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**Impact of Foreign Ownership of Domestic Importers
on Exchange Rate Pass-Through to Import Prices in
Uzbekistan**

Rashid Mirzaakhmedov
The Central Bank of Uzbekistan

Chemin Eugène-Rigot 2
P.O. Box 136
CH - 1211 Geneva 21
Switzerland

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Abstract

This paper examines how foreign ownership of importing firms shapes exchange rate pass-through (ERPT) to import prices in Uzbekistan across three distinct monetary policy regimes. Using transaction-level customs data matched with a firm ownership registry, I find that ERPT remained near-complete before inflation targeting but declined sharply following its formal adoption in October 2019. Foreign-affiliated importers exhibit significantly lower pass-through than domestically owned firms under inflation targeting, with the gap most pronounced for capital and intermediate goods. Rolling window estimation reveals that foreign affiliates adjusted more rapidly to the new monetary framework, suggesting that ownership structure and institutional credibility jointly shape import price dynamics. The results provide micro-level evidence that the central bank's credibility has weakened the exchange rate channel of inflation, while the growing presence of foreign affiliates reduces the effectiveness of exchange rate depreciation as an instrument for correcting the trade balance.

Keywords: Exchange Rate Pass-Through, Import Prices, Foreign Ownership, Inflation Targeting, Transaction-level Customs Data, Uzbekistan.

JEL: F31, F14, E31, F23, E52.

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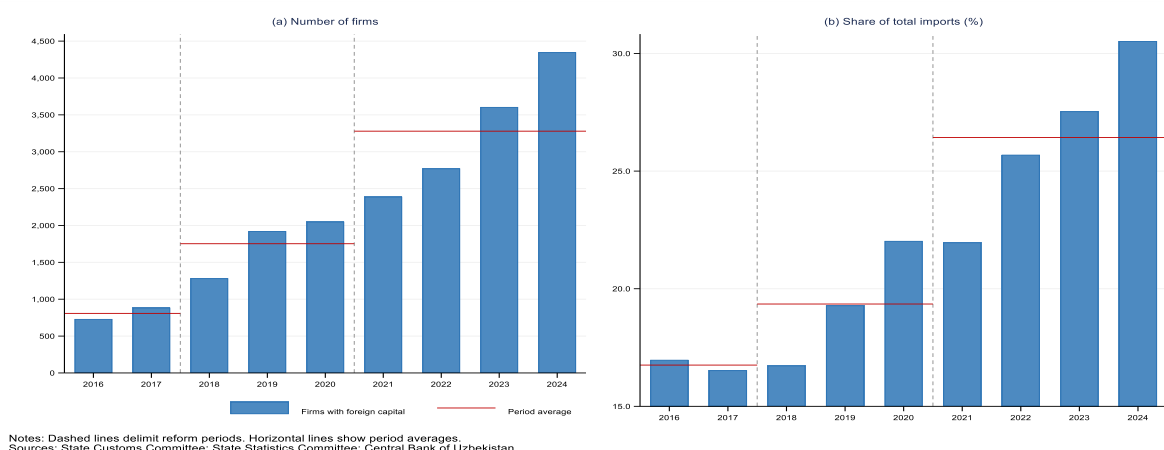
1. Introduction

In September 2017, far-reaching liberalization reform of the foreign exchange system that unified the official and parallel market¹ exchange rate was accomplished. This reform was accompanied by a large depreciation of approximately fifty percent of the Uzbek som against the US dollar and fundamentally transformed the price formation environment for importers². The FX liberalization effectively brought the exchange rate formation process from a managed regime into a market-based, freely floating foreign exchange system.

The higher degree of economic openness which followed FX liberalization made Uzbekistan an attractive investment destination. According to Uzbek IIP data, outstanding equity liabilities on FDI grew from \$7.2 billion in 2016 to \$12.1 billion in 2024. Stock of intercompany lending increased from \$1.4 billion in 2016 to \$4.8 billion in 2024.

At the same time the impact of FX liberalization on trade balance has been substantial. Trade deficit increased from negative \$2.4 billion in 2016 to \$13.5 billion in 2024, mainly due to unprecedented growth in the goods imports. Part of the observed import surge is related to increased participation of foreign affiliates (Figure 1.1.).

Figure 1.1. Participation of foreign affiliates³ in Uzbek imports



Foreign-invested enterprises typically rely heavily on imported intermediate inputs, capital equipment, and proprietary components sourced from parent companies or established supply chain partners abroad – a pattern consistent with backward GVC integration.

In conventional trade models, a depreciation of the domestic currency raises the local-currency cost of imports, dampening import demand and partially correcting the trade balance. However, when a significant share of imports is conducted by affiliates sourcing inputs from entities within the same corporate network, this price mechanism may be attenuated. Expansion of domestic operations by foreign affiliates structurally increases imports independent of price signals and cannot be easily corrected through exchange rate adjustment alone.

¹ An unofficial foreign exchange operations outside the scope of formal banking system.

² Islamov and Parpiev (2000) and Olimov and Sirojiddinov (2008) provided insight into the exchange rate policies and misalignments underlying the existence and persistence of the parallel market premium in Uzbekistan

³ Participation of foreign investor in the domestic enterprise capital equal to 10 percent or more.

In November 2019, Central Bank of Uzbekistan (CBU) primary mandate was shifted from exchange rate stability to price stability⁴. As documented in the CBU's most recent Monetary Policy Guidelines⁵, the CBU has been formally operating under full inflation targeting, with monetary policy instruments subordinated to achieving the five percent permanent inflation target.

The shift in the CBU's core mandate from exchange rate stability to price stability under inflation targeting has important implications not only for the aggregate level of ERPT, but also for how the import price channel operates differentially across importer types.

Under inflation targeting, the primary mechanism through which the CBU's mandate reduces ERPT is expectational: when firms trust that the central bank will act to offset inflationary pressures – including those arising from exchange rate depreciation – they anticipate that cost shocks will be temporary or neutralized by monetary policy, and therefore restrain their price adjustment accordingly (Taylor, 2000; Carrière-Swallow et al., 2021).

