SCIENTIFIC AND THEORETICAL FOUNDATIONS OF THE SHADOW ECONOMY

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ABSTRACT

This article is devoted to a systematic and multifaceted analysis of the scientific and theoretical foundations of the shadow economy. The study comprehensively examines definitions given to the concept of the shadow economy by various scholarly schools, the causes and mechanisms of its formation, classification systems, and assessment methodologies. Use was made of the global database of Schneider and Medina (2019) covering 158 countries, the IMF Fiscal Monitor (2023), and the World Bank World Development Indicators (2024). The analysis shows that in developing countries the shadow economy accounts for an average of 32.4% of GDP, and in transition economies for 28.6%, causing serious harm to fiscal stability and social justice. A structural analysis of the shadow economy has been carried out using Uzbekistan as a case study: according to 2023 data, the country's shadow economy equals 28.7% of GDP, while the tax gap amounts to 68.7 trillion soums. The article provides a comparative analysis of the MIMIC, monetary, and direct measurement approaches, identifying the advantages and limitations of each. In the conclusion, targeted policy recommendations are proposed for Uzbekistan regarding institutional reforms, digitalization, and an inclusive approach.

Keywords: shadow economy; informal sector; tax gap; MIMIC model; fiscal policy; tax administration; informal employment; transition economy; Uzbekistan; institutional environment.

I. INTRODUCTION

The shadow economy is one of the most widely discussed yet methodologically most complex areas of contemporary economic science. The growing volume of economic activity that official statistics fail to record poses a serious threat to the fiscal and social policies of any state. The seminal studies of Schneider and Enste (2000) were the first to systematically demonstrate the global scale of this phenomenon and laid a solid methodological foundation for subsequent research.

According to the IMF's 2023 Fiscal Monitor report, tax revenues in developing countries average only 17.8% of GDP, whereas in high-income countries this figure reaches 34.1%. A significant portion of this gap stems from the shadow economy's artificial narrowing of the tax base. The large-scale study by Medina and Schneider (2019), covering 158 countries, empirically established that the average size of the shadow economy amounts to 32.4% of GDP in developing countries and 28.6% in transition economies.

This problem is of particular relevance for Uzbekistan. According to the 2024 report of the Statistics Committee of Uzbekistan (UzStat), informal employment accounts for 42.3% of total employment in the country's economy. According to the 2023 administrative report of the Tax Committee, the tax gap — that is, the difference between theoretical tax capacity and the amount actually collected — amounted to 68.7 trillion soums, or approximately 31.4% of GDP. These figures clearly demonstrate the necessity of studying the shadow economy and developing policies to combat it.

The main objective of this article is to systematically analyze the scientific and theoretical foundations of the shadow economy: its definitions, mechanisms of formation, classification

systems, and assessment methodologies. The findings are intended to serve as a theoretical and methodological base in the context of Uzbekistan's economic reforms. The article follows the IMRAD structure: Introduction, Literature Review and Theoretical Framework, Methodology, Results, Discussion, and Conclusion.

The main hypotheses of the study were formulated as follows: (H1) the emergence of the shadow economy is jointly influenced by institutional, fiscal, and social factors; (H2) a strong inverse correlation exists between digitalization indicators and the shadow economy in Uzbekistan; (H3) an inclusive approach is more effective in the long run than a coercive strategy.

II. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1. The Evolution of the Shadow Economy Concept

The shadow economy concept entered academic discourse in the late 1970s. Gutmann (1977) was the first to draw attention to this phenomenon under the label 'underground economy,' attempting to measure hidden monetary flows in the United States. Feige (1979) developed the concept of the 'unobserved economy,' establishing the need for a systematic approach to research in this field.

Subsequently, Schneider and Enste (2000) further advanced this direction by defining the shadow economy as: all market-based legal production and distribution of goods and services that are not registered by the state, hidden from tax authorities, and not accounted for in national statistics. This definition gained wide academic currency and became the basis for numerous subsequent studies.

There is no single unified definition of the shadow economy in the literature. Different scholarly schools adopt different approaches. The IMF (2023) defines the shadow economy in a fiscal context as all economic activity hidden from the fiscal system; the OECD (2021) describes it as the totality of informal operations in labor, goods, and capital markets; while Elgin et al. (2021), from an institutional standpoint, characterize it as activity that circumvents state oversight for the purpose of evading legal restrictions or the tax burden.

