue in Cambodia.

2. Literature Review

The shadow economy, often known as the informal or underground economy, refers to the economic activities that are not regulated by the government and are not reported in the official GDP (Schneider and Enste, 2000). This poses significant challenges to governments worldwide, particularly by undermining tax revenue collection. As a result, understanding the dynamics of the shadow economy and its impact on tax revenues is crucial for developing effective fiscal policies and ensuring economic sustainability.

For decades, the shadow economy has intrigued scholars and policymakers due to its complex interplay with the formal economy. This ongoing interest has spurred the development of various methods to analyze its size, causes, and consequences. Studies consistently demonstrated that the size of the shadow economy varied significantly across regions and was influenced by factors such as governance quality, taxation levels, and labor market regulations. However, this variability complicated policymakers' efforts to accurately assess its scale (Albu, 2004).

To address this challenge, researchers have employed a range of methods to estimate the shadow economy's size. For example, researcher have widely utilized the MIMIC (Multiple Indicators, Multiple Causes) approach and the currency demand approach. Specifically, Dell'Anno (2007) adopted the MIMIC approach to estimate the size of the shadow economy in Portugal. The study indicated that the size of the shadow economy was substantial but fluctuated over time due to economic conditions. Similarly, Dell'Anno and Davidescu (2019) expanded this research by incorporating the currency demand method. The study highlighted the inherent difficulty of measuring the shadow economy due to its unobservable nature and demonstrated that different estimation methods yield varying results, complicating policy design. Furthermore, Schneider and Williams (2013) contributed to the discussion, introducing indirect methods like tax discrepancies and electricity consumption models. The study also emphasized the difficulty of quantify the size of the shadow economy. Claiming that the shadow economy comprised activities that are legal but not reported, illegal activities, or activities that fall outside of government regulations. The same study also found that the size of the shadow economy varies across regions, being larger in developing economies due to weaker enforcement and institutional inefficiencies.

In addition, regional analyses further intensify the complexities of the shadow economy. For instance, Albu (2004), focusing on Romania, highlighted how transition economies were particularly susceptible due to structural adjustments and inadequate regulatory frameworks. Likewise, Laumulin (2013) extended this analysis to Kazakhstan. The results linked the shadow economy to the underdeveloped financial systems and weak governance structures. Meanwhile, Baklouti and Boujelbene (2019) examined the broader implications of the shadow economy on economic development, comparing its effects in developed and developing countries. While the shadow economy may temporarily provide employment and economic activity, it undermines long-term sustainable growth by weakening public finances. Specific case studies further highlight diverse drivers of the shadow economy. Dell'Anno,

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 8718-8728, 2024
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Davidescu, and Balele (2017), for instance, applied the MIMIC model to Tanzania, concluding that inflation, unemployment, and government spending significantly contributed to its growth. Similarly, in Romania, Zaman and Golchin (2015) found that socio-economic and institutional factors made the shadow economy a substantial part of GDP, emphasizing the role of structural inefficiencies. Despite advancements in measurement methods, accurately quantifying the shadow economy remains challenging. This underscores the need for better data collection, stronger institutions, and tailored policies to mitigate its economic and fiscal impacts.

Additionally, the factors driving the shadow economy are varied and interconnected. For example, Fuest and Schneider (2012) identified tax evasion and avoidance as key drivers of the shadow economy, fueled by high tax burdens, weak enforcement, and systemic corruption. Nchor (2021) also found that corruption and insufficient enforcement exacerbated shadow economies in the Czech Republic, Poland, and Hungary. Similar findings emerged from the Middle East, where Imam and Jacobs (2007) demonstrated that corruption reduced tax revenues and increased informality. Dreher and Schneider (2010) further confirmed a global correlation between corruption and shadow economies, emphasizing the importance of improving institutional quality. In Asia, similar patterns emerged. Ulyssea (2021), for instance, argued that weak enforcement and complex tax systems deterred compliance and promoted informality. Mughal and Schneider (2020) also highlighted similar issues in Pakistan, where the informal sector not only reduces direct tax collections but also distorts fiscal planning due to unreliable data. In Sub-Saharan Africa, Idris, Yusuf, Oyindamola, and Abdulateer (2024) and Kodila-Tedika and Mutascu (2013) revealed that the shadow economy significantly limits tax bases, hindering fiscal sustainability. Meanwhile, in Latin America and OECD countries, Boitano and Abanto (2019) observed that high informality reduces tax revenues and slows economic growth. In the Middle East, Ghazo, Qasrawi, and Abu-Lila (2021) also demonstrated that informal activity distorted resource allocation and hampered fiscal capacity. Gnangnon (2023) also highlighted that the shadow economy created significant barriers to effective tax reform in developing countries. Structural weaknesses, such as limited administrative capacity and endemic corruption, perpetuated informality and hindered fiscal performance.