For domestically owned importers, whose pricing decisions are made within the domestic institutional environment, this credibility channel operates directly – the CBU's price stability commitment is the relevant signal against which they form expectations about the persistence of exchange rate movements and the need to adjust margins.

For foreign-affiliated importers, however, the transmission of the CBU's credibility signal is necessarily mediated through foreign intermediaries: pricing decisions on intra-group transactions are shaped partly or entirely by parent companies, foreign principals, or headquarters operating under different institutional contexts. The adjustment of price margins in response to exchange rate changes by foreign affiliates will therefore reflect not only the CBU's credibility, but also the incentives and constraints of the foreign counterparties involved in setting transfer prices and procurement contracts – parties for whom the CBU's mandate is one input among many rather than the primary anchor. This structural difference generates two competing predictions.

First, foreign affiliates may prove more responsive to the CBU's IT adoption if their internationally experienced foreign principals are unusually sensitive to institutional credibility signals – renegotiating pricing arrangements more readily once a formal price stability mandate is established.

Second, the same organizational structure may make foreign affiliates less responsive to the domestic monetary policy environment in normal times, since the pricing of intra-group transactions is governed by considerations – tax planning, transfer pricing rules, procurement cycles, and group-level capital allocation – that are largely orthogonal to the CBU's short-run policy signals. Distinguishing between these two channels empirically requires comparing the ERPT of foreign-affiliated and domestically owned importers specifically across the inflation targeting period, which is precisely the identification strategy pursued in this paper.

The remainder of this paper is organized as follows. Chapter 2 provides an overview of literature relevant to the topic. Chapter 3 describes the data and presents the empirical strategy for estimation. Chapter 4 presents the core empirical results and extends the analysis by applying rolling window technique. Chapter 5 provides conclusions the policy implications.

⁴ Presidential Decree No. UP-5877 dated September 2, 2019 “On measures for the transition to inflation targeting”

⁵ <https://cbu.uz/en/monetary-policy/publications/monetary-policy-guidelines/>

2. Literature review

The literature on exchange rate pass-through (ERPT) to import prices is large and well-established. Goldberg and Knetter (1997) survey the early evidence, documenting widespread deviations from the Law of One Price and attributing them to pricing-to-market behavior by exporters with market power.

Campa and Goldberg (2005) estimate ERPT to import prices for 23 OECD countries and find evidence of partial but significant pass-through that varies systematically across product categories: energy and raw materials display near-complete pass-through while manufactured goods show substantially lower elasticities.

Aron, Macdonald, and Muellbauer (2014) and Tunç (2017) extend this evidence to developing and transition economies, concluding that pass-through tends to be higher in such settings, reflecting weaker institutional anchors, higher inflation, and greater dependence on imported inputs.

2.1. Foreign Ownership, Market Power and Exchange Rate Pass-Through

Olivei (2002), estimating pass-through across 34 US manufacturing industries over 1981–1999, documents a broad decline in ERPT from an average of 0.50 in the 1980s to 0.25 in the 1990s. He finds that this decline correlates inversely with the increase in foreign firms' market share in US industries consistent with more dominant foreign suppliers having sufficient market power to absorb exchange rate cost shocks into markups rather than passing them through to prices.

Neiman (2010) arrives at the directly opposite conclusion about intra-firm transactions. Using micro-level evidence, he shows that intra-firm prices exhibit higher pass-through than arm's-length prices, alongside lower price stickiness and less synchronization with competitors. A vertically integrated firm eliminates double marginalization by instructing its upstream unit to price at marginal cost, leaving no markup buffer to absorb exchange rate shocks. Where arm's-length firms can absorb a fraction of cost, related-party manufacturers operating at marginal cost cannot.

Hellerstein and Villas-Boas (2010) reconcile these findings through the double-marginalization channel: it is arm's-length outsourcing, not intra-firm trade, that generates the markup buffer reducing aggregate pass-through. The sector-level reduction in ERPT associated with MNC presence identified by Olivei (2002) therefore operates through market power and markup absorption by large foreign-affiliated importers, not through the intra-firm pricing mechanism.

Li, Ma, and Xu (2015) find that foreign ownership is among the sources of heterogeneity that matter for Chinese exporters' price response to exchange rate movements, alongside import intensity, distribution costs, and income level of destination countries. However, this is for export price pass-through, not import price ERPT, and foreign ownership is one control among several rather than the primary variable.

Bernard, Jensen, and Schott (2009) further document that multinational-affiliated importers are simultaneously among the largest, most productive, and most import-intensive firms in the economy – concentrating exactly on those characteristics that Amiti et al. (2014) and Devereux et al. (2017) associate with lower pass-through into both prices and quantities.

Choi and Kim (2020) examine the role of global production linkages on exchange rate elasticities using Korean firm-level data, finding that firms with foreign ownership or foreign subsidiaries tend to weaken the effects of exchange rate movements, with exchange rate elasticities

statistically insignificant for foreign-owned firms but significant and negative for domestic firms, consistent with global production linkages attenuating the exchange rate sensitivity of internationally integrated firms.

2.2. Monetary Policy Regime as a Moderating Context

Taylor (2000) provides the theoretical foundation, arguing that firms in credible low-inflation environments have weaker incentives to pass through cost shocks – including exchange rate movements – into prices, because they anticipate monetary policy will offset any resulting inflationary pressure.

Empirical support for this mechanism spans both advanced economies — Gagnon and Ihrig (2004) document declining ERPT coinciding with IT adoption across 20 industrialized countries — and emerging markets, where Carrière-Swallow, Gruss, Magud, and Valencia (2021) provide robust cross-country evidence that central bank credibility causally reduces pass-through. López-Villavicencio and Mignon (2017), estimating pass-through for 21 developed and 15 emerging countries, find that IT adoption reduces ERPT into consumer prices primarily through the expectation-formation channel.