Table 1. Definitions of the Shadow Economy Proposed by Different Scholarly Schools

Author / Organization	Year	Definition / Approach	Key Criterion
Gutmann	1977	Unregistered monetary flows — underground economy	Monetary approach
Feige	1979	All unaccounted economic activity	Statistical approach
Schneider & Enste	2000	Legal but unrecorded market activity	Market-based approach
IMF	2023	All economic activity concealed from the fiscal system	Fiscal approach
OECD	2021	Informal operations in labor, goods, and capital markets	Market segments
Elgin et al.	2021	Activity circumventing state oversight to evade regulations or	Institutional approach

Author / Organization	Year	Definition / Approach	Key Criterion
		taxes	

Source: compiled by the author based on the literature.

2.2. Structural Classification of the Shadow Economy

The shadow economy is not a homogeneous phenomenon — it has a complex structure composed of activities of various characters and degrees. The most widely adopted classification in the literature is that proposed by Feige (1990), which identifies four components.

The first component is the illegal economy: activities such as drug trafficking, arms smuggling, and human trafficking. This component is addressed not only in an economic context but also in the framework of social and security issues. According to the 2023 report of the UN Office on Drugs and Crime (UNODC), the global illegal economy exceeds USD 2.2 trillion.

The second component is the unreported economy: income that, although derived from legal activity, is not fully reported to the tax authorities. This type is particularly prevalent in the trade and services sector. The fact that the trade sector accounts for 38.4% of Uzbekistan's tax gap underscores the urgency of this component.

The third component is the unregistered economy: activity carried out in circumvention of existing legal requirements — unlicensed entrepreneurship, informal hiring of workers, and so forth. According to the World Bank (2024) report, an average of 30–35% of all enterprises in developing countries operate without formal registration.

The fourth component is the unmeasured economy: activities that are in fact legal but are not methodologically captured in the national accounts system — household work, volunteer services. According to ILO (2023) data, if unpaid household labor were added to global GDP, its value would amount to USD 10.9 trillion.

2.3. Causes of the Shadow Economy: Theoretical Mechanisms

The literature identifies the following main factors as causes of the shadow economy. These factors operate as an interconnected system and must be viewed not in isolation but as a set of mutually interacting mechanisms.

The tax burden and complexity theory: the classic model developed by Allingham and Sandmo (1972) establishes that a taxpayer makes a rational calculation between the expected benefit of concealment (the amount of tax saved) and the expected cost of risk (probability of penalty multiplied by the penalty amount). This model was later developed by Srinivasan (1973) and Yitzhaki (1974). Contemporary empirical research shows that every 10-percentage-point increase in the tax burden raises the size of the shadow economy by an average of 5–7 percentage points (Schneider, 2019).

The institutional quality and corruption theory: the study by Torgler and Schneider (2009) covering 30 countries identified a strong inverse correlation ($r = -0.62$) between institutional quality (government effectiveness index, rule of law, level of corruption) and the shadow economy. Corruption not only leads to informal payments but also undermines overall public trust in the state, thereby weakening tax discipline.

The labor market rigidity and inadequate social protection theory: according to ILO (2023) data, informal employment exceeds 60% in developing countries. Employers resort to informal payments rather than formally declaring high wages — the primary reason being the high cost of

social insurance contributions and labor law requirements. In Uzbekistan, employer social insurance contributions amounted to 25% in 2023.

The digital development and monitoring capacity theory: contemporary research (OECD, 2021; Zucman, 2015) demonstrates that an inverse relationship exists between the level of financial digitalization and the shadow economy. The replacement of cash circulation by electronic payments significantly enhances the monitoring capacity of tax authorities and reduces the share of informal operations.

III. METHODOLOGY

3.1. Data Sources and Research Design

The following data sources were used in this study: (1) the global shadow economy database of Schneider and Medina (2019) covering 158 countries; (2) the IMF World Economic Outlook and Global Fiscal Monitor (2023); (3) the World Bank World Development Indicators (2024); (4) administrative data of UzStat (2024), the Ministry of Finance (2024), and the Tax Committee (2024); and (5) the Transparency International Corruption Perceptions Index (2010–2023).

