EXIM's Exit: The Real Effects of Trade Financing by Export Credit Agencies*

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Abstract

We study the role of export credit agencies on firm behavior by using the effective shutdown of the Export–Import Bank of the United States (EXIM) from 2015–2019 as a natural experiment. We show that firms that previously relied on EXIM support saw a 18% drop in global sales after the agency closed down, driven by a reduction in exports. Firms affected by the shutdown were unable to make up for the loss of trade financing, especially if they were financially constrained, and consequently laid off employees and curtailed investment. These negative effects were more pronounced for firms with higher export opportunities and higher ex-ante marginal revenue products of capital. Lower exports at the firm level aggregate up to lower total exports for industries most reliant on EXIM support. These findings suggest that government policies aimed at providing trade financing can boost exports and firm growth even in countries with well-developed financial markets without necessarily leading to a misallocation of resources.

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1 Introduction

Financing international trade flows involves complex cross-border frictions. For example, exporters need working capital for the period between the production of a product to its final sale, they face a risk of non-payment from customers in foreign countries after a product is shipped, and these customers may need credit to finance a purchase. This demand for financing creates a role for intermediaries in supporting exporters. However, the same frictions limit the pool of institutions able to provide trade financing. As a result, the private market for trade financing is specialized and concentrated (Niepmann and Schmidt-Eisenlohr, 2017), which could result in the underprovision of funds.

Recognizing the challenges for firms to secure trade financing, governments worldwide have established export credit agencies, which have become the predominant tool of industrial policy around the world, especially in advanced economies (Juhász, Lane, Oehlsen, and Pérez, 2022). While the practice of government-backed export financing is widespread, its effects and efficiency are intensely debated. Proponents argue that these agencies boost firm exports by alleviating a private market failure, which in turn can create jobs and promote economic growth. Critics argue that they provide infra-marginal support to firms that would have been able to finance their exports regardless, and therefore have no effect on the beneficiary firms' performance. In this latter view, export credit agencies primarily provide transfers to well-connected firms at the expense of taxpayers.

In this paper, we study the causal effect of export financing support using a natural experiment: the temporary shutdown of the Export-Import Bank of the United States (EXIM) between 2015 and 2019, prompted by a lapse in its charter and lack of quorum on its board of directors. In normal times, EXIM provides trade financing to firms either through direct loans or through insurance for firms not able to secure the needed trade financing from private banks. Without its charter, EXIM had no statutory authority to approve new transactions. In addition, the lack of quorum on its five-member board

prevented the bank from supporting long-term operations and loans over $10 million. As a result, the shutdown resulted in an 80% drop in the volume of EXIM-supported transactions in 2016 compared to 2014. The volume of export credit support provided by EXIM only returned to pre-shutdown levels after the resumption of full operations in December 2019.

We focus our analysis on publicly traded firms over the period 2010–2019, which were among the largest in the economy and had received over 80% of EXIM support prior to the shutdown. These firms were also the ones most likely to be able to access alternative sources of credit and to be the least constrained following EXIM's shutdown, and so this support was most likely to be infra-marginal for these firms and have limited real effects.

Our identification strategy relies on ex-ante differences between firms that were dependent on EXIM support relative to those that were not. This strategy does *not* require a random allocation of EXIM support among those firms. It also does not require that firms reliant on EXIM were similar to non-reliant firms in terms of their characteristics in levels. In order for our estimated coefficients to have a causal interpretation, we require that there is no simultaneous unobserved shock that is correlated with EXIM exposure such that, absent EXIM's shutdown, the outcomes of treated and control firms would have evolved similarly.

To ensure that our estimates are well-identified, we use three methods. First, we show that key firm outcomes such as global sales, foreign sales, capital, and labor accumulation evolved in parallel for treated and control firms in the years leading up to the shock and only began diverging after mid-2015. Second, we saturate our estimator with high-dimensional fixed effects to remove as much time-varying unobserved heterogeneity as possible. We include year fixed effects interacted with dummies for a firm's industry, export market exposure, firm balance sheet characteristics, and lobbying activities in order to account for potential shocks correlated with those characteristics. The stability of our point estimates indicates that our results cannot be explained by differential exposure to

aggregate or firm type-specific shocks. Third, we account for any the possibility of shocks to unobservable characteristics of EXIM-dependent firms by using variation *within our treated group*. We can do so by comparing the outcomes of firms that relied on EXIM support for long-term loans or transactions larger than $10 million, which were particularly disrupted due to the need for EXIM board approval, with those that did not.

Our first set of results shows that the global sales of EXIM-dependent firms declined by an average of 18% relative to control firms. Both in annual and quarterly data, we find no differential pre-trends prior to EXIM's shutdown, followed by a swift decline in sales afterwards that was persistent all the way through 2019, the last year before EXIM resumed fully its activities. These estimates remain quantitatively similar and statistically significant after including additional controls and restricting the identifying variation to the intensity of treatment within the group of EXIM-dependent firms.

We find that the reduction in firm global sales also passes onto a permanent reduction in capital and labor. These results imply that the supply of loans and insurance from EXIM can have sizable effects on the firms that receive this support and indicates that EXIM offers valuable trade financing on the margin. We also find that there is no differential impact on firms' return on assets (ROA). In combination with the reduction in firm sales and production factors, this evidence is inconsistent with a view of inefficient "capture" in which EXIM support is a pure transfer to beneficiary firms that allows them to earn higher profits without having real effects.

Our second set of results focuses on the channels that explain why beneficiary firms are so sensitive to EXIM's shutdown. We explore the role of financial frictions faced by these firms and examine differences in their export dynamics. We show that our baseline effects are predominantly driven by firms that are more financially constrained, whether proxied by their level of indebtedness, dividend payouts, or a text-based measure constructed from 10-K filings. These findings indicate that a lack of alternative sources of

financing may be preventing them from compensating for the loss of EXIM support.[1]

We also show that the reduction in firms' global sales is driven by a drop in exports, measured in various ways. We are able to examine the effects on the universe of maritime exports at a detailed firm-by-product-by-destination level. Maritime exports, which tend to have longer shipment times and therefore higher working capital needs (e.g., Ahn, Amiti, and Weinstein, 2011; Xu, 2022), are more sensitive to the loss of EXIM funding and respond up to two times as much as measures of firms' *overall* exports. This sensitivity is consistent with the importance of financing frictions in explaining the effect of the EXIM shutdown. The granular nature of the export data also allows us to control for additional dimensions of unobserved demand shocks that might correlate with the treatment at the product and destination level. We find stable point estimates, indicating that the overall effects we estimate for the EXIM shutdown are also unlikely to be due to these types of demand shocks.

