ČNB ČESKÁ NÁRODNÍ BANKA

Working Paper Series 11/2026

Drying Up: The Effect of Drought on Corporate Loans with AnaCredit Data

Jan Janků, Tomáš Karhánek, Simona Malovaná, Ivan Trubelík

Distributed by the Czech National Bank, available at www.cnb.cz

Project Coordinator: Martin Hodula

Drying Up: The Effect of Drought on Corporate Loans with AnaCredit Data

Jan Janků, Tomáš Karhánek, Simona Malovaná, and Ivan Trubelík *

Abstract

This paper examines whether chronic physical climate risk affects corporate credit allocation. We focus on drought, one of the most salient climate-related risks for the Czech economy, and combine granular AnaCredit data with district-level measures of drought-related agricultural losses. Using almost 6 million bank–firm–month observations for nearly 140,000 firms between 2019 and 2023, we show that long-term drought exposure is associated with a significant contraction in new corporate lending. The effect is concentrated at the origination margin: newly originated credit declines by about 12 percent in drought-affected regions, while outstanding credit volumes adjust more gradually. The impact varies across bank–firm relationships, credit-exposure characteristics, and sectors, consistent with banks incorporating chronic physical climate risk primarily into new lending decisions rather than immediately reducing existing exposures.

JEL Codes: E51, G21, G32, Q54.
Keywords: Bank lending, Climate risk, Corporate credit, Drought, Loan origination, AnaCredit.

* Jan Janků, Czech National Bank and Technical University in Ostrava, jan.janku@cnb.cz
Tomáš Karhánek, Czech National Bank and Charles University in Prague, tomas.karhanek@cnb.cz
Simona Malovaná, Czech National Bank and Charles University in Prague, simona.malovana@cnb.cz
Ivan Trubelík, Czech National Bank and Charles University in Prague, ivan.trubelik@cnb.cz
The views expressed are those of the authors and not necessarily those of the Czech National Bank. We gratefully acknowledge comments and suggestions from prof. Tomáš Trnka, prof. Tomáš Havránek and participants of research seminars at the Global Change Research Institute of the Czech Academy of Sciences, the Czech National Bank, the National Bank of Slovakia, Charles University and the Technical University of Ostrava, as well as conference participants at the Research Cluster on Climate Change Annual Conference and Czech Economic Society Conference. All errors and omissions remain the responsibility of the authors.

1. Introduction

Drought has become one of the most visible manifestations of physical climate risk in the Czech Republic. The Czech policy framework explicitly recognizes climate adaptation as a priority: the updated national adaptation strategy for 2021–2030 and the related national action plan were approved by the Czech government in September 2021, with long-term drought, extreme temperatures, floods, heavy precipitation, extreme wind, and vegetation fires identified among the key manifestations of climate change relevant for Czechia (Ministerstvo životního prostředí, 2021). Recent events further illustrate the salience of these risks. The year 2022 was characterized by heat, drought, and fires, with high temperatures and uneven precipitation contributing to climatic, soil, and hydrological drought across a substantial part of the country; the same year also saw the largest forest fire in Czech history in the Bohemian Switzerland National Park (Ministerstvo životního prostředí, 2023). In 2024, the Czech Hydrometeorological Institute reported the warmest year ever recorded in Czechia, with the annual average temperature reaching 10.3 degrees Celsius (Český hydrometeorologický ústav, 2025). These developments make drought a natural starting point for studying how physical climate risk affects financial intermediation in a small open economy with a bank-based financial system.

Unlike acute natural disasters, drought is persistent, spatially uneven, and difficult to reverse quickly. It affects agricultural yields and water availability, but its economic consequences extend well beyond agriculture, influencing production conditions, energy use, supply chains, collateral values, and firms' repayment capacity. This makes drought particularly important from the perspective of the financial sector. Banks may respond to persistent local climate stress by reassessing borrowers' risk profiles, tightening credit standards, reducing loan amounts, or limiting the formation of new lending relationships. At the same time, the adjustment may not be immediate for existing exposures, which are governed by contractual maturities and relationship-specific frictions. Whether banks respond primarily by reducing new credit, by adjusting outstanding exposures, or by reshaping bank–firm relationships remains an empirical question.

This paper asks whether banks adjust corporate lending in response to chronic physical climate risk. More specifically, we examine whether drought affects the origination of new loans, the volume of existing exposures, and the formation of bank–firm relationships. We focus on drought because it represents a persistent and regionally heterogeneous source of risk that is relevant for credit allocation. Using detailed AnaCredit loan-level data for nearly 140,000 firms between 2019 and 2023, combined with district-level information on drought-related agricultural losses, we examine how drought exposure affects both the intensive margin of lending and the extensive margin of bank–firm relationships.

We find that long-term drought exposure is associated with a significant contraction in new corporate lending. In drought-affected regions, newly originated loans decline by approximately 12 percent, while the effects on outstanding loan volumes are smaller and less consistent. This contrast suggests that banks respond to chronic physical climate risk primarily at the origination stage, by tightening new credit, rather than through an immediate active reduction of existing exposures. The finding is consistent with the idea that persistent climate-related shocks are incorporated into new lending decisions more readily than into existing credit stocks, which adjust only gradually over time.

The results further indicate that the response to drought depends on the structure of bank–firm relationships, loan characteristics, and sectors. Firms with multiple banking relationships are better able to sustain loan volumes, suggesting that relationship diversification can mitigate climate-related

credit tightening. However, banks appear more cautious in forming additional relationships with firms that are already connected to several lenders. Larger loans are less affected by drought, while larger firms do not enjoy similar protection, indicating that banks' response is shaped more by loan-level risk assessment than by firm size alone. Sectoral heterogeneity confirms that drought-related credit effects are not limited to agriculture, with particularly adverse effects in the energy sector.

The paper contributes to the literature in three ways. First, it provides evidence on banks' response to chronic physical climate risk, complementing studies that focus mainly on acute natural disasters such as floods, storms, or hurricanes. Second, it shifts the focus from loan pricing and collateral requirements to credit quantities, loan origination, and the structure of bank–firm relationships. Third, it provides granular loan-level evidence from Central Europe, using AnaCredit data that allow us to observe both new and outstanding corporate loans across banks, firms, instruments, and regions. Taken together, the results show that chronic physical climate risk can affect corporate credit allocation even in the absence of a discrete disaster event.

The rest of the paper is organized as follows. Section 2 situates this study within the related literature and highlights its contribution. Section 3 describes the loan-level data and the drought exposure measure. Section 4 presents the empirical framework. Section 5 discusses the main results, including the effects on new and outstanding loans, bank–firm relationships, loan characteristics, and sectoral heterogeneity. Section 6 reports robustness tests and additional analyses. Section 7 concludes.

2. Related Literature

This paper relates to three strands of literature. The first studies the real effects of physical climate risk on firms. The second examines how banks and credit markets respond to climate-related shocks. The third focuses more specifically on drought as a chronic physical risk and on the role of banks in transmitting such risk to firms.

2.1 Physical Climate Risk and Firms

Climate-related financial risks are commonly divided into transition risks and physical risks. Transition risks arise from the adjustment toward a low-carbon economy, while physical risks stem from climate-related events and changes in climate patterns. Physical risks can be acute, such as floods, storms, wildfires, or hurricanes, or chronic, reflecting persistent shifts in temperature, precipitation, water availability, and drought conditions. This distinction is important because acute and chronic risks may affect firms and lenders through different channels. Acute events are sudden and disruptive, while chronic risks are persistent, spatially heterogeneous, and may gradually alter local economic conditions.

A large literature shows that physical climate risks can have substantial effects on firms' economic performance and financial health. Extreme weather events may reduce productivity, profitability, and liquidity, increase default risk, and disrupt supply chains (Lesk et al., 2016; Hong et al., 2019). Among physical risks, drought is particularly relevant because it is persistent and can affect a broad set of sectors. Although its direct impact is most visible in agriculture, drought can also affect manufacturing, energy production, construction, transport, and other water-dependent activities (Huynh et al., 2020). These firm-level effects provide a natural channel through which physical climate risk may be transmitted to banks and credit markets.

Drought also differs from many acute natural disasters in its timing and reversibility. Its economic impact may develop gradually, persist over several seasons, and be difficult to insure against or reverse quickly. For firms, this can affect cash flows, production constraints, collateral values, and repayment capacity. For banks, the same risks may alter the assessment of borrower creditworthiness and the willingness to originate new credit. This makes drought a useful setting for studying whether chronic physical climate risk affects corporate credit allocation.

2.2 Climate Risk and Bank Lending

A growing empirical literature studies whether banks incorporate physical climate risks into credit conditions. Much of this evidence focuses on loan pricing, collateral requirements, and the exposure of banks' balance sheets to climate-related shocks. Early evidence suggests that banks are less likely to supply credit to firms located in flood-prone areas (Faiella and Natoli, 2018). Related firm-level evidence shows that firms in regions historically more exposed to natural disasters operate with lower leverage, consistent with less favorable credit conditions (Elnahas et al., 2018). More recent loan-level studies confirm that lenders price physical risk into credit contracts. For example, Correa et al. (2022) document higher loan spreads for firms more exposed to natural disasters, especially after events that update lenders' beliefs about future risk.

Several studies use granular credit data to examine how physical climate risk affects bank lending. Using AnaCredit data for Ireland, Carroll et al. (2025) show that firms located in flood-risk areas face both interest rate premia and higher collateralization requirements. Similarly, Meucci and Rinaldi (2022) use AnaCredit data for Italy and show that physical risk affects borrowers through deteriorating collateral values and repayment capacity. For European SME lending, Barbaglia et al. (2024) find evidence of an interest rate premium on loans to borrowers located in high flood-risk areas, although the estimated premium is small relative to the implied increase in default risk. Taken together, these studies indicate that banks recognize physical climate risks and incorporate them into loan pricing and contract design.

Physical climate risks may also affect banks' balance sheets, credit supply, and financial stability. Local climate-related shocks can increase non-performing loans and reduce bank stability, although such effects may dissipate over time (Do et al., 2023). Policy-oriented work emphasizes that the impact of physical risks may be stronger for smaller and less-capitalized banks, which have fewer opportunities to absorb losses or diversify geographically (Caselli and Migliorelli, 2024). At the same time, the empirical evidence is not uniform. Some studies document tighter business credit after natural disasters (Garmaise and Moskowitz, 2009), while others find more mixed effects or emphasize the role of bank balance-sheet strength, geographic diversification, and risk management capacity (Cortés and Strahan, 2017; Ivanov et al., 2022; Schüwer et al., 2019; Chavaz, 2016). This suggests that the net effect of physical climate risk on credit markets depends on both borrower exposure and bank characteristics.

Most of this literature focuses on acute climate events or on loan pricing and collateral requirements. Less is known about whether chronic physical risks affect the quantity of credit, the origination of new loans, or the structure of bank–firm relationships. These margins are important because banks may respond to persistent climate stress not only by repricing risk, but also by reducing loan amounts, limiting new lending, or changing their exposure to particular firms and regions.

2.3 Drought, Credit Allocation, and This Paper

The literature on drought and credit markets is smaller but growing. Javadi and Masum (2021) show that drought exposure, measured using the Palmer Drought Severity Index, increases loan spreads for U.S. firms, with stronger effects for long-maturity loans and borrowers with lower credit quality. At the bank level, Brei et al. (2025) show that severe droughts reduce agricultural lending by U.S. banks, especially among geographically concentrated banks, while more diversified banks are more resilient. Related evidence suggests that drought can deteriorate bank asset quality and increase risk, largely through higher non-performing loans (Özsoy et al., 2025). More generally, long-lasting disasters such as droughts and wildfires may increase expected corporate default risk and lead to tighter financial conditions (Nobletz, 2024).

These findings highlight drought as a material source of credit risk, but important gaps remain. First, most existing studies focus on pricing, loan spreads, collateral, or bank balance-sheet outcomes, while less attention has been paid to credit quantities and new loan origination. Second, much of the evidence concerns acute natural disasters, whereas drought is a chronic and persistent risk that may affect lending decisions differently. Third, existing climate-risk measures are often observed at relatively coarse geographic levels, which may obscure local exposure. Finally, empirical evidence for Central and Eastern Europe remains limited, despite the relevance of physical climate risks for bank-based financial systems in the region.

Our paper addresses these gaps by studying how long-term drought exposure affects corporate lending in the Czech Republic. Using granular AnaCredit data, we observe both new and outstanding corporate loans at the bank–firm level, which allows us to distinguish between the origination margin and the stock of existing credit. This distinction is central to our contribution: rather than focusing only on loan pricing, we examine whether chronic physical climate risk affects the quantity of credit and the formation of bank–firm relationships. By combining loan-level credit data with district-level drought exposure, we provide evidence on how banks adjust lending decisions in response to persistent local climate stress.

3. Data

Our empirical analysis combines two sources of information. First, we use district-level data on drought-related agricultural losses to measure persistent local exposure to drought. Second, we use granular loan-level data from AnaCredit to observe corporate lending by Czech banks at the bank–firm–month level. The combination of these datasets allows us to examine whether firms located in regions more exposed to long-term drought receive different amounts of new and outstanding credit, and whether drought exposure is associated with changes in bank–firm relationships.

We begin by describing the drought exposure measure, which is the key source of cross-regional variation in physical climate risk. We then describe the AnaCredit loan-level data and the construction of the credit variables used in the empirical analysis. Finally, we explain how firms are geographically matched to drought exposure and summarize the final estimation sample.

3.1 Drought Exposure Measure

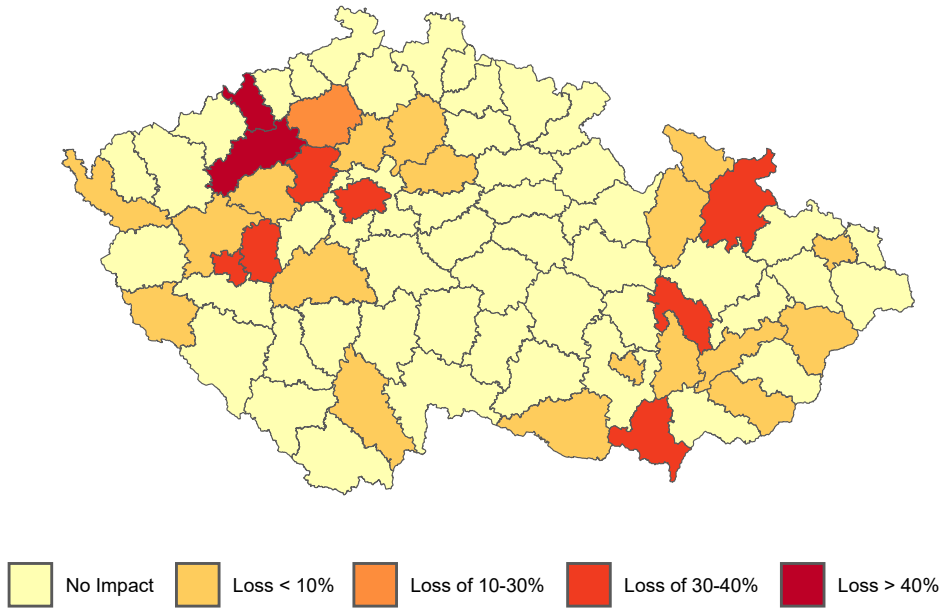
We measure drought exposure using data from the InterSucho project, which provides weekly information on the impact of drought on agricultural production across Czech administrative districts. The data are based on reports of observed or expected losses in selected categories of crops and fruit production. For each district and week, drought impact is classified into five

categories: no impact, losses up to 10 percent, losses between 10 and 30 percent, losses between 30 and 40 percent, and losses above 40 percent.

Although the measure is based on agricultural losses, we use it as a broader proxy for persistent local drought stress. Drought affects agricultural production directly, but it also captures cumulative local climatic conditions that may be relevant for firms' cash flows, production constraints, collateral values, and repayment capacity more broadly. This interpretation is consistent with our focus on chronic physical climate risk: drought is not a short-lived weather fluctuation, but a persistent and spatially uneven shock that may gradually affect local economic conditions and bank lending decisions.

