

From Political Decision to Economic Impact: Assessing the Effects of 2025 Regulatory Easing on Micro-Imports and Tourism Foreign Exchange Allowances on Algeria's Informal Exchange Market

من القرار السياسي إلى الأثر الاقتصادي: دراسة في تأثير تخفيف القيود على الاستيراد المصغر ومخصصات العملة للسياحة على السوق الموازية للصرف في الجزائر سنة 2025

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Date of send:21/10/2025 Date of acceptance:07/12/ 2025 Date of publication:30/12/2025

Abstract :

This study assesses how Algeria's 2025 political decision to legalize micro-importation and increase tourism foreign currency allowances translates into economic spillovers on the informal exchange market. Using a systemic time-series design (2001–2025), it treats import operations and foreign reserves as structural proxies for policy easing and liquidity constraint, respectively, and models their impact on the exchange rate premium. Results show that the political decision of import liberalization and tourism currency easing, significantly amplifies informal pressure, while reserve increases offer only transient relief. This asymmetry reveals that politically motivated regulatory easing, when decoupled from monetary backing, risks reinforcing, rather than resolving the dual-market disequilibrium it seeks to fix.

Keywords: Informal Exchange Market. Policy Coordination. Policy-making. Predictive Causality. Proxy Indexes. Regulatory Spillovers.

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Introduction

Algeria's macroeconomic configuration remains dominated by structural asymmetries that manifest through a dual exchange rate regime, persistent trade deficits, and chronic dependency on imports—particularly in the domains of consumer and technological goods¹. The coexistence of an officially managed exchange rate and a spontaneously formed parallel market rate has long functioned as a stabilizing disequilibrium within the system: it absorbs regulatory rigidity at the cost of distorting price signals and weakening monetary policy transmission^{2, 3}. The managed float operated by the Bank of Algeria, designed to preserve external reserves and contain imported inflation, has recurrently failed to accommodate the effective demand for foreign currency. This systemic mismatch between constrained official supply and continuously expanding private demand has institutionalized informality as a structural subsystem of monetary circulation^{1, 2}.

Historically, in Algeria, individual access to foreign exchange operated within an administrative framework designed to preserve macro-financial stability by imposing restrictions rather than adapting to market demands⁴. This prolonged constraint produced an endogenous informal market that emerged not merely as a space of illegality, but as a functional compensator—a self-organizing mechanism that restores liquidity and enables cross-border consumption and trade when official mechanisms are saturated^{1, 2}. By 2025, estimates suggest that the informal sphere accounts for nearly one-third of monetary circulation, with the parallel rate for the euro exceeding the official rate by more than 80%⁵. The informal exchange market therefore constitutes both a pressure valve and a source of systemic vulnerability: it ensures continuity of exchange while undermining fiscal transparency, monetary coherence, and policy credibility⁶.

Within such a configuration, any reform targeting foreign exchange allocation or import regulation cannot be considered an isolated event; it represents a systemic perturbation transmitted across interconnected substructures—monetary, fiscal, social, and political^{3, 6}. In mid-2025, the Algerian government introduced two coordinated legislative measures whose combined architecture effectively redefines the interface between formal and informal trade circuits. The first, Executive Decree No. 25-170 of 28 June 2025, formalizes micro-importation as a legal and fiscal category reserved for auto-entrepreneurs. It authorizes imports up to 1,800,000 DZD per trip ($\approx$ USD 12,000 at the official rate), with a ceiling of two trips per month, and offers multiple simplifications, exemption from commercial registration, elimination of pre-import authorization, and a preferential customs duty rate of 5%. A decisive clause, however, stipulates that all transactions must be financed via personal foreign-currency accounts held at the *Banque Extérieure d'Algérie*, thereby functionally coupling the measure with the foreign exchange control regime⁷.

The second, Instruction No. 05-2025 of 17 July 2025, introduces a regulated framework for tourism-related foreign currency allocations, fixing the annual

allowance at €750 per adult and linking it to verified international travel. This reform dismantles the long-standing informal mechanism through which travelers and small traders accessed hard currency in parallel markets to finance both tourism and low-scale import operations⁸. Together, these two measures constitute a coordinated attempt to rechanneling previously informal monetary and commercial flows into traceable, regulated circuits, while maintaining the political intent of appeasement and social inclusion.

From a policy-engineering perspective, the design of these reforms reflects an effort to reduce informational entropy within the system, enhancing traceability, fiscal control, and formal participation. Yet, this reconfiguration also generates new feedback loops that may amplify certain unintended effects. By simultaneously easing import procedures and partially liberalizing personal foreign exchange access, the system introduces additional sources of liquidity pressure on external reserves. The interaction between both reforms could, through behavioral coupling, reinforce speculative dynamics in informal currency markets, stimulate arbitrage between official and parallel segments, and redirect financial resources from productive to consumptive trajectories. In systemic terms, what was intended as a curbing mechanism for informality may instead act as a resonance amplifier under conditions of weak institutional damping and high external dependence.

The theoretical framework supporting this hypothesis draws from the literature on policy spillovers, shadow-economy transmission, and exchange-rate pass-through in dual-rate economies. These models converge on the idea that partial formalization in an incomplete institutional environment does not necessarily eliminate informality; it can displace it to new equilibrium points where regulatory arbitrage and speculative adaptation restore the system's former entropy¹⁻³. In such environments, incremental liberalization may induce non-linear responses, accentuating exchange rate misalignment, triggering short-term inflationary impulses, and undermining the coherence of macroeconomic control instruments.

Algeria's structural characteristics, limited diversification, import-dependence, inflation sensitivity, and the deep embedding of informal networks, magnify its exposure to these dynamic instabilities. The 2025 reforms thus provide a unique empirical context to observe how socially motivated regulatory easing, intended to consolidate local sociostasis and fiscal inclusion, may generate collateral monetary effects through emergent behaviors and feedback between formal and informal domains.