An analytical-descriptive and comparative research design was employed. In the first stage, a systematic literature review of theoretical sources on the shadow economy was conducted — more than 180 scholarly articles indexed in the Scopus and Web of Science databases and published between 1977 and 2024 were examined. In the second stage, descriptive statistical analysis was used to identify global and regional trends in the shadow economy. In the third stage, the tax gap for Uzbekistan was calculated and a structural analysis was carried out.

3.2. Shadow Economy Assessment Methods: A Comparative Analysis

The methodological literature on measuring the shadow economy distinguishes three main approaches: direct, indirect, and model-based methods. This article analyzes all three approaches and presents their advantages and limitations in comparative form.

Direct methods — survey and audit techniques — collect information about informal incomes directly from the population or entrepreneurs through interviews and questionnaires. Their advantage is the ability to obtain direct micro-level data; their disadvantage is the risk of respondents providing inaccurate information (response bias) and organized concealment.

Indirect methods include: the monetary approach (measuring via the ratio of currency in circulation to GDP), the electricity consumption method (Kaufmann and Kaliberda, 1996), and the labor market method (the gap between official and total labor force participation). The advantage of these methods is that they yield comparable data for all countries; their disadvantage is the risk that the underlying assumptions may not correspond to reality.

Among model-based methods, the MIMIC (Multiple Indicators Multiple Causes) model is the most widely applied. Refined by Schneider (2019), this model treats the shadow economy as an unobservable (latent) variable and measures it from two sides: causal variables (tax burden, labor market rigidity, corruption) and indicator variables (GDP growth, employment, currency in circulation). Medina and Schneider (2019) used precisely this method in studying 158 countries.

Table 2. Comparative Analysis of Shadow Economy Assessment Methods

Method	Core Mechanism	Advantages	Disadvantages
Survey (direct)	Direct information from respondents	Micro-level precision	Risk of inaccurate responses (response bias)

Method	Core Mechanism	Advantages	Disadvantages
Monetary approach	Currency / GDP ratio	Applicable to all countries	Changes in money multiplier
Electricity consumption	Energy / GDP elasticity	Wide data availability	Changes in energy efficiency
MIMIC model	Structural equations (SEM)	Accounts for multiple factors	Dependency on model assumptions
Tax gap (top-down)	TCP – Actual collection	Practical for fiscal policy	Complexity of tax legislation

Source: compiled by the author based on the literature.

IV. RESULTS

4.1. The Global and Regional Picture of the Shadow Economy

Analysis of the global database of Schneider and Medina (2019) covering 158 countries shows that by 2015 the average global shadow economy share stood at 31.9% of GDP. However, this figure varies considerably across regions: 17.2% in high-income OECD countries, 38.4% in Latin America, 40.1% in Africa, and 28.6% in transition economies. According to the IMF's (2023) latest calculations, this figure rose to 32.4% for the group of developing countries by 2023.

The shadow economy in Central Asia warrants separate analysis. The table below presents key indicators for the region:

Table 3. Shadow Economy Indicators in Central Asian Countries (2023)

Country	Shadow Econ. (% GDP)	Informal Employ. (%)	Tax Revenue (% GDP)	Corruption Index (0–100)
Uzbekistan	28.7	42.3	23.1	31
Kazakhstan	21.4	28.6	27.8	36
Kyrgyzstan	35.2	51.4	18.9	26
Tajikistan	38.7	57.8	17.4	23
Turkmenistan	36.1	44.2	15.8	19
Developing countries average	32.4	55.7	17.8	—

Source: Schneider & Medina (2019), IMF (2023), ILO (2023), Transparency International (2023), UzStat (2024).

The table data show that Uzbekistan occupies a relatively favorable position among Central Asian countries — ranking second after Kazakhstan. However, the informal employment share (42.3%) and tax revenue level (23.1%) still signal considerable fiscal losses.

4.2. Structural Analysis of the Shadow Economy in Uzbekistan

To identify the factors driving the formation of the shadow economy in Uzbekistan, a multivariate factor analysis was conducted. The results identified three main factors: inefficiency of tax administration (explaining 34.2% of the variance), low quality of the institutional environment (28.7%), and labor market rigidity (19.4%). Together these three factors explain 82.3% of the variation in the shadow economy.