Furthermore, economic crises and governance weaknesses further amplify these issues. Vlachaki (2015) found that Greece's shadow economy expanded during crises, significantly reducing VAT revenues. In Lebanon, Ltaif, Mihai-Yiannaki, and Thrassou (2024) showed that financial crises and weak governance intensified the shadow economy's fiscal impacts, exacerbating instability.

Besides the shadow economy also perpetuates socioeconomic disparities. Reduced tax revenues undermine investments in public goods like infrastructure, education, and healthcare, disproportionately affecting marginalized groups (Bak, Kalyta, Tarashchenko, Riznyk, and Artemchuk, 2024; Rogan, 2019). Additionally, informality creates a feedback loop, weakening state capacity and perpetuating inequality (Hallunovi and Vangjel, 2023). Given these implications, addressing the shadow economy requires a balanced approach. Joshi, Prichard, and Heady (2014), for instance, advocated for simplified tax regimes and capacity-building measures for tax administrations. Likewise, Awasthi and Engelschalk (2018) emphasized combining enforcement with measures that encourage compliance, such as reducing bureaucratic hurdles and leveraging technology. For example, digital payment systems can reduce cash transactions, making tax evasion more difficult (Mazhar & Méon, 2017).

Last but not least, tax morale also plays a critical role. Torgler and Schneider (2009) argued that fostering trust in government institutions and ensuring equitable use of tax revenues can significantly reduce tax evasion. This aligns with Hammond, Kwakwa, Berko, and Amissah (2023), who highlighted the importance of fair and transparent tax policies. Tailored strategies, such as tax amnesty programs (Awwad & Al-Kababji, 2023) and local initiatives (Lukit, Firdaus, and Adi, 2023), can also promote formalization.

In conclusion, the shadow economy poses a significant challenge to tax systems and economic growth globally. While regional differences shape its impact, common themes—such as weak enforcement, corruption, and complex tax systems—underscore the need for comprehensive strategies. Combining effective enforcement with measures to encourage formal participation can help governments mitigate the shadow economy's effects, enhance fiscal resilience, and support long-term

Edelweiss Applied Science and Technology
ISSN: 2576-8484
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economic development. Continued research into innovative strategies and improved measurement techniques remains essential for addressing this persistent global challenge.

3. Methodology

Multiple regression analysis serves as a statistical approach utilized to investigate the connections between a dependent variable and several independent variables. This method is crucial for evaluating the extent to which changes in the independent variables affect the dependent variable. A key feature of this analysis is the estimation of coefficients, which reflect both the strength and direction of these relationships. To achieve the aims of this study, multiple regression analysis is applied to evaluate the effects of independent variables such as the shadow economy (*SE*), inflation rate (*INF*), and gross domestic product growth rate (GDP) on the dependent variable, tax revenue (*T*). The general structure of the model is outlined as follows.

$$T_t = \beta_0 + \beta_1 SE_t + \beta_2 INF_t + \beta_3 GDP_t + \varepsilon_t \quad (1)$$

In this context, β_0 serves as the intercept, while β_1, β_2, and β_3 represent the coefficients associated with the shadow economy, inflation rate, and the growth rate of gross domestic product, respectively. The term ε_t denotes the residual or error component, and t signifies the time series aspect of the data. The analysis utilizes annual time series data spanning from 1993 to 2020, resulting in a total of 28 observations. All data utilized in this research are sourced from the World Bank. Given that this study employs time series data, it is essential to perform a unit root test to determine the presence of a unit root in each data series. The Augmented Dickey-Fuller (*ADF*) test, a widely recognized method for this purpose, will be implemented in the analysis.

