

Climate risk and credit supply in Spain

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Rationale

The 2015 Paris Agreement is a milestone in the global fight against climate change. Against this backdrop, and as a result of credit institutions' alignment with the agreement, it is important to analyse its impact on lending to firms.

Takeaways

- The 2015 Paris Agreement represents one of the first initiatives intended to foster the transition to a greener economy and, consequently, to reduce carbon dioxide (CO₂) emissions.
- The findings of this article show that lending by Spanish credit institutions to more polluting firms appears to have declined somewhat between 2014 and 2019.
- The evidence presented also suggests that, during that period, the banks most exposed to climate risk reduced their supply of credit to firms operating in more polluting sectors in order to mitigate this risk. However, in quantitative terms, the effects are moderate.

Keywords

Climate risk, carbon footprint, CO₂ emissions, climate change, lending to non-financial corporations.

JEL classification

E41, E44, E51, G21, G32.

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Introduction

The Paris Agreement, signed in December 2015, marks an important milestone in the joint global effort to fight climate change and its effects. This agreement kicks off a series of initiatives seeking to spur the transition to a greener economy and reduce carbon emissions. In Europe, the Green Deal was launched in 2019 to tackle climate change and environmental degradation, and to transform the European Union (EU) into a modern, competitive and resource-efficient economy.

To achieve the goals set in the European Green Deal, investments and financial resources must be reallocated to more sustainable activities. Under this scenario, the EU adopted a European green taxonomy in July 2020. This taxonomy is a classification system which identifies environmentally sustainable economic activities, providing a solid basis to both firms and investors. It aims to help firms become more environmentally friendly and to reorient investments towards more sustainable sectors in need of funds.

In order to strengthen sustainable firms' access to financing, the European Banking Authority (EBA) included environmental, social and governance (ESG) factors in its Guidelines on loan origination and monitoring¹ published in 2021. Thus, credit institutions must consider and correctly assess the environmental sustainability of firms before granting loans. In addition, in 2022 the EBA published standards on ESG risk disclosures, according to which credit institutions must make comparable disclosures on risks associated with climate change and how these could affect their balance sheets. Such information includes the Green Asset Ratio, which identifies the proportion of green assets (according to the European taxonomy) in credit institutions' overall balance sheets.

Given the growing importance of climate change and its associated financial risks, the regulatory pressure on credit institutions has gradually increased over time. This may have led to changes in financial institutions' loan portfolios and fuelled an increase in lending to firms operating in more sustainable sectors.

The first section of this article analyses the main distinguishing characteristics of Spanish firms belonging to the more polluting sectors, compared with those in the less polluting sectors (second section). The third section examines developments in lending to firms in the two groups of sectors and whether there is a relationship between the initial exposure of Spanish banks to more polluting sectors and the change in lending. Specifically, it explores the extent to which banks with the highest exposure to climate risks have, following the Paris Agreement, reoriented their portfolios towards less polluting sectors.

¹ These guidelines came into force on 30 June 2021. Some provisions relating to the monitoring of existing borrowers or to loans granted prior to the date of application have been delayed until June 2024.

Distinguishing characteristics of firms in more and less polluting sectors

This section includes a comparative analysis of the financial characteristics that distinguish Spanish firms operating in more polluting sectors from those in less polluting ones. These two groups of sectors are identified on the basis of the total CO₂ emissions coefficient calculated in Maza (2022),² which includes the sum of the direct and indirect CO₂ emission intensities of economic activities in each sector. Direct intensities are proxied using the ratio of greenhouse gas emissions into the atmosphere to the value of total output, and indirect intensities are obtained using input-output tables.³ Specifically, more polluting sectors are classified as those whose total CO₂ emissions coefficient was above the 75th percentile⁴ of the distribution of the sample in 2014. Less polluting sectors include all other productive activities below the 75th percentile.⁵

As Chart 1 shows, according to the Central Balance Sheet Data Office (CBI) integrated database, firms operating in more polluting sectors are, on average, larger in terms of asset size than those in less polluting sectors, which have worse financial ratios. In particular, the latter are more financially leveraged, have lower return on assets and lower liquidity ratios. All these differences are statistically significant at a confidence level of 95%, and are relevant when analysing banks' credit supply to the two groups of sectors, as discussed below.