The drought data cover the period from April 2016 to December 2023, while the AnaCredit sample runs from June 2019 to December 2023. This longer pre-sample period allows us to characterize drought exposure from a long-term perspective rather than relying only on contemporaneous monthly fluctuations. In the baseline specification, we summarize drought exposure at the district level using the most frequent drought-impact category observed over the available period. This long-term mode captures whether a district is persistently more exposed to drought-related losses and provides a stable measure of local chronic drought risk. Figure 1 illustrates the resulting geographic variation across Czech districts.

Figure 1: District Mode of the Drought Impact on Agricultural Yields



Note: The figure depicts the most frequent value for each district in the time range of 2016–2023, while omitting weeks with insufficient number of reporters.

The map shows substantial spatial heterogeneity in drought exposure. While many districts are most frequently classified as having no drought impact or losses below 10 percent, several districts repeatedly experience more severe drought-related losses. This variation is central to our empirical strategy, as it allows us to compare lending outcomes across firms located in districts with different degrees of long-term drought exposure.

In additional descriptive analysis, we also examine seasonal and time-varying patterns of drought exposure. Drought losses are more pronounced in summer and autumn, while spring and winter are less affected (Figure A1 in the Appendix). The geographic distribution of drought exposure also changes over time, although some regions, particularly in western Bohemia and southern Moravia, appear repeatedly more exposed (Figure A2 in the Appendix). These patterns confirm that drought is both persistent and spatially heterogeneous, making it suitable for studying the transmission of chronic physical climate risk to corporate lending.

3.2 Loan-Level Credit Data

We measure corporate lending using AnaCredit, a standardized credit register that collects detailed information on individual credit instruments granted to firms. The database contains information on loan amounts, instrument type, maturity, interest rate, collateral, guarantees, and identifiers of both lenders and borrowers. We combine AnaCredit with information from the Register of Institutions and Affiliates Database (RIAD), which provides borrower characteristics such as firm size, location, and economic activity.

We define the bank–firm credit exposure as the monthly aggregate of credit instruments between a bank and a firm in a given currency. Each observation therefore represents the total credit exposure of bank b to firm f in month t and currency c. This aggregation allows us to study lending at the bank–firm relationship level while preserving information on the type and structure of credit instruments. The sample starts in June 2019, the first reporting month of AnaCredit in the Czech Republic, and ends in December 2023. To focus on standard commercial lending, we exclude two institutions whose business models are primarily related to export support and insurance rather than traditional banking.

Table 1: Loan Categories Used in the Analysis

Category	**Instruments included**	**Interpretation**
Term loans	Non-revolving credit instruments	Narrowest category, capturing standard term lending with a fixed credit amount and repayment structure.
Core loans	Overdrafts, revolving credit, non-revolving credit, and other loans	Main credit instruments used to measure bank lending, excluding credit card debt, trade receivables, and guarantees.
Core loans: on-balance sheet	On-balance-sheet component of core loans	Direct balance-sheet credit exposure within the core loan category.
Core loans: off-balance sheet	Off-balance-sheet component of core loans	Conditional or undrawn credit exposure within the core loan category.
All credit exposures	Overdrafts, credit card debt, revolving credit, non-revolving credit, trade receivables, financial guarantees, non-financial guarantees, and other loans	Broadest measure of bank credit exposure to a firm.

We distinguish between five credit categories, summarized in Table 1. The narrowest category consists of term loans, defined as non-revolving credit instruments. We then define core loans as the

main credit instruments used to measure bank lending: overdrafts, revolving credit, non-revolving credit, and other loans. Core loans are further split into on-balance-sheet and off-balance-sheet components. Finally, the broadest category, all credit exposures, includes all credit instruments reported in AnaCredit, namely overdrafts, credit card debt, revolving and non-revolving credit, trade receivables, financial and non-financial guarantees, and other loans. This classification allows us to examine whether the effect of drought differs across instruments with different degrees of commitment, maturity, balance-sheet treatment, and risk exposure.

We analyze both new and outstanding loans. A credit instrument is classified as new when it first appears in AnaCredit. New loans capture the origination margin, where banks can adjust credit standards and lending volumes relatively quickly in response to changing risk conditions. Outstanding loans capture the stock of existing credit exposures, which may adjust more gradually because of contractual maturities and relationship-specific frictions. The distinction between new and outstanding loans is therefore key to our analysis of whether banks respond to drought primarily through new lending decisions or by reducing existing exposures.

3.3 Matching Drought Exposure to Corporate Loans

To assign drought exposure to firms, we geocode firms' headquarters using address information from RIAD and match each firm to a Czech administrative district. The district is the level at which drought impact is observed in the InterSucho data. For firms that change headquarters over time, we construct a monthly panel of firm locations and assign drought exposure according to the firm's district in each month.

This matching strategy allows us to combine loan-level credit information with local drought exposure. It also implies an important limitation: a firm's headquarters may not coincide with the location of its production facilities or other economically relevant operations. More precise information on production locations is not available for the full sample. To the extent that this mismatch introduces measurement error in drought exposure, it is likely to attenuate the estimated relationship between drought and lending.

The final matched dataset contains nearly 6 million bank–firm–month observations for about 140,000 firms and 44 banks. The restricted sample of new loans contains more than 300,000 observations for about 100,000 firms. The appendix provides detailed summary statistics by firm size, sector, region, loan category, and number of bank–firm relationships. Detailed information on sample construction is reported in Table A1.

4. Empirical Framework

Persistent drought represents a region-specific form of chronic physical climate risk that may affect firms' economic conditions and, in turn, banks' lending decisions. Our empirical strategy estimates whether bank lending differs systematically between firms located in districts with different long-term drought exposure, conditional on a rich set of bank and borrower-group-time controls. We interpret the estimated coefficients as lending responses to chronic physical climate risk. Because we do not observe loan applications or rejected credit demand, the baseline estimates should not be interpreted as a pure credit-supply shock. Rather, they capture how observed credit allocation differs across drought-exposed and less exposed regions after controlling for observable loan and firm characteristics, bank fixed effects, and common shocks to comparable firms.

4.1 Baseline Specification

We first examine the intensive margin of lending. The baseline specification relates the amount of credit granted by bank b to firm f in month t to the firm's exposure to long-term drought:

$$Y_{fbt} = \beta Drought_{d(f,t)} + X'_{fbt}\gamma + \alpha_b + \alpha_{i(f)\ell(f,t)s(f)q(t)} + \varepsilon_{fbt}, \tag{1}$$

where Y_{fbt} denotes the natural logarithm of lending from bank b to firm f in month t, aggregated across the relevant credit instruments within a bank–firm pair. Depending on the specification, Y_{fbt} captures either newly originated lending or outstanding credit volumes. We estimate the model separately for the five credit categories defined in Section 3.2: all credit exposures, core loans, core loans on balance sheet, core loans off balance sheet, and term loans.

The variable $Drought_{d(f,t)}$ captures long-term drought exposure in the district d in which firm f is located in month t. In the baseline specification, drought exposure is measured using the district-level modal drought-impact category over the available drought data period. We define an indicator equal to one for districts with long-term drought-related losses and zero otherwise. This measure captures persistent local exposure to drought rather than short-run weather fluctuations.

The vector X_{fbt} includes loan- and firm-level controls. These include the currency composition of credit, firm age and its square, the relevant short-term risk-free rate, and seasonal controls. The term α_b denotes bank fixed effects, which absorb time-invariant differences across banks, such as business models, lending standards, or risk appetite. The term $\alpha_{i(f)\ell(f,t)s(f)q(t)}$ denotes industry-location-size-quarter fixed effects. These fixed effects control for common shocks affecting firms in the same industry, broader region, size class, and quarter.

The distinction between new and outstanding loans is key to the analysis. New loans capture the origination margin, where banks can adjust lending volumes and credit standards relatively quickly in response to changing risk conditions. Outstanding loans capture the stock of existing credit exposures, which may adjust more gradually because of contractual maturities, refinancing cycles, and relationship-specific frictions. Comparing the two outcomes therefore allows us to assess whether drought-related lending responses occur primarily at origination or through the adjustment of existing exposures.

4.2 Identification and Fixed Effects

The coefficient of interest, β, is identified from differences in lending to firms located in districts with different long-term drought exposure, after accounting for bank fixed effects and shocks common to firms in the same industry, broader region, size class, and quarter. Because drought exposure is measured at the district level, while location fixed effects are defined at the broader regional level, the specification exploits within-region variation in drought exposure across districts. This is important because it allows us to compare firms that operate in similar regional, sectoral, and size-specific environments but differ in their exposure to persistent local drought stress.

Industry-location-size-quarter fixed effects absorb a wide range of confounding factors, including sector-specific business-cycle conditions, regional economic developments, size-specific credit demand, and time-varying shocks common to similar firms. Bank fixed effects account for

persistent differences across lenders. The remaining variation therefore compares lending outcomes across firms that are observationally similar along these dimensions but are located in districts with different long-term drought exposure.

We use this fixed-effects structure rather than firm-time fixed effects in the baseline specification for two reasons. First, firm-time fixed effects would absorb all time-varying firm-level credit demand but would also eliminate firms borrowing from only one bank. This is a major limitation in our setting because single-bank firms represent the majority of the sample and are central for understanding corporate lending in the Czech economy. Second, our objective is to study both intensive and extensive margins of credit allocation, including the formation of bank–firm relationships, for which retaining single-bank firms is important. As a robustness check, we estimate specifications with firm-time fixed effects on the subsample of firms with multiple bank relationships.

This identification strategy does not fully eliminate all potential demand-side channels. For example, firms in drought-exposed districts may reduce investment or working-capital needs, which could lower observed borrowing independently of bank credit supply. For this reason, we interpret the estimates as changes in observed lending and credit allocation rather than as a fully isolated supply shock. The comparison between new and outstanding loans, the inclusion of borrower-group-time fixed effects, and the analysis of bank–firm relationship margins help discipline this interpretation.

4.3 Heterogeneity Specifications

We next examine whether the lending response to drought differs across firm, credit-exposure, and relationship characteristics. To do so, we extend the baseline specification by interacting drought exposure with a characteristic Z_{fbt}:

$$\begin{aligned} Y_{fbt} = \beta_1 Drought_{d(f,t)} + \beta_2 Z_{fbt} + \beta_3 \left(Drought_{d(f,t)} \times Z_{fbt} \right) \\ + X'_{fbt}\gamma + \alpha_b + \alpha_{i(f)\ell(f,t)s(f)q(t)} + \varepsilon_{fbt}. \end{aligned} \tag{2}$$

The main coefficient of interest is β_3, which captures whether the effect of drought differs systematically across the characteristic Z_{fbt}. We consider several dimensions of heterogeneity. First, we examine the number of bank relationships, which captures whether firms with more diversified banking connections are better able to sustain credit during drought conditions. Second, we compare large and small credit exposures to test whether larger exposures, which are likely to be subject to more detailed risk assessment and collateral requirements, are less sensitive to drought. Third, we compare large and smaller firms to assess whether firm size provides similar protection. Finally, we estimate sector-specific responses to examine whether drought-related credit effects are concentrated in water- or energy-sensitive industries or extend more broadly across the economy.

In specifications where the characteristic Z_{fbt} is absorbed by the fixed effects, the main effect of Z_{fbt} is omitted, but the interaction with drought exposure remains identified. All heterogeneity specifications retain the same baseline controls and fixed-effects structure as in equation (1).

4.4 Extensive Margin Outcomes

In addition to loan amounts, we study whether drought affects the extensive margin of bank lending. We estimate linear probability models in which the dependent variable is an indicator for the formation of a new lending relationship or a new credit exposure. The baseline extensive-margin specification is

$$M_{fbt} = \delta Drought_{d(f,t)} + X'_{fbt}\theta + \alpha_b + \alpha_{i(f)\ell(f,t)s(f)q(t)} + u_{fbt}, \tag{3}$$

where M_{fbt} denotes one of three binary outcomes. The first indicator equals one if firm f obtains a new loan from bank b with which it already has an existing relationship. The second indicator equals one if firm f forms a new relationship with bank b. The third indicator equals one if either a new loan or a new bank relationship is observed. These outcomes allow us to distinguish between changes in lending within existing relationships and the formation of new bank–firm links.

We also examine whether the extensive-margin response depends on the number of existing bank relationships. This is important because drought may affect firms with single and multiple banking relationships differently. Firms with more bank connections may have better access to credit, but banks may also be more cautious in forming additional relationships with firms that are already connected to several lenders. To capture this mechanism, we interact drought exposure with the number of bank relationships and interpret the interaction term as the differential effect of drought across relationship structures.

5. Results

5.1 Where Does the Adjustment Occur? New Loans versus Outstanding Loans

Table 2 shows that long-term drought leads to a contraction in new corporate lending. The estimated coefficients are negative across all credit categories, indicating weaker loan origination in drought-affected regions. The effect is strongest for all credit exposures, which decline by about 12%, and remains statistically significant for term loans and core loans off balance sheet, where new credit volumes fall by around 8% and 6%, respectively. By contrast, the coefficients for core loans and core loans on balance sheet are not statistically significant at conventional levels.

These findings are consistent with recent evidence on climate-related financial tightening. Nobletz (2024) shows that long-lasting natural disasters, such as droughts and wildfires, increase expected corporate default risk and lead institutional investors to tighten financial conditions. As default probabilities rise, confidence in corporate credit markets deteriorates, amplifying contractions in credit supply.[1]

Table 3 reports corresponding results for outstanding loan volumes. In contrast to new lending, the estimated effects are smaller and less consistent across specifications. We observe a modest decline in outstanding credit, with statistically significant effects for core loans, core loans on balance sheet, and term loans. For term loans, outstanding credit declines by about 4%, while for all outstanding credit exposures the effect is negative but not statistically significant.

[1] As noted earlier, Nobletz (2024) further documents that short-term disasters, such as severe storms or tropical cyclones, increase default risk without triggering comparable financial tightening.

This contrast between new and outstanding loans indicates that the primary adjustment occurs at the origination stage rather than through an active reduction of existing exposures. The weaker response of outstanding loans reflects the stock nature of this measure, which aggregates past lending decisions and therefore adjusts only gradually to changing risk conditions. Existing exposures are typically characterized by longer maturities, contractual rigidities, and limited scope for immediate adjustment, attenuating the short-term impact of drought on total credit stocks. Banks thus respond to elevated climate risk primarily ex ante, by tightening credit standards for new lending rather than by actively reducing existing exposures.