A two-step Engle and Granger cointegration test is utilized to assess the long-term relationships among the variables being examined. It is important to emphasize that the method used for estimating sample parameters is the ordinary least squares (*OLS*) technique. Three fundamental assumptions of *OLS* must be satisfied: the absence of perfect or significant multicollinearity among the independent variables in the regression model, the constancy of the variance of the residuals across observations, known as homoscedasticity, and the lack of serial correlation in the residuals, referred to as no autocorrelation. The correlation matrix is utilized to assess the degree of correlation, whether perfect or strong, between pairs of independent variables. The correlation coefficient ranges from -1, indicating a perfect negative correlation, to +1, signifying a perfect positive correlation, with both extremes included. When the absolute value of the correlation coefficient for a pair of independent variables exceeds 0.8, it is deemed to indicate a strong correlation. In such cases, it is advisable to exclude one of the variables from the model, which can be determined through the analysis of the variance inflation factor (*VIF*). Additionally, the identification of serial correlation in the residuals and the presence of heteroskedasticity can be evaluated using the Breusch-Godfrey serial correlation LM test and the Breusch-Pagan-Godfrey test, respectively.

3.1. Empirical Results

This research utilizes time series data that encompasses the ratio of tax revenue to gross domestic product, the shadow economy, the inflation rate, and the growth rate of real gross domestic product. The study spans from 1993 to 2020, resulting in a total of 28 observations. As presented in Table 1, the average annual figures for tax revenue, the shadow economy, the inflation rate, and the real economic growth rate during this period are estimated to be 10.02%, 45.90, 9.26%, and 3.73%, respectively.

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Table 1.
Summary statistics.

Statistics	T	SE	INF	GDP
Mean	10.02	45.90	9.26	3.73
Median	8.91	46.47	3.18	5.63
Maximum	19.73	53.94	107.40	11.28
Minimum	3.29	34.99	-4.28	-37.22
Std. dev.	4.29	6.28	22.22	8.72
Skewness	0.67	-0.24	3.66	-3.88
Kurtosis	2.49	1.69	15.66	18.79
Jarque-Bera	2.37	2.27	249.70	361.11
Probability	0.31	0.32	0.00	0.00
Observations	28	28	28	28

The indicators for tax and the shadow economy demonstrate a normal distribution for each data series, as evidenced by the Jarque-Bera test probabilities of 0.31 and 0.32, both exceeding the 5% significance level, which indicates that the null hypothesis is not rejected. Conversely, the inflation rate and GDP growth rate do not conform to a normal distribution, as the null hypothesis of the Jarque-Bera test is strongly rejected at the 1% significance level.

It is essential for each time series data utilized in this research to be stationary or devoid of a unit root before proceeding with the estimation and analysis of multiple regression. The evaluation of the unit root is conducted using the *ADF* test, which encompasses three regression models: one with a constant, one with both a constant and a trend, and one without either. It is crucial to recognize that the null hypothesis of this test posits that the series possesses a unit root, indicating non-stationarity. As shown in Table 2, the tax revenue variable is integrated of order one, denoted as *I(1)*. This indicates that the series is non-stationary at its level, but it becomes stationary once it is transformed into its first difference. In contrast, the shadow economy, inflation rate, and real economic growth rate are each integrated of order zero, represented as *I(0)*, signifying that these variables are stationary at their level.