For the Caucasus and Central Asian region, Poghosyan (2020) documents that average ERPT to consumer prices is around 10 percent on impact and 25 percent after 12 months, with a downward shift in the speed of pass-through as the regional inflation environment became more stable following the global financial crisis.

Despite the substantial body of evidence surveyed above, the interaction between foreign ownership and monetary policy regime in determining ERPT has not been studied for Central Asian transition economies. Existing cross-country studies identify average effects across heterogeneous economies, while firm-level studies are concentrated in advanced economies and China. Uzbekistan's experience — spanning a fixed-rate regime, a sharp liberalization, and a formally adopted inflation targeting framework — provides a rare natural experiment in which both the ownership heterogeneity and the monetary policy regime shift can be identified within a single country context. The present paper fills this gap by exploiting transaction-level customs data matched to an ownership registry to test whether foreign affiliation amplifies or attenuates the ERPT decline associated with IT adoption.

3. Data and Empirical Strategy

3.1. Data and unit price construction

Empirical analysis is based on transaction-level customs data from the State Customs Committee of the Republic of Uzbekistan, covering the period from January 2016 to December 2024. Each observation records the total import value (in USD equivalent), volume in net kilograms, the HS4 product code, the exporting country, and anonymized importing firm identifier. Because many products are not traded every month the resulting panel is highly unbalanced.

Following Devereux et al. (2017) and Montfaucon et al. (2021), a monthly import unit price series is constructed that is specific to each HS4 product pr , exporting country ex , and importing firm c , denoted $s = (pr, ex, c)$. For an individual transaction of good s in month t , the transaction-level unit price is:

$$p_{lst} = \frac{IM_{lst}}{Unit_{lst}} \quad (1)$$

where

p_{lst} = transaction unit price;

IM_{lst} = import amount in month t and each l of s ;

$Unit_{lst}$ = the number of unit in weight (kilogram)

Then, denoting total number of product specific monthly transactions by n , we construct weights as:

$$\alpha_{lst} = \frac{IM_{lst}}{\sum_{l=1}^n IM_{lst}} \quad (2)$$

Finally, an import unit price of product s in month t is calculated as:

$$P_{st} = \sum_{l=1}^n (\alpha_{lst} p_{lst}) \quad (3)$$

This construction ensures that price information is aggregated minimizing product-company-country heterogeneity and produces a balanced representation of actual transactions.

Following aggregation 3,256,040 observations are obtained, of which 341,291 belong to pre-liberalization period, 741,235 to post-liberalization period and 2,173,514 are records in IT period. Goods are imported from 150 unique countries.

The resulting monthly cross-sectional dataset is further appended with exporting country consumer price indices and bilateral nominal exchange rates against the USD from the IMF International Financial Statistics database and information on the ownership structure of non-financial enterprises⁶ of the State Statistics Committee.

3.2. Three-Regime Baseline Specification

Montfaucon *et al.* (2021) utilized two-regime panel framework with a single regime-switching dummy to capture the effect of switching from fixed to floating exchange rate system. This framework will be extended to capture the effect of liberalization and inflation targeting introduction on the pre-liberalization period (baseline).

$$\Delta_{\tau} p_{st} = const + \beta_1 \Delta_{\tau} s_{st} + \beta_2 (\Delta_{\tau} s_{st} \times D_t^{II}) + \beta_3 (\Delta_{\tau} s_{st} \times D_t^{III}) + \gamma \Delta_{\tau} z_{st} + \Omega q_{st} + \varepsilon_{st} \quad (4)$$

where

$\Delta_{\tau} p_{st} = \ln p_{st} - \ln p_{s\tau}$ indicates cumulative changes in import price of goods expressed in domestic currency. τ is the last period in which good s was observed. Since goods are not imported every month, the lag interval can be larger than one.

⁶ Based on the information from statistical registry.

$\Delta_{\tau} s_{st} = \ln s_{st} - \ln s_{s\tau}$ indicates cumulative changes in the log of the bilateral nominal exchange rate of the Uzbek soms against the exporters' currency.

D_t^{II} is time dummy equal to "1" during Sep. 2017 – Sep. 2019.

D_t^{III} is time dummy equal to "1" during Oct. 2019 – Dec. 2024.

$\Delta_{\tau} z_{st} = \ln z_{st} - \ln z_{s\tau}$ indicates cumulative changes in the log of export country's consumer price index.

q_{st} indicates control variables including various fixed effects⁷ for every month t and product and composite fixed effect s .

ε_{st} indicates error term.

3.3. Effect of foreign ownership on exchange-rate pass-through

To assess whether pass-through behavior differs between foreign intermediaries and domestically owned importing firms, equation (4) is extended by interacting all exchange rate terms with a binary ownership indicator. Let FA_s equal one if the importing firm in cell s has registered foreign equity participation and zero otherwise. The extended specification takes the form:

$$\Delta_{\tau} p_{st} = const + \beta_1 \Delta_{\tau} s_{st} + \beta_2 (\Delta_{\tau} s_{st} \times D_t^{II}) + \beta_3 (\Delta_{\tau} s_{st} \times D_t^{III}) + \delta_1 (\Delta_{\tau} s_{st} \times FA_s) \dots \quad (5)$$

$$\dots + \delta_2 (\Delta_{\tau} s_{st} \times D_t^{II} \times FA_s) + \delta_3 (\Delta_{\tau} s_{st} \times D_t^{III} \times FA_s) + \gamma \Delta_{\tau} z_{st} + \Omega q_{st} + \varepsilon_{st}$$

where all variables are defined as in equation (1). FA_s is a time-invariant firm-level indicator constructed by matching the customs data to the ownership registry of the State Statistics Committee of Uzbekistan⁸. Firms present in the customs data but absent from the ownership registry are classified as domestically owned and serve as the reference group. The ownership effect is therefore identified entirely through the differential sensitivity of import prices to exchange rate movements across regimes, not through a level difference in prices between foreign affiliates and domestic importers.

