International Journal of Academic Multidisciplinary Research (IJAMR)
ISSN: 2643-9670
Vol. 9 Issue 12 December - 2025, Pages: 351-356

Self-Sufficiency and Food Inflation in Uzbekistan

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Abstract: *Uzbekistan's food system combines rising domestic cereal output with exposure to international markets, especially for edible oils. We compile an indicator-consistent dataset (FAOSTAT food balance and trade; FAO GIEWS Country Brief for Uzbekistan, 19 May 2025; World Bank Food Security Update, 13 June 2025; and CPI press releases of the National Statistics Committee) to quantify self-sufficiency (SSR) and import dependency (IDR) for cereals, and to estimate price pass-through from global cereals and the exchange rate to domestic food CPI during 2010-2024. Official NSC statistics report 8.86-8.88 Mt cereal output in 2024 (depending on coverage), above the 2019–2023 average, implying improved availability. In July 2025 the FAO Food Price Index rose year-on-year, while the Cereal Price Index eased, indicating heterogeneous external pressures. Domestically, headline CPI decelerated from 10.1% y/y in April 2025 to 8.9% in July 2025. ARDL/ECM estimates with seasonal controls and structural breaks (2020-2021; 2024) show: (i) positive, significant short-run pass-through from global cereals (conditional on FX); (ii) a well-behaved long-run relation; and (iii) higher IDR amplifies transmission, whereas higher SSR attenuates it. A +10% global cereals shock yields a smaller, less persistent food-price response under a higher SSR baseline. Policy should combine near-term stabilization (transparent reserve rules, agile trade instruments, targeted transfers) with medium-term resilience (water-smart productivity in cereals, oilseed diversification and processing).*

Keywords — food security, self-sufficiency, price pass-through, ARDL/ECM, Uzbekistan.

1. INTRODUCTION

Food security in land-locked, reforming economies hinges on the balance between domestic availability and exposure to international markets. Uzbekistan is an instructive case: cereals – especially wheat – account for a large share of calorie intake and policy attention, while edible oils remain comparatively import-exposed. Over 2022–2025, global commodity cycles, pandemic-era logistics, and the 2024 energy-tariff realignment shaped both price levels and volatility faced by households (4, 19, 17). At the same time, official statistics report a strong 2024 grain harvest that raised self-sufficiency in cereals, moderating the transmission of external shocks into domestic food prices (11, 4).

This paper addresses two policy-relevant questions: how strongly do global cereal price shocks pass through to Uzbekistan's food consumer prices, and to what extent does higher self-sufficiency in cereals buffer that pass-through? The inquiry is timely for three reasons. First, international evidence documents renewed dispersion across food commodity groups in 2024–2025 – vegetable oils and meat rising, cereals easing – which implies heterogeneous external pressure on national food baskets (4, 17). Second, domestic structural reforms and sectoral modernization have advanced, including measures that affect procurement, storage and processing – factors that influence the speed and magnitude of price transmission (18, 15). Third, agronomic work points to tangible productivity headroom in wheat systems under water-smart practices, which strengthens the medium-term buffer against import-exposed shocks (16, 2).

The goal is to quantify the transmission of global cereal price shocks to domestic food inflation and to assess the buffering role of self-sufficiency (SSR). To achieve this, we pursue five objectives: (i) assemble an internally consistent dataset for 2010–2024 combining FAOSTAT food balance/trade, FAO GIEWS for Uzbekistan, and the National Statistics Committee's official CPI and agricultural output series; (ii) compute SSR and import-dependency ratio (IDR) for cereals and reconcile definitional differences between FAO and NSC series; (iii) estimate monthly ARDL/ECM models of food-price pass-through that control for the exchange rate, seasonality, and structural breaks (2020–2021 logistics; 2024 tariff realignment); (iv) test whether higher SSR attenuates both short-run elasticity and the long-run relation relative to periods of higher IDR; and (v) simulate a stylized +10% global-cereals shock to gauge the quantitative benefits of higher SSR for stabilization policy.

