African Scientific Journal
ISSN : 2658-9311
Vol : 03, Num 36 Juin 2026

Corporate Leverage Dynamics Under an Unorthodox Monetary Policy Regime : Evidence from Industrial Firms Listed On Borsa Istanbul (2016-2023).

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Pour citer cet article : Najwa BENSRHIR (2026). « Corporate Leverage Dynamics Under an Unorthodox Monetary Policy Regime : Evidence from Industrial Firms Listed On Borsa Istanbul (2016-2023). », African Scientific Journal « Volume 03, Num 36 » pp: 3007 – 3032.

DOI : 10.5281/zenodo.21209369

Abstract :

This present paper aims to examine whether firms' pre-existing exposure to short-term liabilities was linked with differential corporate leverage adjustment during Turkiye's 2021-2023 macro-financial regime. This paper uses a balanced panel of 36 non-financial industrial firms listed on Borsa Istanbul,yielding 288 firm-year observations during the period of 2016-2023. Firm level exposure is measured as each firm's average current-liabilities-to-total-assets ratio during the 2016-2020 baseline period.The empirical analysis relies on Two-way fixed-effects models specifications that include firm and year effects and control for size,profitability,tangibility,liquidity,and operating cash flow.Inference is conducted using standard errors clustered with a finite-cluster degrees-of -freedom correction.The interaction between the regime indicator and firm's pre-existing short-term liability exposure is negative and the statistically significant in liability-based leverage model. The estimated coefficient for short-term liabilities and long-term liabilities are likewise negative ,however they are only weakly significant,while the coefficient for liability-maturity remains statistically not significant under the more conservative small-cluster inference.The principal leverage result is robust when sales growth is added,when 2023 is excluded , which limits the regime period to 2021-2022.Overall ,the findings provide robust evidence of a differential association between firms ' pre-existing liability exposure and total leverage adjustment.However,the empirical design does not permit a causal interpretation of the effect of policy-rate reductions or identify a single transmission mechanism operating through debt maturity. The present study contributes to the literature on firm heterogeneity by demonstrating that firms' pre-existing liability structures play a major role in shaping balance-sheet responses in a volatile emerging-market context.

Key words :Unorthodox monetary policy, corporate leverage , firm heterogeneity,short-term liability exposure,monetary-policy transmission ,Borsa Istanbul , Turkey.

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Introduction

Corporate financing is influenced by monetary policy through different elements: cost of funds,bank credit,expectations about future economic activity and asset valuation. Lower policy rates are generally expected to decrease borrowing costs and support credit demand in a conventional easing cycle.This conventional expectation becomes less reliable when the policy rate is accompanied by : inflation,exchange rate depreciation,risk premia and greater regulatory intervention. These conditions lead to growing disconnect between the official policy rate and the financing conditions faced by non-financial firmsBetween 2021 and 2023 Turkey provides a special informative setting.The Central Bank of the Republic of Turkey reduced the one-week repo rate despite accelerating inflation and intense pressure on the Turkish Lira this episode created deeply negative ex-post real policy rates,but this did not constitute a standard monetary expansion.Access to commercial credit was not determined solely by interest rates but also by selective credit policies and macroprudential regulations ,securities-holding requirements, exchange rate-risks and heightened uncertainty.

This monetary-policy stance began to reverse in June 2023 ,when the CBRT started raising the policy rate which reached to 42.5 percent by the end of the year (CBRT,2023).Because annual financial statements do not permit separate identification of he easing and tightening phases of 2023 both phases are treated as part of the broader exceptional episode.The analysis is also repeated after removing 2023 from the sample as a robustness check.

The conditions in Turkey led to the creation of a corporate financing Paradox.The combination of low nominal policy rates and high inflation may have reduced the real cost of domestic-currency debt and supported firms to increase their borrowing , however currency depreciation may have raised the Turkish-lira value of foreign-currency liabilities, while volatile lending conditions and credit constraints may have made access to new financing more difficult.Consequently, the net effect on corporate leverage remains an empirical question rather than a direct implication of the official policy stance.

The effect of the episode should also differ across firms.Companies entering the episode with high short-term liabilities had larger and more frequent refinancing needs.Recent evidence shows that the share of debt approaching maturity amplifies firms' exposure to monetary policy shocks,as these obligations must be refinanced under prevailing market conditions (Jungherr et al., 2024).In an unstable credit environment, high refinancing exposure can encourage deleveraging, liquidity preservation,or the adoption of shorter planning horizons rather than expand their borrowing.

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The main question of this article is : How did pre-existing short-term liability exposure shape the leverage and liability maturity adjustments of Borsa Istanbul industrial firms during Turkey's 2021-2023 unorthodox monetary-policy period?

This study investigates whether firms' pre-existing reliance on short-term liability exposure shaped firms' financing adjustments during Turkey's 2021-2023 macro-financial regime.Exposure is defined as each firm's average ratio to total assets during the 2016-2020.The analysis considers liability-based leverage,short-tetm liabilities, long term liabilities, and liability maturity.

The empirical analysis is based on a balanced panel of 36 publicly listed non-financial industrial firms observed overt the 2016-2023 period,yielding 288 firm-year observations

.The study employs two-way fixed-effects models that include firm and year effects,standard firm-level controls,and firm-clustered standard errors. Robustness tests add sales growth,exclude 2023,and substitute interest-bearing debt for total liabilities as the measure of leverage.

The main interaction coefficient is negative and statistically significant for liability-based leverage. The corresponding coefficients for

short-term and long-term liabilities are also negative,although they attain only marginal levels of statistical significant,while the liability-maturity estimate is not statistically significant.The main leverage result remains robust across alternative specifications.