The coefficients $\beta_1, \beta_2, \beta_3$ retain their interpretation from equation (1) and now correspond to the domestic firm ERPT baseline and its regime-specific increments. The interaction coefficients $\delta_1, \delta_2, \delta_3$ measure the additional pass-through premium or discount associated with joint venture ownership in each regime. Regime-specific ERPT elasticities will be recovered for each ownership group as follows:

$$\begin{aligned} ERPT_{Dom}^I &= \beta_1 & ERPT_{FA}^I &= \beta_1 + \delta_1 \\ ERPT_{Dom}^{II} &= \beta_1 + \beta_2 & ERPT_{FA}^{II} &= \beta_1 + \beta_2 + \delta_1 + \delta_2 \\ ERPT_{Dom}^{III} &= \beta_1 + \beta_3 & ERPT_{FA}^{III} &= \beta_1 + \beta_3 + \delta_1 + \delta_3 \end{aligned}$$

⁷ Full list of fixed effects is available in appendix.

⁸ Lists of domestic enterprises with non-resident's participation in charter capital (10 percent or more) is actual as of December 31, 2024

3.4. Rolling Window Estimation

Rolling window estimation complements the regime-dummy approach by allowing the ERPT elasticity to vary smoothly over time, tracing its trajectory without imposing any a priori break structure. Because monetary policy credibility builds gradually, and exporters' price-setting behavior adjusts continuously as they update their expectations about the policy regime.

Rolling window estimation addresses this limitation by allowing the ERPT coefficient to vary smoothly at every point in the sample without imposing any a priori break structure. At each date t , equation (2) is re-estimated on the most recent W months of data, producing a sequence of point estimates that trace the continuous trajectory of pass-through across the full sample period.

The choice of window width involves a fundamental bias-variance trade-off. A wider window pools more observations, reducing coefficient variance and producing smoother estimates, but at the cost of slower adaptation: the rolling estimate at date t incorporates data from well before t , so structural shifts appear as gradual slopes rather than sharp breaks. A narrower window is more responsive to recent data but amplifies sampling uncertainty, producing noisier estimates with wider confidence bands, which is particularly costly in subsamples where the number of active product–country–firm cells is small.

The 36-month window is wide enough to contain sufficient cross-sectional variation across ownership groups in each rolling sub-sample while remaining narrow enough to trace the dynamics of the 2017 and 2019 regime transitions without fully blurring them into one another.

Importantly, the rolling window and regime-dummy approaches are complementary rather than substitutes. The regime-dummy estimator in equation (2) is the preferred specification for testing the statistical significance of the domestic–foreign affiliate differential, since it pools all observations and maximizes precision. The rolling window serves a different purpose: it provides a visual, non-parametric narrative of *when* the ownership gap opens and closes across the sample, allowing inspection of whether the divergence between domestic and foreign-affiliated importers coincides with the institutional break points. This temporal dimension of the ownership heterogeneity is not identified by the dummy interaction terms, which by construction attribute all dynamics to the two pre-specified dates.

4. Empirical results

4.1. Three-Regime Baseline Specification

The estimation results in Tables 4.1. and 4.2. reveal a pattern of exchange rate pass-through (ERPT) across Uzbekistan's three policy regimes. Pass-through was complete both during pre-liberalization and post-liberalization periods indicating that exchange rate changes were fully reflected in import prices. On aggregate level estimations did not reveal statistically significant change in the pass-through in post-liberalization period. The structural break coincides with the inflation targeting period. This pattern is consistent with the international evidence surveyed by *Aron (2014)* and *Tunç (2017)* that a broad consensus has emerged in the literature that ERPT declines after adoption of inflation targeting in many countries, particularly in developing and emerging market economies.

The primary mechanism underlying this decline operates through the credibility channel: when a central bank commits to an explicit inflation target, it anchors private sector expectations about future price levels, reducing the willingness of firms to pass exchange rate fluctuations through to consumer

prices. If economic agents trust that the central bank will act to offset inflationary pressures – including those arising from currency depreciation – they anticipate that any exchange rate shock will be temporary or neutralized by monetary policy, and therefore adjust wages and prices less aggressively in response. This expectation-driven restraint breaks the mechanical link between exchange rate movements and domestic inflation that tends to prevail in low-credibility environments.

Table 4.1. Exchange Rate Pass-Through by Regime

Dependent variable: Cumulative change in log import price ($\Delta_t p_{st}$)

	(A)	(B)	(C)
Pre-liberalization (β_1)	0.877***	0.872***	0.923***
Post-liberalization ($\beta_1 + \beta_2$)	0.917	0.932	0.935
IT period ($\beta_1 + \beta_3$)	0.422***	0.450***	0.435***

Notes: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$. Standard errors in parentheses, clustered at s level throughout. Estimation via reghdfe (Correia, 2017).

Table 4.2. Underlying Coefficients - Spec. (C)

Coefficient	Est.	s.e.	Sig.
$\beta_1 (\Delta_t S_{st})$	0.923	(0.057)	***
$\beta_2 (\Delta_t S_{st} \times D^{II})$	0.011	(0.058)	n.s.
$\beta_3 (\Delta_t S_{st} \times D^{III})$	-0.494	(0.063)	***

Notes: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$. Standard errors in parentheses, clustered at s level throughout. Estimation via reghdfe (Correia, 2017).

4.2. Effect of foreign ownership on exchange-rate pass-through

In the pre-liberalization period, ERPT was near-complete for both domestic and foreign importers. Table 4.3 shows that while foreign affiliates show a somewhat higher pass-through numerically, the ownership gap is not statistically significant ($\delta_1 = +0.178$, $p = 0.102$), so no robust claim can be made that ownership type drove differential pricing behavior before liberalization. Introduction of inflation targeting was associated with a substantial and significant decline in ERPT for domestic importers (from 0.909 to 0.384). Foreign affiliates show a numerically larger decline (from 1.088 to 0.238), which would be consistent with two reinforcing mechanisms: foreign affiliates may renegotiate pricing arrangements more quickly once a credible price stability mandate is established, and the near-complete pass-through observed under currency controls may dissolve faster for foreign-owned importers when those constraints are lifted under IT.