Recent global and regional assessments document the normalization – but not full reversal – of food-price pressures after the 2022 peak, with notable cross-commodity divergence (4, 19, 17). Country-level studies increasingly emphasize supply-side resilience – productivity, water management, and processing capacity – as core to food-security outcomes (16, 2). In Uzbekistan, analyses of agrarian reforms and industrial policy highlight the role of institutional modernization and cluster development for stabilizing the food sector and raising value-added (18, 15). On the measurement side, the four-dimension framing of food security remains standard, with availability operationalized via SSR and IDR, and access captured by consumer prices and real incomes (7). New multi-country evidence finds substantial and relatively fast cereals pass-through to local markets in developing economies (3),

while recent work on global grain markets documents time-varying volatility spillovers using TVP-VAR-Connectedness methods (20). Within this framework, our design focuses on how Uzbekistan's evolving supply buffer interacts with external price signals.

Consistent with the literature and the policy context, we test: H1 (Pass-through) – global cereal price shocks raise food CPI in the short run and cointegrate in the long run, conditional on the exchange rate; and H2 (Buffering) – higher SSR attenuates both the short-run elasticity and the long-run relation relative to periods of higher IDR.

2. MATERIALS AND METHODS

The object of analysis is the formation of food consumer prices in Uzbekistan, with emphasis on the cereals complex (grain crops, cereals) as the dominant staple and edible oils as a higher-exposure comparator. The scope is national and reflects an institutional environment with strategic grain reserves and ongoing market reforms. The empirical window is 2010–2024, chosen to balance frequency, availability, and cross-source consistency.

We assemble three coherent blocks of series. (i) Domestic availability: FAOSTAT food balance sheets and trade provide production, imports, and exports used to construct availability indicators. End-period levels are benchmarked to the National Statistics Committee (NSC) dataset "Production of grain crops – total in all categories of farms (cereals)" (official 2024 outcome). (ii) Global prices: the FAO World Food Situation (Food Price Index and Cereal Price Index) and monthly Newsroom releases are used to characterise external shocks; estimation focuses on the cereals subindex. (iii) Domestic prices: NSC CPI series (food CPI for estimation; headline CPI for descriptive context). The USD/UZS exchange rate is included as a conditioning variable from the official national series. Where the FAO "cereals" aggregate and the NSC "grain crops (cereals)" series differ in coverage, we document the definitions and verify that results are robust to either definition; conclusions rest on direction and economically meaningful magnitudes rather than exact labels.

Availability is operationalised through the self-sufficiency ratio (SSR) and the import-dependency ratio (IDR) computed from food-balance identities. Let Production, Imports, and Exports be annual quantities; define domestic supply as Production+Imports−Exports. Then

$$IDR_t = \frac{Imports_t}{Production_t + Imports_t - Exports_t} \times 100\% \quad (1)$$

$$SSR_t = \frac{Productions_t}{Production_t + Imports_t - Exports_t} \times 100\% \quad (2)$$

Because SSR/IDR are annual, they are aligned to months by step interpolation only to form interaction terms in regressions; monthly shocks are identified from monthly price and FX data. Stock-change rows are not observed at monthly frequency and enter robustness checks at the annual level when reported.

All price and FX variables are used in natural logs. Denote $y_t = \ln(food\ CPI_t)$, $x_t = \ln(FAO\ Cereal\ Price\ Index_t)$, $s_t = \ln(USD/UZS_t)$. Short-run dynamics are specified in first differences of logs (monthly growth rates). The FAO Food Price Index (FFPI) is used only for descriptive triangulation and is not included as a regressor in the baseline.

$$\Delta_{y_t} = \alpha + \sum_i \phi_i \Delta_{y_{t-i}} + \sum_j \beta_j \Delta_{x_{t-j}} + \sum_k \gamma_k \Delta_{s_{t-k}} + \delta' z_t + \lambda ECT_{t-1} + u_t \ (3)$$

with an intercept in the long-run relation,

$ECT_{t-1} = y_{t-1} - c - \theta_1 x_{t-1} - \theta_2 s_{t-1}$(+τt if a deterministic trend is warranted).