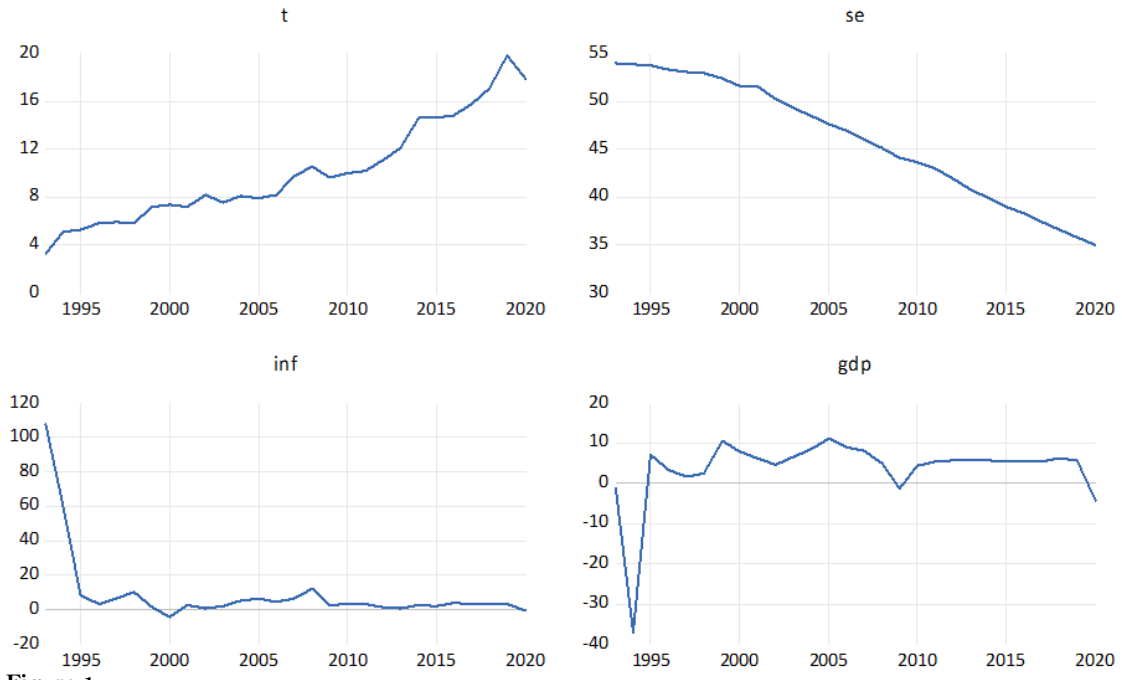

Figure 1.
Tax, shadow economy, inflation rate, and gross domestic product.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
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The outcome of the *ADF* test indicates that the dependent variable, tax revenue, is non-stationary at the level, while the independent variables—shadow economy, inflation rate, and real gross domestic product growth rate—are stationary at the level. Nevertheless, a multiple regression analysis will be performed using the level data series. Following this, the two-step Engle and Granger cointegration test will be implemented to evaluate the existence of a long-term relationship among the variables being examined.

Table 2.
ADF unit root test.

Models	Statistic	At level			
		T	SE	INF	GDP
With constant	t-statistic	-0.1944	2.7471	-2.3576	-4.4118
	Prob.	0.928	1.0000	0.1643	0.0018
		n0	n0	n0	***
With constant & trend	t-statistic	-1.9505	-3.5425	-2.4114	-4.4981
	Prob.	0.6009	0.0547	0.3641	0.007
		n0	*	n0	***
Without constant & trend	t-Statistic	2.9121	-8.711	-12.0042	-3.855
	Prob.	0.9984	0.0000	0.0000	0.0004
		n0	***	***	***
		At First Difference			
		d(T)	d(SE)	d(INF)	d(GDP)
With constant	t-statistic	-5.7128	-3.9161	-12.6674	-12.0083
	Prob.	0.0001	0.0062	0.0000	0.0000
		***	***	***	***
With constant & trend	t-statistic	-5.9314	-4.816	-11.3517	-13.5993
	Prob.	0.0003	0.0036	0.0000	0.0000
		***	***	***	***
Without constant & trend	t-Statistic	-4.4845	0.0852	-13.1352	-12.0026
	Prob.	0.0001	0.7004	0.0000	0.0000
		***	n0	***	***

Notes: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1% and (no) Not Significant Probability based on MacKinnon (1996) one-sided p-values.

To conduct the Engle and Granger cointegration test, the initial step involves executing a multiple regression analysis where the dependent variable, referred to as tax revenue in this research, is analyzed against independent variables such as the shadow economy, inflation rate, and the real growth rate of gross domestic product. This regression generates sample parameters that will be utilized for predicting the residual or error series of the regression model. In the subsequent step, the *ADF* test is employed to determine the stationarity of the predicted residuals. It is important to note that the stationarity of these residual terms signifies that all data series examined are cointegrated, indicating a long-term relationship among them. Furthermore, although the time series data may exhibit non-stationarity, the regression analysis conducted between the dependent and independent variables will not yield spurious results.

The findings from the *ADF* unit root test, as shown in Table 3, indicate that the residual term does not exhibit a unit root across all three test models. The null hypothesis, which posits the presence of a unit root in the series, is rejected at the 1% significance level for the model incorporating a constant, at the 5% significance level for the model that includes both a constant and a trend, and at the 1% significance level for the model that excludes both a constant and a trend. Therefore, it can be concluded that there is cointegration among the variables under investigation, and utilizing the variables at their level will not yield spurious results.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 8718-8728, 2024
DOI: 10.55214/25768484.v8i6.3863

Table 3.
ADF unit root test, residual term.

