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Greener Growth, Tighter Credit? The Dual Role of Climate Action in Revenue Expectations and Financing Obstacles

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Abstract

This study examines the firm-level determinants of expected revenue growth and perceived ease of access to finance, with a particular focus on climate change mitigation actions, leadership and ownership characteristics, institutional environments and macroeconomic conditions. The analysis of 21,729 enterprises across 28 countries during 2018–2020 showed that firms that adopt climate change mitigation actions are significantly more likely to expect revenue growth. Second, female leadership was positively associated with revenue growth expectations, whereas a higher share of female ownership was linked to lower growth expectations. Third, higher perceived corruption and inflation were associated with reduced growth expectations. Regarding perceived access to finance, larger firms, those with more experienced top managers, and firms operating in less corrupt environments perceived easier access to finance. Conversely, firms that monitor CO₂ emissions and those that have experienced weather-related losses report significantly greater financing obstacles. These findings suggested that climate mitigation efforts are not environmentally beneficial alone but are positively correlated with managerial optimism about future revenue. However, such efforts, particularly emissions monitoring, may also signal risks to financiers, while climate-related physical shocks further constrain perceived access to capital. The results underscored the importance of both firm-level capabilities and institutional quality in shaping expectations and financial constraints.


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1. Introduction

Economic growth, employment creation, and technical progress are all fueled by expanding businesses. Many things influence a company's course, but two of the most essential are the likelihood of future revenue growth and the perceived ease of access to capital. Investment choices, recruitment, and innovation are influenced by managers' optimism and strategic, forward-looking behavior, as reflected in revenue growth expectations. Companies' ability to secure working capital, expand their operations, and withstand economic shocks results from their growth ambitions, which, in turn, are influenced by their perceptions of access to finance. The capacity to anticipate growth and the certainty that external funding will be available when required are essential for businesses of any size to grow sustainably. Despite a wealth of literature on firm-level performance, even less is known about the interplay between these two crucial dimensions and emerging strategic priorities, particularly the mitigation of climate change, as well as the moderating effects of leadership and ownership traits, institutional quality, and macroeconomic circumstances.

There has been a lot of momentum in recent years for the economic rationale of climate change action. Regulatory demands, stakeholder expectations, or genuine environmental commitment are driving businesses to adopt techniques such as energy management systems and CO₂ emission monitoring. Nevertheless, there is ongoing debate about the relationship between these climate mitigation efforts and business success. One side of the argument states that energy efficiency should increase revenue expectations and make credit easier to get because it lowers operational costs, improves reputational capital, and signals forward-looking management. However, climate initiatives require upfront investment, and monitoring emissions could put firms at risk of future regulations or costly transitions, which could make lenders wary or reduce optimism. Creditworthiness and the ability to attract capital can be improved through proactive mitigation measures such as monitoring CO₂ emissions or improving energy efficiency (Eccles and Klimenko, 2019). On the other hand, if we do nothing to address environmental issues, we risk seeing capital costs rise or our financing options decline (Flammer, 2021). The importance of financial structure in promoting low-carbon growth is supported by research from across countries, as presented by De Haas and Popov (2023). They conclude that broader stock markets accelerate emissions reductions in carbon-intensive industries by enabling green innovation and the reallocation of investment towards more energy-efficient sectors. The panel covers 48 countries, 16 industries, and 26 years. The importance of financial development, and the rise of equity markets in particular, in facilitating the shift to sustainable growth is highlighted by their findings. To reduce emissions and increase resource efficiency, businesses must take the lead in adopting mitigation strategies, even while governments establish legal frameworks (Porter and Van Der Linde, 1995). Stefan and Paul (2008) and Peters and Romi (2015) are two studies that examined the effects of firm size, sector, governance, and leadership on environmental behavior. But there are still three major holes. Despite evidence that managerial and ownership roles vary in power and strategic aims, the unique impact of gender on each is difficult to separate. The second issue is that in multi-country research, the impact of macroeconomic factors, such as inflation and average GDP levels, on the adoption of mitigation strategies has largely been ignored. Thirdly, there has been a lack of systematic research on the financial access conundrum as it pertains to climate action, wherein actual and perceived credit access differ.

For these conflicting ideas, there is a dearth of empirical evidence, especially from large-scale, cross-national business surveys. This study fills that need by investigating the potential correlation between two climate actions CO₂ monitoring and energy management and improved perceived access to financing and more accurate revenue growth predictions. Paying close attention to leadership and ownership traits, particularly gender composition, is essential for understanding firm-level expectations and climate initiatives. Women business owners and managers may have different risk tolerances, strategic orientations, and network access than men, according to a growing corpus of

research. While some research shows that companies run by women are more environmentally conscious or more profitable, other studies reveal that they are less willing to take financial risks or face discriminatory lending practices. There is a lack of large-sample cross-national evidence on how female ownership and leadership influence growth expectations and perceptions of finance, and the empirical evidence is inconsistent. This study makes a valuable contribution by methodically examining the potential impact of female top management or a higher percentage of female ownership on these outcomes. It does this while controlling for a comprehensive set of business and environmental characteristics.

Institutional context also matters profoundly. Corruption, defined as the abuse of public power for private gain, is widely recognized as a binding constraint on firm activity. In corrupt environments, firms may face bribe demands for loan approvals, opaque regulatory enforcement, or unreliable contracts. Such conditions are likely to depress managerial optimism about future growth and severely impair perceived access to finance. Yet, the magnitude of corruption's effect relative to other firm-level and macroeconomic factors has not been extensively quantified across diverse national contexts. This study provides robust estimates of how perceived corruption, as an operational obstacle, affects both expected revenue growth and access to financing. Macroeconomic conditions, particularly GDP and inflation, constitute the broader environment within which firms operate. Conventional wisdom holds that stronger economic growth boosts firm-level revenue expectations, while high inflation erodes purchasing power and creates uncertainty, dampening optimism and tightening credit availability. However, existing research has primarily examined these relationships using aggregate data or small samples. Whether macroeconomic averages over five- or ten-year horizons exert independent effects on firm-level perceptions, after controlling for firm characteristics and institutional factors, remains an open empirical question. This study tests whether long-term GDP and inflation are significantly associated with expected revenue growth and perceived access to financing, or whether micro-level and institutional factors dominate these associations. Finally, firm-level structural characteristics such as size, age, legal status, and sector are well-established correlates of performance and financial access. Larger firms typically enjoy economies of scale, greater collateral, and more formal relationships with financial institutions. Older firms may benefit from reputation and accumulated experience but might also face lower growth ceilings or organizational inertia. Publicly listed firms and manufacturing enterprises may operate under distinct regulatory and competitive environments. This study controls for these factors to isolate the unique contributions of climate actions, gender, corruption, and macroeconomic conditions.

To investigate those relationships, two research questions were posed: “What is the correlation between the firm’s climate actions and its expected revenue growth?” and “What is the correlation between the firm’s climate actions and its perceived ease of accessing finance?” To do so, this study analyzes a unique, large-scale dataset: Round VI of the Business Environment and Enterprise Performance Survey (BEEPS VI), conducted by the European Bank for Reconstruction and Development (EBRD), merged with World Bank Open Data on macroeconomic indicators. BEEPS VI covers approximately 28,000 firms across 41 countries between 2018 and 2020, with detailed information on climate practices, manager and owner characteristics, perceptions of corruption, and operational environments. After merging with macroeconomic data and applying sample restrictions, the analytical sample comprises 21,729 enterprises across 28 countries.

The analysis proceeds in two main parts. First, we examine the correlation between the firm’s climate actions and its expected revenue growth for the following year. Second, we do the same to analyze the relationship between the firm’s climate actions and its perceived ease of accessing finance. By comparing results across these two outcomes, the study illuminates whether factors that drive growth expectations operate similarly to or differently from those that shape perceptions of

financing, a distinction with important implications for both managerial practice and public policy.

The remainder of the paper is structured as follows. Section 2 discusses related literature and hypothesis development. Section 3 describes the empirical strategy, data sources, and variable construction. Section 4 presents the empirical results and robustness checks and addresses endogeneity problems. Section 5 discusses the findings and limitations. Section 6 concludes with important implications.

2. Literature review

2.1. Firm climate change mitigation and expected revenue growth

Energy efficiency measures, the use of renewable energy sources, and emissions monitoring are all part of climate change mitigation techniques that firms can implement (Porter and Van Der Linde, 1995; Stefan and Paul, 2008). Compliance with regulations, cost savings, stakeholder pressure, and the desire to improve one's reputation are common motivators for implementing such measures (Berrone et al., 2012). Because of variations in pricing structures, institutional pressures, and resource availability, patterns of adoption vary greatly among industries and continents (Kolk and Pinkse, 2005; Hoffman, 2007).

Whether climate mitigation activities are linked to firms' projections of future revenue growth is a crucial question for this study. Theoretical viewpoints offer contradictory predictions. Energy management and emissions monitoring, according to the resource-based view, can increase managerial optimism for future sales by reducing operating expenses, improving efficiency, and building reputational capital (Porter and Van Der Linde, 1995; Stefan and Paul, 2008). However, such measures require an initial capital outlay and may prompt future regulatory scrutiny, which could reduce expectations for immediate expansion. There is a lack of large-scale international studies that provide empirical evidence for this connection. After adjusting for business characteristics, gender, corruption, and macroeconomic conditions, this study directly tests whether enterprises that monitor CO₂ emissions or employ energy management strategies report better-predicted revenue growth.

Manufacturing companies are more prone to take action to reduce their environmental impact, according to research (Littlewood et al., 2018). On the other hand, larger, more established companies have more money to invest in green technology (Geroski, 2000). However, SMEs face specific challenges, particularly regarding capital, that can hinder their participation in sustainability efforts (Boso et al., 2013). The empirical analysis uses these patterns as control variables.

2.2. Gender, leadership, and firm performance expectations

There is mounting evidence that shows how environmental and social responsibility are correlated with gender diversity in leadership roles. Greater CSR engagement, stronger environmental disclosure, and more sustainable decision-making are generally related to female involvement in ownership and governance. According to Adams and Funk (2012), female leaders are more likely to prioritize social and environmental goals over financial ones. By extension, this line of thinking suggests that female leadership may impact expectations for future performance, even if there is little evidence to support this claim.

Gender may have a different impact on executive and ownership positions, though. According to Glass et al. (2016), management responsibilities can be constrained by board directives or organizational culture, whereas ownership positions typically entail the authority to allocate capital and control strategic decisions. Female directors can influence the adoption of environmental policies, according to Post and Byron (2015), but only when the organizational structure supports their authority. This difference has not been thoroughly investigated in cross-national settings, particularly in developing economies with diverse gender norms and institutional obstacles. To determine whether

female top management and female ownership percentages have distinct effects on revenue growth expectations and perceived access to financing, this study disaggregates them.