In the post-liberalization period, the change in the foreign-domestic gap ($\delta_2 = -0.200$) is weakly significant at the 10% level ($p = 0.077$), but the cumulative ownership difference in that regime ($\delta_1 + \delta_2 = -0.022$) remains statistically insignificant ($p = 0.445$), suggesting foreign ownership did not produce meaningfully different pass-through behavior during post-liberalization. The ownership gap under inflation targeting is statistically significant ($\delta_1 + \delta_3 = -0.146$, $p = 0.001$), providing robust evidence

that foreign affiliation is associated with lower ERPT once a credible monetary anchor is in place. (Table 4.4)

Foreign intermediaries do not universally have different ERPT, but they behave significantly differently under inflation targeting.

Table 4.3. Exchange Rate Pass-Through by Ownership Type- Spec. (C)

Dependent variable: Cumulative change in log import price ($\Delta_t p_{st}$)

	Domestic enterprises	Foreign affiliates
Pre-liberalization $\beta_1 / (\beta_1 + \delta_1)$	0.909***	1.088***
Post-liberalization $\beta_1 + \beta_2 / (\beta_1 + \beta_2 + \delta_1 + \delta_2)$	0.941	0.919*
IT period $\beta_1 + \beta_3 / (\beta_1 + \beta_3 + \delta_1 + \delta_3)$	0.384***	0.238***

Notes: *** p<0.01; ** p<0.05; * p<0.10. Standard errors in parentheses, clustered at s level throughout. Estimation via reghdfe (Correia, 2017).

Table 4.4. Ownership Interaction Coefficients (δ) - Spec. (C)

Coeff.	Est.	s.e.	p-value
δ_1 ($\Delta_t s_{st} \times \text{FAs}$)	+0.178	(0.109)	0.102
δ_2 ($\Delta_t s_{st} \times D^{\text{II}} \times \text{FAs}$)	-0.200*	(0.113)	0.077*
δ_3 ($\Delta_t s_{st} \times D^{\text{III}} \times \text{FAs}$)	-0.324***	(0.116)	0.005***
$\delta_1 + \delta_3$ (IT gap)	-0.146	—	0.001***

Notes: *** p<0.01; ** p<0.05; * p<0.10. Standard errors in parentheses, clustered at s level throughout. Estimation via reghdfe (Correia, 2017).

3.3. Rolling Window Estimation

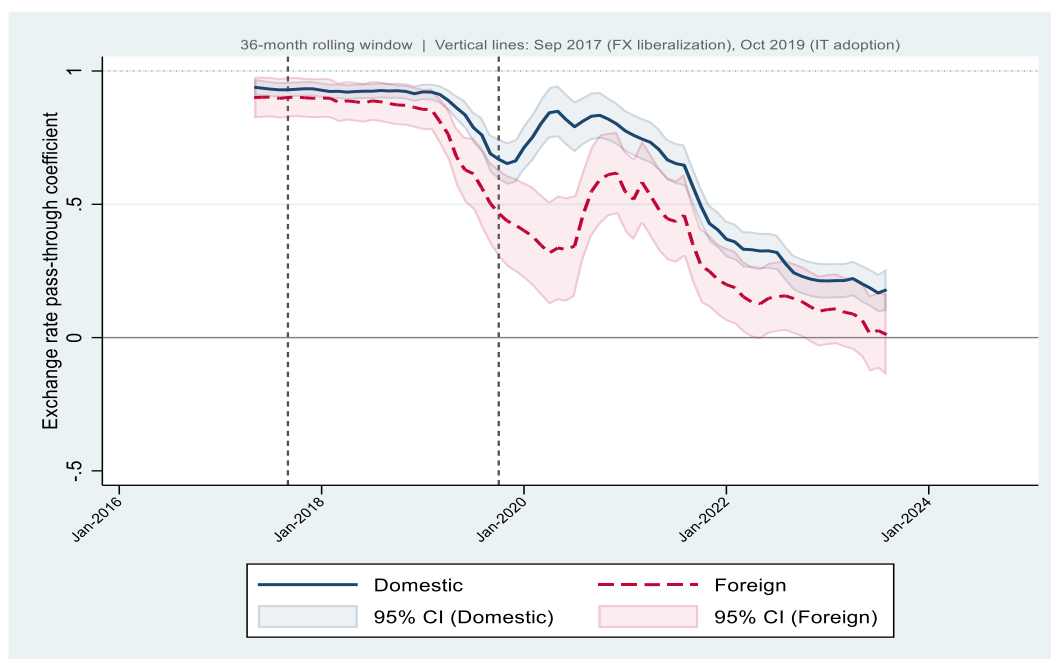
Rolling window follows baseline specification⁹ with fixed effects and common month dummies since absorbing product-level time trends in rolling regressions would be computationally demanding.

The overall convergence of both series toward low pass-through by 2023–2024 is broadly consistent with the IT framework achieving its intended effect: by anchoring inflation expectations, credible monetary policy reduces firms' incentive to immediately transmit exchange rate movements into prices.

The domestic - foreign gap is widest in capital and intermediate goods and narrowest in consumption goods – a pattern that aligns well with the mechanism that foreign affiliates are most insulated from exchange rate movements in goods where intra-firm trade and long-term contracts dominate (capital, intermediate), and least insulated where retail price competition constrains pricing-to-market behavior (consumption). The terminal convergence of both groups toward low pass-through by 2023–2024 is visible in all panels.

⁹ Spec. B in appendix

Graph 4.1. Time -Varying Exchange Rate Pass-Through by Ownership Type - Spec. (B)



After the September 2017 liberalization divergence between domestic firms and foreign intermediaries appears with domestic firms declining gradually but maintaining relatively high pass-through, holding around 0.65–0.80 by the time of the IT adoption event. Foreign intermediaries decline far more steeply and rapidly, falling to approximately 0.55 by 2019, with a wide confidence interval indicating substantial uncertainty.