Models	Statistic	At level
		RESID01
With constant	t-statistic	-4.3364
	Prob.	0.0023
		***
With constant & trend	t-statistic	-4.1195
	Prob.	0.0168
		**
Without constant & trend	t-statistic	-4.4742
	Prob.	0.0001
		***

It is essential to evaluate whether the fundamental assumptions of the ordinary least squares (OLS) method are satisfied, even in the absence of spurious regression results. These assumptions include the absence of perfect multicollinearity among the independent variables, the presence of homoscedasticity, and the lack of serial autocorrelation in the residuals. Consequently, diagnostic tests will be performed, and appropriate remedies will be applied if any of the OLS assumptions are violated, as such violations could lead to the estimated results not being the best linear unbiased estimator (*BLUE*).

Table 4.
Correlation matrix.

Correlation **t-Statistic**	**SE**	**INF**	**GDP**
SE	1		
INF	0.3702*	1	
	2.0317		
GDP	-0.1778	-0.5367***	1
	-0.9212	-3.2436	

Note: ***, **, * Statistically significant at 1%, 5%, and 10% level, respectively.

The relationship between the shadow economy and the inflation rate is quantified by a correlation coefficient of 0.3702, while the correlation between the shadow economy and gross domestic product (*GDP*) stands at -0.1778. Additionally, the correlation between *GDP* and the inflation rate is measured at -0.5367. Given that the correlation coefficients for all variable pairs are below the thresholds of -/+1 or -/+0.8, it can be concluded that there is an absence of perfect or significant multicollinearity among the independent variables, as illustrated in Table 4.

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Vol. 8, No. 6: 8718-8728, 2024
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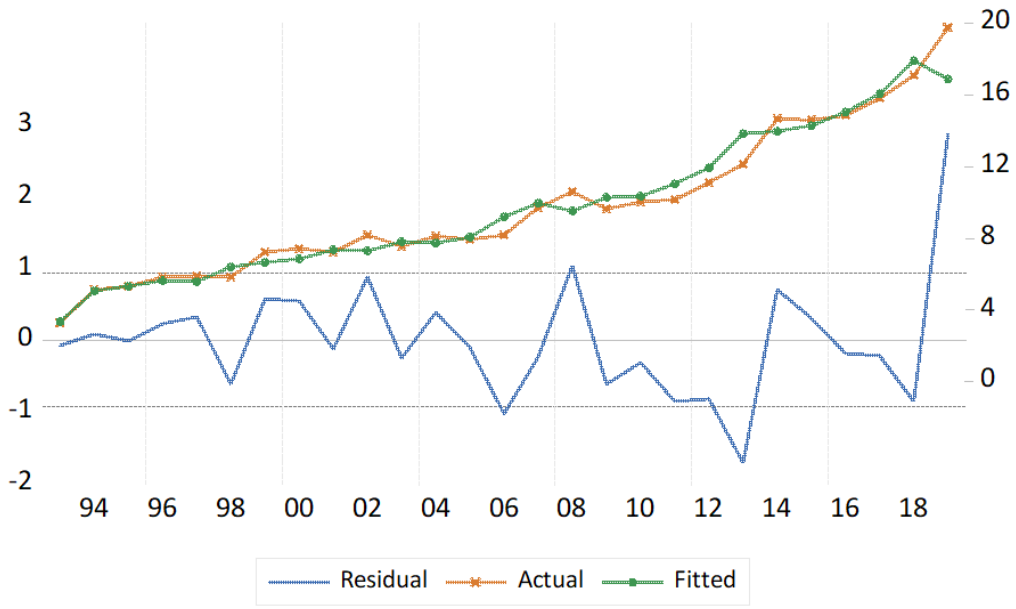

Figure 2.
Residual, actual, and fitted.

The evaluation of serial correlation in the residuals can be conducted through the Breusch-Godfrey serial correlation Lagrange Multiplier (*LM*) test, which operates under the null hypothesis asserting the absence of serial correlation among the residual terms. The results from the F-statistic and Obs*R-squared tests indicate that the null hypothesis remains accepted, as the probability (*p*) values for both tests exceed the 5% significance threshold.

Table 5.
Breusch-Godfrey serial correlation *LM* test.

F-statistic	0.261	Prob. F (2,20)	0.773
Obs*R-squared	0.686	Prob. Chi-square (2)	0.710

One of the fundamental assumptions of the OLS method is that the variance of the residuals remains constant, a condition referred to as homoscedasticity. To determine if this assumption holds, the Breusch-Pagan-Godfrey test for heteroscedasticity is employed, which incorporates three distinct statistical tests: the F-statistic, Obs*Re-squared, and scaled explained sum of squares. It is important to note that the null hypothesis for each of these tests posits that the variance of the residuals is constant. Among the three tests conducted, the Scaled explained sum of squares indicated a rejection of the null hypothesis of homoscedasticity, as evidenced by a p-value of less than 0.05, thereby confirming the presence of heteroscedasticity. This finding contravenes the assumption of homoskedasticity, resulting in inefficient estimators and biased standard errors. As a consequence, hypothesis tests and confidence intervals may become unreliable, leading to erroneous statistical inferences and potentially misleading conclusions.

