



Policy Brief

Unlocking Faster Trade:

An Impact Assessment of Egypt's 2024 Trade Facilitation Reforms on Import Release Times Using Bayesian Modelling

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An Impact Assessment of Egypt's 2024 Trade Facilitation Reforms on Import Release Times

A joint assessment for the Ministry of Investment and Foreign Trade by the Egyptian Center for Economic Studies (ECES).

Executive Summary

In September 2025, the Egyptian Center for Economic Studies (ECES) was commissioned by the Ministry of Investment and Foreign Trade to conduct an independent impact assessment of the Ministry's 2024 trade facilitation program, which aimed to accelerate import release times.

The program comprised a coordinated set of operational, regulatory, digital, and risk-management measures designed to reduce the time required to clear imported goods through customs. The assessment examines changes in import release times associated with the program, using administrative shipment-level records provided by the General Organization for Export and Import Control (GOEIC). The dataset covers 256,310 shipments released between May 2024 and May 2025.

The main estimates are obtained from a Bayesian hierarchical model that allows the estimated change associated with the reform period to vary across ports, origin regions, usage types and importer size. The analysis then uses Double Machine Learning (DML) as a robustness and validation exercise, allowing the estimated relationship between the reform period and release time to be obtained while flexibly accounting for observed shipment characteristics. The two approaches produce closely aligned estimates.

After accounting for observed shipment, importer and Green Path characteristics, the reform period is associated with an estimated 17 percent reduction in import release time on average. The estimated change strengthens over the post-reform period, from 7.1 percent in January 2025 to 26 percent by May 2025. The pattern is broad-based across products and most ports and origin regions, although the magnitude differs substantially across groups.

The heterogeneity is policy-relevant. Commercial consignments show an estimated 11.8 percent reduction and industrial consignments a 3.3 percent reduction, while private and personal-use consignments show estimated increases of approximately 22 percent. Ten of twelve ports show estimated reductions, ranging from 55.5 percent at Nuweiba to 3.3 percent at Damietta; Suez is approximately unchanged, and the 6th of October Dry Port shows a 7.8 percent increase. All product categories examined show estimated reductions.

Green Path status is included as an observed shipment characteristic in the overall reform-period assessment, so differences in Green Path usage across periods are accounted for when estimating the broader reform-period association. The channel is also assessed separately. The separate Green Path analysis indicates an estimated 20 percent reduction in import release time. Because Green Path participation may itself be related to the broader reform environment and shipment characteristics, the overall estimate should be interpreted as a conditional reform-period association rather than as a total effect net of all reform channels. Because the broader reforms were introduced as a package, the main estimate should also be interpreted as the estimated change associated with the post-reform operating environment rather than as the independently identified effect of any one individual measure.

The assessment therefore provides two outputs for policy: an overall estimate of the change associated with the reform program, and a map of where improvements have been strongest or weakest. It also establishes a framework that can be refreshed as additional administrative records become available.

Methodological note: As a policy report, this assessment prioritizes clear, policy-relevant findings and practical implications over extensive technical and econometric detail. The methodology is presented at a level sufficient to support interpretation and transparency, while detailed technical specifications, diagnostics, and sensitive analytical findings are retained outside the public report.

1. Introduction and Research Question

Import release time—the period between a shipment's physical arrival at an Egyptian port and its formal release from customs control—is an important operational determinant of trade competitiveness. Long clearance times increase storage costs, tie up working capital in goods awaiting release, and reduce the predictability of the input supply chains on which domestic manufacturers depend. Reducing release times was therefore an explicit operational objective of the Ministry's 2024 trade facilitation program.

Beginning in 2024, the Ministry implemented and strengthened a coordinated set of trade-facilitation measures working through GOEIC, ports and related administrative systems, building on existing digital and institutional arrangements. The relevant evaluation question is not simply whether release times changed over the period. They did. The more useful question is how large the change associated with the reform period was after accounting for observable differences in the shipments being processed, and where that change was concentrated.

This assessment addresses two related questions:

1. What change in import release time is estimated to be associated with the implementation of the reform programme, after accounting for observed shipment, importer and Green Path characteristics?
2. How does that estimated change vary across ports, products, origin regions, usage types and importer size, and what does the Green Path analysis suggest about one specific channel?

The distinction between descriptive change and estimated policy effect is central. Release times can move because the composition of imports changes—for example, because different products, origins, shipment sizes or importer types become more prevalent. A raw before-and-after comparison would combine these compositional changes with the change associated with operating in the post-reform environment. The present analysis therefore conditions on the principal observable characteristics available in the administrative data.