Table 2: Baseline Regression: New Loans

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.1211**	-0.0944	-0.0850	-0.0590*	-0.0777***
	(0.0607)	(0.0572)	(0.0569)	(0.0308)	(0.0263)
Share_{EUR}	0.3462***	-1.599***	-1.236***	0.6176***	0.9679***
	(0.0310)	(0.1895)	(0.2205)	(0.1322)	(0.1399)
Share_{USD}	-2.396***	-3.802***	-3.358***	0.1602	-0.0480
	(0.1475)	(0.1428)	(0.1434)	(0.3672)	(0.3789)
RFR	-0.2780***	-0.2997***	-0.2668***	-0.0969***	-0.1259***
	(0.0069)	(0.0232)	(0.0287)	(0.0325)	(0.0244)
Firm Age	0.0833***	0.0753***	0.0723***	0.0801***	0.0353***
	(0.0092)	(0.0077)	(0.0090)	(0.0038)	(0.0034)
$(\text{Firm Age})^2$	-0.0012***	-0.0009***	-0.0008***	-0.0011***	-0.0004***
	(0.0002)	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Season = Summer	0.0251	0.0704*	0.0221	-0.0736**	-0.0037
	(0.0164)	(0.0391)	(0.0310)	(0.0361)	(0.0190)
Season = Autumn	-0.0003	0.0110	-0.0102	-0.2585***	-0.0532*
	(0.0166)	(0.0243)	(0.0292)	(0.0486)	(0.0287)
Season = Winter	-0.0883***	-0.2270***	-0.1908***	0.0644	0.0681***
	(0.0100)	(0.0243)	(0.0261)	(0.0549)	(0.0245)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Observations	768,165	271,901	238,899	66,786	103,210
R^2	0.4210	0.4820	0.4836	0.5087	0.5212

Note: The table displays regression results for the model specified in equation (1), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all loans (credit instruments) from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

Table 3: Baseline Regression: Outstanding Loans

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.0306	-0.0468*	-0.0761***	-0.0148	-0.0416**
	(0.0220)	(0.0244)	(0.0277)	(0.0282)	(0.0196)
Share_{EUR}	0.0049	0.0168	0.0178	0.9931***	1.663***
	(0.0449)	(0.1121)	(0.1331)	(0.0938)	(0.1617)
Share_{USD}	-2.901***	-4.645***	-4.712***	0.5367	1.248***
	(0.2120)	(0.3302)	(0.3216)	(0.3634)	(0.2376)
RFR	-0.0747***	-0.0850***	-0.0753***	-0.0279**	-0.0400***
	(0.0054)	(0.0088)	(0.0122)	(0.0110)	(0.0061)
Firm Age	0.0602***	0.0586***	0.0602***	0.0598***	0.0119***
	(0.0077)	(0.0091)	(0.0112)	(0.0021)	(0.0026)
$(\text{Firm Age})^2$	-0.0008***	-0.0008***	-0.0008***	-0.0006***	-1×10^{-5}
	(0.0002)	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Season = Summer	0.0198***	0.0211***	0.0249***	0.0075***	0.0148***
	(0.0023)	(0.0028)	(0.0044)	(0.0025)	(0.0016)
Season = Autumn	0.0087***	0.0111***	0.0214***	-0.0168***	0.0107***
	(0.0019)	(0.0026)	(0.0042)	(0.0023)	(0.0015)
Season = Winter	0.0010	0.0009	0.0061**	-0.0018	0.0036***
	(0.0017)	(0.0017)	(0.0023)	(0.0034)	(0.0013)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	5,687,063	5,048,468	3,980,199	2,805,305	2,488,977
R^2	0.3229	0.3059	0.2578	0.4082	0.3945

Note: The table displays regression results for the model specified in equation (1), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all loans (credit instruments) from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

5.2 Through Which Margin? Bank–Firm Relationships

We next examine whether drought affects the extensive margin of bank lending and whether the response differs with the number of existing bank–firm relationships. Table 4 reports linear probability models for three outcomes: the formation of a new bank relationship, the origination of a new loan within an existing relationship, and either of these two events. The results show that drought exposure is associated with a higher probability of forming a new bank relationship in the broad sample of all credit exposures. The estimated effect is economically modest but statistically significant: firms located in drought-exposed districts are more likely to obtain credit from a bank with which they did not have a lending relationship in the previous quarter.

This extensive-margin effect is concentrated in the broadest credit category. It is not consistently present for core loans or term loans, which suggests that drought does not increase the probability of obtaining new long-term bank financing. Rather, the positive effect in the all-credit-exposures category may reflect the use of broader or more flexible credit instruments, such as guarantees, trade-related exposures, or other short-term credit arrangements. One interpretation is that firms exposed to drought may seek additional banking links to cover liquidity needs or acute losses, while banks remain more cautious in providing larger or longer-term credit exposures.

The interaction with the number of existing bank relationships is negative. This indicates that the positive extensive-margin effect of drought becomes weaker for firms that are already connected to more banks. For firms with several existing banking relationships, drought exposure is therefore less likely to lead to the formation of an additional bank relationship. This pattern is consistent with banks taking into account borrower complexity, coordination problems across creditors, or concerns about leverage when deciding whether to add a new lending relationship in drought-exposed regions.

Table 5 turns to the intensive margin and shows that the number of bank relationships mitigates the negative effect of drought on new lending volumes. The coefficient on drought exposure is negative across most credit categories, confirming that new lending declines in drought-exposed districts. However, the interaction between drought exposure and the number of bank relationships is positive and statistically significant for all credit exposures, core loans, core loans on balance sheet, and term loans. This implies that firms with more diversified banking relationships experience a smaller contraction in new lending. For firms with two or three bank relationships, the estimated drought effect is substantially attenuated and, in several specifications, becomes close to zero. The exception is core loans off balance sheet, where the interaction is not statistically significant.

This mitigating role of multiple bank relationships is consistent with the literature on relationship lending and firms' access to credit. Maintaining several banking relationships can reduce dependence on a single lender and alleviate financing constraints by limiting lender market power (Guiso and Minetti, 2010). Multiple banking links may also signal borrower quality and improve access to larger amounts of credit (Ogane, 2023). In a similar spirit, Gopalan et al. (2011) show that the formation of additional banking relationships is associated with an expansion in loan volumes. Our results suggest that these mechanisms may also matter under chronic physical climate risk: firms with more diversified banking relationships experience a smaller contraction in new lending associated with drought exposure.

Table 4: Extensive Margin Regression: Number of Bank Relationships

Dependent Variables:	New lending or bank relationship			New lending			New bank relationship		
	All credit exposures	Core loans	Term loans	All credit exposures	Core loans	Term Loans	All credit exposures	Core loans	Term loans
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables									
Drought Impact	0.0226***	0.0075	0.0010	0.0013	0.0038**	0.0009	0.0228***	0.0069	0.0013
	(0.0068)	(0.0049)	(0.0047)	(0.0011)	(0.0016)	(0.0009)	(0.0065)	(0.0045)	(0.0046)
# Bank Relationships ×	-0.0161***	-0.0056*	-0.0010	-0.0017***	-0.0031***	-0.0004	-0.0151***	-0.0044	-0.0013
Drought Impact	(0.0045)	(0.0033)	(0.0039)	(0.0006)	(0.0010)	(0.0006)	(0.0043)	(0.0031)	(0.0038)
# Bank Relationships	0.0977***	0.1111***	0.1397***	-0.0005	-0.0036***	-0.0100***	0.0940***	0.1095***	0.1407***
	(0.0022)	(0.0021)	(0.0033)	(0.0004)	(0.0005)	(0.0005)	(0.0024)	(0.0022)	(0.0032)
Share_{EUR}	-0.1033***	-0.0981***	-0.0849***	-0.0198***	-0.0086***	-0.0093***	-0.0852***	-0.0876***	-0.0845***
	(0.0027)	(0.0044)	(0.0061)	(0.0016)	(0.0013)	(0.0011)	(0.0038)	(0.0053)	(0.0063)
Share_{USD}	-0.0946***	-0.0612***	-0.0265*	-0.0103**	0.0089*	-0.0153**	-0.0767***	-0.0508***	-0.0269**
	(0.0050)	(0.0036)	(0.0140)	(0.0048)	(0.0046)	(0.0066)	(0.0035)	(0.0038)	(0.0134)
RFR	-0.0278***	-0.0290***	-0.0242***	-0.0079***	-0.0054***	-0.0034***	-0.0208***	-0.0242***	-0.0227***
	(0.0020)	(0.0018)	(0.0012)	(0.0006)	(0.0005)	(0.0002)	(0.0015)	(0.0015)	(0.0011)
Firm Age	-0.0008***	-0.0005***	-0.0001	-0.0019***	-0.0020***	-0.0018***	-0.0004***	-0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0003)	(0.0003)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
$(\text{Firm Age})^2$	$1 \times 10^{-5***}$	$7 \times 10^{-6**}$	-3×10^{-6}	$3 \times 10^{-5***}$	$4 \times 10^{-5***}$	$3 \times 10^{-5***}$	1×10^{-6}	-3×10^{-6}	$-6 \times 10^{-6*}$
	(2×10^{-6})	(2×10^{-6})	(4×10^{-6})	(8×10^{-6})	(8×10^{-6})	(4×10^{-6})	(4×10^{-6})	(3×10^{-6})	(3×10^{-6})
Season = Summer	0.0121***	0.0122***	0.0076***	0.0024***	0.0017***	0.0002	0.0090***	0.0097***	0.0073***
	(0.0006)	(0.0005)	(0.0004)	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0004)	(0.0004)
Season = Autumn	0.0004	0.0001	-0.0014***	0.0005	0.0003	-0.0017***	-0.0016***	-0.0019***	-0.0017***
	(0.0004)	(0.0004)	(0.0003)	(0.0004)	(0.0004)	(0.0003)	(0.0004)	(0.0004)	(0.0004)
Season = Winter	-0.0106***	-0.0107***	-0.0085***	-0.0010***	-0.0002	-0.0010***	-0.0096***	-0.0106***	-0.0085***
	(0.0004)	(0.0004)	(0.0005)	(0.0003)	(0.0003)	(0.0002)	(0.0004)	(0.0003)	(0.0005)
Fixed-effects									
Bank	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,608,283	4,952,756	2,426,591	5,711,316	5,055,253	2,490,330	5,608,283	4,952,756	2,426,591
R^2	0.1152	0.1363	0.1866	0.1842	0.2085	0.4317	0.1207	0.1503	0.1957

Note: The table displays regression results for the model specified in equation (3), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all loans (credit instruments) from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

Table 5: Number of Bank-Firm Relationships: New Loans

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.3303***	-0.5130***	-0.5150***	0.0492	-0.3453**
	(0.0987)	(0.1433)	(0.1387)	(0.0720)	(0.1374)
# Bank Relationships ×	0.1154**	0.2903***	0.2886***	-0.0847	0.2238*
Drought Impact	(0.0503)	(0.0923)	(0.0887)	(0.0519)	(0.1159)
# Bank Relationships	0.2115***	0.1265***	0.2212***	-0.0268	0.0951**
	(0.0397)	(0.0451)	(0.0503)	(0.0407)	(0.0429)
Share_{EUR}	0.3262***	-1.660***	-1.309***	0.6252***	0.9580***
	(0.0313)	(0.2102)	(0.2419)	(0.1333)	(0.1351)
Share_{USD}	-2.456***	-3.826***	-3.383***	0.1834	-0.0370
	(0.1549)	(0.1443)	(0.1457)	(0.3634)	(0.3750)
RFR	-0.2790***	-0.3051***	-0.2729***	-0.0968***	-0.1237***
	(0.0069)	(0.0244)	(0.0297)	(0.0326)	(0.0241)
Firm Age	0.0797***	0.0730***	0.0690***	0.0801***	0.0352***
	(0.0086)	(0.0067)	(0.0079)	(0.0038)	(0.0035)
$(\text{Firm Age})^2$	-0.0012***	-0.0008***	-0.0008***	-0.0011***	-0.0004***
	(0.0002)	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Season = Summer	0.0271	0.0769*	0.0302	-0.0736**	0.0016
	(0.0166)	(0.0406)	(0.0318)	(0.0362)	(0.0200)
Season = Autumn	0.0021	0.0198	-0.0003	-0.2608***	-0.0475*
	(0.0169)	(0.0256)	(0.0289)	(0.0485)	(0.0281)
Season = Winter	-0.0852***	-0.2197***	-0.1792***	0.0640	0.0746***
	(0.0103)	(0.0257)	(0.0274)	(0.0551)	(0.0258)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	768,165	271,901	238,899	66,786	103,210
R^2	0.4248	0.4842	0.4869	0.5089	0.5229

Note: The table displays regression results for the model specified in equation (2), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all loans (credit instruments) from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

5.3 Which Exposures Are Protected? Loan Size versus Firm Size

We now turn to other heterogeneous characteristics of the loans and firms that may influence the size of the extended credit instruments. In particular, we focus on the relative size of the loan and the size of the borrowing firm. There is sparse evidence in the literature on whether the interaction of the relative size of the loan with another characteristic affects the loan amount or conditions (rather channels of collateralization or relationship lending are considered). On the other hand, studies such as Heller et al. (2025) show that small and medium sized firms are more likely to receive less credit than what they demand, with this effect remaining unchanged by tight/adverse economic conditions.

First, we examine the effect of the relative size of the loan. To this end, we define a binary variable, *Large Loan*, which indicates whether the volume of a given credit line falls within the top quartile of all credit lines in the sample.

Table 6 shows that larger new loans are significantly less sensitive to drought exposure. The interaction between drought and large loans is positive and highly significant across all credit categories, indicating that the contraction in lending is concentrated among smaller loans. In other words, banks continue to originate large loans even under adverse environmental conditions, while scaling back smaller exposures. This pattern suggests that lending decisions are adjusted along a risk-based margin, with banks prioritizing loans that are better screened, more collateralized, or associated with lower perceived risk. Corresponding results for outstanding loans are reported in the Appendix (Table B2) and point in the same direction.

Secondly, we investigate the effect of the size of the company. We introduce a binary variable Large Firm which is based on the RIAD in-built firm size classification. In RIAD, each enterprise is assigned to one of the following size categories: micro, small, medium, or large. Large enterprises are defined as firms with more than 250 employees and either an annual turnover exceeding EUR 50 million or an annual balance sheet total exceeding EUR 43 million.[2]

In contrast to loan size, firm size does not mitigate the impact of drought on new lending. As shown in Table 7, the interaction between drought exposure and firm size is generally insignificant and, for term loans, even negative and statistically significant. This indicates that larger firms are not systematically protected from drought-induced credit tightening. The absence of a positive firm-size effect stands in contrast to the strong attenuation observed for large loans and highlights that banks do not primarily condition their response on borrower size. Evidence for outstanding loans yields similar conclusions and is reported in the Appendix (Table B3).

Results based on triple interactions between firm size, loan size, and drought exposure (Appendix Tables B5 and B4) confirm that the lower sensitivity of large loans persists irrespective of firm size. This reinforces the interpretation that loan characteristics dominate firm characteristics in shaping credit supply responses.

These differentiated impacts are consistent with differences in how banks assess risk at the loan and firm level. Larger loans are typically subject to more intensive screening, collateral requirements, and monitoring, which may make them relatively safer even under adverse environmental conditions. This is not necessarily the case for larger firms, whose overall size does not shield them from operational disruptions caused by drought. As a result, banks appear to place greater weight on the characteristics of the loan itself than on firm size when adjusting credit supply in response to climate risk.

[2] The thresholds for the remaining size categories can be found here.

