

## From energy costs to credit ratings: The multifaceted financial and business risks of climate change

### Research Pulse

Climate change imposes significant economic risks, from escalating energy costs to reduced productivity and creditworthiness. Rising temperatures impact industries by decreasing labor efficiency, shrinking local demand, and lowering GDP growth, particularly in discretionary sectors. Credit ratings are impacted by climate change due to physical (operational disruption) and transition risks (regulatory shifts). Adaptive firms incorporate climate awareness into strategies, leveraging external partnerships to enhance expertise. Proactive management ensures resilience, enabling businesses to navigate evolving environmental, economic, and regulatory challenges effectively.

#### Adapting to rising energy costs: business responses to extreme weather conditions

Climate change has transitioned from being perceived as a distant future concern to an immediate reality with tangible effects on businesses and consumers worldwide. The impacts are evident not only in environmental terms but also in the financial implications it imposes. For instance, the increasing frequency of extreme weather events has already begun to drive up corporate electricity costs, a trend expected to intensify. In the summer of 2022, severe drought conditions disrupted the operation of nuclear reactors in France, necessitating a reduction in electricity production. As Europe faces the prospect of more frequent and prolonged droughts, energy companies will increasingly grapple with regulatory requirements to maintain water levels and temperature thresholds to protect ecosystems and prevent biodiversity loss. These measures, while essential, will constrain energy production, driving up primary input costs (Intelligence, 2024). Considering electricity prices are a key driver of inflation, as highlighted by the Ukraine-Russia conflict, the economic ripple effects are likely to be significant.

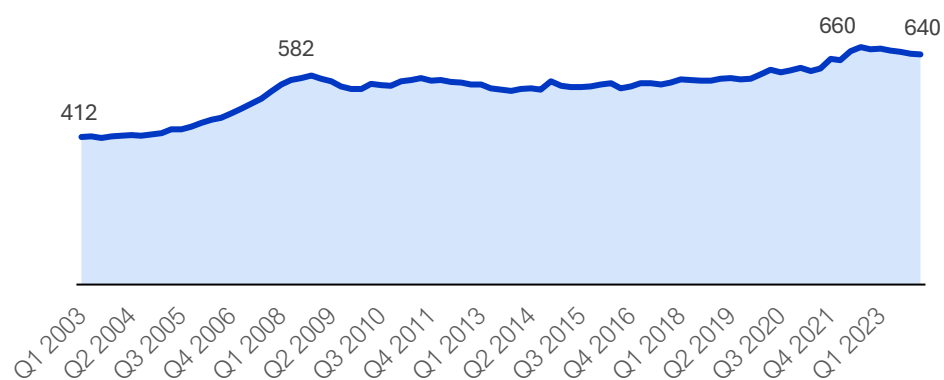
Business in the past reacted to shock to energy prices by passing through part of the increased costs to customers, changing operational structure to increase energy saving and making financial adjustments (Schneebacher, 2024):

- **Cost pass-through:** On average, firms tend to pass through some of the increased energy costs to their customers. Smaller firms are generally more likely to increase their output prices compared to larger firms, who tend to absorb some of the costs and invest more in capital improvements instead.

- **Operational changes:** shifting towards more remote working arrangements is an example, which can pass some energy costs to employees, illustrating an adaptive strategy to manage rising overheads.
- **Financial adjustments:** building up cash reserves and increase debt levels as a response to the shock. This trend is particularly pronounced among small firms. However, with EU corporate debt already at a record high of €640bn (ECB, 2024), accentuated by Covid-19, and high interest rates, further borrowing is increasingly risky and unsustainable in the short term.

### Quarterly outstanding loan amount to non-financial corporations in EZ

Data are in € billion



Source: ECB

### Climate change: A driver of financial risk and higher borrowing costs

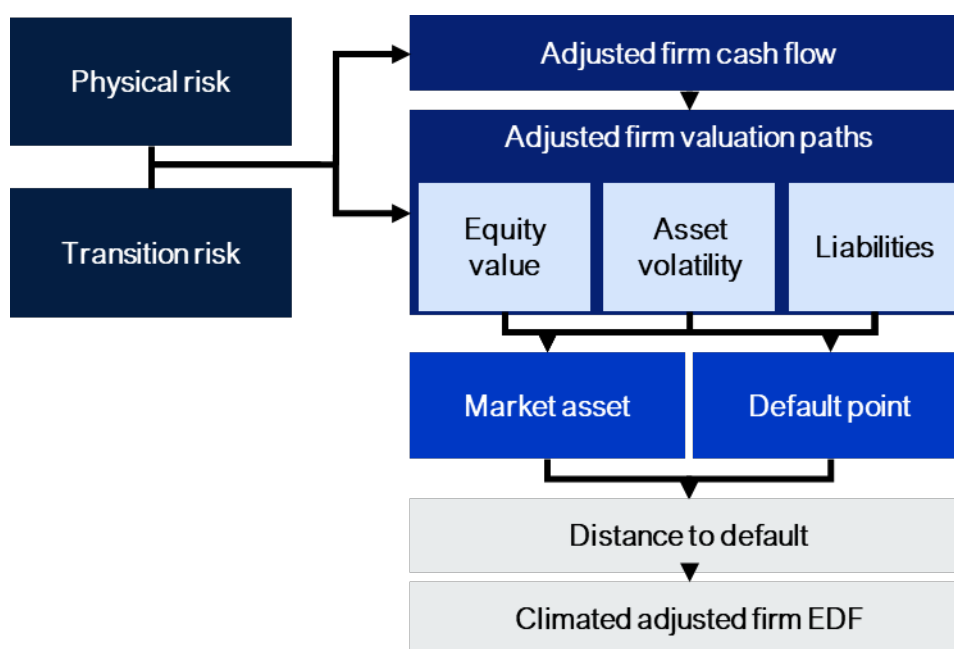
In addition to adding pressure on energy costs, climate change is already considered a megatrend that can have material impacts on the creditworthiness of issuers and debt instruments, and is already identified as one of the key risks to credit conditions. Credit agencies are integrating climate change risk to adjust probability of defaults, Moody's has developed a climate-adjusted version of its Public Firm Expected Default Frequency model, a structural model of credit risk that is used by global banks, insurers, corporates, and asset managers by more than 30 years (Moody's, 2024).

