OIL PRICE SHOCKS: FIRMS' EXPECTATIONS AND BORROWING DECISIONS

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Abstract

This paper examines the high-frequency impact of oil price shocks on firms' inflation expectations and subsequent credit demand. Exploiting city-level variation in retail fuel pump prices within a 5-day window, we identify the immediate effect on firms' expectations. Our findings indicate a pass-through of about 30%: a 1 percent increase in local oil prices leads to a 0.3 percentage point rise in firms' one-year-ahead inflation expectations. Building on this, we analyze the consequent shifts in corporate credit behavior following oil supply shocks: a 1 percent increase in fuel prices leads to a 0.5 percent rise in short-term borrowing and a 0.5 percent decline in long-term borrowing, as higher operating costs increase working-capital needs while a weaker macroeconomic outlook reduces planned investment. The net effect is a maturity reallocation rather than a large change in total borrowing. The results document a dual channel through which oil shocks shape firms' beliefs and create divergent shifts in short- versus long-term corporate credit demand.

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1 Introduction

Oil price fluctuations are a first-order source of macroeconomic uncertainty with well-documented effects on output, inflation, and investment (Hamilton, 1983; Blanchard and Galí, 2007). As a critical input into production and transportation, oil price shocks operate as cost-push disturbances that can simultaneously compress margins and weaken activity, with implications for profitability, credit risk, and firms' investment plans. Here, a central propagation channel runs through inflation expectations. While aggregate evidence links oil price changes to inflation and inflation expectations, much less is known about how firms update their beliefs at high frequency. Because firms set prices and wages, near-term belief revisions can shape the subsequent path of inflation and real activity. Moreover, adjustments in expected costs and demand conditions should map into financing needs: rising operating costs raise working-capital requirements, whereas a weaker outlook can delay or compress capital expenditures.

This paper provides a high-frequency analysis of how oil price shocks affect firms' inflation expectations and, in turn, their credit market behavior. We address three questions. First, how quickly and by how much do firms revise inflation expectations in response to localized and observable changes in fuel prices? Second, is this response amplified, with firms overreacting and revising their expectations by more than oil's direct cost share would suggest? Third, how do these belief revisions translate into demand for short-term versus long-term credit?

To answer these questions, we employ an empirical strategy that leverages city-level variation in gasoline pump prices within a narrow, 5-day window.[1] Pump prices are the most direct measure of oil-cost shocks for firms—more so than movements in benchmark crude prices—because they immediately affect energy and transportation expenses. Because Türkiye is a price taker in global oil markets and pump prices adjust near-simultaneously to Brent and USD/TRY, within-window variation is plausibly exogenous to firm-level shocks. This high-frequency, geographically granular approach allows us to cleanly identify the immediate causal impact of price changes on

[1] The methodology follows a similar approach to Enders et al. (2019), who use a tight, few-day window around monetary policy announcements. The same logic applies here.

firms' inflation expectations, minimizing confounding effects from other macroeconomic news. Our analysis yields two main findings. First, we document a rapid and statistically significant pass-through from oil prices to expectations: a 1 percent increase in local pump prices causes a 0.3 percentage point increase in firms' inflation expectations within 5 days. This highlights the high sensitivity of firms' outlooks to immediate cost pressures. Second, we show that this upward revision in expectations triggers a distinctive reallocation of financing demand. Faced with rising anticipated costs, firms increase their demand for short-term loans by 0.5 percent to meet higher working capital needs. Simultaneously, the deteriorating economic outlook associated with the oil shock leads them to curtail or postpone planned capital expenditures, resulting in a significant decrease in the demand for long-term loans.

In sum, oil price shocks quickly shift firms' inflation expectations and induce divergent responses in corporate credit demand across maturities. Section-2 reviews the related literature. Section-3 describes the data. Section-4 presents the high-frequency response of firms' expectations to oil price shocks. Section-5 analyzes how these shocks affect firms' borrowing decisions and alter their demand for short- and long-term financing, consistent with changes in expectations. Section-6 concludes.

2 Literature Review

The consequences of oil price shocks have been a central theme in macroeconomic research for decades. Early work focused on the centrality of oil prices for monetary policy and business cycles (see Bernanke et al., 1997; Hooker, 2002; Harris et al., 2009; Baumeister and Peersman, 2013). This literature has explored various transmission channels, including the direct impact on production costs and the indirect effects on consumer spending and investment. A key element in the transmission of these shocks is their effect on inflation expectations, and a vast literature has established that salient energy prices are a key driver of household inflation expectations. Using U.S. micro data, Coibion and Gorodnichenko (2015) show that the rise in households' inflation expec-

tations associated with higher gasoline prices during 2009–2011 helps account for the "missing disinflation" in the Great Recession.[2] Wong (2015) finds that while expectations are sensitive to real oil price shocks, the propagation to realized inflation is limited. Synthesizing episodes since the 1990s, Kilian and Zhou (2022) document that oil prices systematically influence 12-month-ahead household inflation expectations, with gasoline shocks explaining nearly 40% of the variation and fully accounting for the missing disinflation.[3] Beyond inflation beliefs, Güntner and Linsbauer (2018) show that oil supply and demand shocks affect consumer sentiment and views on real income. Using cross-country data, An et al. (2023) estimate that oil price shocks explain roughly 10% of the variation in global inflation expectations.

How agents map salient energy prices into aggregate inflation beliefs depends on exposure and salience. Wehrhöfer (2023) show that households who face higher electricity prices raise their inflation expectations and extrapolate personal experience to the aggregate, whereas comparable extrapolation is harder to detect for firms. Related evidence on experience-based or exposure-driven expectation formation appears in Madeira and Zafar (2015); D'Acunto et al. (2021); D'Acunto et al. (2023). Studying gasoline specifically, Burgi et al. (2024) find that pump-price movements affect inflation expectations, but the magnitude aligns closely with the CPI weight of gasoline—consistent with Binder (2018). More recently, Szyszko and Kliber (2025) document asymmetries in the response of inflation expectations to gasoline price increases versus decreases. While the response of households is well-documented, far less is known about how firms update their expectations in response to high-frequency oil price shocks.

This paper advances two strands of research. First, we contribute to the literature on firm-level inflation expectations by providing high-frequency, micro-evidence on how a salient local pump-price shock alters firms' one-year-ahead inflation beliefs. Relative to prior work focused mainly on households, we (i) study firms as price-setters, (ii) exploit within-province timing around quasi-exogenous price resets, and (iii) document extrapolative revisions from oil prices to aggregate

[2] See Aastveit et al. (2023) as well.

[3] Some macro evidence points to a weaker aggregate link, e.g., Blanchard and Galí (2007); Blanchard and Riggi (2013).

inflation at the firm level. Second, we link expectation formation to real financial behavior by showing a novel, dual effect on corporate credit demand: oil shocks (perceived as cost-push) raise working-capital needs and short-term borrowing while dampening long-term credit associated with investment. This maturity reallocation connects expectation shocks to financing composition, offering a concrete transmission channel from oil prices to the real economy with implications for monetary communication and macroprudential design.

3 Administrative Data, Survey Data, and Fuel Price Shocks

Using unique firm identifiers under strict confidentiality, we assemble a unified firm–month panel from six sources: (i) the Business Tendency Survey (BTS), which measures firms' perceptions and expectations; (ii) Revenue Administration (RA) firm-level financial statements for non-financial private-sector firms; (iii) firm–bank stock credits from the Turkish Banking Association (TBA); (iv) firm–bank flow credits from the Banking Regulation and Supervision Agency (BRSA); (v) Social Security Institution (SSI) employment records that track formal employment and firm size; and (vi) province–day retail fuel pump prices collected from major fuel distribution companies (fuel retailers). We harmonize identifiers and calendar definitions across sources and align administrative outcomes with BTS survey dates at the firm–year-month level.

