

## Dynamics of the underground economy in border areas: A case study of Indonesia-Timor Leste

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### Abstract

The underground economy in border regions represents a complex phenomenon shaped by regulatory gaps, limited access to formal economic systems, and high transaction costs in legal trade. This study analyzes the dynamics of informal cross-border trade along the Indonesia–Timor-Leste border, focusing on North Central Timor (TTU) Regency and the Oecusse Enclave. Employing a qualitative descriptive approach, the research draws on field observations, semi-structured interviews, and thematic analysis to demonstrate that underground economic activities function not only as a survival strategy but also as an informally institutionalized, socially organized economic ecosystem. The findings reveal that price disparities, weak supervision, and limited institutional capacity collectively drive communities’ dependence on illicit trade. A comparative analysis of similar cases from international border regions highlights the need for policy responses tailored to local contexts. The study recommends strengthening bilateral cooperation, adopting surveillance technologies suited to regional capacities, and implementing community-based economic empowerment programs to facilitate the transition toward an inclusive and sustainable formal economy.

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**Keywords:** *Border trade; Cross-border cooperation; Economic security; Indonesia–Timor-Leste; Informal economy; Underground economy*

**JEL Classification:** F15, F58, F63, H56, O17

### INTRODUCTION

Underground economic activity refers to all forms of financial transactions conducted outside the formal regulatory system—unrecorded in official statistics and not subject to applicable tax and employment regulations (Medina & Schneider, 2018; Ardizzi et al., 2014). This phenomenon occurs across countries—developed, developing, and in transition economies—with differing characteristics and underlying causes. In developed nations, the underground economy often emerges as a means of evading high taxes and complex regulations. In contrast, in developing countries, this sector tends to dominate as an adaptive response to the state’s limited capacity to provide access to

formal employment and adequate social protection (Blurred, 2014; Mitra & Sharma, 2016).

Globally, the underground economy contributes significantly to Gross Domestic Product (GDP). Medina and Schneider (2018) estimated that it accounts for an average of 22% of global GDP, ranging from 10–15% in developed countries to over 30% in many developing nations. In Indonesia, estimates suggest that this sector has contributed around 18–21% of national GDP over the past two decades (Schneider, 2010; Ramadhan, 2019). According to Ramadhan (2019), potential tax losses from such activity reach approximately Rp56.23 trillion annually. This significant contribution not only undermines fiscal stability and the accuracy of macroeconomic data but also weakens the state's ability to formulate precise and inclusive development policies (Ohnsorge & Yu, 2022).

Following East Timor's separation from the Unitary State of the Republic of Indonesia (NKRI) in 2002 and the establishment of the sovereign state of Timor-Leste, the Province of East Nusa Tenggara (NTT) became a strategically important international border region. North Central Timor Regency (TTU), which directly borders the Oecusse Enclave, exhibits complex cross-border economic dynamics encompassing both legal trade through official channels and a proliferation of underground economic activities that play a vital role in the economic life of border communities (Kristianto et al., 2021).

The characteristics of the TTU–Oecusse border differ from those of other Indonesian border regions, such as Kalimantan or Papua, largely due to the close cultural, ethnic, and linguistic ties between communities on both sides. Although administratively and politically separated, kinship ties remain strong and serve as a primary driver of informal cross-border economic activity. These social relationships sustain a cross-border trade ecosystem that often operates outside official channels, reinforcing the persistence of the underground economy (Korbaffo et al., 2024).

In this study, the term *underground economy* refers to economic activities that are unrecorded, untaxed, and occur beyond state oversight. This definition includes both legal, informal, and illegal activities—such as illicit trade involving smuggling, import duty evasion, and the use of unofficial routes (commonly referred to as “rat runs”). While not all informal activities are illegal, in border contexts the boundaries between formal, informal, and illegal economic activity are often blurred and overlapping (Goel et al., 2019; Ngo & Hung, 2019). Thus, the underground economy can be understood as a spectrum ranging from unrecorded legal informal activities to explicitly unlawful ones.

Theoretically, this phenomenon can be explained through the Dual Sector Theory (Lewis, 1954), which posits that the informal sector expands in response to the formal sector's limited capacity to absorb labor and provide economic opportunities. Meanwhile, De Soto's (1989) Access Limitation Theory argues that the inability to access legal rights, formal markets, and institutional protection compels individuals to create alternative, informal economic systems. In the TTU–Oecusse context, these two theoretical perspectives complement each other, explaining how the underground economy emerges from structural constraints and institutional deficiencies.

According to data from the Central Statistics Agency of NTT (2023), Timor-Leste is the main destination for NTT's exports, accounting for 74.43% of total export value, dominated by industrial products (81.45%). However, most of this trade bypasses official channels. Price differentials, high transaction costs in formal trade, and weak supervision encourage the use of alternative routes to profit from price arbitrage. These unofficial routes—known as *rat runs*—cross both land and sea and are widely used to distribute

essential goods, subsidized fuel, electronics, and even illegal drugs (Oki, 2022a; Tahu, 2019).

To strengthen local economic development, the TTU Regency Government has established several cross-border markets, including Haumeni Ana Market in Biboki Nilulat, Napan Market in North Bikomi, and Wini Market in North Insana. However, the effectiveness of these markets remains limited due to weak local institutional capacity and poor alignment between central government policies and regional economic realities (Pangastuti et al., 2023).

Statistically, the dominance of the informal sector in border areas is striking. The Central Statistics Agency of NTT (2023) reported that only 27.88% of the labor force is employed in the formal sector, while the remaining 72.12% depend on informal and underground economic activities. This imbalance indicates that formal economic mechanisms have failed to meet community needs inclusively.

Several key factors sustain the underground economy: (1) high transaction costs and import tariffs on formal trade routes (Oki & Babulu, 2021); (2) exchange rate differences and the use of U.S. dollars in Timor-Leste, which create arbitrage incentives (Pala & Zamili, 2023); and (3) weak supervision by security forces such as the TNI and POLRI, compounded by difficult geographical conditions and open access between border villages (Orsi et al., 2014).