2.3. Macroeconomic environment: Real GDP growth and inflation

The incentives, capacities, and performance expectations of enterprises regarding environmental investment are influenced by the macroeconomic context. According to [Dasgupta et al. \(2002\)](#) and [Bowen et al. \(2012\)](#), there is a correlation between higher GDP levels and improvements in environmental consciousness, technological capacity, and institutional support for sustainability. Prosperity enables investments in resilience and low-carbon transitions over the long run, as [Hallegatte and Rozenberg \(2017\)](#) point out. On the other side, environmental concerns may take a back seat to economic uncertainty ([Barrett and Graddy, 2000](#)). Managerial optimism about firm-level revenue estimates should be higher in an economy with faster GDP growth and lower in one with weaker growth. However, there is a lack of data on whether average long-run GDP growth affects firm-level opinions, even after accounting for firm traits, corruption, and climate initiatives.

An important consideration is inflation, which, according to [Fisher \(1930\)](#) and [Bernanke \(1983\)](#), can discourage capital-intensive projects such as energy-efficiency upgrades and emissions monitoring by increasing uncertainty and shortening investment horizons. Managers may start prioritizing short-term cash flow over long-term sustainability targets if inflationary pressures persist ([Aghion et al., 2010](#)). Budgetary instability is a common cause of inflation. If the government's finances are precarious, it will not provide the necessary support for climate mitigation. A decline in purchasing power and an increase in uncertainty and pessimism could be detrimental to anticipated revenue growth if inflation is too high. If lenders become more risk-averse due to inflation, the supply of credit could be limited, affecting perceptions of access to finance. Looking at GDP and inflation averages over five and ten years, this analysis determines whether there is a meaningful relationship between the two variables.

2.4. Access to finance

Access to finance is a critical enabler of sustainability transitions and firm growth. Firms engaging in climate-positive behavior can benefit from lower financing costs, improved investor confidence, and eligibility for green finance instruments ([Goyal and Kumar, 2021](#)). Financial institutions are increasingly integrating ESG metrics into lending decisions ([Kölbel et al., 2017](#)), and empirical evidence shows that sustainability performance correlates with higher credit ratings ([Chava, 2014](#)). If climate actions signal responsible management, firms adopting such measures should perceive easier access to finance.

2.5. Hypothesis development

2.5.1. Climate change mitigation actions and expected revenue growth

The relationship between corporate environmental practices and firm performance has received substantial attention in the literature. The resource-based view (RBV) of the firm suggests that environmental capabilities can become sources of competitive advantage when they are valuable, rare, and inimitable ([Barney, 1991](#); [Hart, 1995](#)). Firms that adopt climate change mitigation actions such as monitoring CO₂ emissions and implementing energy management measures may reduce operational costs, enhance resource efficiency, and preemptively comply with evolving regulations. These improvements directly boost profitability and, by extension, managerial confidence in future revenue growth.

Moreover, signaling theory suggests that voluntary environmental actions convey positive information to stakeholders about management quality and long-term strategic orientation ([Connelly](#)

et al., 2011). A firm that monitors its emissions signals that it is forward-looking, transparent, and prepared for transition risks. Similarly, energy management signals operational excellence and cost consciousness. Both signals should enhance managers' expectations for future sales, as they reflect internal capabilities likely to pay off in the marketplace. We therefore hypothesize:

H1: Firms that adopt climate change mitigation actions are positively associated with expected revenue growth.

2.5.2. Climate change mitigation actions and perceived access to finance

The relationship between climate actions and access to finance is more complex and potentially more ambiguous. On the one hand, the sustainable finance literature suggests that strong environmental practices reduce information asymmetry and signal creditworthiness. Lenders are increasingly incorporating ESG criteria into credit risk assessments, and firms with robust environmental management may receive preferential loan terms (Dhaliwal et al., 2011; Eccles and Klimenko, 2019). Energy management, in particular, directly lowers operating costs, freeing up cash flow for debt service and improving credit metrics. From this perspective, both CO₂ monitoring and energy management should be linked to improved access to finance.

On the other hand, when firms begin measuring their carbon footprint, they may uncover substantial climate-related risks: dependence on fossil-fuel inputs, energy-intensive production processes, exposure to carbon taxes, or supply chain disruptions from extreme weather events. In the absence of mandatory disclosure, many firms avoid monitoring and thus never have to report or confront their emissions. However, once monitoring begins, firms become aware of their vulnerabilities and may communicate these risks, directly or indirectly, to lenders. Risk-averse commercial banks, especially those in emerging markets with limited experience in climate risk assessment, may respond by tightening credit terms, demanding higher collateral, or rejecting loan applications.

Thus, a negative association can arise not because monitoring causes worse financial outcomes, but because it reveals pre-existing risks that lenders then price into credit decisions. This mechanism is grounded in the literature on asymmetric information and environmental risk (Barth et al., 2008; Chava, 2014). Banks are known to penalize firms with poor environmental profiles, but the act of measurement itself can act as a disclosure event. For example, research on the EU Emissions Trading Scheme shows that firms that first reported their emissions experienced stock price declines not because emissions changed, but because previously hidden information was revealed (Griffin et al., 2017). We hypothesize:

H2: Adopting climate change mitigation actions is negatively associated with perceived ease of access to finance.

2.5.3. The moderating role of corruption on female leadership: revenue growth vs. access to finance

The performance implications of female leadership depend critically on institutional context. Drawing on institutional voids theory (Khanna and Palepu, 2010), we argue that corruption, a severe institutional void, produces opposing effects on two key outcomes: expected revenue growth and perceived access to finance.

In corrupt environments, female leaders are often excluded from male-dominated informal networks (Ibarra, 1992; McGuire, 2002). This exclusion, rather than being purely disadvantageous, forces them to develop resilient internal substitutes: transparent accounting, formal compliance, and merit-based practices. Combined with higher risk aversion and lower tolerance for unethical behavior (Adams and Funk, 2012; Croson and Gneezy, 2009), these capabilities improve operational reliability

and reduce exposure to bribery-related volatility. Selection effects may also operate, whereby only the most capable female managers rise to top positions in highly corrupt settings (Ryan and Haslam, 2005). Consequently, female leadership is associated with stronger revenue growth expectations in high-corruption environments.

However, the effect on perceived access to finance operates in the opposite direction. Bank loan officers in corrupt environments are embedded in the same male-dominated networks. Loan approvals are often discretionary and require informal facilitation or bribes (Rajan and Zingales, 1998; Allen et al., 2005). Female executives, lacking these connections, are systematically disadvantaged. Moreover, the transparency and formalization that drive operational resilience may be penalized by corrupt lenders, who view such firms as "difficult" or "rigid." In clean, rule-based environments, this disadvantage disappears, and female leaders may even benefit from their firms' better governance. Thus, a paradoxical pattern emerges: female leaders perform better on growth expectations but worse on access to financing in corrupt settings. We hence pose the following hypotheses:

H3: The association between female top managers and expected revenue growth is moderated by perceived corruption, such that the positive association is stronger in high-corruption environments.

H4: The association between female top managers and perceived ease of accessing finance is moderated by perceived corruption, such that the positive association in low-corruption environments weakens or reverses in high-corruption environments.

3. Methodology and data description

3.1. Methodology

To answer the two research questions, Models 1 and 2 were adopted for expected growth and perceived access to finance, respectively. Ordinary Least Squares (OLS) was applied as the method. Besides that, we also weighted by the total population of the country where the firm is based.

$$REVINCRI_i = \alpha + \beta_1 ACTION_i + \beta_2 F_OWN_i + \beta_3 F_TMAGER_i + \beta_4 TMANAGER_EXP_i + \beta_5 FIRM_i + \beta_6 COUNTRY_i + \mu_i + FE (Area) + FE (Year) \text{ (Model 1)}$$

$$FACCESS_i = \alpha + \beta_1 ACTION_i + \beta_2 F_OWN_i + \beta_3 F_TMAGER_i + \beta_4 TMANAGER_EXP_i + \beta_5 FIRM_i + \beta_6 COUNTRY_i + \mu_i + FE (Area) + FE (Year) \text{ (Model 2)}$$

where

- $REVINCRI_i$ refers to whether the firm i expects its total sales to increase in the following year.
- $FACCESS_i$ relates to the firm i 's perceived ease of accessing finance.
- $ACTION_i$ is climate change mitigation actions.
- F_OWN_i is the percentage of female ownership for firm i
- F_TMAGER_i refers to whether firm i has a female top manager.
- $TMANAGER_EXP_i$ is a variable for the experience of the top manager.
- $FIRM_i$ is a set of control variables for the firm i 's characteristics.
- $COUNTRY_i$ is a set of control variables for the country where firm i is located.
- μ_i is an error term.
- $FE (Area)$ are the geographical area's fixed effects.
- $FE (Year)$ are year fixed effects.

3.2. Data description

The dataset draws on two complementary sources: Round VI of the Business Environment and Enterprise Performance Survey (BEEPS VI), conducted by the European Bank for Reconstruction

and Development (EBRD), and World Bank Open Data. BEEPS VI gathered responses from approximately 28,000 firms across 41 countries between 2018 and 2020, using face-to-face interviews with managers. The survey captures detailed information on firm-level access to credit, expected revenue growth, climate change mitigation actions, owner and manager characteristics, and the broader operational environment. Merging these sources yields a rich and diverse sample of 21,729 enterprises across 28 countries¹, covering the period 2018–2020. The following outlines how these data are used to construct the variables in our analysis.

3.2.1. Expected Revenue Growth (REVINCR)

The variable (REVINCR) captures whether a firm expects its total sales to increase in the following year. It is constructed from the BEEPS VI question: “Considering the next year, are this establishment’s total sales expected to increase, decrease, or stay the same?” Responses are coded as 1 for “Increase” and 0 for “Decrease” or “Stay the same.”

3.2.2. Perceived Ease of Access to Finance (FACCESS)

The variable (FACCESS) measures the firm’s perception of how easily it can access finance. It uses the BEEPS VI question: “To what degree is access to finance an obstacle to the current operations of this establishment?” Possible answers range from “No obstacle” to “Very severe obstacle.” We code responses as follows: 0 for “Very severe obstacle”, 1 for “Major obstacle”, 2 for “Moderate obstacle”, 3 for “Minor obstacle”, 4 for “No obstacle.” Higher values indicate that the firm perceives access to finance as less of an obstacle, implying easier access to financing.

3.2.3. Climate Change Mitigation Actions (ACTION)

Two dummy variables are created based on BEEPS VI questions about firms’ climate change mitigation actions:

- *CO2MONITOR*: Derived from “Over the last three years, did this establishment monitor its CO₂ emissions?” It is coded as 1 for “Yes,” 0 for “No.”
- *ENERGYM*: Derived from the question “Over the last three years, did this establishment adopt energy management measures?” It is coded as 1 for “Yes,” 0 for “No.”
- Together, these variables indicate whether a firm has engaged in energy management or emissions monitoring, both central to climate change mitigation.