3.1 Firm-level Survey and Administrative Microdata

The BTS is a monthly panel of roughly 1,800–2,200 manufacturing firms. It records firms' assessments of current business conditions and realized outcomes (e.g., capacity utilization, orders, inventories) alongside expectations for the subsequent three months, each coded as improved, unchanged, or deteriorated. The survey also collects numerical 12-month-ahead inflation expectations. By systematically tracking operating conditions and production constraints, the BTS provides a timely barometer of the manufacturing sector. As shown in Figure-1, firms' expectations display pronounced time-series volatility and time-varying cross-sectional dispersion, which in-

tensifies as inflation fluctuates. This rich time-series and cross-sectional volatility—together with the quantitative 12-month forecasts—provides the identifying variation we need to measure the impact of oil price shocks on firms' inflation expectations. We match the BTS firm respondents to administrative firm outcomes using unique firm identifiers shared across sources under strict confidentiality.[4]

Our first administrative source is firm-level financial statements compiled annually by the RA in accordance with Türkiye's Tax Procedure Law. The universe covers non-financial, private-sector firms. Incorporated entities subject to the corporate income tax regime (e.g., joint-stock and limited liability companies) are legally required to file detailed financial statements; unincorporated entities under the personal income tax regime (e.g., sole proprietorships and partnerships) appear when they exceed size-based reporting thresholds.[5]

Our second administrative source is the credit registry, assembled from two official providers. From the Turkish Banking Association (TBA) we obtain firm–bank stocks of outstanding credit, including maturity structure and currency denomination. From the Banking Regulation and Supervision Agency (BRSA) Credit Registry we obtain firm-level flows of newly extended credit, disaggregated by lending bank, which we aggregate to the firm–year-month level as needed. Because coverage spans the regulated banking system, the registry is effectively universal for on-balance-sheet loans. To mitigate outliers, credit amounts and interest rates are winsorized at the 1st and 99th percentiles within year × 2-digit NACE cells.

Our third source is firm-level annual employment from the SSI, which we use to measure firm size and employment growth.[6] Combining these three datasets with firm survey data and province-level fuel pump prices allows us to conduct the analysis. Our final linked sample covers

[4]We harmonize identifiers and calendar definitions across sources and align administrative outcomes with BTS interview dates at the firm–year (and, where relevant, firm–month) level. The linked panel yields a comprehensive and internally consistent view of firms' expectations (from the BTS) and their realized financial and credit market outcomes.

[5]In practice, the dataset primarily consists of incorporated businesses obliged to submit detailed statements under the corporate income tax regime; unincorporated enterprises enter once specified revenue or asset thresholds are surpassed. See Table-1 for the descriptive statistics of the firms in our sample.

[6]Covers employees working under a service contract pursuant to Article-4/a of Social Security Law No. 5510; the dataset excludes self-employed individuals, informal workers, and part-time workers.

the period from 2009-M1 to 2024-M12.

3.2 Fuel Prices and Inflation Dynamics in Türkiye

Retail fuel prices in Türkiye transmit global energy shocks quickly to the domestic price level. Wholesale reference prices for gasoline and diesel are tied to international product benchmarks (ultimately linked to Brent) quoted in U.S. dollars and converted at the prevailing USD/TRY exchange rate. Taxes (excise and VAT) make up a sizable share of the retail price, and distribution margins are relatively small. In practice, pump prices adjust frequently—especially around large Brent or FX moves—so international shocks propagate to domestic energy prices with minimal delay. Because fuel is both a direct consumption item and a pervasive input in transportation and production, these adjustments might feed through to CPI and to firms' cost expectations in short order. We document three facts in Figures-3–4 to support our identification in the following sections.

First, Türkiye is a price taker in energy markets. Panel (a) of Figure-3 shows that Türkiye is a persistent net energy importer; imports dwarf exports, and Panel (b) documents that the current account balance co-moves closely with the energy import bill. Given negligible market power in global oil markets, domestic conditions in Türkiye cannot plausibly move Brent prices at high frequency. Hence, sudden changes in Brent can be interpreted as orthogonal to domestic shocks within our narrow windows. Second, local prices mechanically track global prices with minimal delay. Panel (a) of Figure-4 shows that fuel prices at the pump adjust rapidly and are highly volatile precisely when Brent moves; Panel (b) shows that the energy-import share fluctuates strongly with Brent (correlation > 0.90). This close, near-contemporaneous pass-through means city-level pump price changes predominantly reflect global oil price innovations rather than local demand or firm-level conditions. Third, the high-frequency, city-level design minimizes confounding. We exploit within-city changes in pump prices over a 5-day window. Domestic macro news or slow-moving local fundamentals that might affect firms' expectations are unlikely to both (a) shift

Brent in real time and (b) differentially move city-level pump prices within such a narrow horizon. Any remaining city-specific, time-invariant factors are absorbed by fixed effects; common macro shocks are differenced out by the high-frequency design. Together, these facts justify treating oil price movements—and the induced pump price changes—as exogenous shifters of firms' near-term cost outlooks in our setting.

4 Impact of Fuel Price Shocks on Firms' Expectations

We observe province–day retail fuel pump prices from major fuel distribution companies and denote the (log) pump price in province p on day d by p_{pd}. Define the daily change $\Delta p_{pd} \equiv p_{pd} - p_{p,d-1}$ and, for each province–month (p,m), the within-month dispersion $\sigma_{pm} = \text{sd}\{\Delta p_{pd} : d \in m\}$. A big jump is any date τ in month m with $|\Delta p_{p\tau}| \geq \kappa \sigma_{pm}$, using $\kappa = 2$ in the baseline. Let h denote the event-study half-window used in estimation (baseline $h = 5$, i.e., ± 5 days). If a month contains multiple big jumps, then: (i) if the distance between any two candidates is ≤ 5 days, we omit both to avoid overlapping $\pm h$ windows; (ii) if spacing is > 5 days, we retain the first jump only for the baseline. Months without any big jump receive no shock.[7] While the timing of these price adjustments is typically uniform nationwide on a given day, the magnitude of the change can differ across provinces due to local market conditions, providing the geographic variation we exploit.

Building on the fuel–price jump construction above, we exploit within–month variation in firms' BTS response timing relative to the first qualifying province–day jump. Let τ_{pt} be the jump date in province p during calendar month t, and let r_{it} be firm i's BTS response day in month t. Define the event-time distance $w \equiv r_{it} - \tau_{pt}$ and restrict attention to observations with $|w| \leq h$ (baseline $h = 5$; robustness $h \in \{3,7\}$). Figure-2 depicts the timeline of survey responses around fuel price shocks. Firms surveyed within $t - h$ days before the shock serve as the control group,

[7] We implement two complementary exercises: (i) vary the minimum spacing rule to 3 and 7 days; (ii) select the maximum absolute jump within the month and drop months where another jump occurs within h days before/after that maximum.

whereas those responding within $t+h$ days after the shock constitute the treatment group. Treatment is captured by an indicator $\text{Post}_{it} = \mathbb{1}(r_{it} \geq \tau_{pt})$ interacted with the (province–month) jump magnitude S_t, taken as the standardized size of the detected jump in the firm's province–month (for brevity, we write S_t). We estimate:

$$y_{it} = \beta_0 + \beta_1 \mathbf{Post}_{it} \times \mathbf{S}_{pt} + \Gamma X_{i,t-1} + \alpha_i + \delta_{st} + \phi_{rt} + \mu_w + \varepsilon_{it}, \tag{1}$$

where y_{it} denotes firm i's expectation (inflation, prices, unit costs, volumes, or overall outlook) in month t; α_i are firm fixed effects; δ_{st} are sector×time fixed effects (e.g., 2-digit NACE by year–month); ϕ_{rt} are region×year–month fixed effects absorbing all region-specific month–level conditions; and μ_w are fixed effects for the signed event-time distance w (number of days before/after the response relative to the jump), which flexibly control for any smooth within-window patterns in outcomes around the event. The vector $X_{i,t-1}$ contains lagged annual firm covariates (e.g., net sales, leverage = total debt/total assets, firm age, and ROA = net profit/total assets). In this specification, β_1 is identified by cross-firm timing differences within the same region–month (and sector–time cell) and scales the before/after contrast by the local fuel price shock size S_{pt}.[8]

Table-2 reports the estimates. Firms revise inflation beliefs upward immediately after sharp fuel price increases: a 1-percent rise in local fuel prices raises 12-month-ahead CPI inflation expectations by 0.27 percentage points (pp) and PPI inflation expectations by 0.33 pp. These coefficients imply a pass-through from fuel prices to aggregate inflation expectations of roughly 30%. This pass-through rate is highly robust: conducting the analysis over five-year rolling windows within the sample period yields estimates between 27% and 35%, indicating little state or time dependence in the relationship.