It is important to note, however, that most existing findings are based on qualitative data—exploratory in nature and not generalizable to broader populations. This study adopts a qualitative case study approach, utilizing in-depth interviews with local economic actors, village officials, and border trade officers. Data were collected in Wini District, North Bikomi, and the Oecusse Enclave. Ethical and logistical challenges—such as issue sensitivity, informant safety, and limited geographic access—also shaped the research process.

The underground economy is not unique to the Indonesia–Timor-Leste border. Studies worldwide have identified similar practices in other developing regions. Williams and Horodnic (2016) found that differences in trade policies and weak monitoring capacities are the main structural factors driving illegal cross-border trade. This conclusion is supported by Etim & Daramola (2020) in the West African context and by Cuyvers (2019) in the Vietnam–Cambodia and Nepal border regions, where communities exploit price disparities and regulatory loopholes to sustain livelihoods amid limited formal economic access. Nonetheless, most studies focus primarily on economic or legal dimensions, neglecting the complex interactions among social, institutional, and geopolitical factors shaping underground economic practices.

This study adopts a more integrative approach by combining multiple perspectives and situating the TTU–Oecusse case within broader international comparisons, including the Mexico–United States border (Richardson & Pisani, 2012), South Africa–Zimbabwe (Rukema & Pophiwa, 2020), and Germany–Poland before European Union integration (Ładykowski, 2011). Recent research by Burgess et al. (2022) also highlights that developing countries face systemic challenges in integrating the informal sector into formal, regulated economies.

Against this backdrop, the present study aims to fill a gap in the literature concerning the underground economy in the border regions of developing countries, focusing specifically on North Central Timor (Indonesia) and the Oecusse Enclave (Timor-Leste). Empirical and contextual studies of this area remain limited, particularly those employing theoretical frameworks that capture the socio-economic complexity of

border realities. By applying the Dual Economy Theory (Vollrath, 2013) and Access Limitation Theory (Barros, 2016), this study seeks to explain how restricted access to the formal sector, high transaction costs, and weak institutional capacity create structural conditions that drive reliance on informal and illegal activities. This framework enables a systematic understanding of the mechanisms sustaining informality and lays the conceptual foundation for developing more inclusive policy strategies.

Accordingly, the main research question is: *How do underground economic activities operate and develop in the TTU–Oecusse border area, and how do structural, social, economic, security, and institutional factors sustain them while influencing the stability and welfare of border communities?* This question aims not only to describe observed phenomena but also to contribute to theory and to provide evidence-based insights for policymakers at both local and national levels. The findings are expected to enhance scholarly understanding of underground economic dynamics in border regions and serve as a reference for designing contextual, inclusive, and sustainable policy interventions.

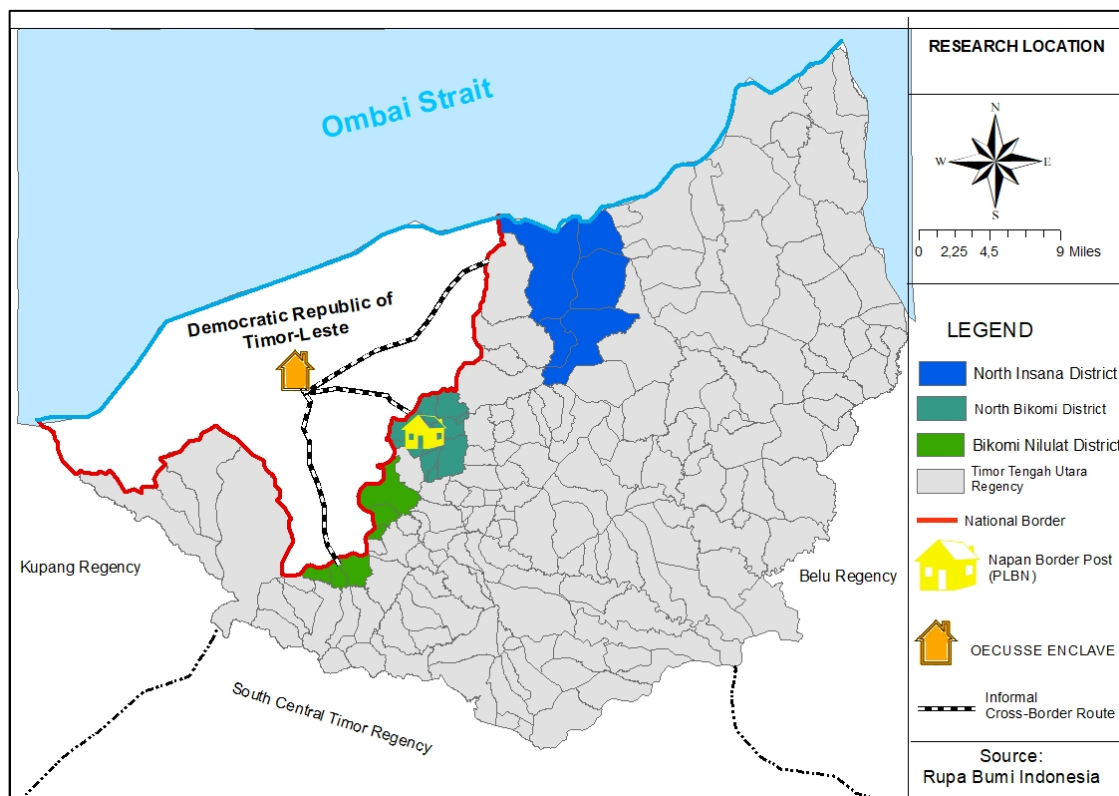
Ultimately, this study reveals that the underground economy in the TTU–Oecusse border area is not merely an act of legal noncompliance but rather a response to unequal access to the formal economy, rigid regulations, and weak institutional frameworks. By combining empirical data with the Dual Economy and Access Limitation theoretical approaches, the study demonstrates how structural and social constraints shape economic practices. Hence, policy interventions should move beyond enforcement toward more inclusive strategies—strengthening local institutions, expanding formal economic access, and fostering adaptive cross-border cooperation. These findings are expected to contribute academically and inform the formulation of more equitable and context-sensitive border development policies.