This study contributes to the literature by demonstrating that firms' pre-existing liability structures influenced their relative financing paths during an exceptional emerging-market episode.It therefore connects the literature on capital structure and debt maturity with recent research on heterogeneous monetary-policy transmission. The remainder of the article presents the literature and hypotheses, the institutional background, methodology,results, discussion ,and conclusion.

2.Literature Review and Hypothesis Developement

2.1 Monetary policy transmission and firm heterogeneity

The conventional interest-rate channel explains monetary transmission through the effect of policy-rate changes on the cost of capital and,consequently, aggregate expenditure.Financial-friction theories broaden this perspective by highlighting that monetary policy also affects the external finance premium and firms' capacity to obtain credit.Bernanke and Gertler (1989) demonstrate that borrowers balance-sheet conditions impact the cost of external funding,while

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Bernanke and Blinder (1992) identify the bank-lending channel as an additional mechanism of monetary transmission.These channels are significant in bank-dominated financial systems,where firms can not easily substitute market finance for bank credit.

Firms do not respond in a uniform way to monetary policy shocks.Gertler and Gilchrist (1994) and Stein (2000) show that differences in financing constraints and intermediary balance-sheet conditions contribute to heterogeneous transmission effects.Ottonelo and Winberry (2020) further demonstrate that firms'responses to monetary policy vary according to their initial leverage positions.Recent central-bank evidence highlights firm size,leverage,export orientation and sector as major dimension of monetary transmission in emerging markets (Dong et al., 2025).

Recent evidence from Turkey is especially informative in this regard.Akarsu et al. (2025) find that unexpected monetary-policy changes generate heterogeneous effects on firms' credit utilization,borrowing costs,default risk,creditworthiness,and foreign-currency activity.Their findings provide support for an empirical framework in which predetermined balance-sheet characteristics condition firm-level outcomes during monetary-policy episodes.

2.2 Capital structure under macroeconomic instability

Capital-structure theory predicts that firms balance the tax advantage of debt against the expected costs of financial distress (Kraus & Litzenberger, 1973).Pecking-order theory argues that , in the presence of information asymmetry firms prioritize internal finance over equity (Myers & Majluf,1984).Cross-country identify profitability, size,tangibility, and growth opportunities as recurring determinants of leverage , however their role varies with legal,financial, and macroeconomic institutions (Rajan & Zingales,1995; Booth et al.,2001 ;Frank & Goyal,2009;Fan et al., 2012)

High inflation can reduce the real value of fixed nominal liabilities,but it can simultaneously distort the assessment of real borrowing costs,weaken planning, and increase risk premia.Exchange rate depreciation may further raise the domestic-currency value of foreign-currency-denominated liabilities and imported production inputs.In emerging markets, these pressures may weaken or offset the expansionary effect of lower official rates.Corporate financing decisions depend not only on the price of credit but also on acess to credit , debt maturity ,currency composition, and expectations regarding future refinancing conditions.

2.3 Debt Maturity,rollover risk,and refinancing exposure

Debt maturity affects how frequently firms must acess external financing markets.Although short-term financing may reduce agency problems and provide greater financial flexibility. It

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also exposes firms to greater liquidity and refinancing risk (Flannery, 1986;Diamond,1991).Empirical research also associates debt maturity with firm size,growth opportunities, asset maturity ,and credit quality (Barclay & Smith,1995).When credit conditions worsen,firms with near-term obligations may be forced to refinance at unfavorable rates, renegotiate existing contracts, dispose of assets,or reduce investment. He and Xiong (2012) show theoretically how rollover risk can amplify financial distress.

Jungherr et .al (2024) provide recent evidence that corporate debt maturity is a major determinant of monetary-policy transmission.Firms' investment responses are stronger when a larger share of debt matures because firms face greater rollover needs and changes in the real burden outstanding nominal obligations.The Committee on the Global financial System (2024) argues that the frequency of interest rate repricing,contractual maturity,and interest-rate structure influence monetary policy transmission beyond aggregate leverage alone.

Evidence from Turkey supports the relevance of these mechanisms.Deniz and Yarba (2024) demonstrate that bank-loan maturity has meaningful implications for corporate investment. Çapacıoğlu and Kara (2024) show that currency mismatches are another important source of corporate vulnerability and macroprudential measures can substantially alter such exposures. Alper Çapacıoğlu (2024) demonstrate that the quality of banks' funding affects the pricing of financing conditions faced by borrowers.

2.4 Recent evidence and positioning of the study

Recent research intensively treats debt maturity and interest-rate repricing structure as key determinants of monetary-policy transmission.Hempel,Li and Tibay (2024) demonstrate that short-and long-term debt are necessarily close substitutes. Kitsul,Kim and Palazzo (2023) further show that pass-through of monetary tightening to debt-servicing costs rely on the repricing structure of outstanding obligations.Taken together,these studies show that the pass-through of monetary policy to corporate debt-servicing costs depends on the maturity and repricing structure of outstanding obligations.

This article extends the existing literature by focusing on listed industrial firms and their overall accounting liability structure.It investigates whether a predetermined indicator of short-term liability exposure accounts for heterogeneous adjustments in total liabilities,current liabilities, non-current liabilities, and liability maturity during the 2021-2023 episode.This approach links recent monetary-transmission research to firm-level balance-sheet dynamics within an unusually volatile emerging-market setting.

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Recent evidence from Turkey also shows that banks' interest-rate can affect monetary-policy transmission,further highlighting the role of bank-sheet conditions in shaping firms' effective acess to credit (Dursun-de Neef,Er, & Yarba,2026).