Table 6.
Heteroskedasticity test: Breusch-Pagan-Godfrey.

F-statistic	**1.4157**	**Prob. F (4,22)**	**0.2618**
Obs*R-squared	5.5272	Prob. Chi-Square (4)	0.2374
Scaled explained SS	9.5779	Prob. Chi-Square (4)	0.0482

Edelweiss Applied Science and Technology
ISSN: 2576-8484
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To ensure the generation of a reliable standard error, this study has employed HAC standard errors and covariance. The outcomes of the multiple regression analysis, following the resolution of all identified issues, are displayed in Table 7. The estimated coefficient for the lagged dependent variable, tax revenue, is both positive and statistically significant at the 1% level, indicating a persistent increase in tax revenue. The primary independent variable examined in this research is the shadow economy, which has an estimated parameter that is negative and significant at the 5% level, illustrating that an expansion of the shadow economy is likely to diminish tax revenue. The estimated slope coefficient for the inflation rate is negative and statistically significant, indicating its impact on tax revenue at the 1% level. Furthermore, the empirical findings demonstrate that an increase in the economic growth rate is associated with a rise in tax revenue, as evidenced by the positive estimated parameter for *GDP*, which is also statistically significant at the 1% level. This study not only conducted individual hypothesis tests for each variable but also executed a simultaneous test to determine whether all parameters of the independent variables, excluding the intercept, are collectively significant in explaining tax revenue. The computed F-statistic is 121.52, and given that its p-value is less than 0.01, it indicates that the independent variables together significantly account for tax revenue. Furthermore, the regression model reveals an adjusted R-squared value of 0.95, suggesting that 95% of the variance in tax revenue can be attributed to the independent variables.

Table 7.
Regression result.

Independent variables	Coefficient
T (1)	0.6456***
	(0.1205)
SE	-0.2064**
	(0.0867)
INF	-0.0164***
	(0.0032)
GDP	0.0221***
	(0.0071)
C	12.9027**
	(5.2357)
Adjusted R-squared	0.95
F-statistic	121.52
Prob(F-statistic)	0.0000
Notes:	
Standard error in parenthesis.	
***, **, * Statistically significant at 1%, 5%, and 10% level, respectively.	

4. Conclusion

This study aims to examine the influence of the shadow economy on tax revenue in Cambodia through the application of multiple regression analysis. The model integrates not only the shadow economy, inflation rate, and real *GDP* growth rate but also incorporates the lagged dependent variable, tax revenue, into the regression framework. The *ADF* unit root test conducted indicates that the dependent variable, tax revenue, is integrated of order one, represented as *I(1)*, while the independent variables, including the shadow economy, inflation rate, and real GDP growth rate, are integrated of order zero. The empirical findings derived from the multiple regression analysis were estimated using the data series in their original form, indicating that each variable, particularly tax revenue, was not converted into its first difference. However, the results were not spurious, as the variables were found to be cointegrated, suggesting a long-term relationship, as indicated by the two-step Engle and Granger cointegration test. The empirical results of this study indicate that the expansion of the shadow

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ISSN: 2576-8484
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economy exert a statistically significant adverse effect on tax revenue in Cambodia. Additionally, the findings reveal a negative correlation between inflation and tax revenue, while a positive relationship exists between real GDP growth and tax revenue.

The government can adopt several policy measures to address the shadow economy and enhance tax revenue. To begin with, streamlining the tax system may motivate businesses to transition to formal operations by lowering compliance obstacles. Furthermore, bolstering enforcement through enhanced monitoring and audits, coupled with penalties for non-compliance, can serve as a deterrent against informal economic practices. Additionally, offering tax incentives or reduced rates for early registration could encourage small businesses to enter the formal sector. Lastly, increasing financial literacy and promoting awareness of the advantages of tax compliance, such as improved access to public services, can cultivate a culture of tax participation, ultimately leading to increased revenue.