The interpretation adopted throughout this report is deliberately aligned with the design. The estimates are treated as the change associated with the reform period conditional on observed characteristics. A causal interpretation requires the additional assumption that, after accounting for those characteristics, other systematic changes coinciding with the reform period are not the main driver of the estimated difference. The report does not treat the design as a randomized experiment, nor does it claim that the available data eliminate every possible source of unobserved time-varying influence.

The remainder of the report first describes the policy package and data, then sets out the empirical framework and its assumptions. The results are presented by time, importer size, usage type, port, origin region and product category, followed by the Green Path analysis and priorities for future work.

2. The Ministry's Policy Package

The interventions examined in this assessment form part of a broader trade-facilitation program. They span operational and logistics measures, as well as regulatory, digital and quality-control measures. Because the measures

were introduced at different points in time, the analysis treats them as components of a broader policy environment rather than as simultaneous, separately identified interventions.

2.1 Trade Facilitation and Logistics

Port operations. Seven-day working weeks, including public holidays, were implemented across ports, with the stated aim of increasing the availability of clearance services and reducing delays associated with interruptions in port and customs operating schedules.

Operational efficiency. Commercial registration office hours were extended to include Saturdays. Dedicated import release-time studies were completed at major gateways including Alexandria, Dekheila and Damietta, providing a diagnostic basis for targeted intervention.

Strategic frameworks. Egypt's National Trade Facilitation Strategy provides an institutional framework for risk-based border management and differentiated treatment of consignments according to assessed risk. The assessment treats this framework as part of the broader policy environment rather than as an independently identified intervention.

2.2 Import Regulations and Quality Control

Digital control. The Advanced Cargo Information (ACI) system requires cargo information and supporting documentation to be submitted before shipment, moving documentary processing upstream of physical arrival and allowing clearance-related decisions to be prepared before the vessel berths. ACI therefore forms part of the existing digital infrastructure within which the 2024 trade-facilitation measures operated, rather than being treated here as a measure newly introduced in 2024.

Legal framework. Import registration operates under the Importers Register Law (No. 121/1982) and its subsequent amendments. These regulatory procedures form part of the institutional environment in which the trade-facilitation measures were implemented.

Accreditation. GOEIC obtained ISO/IEC 17020 (Type-A) accreditation for its pre-shipment inspection and sampling functions, providing an international benchmark for inspection practice.

2.3 Implication for Interpretation

The measures were introduced as a coordinated program rather than as a sequence of isolated interventions. The principal estimate therefore concerns the post-reform policy environment. It should not be read as identifying the independent contribution of seven-day operations, ACI, regulatory changes, accreditation or any other individual component.

Green Path status is included in the overall model as an observed shipment characteristic, while the Green Path channel is assessed separately to examine its estimated association with release time. This distinction allows the overall program estimate and the channel-specific analysis to answer different questions. The overall estimate is therefore conditional on observed Green Path status, while the separate Green Path estimate should not be interpreted as a clean experimental estimate of an independently identified causal effect.

3. Data and Variables

3.1 Source and Coverage

The analysis uses administrative shipment-level records supplied by GOEIC, comprising 256,310 shipments released between May 2024 and May 2025. Each observation represents an individual customs declaration, providing substantially more analytical detail than aggregate monthly or port-level statistics.

3.2 Outcome Variable

The outcome is release time, defined as:

Release Time = Release Date – Arrival Date at Port

Release time is therefore the elapsed number of days between a shipment's arrival at the port and its release from customs control.

The distribution of release time is strongly right-skewed, with most shipments clearing within a relatively narrow range and a smaller number experiencing substantially longer delays. The natural logarithm of release time is therefore used in the main models. This reduces the influence of extreme observations and makes the principal coefficients interpretable as proportional changes. Percentage effects are calculated from the estimated log-scale coefficient β as $(\exp(\beta) - 1) \times 100$.

3.3 Explanatory Variables

Variable	Description
HS code	Harmonized System product classification code
Country of origin	Country from which the shipment originates
Weight	Weight of the shipment, kilograms
Value	Monetary value of the shipment, USD
Green Path	Whether the shipment was routed through the Green Path. Included in the overall model as an observed shipment characteristic; assessed separately as a channel.
Total shipments	Number of prior import transactions by the firm
Port of arrival	Port at which the shipment arrives
Usage type	Import usage type: commercial, industrial, private or personal
Total value	Total transaction value for the importer

Together, these variables capture the principal observable dimensions of a shipment's clearance environment: the product being imported, its origin, its physical and monetary size, the gateway through which it enters, its intended use, and the importing firm's previous transaction history.