Developments in the stock of bank lending to the most and least polluting sectors between 2014 and 2019

Developments in the stock of lending to the sectors classified as the most and least polluting are assessed using a sample that comprises all CBI firms that have received at least one loan from any bank during the period analysed (and which are therefore also included in the Central Credit Register (CCR)). Chart 2.a shows developments in each group's share of the total stock of lending in the period 2014-2019. As can be seen, the proportion of financing extended to the sectors classified as most polluting declined from 47% in 2014 to 43% in 2019. Chart 2.b depicts changes in the stock of bank lending to each group of sectors, with both declining gradually from 2015. This reflects the deleveraging that took place at Spanish firms during the period, although this was more pronounced in the most polluting sectors.

Indeed, as Chart 3 shows, there is a positive relationship between significant banks' exposure in 2014 to the most polluting sectors and the growth in the stock of lending to the least polluting

2 Delgado Tejero (2019) examines the effect of the risks associated with the energy transition on the credit quality of banks' exposures to the sectors most affected by this transition. Classification of the most and least polluting sectors is based on methods that are similar to those used by Maza (2022).

3 Leontief (1936).

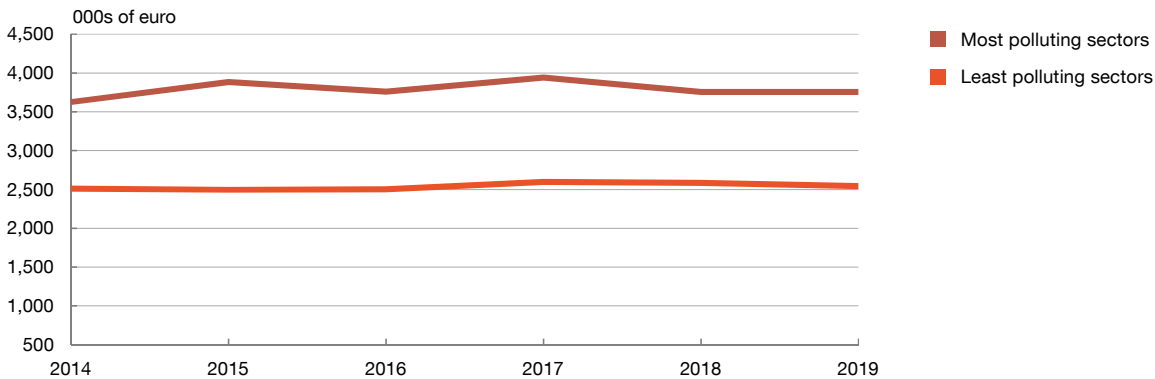
4 The 75th percentile is used for a more conservative classification. However, similar results are obtained when the 50th percentile is used. 2014 is used because it was the year before the Paris Agreement was adopted and, therefore, precedes any major initiatives to reduce greenhouse gas emissions or measures to mitigate the effects of climate change. The analysis covers the period up to 2019, given that the COVID-19 pandemic had a huge impact on bank lending flows to firms and including post-2020 data might distort the analysis.

5 More polluting sectors include the manufacture of coke and refined petroleum products, air transport and the manufacture of chemicals and chemical products. The less polluting sectors include the manufacture of food products, fishing and aquaculture.

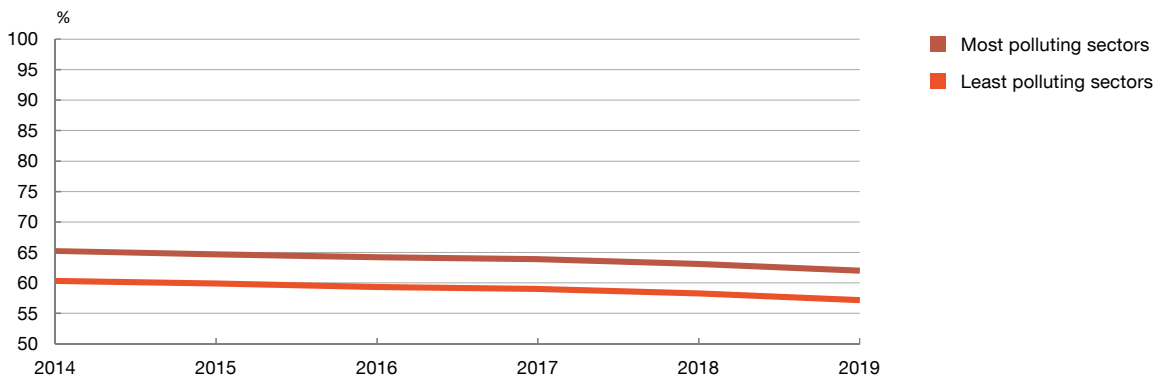
Chart 1

Firms in the most polluting sectors are, on average, larger and have worse financial ratios than those in the least polluting sectors

1.a Size of firms (a)



1.b Leverage (b)



SOURCE: Banco de España. Latest available figure: December 2019.