This may reflect heightened uncertainty during the COVID-19 period (2020–2021) when the som depreciated and firms temporarily reverted to higher pass-through. Foreign affiliates remain low and volatile (~0.3–0.6), with wide confidence bands, suggesting heterogeneity within this group in their response to the new monetary framework.

Divergence in the response of foreign affiliates and domestic enterprises in early-2022 may be driven by various reactions to exchange rate adjustment connected with Russia-Ukraine war. Moreover disruptions in East-West trade networks may have affected pricing strategies of foreign companies operating in Uzbek market motivated by their desire to acquire larger market share.

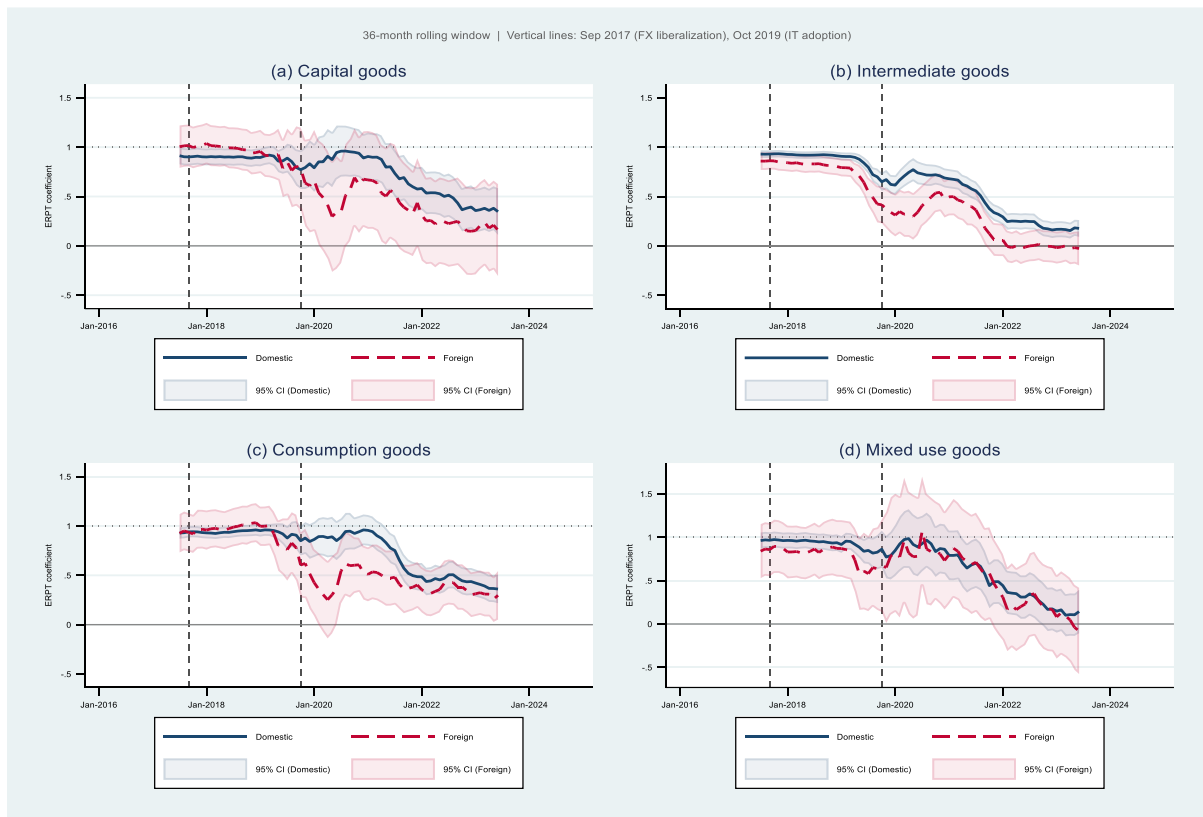
Both series converge toward low levels by 2022–2024 with domestic firms declining from ~0.5 to approximately 0.15–0.20 and remaining statistically above zero. While foreign affiliates decline to approximately 0.0 to -0.10, with the lower bound of the confidence interval dipping significantly negative before recovering slightly toward 0.1–0.3 by early 2024.

The overall convergence of both series toward low pass-through by 2023–2024 is broadly consistent with the IT framework achieving its intended effect: by anchoring inflation expectations, credible monetary policy reduces firms' incentive to immediately transmit exchange rate movements into prices.

The domestic - foreign gap is widest in capital and intermediate goods and narrowest in consumption goods – a pattern that aligns well with the mechanism that foreign affiliates are most insulated from exchange rate movements in goods where intra-firm trade and long-term contracts dominate (capital, intermediate), and least insulated where retail price competition constrains pricing-

to-market behavior (consumption). The terminal convergence of both groups toward low pass-through by 2023–2024 is visible in all panels.

Graph 4.2. Time -Varying Exchange Rate Pass-Through by Good Type



5. Conclusions

This is the first paper to construct a foreign ownership indicator from a matched registry and customs dataset and use it as the primary heterogeneity variable in a three-regime ERPT regression on import prices.

Three principal findings emerge. First, ERPT in Uzbekistan was near-complete and high in the pre-liberalization and post-liberalization regimes (approximately 0.87–0.94), reflecting an environment where monetary policy credibility was limited and the exchange rate was not yet a fully market-determined price signal. The absence of a significant effect post-liberalization indicates that the initial currency unification and depreciation did not in itself alter firms' pricing behavior – the pass-through remained high.