Table 1.Summary of Selected Empirical Literature

Study	Context	Main focus	Main finding	Revelance of the present studies
Financial heterogeneity and monetary-policy transmission	United States	Financial heterogeneity and monetary-policy transmission	Firms'responses to monetary policy vary according to their initial financial positions	Supoports the use of predetermined firm-level exposure
Kitsul et al.(2023)	Non financial corporations	Monetary tightening and debt-servicing costs	The transmission of monetary policy depends on the repricing structure of outstanding debt	Highlights the role of debt repricing and maturity
Jungherr et al.	Corporate sector	Debt maturity and monetary-policy transmission	Firms with more debt approaching maturity are more exposed to changes in financial conditions	Motivates the focus on short-term liability exposure
Deniz and Yarba	Turkey	Bank-loan maturity and corporate investment	Loan maturity affects firms ' investment responses	Provides Turkey specific evidence on debt maturity
Akarsu et al.	Turkey	Heteregenous firm-level effects of monetary-policy transmission	Bank balance-sheet conditions influence the transmission of monetary policy to borrowers	Highlights the importance of credit-supply conditions
Dursun de Neef et.al.(2026)	Turkey	Bank Interest-rate risk and monetary-	Bank balance-sheet conditions influence the transmission of	Highliths the importance of credit-supply conditions

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		policy transmission	monetary policy to borrowers	
Present study	Turkey, 2016-2023	Initial short-term liability and leverage adjustment	Examines whether firms with greater pre-existing exposure followed different leverage and liability-maturity paths during the 2021-2023 regime	Extends the literature to accounting liability structures during an unconventional macro-financial episode

Source : Author'synthesis based on the reviewed literature

2.5 Research Gap

The existing literature reveals three related gaps.First,most empirical studies examine conventional episodes of monetary tightening or easing rather than an episode combining policy-rate cuts accelerating inflation,currency depreciation and extensive macroprudential measures, Second,average treatment effects may conceal heterogeneity arising from differences in pre-existing refinancing exposure. Third ,much of the literature analyzes aggregate leverage without examining the maturity composition of firms' liabilities.

The Turkish episode produces competing predictions.Lower official interest rates and deeply negative real policy rates may have encouraged borrowing,whereas rollover pressure,bank screening, exchange-rate exposure and uncertainty may have constrained liability growth.

Since the theoretical framework does not determine the net sign in this setting,the article formulates non directional hypotheses and determines the direction of these relationships through empirical estimation.

H1: Pre-existing short-term liability exposure is significantly associated with relative liability-based leverage during the 2021-2023 regime period.

H2: Pre-existing short-term liability exposure is significantly associated with the relative short-term liability ratio during the regime period.

H3 : Pre-existing short-term liability exposure is significantly associated with the relative long-term liability ratio during the regime period.

H4 : Pre-existing short-term liability exposure is significantly associated with the relative liability maturity during the regime period.

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3.Institutional and Macroecomic Background

3.1 From the baseline period to the unorthodox regime

The 2016-2020 period serves as the pre-regime reference window , however it was not a period of complete stability: Turkey experienced a major currency shock in 2018 and pandemic-related credit expansion in 2020.Neverthless,monetary policy decisions remained more closely aligned with inflation developments and exchange-rate pressures than during 2021-2023 period .At the beginning firms entered the later episode with substantial variation in liquidity,leverage,foreign-currency exposure, and short-term refinancing needs.

Beginning in September 2021,the Central Bank lowered the one-week repo rate from 19 percent to 14 percent by year-end.Additional reductions took it to 9 percent by the end of 2022 and 8.5 percent in early 2023.These decisions coincided with sharp acceleration in inflation,resulting deeply negative ex-post real policy rates rates. Monetary policy was implemented through a complex framework of macroprudential rules,credit-growth was incentives, securities requirements, and measures designed to support the use of Turkish-lira denominated assets (CBRT,2022,2023,IMF,2024)

3.2 Inflation,exchange rates and effective credit conditions

Annual consumer-price inflation reached 36.1 percent at the end of 2021 rose further to 64.3 percent,at the end of 2023 and stood at 64.8 percent at the end of 2023. Although elevated inflation could reduce the real burden of outstanding Turkish Lira denominated liabilities, it also increased uncertainty and made the pricing of new credit.more difficult.The sharp depreciation of theTurkish Lira increased the domestic-currency cost of unhedged foreign-currency obligations and imported inputs.

The effective financing conditions faced by firms diverged from the official policy rate.Banks determined lending terms according to expected inflation,funding conditions,regulations, collateral availability and borrower specific risk.Firms with high short-term obligations were therefore exposed to refinancing decisions during this volatile period.In June 2023,the CBRT began a conventional monetary tightening cycle raising the policy rate from 8.5 percent to 42.5 percent by December.the inclusion of year fixed effects in the empirical specification absorbs common annual shocks,including the average impact of this within-year policy reversal.

The institutional setting calls for a cautious interpretation of the results the regime indicator captures a broad macro-financial episode rather than a discrete and exogenous policy-rate

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shock.Accordingly,the empirical question is whether firms with different pre-existing exposure experienced systematically different liability paths during this period.

3.3 why low official rates did not imply uniformly easy corporate finance

Three distinctions are essential for understanding this period.First,the policy rate functions as a short-term benchmark,whereas firms borrowing costs reflect a broader set of factors, inflation expectations, credit risk,bank funding costs, maturity premia,collateral quality, and regulatory expenses. Consequently , a falling policy rate can coexist with high or volatile commercial lending rates.Second access to credit may be rationed even when its administered price appears low increasing collateral requirements,or redirecting lending toward activities favored by regulation.

Third inflation affects outstanding and newly issued liabilities through different channels.Unexpected inflation can erode the real value of fixed-rate domestic- currency obligations,thereby benefiting existing borrowers.Conversly,the terms of new borrowing incorporate expectations regarding future inflation and risk.Firms may consequently experience a decline in the real value of their existing nominal obligations while facing
restrictive terms on new borrowing.Currency depreciation adds an additional source of asymmetry, as the Turkish Lira value of foreign-currency liabilities rise in lira terms unless these exposures are offset by export revenues or effective hedging arrangements.