The impact of the EXIM shutdown on firm exports varies significantly by the degree of product differentiation. Comparing exports dynamics for goods that are more substitutable (Rauch, 1999) or have higher quality (Khandelwal, 2010), we find that goods that are more differentiated are less impacted, consistent with the evidence that more differentiated products that have fewer potential substitutes face more inelastic demand, which allows treated firms to pass on more of the shock to trade financing (e.g., Xu, 2022).

Our results point to a beneficial role of EXIM for the average firm. The strong reaction in firm outcomes to the shock in export credit subsidies we document are not consistent with the idea that the typical EXIM-dependent firm simply uses EXIM support to boost its profits with no real effects. That said, these results do not speak to the possible distortions these subsidies could introduce, and in particular whether they would lead or not to a misallocation of resources. Such misallocation would occur if beneficiary firms are less

1. These results are consistent with the findings in Benmelech and Monteiro (2023) that shows that the EXIM shutdown particularly affected Boeing's sales to less financially developed markets. Because these markets made up only a small share of Boeing's overall sales, they find limited effects on the company's overall revenues.

productive than other firms, and were only able to export because of EXIM support.

We offer two pieces of evidence inconsistent with the hypothesis that trade financing supplied by EXIM led to a misallocation of resources. First, we show that the reduction in global sales and capital accumulation induced by EXIM's shutdown is concentrated among firms with high exporting opportunities. We proxy for export opportunities by computing the exports of the US and other developed countries for each industry from the universe of global customs data. Using the exports of non-US countries allows us to measure export opportunities that are plausibly uncorrelated with US firm productivity. We find that treated firms that have potential export growth above the sample median experience a larger drop in their global sales.

Second, we sort firms within each industry according to their marginal revenue products of capital (MRPK) before the shock in order to estimate how misallocation evolves after the reform.[2] We find that EXIM's shutdown led to a drop in global sales and capital that is around five times as large for high MRPK firms (firms above their industry's median MRPK) relative to low MRPK firms. The result that the capital response is larger for high MRPK firms implies that the reallocation of capital across firms worsened due to EXIM's shutdown, which would suggest that a reduction in export credit subsidies increases (not decreases) misallocation. We cannot speak to the effect on aggregate productivity because we are not able to observe the universe of firms, but among the arguably important group of publicly listed firms accounting for the vast majority of EXIM funding, our results do not support the notion that the agency initially produced an inefficient allocation of resources.

Finally, using aggregate customs data at the product-destination-year level, we show that the EXIM shutdown also impacted total export activity. Industries with a higher reliance on EXIM support saw a reduction in exports relative to others, implying that the firm-level reduction in exports we document aggregate up to industry level. Therefore

2. See Bau and Matray (2023) for a detailed description of the methodology and an extended set of references to the literature on capital misallocation.

EXIM support is able to create new exports rather than just reallocating export market share among US firms in favor of firms supported by EXIM.

Related literature. Our paper is connected to several strands of the literature. First, we contribute to the empirical literature on finance and trade. Existing work has primarily focused on how changes in the provision of private credit affects firms' export activity (e.g., Amiti and Weinstein, 2011; Paravisini, Rappoport, Schnabl, and Wolfenzon, 2014; Demir, Michalski, and Ors, 2017; Xu, 2022; Beaumont and Lenoir, 2023; Bruno and Shin, 2023; Monteiro and Moreira, 2023),[3] or how banking networks can affect export patterns (Michalski and Ors, 2012; Niepmann and Schmidt-Eisenlohr, 2017; Niepmann and Schmidt-Eisenlohr, 2017; Xu and Yang, 2022).[4]

Our paper contributes to this literature in two ways. First, our paper looks at a shock specific to trade financing, and not at an all encompassing credit supply shock. This implies that we can identify the effect of trade financing on firm activity separately from a broader effect of changes in financing frictions that would affect firm production in general, and by extension, its exporting behavior. Second, our context focuses on government-backed export credit and shows that government intervention can foster exports and firm growth by promoting access to trade financing in a way that does not necessarily increase misallocation in the economy.

We also relate to the literature studying the real effects of export credit agencies and their provision of trade financing on firms. Existing work has almost entirely relied on firm-level correlations between exports and credit in Germany (Felbermayr and Yalcin, 2013; Heiland and Yalcin, 2021), Austria (Badinger and Url, 2013), Pakistan (Zia, 2008;

3. An initial set of papers studied how external finance dependence affects exports, in particular by relying on the Rajan and Zingales (1998) measure of "external finance dependence." See, for instance, Do and Levchenko (2007); Bricongne, Fontagné, Gaulier, Taglioni, and Vicard (2012); Behrens, Coreos, and Mion (2013); Chor and Manova (2012); and Manova (2013).

4. For surveys of this literature, see Foley and Manova (2015) and Leibovici, Szkup, and Kohn (2022). Models of how financing frictions and financial development should affect international trade include Manova (2013); Caggese and Cuñat (2013); Chaney (2016); and Leibovici (2021).

Defever, Riaño, and Varela, 2020), or Korea (Hur and Yoon, 2022).[5] One exception is Zia (2008) which finds the program mostly led to a misallocation of capital due to "political capture," as evidence by publicly-listed firms being the main recipient of government support, which solely affected their profits but not their exports.[6] In contrast to these studies, the natural experiment of the EXIM lapse allows us to estimate the causal effect of export credit agency support in an economy with a well-developed capital market and lower risk of political capture. Our results also indicate that export credit subsidies can have first-order effects on firm revenue, investment, and employment over and above the effect on exports, particularly when these firms were plausibly financially constrained but faced promising export opportunities.

The most related paper to our study is Benmelech and Monteiro (2023), which also analyzes the shutdown of EXIM in a difference-in-differences setting. It focuses entirely on the impact on Boeing, a major recipient of the agency's support, relative to other aircraft manufacturers. The main finding is that the effect of EXIM's shutdown was only sizable for Boeing's sales to airlines in countries with underdeveloped financial systems.[7] In contrast, we show a significant effect of EXIM support on US exporters independent of specific markets and independent of a single firm, and show that the effects also translate into an important contraction of capital and labor. Studying the universe of listed firms also allows us to make progress on questions about the distributive effects of export credit subsidies and to examine their impact on resource (mis)allocation in the economy.