3.2.4. Female Leadership and Ownership (F_OWN, F_TMAGER and TMANAGER_EXP)

For female leadership and ownership, we create the following based on answers to questions of the BEEPS VI:

- *F_OWN*: The percentage of the firm owned by females, based on the question: “What percentage of the firm is owned by females?”
- *F_TMAGER*: A dummy variable coded as 1 if the top manager is female and 0 if male. Gender has been shown to influence managerial decision-making, particularly regarding sustainability and innovation (Adams and Funk, 2012). The variable is constructed from the question “Is the Top Manager female?”
- *TMANAGER_EXP*: The number of years of experience the top manager has in the industry, logged to account for diminishing returns. More experienced managers may bring greater

¹ 28 countries include Albania; Azerbaijan; Belarus; Bosnia and Herz.; Bulgaria; Croatia; Czechia; Egypt; Georgia; Greece; Hungary; Italy; Jordan; Kazakhstan; Kyrgyzstan; Lebanon; Lithuania; Poland; Portugal; Romania; Russia; Serbia; Slovak Rep.; Slovenia; Tajikistan; Tunisia; Turkiye; and Ukraine.

expertise and networks, positively influencing climate mitigation and financial access (Hambrick and Mason, 1984; Boone and Hendriks, 2009). This variable is derived from the question “How many years of experience working in this sector does the Top Manager have?” and then log-transformed.

3.2.5. Firm-Level Control Variables (FIRM)

Several firm-specific characteristics are included to account for factors that may influence both expected revenue growth and perceived access to finance:

- *LNREVENUE*: The natural logarithm of last year’s total sales, based on the question: “In the last fiscal year, what were this establishment’s total annual sales for all products and services?”
- *LNAGE*: The natural logarithm of the firm’s age, calculated as the survey year minus the year the firm began operations (from the question “In what year did this establishment begin operations?”).
- *LISTED*: A dummy variable indicating whether the firm is publicly listed, based on the question “What is this firm’s current legal status?” It is coded as 1 for “Shareholding Company with shares traded in the stock market” and 0 for all other legal statuses (e.g., sole proprietorship, partnership, non-traded shares).
- *MSME*: A dummy variable for micro, small, or medium-sized enterprises. It is coded as 1 for “Micro,” “Small,” or “Medium” and 0 for “Large.” SMEs often face greater resource constraints and barriers to financing (Boso et al., 2013).
- *MANUF*: A dummy variable for manufacturing firms, coded as 1 for “Manufacturing” and 0 for other sectors (e.g., services, wholesale/retail, construction). Manufacturing firms typically have larger environmental footprints and distinct financial needs.
- *WEATHER*: A dummy variable indicating whether the firm has experienced monetary losses due to extreme weather events (e.g., storms, floods, droughts, landslides) over the last three years. Based on the corresponding survey question, coded as 1 for “Yes,” 0 for “No.”

3.2.6. Country-Level Control Variables (COUNTRY)

The following country-level variables are included to account for broader economic conditions:

- *GG1Y, GG5Y, GG10Y*: One-year, five-year, and ten-year average real GDP growth rates of the country where the firm operates.
- *INF1Y, INF5Y, INF10Y*: One-year, five-year, and ten-year average inflation rates of the country where the firm is based.

Why do we choose five-year and ten-year averages? Top managers update their beliefs about future sales and financing conditions using all available information, including their accumulated experience of past macroeconomic volatility and long-run trends. Drawing on experience-based learning (Malmendier and Nagel, 2011; Malmendier and Shen, 2024), top managers who have lived through decades of stable growth or high inflation form different expectations from those who have experienced repeated recessions, even when current conditions are identical. Moreover, macroeconomic regimes exhibit substantial persistence, meaning that 5-year and 10-year averages capture deep structural features, such as institutional quality and the investment climate, that shape firms’ long-term planning horizons. For these reasons, long-term averages are theoretically appropriate and often more informative than volatile short-term measures for explaining firm-level expectations and perceptions. In addition to long-term averages, we also include one-year averages for both GDP growth and inflation as an alternative specification.

Those are obtained from the World Bank Open Data and the IMF Data.

CORRUPT: Perception of corruption as an obstacle, based on the BEEPS VI question: “To what degree is corruption an obstacle to the current operations of this establishment?” Responses are coded as: 4 for “Very severe obstacle”, 3 for “Major obstacle”, 2 for “Moderate obstacle”, 1 for “Minor obstacle”, 0 for “No obstacle.” Higher values indicate a more severe perceived obstacle.

Tables 1 and 2 below provide variable definitions and summary statistics, respectively.

Table 1. Variable description

Name	Definition	Source
<i>Expected Revenue Growth</i>		
REVINCR	A dummy variable of whether a firm expects its total sales to increase in the following year, coded 1 for “Increase” and 0 for “Decrease” or “Stay the same.”	BEEPS VI
<i>Perceived Ease of Access to Finance</i>		
FACCESS	Firm’s perception that access to finance is not an obstacle. It is coded as 0 for “Very severe obstacle”, 1 for “Major obstacle”, 2 for “Moderate obstacle”, 3 for “Minor obstacle” and 4 for “No obstacle”.	BEEPS VI
<i>Variables of firm climate change mitigation action</i>		
CO2MONITOR	Dummy =1 if the firm monitors its CO ₂ emissions; 0 otherwise.	BEEPS VI
ENERGYM	Dummy =1 if the firm adopts measures for energy management; 0 otherwise.	BEEPS VI
<i>Variable of female ownership</i>		
F_OWN	The percentage of the firm owned by females	BEEPS VI
<i>Variables for the firm top manager’s characteristics</i>		
F_TMAGER	Dummy=1 if the top manager is female; 0 otherwise.	BEEPS VI
TMANAGER_E XP	Logarithm of the top manager's years of experience in the sector.	BEEPS VI
<i>Control variables for firm characteristics</i>		
LNREVENUE	The natural logarithm of last year’s total sales	BEEPS VI
LNAGE	Logarithm of the firm’s age.	BEEPS VI
LISTED	Dummy = 1 if the firm is listed in a stock market; 0 otherwise.	BEEPS VI
MSME	Dummy = 1 if the firm is a micro, small, and medium-sized enterprise (MSME); 0 otherwise.	BEEPS VI
MANUF	Dummy = 1 if the firm is in the manufacturing sector; 0 otherwise.	BEEPS VI
WEATHER	Dummy = 1 if the firm experiences monetary losses from extreme weather events; 0 otherwise.	BEEPS VI
<i>Control variables for country</i>		
GG1Y, GG5Y, GG10Y	Average one-year, five-year, and ten-year real GDP growth of the country where the firm operates.	WBOD, IMF
INF1Y, INF5Y, INF10Y	Average five-year and ten-year inflation rates of the country where the firm operates.	WBOD
CORRUPT	The perception of the country's corruption. It is coded as 4 for “Very severe obstacle”, 3 for “Major obstacle”, 2 for “Moderate obstacle”, 1 for “Minor obstacle” and 0 for “No obstacle”.	BEEPS VI

4. Empirical results

4.1. The correlation between the firm’s climate actions and its expected revenue growth for the next year

Table 3 below presents the estimation results for the determinants of a firm’s expectation of increased total sales in the following year (REVINCR). Six specifications are reported, differing in the inclusion of short-term (one-year), medium-term (five-year), and long-term (ten-year) average macroeconomic controls, namely real GDP growth and inflation. All include area and year fixed effects and are weighted by population, with robust standard errors.

Table 2. Descriptive statistics of the variables

Variable	Obs	Mean	Std. Dev.	Min	Max
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REVINCR	20,810	0.520	0.500	0.000	1.000
FACCESS	21,251	2.740	1.260	0.000	4.000
CO2MONITOR	21,091	0.040	0.200	0.000	1.000
ENERGYM	21,415	0.300	0.460	0.000	1.000
TMANAGER_EXP	21,198	20.850	11.540	1.000	70
F_TMAGER	21,702	0.160	0.360	0.000	1.000
F_OWN	21,208	15.610	31.260	0.000	100
LNREVENUE	19,516	12.990	3.050	-0.530	27.360
LNAGE	21,542	2.770	0.750	0.000	5.310
LISTED	21,567	0.070	0.260	0.000	1.000
MSME	21,698	0.780	0.410	0.000	1.000
MANUF	21,729	0.590	0.490	0.000	1.000
WEATHER	21,340	0.070	0.260	0.000	1.000
CORRUPT	20,010	1.420	1.410	0.000	4.000
GG1Y	21,729	2.520	3.500	-26.800	7.400
INF1Y	21,377	5.550	4.440	0.340	16.330
GG5Y	21,729	2.860	1.970	-1.620	6.860
INF5Y	21,729	6.370	6.380	-0.730	20.010
GG10Y	21,729	3.110	1.960	-0.980	8.830
INF10Y	21,729	6.190	5.020	0.600	21.580

The two climate change mitigation actions show strong positive associations with expected revenue growth. Specifically, firms that monitored their CO₂ emissions over the previous three years (CO2MONITOR) are approximately 7.9 percentage points more likely to expect an increase in sales in the coming year, holding all other variables constant. The effect is even larger for energy management measures (ENERGYM), which increases the probability of expecting revenue growth by about 11.4 percentage points. Both coefficients are statistically significant at the one percent level across all specifications, and their magnitude remains remarkably stable when controlling for different macroeconomic horizons. This suggests that proactive environmental practices are robustly correlated with managerial optimism regarding future sales.

Turning to gender-related leadership variables, the findings reveal contrasting patterns. A female top manager (F_TMAGER) is associated with a 4.7-percentage-point higher probability of expecting revenue growth. In contrast, the percentage of female ownership (F_OWN) exhibits a small but statistically significant negative coefficient of approximately -0.001 , implying that a ten-percentage-point increase in female ownership reduces the likelihood of expecting growth by only 0.1 percentage point, economically negligible, though precisely estimated.

Among firm-level control variables, several patterns emerge. Larger firms, as measured by log annual revenue (LNREVENUE), are more optimistic, with a coefficient of approximately 0.04. Conversely, older firms (LNAGE) are significantly less optimistic, reducing the likelihood of expecting growth by about 6 percentage points per unit increase in log age. Being publicly listed (LISTED) is weakly negatively associated with growth expectations (coefficient ≈ -0.029), while micro, small, and medium enterprises (MSMEs) are also less optimistic than large firms, with coefficients of -0.017 to -0.022 that are significant at conventional levels in most specifications. Manufacturing firms (MANUF) show a weak negative effect (-0.014 to -0.015). Having experienced monetary losses due to extreme weather events (WEATHER) is negatively associated with growth expectations only in models including ENERGYM (coefficient ≈ -0.038), but not in CO2MONITOR models, offering only partial support for the role of weather-related shocks.