Notably, this elasticity exceeds what one would expect based on the direct expenditure shares

[8] In practice, fuel price resets occur on the same calendar day nationally; hence the shock date τ_t is common across provinces in month t. Geographic heterogeneity arises in magnitudes, not timing: provinces differ in pass-through due to freight/logistics costs, station density and competition, and location-specific markups.

of fuel and energy in consumption and production (around 10%),[9] suggesting an amplified response. One interpretation is that firms overweight salient, directly observed fuel price changes when forming economy-wide inflation expectations, effectively extrapolating expected fuel price dynamics into overall inflation. This finding contrasts with Binder (2018) and Burgi et al. (2024), who document limited extrapolative behavior and find that expectation revisions are broadly consistent with the weight of gasoline in the consumer basket.[10] In the Turkish context, however, this extrapolative forecasting behavior is clearly present: forecast errors rise for firms surveyed after exogenous oil price shocks, indicating a near-term overreaction to oil price news (Bordalo et al., 2020, 2022).

Moreover, these revisions spill over to other firm-level expectations. First, both own-price and unit-cost expectations rise following the shock, indicating that higher aggregate inflation beliefs translate into firms' pricing and cost plans. Second, firms read the oil price jump as a cost-push disturbance: they lower expected sales over the next three months and reduce employment and investment expectations. This heightened pessimism is mirrored in a weaker assessment of the general economic outlook, with firms anticipating weaker aggregate activity in subsequent months. Taken together, firms track oil prices in real time, adjust beliefs strongly, and interpret the shock as simultaneously raising prices and weakening activity—at both the aggregate and firm level. These belief shifts motivate our next step: testing whether the changes are persistent and sizable enough to manifest in realized credit and real outcomes.

5 Impact of Fuel Price Shocks on Firms' Borrowing Decisions

We now turn from expectations to borrowing behavior and study how exogenous province-level fuel price movements affect firms' credit at the bank–firm level. Unlike the survey-based specifications above, this design exploits monthly administrative credit registry data that track every

[9] The expenditure share on gasoline is close to 5% in the United States (Binder, 2018), but it is relatively higher in Türkiye, so a larger impact is expected.

[10] See also Kilian and Zhou (2022); Wehrhöfer (2023); Szyszko and Kliber (2025).

bank–firm relationship in Türkiye.[11] Our source of variation is the province-specific change in retail fuel pump prices which is plausibly exogenous to any single firm–bank match and is common in timing nationwide but heterogeneous in magnitude across provinces due to logistics, competition, and local cost factors. Specifically, we estimate

$$y_{jbpt} = \beta_0 + \beta_1 \, \Delta\text{FuelPrice}_{p,t-1} + X'_{jpt}\gamma + \alpha_{jb} + \mu_{bt} + \delta_{st} + \phi_{rt} + \varepsilon_{jbpt}, \tag{2}$$

where y_{jbpt} is one of three outcomes for the bank b–firm j pair in province p and month t: the natural logarithm of (i) total outstanding credit, (ii) outstanding short-term credit, or (iii) outstanding long-term credit. The regressor Δ FuelPrice$_{p,t-1}$ is the province-level lagged change in log-fuel prices. The control vector X_{jpt} mirrors Equation-(1) and includes lagged firm covariates (e.g., size, leverage, age, and profitability), measured at the appropriate administrative frequency.

Bank–firm fixed effects α_{jb} absorb all time-invariant features of the lending relationship (baseline limits, relationship capital, persistent risk assessments, collateral that does not vary monthly, branch proximity, and match-specific selection). Bank-by-year–month fixed effects μ_{bt} capture time-varying credit supply at the bank (funding costs, liquidity, capital constraints, portfolio rebalancing, internal limits, and macroprudential exposure), so identification compares borrowers of the same bank in the same month. To be more specific, after controlling for the supply side, the model identifies the effect of fuel prices on corporate borrowing by comparing different firms, borrowing from the same bank in the same month, that are exposed to different-sized province-level fuel price shocks.[12] Sector-by-year–month fixed effects δ_{st} net out common shocks at the 2-digit (or 4-digit) NACE sector within month, while region-by-year–month fixed effects ϕ_{rt} flexibly absorb region-level demand or policy shocks at the month frequency. Given the nationwide synchronization of price reset dates and cross-province heterogeneity in magnitudes, β_1 is identi-

[11] The 5- or 7-day window is too short to capture changes in corporate borrowing behavior, so a high-frequency analysis is not feasible in this context.

[12] Identification does not require firms to borrow from multiple banks. For example, if Province 1 had a big fuel price shock last month and Province 2 had a small one, the model asks: "Did Firm A's borrowing from Bank Z change differently than Firm B's borrowing from Bank Z?".

fied from within-pair changes in borrowing around province-level fuel price movements, holding bank-month credit supply and sector/region-month conditions fixed.

As shown in Table-3, a 1 percent increase in local oil prices raises outstanding short-term credit by 0.5 percent, consistent with higher input costs and working-capital needs, while long-term outstanding credit falls by a slightly larger amount as uncertainty rises and investment plans are scaled back. The net effect on total outstanding credit is +0.05 percent—statistically significant but economically small.[13] The key margin is the maturity composition: firms substitute from long-term to short-term financing as costs rise and beliefs turn more pessimistic.

The pattern is consistent with a working-capital channel and a wait-and-see approach to investment, amplified by firms' expectation revisions. On impact, higher fuel costs increase the nominal value of inputs, raising the amount of capital tied up in the working capital cycle. Firms must finance more expensive inventory and potentially higher-cost receivables, intensifying the need for liquidity. Even if payment terms and collection periods are unchanged (i.e., the cash conversion cycle length is constant), the value of inventories and other operating needs increases, while payables typically cannot expand one-for-one. In addition, as documented earlier, firms' inflation expectations increase by more than the energy weights in the consumption/production basket would suggest, and near-term unit-cost expectations also rise. These expectation revisions magnify perceived input-cost pressures beyond the immediate energy hike, further tightening liquidity. Firms can bridge this higher working-capital requirement by drawing on overdrafts and revolving facilities or by rolling short-term loans, which drives the observed rise in outstanding short-term credit.

At the same time, the oil price shock worsens the near-term outlook and raises uncertainty about future demand and input costs. With convex adjustment costs and partially irreversible capital, the option value of waiting increases (Bloom, 2009). Consequently, firms postpone or scale back investment projects (consistent with expectations in Table-2), and outstanding long-

[13]The total effect is small because short-term financing accounts for nearly 50% of firms' total borrowing, and short- and long-term loans move in opposite directions by similar magnitudes following an oil price shock.

term credit declines as amortizations are not fully replaced by new issuance. The small positive net change in total credit therefore reflects a rebalancing of maturities rather than an expansion of overall leverage.[14]

Effects are larger for smaller and more leveraged firms, which operate with thinner cash buffers, less pledgeable collateral, and higher external-finance premia (Crouzet and Mehrotra, 2020). For a given increase in input costs, these firms experience a larger rise in required working capital relative to internal liquidity, so they respond more on the short-term margin (overdrafts, revolvers). On the supply side, bank×month fixed effects hold time-varying bank funding conditions and macroprudential constraints constant; thus, within-bank comparisons across clients point to a demand-led reallocation toward short maturities—rather than a contraction in bank supply—as the primary driver of the heterogeneity.

Further robustness checks also show that alternative definitions of the lagged retail pump price at the province level—such as using the mean of the minimum, mode, and maximum daily prices in a given month (effectively the mean of a fitted triangular distribution of daily prices)—yield virtually unchanged estimates for short-term and long-term credit, as shown in Table-B1 and Table-B2. This indicates that tail movements in daily prices are not driving the results.

Fuel Prices and the Extensive Margins of Credit

After analyzing the impact on outstanding credit, we now examine how province-level fuel prices affect firms' use of new credit (extensive margin) and the amount and cost of new credit (intensive margin), using administrative flow-credit records aggregated to the firm–month level.

$$y_{it} = \beta_0 + \beta_1 \Delta \,\text{FuelPrice}_{p,t-1} + \Gamma X_{i,t-1} + \alpha_i + \delta_{st} + \phi_{rt} + \widehat{\omega}_{it} + \widehat{\theta}_{it} + \varepsilon_{it}, \tag{3}$$

[14] In some settings, the cash-conversion-cycle may also move. For example, suppliers can tighten terms, clients may delay payments, or firms may hold precautionary inventories. Without relying on timing changes, the level effect on working capital is sufficient to detect the impact on short-term financing.

where $\Delta\text{FuelPrice}_{p,t-1}$ is the change in log retail pump price in firm i's province p lagged one month; α_i are firm fixed effects; δ_{st} are sector×year–month fixed effects; ϕ_{rt} are region×year–month fixed effects; and $X_{i,t-1}$ are lagged firm controls (e.g., size, leverage, age, ROA). To purge month-specific demand and supply movements in credit markets, we also include two high-dimensional controls recovered from a first-stage on administrative credit stocks: $\widehat{\omega}_{it}$, a firm×year–month effect that saturates firm-side demand shifts in month t, and $\widehat{\theta}_{it}$, a bank-supply index constructed by credit-weighting bank×year–month effects over the firm's incumbent lenders in month t.[15] Our dependent variables are: (i) $\ln\big(1+\text{FlowCredit}_{it}\big)$ in the full sample, which combines the extensive and intensive margins while retaining zero-borrowing months (Panel A of Table 4); (ii) $\ln\big(\text{FlowCredit}_{it}\big)$ restricted to months with positive new credit to isolate the intensive margin (Panel B); and (iii) $\ln\big(\text{BorrowingCost}_{it}\big)$, the log of the volume-weighted average interest rate on new loans in month t (Panel C). In all cases, β_1 is an elasticity with respect to local fuel prices; with $\ln(1+\cdot)$ it is approximately elastic for positive flows while remaining defined at zero.