Moody's divided climate change risk into two subgroups: physical risk and transition risk. Physical risk encompasses the costs and risks arising from the physical effects of climate change on businesses' operations, workforce, markets, infrastructure, raw materials, and assets. Transition risk encompasses the costs and risks associated with the transition to a lower carbon economy, including policy changes, new regulations on goods and services, reputational impacts, and shifts in market preferences, norms, and technologies.

Levels of physical and transition risk can vary dramatically between firms. Firms with facilities in South East Asia, the Middle East, and the Caribbean, areas with

high exposures to warming-related climate and weather events, will have relatively high physical risk. Under various climate scenarios, additional global physical damage is projected to be close to 3% of GDP per year by 2050. Firms in industrial sectors such as Coal, Oil & Gas, and Electricity Generation, which are highly exposed to carbon transition, will have relatively high transition risk.

**Moody’s public EDF model adjusted for climate change risk**



Source: Moody's

This adds a layer of complexity to industry and company valuations. Consequently, the cost of capital is likely to increase for businesses operating in sectors or regions with heightened exposure to climate change risks or stringent regulations. How can a company mitigate this financial burden? By adopting green practices. In August, the European Central Bank (ECB) highlighted that Eurozone banks are already imposing higher interest rates on “brown” companies compared to their greener counterparts. Research revealed that companies with the highest carbon emissions faced borrowing costs approximately 0.14 percentage points higher than those with the lowest emissions. Furthermore, commitments to reduce emissions already influenced borrowing costs: Companies signaling intentions to cut future emissions consistently secured more favorable credit terms (Harris, 2024).

**Rising temperatures**

Additionally, rising heat level, even in the absence of drought or extreme events, poses a risk to firm productivity. Heat reduces worker performance, labor supply, and firm-level output, with sharp declines at temperatures over 30°C. From an

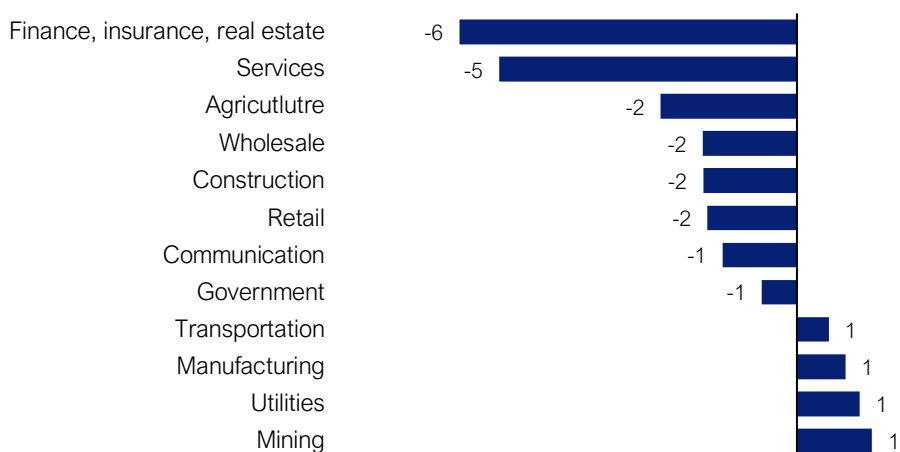
**and industry performance: Adapting to heat-related productivity losses**

economic perspective, even a modest rise in the five-year average of abnormal temperatures contributes to a decline in employment and an increase in factory closures, primarily driven by reduced sales. This effect is mainly present in consumer discretionary industries suggesting that declining local demand is the main reason for the contracting economy (Frank Weikai LI, 2020).

Research on the US economy shows that a 1°F increase in the average summer temperature is associated with a reduction in the annual growth rate of state-level output of 0.15 to 0.25 percentage points. The increased temperature negatively affects the growth rate of output of many industries, including finance, services, retail, wholesale, and construction, which in total account for more than a third of national gross domestic product (GDP). Only a limited number of sectors, such as utilities (18% of national GDP), which includes providers of energy, benefit from an increase in the average summer temperature (Phan, 2018).

**Effect of summer temperature on GDP across industries**

Increase / decrease by sector in basis points



Source: Temperature and growth, a panel analysis of the US (2018)

How can firm react to these changes? Interestingly firms that effectively respond to climate change tend to have management teams that are not only aware of global warming but also incorporate this understanding into their strategic decision-making processes. Similar to other risk factors, awareness of potential climate-related challenges enables proactive measures, allowing for more informed and forward-thinking decisions aimed at mitigating such risks. This approach ensures that the company remains resilient and well-positioned to adapt to changing environmental and regulatory conditions (Schneebacher, 2024). As organizations face increasing complexity, developing certain skills internally may require substantial time and resources. In such scenarios, external partnerships have proven to be an effective strategy for enhancing expertise and accelerating

knowledge acquisition. Leveraging these partnerships enables organizations to access specialized know-how, fostering more informed and efficient decision-making processes.

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