Table 3. The correlation between the firm's climate actions and its expected increase in total sales for next year

	REVINCR Model 1	REVINCR Model 1	REVINCR Model 1	REVINCR Model 1	REVINCR Model 1	REVINCR Model 1
	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	OLS (6)
CO2MONITOR	0.079*** (0.000)		0.078*** (0.000)		0.079*** (0.000)	
ENERGYM		0.114*** (0.000)		0.114*** (0.000)		0.114*** (0.000)
TMANAGER_EXP	-0.000 (0.831)	-0.000 (0.354)	-0.000 (0.881)	-0.000 (0.387)	-0.000 (0.878)	-0.000 (0.385)
F_TMAGER	0.047*** (0.002)	0.047*** (0.002)	0.047*** (0.002)	0.046*** (0.002)	0.047*** (0.002)	0.047*** (0.002)
F_OWN	-0.001*** (0.002)	-0.001*** (0.004)	-0.001*** (0.002)	-0.001*** (0.004)	-0.001*** (0.002)	-0.001*** (0.003)
LNREVENUE	0.040*** (0.000)	0.038*** (0.000)	0.040*** (0.000)	0.038*** (0.000)	0.040*** (0.000)	0.038*** (0.000)
LNAGE	-0.060*** (0.000)	-0.057*** (0.000)	-0.060*** (0.000)	-0.057*** (0.000)	-0.060*** (0.000)	-0.057*** (0.000)
LISTED	-0.029* (0.090)	-0.029* (0.079)	-0.029* (0.089)	-0.029* (0.080)	-0.028* (0.094)	-0.029* (0.085)
MSME	-0.022** (0.041)	-0.018* (0.096)	-0.021* (0.051)	-0.017 (0.116)	-0.021* (0.051)	-0.017 (0.115)
MANUF	-0.015* (0.057)	-0.015* (0.059)	-0.015* (0.063)	-0.014* (0.065)	-0.015* (0.063)	-0.014* (0.065)
WEATHER	-0.026 (0.183)	-0.039** (0.045)	-0.025 (0.202)	-0.038** (0.048)	-0.025 (0.198)	-0.038** (0.047)
CORRUPT	-0.019*** (0.000)	-0.018*** (0.000)	-0.019*** (0.000)	-0.019*** (0.000)	-0.019*** (0.000)	-0.019*** (0.000)
GG1Y	0.008 (0.223)	0.008 (0.220)				
INF1Y	-0.018** (0.028)	-0.017** (0.035)				
GG5Y			0.001 (0.986)	0.001 (0.969)		
INF5Y			-0.051** (0.015)	-0.049** (0.018)		
GG10Y					-0.060 (0.454)	-0.056 (0.477)
INF10Y					-0.091** (0.029)	-0.088** (0.034)
Constant	0.222** (0.016)	0.220** (0.016)	0.202* (0.053)	0.200* (0.053)	0.647 (0.134)	0.623 (0.146)
Area FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Weighted by population	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16046	16201	16238	16397	16238	16397
Adjusted R ²	0.159	0.166	0.158	0.165	0.158	0.165

p-values in parentheses

* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

Perceived corruption as an obstacle (CORRUPT) is among the most robust negative predictors. A one-unit increase in the corruption obstacle scale (where higher values indicate more severe obstacles) reduces the probability of expecting revenue growth by approximately 1.8 to 1.9 percentage points. This suggests that firms operating in more corrupt environments are systematically more pessimistic about future sales.

Macroeconomic controls exhibit an interesting pattern. Inflation averages, whether one-year,

five-year, or ten-year, are consistently negative and significant, with coefficients ranging from -0.017 (one-year) to -0.091 (ten-year). This indicates that firms in countries with higher past inflation are less likely to expect revenue growth, regardless of the time horizon considered. In contrast, real GDP growth rates (GG1Y, GG5Y, and GG10Y) are never statistically significant at conventional levels, although the ten-year coefficient is negative and marginally insignificant.

Table 4 below re-estimates the same six specifications as Table 3 but introduces an interaction term between female top manager (F_TMAGER) and perceived corruption (CORRUPT). This interaction reveals a nuanced conditional relationship that was masked in the simpler model. In Table 3, female top managers were unconditionally associated with a 4.7 percentage-point higher probability of expecting revenue growth. However, Table 4 demonstrates that this apparent advantage is entirely driven by firms operating in corrupt environments. When corruption is perceived as no obstacle, female-led firms show no significant difference from male-led firms. Conversely, as corruption becomes more severe, the positive effect of having a female top manager increases substantially. For a firm facing very severe corruption (CORRUPT = 4), a female top manager raises the likelihood of expecting sales growth by approximately 13.1 percentage points relative to a male-led firm. Moreover, corruption imposes a 2.2 percentage point penalty per unit increase on male-led firms, whereas female-led firms are essentially insulated from this penalty. We also conduct a significance test for the marginal effect. Table 5 below shows that female-led firms have an expected revenue growth of 60.4% on average across all levels of corruption. In other words, female-led firms outperform male-led firms by 4.6 percentage points on average.

The positive and significant interaction suggests that the advantage of female leadership for revenue expectations is not universal but emerges specifically in institutionally weak environments where corruption is a severe obstacle. To understand why, we draw on the institutional voids theory (Khanna and Palepu, 2010). When formal institutions fail, female leaders excluded from corrupt male networks develop resilient internal capabilities as substitutes. They invest in transparent accounting, formal compliance, process efficiency, and human capital, creating organizational architectures that operate predictably despite external corruption. These internal capabilities improve operational reliability and reduce costs, directly supporting revenue growth. Additionally, female executives build alternative informal networks, such as women's business associations, cross-sector alliances, and connections with impact investors, that provide access to non-traditional financing and information on corruption avoidance (Smallbone, 2006). This finding is also consistent with theories that female managers exhibit higher risk aversion and lower tolerance for unethical practices (Adams and Funk, 2012), leading them to avoid costly bribery and instead build formal institutional capabilities that prove resilient when corruption disrupts informal networks. Furthermore, selection effects may operate, and only the most capable female managers rise to top positions in corrupt settings (Ryan and Haslam, 2005). Consequently, female-led firms in highly corrupt environments are associated with greater optimism about future sales, whereas in clean environments no performance difference is observed.

Table 4. The correlation between the firm's climate actions and its expected increase in total sales for next year, adding the interaction between the female top manager and perceived corruption

	REVINC OLS	REVINC OLS	REVINC OLS	REVINC OLS	REVINC OLS	REVINC OLS
	Model 1 (1)	Model 1 (2)	Model 1 (3)	Model 1 (4)	Model 1 (5)	Model 1 (6)
CO2MONITOR	0.078*** (0.000)		0.077*** (0.000)		0.078*** (0.000)	
ENERGY		0.114*** (0.000)		0.114*** (0.000)		0.114*** (0.000)
TMAGER_EXP	-0.000 (0.826)	-0.000 (0.349)	-0.000 (0.876)	-0.000 (0.382)	-0.000 (0.873)	-0.000 (0.379)
F_TMAGER × CORRUPT	0.032*** (0.000)	0.034*** (0.000)	0.031*** (0.000)	0.034*** (0.000)	0.031*** (0.000)	0.034*** (0.000)
F_TMAGER	-0.001 (0.955)	-0.005 (0.804)	-0.001 (0.954)	-0.005 (0.807)	-0.001 (0.962)	-0.005 (0.813)
F_OWEN	-0.000*** (0.006)	-0.000** (0.010)	-0.001*** (0.005)	-0.000*** (0.009)	-0.001*** (0.005)	-0.000*** (0.009)
LNREVENUE	0.040*** (0.000)	0.038*** (0.000)	0.040*** (0.000)	0.038*** (0.000)	0.040*** (0.000)	0.038*** (0.000)
LNAGE	-0.059*** (0.000)	-0.057*** (0.000)	-0.060*** (0.000)	-0.057*** (0.000)	-0.060*** (0.000)	-0.057*** (0.000)
LISTED	-0.028* (0.094)	-0.029* (0.082)	-0.028* (0.092)	-0.029* (0.082)	-0.028* (0.098)	-0.028* (0.088)
MSME	-0.022** (0.042)	-0.018* (0.097)	-0.021* (0.052)	-0.016 (0.118)	-0.021* (0.051)	-0.017 (0.117)
MANUF	-0.016** (0.049)	-0.015** (0.048)	-0.015* (0.054)	-0.015* (0.054)	-0.015* (0.054)	-0.015* (0.054)
WEATHER	-0.026 (0.184)	-0.039** (0.044)	-0.025 (0.203)	-0.038** (0.048)	-0.025 (0.198)	-0.038** (0.046)
CORRUPT	-0.022*** (0.000)	-0.022*** (0.000)	-0.022*** (0.000)	-0.022*** (0.000)	-0.022*** (0.000)	-0.022*** (0.000)
GG1Y	0.008 (0.225)	0.008 (0.223)				
INF1Y	-0.018** (0.027)	-0.017** (0.033)				
GG5Y			0.000 (0.991)	0.001 (0.974)		
INF5Y			-0.051** (0.014)	-0.049** (0.017)		
GG10Y					-0.060 (0.448)	-0.057 (0.469)
INF10Y					-0.092** (0.028)	-0.088** (0.032)
Constant	0.229** (0.014)	0.227** (0.013)	0.208** (0.047)	0.206** (0.046)	0.658 (0.127)	0.636 (0.137)
Area FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Weighted by population	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16046	16201	16238	16397	16238	16397
Adjusted R ²	0.160	0.167	0.159	0.166	0.159	0.166

p-values in parentheses

* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

Table 5. Test of significance for the marginal effect

Dependent variable: Delta-method

REVINCR	Margin	Std. Err.	t	P>t	[95% Conf. Interval]
F_TMAGER					
0 (Male)	0.558	0.004	139.84	0	0.550 0.565
1 (Female)	0.604	0.014	43.27	0	0.577 0.632

4.2. The correlation between the firm's climate actions and its perceived ease of accessing finance

Table 6 below presents the estimation results for the determinants of a firm's perceived ease of access to finance (FACCESS), with higher values indicating less difficulty obtaining financing. Six specifications are reported, differing in the inclusion of one-year, five-year, and ten-year average macroeconomic controls (real GDP growth and inflation). All included area and year fixed effects are weighted by population.