The coefficient β_1 captures how exogenous, province-level movements in fuel prices translate into firms' credit behavior, conditional on rich fixed effects and time-varying demand/supply controls. Firm fixed effects α_i difference out all time-invariant determinants of borrowing (business model, long-run collateral, lender relationships). Sector×year–month effects δ_{st} remove sector-wide shocks (input price swings, policy or export demand) that vary by month, while region×year–month effects ϕ_{rt} net out regional macro and policy conditions (local demand, disasters, localized macroprudential actions). The first-stage controls sharpen identification within each month: $\widehat{\omega}_{it}$ absorbs firm-specific demand for credit that could comove with local conditions (e.g., idiosyncratic investment spikes), and $\widehat{\theta}_{it}$ absorbs bank-side supply shifts (funding costs, capital, internal limits) as they impinge on the firm through its actual lender mix. With these layers in place—and using the one-month lag to avoid simultaneity—variation identifying β_1 comes from

[15] First stage (estimated on the universe of outstanding credit at the bank–firm level): $\text{OutstandingCredit}_{jbt} = \alpha_{jb} + \omega_{it} + \theta_{bt} + \delta_{st} + \phi_{rt} + u_{jbt}$. We then aggregate $\widehat{\theta}_{bt}$ to the firm by credit shares: $\widehat{\theta}_{it} \equiv \sum_b w_{ibt}\widehat{\theta}_{bt}$, with $w_{ibt} = \text{OutstandingCredit}_{jbt} / \sum_{b'} \text{OutstandingCredit}_{jb't}$. The main regression is (**??**) with $(\widehat{\omega}_{it}, \widehat{\theta}_{it})$ entered as controls alongside $\alpha_i, \delta_{st}, \phi_{rt}, X_{i,t-1}$.

month-to-month changes in local fuel prices across provinces that are orthogonal to concurrent firm-demand and bank-supply movements, net of sectoral and regional month shocks and firm time-invariant traits.

Table-4 shows that credit flows increase after oil price shocks. A 1 percent increase in local fuel prices raises new borrowing by 0.15 percent in the full sample (extensive margin) and by 0.82 percent among firms that borrow (intensive margin) in the window. Borrowing costs also rise by 0.5 pp for a shock of the same size. Because both the quantity and the price of new credit move in the same direction, the response is consistent with a demand-driven shift rather than a contraction in bank supply.

Oil price increases lift unit costs almost immediately, raising the level of working-capital needs. Firms respond on the extensive margin by activating previously unused credit lines or initiating short-term borrowing to buffer liquidity risk. Conditional on borrowing, they adjust on the intensive margin by scaling the amount of new credit in proportion to the size of the shock and their exposure.[16] Short-term instruments (overdrafts, revolving facilities, short-term TL loans) adjust fastest and carry higher spreads, so they bear the brunt of the near-term adjustment. Therefore, after oil shocks, we find that (i) the probability of taking a new loan and the volume of new loans both rise (reflecting the extensive and intensive margins), and (ii) the average interest rate on new loans also increases. Under a leftward shift of bank supply, one would expect quantities to fall as prices rise; instead, we observe that both increase, which points to a rightward shift in firm credit demand. This is driven primarily by a composition effect: heightened demand for short-term credit, which carries higher spreads, increases the average price of new borrowing. From the banks' perspective, risk-based pricing might also play a role, as higher input-cost volatility raises cash-flow risk, shortens effective maturities, and increases firm risk, potentially leading to wider spreads. We explicitly control for such supply-side movements with the bank-supply index, $\hat{\theta}_{it}$, in the regression. Even so, the observed co-movement—higher price and higher quantity—remains

[16] Financing constraints include firm size and leverage, exposure can include energy intensity, freight shares, and inventory policies.

the textbook signature of a rightward shift in firms' credit demand.

Following oil shocks, the combination of higher costs, increased uncertainty, and greater pessimism about the future raises the option value of waiting. Firms therefore delay or downsize investment, leading to muted (or declining) long-term new lending even as short-term flows climb. Over subsequent months, the natural amortization of existing long-term debt, combined with this reduced issuance of new long-term credit, leads to the decline in the outstanding stock of long-term credit documented in the previous section.

Lastly, we find that credit behavior is sensitive not only to the first moment (level) of fuel prices but also to the second moment (volatility). As documented in Table-B3-B6, firms increase short-term borrowing when pump-price volatility rises. Higher volatility elevates uncertainty about future marginal costs, prompting precautionary demand for working capital to insure against potential liquidity shortfalls. By contrast, the effect on long-term credit is muted; our results suggest that volatility alone does not generate significant pessimism about medium-term prospects so long as there is no upward pressure on the price level. This finding establishes that not just the level, but also the volatility of oil prices is a significant determinant of firms' short-term financing decisions as liquidity concerns rise.

6 Conclusion

This paper shows that global energy shocks transmit to firms' beliefs and financing choices at high frequency. Exploiting city-level pump price changes within narrow event windows, we document a rapid pass-through from fuel prices to inflation expectations: a 1-percent increase in local pump prices raises one-year-ahead expected inflation by about 0.3-pp within five days. These belief revisions are economically meaningful and propagate to credit choices. As operating costs rise and outlooks worsen, firms reallocate their borrowing toward working-capital finance: short-term credit expands while long-term credit contracts, leaving total outstanding credit roughly unchanged in the short run. Flows and borrowing costs rise jointly, indicating that the immediate

response reflects stronger credit demand rather than a bank-supply contraction. Heterogeneity analyses suggest larger effects for smaller and more leveraged firms.

Taken together, the results highlight a dual transmission channel of oil price shocks—through expectations and the maturity composition of corporate credit. For policymakers, three implications follow. First, because expectations move within days, communications that anchor near-term inflation beliefs can dampen pass-through from energy prices. Second, temporary spikes in fuel costs predictably tighten working-capital needs; liquidity tools and macroprudential settings that facilitate short-term funding—without encouraging excessive maturity risk—can smooth real activity. Third, the contraction of long-term borrowing points to an investment pause after energy shocks, underscoring the value of policies that stabilize medium-horizon inflation expectations and reduce uncertainty. The high-frequency evidence here provides micro-founded support for rapid expectation pass-through and maturity rebalancing following oil shocks—key ingredients for models and policies addressing inflation dynamics in open, energy-importing economies.

Table 1: Summary Statistics of Firm-Level Variables

	Mean	SD	P10	P90
Firm Characteristics				
Net Sales (Million TL)	978.77	6869.61	23.65	1638.87
Employment	621.05	1362.54	80.00	1212.00
Total Assets (Million TL)	914.21	4665.57	22.64	1549.31
Capital (Million TL)	201.99	1269.72	3.17	321.46
Exports (Million TL)	304.19	2023.19	0.00	433.51
Age	26.73	15.04	9.00	46.00
Net Profit (Million TL)	80.10	763.76	-4.70	122.57
Leverage (%)	0.58	0.33	0.21	0.88
Firm Credit Outcomes				
Total Outstanding Credits (Million TL)	0.06	1.19	0.00	0.06
Total Long-Term Outstanding Credits (Million TL)	0.02	0.91	0.00	0.02
Borrowing Cost (%)	14.25	11.41	0.00	25.69
Credit Usage (Million TL)	124.23	2099.76	0.40	138.44
Firm Expectations				
CPI Expectations (%)	20.04	19.66	7.00	55.00
PPI Expectations (%)	21.60	22.90	6.50	60.00
Perception of Economic Outlook	2.07	0.57	1	3
Selling Price Expectations	1.75	0.54	1	2
Unit Cost Expectations	1.55	0.57	1	2
Volume Expectations	1.83	0.64	1	3
Sales Expectations	1.83	0.66	1	3

Notes: Means, standard deviations (SD), and percentiles (P10, P90) computed at the firm level. Monetary values are in million Turkish lira (TL). Except for CPI and PPI expectations, survey questions on firms' expectations are qualitative.