This study utilized a single equation multiple regression model to evaluate the impact of independent variables, including the shadow economy, inflation rate, and growth rate of gross domestic product. However, this model is limited in its ability to illustrate the interrelationships among the variables being examined. Consequently, it is strongly advised that future researchers broaden this investigation by employing systems of equation models, such as the vector autoregressive (*VAR*) model or the structural vector autoregressive (*SVAR*) model. The primary characteristics of the *VAR/SVAR* model involve the representation of each variable as a function of its historical values as well as the historical values of all other variables within the system. This model does not necessitate an understanding of causal relationships beforehand, which renders it effective for investigating intricate interactions among various variables. Additionally, it facilitates the modeling of temporal dependencies, with the lag length serving as an essential parameter. *VAR/SVAR* models are extensively employed for the purposes of forecasting and analyzing data in economic and financial contexts.

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References

[1] Albu, L. (2004). Estimating the size of underground economy in Romania. *The Economics of Transition.*

[2] Awasthi, R., & Engelschalk, M. (2018). Taxation and shadow economy: How the tax system can stimulate and enforce the formalization of business activities. *Policy Research Working Paper.*

[3] Awwad, B. S., & Al-Kababji, M. W. (2023). The impact of the shadow economy on tax revenues in Palestine between the years (2000-2001). *European Journal of Accounting, Auditing and Finance Research, 11*(10), 36-54.

[4] Bak, N., Kalyta, T., Tarashchenko, V., Riznyk, D., & Artemchuk, M. (2024). The impact of the shadow economy on the reduction of tax revenues to the state budget. *Financial and Credit Activity: Problems of Theory and Practice, 2*(55), 130-143. doi:10.55643/fcaptp.2.55.2024.4330

[5] Baklouti, N., & Boujelbene, Y. (2019). The economic growth-inflation-shadow economy trilogy: Developed versus developing countries. *International Economic Journal.* doi:10.1080/00220388.2014.940910

[6] Boitano, G., & Abanto, D. F. (2019). The informal economy and its impact on tax revenues and economic growth: The case of Peru, Latin America, and OECD coutries (1995-2016). *360:Revista de Ciencias de la Gestión*(4), 109-135. doi:http://doi.org/10.18800/360gestion.201904.005

[7] Dell'Anno, R. (2007). The shadow economy in Potugal: An analysis with the MIMIC approach. *Journal of Applies Economics, 10*(2), 253-277. doi:10.1080/15140326.2007.12040490

[8] Dell'Anno, R., & Davidescu, A. A. (2019). Estimate shadow economy and tax evasion in Romania: A comparison by different estimation approaches. *Economic Analysis and Policy, 63*, 130-149. doi:https://doi.org/10.1016/j.eap.2019.05.002

[9] Dell'Anno, R., Davidescu, A. A., & Balele, N. P. (2017, November). Estimating shadow economy in Tanzania: An analysis with mimic approach. *Journal of Economic Studies.* Retrieved from https://doi.org/10.1108/JES-11-2016-0240

[10] Dreher, A., & Schneider, F. (2010). Corruption and the shadow economy: An empirical analysis. *Public Choice, 144*, 215-238. doi:10.1007/s11127-009-9513-0

[11] Eng, R. & Lim, S. (2023). The Interrelationship Between Economic Growth and Tax Revenues In Cambodia. *International Journal of Current Science Research and Review, 6*(10), 6766-6775.

[12] Fleming, M. H., Roman, J., & Farrell, G. (2000). The shadow economy. *Journal of international affairs*, 387-409.

[13] Fuest, C., & Schneide, F. (2012). Tax evasion, tax avoidance and shadow economy: Introduction. *International Tax Public Finance, 19*, 1-4. doi:10.1007/s10797-011-9206-8