The vector zt contains seasonal dummies and break/intervention indicators for 2020–2021 logistics and the 2024 energy-tariff realignment. Heterogeneity by exposure is examined in two ways that map to our hypotheses: (i) interaction of Δxt with time-varying IDR (amplification under higher import dependency, H1), and (ii) allowing long-run parameters to vary with SSR or via SSR-based subsample splits (attenuation under stronger domestic availability, H2).

Models are estimated by OLS; when state dependence is embedded in the long-run vector, non-linear least squares is used for θ(·). Lag orders are selected by AIC/SC within a compact grid to avoid over-parameterisation. We report HAC/Newey–West standard errors and standard residual diagnostics (serial-correlation LM, normality). Bounds/F-tests verify cointegration; CUSUM/recursive estimates assess stability around identified breaks. Outliers (studentised residuals |t|>3) are checked against policy/news calendars; where warranted, a one-off intervention dummy is included and disclosed. Missing monthly CPI observations are rare; when present, a single linear interpolation is used after verifying preservation of year-on-year rates.

To verify stability of the findings, we re-estimate the baseline with (a) alternative global price proxies (e.g., International Grains Council wheat export prices, World Bank Pink Sheet cereals), (b) alternative exchange-rate measures (narrow effective or trade-weighted indices), and (c) food-CPI subcomponents where available. We vary the maximum lag length, run pre-/post-break subsamples (2020–2021; 2024), and compute local-projection impulse responses as a cross-check. Wild-bootstrap HAC confidence intervals are reported; core pass-through and SSR-buffering results remain qualitatively unchanged.

3. RESULTS AND DISCUSSION

Official statistics indicate a materially stronger grain position in 2024. The National Statistics Committee (NSC) reports 8 877.7 thousand tons of grain crops (cereals) in 2024, against a 2019–2023 average of 7 830.5 thousand tons. The deviation (+13.4%) implies a higher availability baseline and, by construction, a higher SSR entering 2025. This

improvement is consistent with the FAO GIEWS Country Brief (19 May 2025) assessment of an above-average cereal harvest for Uzbekistan and aligns with agronomic studies documenting productivity headroom in the country's wheat systems under water-smart practices. In terms of food-security mechanics, higher SSR does not eliminate exposure to world markets but increases the buffer stock of domestic supply, reducing the amplitude and persistence of external cereal shocks transmitted into local prices.

Table 1. Grain crops (cereals), 2024 vs. five-year average (thousand tons, NSC)

Indicator	2024	2019–2023 avg.	Deviation
Grain crops – total (cereals)	8 877.7	7 830.5	+13.4%

Source: National Statistics Committee of the Republic of Uzbekistan, official dataset "Production of grain crops – total in all categories of farms (cereals)".

Two clarifications help interpret Table 1. First, we use NSC "grain crops (cereals)" for domestic levels and FAOSTAT "cereals" for international comparability in SSR/IDR; although the labels differ slightly in coverage, directional conclusions are the same. Second, the 2019–2023 average benchmarks the pre-2024 baseline; any year-specific programmes (e.g., reserve operations) would affect timing, not the sign, of the SSR effect.

The external backdrop in 2024–2025 shows cross-commodity divergence. FAO reports that in July 2025 the FAO Food Price Index (FFPI) equalled 130.1 (+1.6% m/m; +7.6% y/y), while the Cereal Price Index stood at 106.5 (−0.8% m/m; −3.8% y/y). In contrast, the Vegetable Oil Index was 166.8 (+7.1% m/m) and the Meat Index 127.3 (+1.2% m/m; +6.0% y/y). For Uzbekistan, where cereals make up the core staple basket but edible oils are comparatively import-exposed, this split matters: easing global cereals reduce direct pressure on the food basket, whereas firmer oils remain a channel of imported inflation.

The pattern in Table 2 is consistent with the OECD-FAO Agricultural Outlook 2025–2034 (near-term easing in cereals after the 2022 peak, resilient supply) and with the World Bank Food Security Update (June 2025), which documents heterogeneous post-pandemic adjustment across commodity groups. It also provides a natural identification setting for our econometric analysis: when the external driver for cereals is soft while domestic availability is high (Table 1), pass-through to food CPI should be present but attenuated.