Table 2: Effect of Fuel Prices on Firms' Expectations

	(1) CPI Expectations	(2) PPI Expectations	(3) Forecast Error	(4) Price Expectations	(5) Cost Expectations
Panel A: Inflation and Cost Expectations					
$\text{Post}_{it} \times \text{Fuel Prices}_{p,t-1}$	0.273***	0.325***	0.112***	0.004***	0.005***
	(0.019)	(0.025)	(0.024)	(0.001)	(0.002)
Observations	91,954	98,480	90,654	101,513	99,539
R-squared	0.826	0.775	0.366	0.289	0.317
Panel B: Real Activity Expectations					
	(1) Volume Expectations	(2) Sales Expectations	(3) Employment Expectations	(4) Investment Expectations	(5) Macro Expectations
$\text{Post}_{it} \times \text{Fuel Prices}_{p,t-1}$	-0.003**	-0.002**	-0.002**	-0.007***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)
Observations	102,574	101,326	101,023	95,190	98,738
R-squared	0.222	0.235	0.236	0.258	0.301
Firm FE	✓	✓	✓	✓	✓
Sector × Year-Month FE	✓	✓	✓	✓	✓
Region × Year-Month FE	✓	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓	✓
Event-time FE	✓	✓	✓	✓	✓

Notes: Standard errors, clustered by province, are reported in parentheses. Forecast errors are defined as the difference between the 12-month-ahead inflation expectation and the realized inflation rate at that time. Price and cost expectations are qualitative variables, taking the value 1 if the firm reports prices or costs as decreasing or unchanged, and 2 if increasing. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 3: Effect of Fuel Prices on Firms' Outstanding Credits

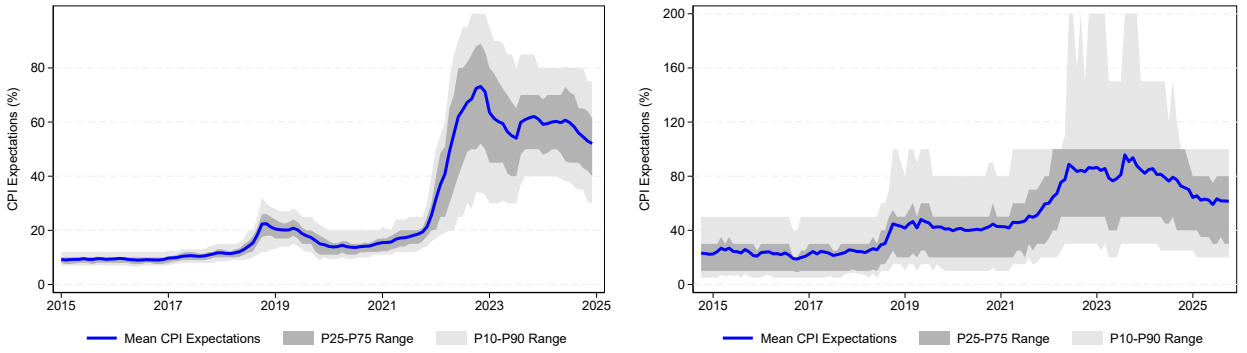
	(1) All Sample	(2) Large	(3) SME	(4) High Leveraged	(5) Low Leveraged
Panel A: Total Outstanding Loans					
Fuel Prices$_{p,t-1}$	0.051***	0.047***	0.057***	0.066***	0.042***
	(0.006)	(0.009)	(0.010)	(0.023)	(0.007)
R-squared	0.622	0.622	0.550	0.607	0.629
Mean of Dependent Variable	8.167	8.731	7.442	7.889	8.261
Panel B: Short-Term Outstanding Loans					
Fuel Prices$_{p,t-1}$	0.506***	0.489***	0.516***	0.692***	0.462***
	(0.030)	(0.047)	(0.049)	(0.091)	(0.032)
R-squared	0.354	0.355	0.366	0.378	0.370
Mean of Dependent Variable	5.635	6.103	5.034	5.424	5.706
Panel C: Long-Term Outstanding Loans					
Fuel Prices$_{p,t-1}$	-0.535***	-0.497***	-0.569***	-0.589***	-0.521***
	(0.031)	(0.046)	(0.066)	(0.071)	(0.035)
R-squared	0.346	0.356	0.372	0.363	0.365
Mean of Dependent Variable	3.991	4.145	3.793	4.001	3.988
Bank × Firm FE	✓	✓	✓	✓	✓
Bank × Year-Month FE	✓	✓	✓	✓	✓
Sector × Year-Month FE	✓	✓	✓	✓	✓
Region × Year-Month FE	✓	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓	✓
Observations	951,433	534,891	416,514	240,210	711,195

Notes: This table presents the estimation results for Equation 2. Each panel corresponds to a different dependent variable as labeled. The sample period covers 2009m1-2024m12. The unit of observation is firm–bank–province–year–month. In each panel, the dependent variable is defined as $y_{jbpt} = \log(X_{jbpt})$, where X_{jbpt} denotes the total outstanding credit amount in Panel A, the short-term outstanding credit amount in Panel B, and the long-term outstanding credit amount in Panel C. An SME is a firm with fewer than 250 employees; firms with 250 or more employees are classified as large. High-leverage firms are those whose leverage ratio (total debt/total assets) lies in the top 20th percentile of the sector–year distribution; low-leverage firms are the remainder. Standard errors, clustered by province, are reported in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

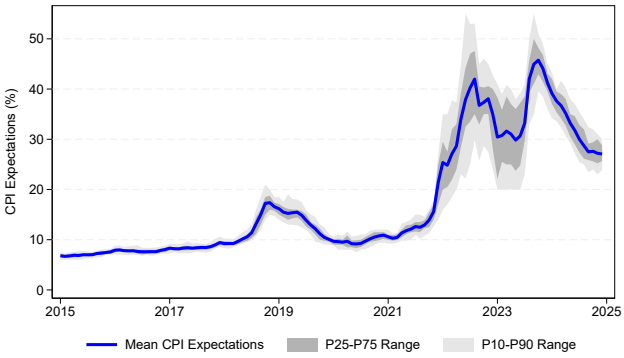
Table 4: Effect of Fuel Prices on Flow Credit and Borrowing Costs

	(1) All	(2) Large	(3) SME	(4) High Leverage	(5) Low Leverage
Panel A: Flow Credits					
Fuel Prices$_{p,t-1}$	0.152***	0.208***	0.069**	0.274***	0.129***
	(0.019)	(0.031)	(0.033)	(0.066)	(0.016)
Observations	297,404	163,747	133,628	53,907	243,450
R-squared	0.433	0.432	0.478	0.519	0.438
Mean of Dependent Variable	0.998	1.032	0.956	1.268	0.938
Panel B: Flow Credits (Borrowing Sample)					
Fuel Prices$_{p,t-1}$	0.824***	0.812***	0.845***	0.740***	0.840***
	(0.017)	(0.015)	(0.022)	(0.040)	(0.017)
Observations	140,901	83,769	57,034	29,849	110,892
R-squared	0.588	0.600	0.604	0.600	0.606
Mean of Dependent Variable	2.707	2.720	2.690	2.692	2.711
Panel C: Borrowing Costs					
Fuel Prices$_{p,t-1}$	0.483***	0.468***	0.523***	0.538***	0.452***
	(0.061)	(0.078)	(0.067)	(0.135)	(0.062)
Observations	140,901	83,769	57,034	29,849	110,892
R-squared	0.633	0.621	0.614	0.681	0.645
Mean of Dependent Variable	8.149	8.699	7.343	8.125	8.158
Firm FE	✓	✓	✓	✓	✓
Sector × Year-Month FE	✓	✓	✓	✓	✓
Region × Year-Month FE	✓	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓	✓
Credit Demand and Supply Controls	✓	✓	✓	✓	✓

Notes: This table presents the estimation results for Equation 3. Each panel corresponds to a different dependent variable as labeled. The sample period covers 2009m1-2024m12. The unit of observation is firm–province–year–month. In each panel, the dependent variable is defined as $y_{jbpt} = \log(X_{jbpt})$, where X_{jbpt} denotes the total outstanding credit amount in Panel A, the short-term outstanding credit amount in Panel B, and the long-term outstanding credit amount in Panel C. An SME is a firm with fewer than 250 employees; firms with 250 or more employees are classified as large. High-leverage firms are those whose leverage ratio (total debt/total assets) lies in the top 20th percentile of the sector–year distribution; low-leverage firms are the remainder. Standard errors, clustered by province, are reported in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.