More generally, as export credit agencies are one of the most important tools of industrial policy, our work contributes to a growing literature that uses modern empirical methods to study how industrial policy affects firms and economic development (e.g., Juhász, 2018; Criscuolo, Martin, Overman, and Van Reenen, 2019; Kantor and Whalley,

5. For a review, see Srhoj, Vitezić, and Wagner (2023)

6. Relatedly, Agarwal et al. (2023) studies a marketing campaign of the Swedish Export Credit Agency.

7. Also related are Desai and Hines (2008) and Kurban (2022). Desai and Hines (2008) studies stock market reactions to the 1997 E.U. complaint at the WTO about illegal U.S. export subsidies. However, they do not look at the real effects of a change in subsidies, and the shock they look at is not specific to preferential access to credit. Kurban (2022) shows that, in the aggregate, EXIM support fosters US export.

2019; Gregg, 2020; Choi and Levchenko, 2021; Garin and Rothbaum, 2022; Lane, 2023; Juhász, Lane, Oehlsen, and Pérez, 2022). For recent reviews, see: Lane, 2020; Juhász and Steinwender, 2023; and Juhász, Lane, and Rodrik, 2023). In contrast to these papers, we focus on trade financing supply from an export credit agency in a developed economy and provide evidence that, even in such context, policies alleviating financing frictions are effective industrial policy for growing the economic activity in the traded sector.

2 Institutional Background

2.1 Financing Trade

Financing is an essential component of trade. Because trade typically involves a lag between the time where the good is shipped and when the good is received, firms typically need working capital during that period. The payment terms of the transaction specify which of the importers or exporters is financing the other.[8] When contractual frictions are sufficiently high such that neither party is willing or able to provide the financing, a beneficial trade may not occur.

In this environment, intermediaries such as banks may be able to overcome those frictions in a way that firms cannot for two reasons. First, banks access capital at a lower cost than most firms, which is advantageous for financing working capital needs. Second, operating in this market involves substantial fixed costs, and banks can operate a sufficiently larger scale to justify those investments.

However, the investment and knowledge necessary to finance international trade entails substantial expertise. Banks often need international correspondents or subsidiaries

8. For a in-depth discussion of the different forms of trade financing and the contractual frictions underlying them, see for instance Schmidt-Eisenlohr (2013) and Antras and Foley (2015). The two polar forms of payments are an "open account," where the exporter produces first and the importer pays after receiving the goods, versus "cash-in-advance," where the importer pays the exporter before receiving the good. In the first case, the exporter pre-finances the working capital and bears the risk that the importer will not pay after receiving the goods. In the second case, the importer bears the risk the exporter may deliver a flawed product or no product at all.

and knowledge of their counterparties' credit and trustworthiness. in addition, they must comply with international regulation, such as those related to money laundering, that imposes additional layers of due diligence and oversight. Complying with these regulations requires being familiar with the foreign market and its legal environment. In addition, in the case of default, banks need to engage in costly contractual enforcement across borders.

As a result of these frictions, the market for trade financing is concentrated, in particular for exports to smaller or less developed countries or exports involving customers with particularly high level of asymmetric information about their risks of default.[9] The specialized nature of trade financing also implies that exporters might have a hard time finding a bank to finance their exporting strategy, and that it would be difficult for a firm to switch to another bank.

2.2 Export Credit Agencies

Export credit agencies (ECAs) are private or quasi-governmental institutions that act on behalf of national governments to issue insurance and guarantees for financing to exporters. They are widespread across the world. The Export-Import Bank of the United States (EXIM) identified 97 active ECAs worldwide in their 2016 competitiveness report.[10] These ECAs operate on all continents, as shown in Appendix Figure A.1. Depending on their mandate, ECAs lend directly to exporters or their customers, or provide credit guarantees or insurance to lower the cost of financing of exporters or their customers.

Panel (A) of Appendix Figure A.2 plots the amount of official medium to long-term credit under the OECD arrangement collected from EXIM's competitiveness report in 2013, before the agency's temporary shutdown in 2015. The figure shows that countries differ widely in how much export credit support they provide. In absolute terms, China, Germany, Korea, and the United States spend the most on these programs. In Panel (B)

9. See Niepmann and Schmidt-Eisenlohr (2017) for details on this market and its effect on trade and Paravisini, Rappoport, and Schnabl (2023) for empirical evidence of bank specialization.

10. EXIM is mandated by the US Congress to prepare a report about its competitiveness relative to other ECAs.

of Figure A.2, we plot credit relative to export volumes in 2013, based on data from the World Bank. The Scandinavian countries, as well as China and Korea, are among the heaviest users of export credit agency support relative to their exports.

It is worth noting that it is common for public policy practitioners to label trade financing products (loans, insurance, guarantees, etc.) supplied by export credit agencies "credit subsidies" (e.g., Melitz and Messerlin, 2014). This does *not* necessarily imply that such financial products are offered below marginal costs and do not correspond to a generic cost subsidy in the general sense.[11] In the rest of this paper, we will use the term "export credit subsidy" interchangeably with "export credit agency support" in the way it is used in this literature.

2.3 The Export-Import Bank of the United States (EXIM)

EXIM activities. Established during the New Deal, EXIM is the official export credit agency of the United States. EXIM's objective is to fill financing gaps of US exporters or their customers when the private sector is unable or unwilling to do so. EXIM supports US exporters through four main products: loan guarantees, insurance against customer credit losses, direct loans, and working capital loans.[12] In that respect, EXIM can affect firm exports not only by financing the necessary working capital, the costs of which can be particularly high for exports, but also by reducing the risks for exporters who might

11. In fact, as we explain below the OECD has enforced strict agreements about the cost at which such financial products can be supplied.