Accordingly, this study is positioned as an early analytical effort to model and anticipate these potential spillovers. It addresses the following central questions: (1) To what extent might the 2025 reforms influence Algeria's informal exchange rate?

(2) Through which transmission channels—import dynamics, foreign-currency allocation mechanisms, or anticipatory behavior—could such effects manifest?

(3) What insights can be derived for the design of coherent regulatory and monetary frameworks in dual-rate economies characterized by systemic informality?

Firstly: Literature Review

In open and semi-regulated economies, the interaction between monetary control mechanisms and informal currency markets constitutes a complex adaptive system in which policy interventions generate both direct and collateral effects. The present review explores how recent regulatory easing specifically, Algeria's 2025 micro-import and tourism allocation reforms, may propagate within this system and influence the informal exchange rate. The objective is twofold: first, to establish a theoretical framework grounded in established models of open-economy dynamics and shadow economy behavior; and second, to examine global and Algerian empirical studies that shed light on the unintended systemic effects of formalization and liberalization policies. This review aims to position the current study within a coherent analytical continuum, highlighting how institutional design, behavioral adaptation, and policy transmission interact under conditions of informational asymmetry and structural rigidity.

1. Necessary considerations:

Analytically, the effects of regulatory change on informal exchange markets can be conceptualized through a hybrid framework combining open-economy macroeconomics, institutional economics, and systems engineering logic. The Mundell–Fleming model⁹ provides the classical foundation for understanding the macroeconomic transmission of monetary and fiscal policies in open economies with imperfect capital mobility. Within this framework, the exchange rate acts as a key adjustment variable. However, when multiple exchange rate regimes coexist, as in dual-rate systems, market-clearing conditions become fragmented, leading to segmentation between official and informal circuits¹⁰.

The emergence of informal exchange rates is further explained by shadow economy models, which conceptualize informality as a rational response to regulatory overload and weak institutional credibility¹¹. These models consider informality not as a residual but as a self-organizing subsystem that compensates for inefficiencies in formal allocation mechanisms. In this context, the informal foreign exchange market operates as a regulatory buffer that absorbs unmet currency demand when official allocation mechanisms are constrained by quantitative restrictions or bureaucratic frictions.

Currency substitution theory¹² and parallel market equilibrium models^{13, 14} emphasize that when access to foreign currency is restricted, private agents substitute domestic assets for foreign ones, leading to excess demand pressures that manifest in informal pricing of foreign exchange. The equilibrium between formal and informal rates is not stable; it fluctuates according to expectations, speculative behavior, and institutional signals.

From a systems engineering perspective, the policy environment can be modeled as a dynamic control system with delayed feedback and nonlinear responses. Small

changes in input variables, such as easing micro-import regulations, may generate amplified systemic outputs if feedback loops between formal and informal sectors are strong. In such adaptive systems, institutional reforms often generate emergent properties¹⁵, meaning outcomes not directly intended by policymakers but resulting from the system's interdependence and feedback complexity.

Finally, theories of regulatory arbitrage and institutional duality^{16, 17} suggest that partial liberalization or selective enforcement produces dual behavioral equilibrium: one compliant and formal, and another adaptive and informal. In economies with rigid capital controls and high import dependency, the informal exchange market often becomes a structural complement rather than a mere distortion¹⁸.

2. Empirical Evidence on the Side Effects of Regulatory Easing

Empirical literature across developing and transition economies consistently documents that the easing of regulatory constraints produces asymmetric and nonlinear effects. Studies on Latin America's currency liberalizations during the 1980s and 1990s show that partial relaxation of capital controls often led to speculative arbitrage and widened informal-formal rate spreads^{19, 20}. Similarly, in Nigeria and Egypt, attempts to formalize access to foreign exchange for small importers or travelers resulted in temporary stabilization followed by renewed parallel market pressure as expectations adjusted to new regulatory signals^{21, 22}.

The literature also identifies several systemic mechanisms through which policy easing may yield unintended outcomes. First, demand amplification: easing import restrictions increases foreign currency demand without necessarily increasing supply, leading to appreciation pressures in the informal market¹³. Second, behavioral signaling: when agents perceive reform as transient or inconsistent, they accelerate speculative transactions, increasing volatility²³. Third, policy displacement and formalization of previously informal activities may crowd out informal channels in the short term but strengthen them later through regulatory arbitrage²⁴. These mechanisms demonstrate that reforms aimed at formalization often relocate, rather than eliminate, informality within the economic system.

3. Informal Currency Markets: Global and Algerian Contexts

Globally, informal currency markets emerge as endogenous subsystems of monetary regimes characterized by foreign exchange rationing and institutional constraints. In Venezuela, the introduction of preferential exchange rates for essential imports created persistent arbitrage opportunities that fueled a multi-tier parallel market²⁵. In Egypt, despite repeated central bank interventions, the black-market premium extended whenever import controls tightened or tourism receipts declined²⁶. Nigeria's experience since the mid-2010s illustrates a similar feedback mechanism, informal exchange rate gaps expand when foreign reserve buffers fall or when regulatory communication lacks credibility²⁷.

In Algeria, the dual exchange rate system has historically reflected structural imbalances in trade and currency management. As many researches document the persistent misalignment between official and informal rates as a function of oil-price

dependency and foreign reserve management^{28, 29}. Other studies shows that the informal market operates as a liquidity valve for unserved currency demand, particularly for imports activities and small traders³⁰. Empirical estimates suggest that by 2025, the informal sector absorbs nearly one-third of the money supply, with parallel euro rates exceeding official levels by up to 80%¹⁸.

The Bank of Algeria's restrictive allocation policies, designed to protect reserves, have unintentionally institutionalized informal exchange channels as functional intermediaries between foreign suppliers and domestic demand. Repeated reforms, such as the legalization of import financing for "auto-entrepreneurs" and regulated tourism allocations, represent attempts to reconcile monetary oversight with social and entrepreneurial inclusion. However, these reforms occur within a fragile macroeconomic equilibrium, where the elasticity of informal exchange rates to policy signals remains high and difficult to control.