Table 6: Loan Size: New Loans

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.3907***	-0.3702***	-0.3715***	-0.1510***	-0.1793***
	(0.1042)	(0.1170)	(0.1167)	(0.0548)	(0.0424)
Large Loan ×	1.262***	1.374***	1.430***	0.4478**	0.6471***
Drought Impact	(0.4275)	(0.4605)	(0.4762)	(0.2214)	(0.1962)
Large Loan	3.795***	4.688***	4.621***	2.628***	2.700***
	(0.0917)	(0.0939)	(0.1160)	(0.0677)	(0.0543)
Share_{EUR}	-0.3087***	-2.031***	-1.623***	0.0137	0.4085***
	(0.0649)	(0.1433)	(0.1664)	(0.1031)	(0.0681)
Share_{USD}	-2.036***	-3.246***	-2.809***	-0.3496	0.0102
	(0.2036)	(0.1206)	(0.1171)	(0.3496)	(0.3591)
RFR	-0.2288***	-0.1962***	-0.1623***	-0.0332	-0.0555***
	(0.0066)	(0.0131)	(0.0160)	(0.0300)	(0.0162)
Firm Age	0.0790***	0.0480***	0.0436***	0.0701***	0.0298***
	(0.0101)	(0.0060)	(0.0074)	(0.0036)	(0.0021)
$(\text{Firm Age})^2$	-0.0011***	-0.0006***	-0.0006***	-0.0010***	-0.0004***
	(0.0002)	(0.0002)	(0.0002)	(0.0001)	(4×10^{-5})
Season = Summer	0.0249	0.1082***	0.0606**	-0.0275	0.0025
	(0.0173)	(0.0360)	(0.0286)	(0.0475)	(0.0186)
Season = Autumn	0.0037	0.0802***	0.0505**	-0.1658***	-0.0496*
	(0.0161)	(0.0259)	(0.0242)	(0.0546)	(0.0274)
Season = Winter	-0.0842***	-0.2658***	-0.2129***	-0.0122	0.0146
	(0.0079)	(0.0199)	(0.0229)	(0.0467)	(0.0213)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	768,165	271,901	238,899	66,786	103,210
R^2	0.5532	0.6228	0.6085	0.6023	0.6476

Note: The table displays regression results for the model specified in equation (2), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all loans (credit instruments) from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

Table 7: Firm Size: New Loans

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.1142*	-0.0920	-0.0786	-0.0546*	-0.0605**
	(0.0625)	(0.0575)	(0.0565)	(0.0311)	(0.0256)
Large Firm ×	-0.0616	-0.0515	-0.1218	-0.3861	-0.4303**
Drought Impact	(0.1606)	(0.2280)	(0.2436)	(0.3402)	(0.2116)
Share_{EUR}	0.3463***	-1.599***	-1.236***	0.6188***	0.9702***
	(0.0309)	(0.1896)	(0.2208)	(0.1319)	(0.1399)
Share_{USD}	-2.396***	-3.802***	-3.358***	0.1586	-0.0521
	(0.1475)	(0.1429)	(0.1435)	(0.3667)	(0.3786)
RFR	-0.2780***	-0.2997***	-0.2667***	-0.0965***	-0.1255***
	(0.0069)	(0.0232)	(0.0288)	(0.0326)	(0.0245)
Firm Age	0.0833***	0.0753***	0.0723***	0.0801***	0.0352***
	(0.0092)	(0.0077)	(0.0091)	(0.0038)	(0.0033)
$(\text{Firm Age})^2$	-0.0012***	-0.0009***	-0.0008***	-0.0011***	-0.0004***
	(0.0002)	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Season = Summer	0.0251	0.0705*	0.0221	-0.0732**	-0.0036
	(0.0164)	(0.0391)	(0.0310)	(0.0360)	(0.0190)
Season = Autumn	-0.0003	0.0110	-0.0103	-0.2587***	-0.0533*
	(0.0166)	(0.0243)	(0.0292)	(0.0487)	(0.0286)
Season = Winter	-0.0883***	-0.2270***	-0.1908***	0.0648	0.0683***
	(0.0100)	(0.0243)	(0.0261)	(0.0548)	(0.0245)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	768,165	271,901	238,899	66,786	103,210
R^2	0.4210	0.4820	0.4836	0.5087	0.5213

Note: The table displays regression results for the model specified in equation (2), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all loans (credit instruments) from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

5.4 Does the Effect Differ across Sectors?

We next examine whether the response of bank lending to drought varies across industries by interacting drought exposure with sectoral indicators. We focus on selected NACE Level 1 sectors that are either economically important or plausibly exposed to drought risk: agriculture, forestry and fishing; mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; water supply, sewerage, waste management and remediation activities; construction; and a residual category of other industries. Results for all new credit exposures, core new loans, and term new loans are reported in Tables 8–10.

Across specifications, the baseline effect of drought remains negative in most cases, confirming that drought exposure is associated with weaker new lending. At the same time, the interaction terms point to meaningful sectoral heterogeneity.

For all new credit exposures, the attenuation of the drought effect is most visible in manufacturing, where the interaction term is positive and statistically significant. This suggests that lending to manufacturing firms is less sensitive to drought exposure than lending to firms in other sectors. By contrast, the residual category of other industries exhibits a significantly stronger contraction, indicating that the adverse effect of drought is not confined to the sectors most directly associated with water use or agriculture.

For core new loans, the strongest adverse sector-specific effect appears in the energy sector. The interaction term for electricity, gas, steam and air conditioning supply is negative and statistically significant, implying a sharper contraction in lending to firms in this sector. A plausible interpretation is that drought and heat-related conditions increase operational risks in energy production, for example through lower water availability for cooling or reduced hydropower generation. This interpretation is consistent with recent European experience, where heatwaves and drought conditions affected the operation of power plants (Autorité de sûreté nucléaire, 2022).[3] However, the estimates should be interpreted as sectoral correlations rather than direct evidence on the underlying technological channel.

For term new loans, the most pronounced heterogeneity is observed in mining and quarrying, where the interaction term is large, positive, and statistically significant. This indicates that the negative drought effect on term lending is substantially weaker in this sector. One possible explanation is that mining projects are more capital-intensive, longer-term, and often backed by tangible assets, which may make term lending less sensitive to local drought exposure. Given the sector-specific nature of this result, we interpret it cautiously.

[3] Sectoral differences may also reflect differences in risk-sharing and adaptation possibilities. For example, crop insurance and public support schemes may partly stabilize income in agriculture and reduce expected credit losses from the lender's perspective (Pogach et al., 2024). By contrast, long-term drought represents a correlated, region-wide shock that is difficult to hedge or diversify, which limits private risk-sharing (Townsend, 1994; Allen and Gale, 2004). The role of insurance and public support is therefore a plausible mechanism, but our empirical design does not directly identify it.

Table 8: All New Credit Exposures and Firm Industry

Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables							
Drought Impact	-0.1299**	-0.1213**	-0.1774***	-0.1199*	-0.1235**	-0.1346**	-0.0126
	(0.0625)	(0.0604)	(0.0573)	(0.0602)	(0.0610)	(0.0642)	(0.0765)
$Share_{EUR}$	0.3474***	0.3475***	0.3474***	0.3474***	0.3477***	0.3474***	0.3470***
	(0.0311)	(0.0311)	(0.0311)	(0.0311)	(0.0311)	(0.0311)	(0.0311)
$Share_{USD}$	-2.386***	-2.386***	-2.386***	-2.386***	-2.386***	-2.386***	-2.387***
	(0.1487)	(0.1488)	(0.1486)	(0.1488)	(0.1488)	(0.1487)	(0.1482)
RFR	-0.2794***	-0.2794***	-0.2794***	-0.2794***	-0.2793***	-0.2793***	-0.2794***
	(0.0071)	(0.0071)	(0.0071)	(0.0071)	(0.0071)	(0.0071)	(0.0071)
Firm Age	0.0835***	0.0834***	0.0834***	0.0834***	0.0834***	0.0834***	0.0835***
	(0.0093)	(0.0093)	(0.0093)	(0.0093)	(0.0093)	(0.0093)	(0.0093)
$(\text{Firm Age})^2$	-0.0012***	-0.0012***	-0.0012***	-0.0012***	-0.0012***	-0.0012***	-0.0012***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Season = Summer	0.0258	0.0258	0.0257	0.0258	0.0258	0.0257	0.0256
	(0.0170)	(0.0170)	(0.0170)	(0.0170)	(0.0170)	(0.0170)	(0.0171)
Season = Autumn	-0.0003	-0.0002	-0.0003	-0.0002	-0.0002	-0.0003	-0.0004
	(0.0169)	(0.0169)	(0.0170)	(0.0169)	(0.0169)	(0.0170)	(0.0170)
Season = Winter	-0.0872***	-0.0872***	-0.0873***	-0.0872***	-0.0872***	-0.0872***	-0.0873***
	(0.0102)	(0.0102)	(0.0102)	(0.0102)	(0.0102)	(0.0102)	(0.0102)
NACE - A × Drought Impact	0.1494						
	(0.2064)						
NACE - B × Drought Impact		0.2823					
		(0.4737)					
NACE - C × Drought Impact			0.1596*				
			(0.0915)				
NACE - D × Drought Impact				-0.2848			
				(0.4108)			
NACE - E × Drought Impact					0.4126		
					(0.4629)		
NACE - F × Drought Impact						0.1203	
						(0.0980)	
NACE - OTHER × Drought Impact							-0.2330***
							(0.0860)
Fixed-effects							
Bank	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics							
Observations	765,540	765,540	765,540	765,540	765,540	765,540	765,540
R^2	0.4179	0.4179	0.4180	0.4179	0.4179	0.4179	0.4180

Note: The table displays regression results for the model specified in equation (2), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all loans (credit instruments) from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

Table 9: New Core Loans and Firm Industry

Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables							
Drought Impact	-0.1026*	-0.0946	-0.1083*	-0.0921	-0.0970*	-0.1041*	-0.0321
	(0.0579)	(0.0569)	(0.0597)	(0.0565)	(0.0568)	(0.0586)	(0.0779)
$Share_{EUR}$	-1.595***	-1.595***	-1.595***	-1.595***	-1.595***	-1.595***	-1.596***
	(0.1891)	(0.1892)	(0.1891)	(0.1890)	(0.1892)	(0.1892)	(0.1890)
$Share_{USD}$	-3.800***	-3.800***	-3.800***	-3.800***	-3.800***	-3.800***	-3.800***
	(0.1437)	(0.1438)	(0.1439)	(0.1437)	(0.1438)	(0.1438)	(0.1439)
RFR	-0.3010***	-0.3009***	-0.3010***	-0.3011***	-0.3010***	-0.3009***	-0.3010***
	(0.0231)	(0.0232)	(0.0231)	(0.0231)	(0.0231)	(0.0232)	(0.0231)
Firm Age	0.0755***	0.0754***	0.0754***	0.0754***	0.0754***	0.0754***	0.0755***
	(0.0077)	(0.0077)	(0.0077)	(0.0077)	(0.0077)	(0.0077)	(0.0077)
$(\text{Firm Age})^2$	-0.0009***	-0.0009***	-0.0009***	-0.0009***	-0.0009***	-0.0009***	-0.0009***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Season = Summer	0.0721*	0.0722*	0.0721*	0.0722*	0.0722*	0.0721*	0.0719*
	(0.0410)	(0.0410)	(0.0410)	(0.0410)	(0.0410)	(0.0410)	(0.0411)
Season = Autumn	0.0098	0.0098	0.0097	0.0098	0.0098	0.0098	0.0096
	(0.0245)	(0.0245)	(0.0246)	(0.0246)	(0.0245)	(0.0245)	(0.0246)
Season = Winter	-0.2255***	-0.2255***	-0.2257***	-0.2257***	-0.2255***	-0.2256***	-0.2257***
	(0.0245)	(0.0245)	(0.0245)	(0.0245)	(0.0245)	(0.0245)	(0.0245)
NACE - A × Drought Impact	0.0997						
	(0.1046)						
NACE - B × Drought Impact		0.5656					
		(0.4427)					
NACE - C × Drought Impact			0.0660				
			(0.1143)				
NACE - D × Drought Impact				-0.7825**			
				(0.3707)			
NACE - E × Drought Impact					0.4449		
					(0.4392)		
NACE - F × Drought Impact						0.0710	
						(0.0897)	
NACE - OTHER × Drought Impact							-0.1108
							(0.0895)
Fixed-effects							
Bank	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics							
Observations	270,278	270,278	270,278	270,278	270,278	270,278	270,278
R^2	0.4796	0.4796	0.4796	0.4796	0.4796	0.4796	0.4796

Note: The table displays regression results for the model specified in equation (2), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all loans (credit instruments) from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

Table 10: New Term Loans and Firm Industry

Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables							
Drought Impact	-0.0932***	-0.0775***	-0.0705**	-0.0780***	-0.0749***	-0.0766**	-0.0509
	(0.0299)	(0.0265)	(0.0311)	(0.0265)	(0.0261)	(0.0296)	(0.0424)
$Share_{EUR}$	0.9675***	0.9670***	0.9676***	0.9673***	0.9671***	0.9671***	0.9667***
	(0.1401)	(0.1402)	(0.1402)	(0.1401)	(0.1402)	(0.1402)	(0.1404)
$Share_{USD}$	-0.0496	-0.0494	-0.0497	-0.0491	-0.0491	-0.0491	-0.0486
	(0.3785)	(0.3786)	(0.3787)	(0.3787)	(0.3787)	(0.3787)	(0.3783)
RFR	-0.1255***	-0.1256***	-0.1255***	-0.1255***	-0.1256***	-0.1256***	-0.1256***
	(0.0244)	(0.0244)	(0.0244)	(0.0244)	(0.0244)	(0.0244)	(0.0244)
Firm Age	0.0356***	0.0355***	0.0354***	0.0355***	0.0354***	0.0355***	0.0355***
	(0.0035)	(0.0034)	(0.0034)	(0.0034)	(0.0034)	(0.0034)	(0.0034)
$(\text{Firm Age})^2$	-0.0004***	-0.0004***	-0.0004***	-0.0004***	-0.0004***	-0.0004***	-0.0004***
	(5.86×10^{-5})	(5.89×10^{-5})	(5.89×10^{-5})	(5.88×10^{-5})	(5.88×10^{-5})	(5.89×10^{-5})	(5.87×10^{-5})
Season = Summer	-0.0024	-0.0020	-0.0024	-0.0023	-0.0025	-0.0024	-0.0023
	(0.0186)	(0.0186)	(0.0186)	(0.0186)	(0.0186)	(0.0186)	(0.0186)
Season = Autumn	-0.0539*	-0.0536*	-0.0541*	-0.0541*	-0.0543*	-0.0541*	-0.0539*
	(0.0283)	(0.0282)	(0.0282)	(0.0282)	(0.0282)	(0.0282)	(0.0282)
Season = Winter	0.0663***	0.0664***	0.0662***	0.0663***	0.0662***	0.0662***	0.0663***
	(0.0241)	(0.0241)	(0.0241)	(0.0241)	(0.0241)	(0.0241)	(0.0241)
NACE - A × Drought Impact	0.1516						
	(0.1034)						
NACE - B × Drought Impact		3.222***					
		(0.0848)					
NACE - C × Drought Impact			-0.0339				
			(0.0837)				
NACE - D × Drought Impact				0.4779			
				(0.4068)			
NACE - E × Drought Impact					-0.5819		
					(0.3802)		
NACE - F × Drought Impact						0.0009	
						(0.0795)	
NACE - OTHER × Drought Impact							-0.0452
							(0.0657)
Fixed-effects							
Bank	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics							
Observations	102,899	102,899	102,899	102,899	102,899	102,899	102,899
R^2	0.5214	0.5214	0.5214	0.5214	0.5214	0.5214	0.5214

Note: The table displays regression results for the model specified in equation (2), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all loans (credit instruments) from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

6. Robustness

We assess the robustness of the main findings along two dimensions. First, we examine whether the results depend on the definition of drought exposure. Second, we test whether the estimates are driven by the geographic concentration of firms and credit in Prague. Across these exercises, the main conclusion remains unchanged: long-term drought exposure is associated with a contraction in new corporate lending, and the adjustment is concentrated primarily at the origination margin.

6.1 Alternative Measures of Drought Exposure

Our baseline specification uses a binary indicator for districts with long-term drought-related losses. We first replace this indicator with a more granular measure that distinguishes the severity of drought impact. The results, reported in Table B6, show that the negative effect on new lending is not driven by a particular threshold. Moderate drought impacts (associated with 10–30% agricultural losses) are associated with lower new loan volumes across several credit categories, while more severe categories (30–40% and over 40% losses) also point to a contraction in selected specifications – particularly for the Term loans category, the negative effect of severe drought is around three times larger than the one of a milder drought.

We then use an alternative drought indicator based on the number of dry days in the upper soil layer.[4] This measure provides an independent proxy for persistent local drought conditions. To make it comparable to the baseline time-invariant drought measure, we compute the average number of dry days for each district over 2016–2023 and classify districts in the top quartile of the distribution as drought-exposed. The results, reported in Tables B7–B10, are qualitatively similar to the baseline findings. In particular, the estimated effect remains negative for new lending and the heterogeneity patterns by bank relationships and loan size are preserved.

6.2 Sample Composition and Geographic Concentration

We next examine whether the baseline results are driven by Prague. Prague accounts for a large number of firms and a substantial share of corporate credit, while its metropolitan structure may make the headquarters-based drought assignment less representative of firms' actual production exposure. We therefore re-estimate the baseline specification after excluding firms headquartered in Prague. The results, reported in Table B11, remain close to the baseline estimates. This suggests that the contraction in new lending is not driven by the capital region.

[4] The dry-days indicator is based on data from the Global Change Research Institute of the Czech Academy of Sciences (GCRI). It is derived from a soil water balance model that combines meteorological inputs, such as precipitation, temperature, and evapotranspiration, with soil characteristics to estimate moisture in the 0–40 cm root zone. Soil moisture is evaluated relative to long-term conditions, and each day is classified as dry or non-dry according to threshold values.