12. There are distinct differences between these products offered by EXIM. First, coverage varies: loan guarantees often cover up to 100% of the principal and interest, while loan insurance typically offers less than 100% coverage. Second, export credit insurance is used to encourage US exporters to provide short-term trade credit to overseas customers, where EXIM insures exporters against non-payment. This insurance, in turn, allows exporters to include these foreign accounts receivable as collateral in their borrowing base, which is often used to back short-term financing from lenders. Loan guarantees, in contrast, can be applied to various types of loans, including long-term financing. Third, direct loans are generally long-term in nature and come with fixed interest rates, making them suitable for capital-intensive projects. In contrast, working capital loans are short-term loans with interest rates that can either be fixed or floating, designed to meet the operational needs of U.S. exporters.

not be able to find a bank capable of issuing letters of credit in the private market.[13] An explicit goal of these products is to encourage exporters to enter emerging markets, partially by covering both commercial and political risks.

Appendix Figure A.3 plots the share of each program over time. Except for the period where the agency's charter had lapsed between 2015 and 2019, loan guarantees and insurance have by far been the most important components of EXIM's activities.

The underwriting for direct loans and long-term loan guarantees, as well as some medium-term and working capital loans, is performed by EXIM loan officers.[14] After EXIM receives an application, usually from a lender or at times foreign buyer of US products, it is screened for completeness and minimum eligibility requirements. Next, applications are evaluated in terms of their compliance with EXIM's policies on credit risk, and financing terms and collateral requirements are determined. Finally, the loan officer makes a decision to approve or deny an application. Long-term transactions above $10 million have to be approved by EXIM's Board of Directors.

Functioning of EXIM. A five-member Board of Directors, drawn from both political parties, leads the Bank. Members are appointed by the President and confirmed by the Senate. The Board needs a quorum of at least three members to conduct certain business, including approving transactions of long-term loans above the $10 million threshold (Appendix Figure A.4 plots the distribution of EXIM loans by maturities over the years).[15] The board had three vacant seats between July 2015 and May 2019; at some point, the board was not staffed at all.

The OECD requires that all ECAs are reserve-neutral, or at least do not depend on gov-

13. For an estimation of the large working capital costs that exporters face, see for instance Feenstra, Li, and Yu (2013). For evidence of the role of risks in affecting pattern of exports, see Niepmann and Schmidt-Eisenlohr (2017) or Demir, Michalski, and Ors (2017).

14. For some of its programs, especially medium-term and working capital loan guarantees, EXIM delegates credit decisions and underwriting to a selected group of "delegated authority lenders." To limit the risks and potential conflicts of interest inherent when working with third-party lenders, EXIM insists on certain fixed underwriting requirements and reviews these transactions on an ongoing basis.

15. After EXIM's re-authorization in December of 2019, alternative procedures were established so that the bank can still approve loans that would otherwise need a board quorum.

ernment funds to cover operating costs and losses.[16] In addition, EXIM's congressional mandate also specifies that the institution must remain self-financing while serving its purpose of providing credit for activities deemed too risky or unprofitable by private credit markets. In practice, EXIM reports that the average default rate on its portfolio was 1.08% between 1934 and 2012 and 0.61% between 1992 and 2012 (EXIM, 2012).

A contested role. According to the nonpartisan Congressional Research Service, EXIM has returned a net profit of $9 billion to the U.S. government since 1992 (CRS, 2022). Despite the considerable profits generated by its activities, the effectiveness of EXIM is hotly debated.[17] Proponents of EXIM argue that it plays a vital role in supporting jobs and economic growth by providing financing and insurance to American companies that would otherwise struggle to compete in foreign markets. Others point to global competition from ECAs of countries such as China and Korea that provide substantial subsidies to their exporters, thereby requiring EXIM to help the competitiveness of US companies by leveling the playing field on the global stage. In fact, "competition with China" is listed as one of EXIM's missions on its website.

EXIM's opponents tend to focus on two main arguments. First, EXIM would provide inframarginal subsidies, which ultimately amounts to a pure transfer from tax payers to the largest US firms with no effect on their exports and employment. Second, even if EXIM support is marginal, it could still create distortions among US firms and give undue competitive advantages to the most connected but unproductive ones, resulting in a misallocation of resources.

2.4 The 2015 Lapse in EXIM's Authorization

Two events in July 2015 led to a significant disruption in EXIM's operations over the subsequent four years. First, on July 1st, EXIM's renewable charter, which requires periodic

16. The Arrangement text from the OECD specifies this requirement. The idea is that ECAs should not to function as pure trade subsidies.

17. In 2014, just before its temporary shutdown, EXIM made close to $1 billion in profits.

reauthorization by Congress, lapsed for the first time since the agency's inception in 1945. Second, on July 20th, the Bank's board of directors lost its quorum, rendering the board unable to approve support for long-term loans above $10 million, which had been at the heart of EXIM's activities. While Congress re-authorized EXIM's charter on December 4th, 2015, the board quorum was not restored until May 8th, 2019.

The lapse in EXIM's charter was primarily caused by a political dispute in the highly polarized environment following the 2012 Presidential elections. With the rise of the Tea Party, EXIM critics gained considerable traction in Congress. While the arguments for and against EXIM were not new, the political gridlock ultimately resulted in an inability to identify sufficient common ground for reauthorizing EXIM's charter.

EXIM's lack of board quorum, which lasted for much longer than the initial shutdown, was caused in part by the fact that EXIM board members only serve until a predetermined date or until a successor is appointed. Potential board members are nominated by the President, assessed by the Senate Banking Committee, and brought to the full Senate for a vote of confidence. During the second Obama Administration, Republican Richard Shelby, the chair of the Senate Banking Committee at the time, opposed all nominees for EXIM board positions.[18]

When Trump became president in 2016, EXIM had lost all its board members. Trump nominated five people for the board. His nominee for EXIM president, Scott Garrett, was a vocal EXIM opponent, and his bid was promptly rejected by the Senate Banking Committee.[19] It was only in May 2019 that Trump's next nominee, Kimberley Reed, was approved by the Senate.

The lapse of EXIM's charter and the lack of board quorum had dramatic consequences on the agency's ability to provide loans, insurance, and guarantees. Figure 1 shows how

18. An article in the New York Times on February 2016 described Mr. Shelby the following way: "He now has the distinction of running the only committee in the Senate that has not acted on a single nominee in this Congress."

19. An article in Reuters quoted a Republican Senator voting against him as saying: "I believe he's a principled man who simply believes in the abolishment of the Bank."