Monetary value, weight and firm shipment counts are log-transformed. Firm shipment count is used as the measure of importer size and is modelled flexibly rather than imposing a linear relationship between firm scale and release time.

3.4 Data Limitations

Two limitations are particularly relevant to interpretation. First, the data do not permit specific raw-material imports to be linked to the finished goods subsequently manufactured for export. The analysis can therefore evaluate clearance outcomes but cannot trace the estimated effect through to export performance.

Second, information identifying the specific inspection bodies or entities to which consignments are referred (جهات العرض) is not available in the supplied data. Because inspection referral can plausibly contribute to clearance duration, these data would materially improve future analysis of the mechanisms behind differences in release time.

4. Methodology

4.1 Study Design and Identification

The empirical design compares shipments released during a reference period before the main analytical cutoff with shipments released during the subsequent post-reform policy period. Although the administrative records cover May

2024–May 2025, the main analytical comparison uses July–October 2024 as the reference period and November 2024–May 2025 as the post-reform policy period.

Period	Window	Role
Reference period	July 2024 – October 2024	Reference period
Reform period	November 2024 – May 2025	Post-reform period

November 2024 is used as the analytical policy-period cutoff. The cutoff identifies the beginning of the post-reform period used in the estimation and does not imply that all individual programme components became operational simultaneously on 1 November. Individual measures were implemented at different points in time, so the reform-period estimate should be interpreted as an association with the broader post-reform operating environment.

The analysis does not rely on the raw difference in mean release time between these periods. Instead, the estimated change is obtained conditional on product, origin, port, shipment value, shipment weight, usage type, importer characteristics and Green Path status. This adjustment is intended to account for observable changes in the composition of shipments processed before and after the analytical cutoff.

The causal interpretation is conditional rather than unconditional. It requires that, after accounting for the observed characteristics included in the model, other systematic changes coinciding with the reform period do not account for the estimated difference in release time. This assumption cannot be tested completely with the available administrative data and is therefore treated as an explicit limitation of the design.

4.2 Bayesian Hierarchical Modelling

The primary estimates are obtained using Bayesian inference. Bayesian estimation represents unknown parameters through probability distributions and combines prior information with the evidence contained in the observed data to obtain posterior distributions.

The framework is particularly useful for this application for three reasons. First, it represents uncertainty directly through posterior distributions rather than relying only on point estimates. Second, the hierarchical structure allows information to be shared across groups with very different numbers of observations. Third, the framework naturally accommodates heterogeneous effects across ports, origin regions, usage types and importer size.

4.2.1 Hierarchical Structure

Ports differ in infrastructure, staffing, traffic composition and operating conditions. Origin regions can differ in documentation and trade arrangements, while usage categories are subject to different regulatory requirements. A single common effect would conceal these differences.

The hierarchical specification therefore estimates group-specific reform-period effects while allowing those effects to be drawn from common population distributions. This partial-pooling structure means that groups with substantial data are informed primarily by their own observations, while estimates for smaller groups are moderated toward the overall distribution. The approach is particularly appropriate when administrative observations vary substantially in frequency across categories.

Importer size is modelled using B-splines rather than arbitrary small/medium/large bins. The spline terms are interacted with the reform indicator, allowing the estimated reform-period effect to vary flexibly across the importer-size distribution and permitting non-monotonic patterns.

4.2.2 Priors and Estimation

Weakly informative priors are used throughout. They express a general expectation that effects are of moderate magnitude and are centred near zero without imposing a preferred direction. Given the size of the administrative dataset, the priors are expected to play a limited role in determining the posterior estimates; their principal purpose is regularization and stable estimation.

The model is estimated using Markov Chain Monte Carlo with the No-U-Turn Sampler. The full computational specification and diagnostics should be retained in the technical appendix accompanying the final analytical release.

4.3 Model Diagnostics

Posterior sampling is assessed through standard MCMC diagnostics, including trace plots across independent chains. The relevant parameters show chains that mix and overlap without the persistent drift or separation that would indicate failure to explore a common posterior distribution. These diagnostics support interpretation of the reported posterior estimates.