These mechanisms make the episode particularly well suited to an exposure-based empirical framework. Firm with limited short-term refinancing requirements needs could delay market acess and benefit from the declining real value of existing Turkish-lira liabilities.Firms with substantial current liabilities were required to interact repeatedly with banks,suppliers and other creditors during the same period.Consequently ,they were more exposed to rollover decisions,changing maturities,and lender screening ,despite facing the same announced policy rate environment .

4.Data ,Variables,and empirical Methodology

4.1 Sample construction

The final sample comprises 36 non-financial industrial firms listed on Borsa Istanbul ,with annual observations covering the period from 2016 to 2023.Eligibility required: (i)be classified as non financial industrial firms companies;(ii) have comparable annual financial statements for every year during the period of 2016-2023 (iii) provide sufficient data to construct the four dependent variables,the 2016-2020 exposure measure,ans all baseline controls,and (IV)have one unique ,internally consistent observation for each firm-year.Financial

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institutions,insurers,and real-estate investment trusts were excluded because of their balance-sheet structuresleverage measures,and regulatory capital frameworks differ substantially from those of industrial firms. Consolidated financial statements were used whenever available .

Firms lacking complete annual observations or missing information required by the baseline specification were excluded so that the main analysis relies on a balanced panel.Application of these section criteria yields 36 firms×8 years=288 firm-year observations.Maintaining a constant sample composition from driving the full-period estimates although,this approach may also introduce survivorship and data-availability bias.The full list of firms included in the sample is reported in Appendix A ,whereas section 6.5 examines the associated limitations to external validity.

Accounting data were collected from firms' published financial statements and standardized prior to the empirical analysis. Ratio variables and controls were winsorized at the 1st and 99th percentiles because to limit the impact of extreme observations the extended specification incorporating sales growth its estimation period begins in 2017,leaving 252 firm-year observations.

4.2 variable definitions

Table 2.Variable definitions

Code	Measurement	Interpretation
LEV	Total liabilities / total assets	Liability-based leverage
STL	Current liabilities / total assets	Short-term liability intensity
LTL	Non-current liabilities / total assets	Long-term liability intensity
MAT	Non-current liabilities / total liabilities	Liability maturity share
Exposure	Average current liabilities / total assets,2016-2020	Predetermined short-term exposure
Regime	1 for 2021-2023 ; 0 otherwise	Unorthodox-period indicator
Size	Natural logarithm of total assets	Firm scale
Tangibility	Property,Plant and equipment/total assets	Collateral capacity
Liquidity	Current assets / current liabilities	Short-term liquidity

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Cash flow	Operating cash flow / total assets	Internal cash generation
Sales growth	Annual percentage change in net sales	Extended control
DEBT	Total interest-bearing/ total assets	Interest-bearing debt leverage robustness measure

Source : Authors' construction based on firms' annual financial statements published on KAP.

Note.Continious ratio variables used in regression are winsorized at the 1st and 99th percentiles. Liability-based leverage,the primary dependent variable,measures the propotion of assets financed by total liabilities. The short-term and long-term ratios provide a decomposition of this measure according to liability maturity.Liability maturity is the the share of non-current liabilities in total liabilities,a higher value indicates a more long-term liability structure.

The exposure measure is time-invariant at the furn level and is calculated using only the 2016-2020 baseline .It therefore reflects each firms' liability structure prior to the unorthodox monetary-policy episode.The interaction Regime × Exposure identifies whether changes in the dependent variables after 2020 change in outcomes varied systematically with firms' initial exposure.

4.3 Empirical specification

The baseline model is

$$Y_{it} = \beta(Regime_t \times Exposure_i)+\gamma' X_{it}+\alpha_i+\lambda_t+\varepsilon_{it}$$

Where Y_{it} is one of the four liability outcomes for firms i in year t; X_{it} contains the time-varying firm controls;α_i denotes firm fixed effects;and λ_t denotes year fixed effects.Standards errors are clustered by firm to allow arbitrary serial correlation and heteroskedacity within each company.

Because the exposure measure is time-invariant, it is individual effects is absorbed by the firm fixed effects,whereas the regime indicator,which is common to all firms is a given year ,is captured by the year fixed effects.The interaction remains identified because firms differ in exposure and the regime changes over time.The coefficient β should be interpreted as a differential association;it indicates whether firms with higher baseline exposure experienced systematically different relative changes in the outcome during 2021-2023 compared with less-exposed firms. It is not the average changes in leverage for all firms and does not by itself,establish a structural causal effect of policy-rate cuts.

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The extended specification incorporates sales growth as an additional control variable.Robutness is further assessed by replacing total liabilities with debt-based leverage,defined as Total interest-bearing borrowings divided by total assets, and by excluding 2023 so that the alternative regime window covers only 2021-2022.All specifications continue to include both firm and year fixed effects.Given that the sample comprises only 36 firm-level clusters,statistical inference is based on a finite-cluster degrees-of-freedom correction,and coefficients significant at the 10 percent level are interpreted as marginal rather than definitive. For replication ,total short-term debt is defined as the sum of short-term borrowings plus the current portion of long-term borrowings. Debt-based leverage is consequently measured as total borrowings divided by total assets.This narrower measure excludes non-interest-bearing operating liabilities and therefore assess whether the main findings are sensitive to the definition of leverage.

4.4 Data Validation , Identification, and Inference

Prior to estimation,firm-year identifiers were checked for duplicates,missing values,regime-coding errors,and economically implausible ratios.Continuous dependent variables and controls were winsorized at the 1st and 99th percentiles,while the time-invariant exposure measure and binary regime indicator were left unchanged.