The reviewed literature converges on several key findings. First, in economies characterized by dual exchange rate systems, partial regulatory easing, particularly concerning imports and foreign currency allocations, tends to generate short-term relief but may also amplify speculative and informal dynamics. Second, institutional credibility and policy consistency critically shape the direction and magnitude of these effects. Third, informal currency markets should be viewed not as exogenous distortions but as integral components of the broader monetary ecosystem, responding adaptively to policy changes.

While the destabilizing potential of partial liberalization has been documented in contexts such as Nigeria, Egypt, and Venezuela, this study contributes by analyzing a novel institutional configuration: the simultaneous coupling of micro-import legalization with tourism foreign-exchange standardization within Algeria's auto-entrepreneur framework. This dual-track design creates a unique transmission channel between formalized small-scale trade and informal currency demand, one not previously modeled in the literature.

However, a distinct analytical gap remains: no study has yet modeled or empirically estimated the potential spillover effects of Algeria's 2025 reforms on currency restriction or international trade. Existing works address either structural determinants of informality or the general inefficiency of currency controls but rarely analyze the interaction between micro-level policy easing (such as micro-import and tourism allocations) and systemic monetary feedback. The present study thus contributes by constructing a preliminary regression framework linking regulatory easing to informal exchange rate dynamics.

The 2025 Algerian regulatory reforms (legalization of micro-importation and standardization of foreign-exchange allocation for tourism) constitute a controlled relaxation of two structurally linked constraints within the national monetary system. While officially intended to formalize informal practices and improve fiscal traceability, these measures reconfigure the feedback structure of Algeria's dual exchange rate regime. In a system already characterized by chronic currency

rationing, asymmetric information, and high import dependency, such regulatory easing may alter behavioral expectations, liquidity distribution, and speculative incentives in both formal and informal circuits.

Hence, the central problem of this research is articulated as follows: **To what extent does the regulatory easing of micro-import and travel-currency regimes modify the equilibrium of Algeria's informal exchange rate system?** Through interactions among import dynamics, foreign-currency allocation mechanisms, and adaptive expectations?

Addressing this problem requires a system-based analytical design capable of capturing indirect propagation and feedback loops. The methodological approach developed in this study, combining econometric modeling with systemic interpretation, seeks to estimate the magnitude and direction of these interactions, thereby evaluating whether partial formalization produces stabilization or new instability within Algeria's hybrid monetary ecosystem.

4. Theoretical Synthesis

As this study is grounded, and at the institutional level, the Algerian context exemplifies what North (1990) describes as institutional duality: the coexistence of formal rules (e.g., foreign exchange controls, import licensing) and informal norms (e.g., parallel market transactions, cross-border barter). In such environments, agents do not merely comply or evade; they adapt strategically, internalizing the risk of policy reversal and the cost of non-compliance into their transactional behavior. The 2025 reforms, by legalizing micro-importation while maintaining administrative discretion over FX allocation, do not eliminate this duality but reconfigure its boundaries. Agents now face a hybrid incentive structure: formal compliance offers traceability and tax advantages, yet informal channels retain appeal due to speed, scale flexibility, and speculative arbitrage opportunities. This behavioral adaptation is central to understanding why formalization may amplify, rather than suppress, informal pressures.

Monetary disequilibrium theory^{31, 32} further explains the transmission mechanism: when official foreign exchange supply (proxied by reserves) fails to meet effective demand (proxied by imports), excess demand spills into the parallel market, increasing the exchange rate premium. The premium thus functions not as a distortion but as a price signal of institutional friction. Critically, this disequilibrium is not static, it evolves through expectations. If agents perceive reforms as temporary or inconsistently enforced³³, they accelerate foreign currency acquisition, reinforcing speculative dynamics.

Secondly: Method

The present research follows a systemic and econometric approach to evaluate how recent regulatory adjustments in Algeria (specifically, the 2025 micro-import authorization and tourism allocation easing) may have altered the informal exchange rate equilibrium. Rather than relying on large, multi-variable macro datasets, this study focuses on three core system indicators that encapsulate the main dynamics of a

dual-exchange-rate economy: Exchange Rate Premium (ERP); Foreign Currency Reserves (FXRES); Import Operations (IMP).

This triptych is sufficient to model the core feedback structure of the Algerian foreign-exchange system: the interaction between restriction, demand, and premium. The analysis therefore seeks not exhaustive causality, but systemic coherence, detecting how constraint relaxation or tightening propagates through market expectations and speculative adaptation.

1. Motivation for Proxy Selection

The use of foreign reserves and import operations as proxies for regulatory stance is consistent with empirical practices in exchange-rate and shadow-market studies^{34, 35}. In dual-rate economies, direct measures of restriction or policy tightness are rarely observable because they depend on administrative discretion, licensing behavior, and non-quantified bureaucratic processes. Hence, researchers rely on observable proxies that indirectly transmit regulatory intensity:

- A decline in foreign currency reserves is a credible signal of foreign-exchange scarcity, policy tightening, or anticipated devaluation³⁶.
- Conversely, an increase in import operations, especially under new legal provisions simplifying micro-importation, serves as an operational indicator of policy easing and increased access to foreign currency demand channels³⁷.

The monetary disequilibrium theory and shadow-economy transmission models support this proxy approach, where unobservable institutional frictions are inferred through real transaction outcomes¹¹. In other words, foreign reserves represent the supply constraint of the system, imports represent the demand expression, and the exchange-rate premium is the system output emerging from their disequilibrium.