## METHODS

This study employs a qualitative descriptive approach to understand the dynamics of the underground economy in the border area of North Central Timor Regency and the Oecusse Enclave. This approach was selected because it enables a nuanced understanding of the complex social, institutional, and economic contexts that cannot be adequately captured through quantitative methods alone. The research was conducted over five months, from August to December 2024.

The selection of research sites was based on the high intensity of unrecorded cross-border trade activities and the complexity of existing regulatory and institutional frameworks in the border regions. The primary locations include Wini, North Bikomi, and Haumeni Ana Districts in the TTU region (Indonesia), as well as Oesilo and Pante Macassar Districts in the Oecusse Enclave (Timor-Leste). These areas were chosen because they serve as key nodes for both formal and informal trade routes, encompassing land and sea pathways.

Spatial visualization of the study area is presented in the form of a map generated using ArcGIS software (Figure 1). The map illustrates the locations of border markets, official crossing points, and informal trade routes identified through triangulation of interview data and field observations. This visualization clarifies the spatial distribution of underground economic activities and maps cross-border economic interactions.



**Figure 1.** Map of North Central Timor Regency and Oecusse Enclave  
 Source: *ArcGIS Application Design Results for 2025.*

The primary data collection technique used was semi-structured interviews, which allowed for an in-depth exploration of the experiences, perspectives, and strategies of actors involved in underground economic activities (Adeoye-Olatunde & Olenik, 2021). The interview guide was structured around three key themes: 1) Factors driving underground economic activity, 2) Informal transaction patterns and distribution networks, and 3) Economic and institutional implications for border area management.

A total of 25 informants were selected using purposive sampling, based on their direct involvement in border economic activities. This technique is commonly used in studies involving hidden or hard-to-reach populations where informant access requires social sensitivity and contextual awareness (Guest et al., 2013). The informants included cross-border informal traders (12 individuals), community leaders and village officials (6), security officers (4), and local government officials (3). Interviews were conducted in both Indonesian and Dawan, and all participants provided informed consent. Confidentiality was maintained in accordance with established research ethics protocols (Table 1).

To ensure the validity of the findings, all interviews were recorded with participant consent, transcribed verbatim, and reconfirmed through member checking (Ruslin et al., 2022). Data validity was further strengthened through triangulation with multiple sources, including local policy documents, academic studies, and relevant media reports. Although the research primarily relied on qualitative data, quantitative secondary data—such as estimates of state losses from illegal trade—were also incorporated to support the thematic arguments presented in the results and discussion sections.

**Table 1.** Informant profiles by role category and region.

| Informant Category                    | Amount    | Area Location             | Main Description  |
|---------------------------------------|-----------|---------------------------|---|
| Cross-border informal traders         | 12        | Wini, Haumeni Ana, Oesilo | Traders in fuel, basic goods, and daily necessities   |
| Community leaders & village officials | 6         | North Bikomi, Napan       | Village heads, traditional figures, and informal market managers  |
| Security forces and border officers   | 4         | Wini PLBN, Napan          | TNI (Indonesian National Armed Forces), POLRI (Indonesian National Police) personnel, and officers stationed at PLBN (State Border Crossings) |
| Relevant local government officials   | 3         | TTU, Oecusse              | Officials from the Trade Office, Border Management Agency, and Civil Service Police Unit (Satpol PP)  |
| <b>Total</b>                          | <b>25</b> |                           |   |

*Source: Field interview results and documentation of participatory observations in the TTU–Oecusse border area (January–March 2025).*

During fieldwork, several technical and social challenges emerged. Some study sites, such as remote villages in Haumeni Ana and Oesilo Districts, were difficult to access due to limited infrastructure and rugged terrain. Moreover, the sensitivity of the research topic initially raised suspicion among residents about the interview process. To address this, the researcher employed an ethics-based participatory approach, building trust through continuous engagement with village officials and traditional leaders. These experiences underscore the importance of social sensitivity and contextual understanding in border research, given the complex political, economic, and cultural dynamics characterizing such regions.

Following data collection, thematic analysis was conducted following the framework proposed by Clarke and Braun (2017). The process involved five key stages: 1) Familiarization with the data through repeated reading of transcripts, 2) Open coding of meaning units, 3) Grouping of codes into initial themes, 4) Refinement of themes based on relational patterns among categories, and 5) Construction of a thematic narrative integrating interview excerpts with relevant theoretical frameworks (Majumdar, 2022).

As part of methodological transparency, the thematic structure is presented in a theme–subtheme table in the results section. This approach demonstrates how field data were inductively developed into structured findings. The results are critically analyzed through the lens of Dual Sector Theory (Clement, 2015) and Access Limitation Theory (Barros, 2016) to explain the mechanisms of informality and restricted access to formal economic opportunities in border areas.

While the qualitative approach provides rich contextual depth, this study acknowledges several limitations. Potential informant bias, limited geographic accessibility, and the underrepresentation of certain participant groups present interpretive challenges. Nevertheless, the use of validation and triangulation methods is expected to enhance the credibility of the findings. Although the results are not statistically generalizable, they offer valuable conceptual transferability to similar border contexts in other developing countries.

## RESULTS AND DISCUSSION

### Underground economy activities in border areas

This study seeks to uncover the dynamics of underground economic activities in the border area of North Central Timor Regency (TTU) and the Oecusse Enclave, Timor-Leste, by examining their causes, forms, actors, and the resulting economic, social, and security impacts. Overall, the findings indicate that the underground economy in this border region is not merely an illegal phenomenon disconnected from the formal system, but rather a community response to limited economic access, price disparities, and weak institutional capacities on both sides of the border.