The source of identifying variation is analogous to that of a continuous difference-in-differences framework. Firms vary in their predetermined exposure measured during the baseline period,while the macro-financial regime changes after 2020.Firm fixed effects account for all time-invariant firm characteristics, including persistent differences in business models and financing preferences.Year fixed effects,in turn,absorb aggregate shocks affecting all firms simultaneously, such as inflation,exchange-rate depreciation,the post-pandemic recovery, and the 2023 policy reversal.

The interaction coefficient captures whether firms with higher pre-regime exposure experienced systematically different relative changes in the outcomes during the 2021-2023 period.It should be interpreted as an exposure-related differential association rather than as the average change in leverage across all firms or as conclusive evidence of a causal effect arising from policy-rate reductions.This interpretation requires the assumption that,in the absence of the regime shift,firms with different initial exposure levels would not have followed systematically different outcome trajectories because of omitted time-varying factors. Standards errors are clustered at the firm level to accommodate both serial correlation and heteroskedacity within firms.Given the limited number of firm clusters,inference incorporates

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a finite-cluster degrees-of-freedom correction,and estimates significant only at the 10 percent level are interpreted as marginal rather than definitive.

5.Empirical Results

5.1 Descriptive evidence

Table 3.Descriptive statistics

Variable	N	Mean	SD	Min	Median	Max
Liability-based leverage	288	0.5508	0.1928	0.1233	0.5686	0.9321
Short-term liabilities	288	0.3424	0.1539	0.0647	0.3180	0.7463
Long-term liabilities	288	0.2077	0.1505	0.0143	0.1839	0.6812
Liability maturity	288	0.3614	0.1943	0.0496	0.3616	0.8572
Baseline exposure	288	0.3483	0.1448	0.1264	0.3375	0.7392
Firm size	288	15.6387	1.9399	10.8195	15.7003	20.0876
ROA	288	0.0652	0.0834	-0.1654	0.0586	0.3104
Tangibility	288	0.3819	0.2131	0.0482	0.3558	0.9322
Liquidity	288	1.6054	1.1266	0.3389	1.2852	6.5719
Cash flow /assets	288	0.0824	0.0904	-0.1247	0.0728	0.3880

Source : Authors' calculations based on firms' annual financial statements published on KAP,2016-2023.

Note.Statistics are based on the baseline regression sample of 288 firm-year observations. The average liability-based leverage is 0.551,indicating that liabilities finance slightly more than half of total assets,exceeding the mean non-current liability ratio of 0.208.The mean maturity share is 0.361,highlighting the substantial reliance of sample firms on short-term obligations.Considerable cross-firm variation is also observed in baseline short-term exposures,which ranges from 0.126 to 0.739.

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However,unconditional averages should not be treated as estimates of the regime effect of the monetary policy regime.Although average total leverage is lower during 2021-2023 than in 2016-2020,the short-term liability ratio remains relatively stable across the two periods.These patterns combine firm composition,common macroecomic shocks,and broader time trends.The fixed-effects regression results therefore provide the more appropriate framework for assessing exposure-related differences in firms' financial adjustments.

5.2 Descriptive comparison across periods.

Table 4.Unconditional means by policy period

Variable	2016-2020	2021-2023	Difference
Liability-based leverage	0.5752	0.5103	-0.0648
Short-term liabilities	0.3417	0.3436	+0.0018
Long-term liabilities	0.2330	0.1657	-0.0673
Liability maturity	0.3850	0.3220	-0.0630
ROA	0.0560	0.0804	+0.0244
Liquidity	1.5763	1.6538	+0.0776

Source : Authors ' estimations based on KAP financial-statement data,2016-2023.

Note. The differences are descriptive and do not control for firm characteristics, firm fixed effects,year effects,or differential exposure.They must not be interpreted as causal regime effects.The unconditional comparisons across periods shows that average liability-based leverage and the long-term liability ratio were lower during 2021-2023, whereas the short-term ratio changed much less.Although these descriptive results are consistent with shorter liability structures during the later period,they do not establish whether firms with greater initial exposure responded differently from those with lower exposure.

The regression design therefore moves beyond the aggregate comparison.Year fixed effects absorb common annual changes affecting all firms,while the interaction term examines whether firms' relative financial adjustment changes with baseline exposure.A negative interaction coefficient may be still observed when many firms increase their nominal liabilities because the

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dependent variables are ratios and the coefficient measures a relative exposure gradient rather than an economy-wide level effect.

5.3 Baseline two-way fixed-effects results

Table 5.Baseline two-way fixed-effects estimates

Variable	LEV	STL	LTL	MAT
Regime × exposure	-0.2310*** (0.0653)	-0.1404* (0.0817)	-0.1047* (0.0614)	-0.1375 (0.0866)
Firm size	-0.0343	-0.0432	0.0016	0.0410
	(0.0319)	(0.0367)	(0.0197)	(0.0327)
ROA	-0.7126*** (0.1134)	-0.1988* (0.1109)	-0.4696*** (0.1090)	-0.4778** (0.2019)
Tangibility	-0.0832 (0.1099)	-0.1133 (0.1163)	0.0682 (0.0505)	0.1864* (0.1061)
Liquidity	-0.0572*** (0.0128)	-0.0783*** (0.0234)	0.0186 (0.0206)	0.0848*** (0.0307)
Cash flow/ assets	-0.2126* (0.1253)	-0.0948 (0.0757)	-0.1398* (0.0761)	-0.1068 (0.0733)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	288	288	288	288
Number of firms	36	36	36	36
Within R^2	0.4936	0.4167	0.2409	0.2912

Source : Authors' estimation based on KAP financial-statement data,2016-2023. Note.LEV denotes liability-based leverage;STL denotes the short-term liability ratio;LTL denotes the long-term liability ratio; and MAT denotes the liability-maturity share.Firm-clustered standard errors adjusted for the finite number of clusters are reported in parentheses.All specifications include firm and year fixed effects.Statistical significance is

denoted by *** p <0.01,** p < 0.05, and *p < 0.10.Results significant only at the 10 percent level are interpreted as marginal .