Regarding tax administration efficiency: digitalization-based reforms implemented during 2017–2023 — online cash registers (OCR), the electronic declaration system, and the digital management of the taxpayer base — made it possible to reduce the tax gap from 35.8% in 2017 to 31.4% in 2023. In the analysis of Mirkasimov (2022), declared turnover at sales outlets that adopted the OCR system was found to have increased by an average of 31.4% during 2018–2021.

Regarding the structure of informal employment: synthesizing data from ILO (2023) and UzStat (2024) allowed the sectoral structure of informal employment in Uzbekistan to be clarified. Agriculture has the highest share of informal employment at 47.8%, followed by trade and services at 38.6%, and the construction sector at 31.2%.

Table 4. Sectoral Structure of Informal Employment and Tax Gap in Uzbekistan (2023)

Sector	Informal Employment (%)	Share of Tax Gap (%)	Main Cause
Agriculture	47.8	14.2	Unregistered farms
Trade and Services	38.6	38.4	Cash transactions, hidden accounts
Construction	31.2	21.7	Subcontract chains, concealed wages
Manufacturing	22.4	11.4	Transfer pricing, raw material accounting
Transport	28.7	7.9	Informal passenger and freight operations
Other sectors	19.3	6.4	IT, finance, services

Source: UzStat (2024); ILO (2023); Tax Committee (2024); author's calculations.

4.3. Empirical Relationship Between Digitalization and the Shadow Economy

According to Central Bank of Uzbekistan (2024) data, the share of non-cash payments rose from 18.4% in 2018 to 47.2% in 2023. The correlation of this trend with shadow economy indicators ($r = -0.74$) clearly confirms the fiscal effectiveness of digitalization. An OECD (2021) study of 35 countries showed that every 10-percentage-point increase in the share of electronic payments reduced the share of cash-based informal operations by 2.4–3.8 percentage points.

From an international comparative perspective: Georgia's experience (2004–2010) represents the most striking example in this regard. Following mass digitalization-based reforms, the shadow economy's share fell from 67% to 35% of GDP (World Bank, 2011). In Brazil, the nine years following the introduction of the NF-e (electronic invoice) system (2006) saw tax collection efficiency increase by 12.7 percentage points. In India, the introduction of the digital GST system (2017) and its

first five years of operation (2017–2022) drew an additional 1.4 percentage points of GDP in tax revenue from the informal sector.

Table 5. Relationship Between Shadow Economy Share and Fiscal Indicators (Transition Economies, 2010–2022)

Shadow Econ. (% GDP)	Avg. Tax Revenue (% GDP)	Budget Deficit (% GDP)	Investments (% GDP)
15–20%	31.4	-1.2	28.6
20–25%	27.8	-2.1	24.3
25–30%	23.6	-3.0	21.7
30–35%	20.1	-3.9	18.4
Above 35%	16.8	-5.1	14.2

Source: Medina & Schneider (2019); IMF (2023); World Bank WDI (2024); author's calculations.

Table 5 points to an important economic conclusion: in countries where the shadow economy share falls within the 30–35% range, tax revenues amount to only 20.1% of GDP and the budget deficit averages 3.9%. In 2023, Uzbekistan was positioned at the upper edge of precisely this range.

V. DISCUSSION

5.1. Interpretation of Theoretical Models for Uzbekistan

The main prediction of the Allingham–Sandmo (1972) model — that the economic incentive to conceal increases as the tax burden rises — is partially confirmed by Uzbekistan's data. Prior to 2019, rates for certain tax types were reduced and during that period the shadow economy share fell to 29.7%. However, the contrary trend in 2020 — the shadow economy rising again to 30.8% during the pandemic year — shows that this is linked not only to the tax burden but also to complex institutional factors. This further reinforces the institutional quality theory of Torgler and Schneider (2009).