Table 2. Global food price indices (FAO), July 2025

Index	Jul-2025	M/M	Y/Y
FAO Food Price Index (FFPI)	130.1	+1.6%	+7.6%
Cereal Price Index	106.5	−0.8%	−3.8%
Vegetable Oil Index	166.8	+7.1%	n/a
Meat Index	127.3	+1.2%	+6.0%

Sources: FAO World Food Situation; FAO Newsroom monthly release.

Turning to prices, NSC releases anchor the domestic picture. Headline CPI year-on-year was 9.8% in Dec-2024, 10.1% in Apr-2025, 8.7% in May-2025, and 8.9% in Jul-2025. While our estimation uses food CPI at monthly frequency, the headline series is informative as a cross-check: the deceleration into mid-2025 is consistent with (i) the softer cereals environment outside Uzbekistan (Table 2), (ii) the stronger domestic availability in 2024 (Table 1), and (iii) policy timing (e.g., energy/tariff realignment in 2024 and inventory management). Combined, these channels suggest that any pass-through from world cereals to domestic food prices in 2024–2025 operated against a favourable state of domestic buffers.

Table 3. Uzbekistan – CPI indicators (headline, YoY, %)

Period	Headline CPI (YoY)
Dec-2024	9.8
Apr-2025	10.1
May-2025	8.7
Jul-2025	8.9

Source: National Statistics Committee of the Republic of Uzbekistan, CPI press releases.

The ARDL/ECM estimates (2010–2024 monthly; controls for seasonality, exchange rate, and structural breaks in 2020–2021 and 2024) yield three robust findings that map directly to the hypotheses stated in the Introduction.

(i) H1 – Short-run pass-through is positive and significant. Innovations in the FAO Cereal Price Index are followed by statistically significant increases in domestic food CPI, conditional on contemporaneous and lagged exchange-rate changes. The timing is economically plausible: the bulk of the response occurs within a few months, which is in line with recent multi-country evidence on fast cereals pass-through (3) and with survey results for emerging markets where exchange-rate pass-through coexists with commodity-price channels (8, 1).

(ii) H1 – A stable long-run relation. The error-correction term is negative and significant, indicating convergence to a long-run combination of domestic food prices, global cereals prices, and the exchange rate. Deviations from the long-run path decay over subsequent months, implying that temporary shocks do not permanently derail the price level once controls and breaks are accounted for.

(iii) H2 – Exposure matters: IDR amplifies, SSR attenuates. Two strategies confirm state dependence. First, interacting Δ cereals with time-varying IDR yields larger

short-run pass-through when import dependency is higher; this is precisely the mechanism highlighted in cross-country studies of developing markets (3). Second, conditioning long-run parameters on SSR (or splitting the sample at SSR thresholds) produces smaller long-run elasticities when self-sufficiency is higher, consistent with the buffer intuition and with supply-side resilience documented in agronomic work for Uzbekistan (16, 2). Together, these patterns support H1 and H2.

Although we do not report the full coefficient matrix here (to preserve space and readability), the signs, significance, and stability diagnostics meet standard econometric criteria. Bounds/F-tests reject the null of no cointegration; CUSUM and recursive-estimate plots remain within confidence bands once breaks are included; and HAC standard errors are robust to heteroskedasticity and mild autocorrelation.

We conduct a set of robustness checks to ensure that the results are not artefacts of a particular specification or proxy:

- replacing the FAO Cereal Price Index with alternative cereal price measures (e.g., benchmark wheat export quotations) leaves the qualitative conclusions intact: short-run pass-through remains positive and significant; long-run cointegration holds once the exchange rate is included;

- using an effective (trade-weighted) exchange rate instead of USD/UZS produces similar pass-through estimates; the error-correction term remains negative and significant, consistent with the role of currency movements emphasized in the regional pass-through literature (8);

- estimating the model separately for pre-2020 and post-2020 subsamples shows higher short-run pass-through in the earlier period and more stable adjustment afterwards, plausibly reflecting improvements in logistics and inventory management. Including an indicator for the 2024 energy-tariff realignment improves residual properties but does not overturn the core results;

- generalized impulse responses computed via local projections deliver similar horizons and magnitudes of the cereal-to-food CPI response, reinforcing the ARDL/ECM interpretation.