7. Conclusion

This paper studies whether chronic physical climate risk affects corporate credit allocation. We focus on drought in the Czech Republic, a persistent and spatially heterogeneous source of physical climate risk, and combine district-level measures of drought-related agricultural losses with granular AnaCredit credit data. This setting allows us to examine how banks adjust corporate lending across both the origination margin and the stock of existing credit exposures.

The main finding is that long-term drought exposure is associated with a significant contraction in new corporate lending. The effect is concentrated at the origination margin: newly originated credit declines in drought-exposed districts, while outstanding credit volumes adjust more gradually and less consistently. This pattern suggests that persistent physical climate risk is reflected more readily in new lending decisions than in existing credit stocks, which are shaped by contractual maturities, refinancing cycles, and relationship-specific frictions.

The results also show that the impact of drought differs across bank–firm relationships, credit-exposure characteristics, and sectors. Firms with more diversified banking relationships experience a smaller contraction in new lending, indicating that multiple bank relationships can partly cushion climate-related credit tightening. At the same time, the formation of additional bank relationships is less likely for firms that are already connected to several lenders, suggesting that banks may take borrower complexity and creditor coordination into account when extending new credit in drought-exposed regions. We also find that larger credit exposures are less sensitive to drought exposure, while larger firms do not receive similar protection. This points to the importance of exposure-level characteristics, such as screening, collateralization, and monitoring, rather than firm size alone. Finally, sectoral results indicate that drought-related credit effects are not confined to agriculture, with stronger adverse effects in selected water- and energy-sensitive activities.

Overall, the evidence shows that chronic physical climate risk can affect corporate credit allocation even in the absence of a discrete disaster event. For banks, the findings highlight the relevance of persistent local climate stress for credit-risk assessment and loan origination. For policymakers and supervisors, they suggest that monitoring physical climate risk requires attention not only to acute disasters, but also to chronic risks such as drought, which may gradually shape credit conditions across firms, sectors, and regions. The results are particularly relevant for bank-based financial systems, where changes in bank lending can have important implications for firms' access to external finance.

The analysis is subject to several limitations. First, drought exposure is assigned based on firms' headquarters, which may differ from the location of production or other economically relevant operations. Second, we observe granted credit but not loan applications or rejected credit demand, which prevents us from fully separating credit-supply responses from changes in firms' demand for credit. Third, the analysis focuses on credit quantities rather than loan pricing or collateral requirements. Future research could combine credit-register data with more detailed information on firms' production locations, loan applications, and contract terms to further identify the mechanisms through which chronic physical climate risk is transmitted to corporate credit markets.

References

ALLEN, F. AND D. GALE (2004): "Financial Intermediaries and Markets." *Econometrica,* 72(4): 1023–1061.

AUTORITÉ DE SÛRETÉ NUCLÉAIRE (2022): "ASN Report on the State of Nuclear Safety and Radiation Protection in France in 2022." Autorité de sûreté nucléaire. Annual report.

BARBAGLIA, L., S. FATICA, AND C. RHO (2024): "Flooded Credit Markets: Physical Climate Risk and Small Business Lending." MOFiR Working Paper No. 186, Money and Finance Research Group.

BREI, M., O. KOWALEWSKI, P. SPIEWANOWSKI, AND E. STROBL (2025): "As Dry as a Bone: How Do Banks Cope with Droughts?" FEB-RN Research Paper No. 47, Finance, Economics and Banking Research Network.

CARROLL, J., M. MAHONY, B. MORANDO, C. O'SULLIVAN, AND S. S. AHANGARKOLAEE (2025): "Firm Credit Conditions and Flood Risk: Evidence from Ireland." *The Economic and Social Review,* 56(4):449–483.

CASELLI, G. AND M. MIGLIORELLI (2024): "Physical Risk from Climate Change and Local Banks' Lending: What Lies Ahead?" SUERF Policy Note.

CORREA, R., A. HE, C. HERPFER, AND U. LEL (2022): "The Rising Tide Lifts Some Interest Rates: Climate Change, Natural Disasters, and Loan Pricing." International Finance Discussion Paper No. 1345, Board of Governors of the Federal Reserve System.

CORTÉS, K. R. AND P. E. STRAHAN (2017): "Tracing Out Capital Flows: How Financially Integrated Banks Respond to Natural Disasters." *Journal of Financial Economics,* 125(1): 182–199.

ČESKÝ HYDROMETEOROLOGICKÝ ÚSTAV (2025): "Klimatologická ročenka České republiky 2024." Annual climatological report. Český hydrometeorologický ústav. Accessed: 2026-05-25.

DO, Q. A., V. PHAN, AND D. T. NGUYEN (2023): "How Do Local Banks Respond to Natural Disasters?" *The European Journal of Finance,* 29(7):754–779.

ELNAHAS, A., D. KIM, AND I. KIM (2018): "Natural Disaster Risk and Corporate Leverage." Economics and Finance Faculty Publications, University of T ersity of Texas Rio Gr exas Rio Grande Valley.

FAIELLA, I. AND F. NATOLI (2018): "Natural Catastrophes and Bank Lending: The Case of Flood Risk in Italy." Occasional Paper No. 457, Bank of Italy.

GARMAISE, M. J. AND T. J. MOSKOWITZ (2009): "Catastrophic Risk and Credit Markets." *The Journal of Finance,* 64(2):657–707.

GOPALAN, R., G. F. UDELL, AND V. YERRAMILLI (2011): "Why Do Firms Form New Banking Relationships?" *Journal of Financial and Quantitative Analysis,* 46(5):1335–1365.

GUISO, L. AND R. MINETTI (2010): "The Structure of Multiple Credit Relationships: Evidence from U.S. Firms." *Journal of Money, Credit and Banking,* 42(6):1037–1071.

HELLER, D., P. KARAPANAGIOTIS, AND Ø. A. NILSEN (2025): "Small and Vulnerable during Crises? Firm Size and Financing Constraint Dynamics." *Small Business Economics,* 65(1): 451–473.

HONG, H., F. W. LI, AND J. XU (2019): "Climate Risks and Market Efficiency." *Journal of Econometrics,* 208(1):265–281.

HUYNH, T. D., T. H. NGUYEN, AND C. TRUONG (2020): "Climate Risk: The Price of Drought." *Journal of Corporate Finance,* 65:101750.

CHAVAZ, M. (2016): "Dis-Integrating Credit Markets: Diversification, Securitization, and Lending in a Recovery." Working Paper No. 617, Bank of England.

IVANOV, I. T., M. MACCHIAVELLI, AND J. A. C. SANTOS (2022): "Bank Lending Networks and the Propagation of Natural Disasters." *Financial Management,* 51(3):903–927.

JAVADI, S. AND A.-A. MASUM (2021): "The Impact of Climate Change on the Cost of Bank Loans." *Journal of Corporate Finance,* 69:102019.

LESK, C., P. ROWHANI, AND N. RAMANKUTTY (2016): "Influence of Extreme Weather Disasters on Global Crop Production." *Nature,* 529(7584):84–87.

MEUCCI, G. AND F. RINALDI (2022): "Bank Exposure to Climate-Related Physical Risk in Italy: An Assessment Based on AnaCredit Data on Loans to Non-Financial Corporations." Occasional Paper No. 706, Bank of Italy.

MINISTERSTVO ŽIVOTNÍHO PROSTŘEDÍ (2021): "Adaptace na změnu klimatu." (https://mzp.gov.cz/cz/agenda/klima-a-energetika/adaptace-na-zmenu-klimatu). Accessed: 2026-05-25.

MINISTERSTVO ŽIVOTNÍHO PROSTŘEDÍ (2023): "2022: Rok veder, sucha a požárů, ve kterém začala agrese na Ukrajinu a energetická krize." (https://mzp.gov.cz/cz/pro-media-a-verejnost/aktuality/archiv-tiskovych-zprav/2022-rok-veder-sucha-a-pozaru-ve-kterem). Accessed: 2026-05-25.

NOBLETZ, C. (2024): "The Impact of Natural Disasters on US Business Credit Markets: A Comparative Analysis of Short-Term and Long-Duration Events." *Review of World Economics,* 1–38.

OGANE, Y. (2023): "The Number of Bank Relationships and Bank Lending to Informationally Opaque SMEs." *Pacific-Basin Finance Journal,* 80:102082.

ÖZSOY, S. M., M. RASTEH, AND E. YÖNDER (2025): "Understanding Drought Shocks: Bank Financial Stability and Loan Performance." *Global Finance Journal,* 65:101100.

POGACH, J., C. POLSON, AND M. HEIL (2024): "Agricultural Lending, Insurance, and Implications of Climate Change." FDIC CFR Working Paper No. 2024-05, Federal Deposit Insurance Corporation Center for Financial Research.

SCHÜWER, U., C. LAMBERT, AND F. NOTH (2019): "How Do Banks React to Catastrophic Events? Evidence from Hurricane Katrina." *Review of Finance,* 23(1):75–116.

TOWNSEND, R. M. (1994): "Risk and Insurance in Village India." *Econometrica,* 62(3):539–591.

Appendix A: Additional Information on Data

This appendix provides additional information on the construction of the loan-level dataset, the matching of firms to local drought exposure, and the descriptive patterns underlying the main analysis. The purpose of this appendix is threefold. First, it documents how the final estimation samples are obtained from the raw AnaCredit data. Second, it provides additional evidence on the spatial, seasonal, and time-varying nature of drought exposure. Third, it reports descriptive statistics showing how firms and loan volumes are distributed across drought-impact categories.

A.1 Sample Construction and Geocoding

Table A1 summarizes the construction of the new-loan and outstanding-loan samples. The non-filtered samples include all loans denominated in Czech koruna and euro over the period from June 2019 to December 2023. The cleaned samples are obtained after applying the filters described in Section 3, including restrictions on banks, instruments, sectors, and firm size. The final geocoded samples include only loans to firms that can be assigned to a Czech administrative district based on the address of their headquarters.

Table A1: New Loans and Outstanding Loans Data (CZK & EUR)

(A) New Loans Data breakdown

Sample	Banks	Firms	Loans
All credit exposures non-filtered	43	134,727	404,925
Cleaned Samples			
All credit exposures	41	100,932	316,424
Core loans	41	93,616	246,498
Term loans	34	47,830	91,617
Cleaned Samples - geocoded			
All credit exposures	40	99,981	312,087
Core loans	40	92,939	244,261
Term loans	33	47,304	90,383

(B) Outstanding Loans Data breakdown

Sample	Banks	Firms	Loans
All credit exposures non-filtered	46	215,527	8,844,797
Cleaned Samples			
All credit exposures	44	147,505	6,260,550
Core loans	44	139,748	5,619,499
Term loans	38	74,799	2,779,242
Cleaned Samples - geocoded			
All credit exposures	44	138,512	5,736,319
Core loans	44	130,820	5,106,906
Term loans	38	67,671	2,510,529

Note: The breakdowns are performed on loans that were contracted in CZK or EUR currency in the period of June 2019 to December 2023. The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate all the loans (credit instruments) from one bank to a firm. The cleaned samples represent subsets of the original population of all credit exposures non-filtered after applying filters on Banks, Instruments, Sectors, and Size, as specified in Section 3.2. The geocoded samples are loans which we were able to geocode based on the address of the borrower to a specific region.

The geocoding procedure is important because drought exposure is observed at the district level. Firms are matched to drought exposure using the location of their headquarters. For firms that change headquarters during the sample period, we construct a monthly location panel and assign drought exposure according to the district in which the firm is located in a given month. This procedure allows us to account for changes in firm location over time, including cases in which firms move across districts. As discussed in the main text, the use of headquarters may introduce measurement error if the location of production differs from the registered address. To the extent that such measurement error is classical, it should attenuate the estimated relationship between drought exposure and corporate lending.

A.2 Additional Evidence on Drought Exposure

The baseline drought measure used in the empirical analysis is based on the long-term most frequent drought-impact category in each district. This measure captures persistent local exposure to drought-related losses and is shown in Figure 1 in the main text. The figures below provide additional descriptive evidence on the seasonal and time-varying patterns of drought exposure.

Figure A1 shows the most frequent drought-impact category separately by season. The seasonal maps indicate that drought-related losses are more pronounced in summer and autumn, while spring and winter are generally less affected. This pattern is consistent with the interpretation of drought as a cumulative climatic stress, where losses may reflect precipitation and temperature conditions from previous months.

Figure A2 shows the development of drought exposure during the AnaCredit sample period. The sample period is divided into four subperiods of approximately equal length. The maps illustrate that drought exposure varies over time, but also that some regions are repeatedly more affected. This supports the use of a long-term district-level measure in the baseline specification, while also confirming that drought exposure has meaningful time variation.

A.3 Summary Statistics of Firms and Loans

Tables A2 and A3 report summary statistics for firms and loans in the new-loan sample. The tables document the skewed nature of corporate lending: most borrowing firms are micro or small firms, while loan volumes and bank relationships are concentrated among a smaller set of larger or more connected firms. These patterns motivate the heterogeneity analysis by bank–firm relationships, loan size, and firm size.

A.4 New Lending by Drought Exposure

Tables A4–A7 describe the composition of the new-loan sample across drought-impact categories. These tables are descriptive and are not intended as causal evidence. They show how firms and loan amounts are distributed across firm sizes, sectors, regions, and the number of bank–firm relationships.

Table A4 shows the distribution of firms and new loan amounts by firm size and drought-impact category. The table confirms that the Czech corporate sector is dominated by micro firms in terms of the number of firms, while larger firms account for a disproportionate share of new loan volumes.

Table A5 reports the corresponding breakdown by sector. The table documents that drought exposure is not limited to agriculture. Firms in manufacturing, construction, wholesale and retail

Table A2: Summary Statistics of Firms Granted New Loans

	All credit exposures	Core loans	Term loans
Firm Age (in years)			
Mean	11.00	10.73	11.06
SD	9.41	9.31	9.29
1st Quartile	3.12	3.02	3.49
Median	8.24	7.92	8.38
3rd Quartile	17.12	16.53	16.72
Loans per Firm			
Mean	7.95	3.02	2.15
SD	342.85	7.61	5.15
1st Quartile	1	1	1
Median	2	2	1
3rd Quartile	3	3	2
Bank Relationships			
Mean	4.96	3.80	2.34
SD	27.18	14.74	5.36
1st Quartile	1	1	1
Median	2	2	1
3rd Quartile	4	3	2
Firm Size			
Micro	73,307	68,605	34,496
Small	15,292	13,828	7,317
Medium	8,363	7,832	4,079
Large	3,019	2,674	1,412

Note: The statistics are computed for firms that have been granted a new loan in the period of June 2019 to December 2023. All credit exposures, core loans, and term loans are defined in Section 3.2. Firm age is first aggregated on the level of individual firms as the mean age of the firm at the times the firm was granted a loan and then the respective statistics are calculated. The Loans per firm refers to the count of new individual instruments the firm was granted in the sample period. The firm size is categorized according to European Commission Recommendation 2003/361/EC concerning the definition of micro, small and medium-sized enterprises - i.e. based on the number of employees and the minimum of annual turnover or balance sheet volume of the firm.