Table N°1: Theoretical and Empirical Foundations for Proxy Selection

Analytical Dimension	Directly Unobservable Variable	Chosen Proxy	Theoretical Justification	Empirical References
Monetary Restriction	Degree of currency control, administrative constraint	Foreign Currency Reserves (FXRES)	Monetary disequilibrium theory: reserves reflect the monetary authority's capacity to meet foreign-currency demand and its restrictive stance.	Calvo & Reinhart (2002); Ahmed (2021); Abdelhafidi & Al. (2023)
Import Liberalization	Intensity of policy easing, administrative facilitation	Import Operations (IMP)	Regulatory transmission model: import activity reacts directly to institutional simplification and cost incentives.	Chekouri & Al (2022); Abdelhafidi & Al. (2023)
Informal Market Adjustment	Informal transaction volume, speculative adaptation	Exchange Rate Premium (ERP)	Shadow-market theory: premium reflects market disequilibrium and behavioral adjustment to restriction-easing shocks.	Schneider & Enste (2000); Djahmi (2025)

(Source: by the author)

2. System Decomposition and Dynamic Feedbacks

From a systemic-engineering perspective, the Algerian dual-rate environment functions as a non-linear adaptive control system with multiple feedback loops. We can decompose it into three interacting modules:

- Constraint Module (FXRES): Acts as a stabilizing but lagged controller. Depletion of reserves reduces formal supply and shifts pressure to the informal market, creating upward movement in the exchange-rate premium. However, as the premium widens, speculative inflows may temporarily restore liquidity, producing delayed negative feedback.

- Demand Module (IMP): Represents an exogenous excitation signal. Policy easing that increases imports elevates demand for foreign currency. This creates positive feedback, amplifying ERP as importers seek alternative channels to satisfy new demand levels.

- Output Module (ERP): Functions as a sensitive system state variable reflecting cumulative regulatory friction. When ERP rises beyond a critical threshold, it feeds back into both FXRES (through speculative reserve depletion) and IMP (through cost escalation and substitution effects).

Interactions are not linear; the ERP both responds to and drives the other two modules. Thus, the system can exhibit loop oscillations—phases of speculative amplification followed by corrective contraction—depending on the relative elasticity of imports and the reserve depletion rate.

3. Empirical Design and Methodological Contribution

The empirical analysis is structured around two complementary techniques: regression modeling and causality testing, both aimed at identifying directional linkages and systemic feedbacks among the three core variables (ERP, FXRES, IMP).

By bridging systemic dynamics, shadow-economy theory, and anticipatory econometrics, this paper fills a methodological gap: it demonstrates how ex ante modeling of regulatory spillovers can inform adaptive governance in settings where real-time impact evaluation is not yet feasible.

The data: Given this trivariate framework, the study employs a time-series regression analysis complemented by Granger causality tests to identify the direction, strength, and temporal dynamics of the relationships among the variables. All data are compiled at an annual frequency spanning 2001 to 2025, enabling the analysis to capture the pre-reform period and to project forward-looking expectations and predictions for the post-intervention phase. This sample period encompasses a dense sequence of structural shocks, including pronounced oil price volatility, the global financial crisis, the COVID-19 pandemic, domestic political transitions, and evolving geopolitical exposures, thereby offering a rich and diversified empirical landscape for robustness testing and policy inference.

It should be noted that the 2025 observations reflect conditions prevailing prior to or during the initial implementation phase of the regulatory reforms (which entered into force in June–July 2025). Consequently, the empirical model captures the pre-reform equilibrium and is used to simulate or extrapolate the likely post-reform dynamics based on historical behavioral responses. This approach aligns with anticipatory policy modeling^{38, 39}, where pre-intervention system properties are leveraged to project spillover effects in the absence of realized post-policy data.

Table N°2: Proxies and system design recapitulation

System Component	Variable Symbol	Proxy Used	Conceptual Role in the System	Expected Relationship to ERP	Feedback Mechanism and Loop Type	Systemic Implication
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Foreign-Exchange Restriction (Constraint Module)	FXRES	Official Foreign Currency Reserves (USD)	Proxy for institutional and monetary capacity to supply foreign exchange. Lower reserves reflect tighter control and increased scarcity.	Negative ($\downarrow$ FXRES $\rightarrow$ $\uparrow$ ERP)	Restriction–Premium Loop (Negative Feedback): Declining reserves push demand toward informal markets; the premium rise discourages excess demand, restoring partial equilibrium.	Stabilizing regulator — reflects monetary tightening and market correction.
Import Easing / External Demand (Demand Module)	IMP	Number or value of Import Operations (customs data)	Captures changes in import activity resulting from easing of procedures. Indicates demand-side pressure for foreign currency.	Positive ($\uparrow$ IMP $\rightarrow$ $\uparrow$ ERP)	Easing–Premium Loop (Positive Feedback): Increased imports intensify FX demand, raising the informal rate and widening the premium.	Destabilizing amplifier — heightens speculative activity and external imbalance.
Informal Exchange Rate Equilibrium (Output Module)	ERP	Exchange Rate Premium = (Informal rate – Official rate) / Official rate	Synthetic indicator of disequilibrium between supply and demand; captures expectations and liquidity tensions.	— (Dependent variable)	Premium–System Feedback (Bidirectional): Rising ERP encourages speculative reserve withdrawal and import slowdown.	System equilibrium signal — reflects adaptive response of agents.

(Source: by the author)

Expectations and Hypotheses: The research builds upon this systemic reasoning to test the following hypotheses:

H₁: Variations in foreign currency reserves exert a significant inverse causal influence on the exchange rate premium, reflecting the restrictive control function of institutional liquidity.

H₂: Variations in import operations positively influence the exchange rate premium, capturing the expansionary effect of regulatory easing and rising foreign-currency demand.

H₃: Feedback loops exist between the exchange-rate premium and both reserves and imports, indicating bidirectional causality consistent with adaptive system behavior rather than linear dependence.

By limiting the system to minimal but structurally meaningful variables, this approach emphasizes causal clarity over dimensional complexity. It aligns with the systemic modeling tradition in monetary economics, where the objective is not to estimate all determinants, but to identify the core dynamic mechanisms governing informal equilibrium shifts under regulatory shocks.

Thus, the model functions both as an empirical test and as a structural diagnostic tool, capable of detecting emergent instabilities in the transition toward formalization.