Based on in-depth interviews, participant observation, and secondary data from media and institutional reports, this study identifies a structured pattern of illegal activity in the TTU–Oecusse border area. Geographically, the region spans approximately 119.7 kilometers of land borders and 48 kilometers of coastline. Yet, it is served by only three official State Border Crossing Posts (PLBN): Wini, Napan, and Haumeni Ana. The limited surveillance infrastructure creates gaps that local communities exploit to access alternative routes—commonly known as rat routes—which serve as unofficial pathways for cross-border trade.

Field findings show that the commodities most frequently traded illegally include subsidized fuel, motor vehicles, used clothing, and alcoholic beverages (Nahak et al., 2021). The use of these informal routes is facilitated not only by favorable geographical conditions that enhance mobility but also by strong economic incentives arising from significant price disparities between Indonesia and Timor-Leste. Within this context, *rat routes* serve as adaptive strategies that enable border communities to sustain their livelihoods despite restricted access to the formal economy and weak border control mechanisms (Pusvitasary, 2017).

The existence of these alternative routes has fostered the emergence of an informal trade ecosystem that is both socially and economically organized. Trade occurs not only around the PLBN but also, more prominently, through concealed routes that lack permanent monitoring systems. The absence of adequate oversight infrastructure and the limited capacity of border institutions are the primary factors enabling persistent illegal cross-border mobility (Siregar & Saepudin, 2020). These activities are far from random; rather, they exhibit consistent geographic and logistical patterns, demonstrating a clear economic rationale underpinning such practices.

This phenomenon illustrates that underground economic activities are not sporadic but follow structured geographical and economic patterns driven by identifiable incentives. A key driver is the substantial price disparity between Indonesia and Timor-Leste, particularly for subsidized commodities. These conditions create significant profit opportunities, thereby encouraging smuggling as an adaptive strategy within a constrained border economy. The actors involved extend beyond individual or low-income households to include larger networks comprising local officials and cross-border syndicates that operate systematically and in an organized manner (Sengkoen & Pangastuti, 2025).

To illustrate these dynamics, Table 2 synthesizes field findings from observations, interviews, and documentation. It summarizes six core dimensions that characterize the complexity and systemic nature of underground economic activities in TTU–Oecusse: commodity types, actors involved, main motives, distribution patterns, vulnerable areas, and resulting impacts. This synthesis serves not only as a complement to the narrative but also as a conceptual framework for understanding the underground economy as an alternative socio-economic system embedded in local border dynamics.

**Table 2.** Key findings of underground economic activities in TTU–Oecusse

| <b>Category</b>      | <b>Findings</b>   |
|----------------------|---|
| Commodity Type       | Subsidized fuel, motor vehicles, necessities, used clothing, and alcoholic beverages. |
| Actors Involved      | Local communities, government officials, and transnational networks                   |
| Main Motive          | Price disparities, high profit margins, and elevated formal transaction costs         |
| Distribution Pattern | Land and sea <i>rat routes</i> , border markets, container shipping                   |
| Vulnerable Areas     | Wini, Haumeni Ana, Atapupu–Dili route, Napan  |
| Impact               | Loss of state revenue, weakened law enforcement, and economic inequality              |

*Source: Field interviews and participatory observation documentation in the TTU–Oecusse border area (January–March 2025).*

Price disparities emerge as the primary driver of these activities. For instance, Peralite fuel in Indonesia costs approximately Rp 10,000 per liter, while in Timor-Leste the price reaches about Rp 23,200 per liter—yielding a profit margin exceeding 100%. This differential provides a strong incentive for residents to use illegal routes as a survival strategy. One informant noted:

*"The official fees are too high. If you go through the formal route, there are many taxes and levies from the authorities. But if you use the back roads, even if there are levies, it's still cheaper and faster."*

This statement reflects the rational motives underpinning informal economic practices, consistent with the principles of Rational Choice Theory. Theoretically, the phenomenon aligns with Dual Sector Theory (Uys & Blaauw, 2006), which posits the coexistence of formal and informal sectors in societies with weak institutional frameworks. Simultaneously, Access Limitation Theory (Kolotilov & Magomedov, 2017) emphasizes that restricted access to public services, information, and infrastructure drives individuals to participate in informal economies. Together, these theories elucidate the structural roots of the underground economy's growth in TTU–Oecusse.

Secondary findings from national media reports reinforce this analysis. In one 2024 operation, the value of smuggled motor vehicles to Timor-Leste was estimated at IDR 400 million per month, while fuel smuggling reached up to 16 tons in a single shipment by sea from Atapupu to Dili. These figures demonstrate that the underground economy in the region is systemic and organized, involving cross-border networks and, at times, state actors.

Formal markets established by the government—such as those in Wini, Napan, and Haumeni Ana—were initially intended to legitimize cross-border community trade. However, in practice, these markets have undergone functional deviation, gradually transforming into centers of informal transactions. This shift is attributed to the lack of incentives for traders to join the formal sector, weak local monitoring and enforcement mechanisms, and high compliance costs resulting from rigid and non-contextual regulations. These findings underscore that physical infrastructure development alone, without parallel institutional reforms and regulatory simplification, is insufficient to integrate community trading activities into the formal economy.

Institutional challenges also persist on the Timor-Leste side. In Oecusse—a semi-autonomous region under the Special Zone for Social and Market Economy (ZEESM) program—local authorities have yet to demonstrate sufficient capacity in critical areas, including cross-border surveillance, goods regulation, and efficient local economic

management. Structural constraints, including limited fiscal resources, a shortage of skilled personnel, and weak intersectoral coordination, have created institutional voids that transnational informal trade networks exploit. Consequently, weak institutional capacity on both sides of the border remains a central obstacle to implementing formal policies to regulate and legalize cross-border trade in frontier zones.

The economic implications of these activities are multifaceted. From a fiscal standpoint, they result in significant state revenue losses, as untaxed goods escape formal channels. Socially, dependence on opportunistic informal practices undermines business ethics and perpetuates community reliance on illegality. From a security perspective, the involvement of certain officials and the weakness of law enforcement agencies facilitate the expansion of cross-border criminal networks.