Turning first to climate change mitigation actions, a striking and unexpected pattern emerges. Firms that monitor their CO₂ emissions (CO2MONITOR) perceive significantly worse access to finance, with a coefficient of approximately -0.107 across all specifications. This implies that CO₂ monitoring is associated with a reduction in perceived financing ease of about one-tenth of a point on the four-point scale, holding other factors constant. The negative effect of CO₂ monitoring on financing perceptions may reflect that firms that monitor CO₂ emissions perceive worse access to finance. In contrast, the adoption of energy management measures (ENERGYM) shows no statistically significant association with FACCESS.

Regarding managerial characteristics, the top manager's industry experience (TMANAGER_EXP) exhibits a small but consistently positive and statistically significant effect across all columns (coefficient ≈ 0.002). Although the magnitude is modest, the robustness of this finding suggests that more experienced managers are better able to navigate financial markets, likely through accumulated networks, reputation, and knowledge of financing sources.

Larger firms, as measured by log annual revenue (LNREVENUE), perceive significantly easier access to finance, with a coefficient of approximately 0.020 . This aligns with the well-established literature showing that larger firms possess more collateral, formal financial documentation, and bargaining power with lenders. Micro, small, and medium enterprises (MSMEs) have worse access to finance than large firms, with coefficients of approximately -0.044 to -0.045 that are marginally significant. This finding is consistent with the extensive literature on SME financing constraints.

One of the most robust effects in Table 6 comes from weather-related shocks. Firms that experienced monetary losses due to extreme weather events (WEATHER) over the previous three years perceive substantially worse access to finance, with coefficients ranging from -0.156 to -0.166 . This reduction of approximately 0.16 points on the FACCESS scale is economically meaningful. The likely mechanism is that weather shocks damage firms' assets, reduce profitability, and increase firms' perceived riskiness from a lender's perspective.

Perceived corruption (CORRUPT) emerges as a negative predictor of access to financing. A one-unit increase in the corruption obstacle scale (where higher values indicate more severe obstacles) reduces perceived ease of access to finance by approximately 0.190 to 0.191 points. This suggests that corruption directly and severely impedes firms' ability to obtain financing. In corrupt environments, firms may face demands for bribes to secure loans, contract enforcement becomes unreliable, and lenders perceive higher country risk, all of which worsen perceptions of financing.

Finally, macroeconomic variables exhibit no statistically significant relationships with FACCESS. Neither one-year, five-year, nor ten-year averages of real GDP growth or inflation are statistically significant.

Table 6. The correlation between the firm's climate actions and its perceived ease of accessing finance

	FACCESS	FACCESS	FACCESS	FACCESS	FACCESS	FACCESS
	OLS	OLS	OLS	OLS	OLS	OLS
	Model 2	Model 2	Model 2	Model 2	Model 2	Model 2
	(1)	(2)	(3)	(4)	(5)	(6)
CO2MONITOR	-0.106** (0.035)		-0.107** (0.033)		-0.107** (0.032)	
ENERGYM		0.010 (0.657)		0.009 (0.684)		0.009 (0.681)
TMANAGER_EXP	0.002** (0.022)	0.002** (0.026)	0.002** (0.025)	0.002** (0.029)	0.002** (0.025)	0.002** (0.029)
F_TMAGER	0.042 (0.219)	0.041 (0.235)	0.042 (0.224)	0.040 (0.241)	0.042 (0.224)	0.040 (0.240)
F_OWN	-0.000 (0.671)	-0.000 (0.726)	-0.000 (0.665)	-0.000 (0.721)	-0.000 (0.666)	-0.000 (0.722)
LNREVENUE	0.020*** (0.000)	0.019*** (0.000)	0.020*** (0.000)	0.019*** (0.000)	0.020*** (0.000)	0.019*** (0.000)
LNAGE	-0.003 (0.830)	-0.003 (0.851)	-0.003 (0.824)	-0.003 (0.845)	-0.003 (0.815)	-0.003 (0.836)
LISTED	-0.034 (0.377)	-0.027 (0.482)	-0.034 (0.368)	-0.027 (0.470)	-0.034 (0.368)	-0.027 (0.469)
MSME	-0.044* (0.069)	-0.037 (0.119)	-0.045* (0.061)	-0.038 (0.105)	-0.045* (0.061)	-0.038 (0.105)
MANUF	-0.021 (0.230)	-0.025 (0.162)	-0.022 (0.221)	-0.025 (0.155)	-0.022 (0.219)	-0.025 (0.153)
WEATHER	-0.156*** (0.000)	-0.166*** (0.000)	-0.156*** (0.000)	-0.166*** (0.000)	-0.156*** (0.000)	-0.165*** (0.000)
CORRUPT	-0.190*** (0.000)	-0.191*** (0.000)	-0.190*** (0.000)	-0.191*** (0.000)	-0.190*** (0.000)	-0.191*** (0.000)
GG1Y	0.013 (0.395)	0.012 (0.438)				
INF1Y	0.013 (0.488)	0.012 (0.530)				
GG5Y			0.037 (0.675)	0.038 (0.665)		
INF5Y			-0.012 (0.790)	-0.016 (0.734)		
GG10Y					0.126 (0.483)	0.137 (0.443)
INF10Y					0.049 (0.603)	0.043 (0.646)
Constant	2.678*** (0.000)	2.701*** (0.000)	2.630*** (0.000)	2.646*** (0.000)	2.001** (0.040)	1.968** (0.043)
Area FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Weighted by population	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16361	16524	16554	16721	16554	16721
Adjusted R ²	0.268	0.268	0.268	0.268	0.268	0.268

Table 7 below presents the interaction between female top managers and perceived corruption for perceived ease of access to finance (FACCESS). The interaction coefficient is negative and statistically significant (approximately -0.050), while the main effect of a female top manager becomes positive and significant (approximately 0.115). This implies that female-led firms enjoy substantially better perceived access to finance than male-led firms only in low-corruption environments. As corruption becomes more severe, this advantage diminishes and eventually reverses: at very high levels of corruption ($\text{CORRUPT} = 4$), female-led firms perceive their access as approximately 0.085 points worse than that of male-led firms. Moreover, corruption imposes a larger penalty on female-led firms: a one-unit increase in corruption reduces FACCESS by 0.235 points for female-led firms compared to 0.185 points for male-led firms. However, when we conduct a significance test for the marginal effect, the results show that female-led firms have a predicted FACCESS

score of 2.675 on average across all corruption levels. In other words, female-led firms have slightly higher perceived ease of accessing finance (+0.034) than male-led firms on average (see Table 8)

Table 7. The correlation between the firm's climate actions and its perceived ease of accessing finance, adding the interaction term between female top manager and perceived corruption

	FACCESS OLS Model 2	FACCESS OLS Model 2	FACCESS OLS Model 2	FACCESS OLS Model 2	FACCESS OLS Model 2	FACCESS OLS Model 2
	(1)	(2)	(3)	(4)	(5)	(6)
CO2MONITOR	-0.104** (0.038)		-0.105** (0.035)		-0.106** (0.034)	
ENERGY		0.010 (0.663)		0.009 (0.691)		0.009 (0.687)
TMAGER_EXP	0.002** (0.023)	0.002** (0.026)	0.002** (0.026)	0.002** (0.029)	0.002** (0.026)	0.002** (0.030)
F_TMAGER × CORRUPT	-0.047** (0.012)	-0.052** (0.005)	-0.047** (0.012)	-0.052** (0.005)	-0.047** (0.012)	-0.052** (0.005)
F_TMAGER	0.113** (0.011)	0.119** (0.007)	0.112** (0.011)	0.118** (0.007)	0.112** (0.011)	0.118** (0.007)
F_OWEN	-0.000 (0.534)	-0.000 (0.575)	-0.000 (0.527)	-0.000 (0.569)	-0.000 (0.528)	-0.000 (0.570)
LNREVENUE	0.021*** (0.000)	0.019*** (0.000)	0.020*** (0.000)	0.019*** (0.000)	0.021*** (0.000)	0.019*** (0.000)
LNAGE	-0.003 (0.821)	-0.003 (0.837)	-0.003 (0.814)	-0.003 (0.831)	-0.003 (0.806)	-0.003 (0.821)
LISTED	-0.034 (0.371)	-0.027 (0.476)	-0.035 (0.363)	-0.028 (0.464)	-0.035 (0.362)	-0.028 (0.464)
MSME	-0.044* (0.069)	-0.037 (0.119)	-0.045* (0.061)	-0.038 (0.105)	-0.045* (0.061)	-0.038 (0.105)
MANUF	-0.021 (0.245)	-0.024 (0.178)	-0.021 (0.235)	-0.024 (0.170)	-0.021 (0.234)	-0.024 (0.168)
WEATHER	-0.155*** (0.000)	-0.165*** (0.000)	-0.156*** (0.000)	-0.165*** (0.000)	-0.155*** (0.000)	-0.165*** (0.000)
CORRUPT	-0.185*** (0.000)	-0.185*** (0.000)	-0.185*** (0.000)	-0.185*** (0.000)	-0.185*** (0.000)	-0.185*** (0.000)
GG1Y	0.013 (0.391)	0.012 (0.434)				
INF1Y	0.013 (0.482)	0.012 (0.522)				
GG5Y			0.037 (0.675)	0.038 (0.666)		
INF5Y			-0.012 (0.801)	-0.015 (0.748)		
GG10Y					0.127 (0.480)	0.138 (0.440)
INF10Y					0.050 (0.594)	0.044 (0.635)
Constant	2.669*** (0.000)	2.690*** (0.000)	2.622*** (0.000)	2.636*** (0.000)	1.986** (0.041)	1.950** (0.044)
Area FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Weighted by population	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16361	16524	16554	16721	16554	16721
Adjusted R ²	0.268	0.269	0.269	0.269	0.269	0.269

p-values in parentheses

* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

Table 8. Test of significance for the marginal effect

Dependent variable: FACCESS	Margin	Delta-method		t	P>t	[95% Conf. Interval]
		Std. Err.				
F_TMAGER						
0	2.641	0.009	294.33	0	2.623	2.658
1	2.675	0.032	84.83	0	2.613	2.737

4.3. Robustness checks

To assess the robustness of our main findings, the baseline models were re-estimated using alternative econometric specifications. Specifically, a probit model was employed for expected revenue growth (REVINCR) in Model 1 because REVINCR has 2 values: 0 and 1. It is coded as 1 for “Increase” and 0 for “Decrease” or “Stay the same.” For Model 2, an ordered probit model was adopted for perceived ease of access to finance (FACCESS) because it is an ordinal variable ranging from 0 (“Very severe obstacle”) to 4 (“No obstacle”). All specifications included country fixed effects and country-level clustering.

Overall, the core results remain robust. As shown in Table 9, the two climate change mitigation actions, such as monitoring CO₂ emissions (CO2MONITOR) and adopting energy management measures (ENERGYM), continue to exhibit strong positive associations with expected revenue growth. When we introduce the interaction term between female top manager and perceived corruption (see Table 10), both CO2MONITOR and ENERGYM retain their positive and significant associations with expected revenue growth. However, the interaction term itself becomes statistically insignificant.