EXIM-supported transactions changed after July 2015. Panel (A) of Figure 1 plots the total amount of new EXIM-supported loans. After EXIM lost its charter, the amount of newly issued loans dropped to zero, and remained almost unchanged for a prolonged period. This drop was almost entirely due to loans larger than $10 million, showing the binding effect of the Bank's lack of a quorum. Panel (B) of Figure 1 shows that the number of loans did not drop quite as dramatically. Instead, Panels (C) and (D) of Figure 1 suggest that EXIM's temporary shutdown particularly affected large loans, leading to a decrease in the average size of loans supplied by the Bank. As such, EXIM's charter loss is best understood as a shock to the provision of credit to firms relying on large loans of longer maturity.

3 Data and Empirical Strategy

3.1 Data

We use four main data sources: (1) Standard & Poor's Compustat North America Fundamentals, (2) publicly available data on loan authorizations by EXIM, (3) transaction-level export data from Datamyne, and (4) additional firm-level variables from various sources.

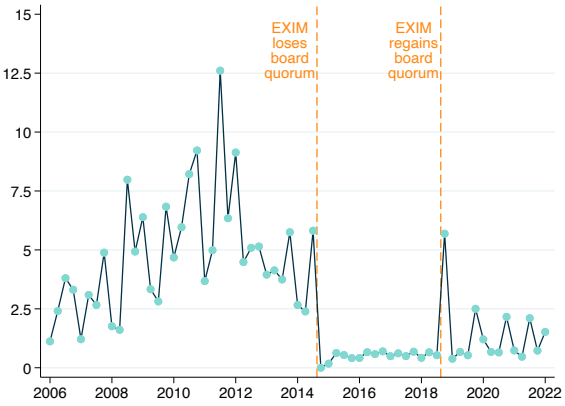
Firm data. To measure firm outcomes, we focus on publicly listed companies incorporated and located in the US we observe in Compustat for the sample period 2010–2019. We exclude utilities (SIC 4900-4999) and financials (SIC 6000-6999) and exclude observations with negative or missing values for the book value of assets or sales as well as very small firms with less than $500K of sales.

We hand-match firms in Compustat to the data on newly issued EXIM-supported loans using the exporter's name, address, and product description. The loan-level data from EXIM provides information beginning in October 2006.[20] While publicly listed companies make up only a small fraction of companies borrowing from EXIM, they account

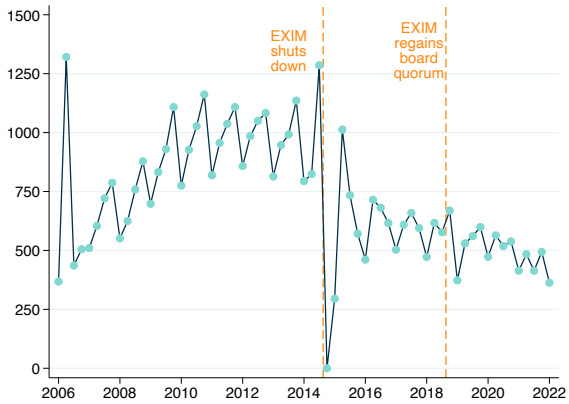
20. The data file can be found at https://data.exim.gov/.

Figure 1: The Effect of Lapse in EXIM's Authorization

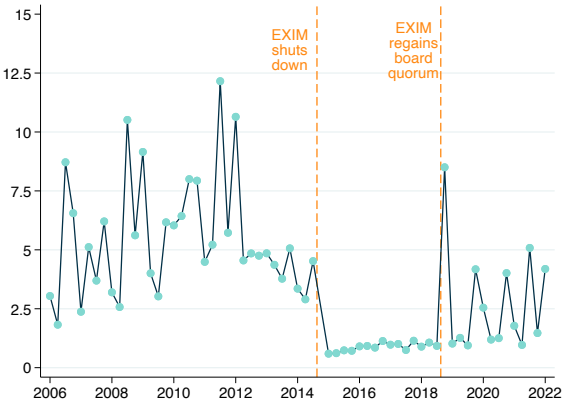
(A) New EXIM Lending ($ billion)



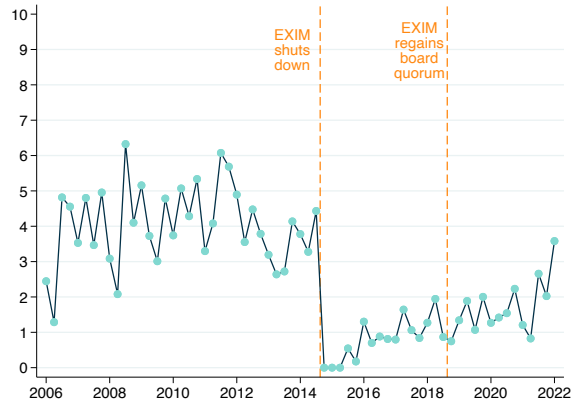
(B) Number of new EXIM loans



(C) Average Size of New EXIM Loans ($m)



(D) Share of EXIM Loans Larger Than $10m



These figures visualize the effect of EXIM's temporary shutdown and lack of board quorum on newly issued EXIM-supported loans. Panel (A) plots the quarterly amount of new loans in $ billions. Panel (B) plots the number of newly originated loans. Panel (C) plots the average loan size in $ million. Panel (D) plots the fraction of loans greater than $10 million. Note that these figures exclude loans to multiple exporters.

for the majority of loan volume. Before EXIM's authorization lapsed, over 80% of EXIM credit went to publicly traded US companies.[21] From Compustat, we take real outcomes such as overall firm size (total assets), employment, capital, and global sales, as well as financial measures such as leverage and return on assets. Global sales refers to the sales made worldwide by each firm and is the sum of domestic and foreign sales.[22]

Firm export data. We measure exports at the firm level in three ways. First, we use the Compustat historical segment data that includes information on sales to foreign customers.[23] To measure foreign sales, we take the sum of all non-domestic sales in the geographic segment data. We use these data as our baseline proxy for exports.[24] When looking at foreign sales, we keep the observations where the reporting date equals the first 10-K reporting date and exclude observations where geographical segment-type data is missing.

Second, we use data from Datamyne, a private vendor that collects and cleans maritime bills of lading.[25] We hand-match firms in Datamyne to Compustat using company names combined with information on the location and types of exports. While Datamyne provides detailed information on individual shipments—including product codes, destination countries, and the weight of the shipped products—the data has some limitations. First, it only covers seaborn trade, which accounts for around 35% of total U.S. exports (International Trade Administration, 2022). Second, it only includes information on ship-

21. A few massive firms, such as Boeing, make up a significant share of EXIM loans. As we discuss below, this does not drive our results.