(a) Firms **(b)** Households



(c) Survey of Market Participants

Figure 1: One-Year-Ahead Inflation Expectations Distributions of Households, Firms, and Professionals

Notes:

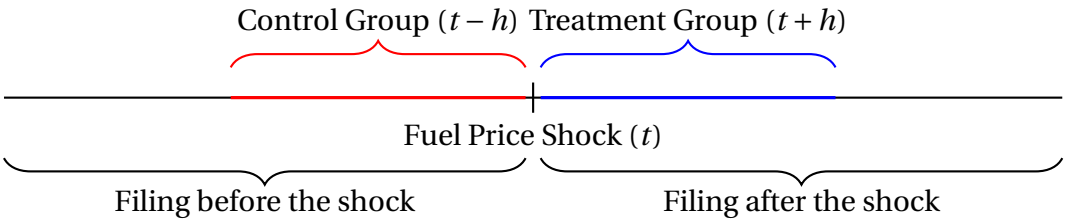
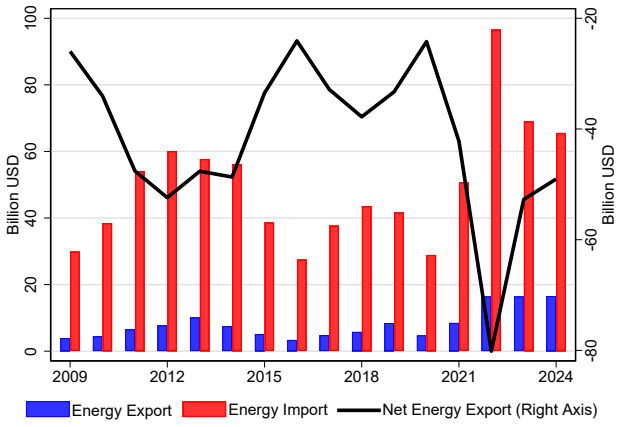
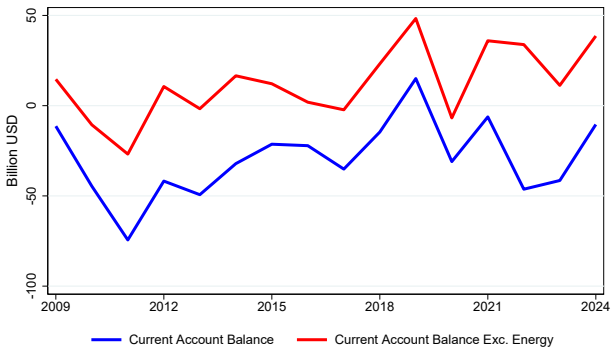


Figure 2: Timeline of Filling the Survey Relative to Fuel Price Shocks



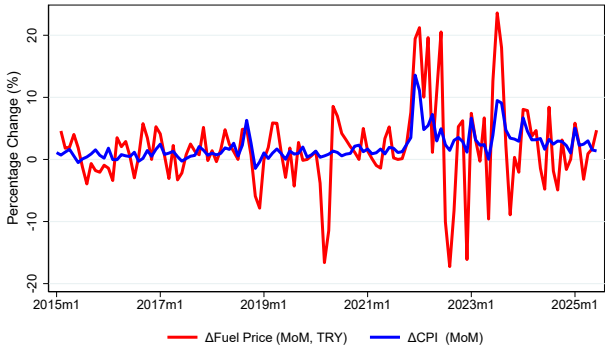
(a) Energy Exports vs. Imports



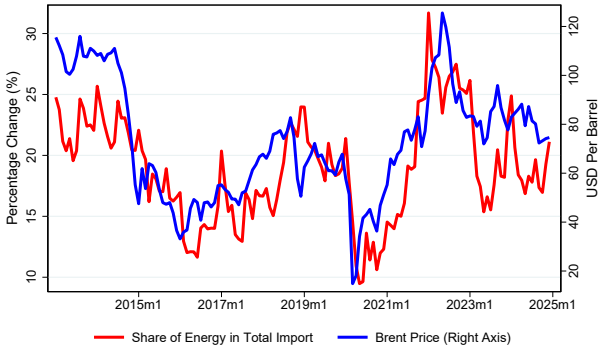
(b) Current account balance and Energy

Figure 3: External Balance and Energy Trade

Notes: Türkiye is a persistent net energy importer; the current account balance co-moves with the energy import bill. Because Türkiye is not a major oil producer and has negligible market power in global energy markets, innovations in global oil prices can be treated as exogenous to domestic conditions.



(a) CPI and Brent Price



(b) Energy Import Share and Brent Price

Figure 4: Fuel Prices, CPI, and Energy Import Intensity

Notes: Panel a): Changes in fuel prices are highly volatile in Turkey, as the prices are updated particularly in case of large shocks without delay. Panel (b): Energy imports average about 20% of total imports but fluctuate substantially as Brent prices fluctuate; the correlation between the energy-import share and Brent exceeds 0.90.

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Appendix - A - BTS Detailed Questionnaire

The BTS (Business Tendency Survey) collects data through monthly surveys of a representative sample of 1,800 to 2,200 manufacturing firms, since 2007. The questions from the BTS translated from Turkish are provided below:

Question 1: The production volume of your company over the last three month: Increased, Stayed the same, Decreased.

Question 2: The total amount of your currently registered orders: Above normal, Normal for the season, Below normal.

Question 3: The amount of your currently registered export orders: Above normal, Normal for the season, Below normal.

Question 4: The level of your current finished goods inventory: Above normal, Normal for the season, Below normal.

Question 5: Your production volume expectation for the next three months: It will increase, It will remain the same, It will decrease.

Question 6: Your sales price expectation for the next three months: It will increase, It will remain the same, It will decrease.

Question 7: Your total employment expectation for the next three months: It will increase, It will remain the same, It will decrease.

Question 8: The total amount of orders you received in the last three months: Increased, Stayed the same, Decreased.

Question 9: Your total order quantity expectation for the next three months: It will increase, It will remain the same, It will decrease.

Question 10: The amount of export orders you received in the last three months: Increased, Stayed the same, Decreased.

Question 11: Your export order quantity expectation for the next three months: It will increase, It will remain the same, It will decrease.

Question 12: Your capacity utilization rate (Please indicate the actual capacity utilization as a percentage of physical capacity at present.)

Question 13: The amount of your currently registered domestic market orders: Above normal, Normal for the season, Below normal.

Question 14: The amount of domestic market orders you received in the last three months: Increased, Stayed the same, Decreased.

Question 15: Your domestic market order quantity expectation for the next three months: It will increase, It will remain the same, It will decrease.

Question 16: Your domestic market sales price expectation for the next three months: It will increase, It will remain the same, It will decrease.

Question 17: Compared to the past twelve months, your expectation for fixed capital investment expenditures in the next twelve months: It will increase, It will remain the same, It will decrease.

Question 18: Your average unit cost over the last three months: Increased, Stayed the same, Decreased.

Question 19: Your expectation for the average unit cost in the next three months: It will increase, It will remain the same, It will decrease.

Question 20: Your annual inflation expectation at the end of the next twelve-month period (Please specify as a percentage): (CPI:...) (PPI:...)

Question 21 :Your expectation for the short-term Turkish Lira interest rate in the upcoming three-month period: It will increase, It will remain the same, It will decrease.

Question 22: Your opinion on the general trend in your industry compared to a month ago: More optimistic, The same, More pessimistic.