Table A3: Summary Statistics of New Loans

	All credit exposures	Core loans	Term loans
Currency (count)			
CZK	257,320	203,441	79,898
EUR	54,767	40,820	10,485
USD	2,941	2,037	83
Total Credit (in CZK)			
Mean	17,208,144	16,054,449	21,956,560
SD	128,668,809	111,064,275	113,105,310
1st Quartile	30,000	1,930.54	500,000
Median	772,419	600,000	1,500,300
3rd Quartile	4,868,000	4,001,620	7,235,179
On-BS Credit (in CZK)			
Mean	11,495,914	14,042,962	18,704,297
SD	97,906,247	101,276,875.00	105,617,094
1st Quartile	0	113	200,000
Median	1,050	180,210	800,000
3rd Quartile	1,460,164	2,500,000	4,000,000
Off-BS Credit (in CZK)			
Mean	5,712,230	2,011,486	3,252,263
SD	70,881,739	37,925,018	40,194,369
1st Quartile	0.00	0.00	0.00
Median	0.00	0.00	0.00
3rd Quartile	611,480	14,800	0.00
Annualized IR (in %)			
Mean	6.57	6.55	6.10
SD	6.91	6.81	4.07
1st Quartile	0.70	1.02	3.17
Median	4.73	4.81	5.83
3rd Quartile	9.57	9.47	8.90
Maturity (in months)			
Mean	42.82	46.71	71.33
SD	54.51	57.44	64.04
1st Quartile	12.00	12.00	36.00
Median	24.00	28.00	61.00
3rd Quartile	61.00	61.00	86.00

Note: The statistics are computed for loans that have been granted in the period of June 2019 to December 2023. All credit exposures, core loans, and term loans are defined in Section 3.2. Total credit represents the sum of the on-balance sheet (On-BS) and off-balance sheet (Off-BS) amount of credit. The On-BS credit and Off-BS credit are calculated based on the aggregation of bank-firm-time triplets of new loans, i.e. for example the mean of On-BS Credit is calculated as the average of the sum of loans appearing on the balance sheet that have been granted to each firm by a bank in a particular month (and therefore represents the average size of the new credit that was granted by a bank to a firm in the sample period). Similarly, The Annualized IR is calculated as a weighted average for the bank-firm-time triplet with weights represented by the on-balance sheet amount of credit. Maturity is in similar vein calculated as an average of the maturities of individual instruments for the bank-firm-time points.

Table A4: New Lending: Breakdown by Drought Impact and Firm Size

(A) Number of Firms and Share in %

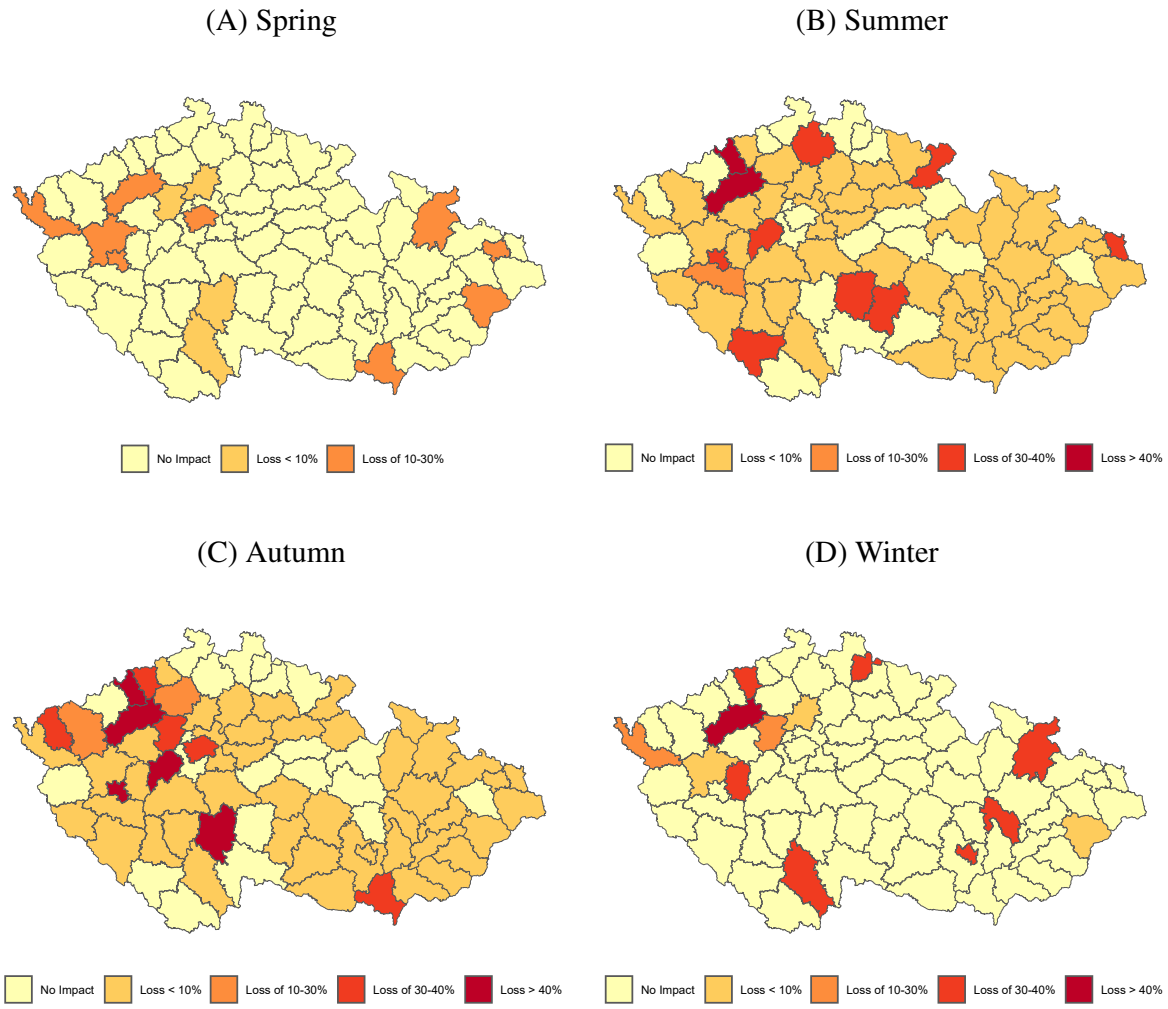
Drought impact:	No impact	Loss < 10%	Loss 10–30%	Loss 30–40%	Loss > 40%
All firms	36,892	41,014	22,034	665	997
Shares (in %)					
Micro firms	63.8	72.8	65.8	68.6	68.5
Small firms	20.9	14.8	19.6	17.0	19.0
Medium firms	11.5	8.8	10.7	10.0	9.5
Large firms	3.8	3.7	3.9	4.4	3.0

(B) New Loan Amount (in billion CZK)

Drought impact:	No impact	Loss < 10%	Loss 10–30%	Loss 30–40%	Loss > 40%
All firms	1,508	2,967	1,000	48	48
Micro firms	168	318	113	2	3
Small firms	233	825	175	1	3
Medium firms	386	417	222	8	10
Large firms	720	1,406	490	36	31

Note: Drought impact is calculated based on the most frequent drought conditions in a specific region over time, using weekly data from 2016 to 2023. "No impact" indicates firms experiencing no significant drought effects, while the other categories reflect varying degrees of loss due to drought, for more information refer to Section 3.1. The categories "Micro," "Small," "Medium," and "Large" firms are defined according to the European Commission Recommendation 2003/361/EC concerning the definition of micro, small and medium-sized enterprises - i.e. based on the number of employees and the minimum of annual turnover or balance sheet volume of the firm.

Figure A1: District Mode of the Drought Impact during Seasons of the Year



Note: The figure depicts the most frequent value for each district in the time range of 2016-2024, while omitting weeks with insufficient number of reporters, for each season of the year - with Spring being defined as the 3 - 5 month, Summer as the 6 - 8 month, Autumn as the 9 - 11 month and Winter as the 12 - 2 month of the year.

trade, real estate, and other sectors are also represented across drought-impact categories. This supports the interpretation of drought exposure as a broader local physical climate risk rather than a purely agricultural shock.

Table A6 reports the distribution of firms and new loan amounts by region. The table highlights the geographic concentration of some drought-impact categories and illustrates how the district-level drought measure maps into the regional distribution of borrowers. This is useful for interpreting the fixed-effects structure used in the empirical analysis, where drought exposure is measured at a more granular level than the regional controls.

Finally, Table A7 reports the distribution of firms and new loan amounts by the number of bank–firm relationships. Most firms have only one banking relationship, but loan amounts are more concentrated among firms with multiple bank connections. This motivates the relationship-lending

Table A5: New Lending: Breakdown by Drought Impact and Sector

(A) Number of Firms and Share in %

Drought impact:	No impact	Loss < 10%	Loss 10–30%	Loss 30–40%	Loss > 40%
All firms	36,892	41,014	22,034	665	997
Shares (in %)					
A: Agriculture	6.1	3.1	4.8	6.8	5.7
B: Mining and quarrying	0.1	0.1	0.1	0.4	0.3
C: Manufacturing	20.6	9.4	16.3	17.0	17.6
D: Energy supply	0.6	0.7	0.5	0.1	0.5
E: Water supply	0.9	1.0	0.9	1.1	1.5
F: Construction	13.7	10.0	13.1	17.2	17.8
G: Wholesale and retail trade	20.9	24.1	21.5	16.9	18.6
H: Transportation and storage	5.8	3.7	5.0	7.2	4.6
I: Accommodation	5.8	5.7	5.4	7.5	5.8
L: Real estate activities	7.0	14.8	11.2	5.9	6.2
M: Professional services	8.0	14.4	9.1	7.6	8.1
Other	9.8	11.8	11.0	12.0	12.6

(B) New Loan Amount (in billion CZK)

Drought impact:	No impact	Loss < 10%	Loss 10–30%	Loss 30–40%	Loss > 40%
All firms	1,508	2,967	1,000	48	48
A: Agriculture	67	15	31	1	0
B: Mining and quarrying	36	1	1	0	1
C: Manufacturing	764	317	266	37	36
D: Energy supply	28	330	20	0	1
E: Water supply	7	17	8	0	0
F: Construction	96	257	81	8	2
G: Wholesale and retail trade	278	670	360	1	1
H: Transportation and storage	41	165	22	0	1
I: Accommodation	9	19	5	0	0
L: Real estate activities	125	672	139	0	1
M: Professional services	29	321	33	0	3
Other	25	176	33	0	1

Note: Drought impact is calculated based on the most frequent drought conditions in a specific region over time, using weekly data from 2016 to 2023. "No impact" indicates firms experiencing no significant drought effects, while the other categories reflect varying degrees of loss due to drought, for more information refer to Section 3.1. The sectors are based on the NACE level 1 classification with Other sectors aggregating the sectors of J: Information and Communication, N: Administrative and Support Service Activities, O: Public Administration and Defence, P: Education, Q: Human Health and Social Work Activities, R: Arts, Entertainment and Recreation, S: Other Service Activities and T: Activities of Households as Employers together.

Table A6: New Lending: Breakdown by Drought Impact and Region

(A) Number of Firms and Share in %

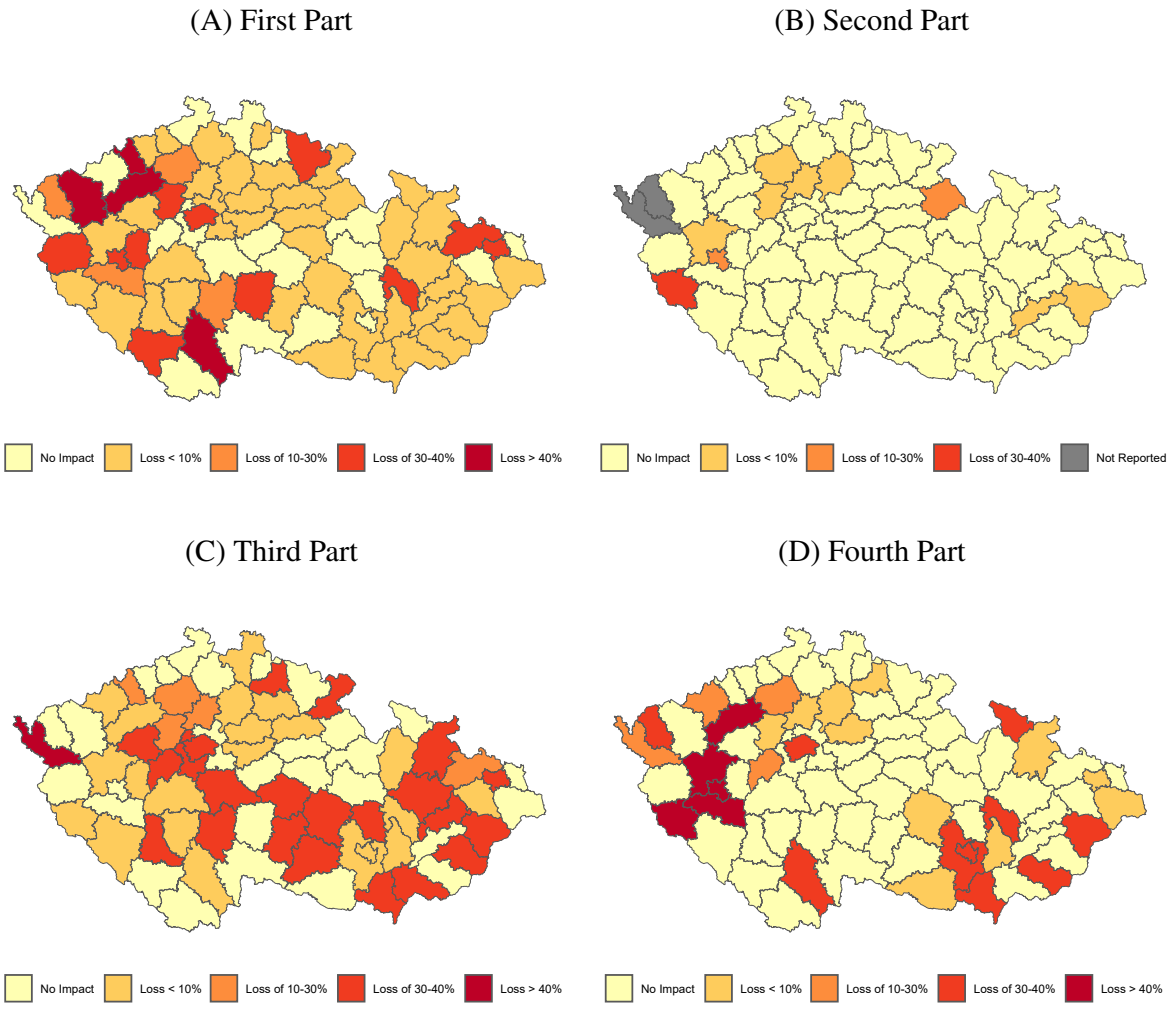
Drought impact:	No impact	Loss < 10%	Loss 10–30%	Loss 30–40%	Loss > 40%
All firms	36,892	41,014	22,034	665	997
Shares (in %)					
Hlavní město Praha	0.3	87.6	0.2	0.3	0.3
Jihomoravský kraj	8.1	1.9	38.6	0.0	0.4
Jihočeský kraj	7.0	0.0	8.3	0.0	0.2
Karlovarský kraj	2.9	0.0	2.5	0.0	0.0
Kraj Vysočina	7.5	0.0	0.1	1.4	0.1
Královéhradecký kraj	9.5	0.0	0.1	0.0	0.0
Liberecký kraj	7.5	0.0	0.0	0.0	0.1
Moravskoslezský kraj	12.5	1.3	20.0	0.2	0.2
Olomoucký kraj	7.6	1.6	3.9	0.2	0.1
Pardubický kraj	9.8	0.0	0.1	0.3	0.0
Plzenský kraj	2.7	5.2	2.8	0.5	0.4
Středočeský kraj	13.5	2.5	12.5	0.6	0.4
Zlínský kraj	4.4	0.0	11.0	0.0	0.0
Ústecký kraj	7.2	0.1	0.1	97.0	98.0

(B) New Loan Amount (in billion CZK)

Drought impact:	No impact	Loss < 10%	Loss 10–30%	Loss 30–40%	Loss > 40%
All firms	1,508	2,967	1,000	48	48
Hlavní město Praha	1	2,697	3	0	0
Jihomoravský kraj	134	23	386	0	0
Jihočeský kraj	84	0	69	0	0
Karlovarský kraj	23	0	10	0	0
Kraj Vysočina	173	0	0	0	0
Královéhradecký kraj	108	0	0	0	0
Liberecký kraj	64	0	0	0	0
Moravskoslezský kraj	287	37	286	0	0
Olomoucký kraj	99	17	22	0	0
Pardubický kraj	149	0	0	0	0
Plzenský kraj	21	148	17	0	0
Středočeský kraj	191	43	118	0	0
Zlínský kraj	67	1	89	0	0
Ústecký kraj	107	0	0	48	47

Note: Drought impact is calculated based on the most frequent drought conditions in a specific region over time, using weekly data from 2016 to 2023. "No impact" indicates firms experiencing no significant drought effects, while the other categories reflect varying degrees of loss due to drought, for more information refer to Section 3.1. The regions correspond to the NUTS-3 classification of the Czech geographical administrative units.