Across these checks, the direction of effects is invariant and the magnitudes vary within narrow, economically plausible bands. This triangulation is consistent with the broader evidence that pass-through is state-dependent – stronger when import exposure is high and buffers are thin, weaker when availability is strong and exchange-rate conditions are benign (1, 3).

The findings dovetail with three strands of recent literature. First, multi-country work documents non-negligible, fairly quick pass-through from world cereals to domestic prices in developing economies (3), in line with our H1. Second, connectedness studies show time-varying volatility spillovers across grain markets (20). This implies that the external driver in our setting is not constant, strengthening the case for models that allow for structural breaks and state dependence – features embedded in our ARDL/ECM. Third, the agronomic and sectoral literature for Uzbekistan (16, 2, 18, 15) emphasises productivity, storage, and processing. Our evidence provides the price-system complement: higher SSR and credible reserves compress pass-through rather than sever it, thereby reducing the amplitude and persistence of shocks.

Policy implications follow directly. In the near term, transparent reserve rules and agile trade instruments can help smooth temporary external shocks, especially when oils (more import-exposed) rise while cereals ease (Table 2). Targeted transfers should focus on vulnerable households during short-lived spikes. In the medium term, investment in water-smart productivity for cereals and diversification/processing in oilseeds can sustainably raise SSR and reduce IDR in the most exposed segments, lowering the steady-state pass-through elasticity. Complementary steps include improving price-information systems and ensuring that FX policy remains consistent with inflation objectives, given the robust role of the exchange rate in the long-run relation.

Bringing the strands together, Table 1 shows that Uzbekistan entered 2025 with a strong cereals availability base; Table 2 indicates that global cereals were comparatively soft relative to other food groups in mid-2025; Table 3 documents that headline inflation decelerated into mid-2025, consistent with partial insulation of the food component. The econometric evidence confirms significant pass-through from world cereals (H1) alongside a buffering role for self-sufficiency (H2). The results argue for a two-horizon policy portfolio that blends near-term stabilization with medium-term resilience – aligning economic incentives with food-security objectives.

4. CONCLUSION

Uzbekistan's recent grain performance and the international price context together shaped the transmission of global shocks into domestic food prices over 2010–2024. Using official statistics (NSC) aligned with FAOSTAT counters and an ARDL/ECM framework, the analysis yields three robust results. First, shocks to the FAO Cereal Price Index pass through to food CPI in the short run, conditional on the exchange rate; the response is economically meaningful and materializes within a few months. Second, domestic food prices, global cereals, and the exchange rate form a stable long-run relation, implying eventual re-anchoring after disturbances. Third, exposure matters: higher import dependency (IDR) amplifies transmission, whereas higher self-sufficiency (SSR) – supported by the strong 2024 grain outcome – attenuates both the short-run elasticity and the long-run coefficients.

The results rationalize why food inflation pressures moderated even as some global food groups remained firm: Uzbekistan entered 2025 with elevated cereal availability while the global cereals component softened. In such states, credible domestic buffers compress, rather than sever,

imported price signals, lowering the amplitude and persistence of shocks faced by households.

Near term, codify transparent reserve rules for cereals, coordinate them with agile trade instruments (temporary tariff/contingent import windows), and deploy targeted transfers during brief price spikes. Medium term, prioritize water-smart productivity in wheat and maize, expand oilseed diversification and domestic processing to reduce exposure where it is largest, and upgrade storage/logistics to cut adjustment lags. Complementary steps include strengthening price-information systems, aligning FX policy with inflation objectives, and improving data reconciliation between NSC and FAO definitions to sharpen real-time SSR/IDR monitoring.

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