Appendix - B - Robustness Check

Alternative Definition of Lagged Fuel Prices

Table B1: Effect of Fuel Prices on Firms' Outstanding Credits

	(1) All Sample	(2) Large	(3) SME	(4) High Leveraged	(5) Low Leveraged
Panel A: Total Outstanding Loans					
Fuel Prices$_{p,t-1}$	0.051***	0.047***	0.057***	0.067***	0.042***
	(0.006)	(0.009)	(0.010)	(0.022)	(0.007)
R-squared	0.622	0.622	0.550	0.607	0.629
Mean of Dependent Variable	8.167	8.731	7.442	7.889	8.261
Panel B: Short-Term Outstanding Loans					
Fuel Prices$_{p,t-1}$	0.499***	0.485***	0.509***	0.681***	0.458***
	(0.030)	(0.047)	(0.049)	(0.090)	(0.033)
R-squared	0.354	0.355	0.366	0.378	0.370
Mean of Dependent Variable	5.635	6.103	5.034	5.424	5.706
Panel C: Long-Term Outstanding Loans					
Fuel Prices$_{p,t-1}$	-0.524***	-0.490***	-0.555***	-0.569***	-0.512***
	(0.030)	(0.044)	(0.066)	(0.070)	(0.034)
R-squared	0.346	0.356	0.372	0.363	0.365
Mean of Dependent Variable	3.991	4.145	3.793	4.001	3.988
Bank × Firm FE	✓	✓	✓	✓	✓
Bank × Year-Month FE	✓	✓	✓	✓	✓
Sector × Year-Month FE	✓	✓	✓	✓	✓
Region × Year-Month FE	✓	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓	✓
Observations	951,433	534,891	416,514	240,210	711,195

Notes: This table presents the estimation results for Equation 2. Each panel corresponds to a different dependent variable as labeled. The unit of observation is firm–bank–province–year–month. The regressor Fuel Prices$_{p,t-1}$ is the log province–month pump price (lagged one month), computed as the triangular mean using the *monthly* min, mode, and max of daily prices: Fuel Prices$_{p,t-1} = \ln\left[(p^{\min}_{p,t-1} + p^{\text{mode}}_{p,t-1} + p^{\max}_{p,t-1})/3\right]$. In each panel, the dependent variable is defined as $y_{jbpt} = \log(X_{jbpt})$, where X_{jbpt} denotes the total outstanding credit amount in Panel A, the short-term outstanding credit amount in Panel B, and the long-term outstanding credit amount in Panel C. An SME is a firm with fewer than 250 employees; firms with 250 or more employees are classified as large. High-leverage firms are those whose leverage ratio (total debt/total assets) lies in the top 20th percentile of the sector–year distribution; low-leverage firms are the remainder. Standard errors, clustered by province, are reported in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table B2: Effect of Fuel Prices on Flow Credit and Borrowing Costs

	(1) All	(2) Large	(3) SME	(4) High Leverage	(5) Low Leverage
Flow Credits					
Fuel Prices$_{p,t-1}$	0.169***	0.230***	0.079**	0.292***	0.146***
	(0.019)	(0.031)	(0.033)	(0.067)	(0.016)
Observations	297,404	163,747	133,628	53,907	243,450
R-squared	0.433	0.432	0.478	0.519	0.438
Mean of Dependent Variable	0.998	1.032	0.956	1.268	0.938
Flow Credits (Borrowing Sample)					
Fuel Prices$_{p,t-1}$	0.825***	0.813***	0.847***	0.743***	0.840***
	(0.017)	(0.016)	(0.022)	(0.039)	(0.017)
Observations	109,387	61,987	47,279	25,224	83,979
R-squared	0.588	0.600	0.604	0.600	0.606
Mean of Dependent Variable	2.707	2.720	2.690	2.692	2.711
Borrowing Costs					
Fuel Prices$_{p,t-1}$	0.522***	0.506***	0.568***	0.583***	0.490***
	(0.063)	(0.081)	(0.069)	(0.136)	(0.065)
Observations	140,901	83,769	57,034	29,849	110,892
R-squared	0.633	0.622	0.614	0.681	0.645
Mean of Dependent Variable	8.149	8.699	7.343	8.125	8.158
Firm FE	✓	✓	✓	✓	✓
Sector × Year-Month FE	✓	✓	✓	✓	✓
Region × Year-Month FE	✓	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓	✓
Credit Demand and Supply Controls	✓	✓	✓	✓	✓

Notes: This table presents the estimation results for Equation 3. Each panel corresponds to a different dependent variable as labeled. The unit of observation is the firm–year–month. The regressor Fuel Prices$_{p,t-1}$ is the log province–month pump price (lagged one month), computed as the triangular mean using the *monthly* min, mode, and max of daily prices: Fuel Prices$_{p,t-1} = \ln\left[(p^{\min}_{p,t-1} + p^{\text{mode}}_{p,t-1} + p^{\max}_{p,t-1})/3\right]$. The dependent variables are: (i) Panel A: $y_{it} = \ln(1 + \text{FlowCredit}_{it})$ in the full sample (zeros retained), capturing the extensive and intensive margins jointly; (ii) Panel B: $y_{it} = \ln(\text{FlowCredit}_{it})$, estimated on the borrowing sample with strictly positive new credit; (iii) Panel C: $y_{it} = \ln(\text{BorrowingCost}_{it})$, the log of the volume-weighted average interest rate on new loans (borrowing sample). Credit Demand and Supply Controls are high-dimensional fixed-effect proxies—firm×year–month effects $\widehat{\omega}_{it}$ and bank×year–month effects $\widehat{\theta}_{bt}$ (credit-weighted to the firm)—constructed from a first-stage on outstanding credit to absorb time-varying firm-side demand shifts and bank-side supply shocks. An SME is a firm with fewer than 250 employees; firms with 250 or more employees are classified as large. High-leverage firms are those whose leverage ratio (total debt/total assets) lies in the top 20th percentile of the sector–year distribution; low-leverage firms are the remainder. Standard errors, clustered by province, are reported in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Effect of Volatility in Fuel Prices

Table B3: Effect of Volatility in Fuel Prices on Firms' Outstanding Credits

	(1) All Sample	(2) Large	(3) SME	(4) High Leveraged	(5) Low Leveraged
Panel A: Total Outstanding Loans					
Volatility in Fuel Prices$_{p,t-1}$	0.004***	0.003**	0.005***	0.007*	0.003**
	(0.001)	(0.002)	(0.002)	(0.004)	(0.001)
R-squared	0.622	0.622	0.550	0.607	0.629
Mean of Dependent Variable	8.167	8.731	7.442	7.889	8.261
Panel B: Short-Term Outstanding Loans					
Volatility in Fuel Prices$_{p,t-1}$	0.053***	0.053***	0.058***	0.068***	0.048***
	(0.012)	(0.016)	(0.010)	(0.016)	(0.015)
R-squared	0.353	0.355	0.366	0.378	0.370
Mean of Dependent Variable	5.635	6.103	5.034	5.424	5.706
Panel C: Long-Term Outstanding Loans					
Volatility in Fuel Prices$_{p,t-1}$	-0.023*	-0.015	-0.035***	-0.009	-0.020
	(0.013)	(0.014)	(0.012)	(0.027)	(0.011)
R-squared	0.346	0.356	0.372	0.363	0.365
Mean of Dependent Variable	3.991	4.145	3.793	4.001	3.988
Bank × Firm FE	✓	✓	✓	✓	✓
Bank × Year-Month FE	✓	✓	✓	✓	✓
Sector × Year-Month FE	✓	✓	✓	✓	✓
Region × Year-Month FE	✓	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓	✓
Observations	951,433	534,891	416,514	240,210	711,195

Notes: This table presents the estimation results for Equation 2. Each panel corresponds to a different dependent variable as labeled. The unit of observation is firm–bank–province–year–month. In each panel, the dependent variable is defined as $y_{jbpt} = \log(X_{jbpt})$, where X_{jbpt} denotes the total outstanding credit amount in Panel A, the short-term outstanding credit amount in Panel B, and the long-term outstanding credit amount in Panel C. An SME is a firm with fewer than 250 employees; firms with 250 or more employees are classified as large. High-leverage firms are those whose leverage ratio (total debt/total assets) lies in the top 20th percentile of the sector–year distribution; low-leverage firms are the remainder. Standard errors, clustered by province, are reported in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table B4: Effect of Volatility in Fuel Prices on Firms' Outstanding Credits

	(1) All Sample	(2) Large	(3) SME	(4) High Leveraged	(5) Low Leveraged
Panel A: Total Outstanding Loans					
Volatility in Fuel Prices$_{p,t-1}$	0.005***	0.006**	0.006*	0.009*	0.005**
	(0.002)	(0.002)	(0.003)	(0.005)	(0.002)
R-squared	0.622	0.622	0.550	0.607	0.629
Mean of Dependent Variable	8.167	8.731	7.442	7.889	8.261
Panel B: Short-Term Outstanding Loans					
Volatility in Fuel Prices$_{p,t-1}$	0.053***	0.057**	0.052***	0.062***	0.048**
	(0.020)	(0.024)	(0.017)	(0.022)	(0.024)
R-squared	0.353	0.355	0.366	0.378	0.370
Mean of Dependent Variable	5.635	6.103	5.034	5.424	5.706
Panel C: Long-Term Outstanding Loans					
Volatility in Fuel Prices$_{p,t-1}$	-0.016	-0.008	-0.027	0.011	-0.014
	(0.021)	(0.021)	(0.021)	(0.041)	(0.020)
R-squared	0.346	0.356	0.372	0.363	0.365
Mean of Dependent Variable	3.991	4.145	3.793	4.001	3.988
Bank × Firm FE	✓	✓	✓	✓	✓
Bank × Year-Month FE	✓	✓	✓	✓	✓
Sector × Year-Month FE	✓	✓	✓	✓	✓
Region × Year-Month FE	✓	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓	✓
Observations	951,433	534,891	416,514	240,210	711,195