Figure A2: District Mode of the Drought Impact during the Data Sample



Note: The data sample merged to AnaCredit data ranges from June 2019 to December 2023 and for the purpose of this figure, it was divided into four 14 months parts (with the last part having only 13 months). The figure then depicts the most frequent value for each district within the particular period of time, while omitting weeks with insufficient number of reporters.

analysis in the main text, where we examine whether the effect of drought differs with the number of bank relationships.

Table A7: New Lending: Breakdown by Drought Impact and Number of Bank–Firm Relationships

(A) Number of Firms and Share in %

Drought impact:	No impact	Loss < 10%	Loss 10–30%	Loss 30–40%	Loss > 40%
All banks	36	39	35	17	19
All firms	36,892	41,014	22,034	665	997
Shares (in %)					
1 relationship	85.4	86.9	85.4	84.1	84.4
2 relationships	12.2	11.1	12.1	11.3	13.1
3 relationships	2.0	1.6	1.9	3.3	2.0
More than 3 relationships	0.5	0.5	0.5	1.4	0.5

(B) New Loan Amount (in billion CZK)

Drought impact:	No impact	Loss < 10%	Loss 10–30%	Loss 30–40%	Loss > 40%
All firms	1,508	2,967	1,000	48	48
1 relationship	455	821	282	5	13
2 relationships	373	460	246	8	15
3 relationships	239	281	113	8	9
More than 3 relationships	441	1405	359	28	11

Note: Drought impact is calculated based on the most frequent drought conditions in a specific region over time, using weekly data from 2016 to 2023. "No impact" indicates firms experiencing no significant drought effects, while the other categories reflect varying degrees of loss due to drought, for more information refer to Section 3.1. The number of bank relationships for a firm is evaluated during the whole sample period of June 2019 to December 2023 and accounts also for foreign branches of the bank institutions.

Appendix B: Additional Regression Results

Table B1: Number of Bank-Firm Relationships: Outstanding Loans

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.1675**	-0.1868***	-0.2816***	-0.0799	-0.1761***
	(0.0705)	(0.0706)	(0.0738)	(0.0775)	(0.0620)
# Bank Relationships ×	0.0896**	0.0941**	0.1330***	0.0469	0.1035**
Drought Impact	(0.0439)	(0.0437)	(0.0441)	(0.0524)	(0.0457)
# Bank Relationships	0.1438***	0.1046***	0.0724***	-0.1504***	-0.0225
	(0.0194)	(0.0199)	(0.0193)	(0.0228)	(0.0246)
Share_{EUR}	-0.0204	-0.0046	-0.0007	1.003***	1.663***
	(0.0495)	(0.1183)	(0.1397)	(0.0917)	(0.1620)
Share_{USD}	-2.959***	-4.685***	-4.745***	0.5633	1.238***
	(0.2207)	(0.3367)	(0.3281)	(0.3590)	(0.2413)
RFR	-0.0742***	-0.0847***	-0.0752***	-0.0298***	-0.0398***
	(0.0055)	(0.0087)	(0.0122)	(0.0112)	(0.0062)
Firm Age	0.0591***	0.0579***	0.0593***	0.0606***	0.0121***
	(0.0074)	(0.0089)	(0.0108)	(0.0020)	(0.0026)
$(\text{Firm Age})^2$	-0.0008***	-0.0008***	-0.0008***	-0.0006***	-2×10^{-5}
	(0.0001)	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Season = Summer	0.0196***	0.0210***	0.0247***	0.0077***	0.0149***
	(0.0023)	(0.0028)	(0.0044)	(0.0025)	(0.0015)
Season = Autumn	0.0086***	0.0110***	0.0213***	-0.0167***	0.0107***
	(0.0019)	(0.0026)	(0.0043)	(0.0023)	(0.0015)
Season = Winter	0.0016	0.0013	0.0064***	-0.0018	0.0036***
	(0.0017)	(0.0017)	(0.0024)	(0.0033)	(0.0013)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	5,687,063	5,048,468	3,980,199	2,805,305	2,488,977
R^2	0.3259	0.3077	0.2595	0.4091	0.3948

Note: The table displays regression results for the model specified in equation (2), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all credit exposures from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

Table B2: Loan Size: Outstanding Loans

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.1525**	-0.1776**	-0.2508***	-0.0543	-0.0973***
	(0.0634)	(0.0713)	(0.0937)	(0.0351)	(0.0343)
Large Loan	3.547***	3.549***	3.331***	2.221***	2.769***
	(0.0576)	(0.0713)	(0.0776)	(0.0437)	(0.0248)
Large Loan ×	0.5822**	0.6446**	0.7094**	0.2437**	0.3405**
Drought Impact	(0.2568)	(0.2901)	(0.3274)	(0.1091)	(0.1418)
Share_{EUR}	-0.4715***	-0.7746***	-0.6252***	0.3989***	0.6381***
	(0.0621)	(0.1738)	(0.1991)	(0.0600)	(0.0988)
Share_{USD}	-2.614***	-4.159***	-4.137***	0.1465	0.2627
	(0.2088)	(0.2361)	(0.2232)	(0.2767)	(0.2461)
RFR	-0.0209***	-0.0475***	-0.0323***	-0.0088	-0.0115**
	(0.0043)	(0.0068)	(0.0092)	(0.0093)	(0.0046)
Firm Age	0.0470***	0.0455***	0.0411***	0.0533***	0.0088***
	(0.0083)	(0.0091)	(0.0108)	(0.0021)	(0.0014)
$(\text{Firm Age})^2$	-0.0008***	-0.0007***	-0.0007***	-0.0006***	-0.0001***
	(0.0002)	(0.0002)	(0.0002)	(0.0001)	(3×10^{-5})
Season = Summer	0.0118***	0.0138***	0.0181***	0.0030	0.0113***
	(0.0018)	(0.0019)	(0.0034)	(0.0023)	(0.0012)
Season = Autumn	0.0052***	0.0068***	0.0190***	-0.0196***	0.0082***
	(0.0016)	(0.0017)	(0.0030)	(0.0022)	(0.0010)
Season = Winter	0.0015	0.0021	0.0060***	0.0005	0.0012
	(0.0012)	(0.0013)	(0.0020)	(0.0030)	(0.0009)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	5,687,063	5,048,468	3,980,199	2,805,305	2,488,977
R^2	0.5500	0.5275	0.4584	0.4885	0.6258

Note: The table displays regression results for the model specified in equation (2), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all credit exposures from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

Table B3: Firm Size: Outstanding Loans

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.0276	-0.0429*	-0.0712**	-0.0150	-0.0365*
	(0.0219)	(0.0250)	(0.0290)	(0.0275)	(0.0193)
Large Firm ×	-0.0725	-0.1062	-0.1219	0.0076	-0.1621
Drought Impact	(0.1097)	(0.1071)	(0.1253)	(0.1431)	(0.1244)
Share_{EUR}	0.0048	0.0170	0.0179	0.9932***	1.663***
	(0.0449)	(0.1122)	(0.1331)	(0.0937)	(0.1616)
Share_{USD}	-2.902***	-4.646***	-4.712***	0.5368	1.247***
	(0.2118)	(0.3300)	(0.3215)	(0.3630)	(0.2380)
RFR	-0.0746***	-0.0849***	-0.0753***	-0.0279**	-0.0399***
	(0.0054)	(0.0088)	(0.0122)	(0.0110)	(0.0061)
Firm Age	0.0602***	0.0586***	0.0602***	0.0598***	0.0119***
	(0.0077)	(0.0091)	(0.0112)	(0.0021)	(0.0026)
$(\text{Firm Age})^2$	-0.0008***	-0.0008***	-0.0008***	-0.0006***	-1.26×10^{-5}
	(0.0002)	(0.0002)	(0.0002)	(5.76×10^{-5})	(5.27×10^{-5})
Season = Summer	0.0198***	0.0211***	0.0249***	0.0075***	0.0148***
	(0.0023)	(0.0028)	(0.0044)	(0.0025)	(0.0016)
Season = Autumn	0.0087***	0.0111***	0.0214***	-0.0168***	0.0107***
	(0.0019)	(0.0026)	(0.0042)	(0.0023)	(0.0015)
Season = Winter	0.0010	0.0009	0.0061**	-0.0018	0.0036***
	(0.0017)	(0.0017)	(0.0023)	(0.0034)	(0.0013)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	5,687,063	5,048,468	3,980,199	2,805,305	2,488,977
R^2	0.3229	0.3059	0.2578	0.4082	0.3945

Note: The table displays regression results for the model specified in equation (2), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all credit exposures from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

Table B4: Firm Size and Loan Size Interaction: New Loans

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.3922***	-0.3645***	-0.3610***	-0.1505***	-0.1686***
	(0.1085)	(0.1151)	(0.1134)	(0.0541)	(0.0389)
Large Loan	3.668***	4.533***	4.448***	2.580***	2.633***
	(0.0957)	(0.0933)	(0.1169)	(0.0697)	(0.0546)
Large Firm ×	0.0689	0.0506	-0.0848	0.0176	-0.3356
Drought Impact	(0.1797)	(0.2832)	(0.2794)	(0.4664)	(0.2145)
Large Loan ×	1.546***	1.451***	1.515***	0.4825**	0.6935***
Drought Impact	(0.5235)	(0.4866)	(0.5048)	(0.2222)	(0.1989)
Large Firm × Large Loan	0.5090***	1.809***	1.777***	1.889***	0.5789***
	(0.1812)	(0.3203)	(0.2809)	(0.6452)	(0.1486)
Large Firm × Large Loan	-1.165**	-0.7103	-0.6077	-1.284*	-0.1055
× Drought Impact	(0.4743)	(0.4368)	(0.4087)	(0.7314)	(0.1660)
Share_{EUR}	-0.3125***	-2.030***	-1.623***	0.0120	0.4118***
	(0.0709)	(0.1421)	(0.1649)	(0.1017)	(0.0690)
Share_{USD}	-2.039***	-3.234***	-2.796***	-0.3609	0.0001
	(0.2122)	(0.1206)	(0.1176)	(0.3405)	(0.3578)
RFR	-0.2281***	-0.1946***	-0.1609***	-0.0316	-0.0556***
	(0.0067)	(0.0133)	(0.0162)	(0.0298)	(0.0162)
Firm Age	0.0789***	0.0479***	0.0435***	0.0702***	0.0295***
	(0.0100)	(0.0059)	(0.0073)	(0.0037)	(0.0021)
$(\text{Firm Age})^2$	-0.0011***	-0.0006***	-0.0006***	-0.0010***	-0.0004***
	(0.0002)	(0.0002)	(0.0002)	(0.0001)	(4×10^{-5})
Season = Summer	0.0249	0.1062***	0.0586**	-0.0280	0.0017
	(0.0173)	(0.0365)	(0.0289)	(0.0484)	(0.0185)
Season = Autumn	0.0035	0.0793***	0.0496**	-0.1659***	-0.0502*
	(0.0161)	(0.0263)	(0.0242)	(0.0554)	(0.0272)
Season = Winter	-0.0847***	-0.2640***	-0.2109***	-0.0129	0.0149
	(0.0079)	(0.0198)	(0.0226)	(0.0472)	(0.0211)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	768,165	271,901	238,899	66,786	103,210
R^2	0.5537	0.6235	0.6093	0.6028	0.6479

Note: The table displays regression results for the model specified in equation (2), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all loans (credit instruments) from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

Table B5: Firm Size and Loan Size Interaction: Outstanding Loans

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.1503**	-0.1743**	-0.2466***	-0.0498	-0.0943***
	(0.0626)	(0.0694)	(0.0916)	(0.0343)	(0.0333)
Large Loan	3.479***	3.473***	3.273***	2.199***	2.745***
	(0.0595)	(0.0714)	(0.0791)	(0.0430)	(0.0262)
Share_{EUR}	-0.4732***	-0.7820***	-0.6308***	0.3978***	0.6352***
	(0.0608)	(0.1726)	(0.1981)	(0.0606)	(0.0992)
Share_{USD}	-2.603***	-4.151***	-4.135***	0.1624	0.2498
	(0.2136)	(0.2380)	(0.2238)	(0.2725)	(0.2417)
Large Firm ×	0.0551	0.0426	-0.0065	-0.1314	-0.0646
Drought Impact	(0.1230)	(0.1587)	(0.1710)	(0.1480)	(0.0890)
Large Loan ×	0.6009**	0.6614**	0.7239**	0.2252**	0.3532**
Drought Impact	(0.2702)	(0.2963)	(0.3324)	(0.1106)	(0.1438)
Large Firm ×	0.9159***	1.220***	0.9563***	0.4045**	0.4281***
Large Loan	(0.1242)	(0.1608)	(0.1627)	(0.1747)	(0.0999)
Large Firm × Large Loan	-0.3049	-0.3540*	-0.2871	0.2182	-0.2001*
× Drought Impact	(0.1879)	(0.1934)	(0.1795)	(0.2132)	(0.1050)
RFR	-0.0206***	-0.0470***	-0.0318***	-0.0080	-0.0113**
	(0.0042)	(0.0069)	(0.0094)	(0.0094)	(0.0045)
Firm Age	0.0469***	0.0454***	0.0410***	0.0533***	0.0087***
	(0.0083)	(0.0091)	(0.0108)	(0.0021)	(0.0014)
$(\text{Firm Age})^2$	-0.0008***	-0.0007***	-0.0007***	-0.0006***	-0.0001***
	(0.0002)	(0.0002)	(0.0002)	(0.0001)	(3×10^{-5})
Season = Summer	0.0119***	0.0139***	0.0182***	0.0030	0.0114***
	(0.0017)	(0.0019)	(0.0033)	(0.0023)	(0.0012)
Season = Autumn	0.0053***	0.0069***	0.0191***	-0.0196***	0.0083***
	(0.0015)	(0.0016)	(0.0030)	(0.0021)	(0.0010)
Season = Winter	0.0016	0.0022*	0.0060***	0.0005	0.0012
	(0.0012)	(0.0013)	(0.0020)	(0.0030)	(0.0009)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	5,687,063	5,048,468	3,980,199	2,805,305	2,488,977
R^2	0.5506	0.5285	0.4589	0.4888	0.6260

Note: The table displays regression results for the model specified in equation (2), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all loans (credit instruments) from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

B.1 Robustness

Table B6: Baseline Regression, Granular Measure of Drought: New Loans

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact: <10%	-0.1854	-0.0636	-0.0605	0.0367	-0.0638
	(0.1197)	(0.0918)	(0.0839)	(0.0463)	(0.0828)
Drought Impact: 10-30%	-0.1155*	-0.0925	-0.0802	-0.0552	-0.0683**
	(0.0671)	(0.0678)	(0.0670)	(0.0333)	(0.0276)
Drought Impact: 30-40%	0.2059	-0.1807	-0.1897	-0.4855***	-0.1991***
	(0.1822)	(0.1470)	(0.1320)	(0.1092)	(0.0734)
Drought Impact: > 40%	-0.2189	-0.1801	-0.1830	-0.1967**	-0.1837***
	(0.1737)	(0.1194)	(0.1126)	(0.0820)	(0.0547)
Share_{EUR}	0.3456***	-1.599***	-1.236***	0.6195***	0.9677***
	(0.0310)	(0.1895)	(0.2206)	(0.1320)	(0.1399)
Share_{USD}	-2.397***	-3.802***	-3.358***	0.1659	-0.0466
	(0.1474)	(0.1430)	(0.1435)	(0.3658)	(0.3792)
RFR	-0.2781***	-0.2997***	-0.2668***	-0.0966***	-0.1259***
	(0.0069)	(0.0232)	(0.0287)	(0.0326)	(0.0244)
Season = Summer	0.0251	0.0704*	0.0221	-0.0725**	-0.0036
	(0.0164)	(0.0391)	(0.0309)	(0.0360)	(0.0190)
Season = Autumn	-0.0005	0.0112	-0.0100	-0.2570***	-0.0530*
	(0.0166)	(0.0242)	(0.0292)	(0.0484)	(0.0287)
Season = Winter	-0.0882***	-0.2270***	-0.1908***	0.0648	0.0681***
	(0.0100)	(0.0243)	(0.0261)	(0.0548)	(0.0245)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Observations	768,165	271,901	238,899	66,786	103,210
R^2	0.4211	0.4820	0.4836	0.5088	0.5212