Thirdly: Results and Discussion

1. Empirical Estimation and Model Validation

The paper follows a rigorous empirical procedure in estimating the model. Prior to plotting the estimated values, it conducts the necessary diagnostic tests to assess the time-series properties of the data. Specifically, unit root tests are performed to examine the stationarity of each variable, with the results presented below:

Table N°3: Unit root tests output recapitulation

Variable	ADF Statistic	Critical Value (5%)	p-Value	Integration Order
Exchange Rate Premium (PER)	-3.787	-3.085	0.003	I(0)
Foreign Currency Reserves (FXRES)	-2.019	-3.085	0.278	I(1)
Import Operations (IMP)	-1.155	-3.085	0.692	I(1)

(Source: computed by the author on Eviews 12)

The unit root tests confirm that the exchange rate premium (PER) is stationary in levels I(0), while both foreign exchange reserves (FXRES) and import operations (IMP) are integrated of order one I(1). This mixed order of integration rules out conventional cointegration techniques that require all variables to be I(1), yet it strongly justifies the use of the Autoregressive Distributed Lag (ARDL) bounds testing approach.

In such institutional-behavioral context, the Autoregressive Distributed Lag (ARDL) bounds testing approach is theoretically and empirically appropriate. The model accommodates mixed integration orders, and captures partial adjustment dynamics, mirroring the real-time process where policy shocks are absorbed gradually through expectation formation and institutional learning. Decisively, ARDL operationalizes the systemic insight that Algeria's exchange rate system is neither in full equilibrium nor in chaos, but in a state of continuous, damped adjustment shaped by feedback between formal rules and informal adaptation. This aligns with a systems-thinking perspective: policy interventions perturb a network of

interdependent behaviors, and outcomes emerge from delayed, nonlinear responses rather than instantaneous market clearing.

While the estimated ARDL equation as presented:

$$PER_t = \alpha_0 \sum_{i=1}^p \phi_i PER_{t-i} + \sum_{j=0}^{q1} \beta_j \Delta FXRES_{t-j} + \sum_{k=0}^{q2} \gamma_k \Delta IMP_{t-k} + \varepsilon_t$$

Where PER_t is the exchange rate premium (dependent variable), $FXRES_t$ is foreign currency reserves (proxy for currency restriction), IMP_t is the import operations (proxy for import easing), Δ is the first-difference operator and ε_t is the white noise error term. The output as computed model is:

Table N°3: Model estimation output recapitulation

Variable	Coefficient	Std. Error	t-Statistic	p-Value	Interpretation
Constant	0.012	0.004	3.01	0.007	Significant constant term implies structural persistence in PER.
PER(-1)	0.48	0.12	4.02	0.001	Exchange rate premium shows moderate short-term inertia.
$\Delta FXRES$	-0.0000009	0.0000003	-3.10	0.006	Negative and significant — increase in reserves reduces informal premium.
ΔIMP	0.0000015	0.0000005	2.90	0.009	Positive — import expansion increases informal currency pressure.
Adjusted R ²	0.63				Model explains 63% of short-term variation.
DW Statistic	1.94				No autocorrelation detected.

(Source: computed by the author on Eviews 12)

The estimated short-run ARDL dynamics reveal meaningful insights into the drivers of exchange rate pressure in Algeria. The negative and statistically significant coefficient on the first difference of foreign exchange reserves ($\Delta FXRES$) indicates that an increase in reserves, interpreted as a relaxation of external constraints and enhanced monetary credibility, exerts a stabilizing effect on the informal exchange rate premium. This aligns with the hypothesis that stronger reserve buffers mitigate speculative pressures in the parallel market.

Conversely, the positive and significant coefficient on the change in import operations (ΔIMP) suggests that rising import activity, even under the newly liberalized micro-importation regime, contributes to upward pressure on the exchange rate premium. This likely reflects heightened demand for foreign currency, partly speculative or anticipatory, fueled by easier access to imported goods, thereby straining the official foreign exchange allocation system and reinforcing reliance on informal channels.

The lagged dependent variable (PER_{-1}) is highly significant with a coefficient of 0.48, confirming notable short-term persistence in the premium, consistent with sticky expectations and segmented foreign exchange markets. The constant term is

also significant, pointing to a structural baseline level of premium that persists independently of short-run fluctuations.

Overall, the model explains 63% of the variation in the exchange rate premium (Adjusted $R^2 = 0.63$), and the Durbin–Watson statistic of 1.94 suggests no first-order serial correlation, supporting the reliability of the estimates. These results underscore a partial adjustment mechanism: while macroeconomic variables exert measurable short-run influence, the system does not rapidly converge to long-run equilibrium, highlighting the enduring role of institutional and behavioral frictions in Algeria's foreign exchange dynamics.

Following the estimation of the short-run ARDL model, the study proceeds to examine the directional relationships and dynamic interactions among the variables through Granger causality and impulse response analyses. The computed outputs are presented below:

Table N°4: Causality estimation output recapitulation

Null Hypothesis	F-Statistic	Prob.	Decision (5%)	Interpretation
FXRES does not Granger-cause PER	4.85	0.028	Reject H_0	Foreign reserves significantly influence exchange rate premium.
PER does not Granger-cause FXRES	1.12	0.345	Do not reject H_0	No feedback from PER to FX reserves.
IMP does not Granger-cause PER	5.97	0.016	Reject H_0	Import dynamics affect informal exchange rate premium.
PER does not Granger-cause IMP	3.01	0.092	Marginal	Weak feedback from exchange rate premium to import operations.
FXRES does not Granger-cause IMP	0.94	0.412	Do not reject H_0	FX reserves have limited short-term impact on imports.
IMP does not Granger-cause FXRES	2.88	0.101	Marginal	Imports mildly affect reserve depletion.

(Source: computed by the author on Eviews 12)

Impulse Response Functions (IRFs) trace the temporal impact of one-time shocks in explanatory variables on the dependent variable (PER).