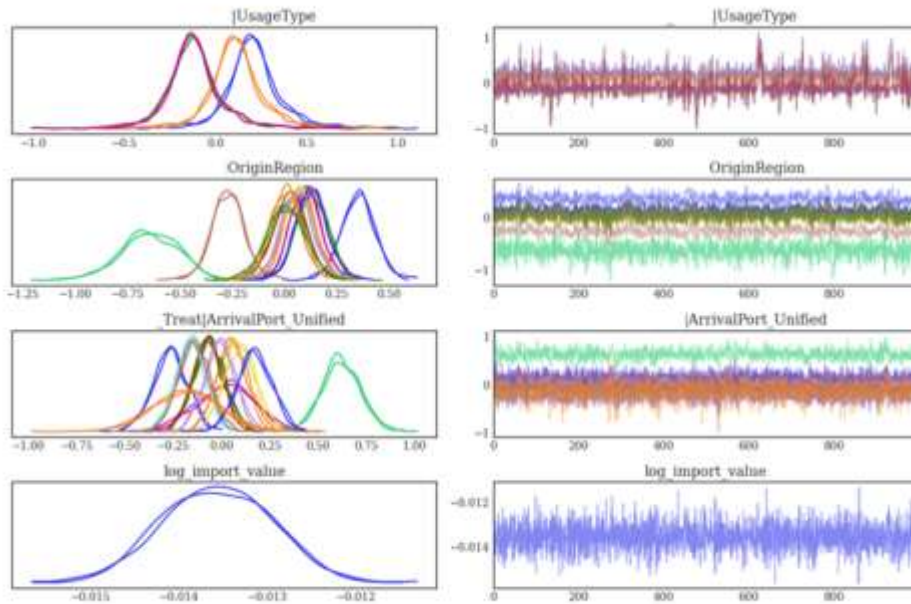


Figure 1. Selected posterior density and MCMC trace diagnostics for model parameters.

4.4 Validation via Double Machine Learning

The Bayesian model imposes a structured functional form. As a robustness exercise, the overall reform-period effect is therefore re-estimated using Double Machine Learning, which provides a substantially different estimation framework and allows the relationships between the reform-period indicator, outcome and observed covariates to be modelled flexibly.

DML estimates nuisance functions for the outcome and reform-period indicator using flexible machine-learning models and then estimates the reform-period effect from the residual variation after accounting for the observed covariates. Cross-fitting is used so that predictions are generated on observations not used to train the corresponding first-stage model, reducing concerns about overfitting contaminating the reform-period estimate.

Two independent implementations of DML are used, together with a Causal Forest as an additional flexible estimator of heterogeneous effects. The purpose of this exercise is not to eliminate the identifying assumption shared by observational approaches, but to examine whether the principal result is sensitive to the functional form and estimation strategy.

The Bayesian and DML estimates show close agreement. Their agreement reduces concern that the principal result is primarily an artefact of the chosen functional form or estimation framework. It does not, however, eliminate the possibility of bias from factors not observed in the administrative data.

5. Results: The Reform Program

5.1 Reading the Results

The results distinguish between descriptive changes in observed release times and the estimated reform-period effect after accounting for observed characteristics. This distinction is important because the composition of shipments changes over time. Unless otherwise stated, percentages reported below refer to estimated proportional changes in release time.

5.2 Overall Estimated Effect

The overall estimated reform-period effect is a 17 percent reduction in release time. Conditional on the observed shipment, importer and Green Path characteristics included in the model, shipments processed during the post-reform policy period are estimated to have taken approximately 17 percent less time to clear than the corresponding reference-period benchmark.

The estimate should be understood as the change associated with the post-reform operating environment under the identification assumption described in Section 4.1. It is not interpreted as the independently identified contribution of any single component of the policy package.

5.3 Evolution Over Time

The estimated reform-period effect strengthens over the post-reform period. The estimated reduction is 7.1 percent in January 2025 and reaches 26 percent by May 2025.

The pattern is consistent with a program whose operational effects develop over time. For example, changes in working schedules may require operational adjustment, risk-based processes can accumulate implementation experience, and importers may become more familiar with revised documentary requirements over successive transactions. These explanations are consistent with the observed trajectory but are not separately identified by the present analysis.

The May 2025 estimate should therefore be read as evidence that the estimated association was stronger at the end of the observation window than in the earlier reform months, rather than as evidence that the program had reached a stable long-run effect.

5.4 Effect by Importer Size

The estimated reform-period effect is negative across the importer-size distribution, but its magnitude is non-monotonic.