22. Compustat Fundamentals reports the consolidated financial statement for each firm and does not report a breakdown between domestic and foreign sales. For a subset of firms, we observe this breakdown in the Compustat segment files, although these data appear to be of somewhat lower data quality.

23. In the United States, publicly-listed companies need to disclose foreign sales when they are material. In particular, SFAS No. 131 requires firms to separately report sales for operating segments if they account for 10% or more of total revenue.

24. To illustrate the difference between foreign sales and exports, consider the following example. Tesla produces some of its cars in China and also has many Chinese customers. If Tesla sells a car manufactured in China to a customer there, this transaction will be recorded as a foreign sale. However, the transaction would not be recorded as an export since the car was technically not shipped to a foreign country.

25. These data have previously been used by, among others, Amiti, Kong, and Weinstein (2021), Cavallo, Gopinath, Neiman, and Tang (2021), and Lashkaripour and Lugovskyy (2022).

ment volumes.[26] Third, according to our contact at Datamyne, the data are incomplete and less reliable before 2013; we thus rely on a shorter sample from 2013 to 2019 for the analysis where we use Datamyne information.

Table 1: Summary Statistics

	Mean	Std. Dev.	p25	Median	p75
EXIM dummy	0.04	0.21	0.00	0.00	0.00
Large loan dummy	0.01	0.10	0.00	0.00	0.00
Exporter dummy	0.70	0.46	0.00	1.00	1.00
Global sales	4,137.46	17,581.10	66.24	470.30	2,178.18
Employees No. (thousands)	12.65	56.15	0.21	1.50	7.40
Foreign sales	1,376.75	7,895.81	0.00	8.59	355.49
Total assets	5,283.22	24,501.34	90.11	554.94	2,498.88
ROA	-0.01	0.72	0.02	0.10	0.15
Leverage	0.29	0.35	0.03	0.21	0.40
Tangibility	0.25	0.24	0.06	0.15	0.36
Observations	28583				

This table presents summary statistics for the main estimation sample. The EXIM dummy takes the value of one if a firm was supported by an EXIM loan before the lapse in its authorization (1st July 2015). The large loan dummy equals one if an exporter or its customer received a loan larger than $10 million before the lapse. Sales, exports, and total assets are measured in $ million. ROA is operating income before depreciation divided by total assets. Book leverage is defined as long-term debt plus debt in current liabilities divided by the total assets. Asset tangibility is net property, plant, and equipment divided by total assets.

Third, we use a measure of exporting activity from Hoberg and Moon (2017) that uses textual analysis to extract information on firms' international activities from their 10-K filings. This data includes a measure of "offshore output," which measures the number of text mentions about selling products to other countries. We sum this measure across all export destinations to proxy for a firm's exports. We also use these data to extract information on firms' export destinations. The Hoberg and Moon (2017) data are only available up until 2017.

Additional firm data. We measure lobbying activity for EXIM support using LobbyView (Kim, 2018). We treat firms as lobbying if they are recorded in the issue dataset with the key "Export Import Bank of the United States," and use the firm identifier to match this information to Compustat.

26. Datamyne provides an imputation of export values based on average values for Harmonized System (HS) codes, but even these estimates are missing for 18% of the shipments.

Table 1 reports descriptive statistics for the matched Compustat-EXIM-Datamyne dataset covering 2010–2019. 4% of our firm-year observations are accounted for by firms who were supported by EXIM before the 2015 lapse, and 1% had received a loan larger than $10 million. The average firm has revenues of $4.1 billion; one third of these sales are generated abroad.

To study the effects of the EXIM shutdown on exporters in the U.S. and abroad, we construct a country-product-year panel on exports using trade flow from BACI (Gaulier and Zignago, 2010), which cleans and accounts for irregularities in the raw bilateral trade data from COMTRADE.

3.2 Identification Strategy

To estimate the effect of EXIM's shutdown on individual firms, we estimate regressions of the following form:

$$Y_{i,j,t} = \beta_t \, EXIM_i \times Post_{\geq 2015} + \alpha_i + \gamma_{j,t} + Destinations_{i,t_0} \times \delta_t + X_{i,t} + \varepsilon_{i,j,t} \tag{1}$$

where $Y_{i,j,t}$ are various firm outcomes for firm i in industry j at time t. $EXIM_i$ is an indicator variable for whether firm i received an EXIM loan between 2010 and 2014 (the period prior to the shutdown). Since we cannot observe the loans that would have been granted if the shutdown had not occurred, $EXIM_i$ is a proxy for likely exposure to the shutdown. β_t varies quarterly or annually and captures the semi-elasticity of firm outcomes to EXIM dependency prior to the charter lapse on June 30, 2015. It is estimated by comparing outcomes at various horizons for firms that had relied on EXIM funding relative to firms that had not. We cluster standard errors at the firm level.

The inclusion of firm fixed effects α_i ensures we remove time-invariant heterogeneity across firms, and in particular account for possible ex-ante differences in characteristics between treated and control firms. Industry-by-year fixed effects $\gamma_{j,t}$ restrict the identify-

ing variation to comparing firms within the same industry each period. This controls for time-*varying* unobserved heterogeneity across industries, such as differences in industry cycles, which may be correlated with firm outcomes.

$Destinations_{i,t_0} \times \delta_t$ is a vector of fixed effects that allows us to flexibly control for time-varying shocks to a firm's export destinations. We calculate the top ten foreign markets to which a firm reports foreign sales in its 10-K report during the period 2010–2014 based on data from Hoberg and Moon (2017).[27] We then construct dummy variables for each destination and take their cross-product, so that we have dummy variables for each exact combination of the top ten export destinations. The interaction $Destinations_{i,t_0} \times \delta_t$ allows us to control in a flexible way for possible demand shocks from foreign markets that could be correlated with EXIM support. It implies that the coefficient of interest β_t is obtained by comparing firms that have similar exposure to foreign countries. For instance, it uses variation between treated and control firms that both export to Japan *and* Mexico, but does not use the comparison with firms that export to Japan only or Japan and China.[28]

Identifying assumptions and threats to identification. Our identification relies on the following assumption: firms that received EXIM support in the pre-period were not subsequently differentially exposed to unobserved shocks that are correlated with EXIM dependency, conditional on the rich set of fixed effects and other control variables. This identifying assumption does not require random assignment for EXIM support, nor does it require that firms have similar characteristics in levels. Rather, what we rely on is the "parallel trend assumption" that outcomes for treated and control firms would have

27. Specifically, we use the variable *Offshore Output* in their dataset, defined as: "number of mentions of the firm selling goods to the given nation." The top ten destinations includes: Australia, Canada, China, England, Japan, Mexico, Asia, Europe, Middle-East, Foreign and "other countries." The continents Asia, Europe and Middle-East are due to the fact that many firms only report the continent of exports in their 10-K filings. We assign a value of zero if the firm does not mention a country of destination. As such, a firm reporting no foreign sales has a zero value for all destination dummies.