Including sales growth as an additional control produces a leverage coefficient that remains very close to the baseline estimate (-0.2247, p=0.0031).For short-term liabilities,the estimate

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becomes somewhat more negative but falls just above the 5 percent significance threshold under the finite-cluster correction (p=0.0504),while remaining significant at the 10 percent level.The estimates for long-term liabilities and liability maturity continue to be imprecisely estimated. Excluding 2023 also leaves the central leverage estimate negative and significant (-0.1974,p=0.0015),while the component estimates are weaker,these robustness checks confirm that the most consistent evidence relates to overall leverage adjustment rather than to a clearly identified liability-maturity mechanism.

Debt-based leverage offers a more narrowly defined outcome measure because it captures only interest-bearing borrowings rather than total liabilities.The interaction remains negative in both the core and growth specifications,with estimates ranging from approximately -0.18 to -0.20.The alternative measure therefore supports the central interpretation: higher pre-existing short-term exposure is associated with comparatively restrained leverage path during the unorthodox period.The findings do not support straightforward cheap-credit narrative in which highly exposed firms exploit lower policy rates to expand borrowing more aggressively.Instead,they are more compatible with defensive balance-sheet adjustment, restricted credit acess,or selective lending behaviour by creditors.However,because the empirical design does not directly capture firms' loan applications,rejected credit requests, or the currency denomination of all liabilities ,these mechanisms cannot be separated conclusively.

5.4 Robustness check

Table 5 presents three robustness tests conducted to assess whether the main result is sensitive to the inclusion of an additional firm-level control,the definition of the regime period,or the measurement of leverage.First, annual sales growth is added to the baseline control variables.Because the construction of sales growth requires a lagged sales value,the resulting specification covers the 2017-2023 period and includes 252 firm-year observations.Second,observations from 2023 are excluded ,narrowing the regime window to 2021-2022.This test accounts for the monetary tightening cycle that began during 2023 and cannot be separately identified using annual financial statements.Third,the liability-based leverage measure is replaced by debt-based leverage,defined as total intetest-bearing borrowings divided by total assets.

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Table 6.Robustness checks for the Regime × Exposure coefficient Panel A.Alternative specifications across liability outcomes

Outcome	With sales growth:Coefficient (SE)	p-value	Excluding 2023: Coefficient (SE)	p-value
Liability-based leverage	-0.2247*** (0.0708)	0.0031	-0.1974*** (0.0573)	0.0015
Short-term liabilities	-0.1584* (0.0781)	0.0504	-0.1065 (0.0750)	0.1644
Long-term liabilities	-0.0821 (0.0686)	0.2391	-0.1047* (0.0536)	0.0589
Liability maturity	-0.1400 (0.1032)	0.1837	-0.0918 (0.0681)	0.1864
Observations	252	-	252	-
Number of firms	36	-	36	-
Firm fixed effects	Yes	-	Yes	-
Year fixed effects	Yes	-	Yes	-

Panel B.Debt-based leverage as an alternative outcome

Specification	Coefficient	Clustered SE	p-value	Observations
Core specification	-0.1953***	0.0640	0.0043	288
Specification with sales growth	-0.1842***	0.0637	0.0065	252
Number of firms	36	-	-	-
Firm fixed effects	Yes	-	-	-
Year fixed efects	Yes	-	-	-

Source: Authors ' estimations based on KAP financial-statement data,2016-2023.

The sales-growth specifications cover the 2017-2023 because calculating annual sales growth requires a lagged sales value.The specifications excluding 2023 are estimated over 2016-2022 and define the regime period as 2021-2022. Panel B replaces liability-based leverage with debt-based leverage, measured as total intetest-bearing borrowings divided by total assets.All specifications includ3 the baseline time-varying firm-level controls,as well as firm and year fixed effects;the sales-growth models additionally include annual sales growth.Standard errors

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are clustered at the firm level ans incorporate the full fixed-effects finite-sample correction.Statistical inference is based on (t)-distribution with 35 degrees of freedom .*** (p<0.01), **(p<0.05), and * (p<0.10).Results significant only at the 10 percent level are interpreted as marginal.

Including annual sales growth as an additional control does not materially affect the main finding. The regime × Exposure coefficient for liability-based leverage remains negative and statistically significant at the 1 percent level (coefficient= -0.2247,standard error =0.0708 ,(p=0.0031)).This estimated is close to the baseline coefficient,indicating that the main finding is not driven by the omission of firm growth.

For the individual liability components , the coefficient for short-term liabilities remains negative and is statistically significant only at the 10 percent level (coefficient = -0.1584,(p=0.0504)),and should therefore be interpreted as marginal evidence ,but neither is statistically distinguishable from zero at conventional significance levels.Therefore,the sales-growth specification supports the robustness of total leverage result but provides weaker evidence regarding the composition or maturity of liabilities.

Excluding observations from 2023 yields broadly consistent results. The interaction coefficient for liability-based leverage remains negative and statistically significant at the 1 percent level (coefficient = -0.1974, standard error= 0.0573,(p=0.0015)).For long-term liabilities the interaction coefficient is also negative but significant only at 10 percent level (coefficient =-0.1047;p= 0.0589)),whereas the estimates for short-term liabilities and liability
maturity are not statistically significant.The main leverage finding is therefore not dependent on treating 2023 as part of the regime period.

Panel B further demonstrates that the main finding is robust to an alternative definition of leverage based on interest-bearing debt rather than total accounting liabilities. The Regime × Exposure coefficient is negative and statistically significant in both the core debt-based specification (coefficient=-0.1953, or standard error =0.0640, (p=0.0043)) and the specification including sales growth (coefficient=-0.1842,standard error =0.0637, (p=0.0065)).