[14] Ghazo, A. M., Qasrawi, Q. M., & Abu-Lila, Z. M. (2021). An econometric analysis of tax evasion and its consequences on economic performance. *Emerging Science Journal*, *5*(2), 211-220. doi:http://dx.doi.org/10.28991/esj-2021-01271
[15] Giedraitis, V. R., Stavytskyy, A., Kharlamova, G., & Ulvidiene, E. (2023). Bring on the the Light: Reduction of the Corporate Shadow Economy by Tax Reform. *Access to Just. E. Eur.*, 165.
[16] Gnangnon, S. K. (2023). Effect of the shadow economy on tax reform in developing countries. *Economies*, *11*(96). doi:https://doi.org/10.3390/
[17] Hallunovi, A., & Vangjel, R. (2023). Shadow economy and its impact on economic growth. *Corporate & Business Strategy Review*, *4*(4), 186-194. doi:10.22495/cbsrv4i4art17
[18] Hammond, P., Kwakwa, P. A., Berko, D., & Amissah, E. (2023). Taxing informal sector through modified taxation: Implementation challenges and overcoming strategies. *Cogent Business & Management*, *10*(3). doi:10.1080/23311975.2023.2274172
[19] Idris, A. A., Yusuf, I., Oyindamola, E. O., & Abdulateer, Y. (2024). Impact of shadow economy on tax revenue in Sub-Saharan Africa. *FUDMA Journal of Accounting and Finance Reserach [FUJAFR]*, *2*(4). Retrieved from https://doi.org/10.33003/fujafr-2024.v2i4.130.1-10
[20] Imam, P. A., & Jacobs, D. F. (2007). Effect of corruption on tax revenues in the Middle East. *International Monetary Fund*.
[21] *International Labour Organization*. (2023, December). Understanding the Paths to Formalization in Cambodia: An Integrated Vision. Retrieved March 4, 2024, from https://www.undp.org/sites/g/files/zskgke326/files/2023-12/Understanding%20the%20Paths%20to%20Formalization%20in%20Cambodia_An%20Integrated%20Vision.pdf.
[22] Joshi, A., Prichard, W., & Heady, C. (2014). Taxing the informal economy: The current state of knowledge and agendas for future research. *The Jounal of Development Studies*, *50*(10), 1325-1347. doi:10.1080/00220388.2014.940910
[23] Kodila-Tedika, O., & Mutascu, M. (2013). Shadow economy and tax revenue in Africa. *Munich Personal RePEc Archive*(50812). Retrieved from https://mpra.ub.uni-muenchen.de/50812/
[24] Laumulin, M. (2013). Influence of the shadow economy on the financial and economic development of Kazakhstan. *Central Asia and Caucasus*, *14*(1), 157-167.
[25] Ltaif, S. F. A., Mihai-Yiannaki, S., & Thrassou, A. (2024). Lebanon's economic develpment risk: Global factors and local realities of the shadow economy amid financial crisis. *Risks*, *12*(122). doi:https://doi.org/10.3390/
[26] Lukito, H., Firdaus, A., & Adi, N. (2023). Shadow economy and its impact on tax revenues in Mojokerto city. *PROFIT: Jurnal Administrasi Bisnis*, *17*(2), 214-230.
[27] Mazhar, U., & Méon, P. (2017). Taxing the unobserable: The impact of the shadow economy on inflation and taxation. *World Development*, *90*, 89-103. doi:http://dx.doi.org/10.1016/j.worlddev.2016.08.019
[28] Mughal, K., & Schneider, F. G. (2020). How informal sector affects the formal economy in Pakistan? A lesson for developing countries. *South Asian Journal of Macroeconomics and Public Finance*, 1-15. doi:10.1177/2277978719898975
[29] Nchor, D. (2021). Shadow economies and tax evasion: The case of Czech Republic, Poland and Hungry. *Society and Economy 43*, *1*, 21-37. doi:10.1556/204.2020.00029
[30] Rogan, M. (2019). Tax justice and the informal economy: A review of the debates. *WIEGO Working Paper*(41).
[31] Schneider, F., & Enste, D. H. (2000, March). Shadow economies: Size, causes, and consequences. *Journal of Economic Literature*, *38*, 77-114.
[32] Schneider, F., & Williams, C. C. (2013). *The shadow economy*. London: The Institute of Economic Affairs.
[33] Taing, H. B., & Chang, Y. (2021). Determinants of tax compliance intention: Focus on the theory of planned behavior. *International journal of public administration*, *44*(1), 62-73.
[34] Torgler, B., & Schneider, F. (2009). The impact of tax moral and institutional quality on the shadow economy. *Journal of Economic Psychology*, *30*, 228-245. doi:10.1016/j.joep.2008.08.004
[35] Ulyssea, G. (2021). Informality and taxation in developing Asia. *Asian Development Outlook 2022: Mobilizing Taxes for Development*.
[36] Vlachaki, M. (2015). The impact of the shadow economy on indirect tax revenues. *Economics and Politics*, *27*(2), 234-265. doi:10.1111/ecpo.12054
[37] Zaman, G., & Goschi, Z. (2015). Shadow economy and economic growth in Romania. Cons and pros. *Procedia Economics and Finance*, *22*, 80-87. doi:10.1016/S2212-5671(15)00229-4

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 8718-8728, 2024
DOI: 10.55214/25768484.v8i6.3863