- a Polluting (non-polluting) sectors are those with a CO₂ emissions coefficient above (below) the 75th percentile of NACE Rev.2 sectors, based on data provided by Maza (2022). The charts show the average of all the firms considered for each type of sector.
- b The leverage ratio is calculated as the ratio of debt to total assets.



sectors in the period 2014-2019. What is more, this relationship is statistically significant. Conversely, no significant relationship is found between the exposure in 2014 to the most polluting sectors and developments in the stock of lending to these industries. Overall, these results⁶ indicate that the significant banks most exposed to the worst-polluting sectors have reduced the proportion of financing extended to these by more than their less exposed counterparts.

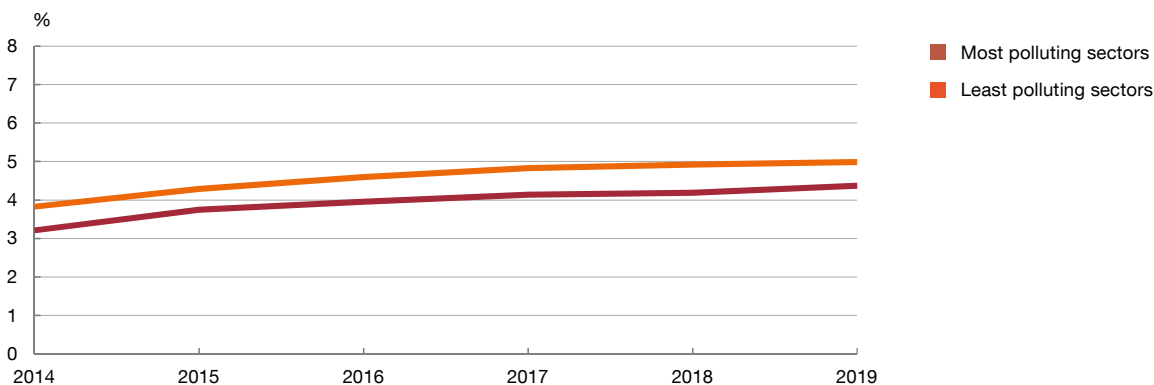
However, these results could owe to both supply-side and demand-side factors. Therefore, the supply-side contribution to changes in bank lending to the most polluting sectors should be

⁶ This analysis focuses on significant banks because less significant banks include small institutions. Using such banks would hamper the correct interpretation of the implicit relationship in the scatter plot, since it would include observations that are highly unrepresentative in terms of their share in the economy. In any event, the exercise has been replicated for the set of less significant banks. According to the results, for the period analysed there is a positive relationship between the more polluting banks and growth in the stock of lending to the least polluting sectors, and a negative relationship between the more polluting banks and growth in the stock of lending to the most polluting sectors. However, none of these relationships are statistically significant.

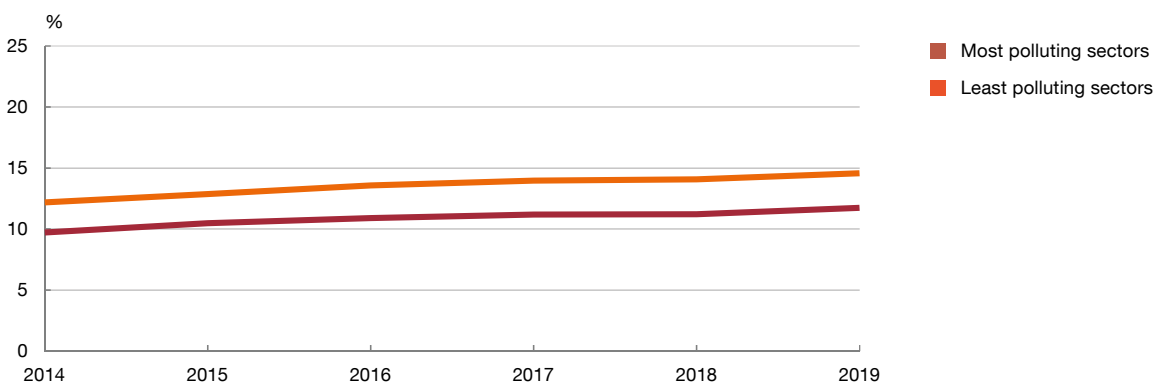
Chart 1

Firms in the most polluting sectors are, on average, larger and have worse financial ratios than those in the least polluting sectors (cont'd)

1.c Return on assets (a)



1.d Liquidity (b)



SOURCE: Banco de España. Latest available figure: December 2019.