Turning to the relationship between climate actions and perceived access to finance (see Table 11), CO₂ emissions (CO2MONITOR) continue to show a significant negative association with perceived access to finance (FACCESS). Meanwhile, energy management measures (ENERGYM) show no statistically significant correlation with FACCESS. After including the interaction between female top manager and perceived corruption (see Table 12), the interaction term remains negatively associated with perceived access to finance. However, it does not materially change the main results.

Moreover, the variable CORRUPT is not mean-centered. For the robustness test, a new variable named CORRUPT_C was created to center it. Then we redo the analysis, and the key findings remain robust (see Tables 13 and 14).

Table 9. The robustness check for the correlation between the firm’s climate actions and its expected increase in total sales for next year, using the probit method

	REVINCR Model 1 probit (1)	REVINCR Model 1 probit (2)	REVINCR Model 1 probit (3)	REVINCR Model 1 probit (4)	REVINCR Model 1 probit (5)	REVINCR Model 1 probit (6)
CO2MONITOR	0.350*** (0.000)		0.349*** (0.000)		0.350*** (0.000)	
ENERGY		0.283*** (0.000)		0.283*** (0.000)		0.284*** (0.000)
TMAGER_EXP	-0.003* (0.073)	-0.004** (0.046)	-0.003* (0.099)	-0.003* (0.064)	-0.003* (0.098)	-0.003* (0.064)
F_TMAGER	0.035 (0.504)	0.045 (0.394)	0.033 (0.528)	0.043 (0.410)	0.033 (0.519)	0.044 (0.404)
F_OWEN	-0.001 (0.187)	-0.001 (0.139)	-0.001 (0.192)	-0.001 (0.140)	-0.001 (0.193)	-0.001 (0.140)
LNREVENUE	0.090*** (0.000)	0.085*** (0.000)	0.089*** (0.000)	0.083*** (0.000)	0.089*** (0.000)	0.084*** (0.000)
LNAGE	-0.137*** (0.000)	-0.136*** (0.000)	-0.138*** (0.000)	-0.137*** (0.000)	-0.137*** (0.000)	-0.137*** (0.000)
LISTED	-0.010	0.002	-0.006	0.007	-0.003	0.010

	(0.891)	(0.982)	(0.930)	(0.918)	(0.968)	(0.883)
MSME	-0.032	-0.023	-0.024	-0.017	-0.025	-0.018
	(0.402)	(0.550)	(0.525)	(0.670)	(0.501)	(0.646)
MANUF	-0.033	-0.031	-0.028	-0.026	-0.029	-0.026
	(0.518)	(0.550)	(0.570)	(0.608)	(0.565)	(0.603)
WEATHER	0.050	0.030	0.054	0.032	0.052	0.030
	(0.301)	(0.541)	(0.264)	(0.520)	(0.276)	(0.537)
CORRUPT	-0.020	-0.018	-0.021	-0.020	-0.021	-0.020
	(0.317)	(0.361)	(0.267)	(0.307)	(0.276)	(0.317)
GG1Y	0.011	0.009				
	(0.253)	(0.385)				
INF1Y	-0.046***	-0.048***				
	(0.001)	(0.001)				
GG5Y			-0.014	-0.009		
			(0.671)	(0.795)		
INF5Y			-0.109***	-0.108***		
			(0.001)	(0.002)		
GG10Y					-0.191	-0.170
					(0.155)	(0.225)
INF10Y					-0.219***	-0.222***
					(0.002)	(0.002)
Constant	-0.768***	-0.808***	-0.658***	-0.716***	0.064	-0.004
	(0.000)	(0.000)	(0.004)	(0.003)	(0.861)	(0.992)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (Country)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16046	16201	16238	16397	16238	16397
Adjusted R ²						

p-values in parentheses

* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

Table 10. The robustness check for the correlation between the firm's climate actions and its expected increase in total sales for next year when adding the interaction between female top manager and perceived corruption, using the probit method

	REVINCR Model 1 probit (1)	REVINCR Model 1 probit (2)	REVINCR Model 1 probit (3)	REVINCR Model 1 probit (4)	REVINCR Model 1 probit (5)	REVINCR Model 1 probit (6)
CO2MONITOR	0.349*** (0.000)		0.349*** (0.000)		0.350*** (0.000)	
ENERGY		0.283*** (0.000)		0.283*** (0.000)		0.284*** (0.000)
TMAGER_EXP	-0.003* (0.077)	-0.004** (0.048)	-0.003 (0.103)	-0.003* (0.067)	-0.003 (0.102)	-0.003* (0.067)
F_TMAGER × CORRUPT	0.026 (0.439)	0.027 (0.415)	0.025 (0.452)	0.026 (0.432)	0.025 (0.448)	0.026 (0.428)
F_TMAGER	0.001 (0.976)	0.009 (0.820)	0.001 (0.988)	0.010 (0.814)	0.001 (0.981)	0.010 (0.811)
F_OWN	-0.001 (0.185)	-0.001 (0.137)	-0.001 (0.189)	-0.001 (0.138)	-0.001 (0.191)	-0.001 (0.138)
LNREVENUE	0.090*** (0.000)	0.085*** (0.000)	0.088*** (0.000)	0.083*** (0.000)	0.089*** (0.000)	0.083*** (0.000)
LNAGE	-0.137*** (0.000)	-0.136*** (0.000)	-0.138*** (0.000)	-0.138*** (0.000)	-0.137*** (0.000)	-0.137*** (0.000)
LISTED	-0.009 (0.900)	0.002 (0.973)	-0.006 (0.938)	0.008 (0.911)	-0.002 (0.976)	0.011 (0.876)
MSME	-0.031 (0.401)	-0.024 (0.548)	-0.024 (0.523)	-0.017 (0.668)	-0.025 (0.500)	-0.018 (0.644)

MANUF	-0.033 (0.515)	-0.031 (0.547)	-0.028 (0.568)	-0.026 (0.605)	-0.029 (0.562)	-0.026 (0.600)
WEATHER	0.050 (0.301)	0.030 (0.541)	0.054 (0.264)	0.032 (0.520)	0.052 (0.276)	0.030 (0.537)
CORRUPT	-0.023 (0.303)	-0.022 (0.336)	-0.025 (0.262)	-0.024 (0.293)	-0.025 (0.269)	-0.024 (0.300)
GG1Y	0.011 (0.249)	0.009 (0.379)				
INF1Y	-0.046*** (0.001)	-0.048*** (0.001)				
GG5Y			-0.014 (0.680)	-0.009 (0.804)		
INF5Y			-0.110*** (0.001)	-0.108*** (0.002)		
GG10Y					-0.192 (0.151)	-0.171 (0.220)
INF10Y					-0.220*** (0.002)	-0.223*** (0.002)
Constant	-0.761*** (0.000)	-0.800*** (0.000)	-0.652*** (0.003)	-0.709*** (0.002)	0.077 (0.833)	0.010 (0.980)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (Country)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16046	16201	16238	16397	16238	16397
Adjusted R ²						

p-values in parentheses

* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

Table 11. The robustness check for the correlation between the firm's climate actions and its perceived ease of accessing finance, using the ordered probit method

	FACCESS Model 2 Ordered probit (1)	FACCESS Model 2 Ordered probit (2)	FACCESS Model 2 Ordered probit (3)	FACCESS Model 2 Ordered probit (4)	FACCESS Model 2 Ordered probit (5)	FACCESS Model 2 Ordered probit (6)
CO2MONITOR	-0.110* (0.052)		-0.112** (0.047)		-0.113** (0.045)	
ENERGY		-0.022 (0.700)		-0.025 (0.657)		-0.025 (0.659)
TMAGER_EXP	0.002 (0.276)	0.002 (0.264)	0.001 (0.331)	0.002 (0.314)	0.001 (0.332)	0.002 (0.315)
F_TMAGER	0.037 (0.262)	0.038 (0.265)	0.035 (0.301)	0.035 (0.305)	0.034 (0.302)	0.035 (0.306)
F_OWEN	-0.000 (0.901)	-0.000 (0.916)	-0.000 (0.929)	-0.000 (0.949)	-0.000 (0.932)	-0.000 (0.951)
LNREVENUE	0.027*** (0.000)	0.027*** (0.000)	0.027*** (0.000)	0.027*** (0.000)	0.027*** (0.000)	0.027*** (0.000)
LNAGE	0.024 (0.343)	0.023 (0.360)	0.022 (0.360)	0.022 (0.377)	0.022 (0.366)	0.021 (0.383)
LISTED	-0.093 (0.202)	-0.087 (0.223)	-0.090 (0.214)	-0.085 (0.233)	-0.090 (0.209)	-0.085 (0.228)
MSME	-0.011 (0.632)	-0.006 (0.806)	-0.019 (0.418)	-0.015 (0.563)	-0.019 (0.423)	-0.015 (0.571)
MANUF	-0.115*** (0.000)	-0.118*** (0.000)	-0.119*** (0.000)	-0.121*** (0.000)	-0.119*** (0.000)	-0.121*** (0.000)
WEATHER	-0.181*** (0.000)	-0.190*** (0.000)	-0.182*** (0.000)	-0.189*** (0.000)	-0.181*** (0.000)	-0.189*** (0.000)
CORRUPT	-0.248*** (0.000)	-0.248*** (0.000)	-0.245*** (0.000)	-0.245*** (0.000)	-0.245*** (0.000)	-0.245*** (0.000)

GG1Y	-0.003 (0.673)	-0.003 (0.600)				
INF1Y	0.024** (0.038)	0.022* (0.054)				
GG5Y			-0.006 (0.807)	-0.004 (0.846)		
INF5Y			0.013 (0.338)	0.007 (0.596)		
GG10Y					0.063 (0.396)	0.077 (0.310)
INF10Y					0.075 (0.145)	0.069 (0.179)
cut1						
Constant	-1.665*** (0.000)	-1.661*** (0.000)	-1.723*** (0.000)	-1.717*** (0.000)	-1.414*** (0.000)	-1.398*** (0.000)
cut2						
Constant	-0.861*** (0.000)	-0.860*** (0.000)	-0.921*** (0.000)	-0.917*** (0.000)	-0.612** (0.015)	-0.599** (0.017)
cut3						
Constant	-0.070 (0.579)	-0.070 (0.592)	-0.131 (0.366)	-0.129 (0.387)	0.178 (0.460)	0.189 (0.428)
cut4						
Constant	0.497*** (0.000)	0.496*** (0.000)	0.437*** (0.003)	0.438*** (0.003)	0.746*** (0.004)	0.756*** (0.003)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (Country)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16361	16524	16554	16721	16554	16721
Adjusted R ²						

p-values in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 12. The robustness check for the correlation between the firm's climate actions and its perceived ease of accessing finance when adding the interaction between female top manager and perceived corruption, using the ordered probit method