Comparative studies of the India–Bangladesh and Mexico–Guatemala borders reveal that effectively addressing similar challenges requires integrated strategies involving digitalized surveillance systems, strengthened local institutional capacity, and the creation of formal economic alternatives for border communities. Consequently, policy responses in TTU–Oecusse must move beyond repressive measures toward participatory and transformative approaches. These findings are relevant to other developing-country border contexts sharing similar structural characteristics. The conceptual transferability of this study lies in its demonstration of how systemic state weaknesses in providing equitable economic access foster alternative informal economies that function as adaptive mechanisms for border communities.

In conclusion, the underground economy in TTU–Oecusse should not be viewed solely as an issue of lawlessness but as a manifestation of systemic failure in building an inclusive and adaptive economic system. Future policy strategies must be evidence-based, sensitive to local socio-economic dynamics, and capable of bridging the gap between formal structures and community realities. The primary contribution of this study lies in mapping the interconnections between geographic configurations, price disparities, and institutional weaknesses that sustain cross-border informal practices. This perspective expands our understanding of the underground economy at borders—not merely as a violation of the law, but as a form of economic rationality within a space neglected by the state.

## **The impact of underground economy activities on the local economy**

### ***Economic impact***

The intensive underground economic activities occurring in the border areas of North Central Timor (TTU) Regency and the Oecusse Enclave have significantly influenced both local and national economic dynamics. These impacts extend beyond fiscal losses to include structural distortions in the regional financial system, increased reliance on informal practices, and long-term threats to regional fiscal sustainability. This phenomenon reflects a complex interaction between weak institutional capacity, non-adaptive regulations, and the high economic pressures experienced by border households.

From a fiscal perspective, cross-border trade conducted outside taxation and customs frameworks has resulted in substantial potential losses of national and regional revenue. According to national media reports, the smuggling of motor vehicles from East Nusa Tenggara to Timor-Leste is estimated to reach a monthly transaction value of approximately IDR 400 million (Antaranews, 2023). Similarly, the smuggling of fuel oil (BBM) from Atapupu Port to Dili can reach up to 16 tons—or roughly 20,000 liters—of subsidized Pertalite in a single shipment. With a market price differential of IDR 13,200 per liter between Indonesia and Timor-Leste, the potential subsidy loss from a single

shipment is estimated at IDR 264 million. If such shipments occur four times a month, state losses from fuel smuggling alone could exceed IDR 1 billion. These figures do not account for additional fiscal losses from import duties, vehicle taxes, or revenues related to official trade permits and levies.

Motor vehicle smuggling also produces substantial fiscal repercussions. Between 2014 and mid-2016, a total of 1,021 vehicles were reported to have been smuggled into Timor-Leste through illegal routes, predominantly from eastern Indonesia (Detik.com, 2016). Assuming an average value of IDR 100 million per vehicle, the potential cumulative loss to the state exceeds IDR 102 billion. This estimate excludes subsequent effects such as the loss of vehicle tax revenues, export duties, and disruptions to the legal distribution of goods. These findings demonstrate that underground economic activities in border regions not only violate legal norms but also impose severe fiscal pressures on both national and regional economies.

At the regional level, the existence of informal markets and the parallel distribution of illegal goods weakens the potential contribution of the regional gross domestic product (GDP), particularly from market levies, cross-border trade permits, and other local fiscal sources. The failure to integrate informal economic activities into formal mechanisms limits the data foundation for fiscal performance indicators, such as the Regional Incentive Fund (DID) and the General Allocation Fund (DAU). Consequently, regional governments face challenges in designing responsive and sustainable development policies.

Moreover, market distortions resulting from underground economic activities disrupt the local micro, small, and medium enterprise (MSME) ecosystem. Formal business actors—who are required to comply with taxation and regulatory frameworks—are disadvantaged compared to informal traders who acquire goods illegally at lower prices. This imbalance erodes local economic competitiveness, discourages formal investment, and delays structural transformation toward a formalized economic system.

Structural macroeconomic vulnerabilities compound this problem. North Central Timor Regency recorded a poverty rate of 21.85 percent, higher than the provincial average in East Nusa Tenggara (19.96 percent) and significantly above the national rate. Economic growth in the regency reached only 3.00 percent in 2023 (BPS NTT, 2023), indicating productivity stagnation and a fragile formal economic base. In this context, the underground economy becomes a rational survival strategy, particularly when access to formal employment and business capital is severely constrained.

Rigid administrative and procedural regulations further obstruct formal economic development in the region. In Timor-Leste, the Ministry of Trade, Industry, and Environment (MCTI) Regulation No. 1/2008 mandates a series of requirements for business legalization, including possession of a tax identification number, domicile permit, and location survey report. Meanwhile, in Indonesia, the cross-border trade licensing system is burdened by high-cost economic practices and illicit levies (Pusvitasary, 2017). These barriers not only create disincentives for legal compliance but also reinforce the perception that informal channels are more efficient and practical.

Field findings confirm the community's reliance on illicit trade practices. In an in-depth interview, a business actor explained that while the Timor-Leste market shows strong demand for Indonesian products, strict and costly regulations make informal routes the only viable option. The informant stated:

*“Indonesian products are very popular there (East Timor), but the rules are too complicated and the costs are high. The official route makes us lose money. If we don't go through the back channels, we can't survive. It's a matter of life or death.”*

This statement reflects the microeconomic logic underlying the economic decisions of border communities. Theoretically, this condition aligns with Access Limitation Theory, which posits that exclusionary regulations restrict low-income individuals' access to formal markets. As articulated by Hernando de Soto, the informal sector should not be viewed merely as a violation of the law but as a rational response to an exclusionary economic system (Buszko, 2017). Similarly, W. Arthur Lewis's Dual Sector Theory provides a structural explanation for the coexistence of formal and informal sectors in developing economies, where limited formal employment opportunities push labor into informal activities, including illegal cross-border trade (Ranis, 2004).

A comparative study by Mahanty (2019) on the Vietnam–Cambodia border found that over 60% of the local population depends on informal economic activities for their livelihoods. A comparable pattern is evident in TTU–Oecusse, where most economic activity remains unrecorded and relies on underground trading networks. This condition generates market distortions, reduces formal business competitiveness, and exacerbates income inequality.