- a The return on assets is calculated as the ratio of net income to total assets.
- b The liquidity ratio is calculated as the ratio of liquid assets to total assets.



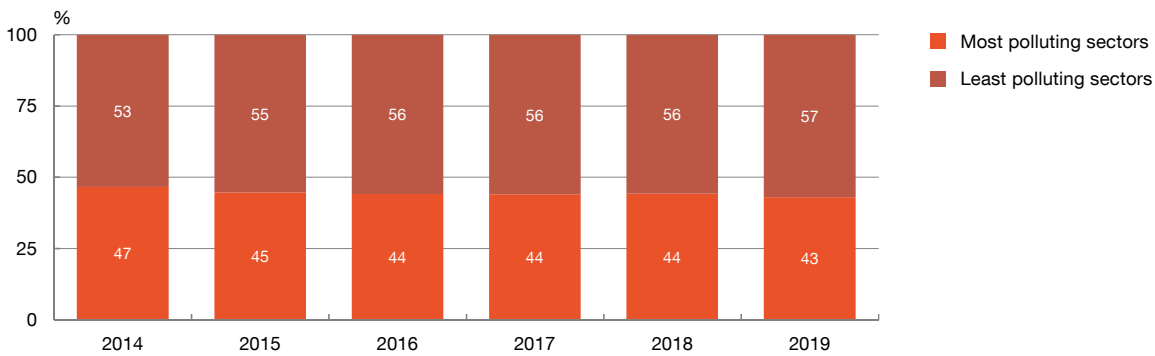
analysed in isolation. To do this, a regression analysis is conducted based on individual firm- and bank-level information drawn from the CBI and the CCR. The dependent variable of this regression is the annual growth rate in a given bank’s stock of lending to a specific firm in the period 2014-2019, and the independent variable of interest is the interaction between an indicator – which takes a value of 1 if the firm operates in a more polluting sector – and the bank’s exposure to CO₂ emissions. This exposure is measured as the product of the bank’s stock of lending to the firm at the start of the year and the total CO₂ coefficient of the sector in which that firm operates (calculated following Maza, 2022). To isolate the supply-side effects, sector-year fixed effects are used to control for credit demand. The implicit assumption is that the demand for credit of firms operating in the same sector is similar in each year, allowing us to distinguish the significance – in terms of the supply of credit to the most polluting sectors – of each bank’s exposure to CO₂ emissions.⁷

⁷ The methodology used to control for credit demand is inspired by Degryse et al. (2019). Bank-level fixed effects and one-year lagged firm-level characteristics are also used.

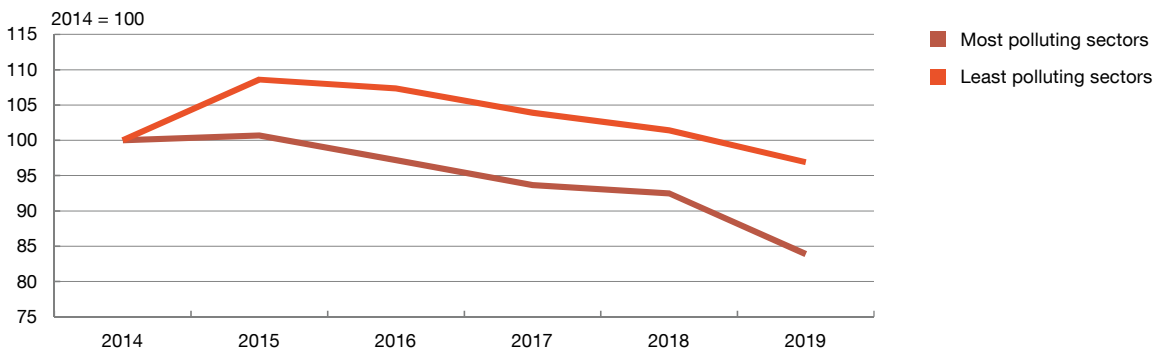
Chart 2

The share of total lending to the least polluting sectors increased between 2014 and 2019

2.a Developments in the proportion of lending to the most and least polluting sectors



2.b Developments in lending to the most and least polluting sectors



SOURCE: Banco de España. Latest available figure: December 2019.