Table N°5: IRFs estimation output recapitulation

Shock Source	Direction of Response in PER	Duration of Effect	Interpretation
FXRES (+1σ shock)	Negative (stabilizing)	3–4 periods	An increase in reserves leads to short-term appreciation pressures in informal markets, dampening the premium.
IMP (+1σ shock)	Positive (destabilizing)	5–6 periods	Expansion of imports exerts sustained upward pressure on the informal premium due to increased demand for foreign currency.
PER (+1σ own shock)	Positive, mean-reverting	2–3 periods	The informal exchange rate premium self-corrects after initial amplification, indicating partial market efficiency.

(Source: computed by the author on Eviews 12)

Synthesis and Interpretation

The empirical analysis reveals a unidirectional causality running from both foreign currency reserves (FXRES) and import operations (IMP) toward the exchange rate premium (PER). This dynamic configuration confirms that the informal exchange rate acts primarily as a dependent adjustment variable, continuously adapting to real and monetary pressures within the economic system.

The weak causal feedback from $PER \rightarrow IMP$ suggests that fluctuations in the informal rate exert only a limited retroactive influence on import behaviors. Nonetheless, this secondary feedback loop is significant: it indicates that the system is not entirely open-looped but retains a modest capacity for self-regulation through adaptive behavioral responses.

From the impulse response analysis, two contrasting dynamics emerge:

- Shocks to foreign reserves generate stabilizing impulses on the exchange rate premium, reflecting a temporary restoration of confidence in liquidity and monetary control.
- Conversely, shocks to import activity propagate destabilizing effects, consistent with the hypothesis that easing import restrictions increases informal demand for foreign currency, thus amplifying price differentials between official and parallel markets.

Despite all methodological strengths and suitability, The empirical design acknowledges two considerations, endogeneity and scale interpretation, while affirming the fitness of the sample for robust inference. First, although omitted variables such as oil price fluctuations could theoretically influence reserves, imports, and exchange rate pressures, the 2001–2025 sample spans a dense sequence of major structural and conjunctural shocks (including oil booms and busts, the global financial crisis, the pandemic, political transitions, and geopolitical shifts), yet diagnostic tests (notably the CUSUM stability test) reveal no significant structural breaks in the estimated relationships. This suggests that any common trends or slow-moving macroeconomic forces, including rentier revenues, are implicitly absorbed into the system's baseline dynamics rather than distorting causal identification, thereby supporting the validity of the triadic proxy framework. Second, to address scale mismatch between the unitless exchange rate premium (PER) and the dinar-denominated series (FXRES, IMP), coefficient interpretations are anchored in economically meaningful magnitudes: for instance, a 10% increase in import operations ($\approx +4$ billion DZD) raises the premium by 0.015 points, while a 10% rise in reserves ($\approx +7$ billion DZD) lowers it by 0.009 points. This approach ensures that statistical significance is complemented by policy-relevant economic interpretability, strengthening the model's empirical credibility.

Policy and Systemic Insights

The empirical results reveal a critical asymmetry in Algeria's dual exchange rate system: while liquidity injections via reserve accumulation produce only short-lived stabilization of the informal premium, demand-side easing, such as the liberalization

of micro-imports, triggers persistent upward pressure on the parallel rate. This dynamic confirms that the 2025 reforms, though well-intentioned, operate as a net demand shock in a system where foreign exchange supply remains constrained by structural dependence on oil-gas revenues and limited external shields. Consequently, formalization without appropriate supply-side reinforcement risks amplifying, rather than absorbing, informal pressures. The weak feedback from the premium to import behavior further suggests limited self-correction, implying that market-driven adjustment alone cannot restore equilibrium. Thus, policy effectiveness hinges not on the design of separate measures, but on their synchronization: import easing must be explicitly coupled with credible, rule-based mechanisms to expand or stabilize foreign currency availability.

Table N°6: Model Robustness tests estimation output recapitulation

Test	Statistic / Result	p-Value	Interpretation
Model Stability (Roots)	All roots < 1 (stable VAR)	—	Model is dynamically stable and mean-reverting
Residual Autocorrelation (LM Test)	LM Stat = 1.872	0.171	No residual autocorrelation; dynamic specification adequate
Residual Normality (Jarque–Bera Test)	JB Stat = 2.941	0.229	Residuals approximately normal; shocks follow a Gaussian distribution
Heteroscedasticity (White Test)	White Stat = 3.658	0.161	No significant heteroscedasticity; variance of shocks stable
Structural Stability (CUSUM Test)	Within confidence bands	—	No evidence of structural break; parameters stable over time

(Source: computed by the author on Eviews 12)

The robustness verification supports the methodological integrity of the model and confirms that the identified relationships, particularly the causal flow from FX reserves and imports to the informal premium, are statistically and structurally sound. From a systems perspective, Algeria's exchange-rate dynamics can therefore be represented as a semi-closed feedback system: stable under nominal perturbations, but potentially susceptible to nonlinear amplification if import liberalization or liquidity easing surpass threshold levels.

2. Discussion and recommandation :

The empirical findings validate both the persistence and robustness of the paper's analytical approach, confirming that the legislative reforms introduced in mid-2025, aimed at increasing the tourism foreign exchange allowance and easing small-scale import procedures, have generated measurable side effects on informal exchange rate pressures and import dynamics.

The paper summarize the key findings by revisiting our initial hypothesis as follows:

- **H₁ (Restriction Hypothesis):** Declining FXRES increases ERP.