28. In this respect, our strategy is akin to a commonly used identification strategy in the trade literature that uses detailed custom level data and includes product-by-time fixed effects. We estimate such a specification in Section 5.1, where we use customs data from Datamyne that precisely allows us to work at the firm-product-destination-year level. We also show results without these destination-year fixed effects where we only control for a dummy for firms that are exporters interacted with year, which only exploits variation across treated and control firms within the group of exporting firms.

trended similarly absent the EXIM shutdown. An example of a threat to identification would be that firms that received EXIM support ex-ante were also more likely to engage in political lobbying, and that the returns to political connections changed right after 2015.

We assess the plausibility of our assumption in several ways. First, we show that treated and control firm outcomes evolved on similar trends prior to the shutdown for a host of outcomes (Figure 3 and Appendix Figure A.7). The lack of differential trends pre-shock indicate that any unobserved differences correlated with EXIM support that could be confounding our estimates were irrelevant before 2015 (otherwise we would observe pre-trends) and only mattered afterward. In the analysis at the quarterly level, any correlated shock would have to take effect precisely in mid-2015.

Second, we directly compare the observable characteristics of treated versus control firms. Figure 2 reports the average (normalized) differences and confidence intervals for various observable ex-ante characteristics estimated unconditionally (i.e., with no other controls), conditional on exporter fixed effects, or conditional on industry and exporter fixed effects. Exporter is an indicator variable for whether the firm has either received EXIM support, reported foreign sales in Compustat Segment, has positive exports in Datamyne, or reports taxable foreign income. Unconditionally, treated and control firms are different. This is potentially due to the mechanical correlation between being supported by EXIM and being an exporter (since by definition firms need to export to receive EXIM support). Consistent with a large literature that has shown that exporters are larger and more productive, EXIM dependent firms report higher sales, higher ROA, are older and have a higher share of their sales coming from abroad.

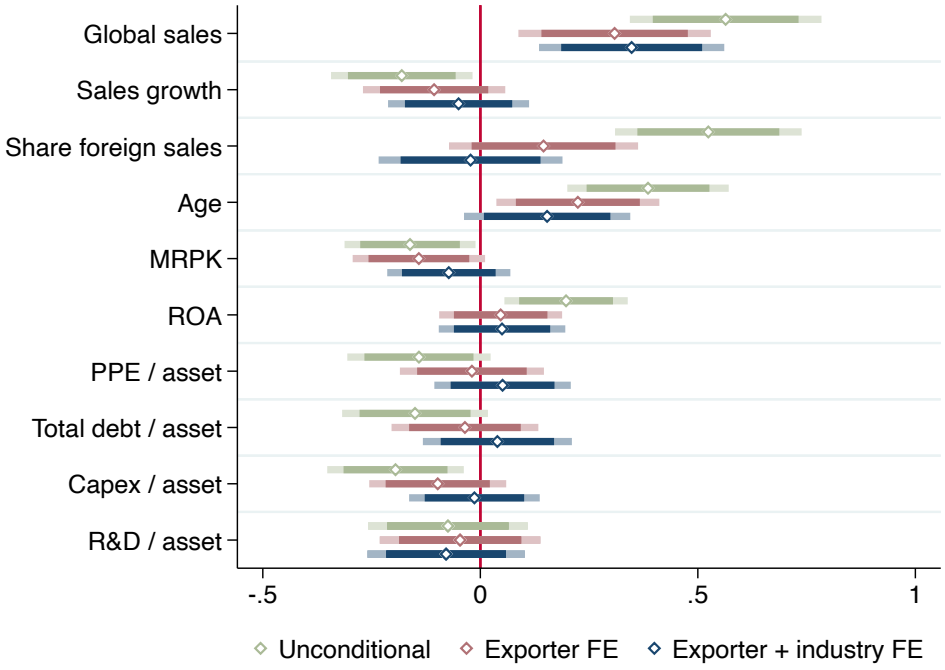
However, once we control for exporter fixed effects, we find that the difference between treated and control firms for most variables is statistically insignificant at conventional levels (the red bars), with the exception of global sales and age. Controlling in addition for industry, as we do in our baseline specification, gives us point estimates for the standardized differences that are almost equal to zero and are well below the thresh-

old of 0.20 recommended by Imbens and Rubin (2015) with the exception of firm size. However, despite this difference, treated and control firms still share a large overlap in size which ensures that effect can be identified across firms of similar size. In addition, treated and control firms have the same age, the same share of foreign sales, the same financing frictions proxied by their leverage or their tangibility (defined as property, plants and equipment over total asset). They also have the same dynamism based on the growth rate of their sales, their investment intensity (both in terms of physical investment and R&D), and have the same productivity based on their ROA and marginal return to capital (MRPK, defined as sales over tangible capital). Although they are slightly older, the difference is not statistically significant.

We also show in Table 3 (Section 4) that our point estimates are stable after including a battery of additional firm characteristics interacted with time fixed effects. These additional control variables absorb the impact of unobserved shocks that are correlated with these characteristics. For example, the inclusion of total asset quintile-by-year fixed effects ensures that our coefficient of interest β_t is not driven by differences in time-varying unobserved shocks on smaller or larger firms.