We also explore whether these effects are more pronounced for significant banks⁸ than for less significant banks. Significant banks, which account for a very large share of the stock of lending (82% on average in 2014-2019), are subject to greater regulatory pressure by the supervisory authority. It is therefore reasonable to assume that their investment decisions are more influenced by environmental sustainability considerations.

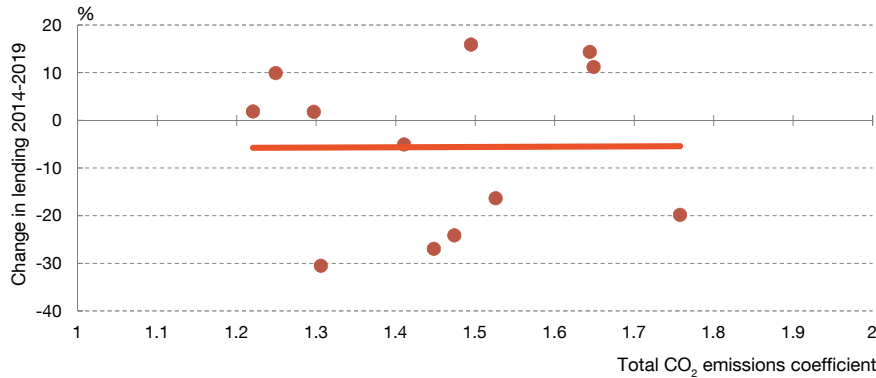
The results of the regression, which are summarised in Chart 4, show a negative and statistically significant relationship between banks' exposure to polluting firms and credit supply in the period 2014-2019. This would mean that, in contrast with other institutions, the banks most exposed to this risk reduced lending to firms. Further, this effect is more pronounced in the case of lending to the most polluting sectors and for the significant banks than other institutions. Therefore, these results suggest that the banks most exposed to polluting firms, and particularly significant banks,

⁸ The credit institutions were classified as "significant" in 2019 pursuant to the Single Supervisory Mechanism (SSM) Regulation.

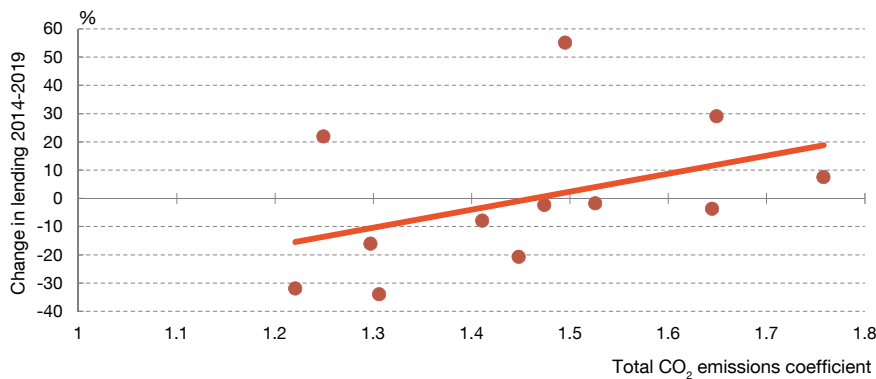
Chart 3

In 2014-2019, the significant banks most exposed to the more polluting sectors appear to have increased the share of lending to less polluting sectors more than their less exposed counterparts (a)

3.a Change in lending to the most polluting sectors (2014-2019) vs CO₂ emissions coefficients.



3.b Change in lending to the least polluting sectors (2014 -2019) vs CO₂ emissions coefficients



SOURCE: Banco de España.

a Average CO₂ coefficients for each bank using the CO₂ emissions coefficients assigned to each NACE sector in 2014 and the stock of lending to each sector in 2014. Each brown dot represents a bank with its emissions coefficient and change in lending between 2014 and 2019. The orange line represents the fit of the linear regression of the change in lending between 2014 and 2019 on the total CO₂ emissions coefficient.



actively refocused their credit portfolios, giving greater weight to firms in less polluting sectors in order to reduce their relative exposure to more environmentally damaging industries.