	FACCESS Model 2 Ordered probit (1)	FACCESS Model 2 Ordered probit (2)	FACCESS Model 2 Ordered probit (3)	FACCESS Model 2 Ordered probit (4)	FACCESS Model 2 Ordered probit (5)	FACCESS Model 2 Ordered probit (6)
CO2MONITOR	-0.109* (0.053)		-0.111** (0.048)		-0.112** (0.046)	
ENERGY		-0.021 (0.707)		-0.024 (0.664)		-0.024 (0.667)
TMAGER_EXP	0.002 (0.284)	0.002 (0.273)	0.001 (0.341)	0.001 (0.324)	0.001 (0.342)	0.001 (0.326)
F_TMAGER × CORRUPT	-0.046** (0.011)	-0.052*** (0.004)	-0.047*** (0.010)	-0.053*** (0.003)	-0.047*** (0.009)	-0.053*** (0.003)
F_TMAGER	0.103** (0.013)	0.112*** (0.007)	0.101** (0.013)	0.110*** (0.007)	0.101** (0.013)	0.111*** (0.007)
F_OWEN	-0.000 (0.908)	-0.000 (0.927)	-0.000 (0.934)	-0.000 (0.959)	-0.000 (0.938)	-0.000 (0.960)
LNREVENUE	0.027*** (0.000)	0.027*** (0.000)	0.027*** (0.000)	0.027*** (0.000)	0.027*** (0.000)	0.027*** (0.000)
LNAGE	0.024	0.024	0.023	0.022	0.023	0.022

LISTED	(0.334)	(0.350)	(0.351)	(0.367)	(0.356)	(0.373)
	-0.094	-0.089	-0.091	-0.086	-0.091	-0.087
MSME	(0.198)	(0.216)	(0.208)	(0.226)	(0.204)	(0.221)
	-0.011	-0.006	-0.019	-0.015	-0.019	-0.014
MANUF	(0.640)	(0.817)	(0.426)	(0.573)	(0.431)	(0.581)
	-0.115***	-0.118***	-0.119***	-0.121***	-0.119***	-0.121***
WEATHER	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	-0.181***	-0.190***	-0.182***	-0.189***	-0.181***	-0.188***
CORRUPT	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	-0.242***	-0.241***	-0.239***	-0.237***	-0.239***	-0.237***
GG1Y	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	-0.003	-0.003				
INF1Y	(0.669)	(0.597)				
	0.024**	0.023**				
GG5Y	(0.035)	(0.049)				
			-0.007	-0.006		
INF5Y			(0.776)	(0.810)		
			0.013	0.008		
GG10Y			(0.324)	(0.567)		
					0.065	0.079
INF10Y					(0.381)	(0.296)
					0.078	0.072
cut1					(0.130)	(0.158)
Constant	-1.651***	-1.644***	-1.711***	-1.702***	-1.390***	-1.371***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cut2						
Constant	-0.847***	-0.843***	-0.909***	-0.903***	-0.588**	-0.571**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.017)	(0.021)
cut3						
Constant	-0.056	-0.053	-0.119	-0.115	0.202	0.217
	(0.653)	(0.680)	(0.408)	(0.440)	(0.394)	(0.354)
cut4						
Constant	0.511***	0.513***	0.449***	0.452***	0.770***	0.784***
	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)	(0.002)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (Country)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16361	16524	16554	16721	16554	16721
Adjusted R ²						

p-values in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 13. The robustness check for the correlation between the firm's climate actions and its expected increase in total sales for next year when adding the interaction between female top manager and perceived corruption, using Mean-center corrupt (CORRUPT_C)

	REVINCR Model 1 OLS (1)	REVINCR Model 1 OLS (2)	REVINCR Model 1 OLS (3)	REVINCR Model 1 OLS (4)	REVINCR Model 1 OLS (5)	REVINCR Model 1 OLS (6)
CO2MONITOR	0.078*** (0.000)		0.077*** (0.000)		0.078*** (0.000)	
ENERGY		0.114*** (0.000)		0.114*** (0.000)		0.114*** (0.000)
TMAGER_EXP	-0.000 (0.826)	-0.000 (0.349)	-0.000 (0.876)	-0.000 (0.382)	-0.000 (0.873)	-0.000 (0.379)
F_TMAGER × CORRUPT_C	0.032*** (0.000)	0.034*** (0.000)	0.031*** (0.000)	0.034*** (0.000)	0.031*** (0.000)	0.034*** (0.000)
F TMAGER	0.044***	0.043***	0.044***	0.043***	0.044***	0.043***

	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
F_OWN	-0.000***	-0.000**	-0.001***	-0.000***	-0.001***	-0.000***
	(0.006)	(0.010)	(0.005)	(0.009)	(0.005)	(0.009)
LNREVENUE	0.040***	0.038***	0.040***	0.038***	0.040***	0.038***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LNAGE	-0.059***	-0.057***	-0.060***	-0.057***	-0.060***	-0.057***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LISTED	-0.028*	-0.029*	-0.028*	-0.029*	-0.028*	-0.028*
	(0.094)	(0.082)	(0.092)	(0.082)	(0.098)	(0.088)
MSME	-0.022**	-0.018*	-0.021*	-0.016	-0.021*	-0.017
	(0.042)	(0.097)	(0.052)	(0.118)	(0.051)	(0.117)
MANUF	-0.016**	-0.015**	-0.015*	-0.015*	-0.015*	-0.015*
	(0.049)	(0.048)	(0.054)	(0.054)	(0.054)	(0.054)
WEATHER	-0.026	-0.039**	-0.025	-0.038**	-0.025	-0.038**
	(0.184)	(0.044)	(0.203)	(0.048)	(0.198)	(0.046)
CORRUPT_C	-0.022***	-0.022***	-0.022***	-0.022***	-0.022***	-0.022***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GG1Y	0.008	0.008				
	(0.225)	(0.223)				
INF1Y	-0.018**	-0.017**				
	(0.027)	(0.033)				
GG5Y			0.000	0.001		
			(0.991)	(0.974)		
INF5Y			-0.051**	-0.049**		
			(0.014)	(0.017)		
GG10Y					-0.060	-0.057
					(0.448)	(0.469)
INF10Y					-0.092**	-0.088**
					(0.028)	(0.032)
Constant	0.197**	0.195**	0.176*	0.175*	0.626	0.604
	(0.033)	(0.032)	(0.091)	(0.090)	(0.147)	(0.158)
Area FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16046	16201	16238	16397	16238	16397
Adjusted R ²	0.160	0.167	0.159	0.166	0.159	0.166

p-values in parentheses

* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

Table 14. The robustness check for the correlation between the firm's climate actions and its perceived ease of accessing finance when adding the interaction between female top manager and perceived corruption, using Mean-center corrupt (CORRUPT_C)

	FACCESS Model 2 OLS (1)	FACCESS Model 2 OLS (2)	FACCESS Model 2 OLS (3)	FACCESS Model 2 OLS (4)	FACCESS Model 2 OLS (5)	FACCESS Model 2 OLS (6)
CO2MONITOR	-0.104** (0.038)		-0.105** (0.035)		-0.106** (0.034)	
ENERGY		0.010 (0.663)		0.009 (0.691)		0.009 (0.687)
TMAGER_EXP	0.002** (0.023)	0.002** (0.026)	0.002** (0.026)	0.002** (0.029)	0.002** (0.026)	0.002** (0.030)
F_TMAGER × CORRUPT_C	-0.047** (0.012)	-0.052*** (0.005)	-0.047** (0.012)	-0.052*** (0.005)	-0.047** (0.012)	-0.052*** (0.005)
F_TMAGER	0.046 (0.184)	0.045 (0.192)	0.045 (0.189)	0.044 (0.197)	0.045 (0.189)	0.044 (0.196)
F_OWN	-0.000 (0.534)	-0.000 (0.575)	-0.000 (0.527)	-0.000 (0.569)	-0.000 (0.528)	-0.000 (0.570)
LNREVENUE	0.021***	0.019***	0.020***	0.019***	0.021***	0.019***

	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LNAGE	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003
	(0.821)	(0.837)	(0.814)	(0.831)	(0.806)	(0.821)
LISTED	-0.034	-0.027	-0.035	-0.028	-0.035	-0.028
	(0.371)	(0.476)	(0.363)	(0.464)	(0.362)	(0.464)
MSME	-0.044*	-0.037	-0.045*	-0.038	-0.045*	-0.038
	(0.069)	(0.119)	(0.061)	(0.105)	(0.061)	(0.105)
MANUF	-0.021	-0.024	-0.021	-0.024	-0.021	-0.024
	(0.245)	(0.178)	(0.235)	(0.170)	(0.234)	(0.168)
WEATHER	-0.155***	-0.165***	-0.156***	-0.165***	-0.155***	-0.165***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CORRUPT_C	-0.185***	-0.185***	-0.185***	-0.185***	-0.185***	-0.185***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GG1Y	0.013	0.012				
	(0.391)	(0.434)				
INF1Y	0.013	0.012				
	(0.482)	(0.522)				
GG5Y			0.037	0.038		
			(0.675)	(0.666)		
INF5Y			-0.012	-0.015		
			(0.801)	(0.748)		
GG10Y					0.127	0.138
					(0.480)	(0.440)
INF10Y					0.050	0.044
					(0.594)	(0.635)
Constant	2.406***	2.427***	2.359***	2.374***	1.723*	1.687*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.077)	(0.082)
Area FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16361	16524	16554	16721	16554	16721
Adjusted R ²	0.268	0.269	0.269	0.269	0.269	0.269

p-values in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.4. Addressing endogeneity issues

These findings should be interpreted with appropriate caution regarding causality. At the same time, the empirical results presented above reveal robust associations among climate mitigation actions, firm characteristics, institutional factors, and the two outcomes of interest: expected revenue growth and perceived access to finance. Several sources of endogeneity may bias the estimates, including reverse causality, omitted variable bias, and measurement error. This section discusses these concerns and the strategies employed to mitigate them.

The most prominent endogeneity concern is reverse causality: rather than climate actions causing higher growth expectations, firms that are already more optimistic or growth-oriented may be more likely to adopt energy management measures or monitor their CO₂ emissions. Optimistic managers may have longer investment horizons, greater willingness to experiment with new practices, or stronger beliefs that environmental investments will pay off. Similarly, firms with easier access to finance may invest in climate actions, rather than in actions that improve perceptions of financing. The cross-sectional nature of the BEEPS VI data (firms surveyed once, with retrospective and forward-looking questions) precludes definitive causal ordering.