The insights of Kamilaus Oki, an economist at the University of Timor, further validate these findings:

*“Underground trade continues because of economic needs and complex social relationships. The cost of official channels is too high, and there are networks involving certain officials. Even the fuel shortage in TTU is suspected to be due to a syndicate selling to the border. The red belt route built by the government opens up new space for illegal routes.”*

This statement underscores that the problem's root lies not solely in individual behavior but in systemic weaknesses that permit illegal practices to flourish. These findings are consistent with research by Herrera (2023) and Nguyen et al. (2024), which demonstrate that structural corruption and institutional fragility facilitate the expansion of underground economies as alternative systems of exchange.

The macroeconomic implications of such activities are also significant. When informal economic activities dominate, the effectiveness of fiscal and monetary policies declines because official databases fail to reflect the actual economic landscape. Wiafe et al. (2024) emphasize that the prevalence of underground economies undermines the accuracy of public policy by obscuring real income and consumption patterns. Similarly, Kar (2012) found that countries with large informal sectors tend to experience greater income volatility and investment uncertainty.

### ***Social impact***

Underground economic activities in the border areas of North Central Timor (TTU) Regency and the Oecusse Enclave, Timor-Leste, generate not only economic consequences but also complex and profound social impacts. Limited access to formal employment, minimal productive job opportunities, and high poverty rates compel many residents to engage in illegal trade as an alternative means of livelihood. This dependence gradually creates a vulnerable social structure in which informal practices become a culturally accepted norm.

This phenomenon creates a self-perpetuating cycle of social dependency, in which short-term gains from illegal activities are perceived as more promising than long-term investments in the formal economy. This finding is consistent with the argument of Iacobuta-Mihaita et al. (2022), who emphasize that the appeal of the informal economy lies in its accessibility and flexibility. Nevertheless, income instability and the absence of

formal social protection leave participants in the underground economy in a state of uncertainty, deprived of social security, pensions, and job stability.

This situation aligns with Social Disorganization Theory, which posits that when formal social institutions—such as schools, families, and legal authorities—are weakened, communities tend to develop alternative value systems that tolerate or normalize lawlessness. In TTU–Oecusse, illegal economic activities that occur openly and involve various layers of society contribute to the strengthening of deviant norms, particularly among the younger generation. This condition threatens the sustainability of moral and ethical values within the community.

Another significant social consequence is the increasing potential for crime and the emergence of organized networks that dominate the informal economy. Case studies from the U.S.–Mexico border (Ferreira, 2020) and the South Africa–Zimbabwe border (Mutendi & Chekero, 2023) demonstrate that illegal trade frequently overlaps with other criminal activities, including smuggling, violence, and the embezzlement of goods. A similar pattern can be observed in TTU–Oecusse, where weak law enforcement enables organized syndicates to control illicit flows of goods and capital.

A long-term consequence of these dynamics is the gradual erosion of social values and community ethics. The younger generation raised in such environments becomes increasingly exposed to the normalization of illegal practices. This observation is consistent with the findings of Badalič (2023) and Paitoonpong (2006), who argue that early exposure to underground economic activities reshapes perceptions of legality and the value of legitimate work. Children from families involved in illicit trade are often excluded from formal education due to economic constraints and early work demands. Samers (2004) identified a comparable trend along the Nigeria–Benin border, where similar conditions led to declining school participation and growing intergenerational inequality.

The views of Sirilius Seran, an academic at Timor University, further reinforce this analysis:

*“Although now separated by national borders due to political differences, the people of TTU and Oecusse still share deep cultural and kinship ties. However, the high level of illegal trade activity is gradually eroding these cultural values. Illicit trade is increasingly seen as ordinary work, especially among the younger generation, which can harm mental well-being and undermine social ethics. Moreover, children from the families of illegal traders often lack access to proper education, further deepening social inequality.”*

This statement underscores that the challenges faced by border communities stem not only from economic deprivation but also from structural fractures in social norms and community values. Consequently, policy interventions must focus on formalizing the economy through community empowerment, expanding access to education, and improving basic social services. Countries such as Brazil and Colombia have demonstrated that programs promoting the legalization of micro, small, and medium enterprises (MSMEs) and simplifying business licensing can successfully help informal actors transition into the formal economy (Buszko, 2017).

In addition, strengthening legal oversight and fostering cross-border collaboration represent crucial strategies. Community-based monitoring models implemented in Kenya and Uganda (Lim & Su, 2021) could be adapted to the TTU–Oecusse context to enhance legal awareness and social cohesion. With inclusive, evidence-based policies that are sensitive to local cultural and socio-economic contexts, the adverse social impacts of the

underground economy can be mitigated. Such measures would help establish a more stable, equitable, and dignified social order in the border region.

### ***Impact on security in border areas***

Underground economic activities in the border areas of North Central Timor Regency and the Oecusse Enclave pose not only financial and social consequences but also significant threats to security and regional stability. The vast and geographically challenging nature of the border—monitored by only three State Border Crossing Posts (PLBN): Napan, Wini, and Haumeni Ana—creates extensive gaps that enable various uncontrolled illegal activities. The resulting security threats are multidimensional, encompassing rising crime rates, the expansion of organized illicit trade networks, and the weakening of institutional authority.

One of the most prominent consequences of underground economic growth is the escalation of criminal activity in the border zone. The smuggling of fuel, motor vehicles, and even narcotics often involves well-structured cross-border networks that operate beyond the reach of law enforcement agencies. Studies conducted along the borders of Argentina, Paraguay, and Brazil reveal a direct correlation between illegal economic activities and the strengthening of organized crime, including human and arms trafficking (Kosmyinka, 2020). A similar pattern has been observed on the Kenya–Somalia border, where criminal groups exploit weak surveillance systems, further aggravating regional insecurity (Reuben et al., 2022).