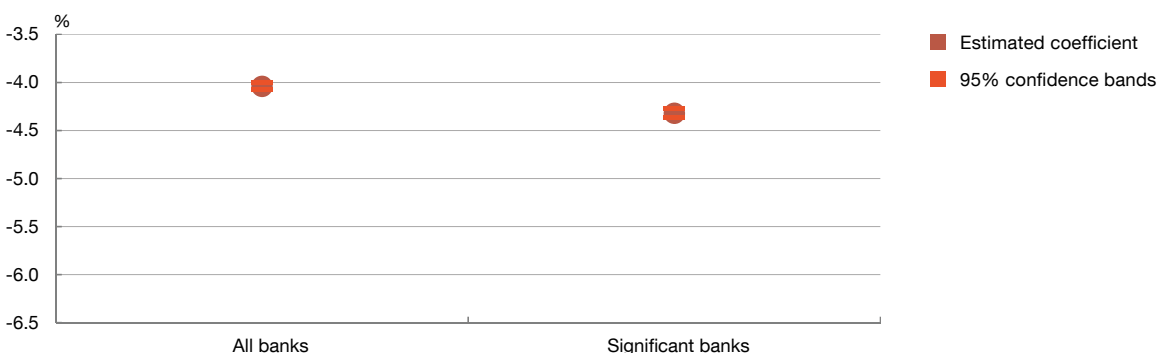
However, although this effect is statistically significant, it is moderate in economic terms. Specifically, during the period 2014-2019, a bank whose exposure to CO₂ emissions was in the 75th percentile would have reduced the supply of credit to polluting firms by €2,884.50 per year on average relative to that extended to less polluting firms.⁹ This is a moderate figure bearing in mind that the average firm in the sample has an outstanding credit balance with a given bank of €160,000.

⁹ Calculated based on the average balance per firm.

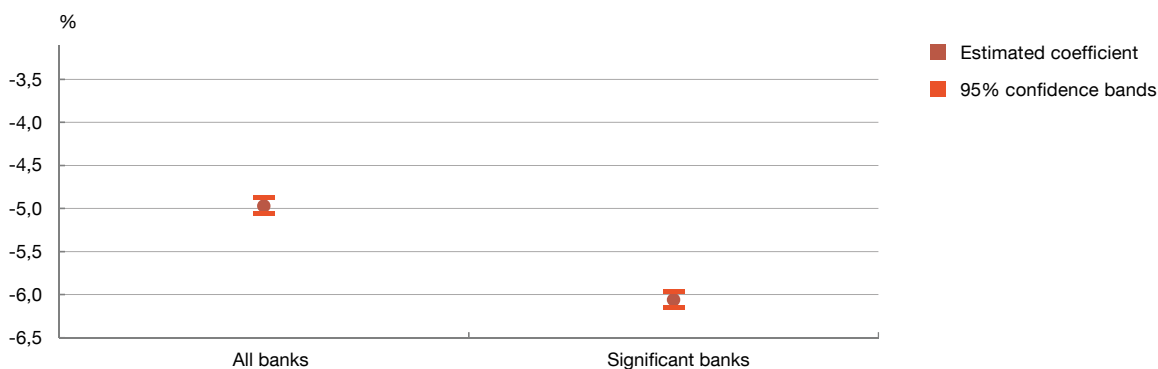
Chart 4

The banks most exposed to climate-related risks appear to have reduced their supply of credit to the most polluting sectors in 2014-2019

4.a Least polluting sectors (a)



4.b Most polluting sectors



SOURCE: Banco de España.

a A regression analysis is conducted where the dependent variable is the annual growth rate of a bank's stock of lending to a specific firm in the period 2014-2019, and the independent variable of interest is the interaction between an indicator, which takes a value of 1 if the firm belongs to a more (or less) polluting sector, and the bank's exposure to CO₂, calculated as the product of the carbon footprint according to Maza (2022) and the firm's credit balance with the bank at the start of each year. Also included are sector-year fixed effects, bank-level fixed effects and one-year lagged firm characteristics. The annual change in credit is calculated using firms with loans from a given bank at the start and end of the year. The charts show the coefficient of interest and the 95% confidence bands. The standard deviations are calculated using bank- and firm-level clusters.



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