To partially address this concern, the dependent variable is forward-looking (expected revenue growth for the next year). On the other hand, independent variables reflect the company's status before and at the time of the survey, including climate action, firm characteristics, and perceptions of corruption. This temporal alignment reduces but does not eliminate reverse causality, as unobserved firm-level optimism could simultaneously drive both past adoption of climate measures and current

growth expectations.

Unobserved firm-level heterogeneity may confound the estimated relationships. For example, managerial quality or corporate culture could influence both the propensity to adopt climate actions and the likelihood of expecting revenue growth. A more competent or forward-looking management team might simultaneously implement energy management systems and generate optimistic sales forecasts. Similarly, firms with stronger social capital or better banking relationships might find it easier both to monitor emissions and to access finance, thereby producing a spurious negative correlation between CO₂ monitoring and perceptions of financing if the true driver is an unmeasured relationship quality. To mitigate omitted variable bias, the empirical models include a rich set of control variables: firm size (logged revenue), firm age, sector (manufacturing indicator), legal status (publicly listed indicator), MSME classification, and area and year fixed effects. Area fixed effects absorb time-invariant unobserved heterogeneity at the regional level (e.g., local business culture, regulatory enforcement quality). Year fixed effects absorb common macroeconomic shocks.

The perceived ease of accessing finance variable (FACCESS) is a four-point scale, which reduces some measurement variability but remains perceptual. Ideally, objective measures of credit access (e.g., loan approval rates, interest spreads, credit limits) would complement perceptual measures. The results should therefore be understood as reflecting perceived constraints, which are nonetheless important for firm behavior: firms act on their perceptions, regardless of objective reality.

5. Discussion and limitations

5.1. Discussion

This study set out to examine the determinants of two critical firm-level outcomes: expected revenue growth and perceived access to finance. Drawing on a large, cross-country sample of enterprises from the BEEPS VI survey, the analysis yields several novel findings that extend existing literature and open new avenues for research. The discussion below highlights the most interesting and unexpected patterns, organized by thematic area.

The climate action paradox: a divergence between growth expectations and perceptions of financing. One of the most striking findings is the asymmetric relationship between different climate mitigation actions and the two outcomes. Both CO₂ monitoring and energy management are strongly and positively associated with expected revenue growth; firms adopting these practices are more likely to anticipate sales increases. This result aligns with the resource-based view, which holds that environmental efficiency measures reduce costs, enhance reputation, and signal forward-looking management (Porter and Van Der Linde, 1995; Stefan and Paul, 2008). From managers' own perspectives, climate actions are not a drag on performance but rather a correlate of optimism.

Firms that actively monitor CO₂ emissions reported significantly higher perceived financing obstacles. This can be explained by the fact that when firms begin measuring their carbon footprint, they may uncover substantial exposure to climate-related risks: dependence on fossil-fuel inputs, energy-intensive production processes, vulnerability to carbon taxes, or supply chain disruptions from weather events. In the absence of mandatory disclosure, many firms may not monitor their emissions and therefore need not report or confront them. Once monitoring begins, however, the firms become aware of their vulnerabilities and may communicate this (directly or indirectly) to the lenders. Risk-averse commercial banks, particularly those in emerging markets with limited experience in climate risk assessment, may respond by tightening credit terms, demanding higher collateral, or rejecting loan applications. Thus, the negative association arises not because monitoring worsens financial outcomes, but because monitoring reveals pre-existing risks that lenders then price into their credit decisions. This mechanism is grounded in the literature on asymmetric information and

environmental risk (Barth et al., 2008; Chava, 2014). Banks are known to penalize firms with poor environmental profiles, but the act of measurement itself can be a disclosure event. For example, research on the EU Emissions Trading Scheme shows that firms that first reported their emissions experienced stock price declines, not because emissions changed, but because information was revealed (Griffin et al., 2017).

Female leadership is an asset for growth expectations and financing. Firms led by a female top manager are more likely to expect sales growth. This suggests that female managers may bring strategic perspectives, stakeholder engagement skills, or adaptive capabilities that foster optimism about future revenue. However, female leadership shows no significant association with perceived access to finance. Surprisingly, the percentage of female ownership exhibits a small but statistically significant negative association with growth expectations. This pattern implies that gender effects are nuanced: female managers (day-to-day decision-makers) positively influence growth expectations, whereas female ownership (strategic control and capital allocation) does not, or even slightly reverses, that effect. One interpretation is that female-owned firms may face disadvantages (discrimination, sectoral sorting, or constrained networks) that offset any positive effects of gender on optimism. In contrast, female managers operate within existing ownership structures that buffer such disadvantages.

Corruption as a dominant constraint. Among all predictors, perceived corruption consistently exhibits one of the largest effects. A one-unit increase on the corruption obstacle scale reduces the probability of expecting sales growth and lowers perceived access to financing. These effects are larger than those of firm size, age, or any macroeconomic variable. This finding reinforces a substantial literature documenting corruption's damaging effects on firm performance (Fisman and Svensson, 2007; Aidis et al., 2008) and extends this literature to forward-looking expectations and perceptions of financing. Notably, corruption's effect on access to financing is nearly 10 times as large (in standardized terms) as the effect of CO₂ monitoring. This implies that for firms struggling to access credit, reducing corruption may yield greater dividends than adopting climate practices.

The most novel and theoretically provocative finding emerges from the interaction analyses. When examining the conditional role of female top managers across different levels of perceived corruption, female-led firms outperformed their male-led counterparts in growth expectations and access to finance, particularly in corrupt environments.

5.2. Limitation

Due to the cross-sectional nature of the BEEPS VI data, all estimates reported in this paper are correlational. Causation cannot be established, nor is it claimed to be established. The models control for a rich set of firm- and country-level covariates, include area, country, and year fixed effects, and employ temporal ordering in which the independent variables (e.g., past adoption of climate measures, past weather shocks) precede the dependent variables in the survey question wording. However, these steps address only observable confounding and do not eliminate the risk of unobserved heterogeneity, reverse causality, or self-selection.

Furthermore, the BEEPS VI data were collected primarily between 2018 and 2020, both before and during the COVID-19 pandemic. While this context provides a valuable baseline for understanding structural relationships among climate actions, corruption, gender, and firm outcomes, the pandemic has since disrupted global GDP, supply chains, and financial markets. Macroeconomic conditions and firm expectations may have shifted. Therefore, the findings should be interpreted as reflecting the pre-pandemic and pandemic periods, and future research using post-COVID data is necessary to test whether the associations documented here remain stable or have been altered by the pandemic and subsequent recovery. The BEEPS VI survey remains the most recent publicly available

wave of the Business Environment and Enterprise Performance Survey at the time of this analysis, as the EBRD has not yet released subsequent waves. We acknowledge this as a limitation and encourage replication when newer waves become available.

Finally, future research using panel data such as multiple waves of BEEPS or linked administrative data could employ firm fixed effects to control for time-invariant unobserved heterogeneity. Quasi-experimental approaches, such as difference-in-differences around regulatory changes (e.g., mandatory emissions reporting or anti-corruption campaigns), could provide stronger causal evidence. Instrumental variables, such as exogenous weather shocks for climate action adoption or regional corruption scandals for perceived corruption, could also help address endogeneity. In the absence of such designs, the present study aims to document robust associations and generate hypotheses for future causal testing.

6. Conclusion and implications

This study examined the correlates of firms' expected revenue growth and perceived access to finance using a large, cross-country dataset of enterprises from the BEEPS VI survey, combined with macroeconomic data from the World Bank. Given the cross-sectional nature of the data, all findings should be interpreted as robust associations rather than causal effects. With this caution in mind, the analysis yields several novel patterns that offer suggestive implications for policies and business strategies.

First, climate change mitigation actions are strongly and positively associated with expected revenue growth. However, a critical divergence emerges in perceived access to finance, and energy management shows no association, whereas CO₂ monitoring is associated with worse perceived access to finance. In other words, not all climate-related actions are seen the same way by firms and managers. Energy management, likely perceived as an efficiency-enhancing practice, is correlated with optimism about future sales, whereas CO₂ monitoring, possibly because of its association with regulatory disclosure or compliance risk, is associated with greater reported financing difficulties. It is important to emphasize that these are perceptual measures; we cannot conclude that lenders actually penalize CO₂-monitoring firms, only that such firms report greater obstacles in accessing finance.

Second, female top managers are associated with higher growth expectations. Still, female ownership shows a small negative effect, and corruption consistently ranks among the largest perceived constraints on both outcomes. The conditional analysis reveals a striking pattern; female-led firms report higher growth expectations in corrupt environments but simultaneously report worse access to financing as corruption rises. This suggests that female managers may overcome financing disadvantages through alternative means such as internal efficiency, operational controls, or non-traditional funding sources.

Third, perceived corruption emerges as one of the largest constraints on both outcomes, with effects substantially larger than those of climate actions or most firm-level controls. This finding reinforces the institutional literature on corruption's damaging role in private-sector development and extends it to forward-looking expectations and perceptions of financing.

The findings of this study carry several suggestive implications, though these should be treated as hypothesis-generating rather than prescriptive. For firm managers, the positive association between climate change mitigation actions, particularly energy management, and expected revenue growth

suggests that investing in such practices is correlated with managerial optimism about future performance. Managers may consider energy management as part of operational strategy rather than mere compliance. However, the finding that CO₂ monitoring is associated with worse perceived access to finance presents a strategic puzzle. Firms that monitor emissions might benefit from proactively communicating their broader risk management strategies and efficiency gains to lenders, framing emissions data within a narrative of transition readiness rather than regulatory vulnerability. Furthermore, the strong negative association between weather shocks and perceptions of financing suggests that lenders might consider post-disaster credit guarantees or flexible restructuring options for affected firms, thereby preventing temporary weather events from becoming persistent financing obstacles.

For policymakers, corruption is one of the most perceived constraints on both growth expectations and access to financing. Anti-corruption reforms such as transparent loan approval processes, strengthened contract enforcement, and reduced bribery demands may yield greater dividends for private sector development than macroeconomic stabilization policies, at least in the institutional contexts covered by our sample. Regarding climate policy, the divergence between CO₂ monitoring and energy management suggests that not all climate mitigation actions are associated with perceptions of financing in the same way. Policymakers should consider designing disclosure frameworks that do not inadvertently discourage monitoring, potentially through regulatory safe harbors or certification schemes that verify credible transition plans. Subsidies or technical assistance for energy management are also justified, given their positive association with growth optimism.

Finally, the positive association between female leadership and growth expectations suggests untapped potential. Policies that reduce barriers to female managerial advancement, such as mentorship programs, leadership training, and anti-discrimination measures, may foster more optimistic and growth-oriented firms. The small negative coefficient on female ownership, while not a policy priority given its magnitude, warrants monitoring rather than immediate intervention.

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