The failure to control these illegal activities also disrupts public order and stability. Tensions frequently arise between informal traders and law enforcement officers, especially when enforcement actions are undertaken without a participatory approach. Comparable conditions have been documented in the Afghanistan–Pakistan border region, where armed groups utilize illegal trade networks to finance their operations, leading to chronic insecurity in the area (Herbert & Idris, 2024).

In the local context, the testimony of Siprianus Padapili, Head of the Wini PLBN, underscores these challenges:

*“With a land border of 119.7 km and a coastline of 48 km, and only three State Border Posts, strict supervision is a major challenge. Underground economic activities in this border region pose numerous challenges for law enforcement and regional stability. Coordinated efforts across institutions and countries are urgently needed.”*

This statement illustrates that law enforcement limitations stem not only from a shortage of human resources and infrastructure but also from the lack of coordination among authorized institutions. This aligns with Institutional Capacity Theory (Domorenok et al., 2021), which emphasizes that institutional resilience and bureaucratic responsiveness are critical in managing security dynamics in high-risk areas. Similarly, Social Disorganization Theory (Kingston et al., 2009) posits that unstable social conditions, weak community institutions, and limited local control contribute to increased criminal activity. In the TTU–Oecusse context, vulnerability is heightened by insufficient oversight and the absence of community-based institutional strengthening.

International experiences further demonstrate that effective border security management requires a multi-stakeholder approach. The European Union’s Integrated Border Management (IBM) framework, for example, combines cross-border intelligence, integrated reporting systems, and advanced monitoring technologies to address the growing complexity of transnational threats (Medina & Schneider, 2019). This integrated

approach provides a relevant model for adaptation in the Indonesia–Timor-Leste border context.

From a technological standpoint, practices on the U.S.–Mexico border offer valuable insights. The use of drones, thermal cameras, and facial recognition systems has substantially improved the monitoring of vulnerable zones (Chung et al., 2023). Contextual adaptation of such technologies in TTU–Oecusse could enhance the mapping of illegal logistical movements and strengthen early-warning systems along *rat routes* and informal coastal ports.

Nevertheless, technological advancement alone will not suffice without adequate institutional support. Cross-border capacity-building programs—such as those implemented in Uzbekistan and Afghanistan—have proven effective in strengthening collaboration, trust, and technical competence among border security personnel (Vakulchuk & Irnazarov, 2014). Similar initiatives are crucial for fostering intergovernmental cooperation, improving coordination mechanisms, and promoting professional solidarity between the Indonesian and Timor-Leste security forces.

By reinforcing institutional collaboration, adopting appropriate monitoring technologies, and prioritizing cross-border intelligence sharing, security challenges arising from underground economic activities in TTU–Oecusse can be substantially mitigated. Such a multidimensional strategy will not only enhance border security and public order but also lay the groundwork for more sustainable economic and social development in the region.

### **Policy implications**

Addressing underground economic activities in the border areas of the North Central Timor (TTU) Regency and the Oecusse Enclave requires policies that go beyond repressive measures and adopt comprehensive, adaptive, and evidence-based approaches. The persistence of underground economic phenomena reflects the interaction of unequal socio-economic structures, institutional weaknesses, and limited access to formal systems. Accordingly, mitigation strategies must be designed through a multi-level and multi-sectoral approach that integrates security, economic, social, and institutional dimensions (Medina & Schneider, 2019; Domorenok et al., 2021).

A crucial first step in tackling underground economic activities in the TTU–Oecusse border region is to strengthen border surveillance systems. Given the area’s rugged terrain and limited accessibility, innovative approaches to territorial control are required beyond conventional patrol methods. The deployment of technologies such as drones, satellite-based monitoring, and biometric identification systems has proven effective in enhancing border security in various contexts, as seen in the India–Bangladesh and U.S.–Mexico borders (Chung et al., 2023; Bose, 2023).

However, the adoption of such high-end technologies must be calibrated against the fiscal and infrastructural constraints that characterize the TTU–Oecusse region. In light of these limitations, a more realistic and adaptive strategy is recommended. Instead of large-scale technological investments, border management could begin with limited-range surveillance drones, portable CCTV systems at high-risk locations, and cross-border coordination units linking Indonesian and Timor-Leste security authorities. These initiatives are more compatible with local fiscal capacities and can be operationalized through targeted training programs. Moreover, this model can be integrated with community-based digital reporting systems and grassroots patrol initiatives involving local leaders, thereby broadening surveillance networks in a participatory manner. This hybrid model not only aligns with local socio-economic realities but also strengthens civic engagement and fosters culturally grounded, sustainable security practices.

Strengthening surveillance should be accompanied by enhanced cross-border cooperation. Bilateral collaboration between Indonesia and Timor-Leste can focus on intelligence sharing, joint patrol operations, and the creation of a border coordination unit for rapid response to illegal activities. The Mexico–Guatemala case study demonstrates that such synergy can substantially reduce smuggling rates (Justin & Campbell, 2021). However, while regional frameworks such as the Schengen Agreement or Latin American border management models offer valuable insights, the disparity in institutional capacity and resources between Indonesia and Timor-Leste requires a more contextualized and locally grounded approach. Hence, international models must be selectively adapted to fit the socio-economic and institutional realities of the TTU–Oecusse border region. This cooperative framework aligns with Institutional Capacity Theory, which emphasizes that effective surveillance depends heavily on the quality of interjurisdictional coordination and bureaucratic responsiveness (Domorenok et al., 2021).

Moreover, surveillance and enforcement efforts will be ineffective if the structural roots of underground economic activity remain unaddressed. The community's dependence on the informal sector is largely driven by limited access to capital, skills, and formal business opportunities. Thus, economic empowerment should be a core component of long-term mitigation policies. Experiences from the Peru–Bolivia and Colombia–Ecuador border regions demonstrate that improving access to microfinance, implementing skills training, and facilitating the legalization of small enterprises can substantially reduce illegal cross-border activities (Christman & Heimann, 2004; Buszko, 2017). In TTU–Oecusse, similar programs could include fiscal incentive schemes, market access facilitation, and the integration of micro-entrepreneurs into formal digital economic platforms to promote sustainable livelihoods.