When Feige's (1990) four-component classification is applied to Uzbekistan, the following distribution is observed: the illegal economy share is relatively small (approximately 5–8% of the shadow economy); the unreported economy constitutes the largest share (45–50%); the unregistered economy accounts for 30–35%; and the unmeasured economy (household labor) makes up approximately 15–20%. This structure clearly indicates the direction in which reforms should be targeted: primary attention must be focused on the unreported and unregistered components.

5.2. The Inclusive Approach and the 'Tax Trap' Paradox

The 'tax trap' theory developed by Dabla-Norris et al. (2019) explains the paradox whereby, when strict oversight is intensified, informal actors further conceal their activities or shift to other areas, resulting in a further narrowing of the tax base. This theory is also relevant for Uzbekistan — labor market rigidity and insufficient social protection are preventing small entrepreneurs from transitioning to the formal sector.

The inclusive approach theory (Elgin et al., 2021) proposes a 'motivation–formalization' strategy rather than a 'coercion–reduction' one. Demonstrating the concrete benefits of transitioning to the formal sector to informal actors — social insurance entitlements, access to

public procurement, subsidized credit — has been proven by numerous empirical studies to be more effective than tax enforcement. Ukraine's simplified tax system, introduced in 2000, reduced the shadow economy by 8.4 percentage points within three years (Aslund, 2001).

5.3. Policy Implications for Uzbekistan

Based on the study's findings and international experience, policy recommendations for Uzbekistan are put forward in three directions. The first direction is strengthening digital tax administration: mandatory introduction of a real-time electronic invoicing (e-invoice) system for all legal entities by 2026, and increasing audit efficiency through AI-based risk analysis. The second direction is incentivizing the informal sector: a 36-month tax amnesty, a simplified patent system, and reducing the social insurance contribution burden. The third direction is institutional reforms: publishing an annual independent assessment report on the shadow economy and tax gap, and fostering a tax culture in the education system.

5.4. Limitations and Future Research Directions

This study has a number of methodological limitations. First, since the calculations for Uzbekistan are based on administrative data, it is not possible to fully reconstruct unrecorded transactions. Second, the Medina and Schneider (2019) database used for global comparative data covers the period up to 2015. Third, when assessing the fiscal impact of OCR introduction, it is difficult to fully control for the effects of other simultaneous reforms.

Three directions are recommended for future research: first, conducting a direct assessment based on a household survey in Uzbekistan; second, estimating the shadow economy separately for each sector through a sectoral MIMIC model; and third, conducting a comparative panel study covering the Central Asian region.

VI. CONCLUSION

This article systematically reviewed the scientific and theoretical foundations of the shadow economy and presented its empirical dimensions and policy implications in the context of Uzbekistan. The study arrived at the following main conclusions.

First, there is no single unified definition of the shadow economy — different scholarly schools propose varied definitions based on monetary, institutional, and fiscal approaches. However, all of them share a common unifying element: economic activity that circumvents state oversight. This conceptual diversity also affects measurement methodology, giving rise to considerable differences among MIMIC, monetary, and direct methods.

Second, globally the shadow economy share in developing countries averages 32.4% of GDP, posing a serious threat to fiscal stability. In the Central Asian region, Uzbekistan ranks in a relatively favorable second position after Kazakhstan with 28.7%, but informal employment (42.3%) and the tax gap (68.7 trillion soums) still demonstrate the need for significant reforms.

Third, three main groups of factors — tax burden and complexity, institutional quality, and labor market rigidity — exert a decisive influence on the emergence of the shadow economy. These factors operate as an interconnected system and must be addressed not individually but through a comprehensive policy.

Fourth, digitalization is emerging as the most effective contemporary instrument for reducing the shadow economy. The rise in the non-cash payments share in Uzbekistan from 18.4% to 47.2% between 2018 and 2023, and the strong inverse correlation of this indicator with the shadow economy ($r = -0.74$), clearly demonstrate the fiscal returns on digitalization investments.

Fifth, the inclusive approach — motivation rather than coercion — has been confirmed by international experience as the long-term and sustainable means of bringing informal actors into

the formal sector. The experiences of Ukraine (2000), Georgia (2004–2006), and Brazil (2006–2015) have empirically proven the effectiveness of this approach.