Importer size	Estimated effect
Small	–10% to –25%
Medium	–5% to –10%
Large	Up to –35%

The estimated gains are largest toward the smaller and larger ends of the distribution and smallest among mid-sized importers. The pattern is substantively important because it would be difficult to recover from a specification that imposed a simple linear relationship between importer size and the reform effect.

The administrative data do not directly observe the operational mechanisms underlying this heterogeneity. Further analysis incorporating information on compliance capacity, customs interactions and inspection processes would be required to establish why estimated gains differ across the importer-size distribution.

5.5 Effect by Usage Type

Usage type	Estimated effect
Commercial	−11.8%
Industrial	−3.3%
Private	+22.4%
Personal	+22.7%

The largest divergence in the results occurs by usage type. Commercial consignments show an estimated 11.8 percent reduction and industrial consignments a 3.3 percent reduction. Private and personal-use consignments show estimated increases of 22.4 and 22.7 percent, respectively.

The contrast is consistent with a system in which clearance resources and risk-based treatment are not distributed uniformly across usage categories. However, because the data do not contain the complete inspection-referral process, the analysis cannot establish the precise operational mechanism behind the divergence.

From a policy perspective, the finding is important regardless of mechanism: the aggregate improvement masks a material deterioration for private and personal-use consignments, creating a clear area for operational review.

5.6 Effect by Port

Port	Estimated effect
Nuweiba	−55.5%
Safaga	−30.5%
East Port Said	−24.7%
Ain Sokhna	−21.7%
Borg El Arab Airport	−18.9%
Other Inland	−16.7%
Alexandria	−11.8%
Cairo Airport	−11.2%
Port Said	−4.5%
Damietta	−3.3%
Suez	+0.7%
6th of October Dry Port	+7.8%

Ten of the twelve gateways show estimated reductions in release time. The estimated effects range from a 55.5 percent reduction at Nuweiba to a 3.3 percent reduction at Damietta. Suez is approximately unchanged, while the 6th of October Dry Port shows an estimated 7.8 percent increase.

The dispersion across ports is precisely the type of heterogeneity the hierarchical model is designed to recover. The strongest estimated reductions occur at several Red Sea and secondary gateways, while the largest gateway by trade volume, Alexandria, shows a more moderate proportional reduction.

The concentration of large percentage changes at some smaller gateways should be interpreted together with their underlying shipment counts and posterior uncertainty. A large estimated percentage change at a thinly observed gateway should not automatically be treated as equivalent in operational importance to a smaller percentage change at a high-volume gateway.

The positive estimate at the 6th of October Dry Port merits specific operational review. The result indicates that the broader improvement seen elsewhere in the system was not replicated at this gateway during the study period.

5.7 Effect by Origin Region

Origin region	Estimated effect
Commonwealth	−33.3%
Europe (non-EU)	−16.9%
South Asia	−16.4%
European Union	−14.0%
East Asia	−11.8%
MENA (non-GCC)	−10.7%
North America	−10.5%
GCC	−7.6%
Sub-Saharan Africa	−5.9%
Southeast Asia	−5.5%
South & Central America	+24.4%
Oceania	+80.8%

Ten of the twelve origin regions show estimated reductions. The EU, East Asia, MENA and GCC—important trading regions for Egypt—show estimated reductions between 7.6 and 14.0 percent.

South and Central America and Oceania are exceptions, with estimated increases of 24.4 and 80.8 percent. Because these estimates are large in magnitude, they should be treated cautiously and reviewed alongside the underlying observation counts and posterior uncertainty before drawing a policy conclusion.

5.8 Effect by Product Category

HS Level 2 category	Estimated effect
Furniture	–24.9%
Vehicles	–20.2%
Rubber & articles	–13.5%
Glass & glassware	–13.3%
Boilers & machinery	–12.4%
Electrical machinery	–11.9%
Plastics & articles	–10.8%
Articles of iron/steel	–10.3%
Other	–9.6%
Wood & articles	–8.6%
Apparel & clothing	–7.9%

Product-level results are the most uniform dimension of the analysis: every category examined shows an estimated reduction in release time, ranging from 7.9 percent for apparel and clothing to 24.9 percent for furniture.

Several categories with direct relevance to domestic production show meaningful estimated reductions. Boilers and machinery, electrical machinery, plastics, and articles of iron and steel show estimated reductions of 10.3 to 12.4 percent. Faster clearance of such inputs can reduce the time capital is tied up in goods awaiting release and may improve production planning, although the present dataset does not permit the downstream effect on production or exports to be estimated directly.