Note: The table displays regression results for the model specified in equation (1), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The binary "Drought Impact" indicator is in this specification replaced by a categorical variable distinguishing between 5 levels of drought intensity. The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all loans (credit instruments) from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

Table B7: Baseline Regression: New Loans - Alternative Drought Indicator

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.1176	-0.1131**	-0.0940	-0.0053	-0.0428
(0-40cm soil)	(0.1160)	(0.0422)	(0.0905)	(0.0424)	(0.0394)
$Share_{EUR}$	0.3480	-1.600**	-1.237*	0.6178	0.9666**
	(0.2465)	(0.6713)	(0.6266)	(0.4146)	(0.3957)
$Share_{USD}$	-2.391***	-3.800***	-3.356***	0.1596	-0.0440
	(0.7726)	(0.7292)	(0.6791)	(0.5797)	(0.3428)
RFR	-0.2777***	-0.2998***	-0.2669***	-0.0967**	-0.1263*
	(0.0527)	(0.0645)	(0.0792)	(0.0366)	(0.0666)
Firm Age	0.0833**	0.0754***	0.0724***	0.0802***	0.0354***
	(0.0319)	(0.0104)	(0.0168)	(0.0120)	(0.0087)
$(\text{Firm Age})^2$	-0.0012**	-0.0009***	-0.0008***	-0.0011***	-0.0004***
	(0.0005)	(0.0001)	(0.0002)	(0.0002)	(0.0001)
Season = Summer	0.0252	0.0704	0.0223	-0.0743	-0.0038
	(0.0207)	(0.0629)	(0.0559)	(0.0734)	(0.0308)
Season = Autumn	-0.0004	0.0112	-0.0100	-0.2589**	-0.0534
	(0.0315)	(0.0508)	(0.0414)	(0.1011)	(0.0372)
Season = Winter	-0.0884***	-0.2268***	-0.1906***	0.0645	0.0679**
	(0.0269)	(0.0364)	(0.0439)	(0.1188)	(0.0310)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Observations	768,165	271,901	238,899	66,786	103,210
R^2	0.42099	0.48195	0.48359	0.50864	0.52112

Note: The table displays regression results for the model specified in equation (1), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The alternative drought indicator used in the regression is described in Section 6. The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all credit exposures from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

Table B8: Number of Bank-Firm Relationships: New Loans - Alternative Drought Indicator

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.3918***	-0.6224***	-0.5576***	-0.0195	-0.3673***
(0-40cm soil)	(0.1066)	(0.1345)	(0.1403)	(0.0765)	(0.1195)
# Bank Relationships ×	0.1760***	0.3716***	0.3350***	0.0119	0.2709**
Drought Impact	(0.0361)	(0.0798)	(0.0824)	(0.0416)	(0.1044)
# Bank Relationships	0.1845***	0.0959**	0.2115***	-0.0853**	0.0811**
	(0.0337)	(0.0465)	(0.0488)	(0.0372)	(0.0375)
Share_{EUR}	0.3281***	-1.659***	-1.306***	0.6260***	0.9592***
	(0.0310)	(0.2112)	(0.2432)	(0.1326)	(0.1344)
Share_{USD}	-2.461***	-3.831***	-3.386***	0.1797	-0.0273
	(0.1544)	(0.1449)	(0.1467)	(0.3652)	(0.3731)
RFR	-0.2786***	-0.3048***	-0.2724***	-0.0965***	-0.1236***
	(0.0069)	(0.0245)	(0.0298)	(0.0325)	(0.0237)
Firm Age	0.0798***	0.0730***	0.0691***	0.0803***	0.0351***
	(0.0085)	(0.0067)	(0.0079)	(0.0038)	(0.0036)
$(\text{Firm Age})^2$	-0.0012***	-0.0008***	-0.0008***	-0.0011***	-0.0004***
	(0.0002)	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Season = Summer	0.0273	0.0768*	0.0305	-0.0749**	0.0025
	(0.0165)	(0.0406)	(0.0318)	(0.0364)	(0.0200)
Season = Autumn	0.0021	0.0195	-0.0011	-0.2612***	-0.0469*
	(0.0168)	(0.0257)	(0.0291)	(0.0483)	(0.0281)
Season = Winter	-0.0852***	-0.2191***	-0.1791***	0.0636	0.0755***
	(0.0103)	(0.0255)	(0.0273)	(0.0552)	(0.0254)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	768,165	271,901	238,899	66,786	103,210
R^2	0.42495	0.48444	0.48704	0.50881	0.52299

Note: The table displays regression results for the model specified in equation (2), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The alternative drought indicator used in the regression is described in Section 6. The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all credit exposures from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

Table B9: Loan Size: New Loans - Alternative Drought Indicator

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.4137***	-0.5067***	-0.4845***	-0.1744**	-0.1718***
(0-40cm soil)	(0.1106)	(0.1173)	(0.1190)	(0.0752)	(0.0514)
Large Loan ×	1.470***	1.744***	1.805***	0.6430***	0.7742***
Drought Impact	(0.4083)	(0.3996)	(0.4163)	(0.1854)	(0.1738)
Large Loan	3.778***	4.578***	4.508***	2.559***	2.665***
	(0.0906)	(0.0766)	(0.0883)	(0.0629)	(0.0600)
Share_{EUR}	-0.3044***	-2.022***	-1.612***	0.0154	0.4095***
	(0.0649)	(0.1408)	(0.1641)	(0.1034)	(0.0695)
Share_{USD}	-2.027***	-3.254***	-2.816***	-0.3649	-0.0173
	(0.2079)	(0.1213)	(0.1178)	(0.3467)	(0.3657)
RFR	-0.2264***	-0.1953***	-0.1608***	-0.0339	-0.0543***
	(0.0064)	(0.0129)	(0.0159)	(0.0306)	(0.0164)
Firm Age	0.0797***	0.0480***	0.0436***	0.0702***	0.0298***
	(0.0102)	(0.0059)	(0.0073)	(0.0036)	(0.0021)
$(\text{Firm Age})^2$	-0.0011***	-0.0006***	-0.0006***	-0.0010***	-0.0004***
	(0.0002)	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Season = Summer	0.0249	0.1055***	0.0565*	-0.0280	0.0024
	(0.0174)	(0.0361)	(0.0288)	(0.0478)	(0.0189)
Season = Autumn	0.0038	0.0765***	0.0471*	-0.1695***	-0.0469*
	(0.0162)	(0.0263)	(0.0240)	(0.0551)	(0.0274)
Season = Winter	-0.0839***	-0.2678***	-0.2139***	-0.0141	0.0180
	(0.0080)	(0.0197)	(0.0226)	(0.0467)	(0.0211)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	768,165	271,901	238,899	66,786	103,210
R^2	0.55403	0.62419	0.60982	0.60289	0.64815

Note: The table displays regression results for the model specified in equation (2), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The alternative drought indicator used in the regression is described in Section 6. The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all credit exposures from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

Table B10: Firm Size: New Loans - Alternative Drought Indicator

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.1404	-0.1534*	-0.1394*	-0.0005	-0.0458
(0-40cm soil)	(0.0943)	(0.0800)	(0.0830)	(0.0630)	(0.0562)
Large Firm ×	0.2066	1.166**	1.174**	-0.5407	0.1078
Drought Impact	(0.1801)	(0.4695)	(0.5059)	(0.4592)	(0.4484)
$Share_{EUR}$	0.3481***	-1.597***	-1.234***	0.6178***	0.9674***
	(0.0308)	(0.1892)	(0.2204)	(0.1321)	(0.1396)
$Share_{USD}$	-2.391***	-3.796***	-3.353***	0.1597	-0.0435
	(0.1496)	(0.1433)	(0.1440)	(0.3675)	(0.3796)
RFR	-0.2777***	-0.2992***	-0.2663***	-0.0967***	-0.1261***
	(0.0069)	(0.0232)	(0.0287)	(0.0325)	(0.0244)
Firm Age	0.0834***	0.0755***	0.0726***	0.0802***	0.0355***
	(0.0092)	(0.0077)	(0.0090)	(0.0038)	(0.0035)
$(\text{Firm Age})^2$	-0.0012***	-0.0009***	-0.0009***	-0.0011***	-0.0004***
	(0.0002)	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Season = Summer	0.0252	0.0703*	0.0221	-0.0741**	-0.0038
	(0.0164)	(0.0392)	(0.0310)	(0.0362)	(0.0190)
Season = Autumn	-0.0004	0.0117	-0.0096	-0.2590***	-0.0533*
	(0.0166)	(0.0243)	(0.0292)	(0.0486)	(0.0287)
Season = Winter	-0.0883***	-0.2269***	-0.1907***	0.0645	0.0679***
	(0.0100)	(0.0244)	(0.0261)	(0.0549)	(0.0245)
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	768,165	271,901	238,899	66,786	103,210
R^2	0.42099	0.48202	0.48366	0.50865	0.52112

Note: The table displays regression results for the model specified in equation (2), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The alternative drought indicator used in the regression is described in Section 6. The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all credit exposures from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

Table B11: Baseline Regression: New Loans - Without the Prague District

Dependent Variables:	All credit exposures	Core loans	Core loans: On-BS	Core loans: Off-BS	Term loans
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Drought Impact	-0.1242**	-0.0938	-0.0873	-0.0552*	-0.0817***
	(0.0618)	(0.0596)	(0.0588)	(0.0316)	(0.0283)
Share_{EUR}	0.3258***	-1.367***	-0.9680***	0.5680***	0.8472***
	(0.0522)	(0.1361)	(0.1681)	(0.1661)	(0.1578)
Share_{USD}	-2.194***	-3.768***	-3.308***	0.3364	-0.0401
	(0.1773)	(0.3024)	(0.2980)	(0.7304)	(0.6416)
RFR	-0.2759***	-0.2773***	-0.2399***	-0.0692*	-0.1096***
	(0.0108)	(0.0232)	(0.0307)	(0.0404)	(0.0346)
Firm Age	0.0703***	0.0675***	0.0635***	0.0785***	0.0382***
	(0.0063)	(0.0076)	(0.0095)	(0.0040)	(0.0038)
$(\text{Firm Age})^2$	-0.0009***	-0.0007***	-0.0006***	-0.0010***	-0.0004***
	(0.0001)	(0.0001)	(0.0002)	(9.13×10^{-5})	(6.63×10^{-5})
Season = Summer	0.0055	0.0246	-0.0074	-0.0917*	-0.0103
	(0.0136)	(0.0354)	(0.0377)	(0.0498)	(0.0278)
Season = Autumn	-0.0201	-0.0014	0.0025	-0.2873***	-0.0412
	(0.0144)	(0.0386)	(0.0474)	(0.0651)	(0.0411)
Season = Winter	-0.0927***	-0.2363***	-0.1977***	0.0179	0.0568
Fixed-effects					
Bank	Yes	Yes	Yes	Yes	Yes
ILS-quarter	Yes	Yes	Yes	Yes	Yes
Observations	511,152	180,499	156,058	49,502	72,853
R^2	0.44302	0.50079	0.50498	0.55557	0.58756

Note: The table displays regression results for the model specified in equation (1), using monthly bank-firm level data from AnaCredit on loans granted by Czech banks to Czech and non-Czech non-financial corporations (NFCs). The loans granted to the companies located in the capital city–Prague–are excluded. The term "loan" is defined in the context of the bank-firm pair; that is, for each month, we aggregate the outstanding amounts (including off-balance sheet amounts) of all credit exposures from one bank to a firm. Standard errors, presented in parentheses, are clustered at the district level. Significance levels: ***: 0.01, **: 0.05, *: 0.1.

CNB Working Paper Series (since 2025)

WP 11/2026	Jan Janků, Tomáš Karhánek, Simona Malovaná, Ivan Trubelík	*Drying Up: The Effect of Drought on Corporate Loans with AnaCredit Data*
WP 10/2026	Zuzana Gric Simona Malovaná D.Ehrenbergerová	*Who Is Less Likely to Get a Mortgage When Borrowing Limits Tighten?*
WP 9/2026	Filip Blaha Jan Botka Josef Švéda Aleš Michl	*AI-Based Forecasting of Czech Inflation: Quantile Regression Forests with Dynamic Weights*
WP 8/2026	Martijn Boermans Laurens Swinkels	*Hedging Against Inflation: International Evidence on Investor Clientele Effects*
WP 7/2026	Zuzana Gric Jan Janků Simona Malovaná	*Euroisation and the Bank Lending Channel of Monetary Policy: Evidence from Czechia*
WP 6/2026	František Mašek	*Households' Inflation Expectations and Consumption in Macroeconomic Models: A Negative Real Income Channel*
WP 5/2026	Volha Audzei Michal Franta	*International Spillovers from Euro Area Monetary Policy to Advanced Small Open Economies: Investment Behavior of Czech Firms*
WP 4/2026	Josef Simpartl	*Social Media as a Monetary Policy Tool? Evidence from a Survey Experiment*
WP 3/2026	Tomáš Šestořád Jan Vlček Karel Musil	*Monetary Policy and the Output Gap in DSGE Models for Small Open Economies: Insights from the Czech Republic*
WP 2/2026	Martin Hodula Simona Malovaná Lukáš Pfeifer	*When Monetary and Macroprudential Policies Tighten Together: Evidence from the Czech Mortgage Market*
WP 1/2026	Jiří Gregor Jan Janků	*Chasing Lower Rates: How Households Balance Refinancing Incentives and Debt Constraints*
WP 13/2025	Oxana Babecká Kucharčuková Jan Brůha Petr Štěrba	*Web Reviews as a New Leading Indicator for Nowcasting Travel Expenditure in Balance of Payments Statistics*
WP 12/2025	Jan Janků Simona Malovaná Josef Bajzík Klára Moravcová Ngoc Anh Ngo	*Credit Shocks Fade, Output Shocks Persist: A Meta-Analysis of 2,600 VAR Estimates Across 63 Countries*
WP 11/2025	Martin Hodula Simona Malovaná	*When Foreign Rates Matter More: Domestic Investor Responses in a Small Open Economy*
WP 10/2025	Volha Audzei Jan Brůha Ivan Sutóris	*Does Firms' Financing in Foreign Currency Matter for Monetary Policy?*
WP 9/2025	Volha Audzei Sergey Slobodyan	*Dynamic Sparse Adaptive Learning*
WP 8/2025	Michal Franta Jan Vlček	*Inflation at Risk: The Czech Case*

CNB Working Paper Series (since 2025)

WP 7/2025	František Brázdik Karel Musil Tomáš Pokorný Tomáš Šestořád Jaromír Tonner Jan Žáček	*Upgrading the Czech National Bank's Core Forecasting Model g3+*
WP 6/2025	Raphael Auer David Köpfer Josef Švéda	*The Rise of Generative AI: Modelling Exposure, Substitution, and Inequality Effects on the US Labour Market*
WP 5/2025	Josef Švéda	*Navigating Banking Resilience: Bail-Ins & Bailouts in the Czech Banking Sector*
WP 4/2025	Ivan Trubelík Tomáš Karhánek Simona Malovaná Aleš Michl	*Instant Payments in Czechia: Adoption and Future Trends*
WP 3/2025	Daniel Štodt	*Non-Linearity of Government Spending Multiplier: The Case of a Small Open Economy*
WP 2/2025	Soňa Benecká	*Forecasting Disaggregated Producer Prices: A Fusion of Machine Learning and Econometric Techniques*
WP 1/2025	Martin Hodula Lukáš Pfeifer	*Payment Holidays, Credit Risk, and Borrower-Based Limits: Insights from the Czech Mortgage Market*

CZECH NATIONAL BANK
Na Příkopě 28
115 03 Prague 1
Czech Republic

RESEARCH DIVISION
www.cnb.cz
research@cnb.cz

ISSN 1803-7070

ČNB ČESKÁ NÁRODNÍ BANKA