Taken together,the robustness analyses provide consistent evidence that firm with higher pre-existing exposure to short-term liabilities followed a relatively less expansionary leverage trajectory during the regime period.This conclusion is robust to the inclusion of sales growth,the exclusion of the 2023 transition year,and the use of debt-basrd leverage as an alternative .However, the evidence concerning short-term liabilities, long-term liabilities, and liability maturity is less stable across specifications.The robustness teats therefore strengthen the

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conclusion regarding total leverage but do not establish unique liability-composition or maturity mechanism.

5.5 Pre-trend and transition-year checks

To examine whether baseline exposure was associated with differential leverage dynamics prior to 2021,the regime interaction was replaced with exposure-by-year interactions,using 2020 as the reference year.The coefficients for the four pre-refime years ,2016-2019 are not jointly significant (F=0.701 ,p=0.597).A seperate linear pre-period exposure tend is also statistically insignificant (coefficient = -0.0151, standard error = 0.0338,p= 0.658).These results provide no evidence of a systematic differential leverage trend before the regime period,although the relatively short pre-period limits statistical power.

Table 7.Exposure-by-year coefficients for liability-based leverage

Interaction	Coefficient	Clustered SE	p-value
2016 × Exposure	0.0400	0.1220	0.7451
2017× Exposure	0.2467	0.1561	0.1230
2018× Exposure	0.1001	0.0815	0.2273
2019 × Exposure	0.1080	0.0741	0.1540
2021 × Exposure	-0.0881	0.0770	0.2604
2022 × Exposure	-0.1218	0.0958	0.2121
2023 × Exposure	-0.1953	0.1210	0.1155

Source: Authors ' estimations based on KAP financial-statement data,2016-2023.

Note.The dependent variable is liability-based leverage.The model includes the baseline controls,firm fixed effects,and year fixed effects;2020 is the omitted reference year.Standard errors use the full fixed-effects finite-sample correction.The joint test of the 2016-2019 coefficient! gives F(4,35)=0.701,p=0.597.

The post-2020 interaction coefficient are consistently negative and become larger in magnitude over time,but the individual annual estimates are imprecise,the pooled regime interaction remain the preferred specification, while the annual coefficients serve as diagnostic rather than as separate treatment estimates.

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5.6 Assesment of Hypotheses an overall Robutness

The empirical support is most compelling for H1.The negative total-liability estimate is statistically precise,economically meaningful, and directionally stable across the extended,debt-based,and 2021-2022 specifications.H2 and H3 receive only marginal support at 10 percent level.H4 is not supported under the finite-cluster correction.Accirdinly,the article's principal conclusion concerns differential adjustment in total liabilities, whereas the maturity-related findings should be regarded as suggestive rather than definitive.Nevertheless,the results across the individual liability outcomes provide additional insight.The negative total effects does not appear to arise solely from a reclassification between current and non-current liabilities,because both components carry negative coefficients.The negative maturity coefficient further suggest that,among firms with greater initial exposure,long-term liabilities may have decline more substantially or increased less rapidly than short-term liabilities. This pattern is compatible with an envirnoment in which acess to longer-maturity financing was especially constrained.However,the estimates are not sufficiently precise to establish this channel conclusively .

6.Discussion

6.1 Interpretation and Relation to Previous Research

The Central finding indicates that firms entering the 2021-2023 regime with higher pre-existing exposure to short-term liabilities followed a relatively less expansionary leverage path.This result is inconsistent with a simple cheap-credit mechanism in which lower official policy rates generate a uniform increase in corporate borrowing.

Several complementary mechanisms may account for this pattern.Firns with greater short-term liability exposure faced more frequent refinancing requirements and may therefore have prioritized liquidity preservation and liability reduction.At the same time,banks operating under shifting regulatory frameworks and changing funding and liquidity conditions may have imposed tighter lending standards or offered less favorable maturities to borrowers already carrying substantial current obligations.Inflation and exchange-rate uncertainty may also have reduced firms willingness or ability to assume additional liabilities ,particularly where foreign-currency exposure was significant.The results align with recent research highlighting the importance of debt maturity,refinancing pressures,borrower-specific characteristics, and foreign-currency exposure in shaping the transmission of monetary policy.More broadly,they reinforce the view that firms' pre-existing financial structures condition how shifts in monetary and credit conditions are transmitted to corporate balance sheets.

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Nevertheless,the evidence remains consistent with several alternative explanations,while lenders may have limited the supply of additional credit to borrowers.

Moreover,inflation-related increases in nominal asset values may have mechanically lowered liability-to-asset ratios without equivalent reductions in nominal liabilities.Current liabilities also include trade payables,tax obligations,and other operating liabilities,while mean reversion can not be fully excluded.The findings should therefore be interpreted as a robust conditional association rather than as evidence identifying a unique causal mechanism.

6.2 Managerial and Policy Implications

From a managerial perspective, the findings underscore the importance of maintaining a diversified liability-maturity structure and adequate liquidity reserves.Excessive dependence on short-term liabilities may heighten refinancing risk when financial conditions become unstable. Firms may therefore strengthen their financial resilience by lengthening debt maturities, diversifying financing sources,aligning liability currencies with revenue currencies, and preserving sufficient cash-flow capacity to meet financing obligations. From a policy perspective, the findings suggest that the degree of monetary accommodation should not be assessed solely trough changes in the official policy rate.Effective credit availability, lending rates,loan maturities, currency exposure, lender balance sheets,and borrower heterogeneity may substantially alter corporate responses. Consequently, a low policy rate can therefore coexist with restrictive or uneven financing conditions across firms.