6. Green Path Channel

Green Path status is included as an observed shipment characteristic in the overall reform-period assessment. This accounts for differences in Green Path usage across periods when estimating the conditional association between the broader reform period and release time.

The Green Path channel is then assessed separately. The analysis indicates an estimated 20 percent reduction in import release time. Because participation in the channel may be related to shipment characteristics and the broader reform environment, this estimate should be interpreted as a channel-specific association rather than as a clean experimental estimate of an independently identified causal effect.

Because participation in the channel may be related to shipment characteristics, the Green Path estimate should not be interpreted as a clean experimental estimate of an independently identified causal effect.

7. Policy Implications

The results point to a broad improvement in the customs clearance environment, but they also show that the average effect is not a sufficient guide for operational decision-making.

First, the program should be assessed by both aggregate performance and distributional performance. The 17 percent overall estimated reduction is important, but the deterioration estimated for private and personal-use consignments should be monitored explicitly.

Second, port-level monitoring should focus on outliers rather than treating all gateways as equally constrained. The large differences in estimated effects suggest that the binding constraints vary across locations.

Third, importer-size heterogeneity deserves attention. Mid-sized importers appear to receive the smallest estimated gains under the broader package.

Fourth, Green Path performance should be monitored as a targeted facilitation channel, while maintaining appropriate safeguards and improving the information available for future evaluation.

Finally, the framework should be used as an ongoing monitoring system rather than a one-time evaluation. Re-estimation with later administrative records can establish whether the improvement observed through May 2025 is sustained.

8. Areas for Future Work

The administrative framework developed for this assessment can support both retrospective monitoring and carefully defined counterfactual analysis. Several extensions would materially increase its policy value.

8.1 Data Development

Linking raw-material imports to finished goods subsequently exported would allow the Ministry to move from evaluating clearance performance to evaluating the implications of trade facilitation for export competitiveness. Such a linkage would require coordinated integration of import and export administrative records.

Inspection-referral data should also be incorporated. Knowing which entity receives a shipment, when the referral occurs and how long the inspection stage takes would allow a more direct decomposition of clearance delays.

8.2 Strengthening the Evaluation Design

Future refreshes should preserve the current modelling framework while adding richer temporal information. In particular, a longer pre-reform history would permit stronger assessment of pre-existing time patterns and provide a more informative basis for testing alternative reform cutoffs.

As additional post-reform observations accumulate, the Ministry will also be able to distinguish more clearly between an initial implementation effect and a persistent long-run change in clearance performance.

8.3 Continuous Monitoring

Because the Bayesian framework produces a full posterior distribution and can be updated as new observations arrive, it can serve as the foundation for a recurring monitoring system. Regular refreshes would allow the Ministry to track the overall effect, identify ports or categories where performance deteriorates, and determine whether the gains observed at the end of the current study window are sustained.

9. Conclusion

The Ministry's 2024 trade facilitation programme is associated with a substantial improvement in import release times. After accounting for observed shipment, importer and Green Path characteristics, the analysis estimates a 17 percent reduction in release time on average, with the estimated reduction increasing from 7.1 percent in January 2025 to 26 percent by May 2025.

The gains are broad but not uniform. Every product category examined shows an estimated reduction. Ten of twelve ports and ten of twelve origin regions show estimated reductions, while importers across the size distribution experience estimated improvements. At the same time, private and personal-use consignments show estimated increases of roughly 22 percent, and the 6th of October Dry Port shows an estimated increase of 7.8 percent.

The close agreement between the Bayesian hierarchical model and Double Machine Learning provides reassurance that the principal estimate is not highly sensitive to the functional form or estimation framework. This validation is

complementary to, rather than a substitute for, the identifying assumption required by the observational before-and-after design.

The Green Path analysis indicates an estimated 20 percent reduction in release time. Because participation in the channel may be related to shipment characteristics, the result should be interpreted as a channel-specific estimate rather than as a clean experimental estimate of an independently identified causal effect.

The broader contribution of the exercise is institutional as well as empirical. Shipment-level administrative data already provide sufficient detail to move beyond descriptive monitoring toward structured policy evaluation. With continued data integration and regular model updates, the framework can become a standing analytical instrument for identifying bottlenecks, assessing operational changes and informing future trade-facilitation decisions.