Second, the formal adoption of inflation targeting produced a sharp and statistically significant structural break. ERPT falls by approximately 45 percentage points in IT period relative to the pre-liberalization baseline. This is consistent with the Taylor (2000) mechanism where credible monetary policy anchors inflation expectations, reducing firms' incentive and ability to pass exchange rate movements into domestic prices. Monetary policy guidelines for 2024–2026 estimates the long-run effect of a 1% exchange rate change on core inflation at around 0.2%, broadly consistent with the order of magnitude implied by these results at the CPI transmission stage.

Third, rolling window estimation reveals a meaningful divergence between foreign affiliates and domestically owned firms following the September 2017 liberalization. Foreign affiliated importers

adjusted more rapidly, with pass-through declining to approximately 0.3–0.4 by 2019, while domestic firms held around 0.65–0.80 through the same period. Both groups converge toward near-zero pass-through by 2022–2024.

The product-level evidence adds another layer: the domestic-foreign gap is most pronounced for capital and intermediate goods – precisely those product categories where intra-firm trade, long-term procurement contracts, and transfer pricing arrangements are most likely to insulate prices from short-run exchange rate movements. For consumption goods, where retail price competition constrains pricing-to-market strategies, the gap narrows.

At the same time following limitations should be acknowledged:

Firstly, survivorship bias likely understates the true share of foreign associated importers in earlier periods. Even though, potential magnitude of misclassification can be considered limited due to the low level of foreign participation in domestic economy in pre-liberalization period.

Secondly, estimations do not control for firm size, sector concentration, or market power. Foreign affiliates are usually larger, more capital-intensive, and could be concentrated in specific sectors. The observed ownership effect on ERPT could partially reflect these correlated characteristics – larger firms have more pricing power and can engage in pricing-to-market regardless of ownership – rather than the ownership channel per se. Without controlling for firm size (e.g., import value quartile) or sector, the δ estimates conflate ownership effects with scale and market structure effects.

Finally, invoicing currency in external trade is a major determinant of ERPT. Before liberalization foreign exchange regulations constrained the denomination of trade contracts to foreign currencies which affected exchange rate pass-through. Despite change in the regulations behavior of importers remain unchanged with up to this date majority (more than 70%) of foreign exchange deals invoiced in US dollars. Analysis of this behavior is however, outside the scope of this paper due to present data limitations.

5.1. Policy implications

This paper provides several implications for policymakers.

Firstly, inflation targeting is working through the import price channel. The near-halving of ERPT between the pre-IT regimes and the IT period provides micro-level evidence that the Central bank's credibility-building has materially weakened the exchange rate channel of inflation. Policymakers can take some confidence that the exchange rate is operating more as a shock absorber than as an inflation amplifier – a prerequisite for the free-floating framework to function as intended.

Secondly, growing share of foreign affiliates in imports has structural implications for trade balance adjustment. The paper demonstrates that foreign affiliated importers exhibit lower and more stable pass-through, particularly for capital and intermediate goods. This means that exchange rate depreciation becomes a less effective instrument for correcting the trade deficit. The structural import needs of foreign-invested enterprises, driven by investment plans rather than price signals, reduce the trade-balance sensitivity to currency movements.

Thirdly, the faster adjustment of foreign affiliates to regime shifts – both post-liberalization and post-IT – implies that their pricing strategies are more sensitive to institutional credibility signals.

Appendix

Table 1. Policy Environment Affecting ERPT in Uzbekistan

Period	Description
Pre-liberalization (Jan. 2016 – Aug. 2017)	Managed/fixed FX; currency stability as primary CBU objective; parallel FX market with substantial premium
Post-liberalization (Sep. 2017 – Sep. 2019)	FX liberalization with large initial depreciation (~50%); floating rate regime <i>de jure</i> ; IT not yet formalized; CBU objective still expressed as currency stability
IT period (Oct. 2019 – Dec. 2024)	Inflation targeting formally adopted via Presidential Decree; price stability as primary CBU mandate; inflation target set at 10% (2021) converging to 5%

¹ Anchoring the breaks to institutional events rather than selecting them endogenously from the data avoids the pre-testing bias that arises when break dates are inferred from the outcome variable itself (Hansen, 2001).

Table 2. Fixed Effects Structure Across Specifications

Dependent variable: Cumulative change in log import price ($\Delta_{\tau} p_{st}$)

Fixed Effect / Sample Restriction	Spec. (A)	Spec. (B) Baseline	Spec. (C) Preferred
Unit (Cross-Sectional) Fixed Effects			
HS4 product (pr)	✓	—	—
Composite: HS4 × exporter country × importing firm (s)	—	✓	✓
Time Fixed Effects			
Common month dummies (t)	✓	✓	—
HS4-specific month dummies ($pr \times t$)	—	—	✓
Sample Restriction			
Full sample (all s units)	✓	—	—
Singletons dropped (s units observed > once)	—	✓	✓

Notes: The composite unit s = (HS4 product × exporter country × importing firm). Specification (A) is the most parsimonious, using HS4 product and common month fixed effects on the full sample, but omits firm- and country-level heterogeneity within product categories. Specification (B) replaces HS4-level unit fixed effects with the composite s -level fixed effect, absorbing all time-invariant heterogeneity at the product–exporter–firm level, and drops singleton observations. Specification (C) further replaces common month dummies with HS4-specific month dummies, absorbing product-level time trends including global commodity cycles, supply chain shocks, and sector-specific demand shifts that cause HS4 products to follow different price paths over time; this comes at the cost of a marginally smaller sample. All specifications estimated via *reghdfe* (Correia, 2017). SE clustered at the s = (HS4 × exporter country × importing firm) level throughout.