Notes: This table presents the estimation results for Equation 2. Each panel corresponds to a different dependent variable as labeled. The unit of observation is firm–bank–province–year–month. Fuel Volatility$_{p,t-1}$ is the province–month price volatility (triangular s.d.) computed from the *monthly* min, mode, and max of daily prices: $\text{Fuel Volatility}_{p,t-1} = \sqrt{\frac{(p^{\min}_{p,t-1})^2+(p^{\text{mode}}_{p,t-1})^2+(p^{\max}_{p,t-1})^2-p^{\min}_{p,t-1}p^{\text{mode}}_{p,t-1}-p^{\min}_{p,t-1}p^{\max}_{p,t-1}-p^{\text{mode}}_{p,t-1}p^{\max}_{p,t-1}}{18}}$. In each panel, the dependent variable is defined as $y_{jbpt} = \log(X_{jbpt})$, where X_{jbpt} denotes the total outstanding credit amount in Panel A, the short-term outstanding credit amount in Panel B, and the long-term outstanding credit amount in Panel C. An SME is a firm with fewer than 250 employees; firms with 250 or more employees are classified as large. High-leverage firms are those whose leverage ratio (total debt/total assets) lies in the top 20th percentile of the sector–year distribution; low-leverage firms are the remainder. Standard errors, clustered by province, are reported in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table B5: Effect of Fuel Price Variance on Flow Credit and Borrowing Costs

	(1) All	(2) Large	(3) SME	(4) High Leverage	(5) Low Leverage
Panel A: Flow Credits					
Volatility in Fuel Prices$_{p,t-1}$	0.103***	0.133***	0.059***	0.121***	0.100***
	(0.008)	(0.012)	(0.013)	(0.027)	(0.009)
Observations	297,404	163,747	133,628	53,907	243,450
R-squared	0.433	0.433	0.478	0.519	0.438
Mean of Dependent Variable	0.998	1.032	0.956	1.268	0.938
Panel B: Flow Credits (Borrowing Sample)					
Volatility in Fuel Prices$_{p,t-1}$	0.121***	0.118***	0.125***	0.104***	0.124***
	(0.003)	(0.004)	(0.004)	(0.005)	(0.003)
Observations	109,387	61,987	47,279	25,224	83,979
R-squared	0.572	0.584	0.589	0.588	0.589
Mean of Dependent Variable	2.707	2.720	2.690	2.692	2.711
Panel C: Borrowing Costs					
Volatility in Fuel Prices$_{p,t-1}$	0.098***	0.113***	0.069**	0.143***	0.086***
	(0.015)	(0.030)	(0.026)	(0.043)	(0.018)
Observations	140,901	83,769	57,034	29,849	110,892
R-squared	0.633	0.621	0.613	0.680	0.644
Mean of Dependent Variable	8.149	8.699	7.343	8.125	8.158
Firm FE	✓	✓	✓	✓	✓
Sector × Year-Month FE	✓	✓	✓	✓	✓
Region × Year-Month FE	✓	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓	✓
Credit Demand and Supply Controls	✓	✓	✓	✓	✓

Notes: This table presents the estimation results for Equation 3. Each panel corresponds to a different dependent variable as labeled. The unit of observation is the firm–year–month. The regressor $\ln(\text{fuel})_{p,t-1}$ is the log retail pump price in the firm's province, lagged one month. The dependent variables are: (i) Panel A: $y_{it} = \ln(1 + \text{FlowCredit}_{it})$ in the full sample (zeros retained), capturing the extensive and intensive margins jointly; (ii) Panel B: $y_{it} = \ln(\text{FlowCredit}_{it})$, estimated on the borrowing sample with strictly positive new credit; (iii) Panel C: $y_{it} = \ln(\text{BorrowingCost}_{it})$, the log of the volume-weighted average interest rate on new loans (borrowing sample). Credit Demand and Supply Controls are high-dimensional fixed-effect proxies—firm×year–month effects $\widehat{\omega}_{it}$ and bank×year–month effects $\widehat{\theta}_{bt}$ (credit-weighted to the firm)—constructed from a first-stage on outstanding credit to absorb time-varying firm-side demand shifts and bank-side supply shocks. An SME is a firm with fewer than 250 employees; firms with 250 or more employees are classified as large. High-leverage firms are those whose leverage ratio (total debt/total assets) lies in the top 20th percentile of the sector–year distribution; low-leverage firms are the remainder. Standard errors, clustered by province, are reported in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table B6: Effect of Fuel Price Variance on Flow Credit and Borrowing Costs

	(1) All	(2) Large	(3) SME	(4) High Leverage	(5) Low Leverage
Panel A: Flow Credits					
Volatility in Fuel Prices$_{p,t-1}$	0.153***	0.202***	0.080***	0.164***	0.152***
	(0.013)	(0.020)	(0.018)	(0.036)	(0.014)
Observations	297,404	163,747	133,628	53,907	243,450
R-squared	0.433	0.433	0.478	0.519	0.438
Mean of Dependent Variable	0.998	1.032	0.956	1.268	0.938
Panel B: Flow Credits (Borrowing Sample)					
Volatility in Fuel Prices$_{p,t-1}$	0.156***	0.153***	0.162***	0.139***	0.159***
	(0.004)	(0.005)	(0.005)	(0.009)	(0.004)
Observations	109,387	61,987	47,279	25,224	83,979
R-squared	0.571	0.583	0.588	0.588	0.588
Mean of Dependent Variable	2.707	2.720	2.690	2.692	2.711
Panel C: Borrowing Costs					
Volatility in Fuel Prices$_{p,t-1}$	0.127***	0.167***	0.051	0.180***	0.112***
	(0.020)	(0.040)	(0.036)	(0.063)	(0.024)
Observations	140,901	83,769	57,034	29,849	110,892
R-squared	0.633	0.621	0.613	0.680	0.644
Mean of Dependent Variable	8.149	8.699	7.343	8.125	8.158
Firm FE	✓	✓	✓	✓	✓
Sector × Year-Month FE	✓	✓	✓	✓	✓
Region × Year-Month FE	✓	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓	✓
Credit Demand and Supply Controls	✓	✓	✓	✓	✓

Notes: This table presents the estimation results for Equation 3. Each panel corresponds to a different dependent variable as labeled. The unit of observation is the firm–year–month. Fuel Volatility$_{p,t-1}$ is the province–month price volatility (triangular s.d.) computed from the *monthly* min, mode, and max of daily prices: $\text{Fuel Volatility}_{p,t-1} = \sqrt{\frac{(p^{\min}_{p,t-1})^2+(p^{\text{mode}}_{p,t-1})^2+(p^{\max}_{p,t-1})^2-p^{\min}_{p,t-1}p^{\text{mode}}_{p,t-1}-p^{\min}_{p,t-1}p^{\max}_{p,t-1}-p^{\text{mode}}_{p,t-1}p^{\max}_{p,t-1}}{18}}$. The dependent variables are: (i) Panel A: $y_{it} = \ln(1 + \text{FlowCredit}_{it})$ in the full sample (zeros retained), capturing the extensive and intensive margins jointly; (ii) Panel B: $y_{it} = \ln(\text{FlowCredit}_{it})$, estimated on the borrowing sample with strictly positive new credit; (iii) Panel C: $y_{it} = \ln(\text{BorrowingCost}_{it})$, the log of the volume-weighted average interest rate on new loans (borrowing sample). Credit Demand and Supply Controls are high-dimensional fixed-effect proxies—firm×year–month effects $\widehat{\omega}_{it}$ and bank×year–month effects $\widehat{\theta}_{bt}$ (credit-weighted to the firm)—constructed from a first-stage on outstanding credit to absorb time-varying firm-side demand shifts and bank-side supply shocks. An SME is a firm with fewer than 250 employees; firms with 250 or more employees are classified as large. High-leverage firms are those whose leverage ratio (total debt/total assets) lies in the top 20th percentile of the sector–year distribution; low-leverage firms are the remainder. Standard errors, clustered by province, are reported in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.