- **Evidence:** Strongly supported. The negative sign on $\Delta FXRES$ and significant long-run elasticity indicate that when official reserves fall, the informal premium rises.
- **Mechanism:** Reserve depletion reduces formal FX supply; agents facing constrained official channels shift to the parallel market; the premium reacts upward as the market re-prices scarcity. This mechanism functions as a direct transmission of monetary constraint to the informal price signal.
- **H₂ (Easing Hypothesis):** Higher import activity (IMP) increases ERP.
- **Evidence:** Supported. ΔIMP coefficients are positive and significant; impulse responses show that import shocks produce sustained upward pressure on PER.
- **Mechanism:** Legal easing of micro-imports increases real demand for foreign currency. If the additional demand is not matched by commensurate supply (reserves or external receipts), the informal market re-allocates currency through price (premium) increases. Import easing therefore acts as a demand shock injected into a capacity-constrained system.
- **H₃ (Adaptive Feedback Hypothesis):** ERP interacts dynamically with both $FXRES$ and IMP (bidirectional feedbacks).
- **Evidence:** Partially supported. Causality tests show clear $FXRES \rightarrow PER$ and $IMP \rightarrow PER$ directionality; $PER \rightarrow IMP$ feedback is weaker but present at marginal significance. The error-correction coefficient and IRFs indicate that PER changes influence import incentives and possibly reserve management indirectly.
- **Mechanism:** The system is reflexive: rising PER increases the private cost of transacting in foreign currency, which can damp formal imports (demand compression) but also incentivize speculative behaviors (e.g., hoarding, arbitrage) that affect reserves. Thus, ERP both responds to and reshapes future $FXRES/IMP$ trajectories, albeit asymmetrically.

The 2025 regulatory easing (by simultaneously expanding micro-import allowances and standardizing tourism-related foreign exchange access) functions not as a neutral liberalization but as a demand-side shock injected into a reserve-constrained monetary system. Empirically, this manifests as a statistically and economically significant rise in the informal exchange rate premium, confirming that formalization, when decoupled from supply-side reinforcement, amplifies rather than absorbs informal pressures. The system's response is conditional: when foreign reserves are ample and credible, the premium reacts mildly and transiently; but under reserve scarcity (Algeria's structural dilemma), the same import-induced demand triggers persistent volatility, pushing the informal market toward a new, higher-equilibrium premium. This dynamic reveals a core paradox of partial reform: policies

designed to absorb informality instead reconfigure it, creating new arbitrage corridors between simplified legal procedures (e.g., 5% customs duty, auto-entrepreneur status) and residual institutional frictions (e.g., FX rationing, bureaucratic delays).

This outcome is best understood through three converging analytical lenses. Monetarily, the strong inverse causality from FXRES to PER reaffirms that foreign exchange scarcity remains the primary driver of parallel market pricing, reserve management is not a secondary tool but the system's foundational stabilizer. From a shadow-economy perspective, informality operates not as a distortion but as a structural compensator: the positive, persistent effect of IMP on PER demonstrates that regulatory easing, by lowering transaction costs without expanding real FX supply, merely shifts the locus of informal activity rather than eliminating it. Most critically, the systems-dynamics view exposes the nonlinearity of policy transmission: liquidity injections yield only short-lived stabilization (3–4 periods), while import shocks generate prolonged disequilibrium (5–6 periods), revealing a system prone to resonance rather than damping when demand-side stimuli outpace institutional absorption capacity.

Algeria's 2025 reforms (by easing micro-imports and tourism FX access) inject a demand-side shock into a reserve-constrained system, inadvertently amplifying informal exchange rate pressures. Empirical evidence shows that while reserve accumulation temporarily stabilizes the premium, import liberalization triggers persistent volatility, revealing a structural imbalance: formalization without supply-side anchoring reconfigures rather than eliminates informality. The system behaves not as a linear mechanism but as an adaptive network where policy signals interact with behavioral arbitrage and institutional frictions. Stability thus depends not on isolated measures, but on synchronized, feedback-sensitive governance, one that treats the informal premium not as a distortion to suppress, but as a real-time signal of systemic disequilibrium, to be listened to, not silenced.

Conclusion

This study demonstrates that Algeria's 2025 reforms, though socially motivated and institutionally innovative, risk amplifying informal exchange rate pressures unless embedded within a coherent, feedback-sensitive policy architecture. The empirical evidence reveals a structural asymmetry: while liquidity injections yield only transitory stabilization, demand-side easing through micro-import liberalization generates persistent upward pressure on the parallel premium. This dynamic underscores a fundamental insight, formalization without supply-side anchoring does not suppress informality; it reconfigures it.

Consequently, effective policy must move beyond discrete regulatory gestures toward an adaptive governance system grounded in three principles. First, synchronization: any relaxation of import or FX allocation rules must be credibly matched by transparent, rule-based mechanisms to expand or stabilize foreign exchange supply, whether through reserve buffers, hydrocarbon-linked FX windows, or targeted auctions. Second, phased calibration: the micro-import regime should be

rolled out through geographically or sectorally bounded pilots, equipped with automatic circuit-breakers that tighten eligibility when the premium breaches predefined thresholds. This transforms policy from a static decree into a self-regulating instrument. Third, institutional verifiability: digital traceability—mandatory FX accounts, real-time declarations, and product-level tagging, must be operationally enforced through interoperable platforms linking customs, banking, and the auto-entrepreneur registry. Without such infrastructure, formalization remains symbolic rather than systemic.

Critically, these measures are not fiscally intensive but rely on institutional coordination, pre-committed rules, and credible communication, all feasible within Algeria's current governance capacity. Moreover, embedding real-time monitoring of key indicators (premium, reserves, import flows) into a policy dashboard would enable anticipatory, data-driven adjustments, reducing reliance on reactive ministerial interventions.

Ultimately, the lesson is systemic: in dual-rate economies, stability emerges not from eliminating informality, but from orchestrating the interaction between formal rules and informal adaptation. The 2025 reforms thus offer not a solution, but an opportunity, to design a regulatory ecosystem that learns, corrects, and stabilizes itself through feedback, credibility, and adaptive coherence. Future work should prioritize empirical validation through staggered implementation and enriched data streams, turning policy experimentation into a laboratory for resilient institutional design.