Social transformation also constitutes an essential policy dimension. Public education campaigns targeted at border communities can build collective awareness of the legal risks, long-term economic effects, and ethical implications of informal trade. Community-based educational programs—developed collaboratively with local leaders, academics, and media—have proven effective in reducing community participation in illicit economic activities, as shown in the Thailand–Myanmar border context (McEvoy et al., 2022). Such initiatives not only enhance legal literacy but also help restore the moral and ethical foundations of society, fostering respect for formal trade practices.

In parallel, institutional capacity building is indispensable. Border security forces and surveillance agencies require continuous training, modern equipment, and transparent monitoring systems. Evidence from the South Africa–Mozambique border shows that equipment modernization and sustained personnel training can significantly reduce illegal trade volumes (Mamkeli, 2014). For TTU–Oecusse, capacity building should also involve local governments in early detection systems and data-driven coordination of enforcement actions.

Equally important is the active involvement of multiple stakeholders in policy formulation. The participatory governance model implemented in Canada and the United States demonstrates that engaging academics, private sector actors, and civil society organizations in policymaking enhances the legitimacy, effectiveness, and accountability of border management (Gold, 2020). In TTU–Oecusse, a similar mechanism could take the form of a cross-sectoral coordination forum that brings together community representatives, business actors, and government agencies under a unified framework.

To address the complexity of underground economic activities in the TTU–Oecusse border area, policies must evolve from reactive, punitive approaches to proactive, participatory, and evidence-based ones. This approach must target the root causes across

economic, regulatory, institutional, and sociocultural dimensions. Table 3 presents an integrated summary of strategic recommendations derived from field findings, literature reviews, and comparative policy practices from other border regions:

**Table 3.** Integrated policy strategies and implications for reducing underground economic activities in TTU–Oecusse.

| <b>Main Problem</b>    | <b>Root Cause</b>                                  | <b>Strategic Solution</b>  | <b>Target Outcome</b>                                 |
|------------------------|--|--|---|
| Rise in illegal trade. | Price disparities and regulatory barriers          | Fiscal incentives for legal trade and simplification of licensing procedures | 20% reduction in smuggling cases within two years     |
| Weak surveillance      | Limited infrastructure and technological capacity  | Deployment of drones, border CCTV, and coordination units                    | Decrease in trade intensity along <i>rat routes</i>   |
| Low legal awareness    | Weak public education and erosion of social values | Community-based education and local media campaigns                          | Increased participation in formal business activities |
| Economic inequality    | Limited access to finance and markets              | MSME legalization schemes and digital access expansion                       | 15% growth in formal MSMEs within three years         |

*Source: Synthesis of primary and secondary data and policy recommendations based on field findings in the TTU–Oecusse border area (2025).*

The policy framework summarized in Table 3 underscores the need for cross-sectoral and institutional integration to address underground economic issues in border regions. Rather than relying on fragmented and sector-specific interventions, this strategy promotes synergy between data-driven technocratic approaches and active community participation. By explicitly linking problems, root causes, strategies, and measurable outcomes, this framework ensures targeted policymaking and facilitates periodic evaluation.

Ultimately, addressing the underground economy in border areas requires more than legal enforcement—it calls for systemic governance reform that is responsive to local contexts and grounded in inclusive development principles. Through this integrated intervention model, efforts to combat illegal economic activities can move beyond suppression toward building a resilient, inclusive, and sustainable economic foundation. When the security dimension is strategically combined with economic empowerment and community-based legal education, the image of border areas can be transformed from vulnerable peripheries into strategic growth corridors. In the long term, such initiatives are expected not only to reduce informal economic activity but also to strengthen national economic sovereignty and accelerate equitable regional integration through adaptive, locally driven development.

## CONCLUSION AND RECOMMENDATIONS

### Conclusion

This study demonstrates that underground economic activity in the border region of North Central Timor (TTU) Regency and the Oecusse Enclave is not merely a sporadic manifestation of informal trade. Rather, it represents a complex structural phenomenon shaped by limited access to formal economic systems, weak institutional capacity, high transaction costs, and the sociocultural dynamics that characterize transboundary communities.

Economically, these activities perpetuate community dependence on informal trade mechanisms, diminishing potential revenues for both state and local governments while fostering unfair competition for formal-sector actors. Socially, they cultivate permissive norms toward legal violations, erode public trust in state institutions, and hinder intergenerational social mobility. From a security perspective, the expansion of illicit cross-border activities heightens the risk of organized crime and exposes institutional blind spots in areas vital to national sovereignty.

Collectively, these findings underscore that underground economic practices in border regions are symptomatic of localized state fragility, in which the state's substantive presence remains limited. Illicit economic behavior thus emerges not merely as a form of law evasion but as a rational adaptation to the absence of inclusive and equitable formal systems capable of addressing the socio-economic realities of marginalized border populations.

### **Recommendations**

Addressing this issue requires more than repressive enforcement measures. A holistic and multi-layered policy strategy is essential—one that balances immediate responses with long-term structural transformation.

First, border surveillance infrastructure should be modernized by deploying cost-effective technologies, such as drones, biometric sensors, and geospatial monitoring systems, tailored to local capacities. Second, cross-agency and bilateral coordination must be significantly strengthened to establish a coherent and integrated framework for managing illicit transboundary trade.

Third, economic empowerment initiatives should serve as a cornerstone of medium-term policy, encompassing incentives for the formalization of micro-enterprises, regulatory simplification, enhanced access to microfinance, and community-based skills training programs. Fourth, shifting collective perceptions of legality and economic norms requires a public education strategy grounded in community engagement, local media mobilization, and the leadership of respected local figures.

Future research is encouraged to broaden the analytical scope through longitudinal and spatial methodologies, while also incorporating the perspectives of marginalized groups—such as women, youth, and micro-entrepreneurs—to generate more inclusive and context-sensitive solutions. In doing so, the policy discourse can advance toward a more comprehensive framework that bridges disciplinary, sectoral, and national boundaries.

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### CONFLICT OF INTEREST

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