6.3 Limitations and Future Research

This study is subject to several limitations.First,the sample is restricted to 36 publicly listed industrial firms and may therefore not be representative of smaller companies, privately held firms,or business operating in the service sector.The limited number of firm clusters also reduces statistical precision,particularly for coefficients that attain significance only at the 10 percent level.Second,the regime indicator captures a broad macro-financial episode rather than an isolated and exogenous monetary-policy intervention.It combines policy-rate reductions with inflation, currency depreciation, macroprudential measures, pandemic-related effects,and the policy reversal initiated in 2023.Third,annual data cannot capture within-year policy changes or individual refinancing events.Finally ,current liabilities comprise both interest-bearing debt and operating obligations, and unobsverd time-varying firm characteristics may remain correlated with baseline exposure.

Future research could employ loan-level or higher-frequency data to better distinguish financing demand from credit-supply constraints and to examine interest rates,collateral, lender

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identifiy,refinancing events,and remaining maturity.Studies based on larger samples could further differentiate between Turkish-lira and foreign-currency-denominated liabilities and explore heterogeneity according to export intensity,currency mismatches, firm size,ownership structure, and sectoral affiliation.

2.Conclusion

This article examines whether firms' pre-existing exposure to short-term liabilities influenced their financing adjustments during Turkey Unorthodox monetary-policy regime from 2021 to 2023.Using a balanced panel of 36 industrial firms listed on Borsa Istanbul,using 288 observations for 36 Borsa Istanbul industrial firms,the analysis estimates two-way fixed-effets models with firm-clustered standard errors.

The results show that greater baseline short-term liability exposure is associated with a significantly larger relative decline in liability-based leverage during the regime period.Negative estimates also emerge for short and long-term liabilities,but these component results are only marginally significant , and the maturity result is not statistically significant under finite-cluster inference .The main leverage result is robust to controlling for sales growth,using debt-based leverage as an alternative outcome,and excluding 2023.Moreover,exposure by-year tests reveal no jointly significant differential pre-2021trends.

The findings indicates that lower official policy rates did not lead the most exposed firms to increase their liabilities more aggressively.Instead,refinancing risk,lender selection,exchange-rate pressures,and uncertainty are consistent with comparatively defensive balance-sheet adjustment.The results emphasize that monetary-policy transmission depends on firms' initial liability structures and on the effective availability and maturity of credit.

The article's contribution is not to suggest that all firms deleveraged during the episode.but to show that firms with greater pre-existing short-term term liability exposure followed a systematically less explansionary relative liability path.Thid distinction matters for both research and policy : monetary accommodation cannot be evaluated solely from the announced policy rate when refinancing needs,lender balance sheets,inflation,currency risk and macroprudential rules jointly determine effective credit conditions.The results also highlight the importance of examining liability maturity alongside aggregate leverage in volatile emerging markets.

Data and Code Availability

The analysis dataset,variable documentation and R replication script are available upon reasonable request.

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Appendix A.Firms included in the Balanced Panel

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The final sample contains the following 36 non-financial firms,each observed annually from 2016 trough 2023.All firms satisfy the eligibility and complete data requirements described in Section 4.1

Table Al.Sample firms

Ticker	Compagny name
AEFES	Anadolu Efes Biracılık ve Malt Sanayii A.Ş.
AKENR	Akenerji Elektrik Üretim A. Ş.
AKSEN	Aksa Enerji Üretim A.Ş.
ALKIM	Alkim Alakali Kimya A.Ş.
ACLK	Arçelik A.Ş.
ARSELS	Aselsan Elektronik Sanayi ve Ticaret A.Ş.
ASUZU	Anadolu Isuzu Otomativ Sanayi Ve Ticaret A.Ş.
ATKES	Akin Tekstil A.Ş.
AYEN	Ayen Energi A.Ş.
AYGAZ	Aygaz A.Ş.
BAKAB	Bak Ambalaj A.Ş.
BANVT	Banvit Bandırma Vitaminli Yem Sanayii A.Ş.
BASCM	Baştas Başkent Çimento Sanayi ve Ticaret A.Ş.
BLCYT	Bilici Yatırım Sanayi ve Ticaret A.Ş.
BRSAN	Borusan MANNESMANN Boru Sanayi ve Ticaret A.Ş.
BTCIM	Batıçim Batı Anadolu Çimento Sanayi A.Ş.
DUCIM	Bursa Çimento Fabrikasi A.Ş.
BURCU	Burçelik Bursa çelik Döküm Sanayi A.Ş.
CCOLA	Coca-Cola Içecek A.Ş.
CIMSA	Çimsa Çimento Fabrikasi A.Ş.
EGEN	Ege Endüstri ve Ticaret A.Ş.
GEDZA	Gediz Amabalaj Sanayi ve ve Ticaret A.Ş.
GUBRF	Gübre Fabrikalari T. A.Ş.
HEKTS	Hektaş Ticaret A.Ş.
KRDMD	Karademir karabük Demir çelik San .ve tic A.Ş.
ODAS	Odaş Elektrik Üretim Sanayi Ticaret A.Ş.
OTKAR	Otokar Otomotiv Petrokimya Holding A.Ş.
PETKM	Petkim Petrokimya Holding A.Ş.
SASA	Sasa Polyster Sanayi A.Ş.
SISE	Şişecam (Türkiye Şişe ve Cam Fabriklari A.Ş.
TOASO	Tofaş Gida sanayi Ticaret A.Ş.

TUKAS	Türkiye Petrol Rafinerileri A.Ş.
TUPRS	Tukaş Gida Sanayi ve Ticaret A.Ş
ULKER	Ülker Bisküvi Sanayi A.Ş.
VESTL	Vestel Eleketronik Sanayi ve Ticaret A.Ş.
ZOREN	Zorlu Enerji Elektrik Üretim A.Ş.

Source: Authors' compilation based on KAP financial statements and Borsa Istanbul sector classifications.