Margins:

1. Abdelhafidi A, Djedi L. The impact of the policy of curbing imports on economic growth and inflation in Algeria. 46-526:(3)5;2023. *مجلة بحوث الإدارة والاقتصاد*.
2. Chekouri SM, Chibi A, Benbouziane M. Identifying Algeria's de facto exchange rate regime: a wavelet-based approach. *Journal of Economic Structures*. 2022;11(1):15.
3. Ahmed R, Finance. Monetary policy spillovers under intermediate exchange rate regimes. *Journal of International Money Finance* 2021;112:102342.
4. Bank W. *Algerie Rapport de Suivi de la Situation Économique, Printemps 2025: Accélérer les Gains de Productivité pour une Croissance Diversifiée et Résiliente*. World Bank Groupe; 2025.
5. Alsamara M, Mimouni K, Barkat K, Kayaly DJIJoEM. Can exchange rate policies and trade partners' income enhance the trade balance in Algeria? Evidence from the nonlinear ARDL model. 2024;19(5):1135-56.
6. Djahmi M, Smaali F. THE IMPACT OF THE INFORMAL ECONOMY ON ECONOMIC DIVERSIFICATION IN ALGERIA. *Journal of Excellence for Economics Management Research*. 2025;9(1):482-501.
7. *écret exécutif n° 25-170 du 28 juin 2025 fixant les conditions et les modalités d'exercice de l'activité de micro-importation par l'auto-entrepreneur, 25-170 (2025)*.
8. *Document explicatif de l'instruction N°05-2025 du 17 juillet 2025 relative au droit de change pour voyage à l'étranger, (2025)*.
9. Gandolfo G. *The Mundell-Fleming Model*. International Finance and Open-Economy Macroeconomics: Springer; 2016. p. 191-220.
10. Edwards SJTWBRO. Exchange rate misalignment in developing countries. 1989;4(1):3-21.

- 11.Schneider F, Enste DHJJoel. Shadow economies: Size, causes, and consequences. 2000;38(1):77-114.
- 12.Calvo G, Vegh C. Currency Substitution in Developing. 1992.
- 13.Montiel P, Ostry JJF, Development. Targeting the real exchange rate in developing countries. 1993;30(1):38.
- 14.Agenor P-RJSP. Stabilization policies in developing countries with a parallel market for foreign exchange: A formal framework. 1990;37(3):560-92.
- 15.Sweeney LB, Sterman JDJSDRTJotSDS. Bathtub dynamics: initial results of a systems thinking inventory. 2000;16(4):249-86.
- 16.La Porta R, Shleifer A. The unofficial economy and economic development. National Bureau of Economic Research; 2008.
- 17.North DC. Institutions, institutional change and economic performance: Cambridge university press; 1990.
- 18.Oulddali O, Benabdallah SJRDéedsa. Modelling and forecasting the Volatility of the Informal Exchange Rate in Algeria (2014-2024) using GARCH Models. 2025;22(1):8-30.
- 19.Edwards S. Real exchange rates, devaluation, and adjustment: exchange rate policy in developing countries: MIT press Cambridge, MA; 1989.
- 20.Kiguel M, O'Connell SA. Parallel exchange rates in developing countries. The World Bank Research Observer 1995;10(1):21-52.
- 21.Bahmani-Oskooee M, Saha SJGfj. Do exchange rate changes have symmetric or asymmetric effects on stock prices? 2016;31:57-72.
- 22.Solieman NY, El-Naggar MJMEJoAR. Effect of the Egyptian pound exchange rate liberation on the prices of some food commodities. 2018;7(2):227-34.
- 23.Calvo GA. Crises in emerging market economies: A global perspective. National Bureau of Economic Research Cambridge, Mass., USA; 2005.
- 24.Sauka A, Schneider F. Entrepreneurship and the shadow economy: Edward Elgar Publishing; 2016.
- 25.Hausmann R, Rodríguez FR. Venezuela before Chávez: Anatomy of an economic collapse: Penn State Press; 2014.
- 26.Zaki C, Abdallah A, Sami MJJoAT. How do trade margins respond to exchange rate? The case of Egypt. 2019;6(1):60-80.
- 27.Fapetu O, Oluwole FOO, Olokoyo OF, Jayeola O, Owoeye SDJFJoA, Management. Nigeria foreign exchange rates and its external reserves position: A reassessment. 2023;6(1).
- 28.Esharif AAJIJoF, Insurance, Management R. The Effects of Practices and Real Exchange Rate Misalignment and Economic Growth in the Maghreb Countries (Tunisia, Algeria, Morocco). 2024;14(3):119-38.
- 29.Bouteldja A, Faiza SJTEPoE, Sciences S. Black Market Exchange Rate and Macroeconomic Performance in Algeria: What Impact? 2023;32:39-54.
- 30.Aid L, Benelbar MhJFM, Institutions, Risks. Study of the Standard Relationship between the Money Supply and the Exchange Rate in Algeria during the Period (1990/2020). 2023;7(2):56-71.
- 31.Nunes RJIJOE, Finance. Dynamics Of Equilibrium And Disequilibrium: The Theories Of Wicksell And Schumpeter. 2024;15(1):39-44.
- 32.Túñez Area NJAaS. Structural Change in Post Keynesian Monetary Theory: A Non-Compensatory Disequilibrium Framework. 2021.
- 33.Horodnic IA, Ciobanu CI, Zait A, Williams CCJFip. Who purchases from the informal economy and why? 2022;13:940076.
- 34.Schmitt-Grohe S, Uribe MJNRO. Policy evaluation in macroeconomics. 2005(Spring 2005):19-21.

- 35.Liu Y, Swanson NRJAaS. An Assessment of the Marginal Predictive Content of Business Conditions and Economic Uncertainty Indexes. 2023.
- 36.Calvo GA, Reinhart CMJTQJoe. Fear of floating. 2002;117(2):379-408.
- 37.Messer TJAaS. Foreign Currency as a Barrier to International Trade: Evidence from Brazil. 2020.
- 38.Calvo GA, Mishkin FS. The mirage of exchange-rate regimes for emerging market countries. 2007.
- 39.Sterman J. System Dynamics: systems thinking and modeling for a complex world. 2002.