Table 3. Three-Regime Exchange Rate Pass-Through in Uzbekistan*Dependent variable: Cumulative change in log import price ($\Delta_{\tau} p_{st}$)*

	(A)	(B)	(C)
Exchange Rate Pass-Through by Regime			
Pre-liberalization (β_1)	0.872***	0.878***	0.924***
s.e.	(0.040)	(0.052)	(0.057)
Post-liberalization ($\beta_1 + \beta_2$)	0.923	0.918	0.935
s.e.	(0.010)	(0.013)	(0.014)
IT period ($\beta_1 + \beta_3$)	0.445***	0.418***	0.430***
s.e.	(0.019)	(0.023)	(0.026)
Underlying Coefficients			
β_1 ($\Delta_{\tau} S_{st}$)	0.872***	0.878***	0.923***
s.e.	(0.040)	(0.052)	(0.057)
β_2 ($\Delta_{\tau} S_{st} \times D^{II}$)	0.051	0.040	0.011
s.e.	(0.042)	(0.053)	(0.058)
β_3 ($\Delta_{\tau} S_{st} \times D^{III}$)	-0.427***	-0.460***	-0.494***
s.e.	(0.045)	(0.057)	(0.063)
$\Delta_{\tau} \ln(CPI)_{it}$	0.535***	0.429***	0.463***
s.e.	(0.021)	(0.028)	(0.031)
Model Statistics			
Observations	1,848,825	1,707,503	1,691,722
Singletons dropped	50	141,396	157,191
Clusters (<i>nb</i>)	368,156	226,834	224,815
Within R ²	0.006	0.005	0.004
Adjusted R ²	0.015	-0.066	-0.077
Unit fixed effects	HS4	<i>s</i> (<i>pr</i> , <i>ex</i> , <i>c</i>)	<i>s</i> (<i>pr</i> , <i>ex</i> , <i>c</i>)
Time fixed effects	Month	Month	HS4 $\times$ Month
SE clustering	<i>s</i> level	<i>s</i> level	<i>s</i> level

Notes: Robust standard errors in parentheses, clustered at the *s* = (HS4 product $\times$ exporter country $\times$ importing firm) level throughout. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$. Regime II total ERPT = $\beta_1 + \beta_2$; Regime III total ERPT = $\beta_1 + \beta_3$. Stars on Regime II and III rows reflect significance of β_2 and β_3 respectively (incremental change from baseline); stars on Regime I row reflect significance of β_1 . Estimation via *reghdfe* (Correia, 2017) with two high-dimensional fixed effect sets absorbed via iterative demeaning. Singleton observations dropped prior to estimation. Specification (A): HS4 product and common month fixed effects, full sample – most parsimonious. Specification (B): composite *s*-level and common month fixed effects, singletons dropped – baseline. Specification (C): composite *s*-level and HS4-specific month fixed effects, singletons dropped – preferred specification, absorbs product-level global price trends and commodity cycles.

Table 4. Exchange Rate Pass-Through by Ownership Type — Three-Regime Results

Dependent variable: Cumulative change in log import price ($\Delta_{\tau} p_{st}$)

	Domestic	Foreign	Difference (δ)	<i>p</i> -value
Panel A: Total ERPT by Ownership Type and Regime				
Pre-liberalization $\beta_1 / \beta_1 + \delta_1$	0.909***	1.088***	+0.178	0.102
s.e.	(0.058)	(0.112)		
Post-liberalization $\beta_1 + \beta_2 / \beta_1 + \beta_2 + \delta_1 + \delta_2$	0.941	0.919	−0.021	0.445
s.e.	(0.014)	(0.029)		
IT period $\beta_1 + \beta_3 / \beta_1 + \beta_3 + \delta_1 + \delta_3$	0.384***	0.238***	−0.146***	0.001
s.e.	(0.022)	(0.038)		
Panel B: Underlying Regression Coefficients				
β_1 ($\Delta_{\tau} s_{st}$)	0.909***	—	—	<0.001
s.e.	(0.058)			
β_2 ($\Delta_{\tau} s_{st} \times D^{II}$)	0.031	—	—	0.593
s.e.	(0.059)			
β_3 ($\Delta_{\tau} s_{st} \times D^{III}$)	−0.525***	—	—	<0.001
s.e.	(0.062)			
δ_1 ($\Delta_{\tau} s_{st} \times FA_s$)	—	+0.178	+0.178	0.102
s.e.		(0.109)		
δ_2 ($\Delta_{\tau} s_{st} \times D^{II} \times FA_s$)	—	−0.200*	−0.200*	0.077
s.e.		(0.113)		
δ_3 ($\Delta_{\tau} s_{st} \times D^{III} \times FA_s$)	—	−0.324***	−0.324***	0.005
s.e.		(0.116)		
Panel C: Model Statistics				
Observations	1,754,727			
Singletons dropped	158,773			
Clusters (<i>nb</i>)	229,030			
Within R ²	0.0042			
Unit fixed effects	$s = (HS4 \times \text{exporter country} \times \text{importing firm})$			
Time fixed effects	$HS4 \times \text{month (product-specific)}$			

Notes: Robust standard errors in parentheses, clustered at the *nb* = (HS4 × exporter × firm) level. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$. Stars on Regime I rows reflect significance of β_1 (domestic) and δ_1 (foreign increment). Stars on Regime III rows reflect significance of β_3 and δ_3 respectively. Regime II carries no stars as β_2 is not significant ($p = 0.607$); stars on the Regime II difference reflect significance of δ_2 ($p = 0.090$). The difference column reports the foreign-ownership regime interaction coefficient ($\delta_1, \delta_2, \delta_3$); *p*-values test $H_0: \delta = 0$. The foreign-ownership level dummy is omitted — perfectly collinear with *nb* fixed effects. Estimation via *reghdfe* (Correia, 2017). $HS4 \times \text{month}$ fixed effects absorb product-level global price trends and commodity cycles.

Table 5. Shares of Domestic Firms and Foreign Intermediaries

	Domestic firms	Share	Foreign intermediaries	Share
Total	2,559,640 obs.	100%	688,080 obs.	100%
Pre-liberalization (Jan. 2016 – Aug. 2017)	286,514 obs.	11%	54,777 obs.	8%
Post-liberalization (Sep. 2017 – Sep. 2019)	630,183 obs.	25%	111,052 obs.	16%
IT period (Oct. 2019 – Dec. 2024)	1,642,943 obs.	64%	522,251 obs.	76%