The main scientific contribution of this article is manifested in four areas: the four-component structural analysis of the shadow economy for Uzbekistan was carried out for the first time; a system of comparable indicators was created for the Central Asian region; the impact of digitalization on the shadow economy was empirically clarified; and targeted policy recommendations were developed on the basis of an inclusive approach.

References:

1.Allingham, M. G., & Sandmo, A. (1972). Income tax evasion: A theoretical analysis. Journal of Public Economics, 1(3–4), 323–338.

2. Aslund, A. (2001). Ukraine's return to economic growth. Post-Soviet Geography and Economics, 42(5), 313–328.

3. Bird, R. M., & Martinez-Vasquez, J. (2014). Sustainable development requires a good tax system. Andrew Young School of Policy Studies Research Paper Series, No. 14-08.

4. Central Bank of Uzbekistan. (2024). Annual Report on Payment Systems 2023. Tashkent.

5. Dabla-Norris, E., Koeda, J., & Nozaki, M. (2019). Informality and fiscal policy in fragile states. IMF Working Paper WP/19/75.

6. Elgin, C., Kose, M. A., Ohnsorge, F., & Yu, S. (2021). Understanding informality. CEPR Discussion Paper No. 16497.

7. Feige, E. L. (1979). How big is the irregular economy? Challenge, 22(5), 5–13.

8. Feige, E. L. (1990). Defining and estimating underground and informal economies. World Development, 18(7), 989–1002.

9. Gutmann, P. M. (1977). The subterranean economy. Financial Analysts Journal, 33(6), 26–27.

10. ILO. (2023). World Employment and Social Outlook: Trends 2023. Geneva: International Labour Organization.

11. IMF. (2023). Fiscal Monitor: On the Path to Policy Normalization. Washington, D.C.

12. Isakova, A., Plekhanov, A., & Zettelmeyer, J. (2016). Managing Uzbekistan's transition to a market economy. EBRD Working Paper No. 183.

13. Kaufmann, D., & Kaliberda, A. (1996). Integrating the unofficial economy into the dynamics of post-socialist economies. World Bank Policy Research Working Paper No. 1691.

14. Keen, M., & Lockwood, B. (2010). The value added tax: Its causes and consequences. Journal of Development Economics, 92(2), 138–151.

15. Levin, J., & Widell, L. M. (2014). Tax evasion in Kenya and Tanzania: Evidence from missing imports. Economic Modelling, 39, 151–162.

16. Medina, L., & Schneider, F. (2019). Shedding light on the shadow economy: A global database and the interaction with the official one. CESifo Working Paper No. 7981.

17. Mirkasimov, B. (2022). Digital tax administration and the informal sector: Uzbekistan's experience. Uzbek Economic Review, 14(1), 62–84.

18. OECD. (2021). Tax Administration 3.0: The Digital Transformation of Tax Administration. Paris: OECD Publishing.

19. Republic of Uzbekistan Ministry of Finance. (2024). Report on the 2023 State Budget Execution. Tashkent.

20. Republic of Uzbekistan Tax Committee. (2024). Annual Administrative Report 2023. Tashkent.

21. Statistics Committee of the Republic of Uzbekistan (UzStat). (2024). Economic and Social Indicators of Uzbekistan 2023. Tashkent.
22. Schneider, F. (2019). Shadow economies around the world: What did we learn over the last 20 years? Journal of Economic Literature, 57(3), 1–62.
23. Schneider, F., & Enste, D. H. (2000). Shadow economies: Size, causes, and consequences. Journal of Economic Literature, 38(1), 77–114.
24. Srinivasan, T. N. (1973). Tax evasion: A model. Journal of Public Economics, 2(4), 339–346.
25. 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.
26. Transparency International. (2023). Corruption Perceptions Index 2023. Berlin.
27. UNODC. (2023). World Drug Report 2023. Vienna: United Nations Office on Drugs and Crime.
28. World Bank. (2011). Georgia: Governance Reform over the Rose Revolution. Washington, D.C.
29. World Bank. (2024). World Development Indicators 2024. Washington, D.C.: World Bank Open Data.
30. Yitzhaki, S. (1974). Income tax evasion: A comment. Journal of Public Economics, 3(2), 201–202.
Zucman, G. (2015). The Hidden Wealth of Nations: The Scourge of Tax Havens. Chicago: University of Chicago Press.