Third, our empirical setting allows us to use *within* treatment variation arising from an institutional detail specific to the shutdown. In particular, it was not possible to authorize long-term loans over $10 million while there was no board quorum, while short and medium-term loans under $10 million quickly resumed after the reinstatement of EXIM's charter in December 2015. This allows us to compare outcomes for firms that relied on loans above $10 million relative to firms that received EXIM loans below this cutoff (which had not been relevant before the Bank's shutdown). We do so by including a fixed effect EXIM$\times$Year in our specification to ensure that the coefficient of interest is only estimated by comparing the firms that had received any EXIM loans. To the extent that the selection into relying on EXIM support is the same for firms receiving a larger or smaller loan, this specification controls for any unobserved shocks that might be correlated with the

Figure 2: Covariate Balance



This figure shows coefficient estimates and 90% (lighter bars) and 95% (darker bars) error bands of the difference between treated and control firms for different variables. All variables are normalized to have a mean of zero and a standard deviation of one. "Unconditional" refers to the sample where we compare treated firms to all untreated firms without conditioning on any fixed effects. MRPK (Marginal Return Product to Capital) is defined as sales over tangible capital. Exporter is a dummy that takes the value one if a firm has either received EXIM support, reported foreign sales in Compustat Segment, has positive exports in Datamyne, or reports taxable foreign income.

treatment in equation (1).

4 Average Effects of EXIM's Shutdown on Firm Outcomes

We first examine the hypothesis that EXIM support is infra-marginal and primarily boost firm profits rather than impacting real outcomes. Our results show that on average, the shutdown had sizable negative impact on real firm outcomes including global sales, employment, capital, and assets, but no clear effect on firm profitability. These effects indicate that it is unlikely that EXIM was simply "cream skimming" the best firms, since those would be the most likely to be able to operate without EXIM support.

4.1 Effect on Global Sales

Baseline effect. We begin by estimating the impact of the EXIM shutdown on firms' global sales. Panel (A) of Figure 3 plots the average global sales of treated firms relative to control firms each year around 2015, indexed to equal one in 2014. The sales for the two groups of firms evolve in tandem through 2014, and then diverge in 2015. The raw pattern shows that the gap that emerges in outcomes between treated and control firms is driven by a contraction by the treated firms. Moreover, this gap is persistent through the end of our sample period, indicating that the affected firms on average do not appear to be able to recapture their lost market share.

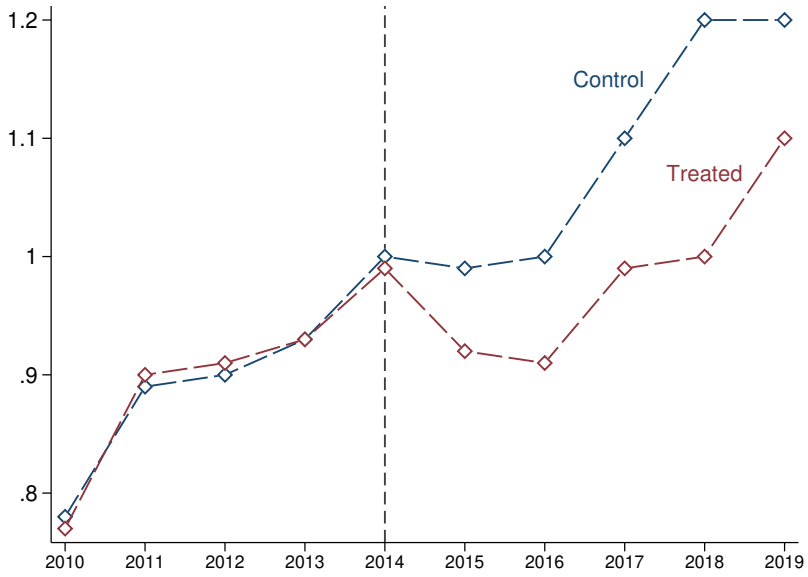
Panel (B) of Figure 3 plots the yearly coefficients of β_t and 95% confidence intervals when we estimate equation (1). The dependent variable is the accumulation of firm's global sales relative to the year prior to the shock, which we define as: $\textit{global sales}_{i,t}/\textit{global sales}_{i,t=2014}$.[29] We use the baseline specification controlling for firm fixed effects and destinations-by-year and industry-by-year fixed effects. The figure provides visual evidence of the absence of differential pre-trends before the shock. After EXIM's shutdown, the global sales of treated firms decline significantly relative to control firms. As in the raw data, these differences persist for years after the shock, indicating that firms are not able to fully compensate for the drop in EXIM's supply of trade financing and do not recover their relative market share.

In Appendix Figure A.5, we plot the β_t coefficients from estimating equation (1) using quarterly data. The reference period is the second quarter of 2015, which corresponds to the last quarter prior to the EXIM shutdown in June 2015. As in our baseline specification,

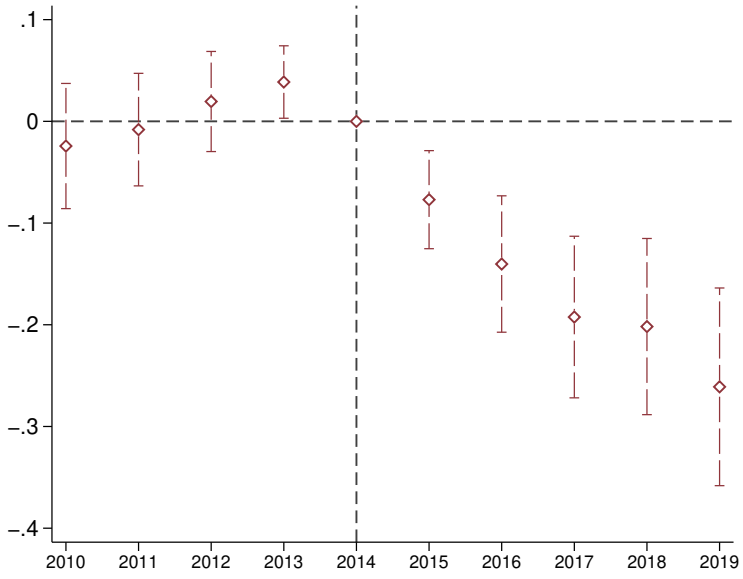
29. This variable corresponds to the cumulative growth of firm revenue, since we can write the change in firm revenues between t and t_0 as the cumulative flow change: $\frac{Revenue_t}{Revenue_{t_0}} = \frac{\sum_{t'=t_0}^{t} [\Delta Revenue_{t'}] + Revenue_{t_0}}{Revenue_{t_0}}$. We winsorize outliers at the 5th and 95th percentile to limit the influence of extreme observations, but this does not drive our results.[30] Because the shock shifted the gap between treated and control firms, we winsorize observations separately based on the distribution of revenues in the group of treated and control firms and the pre and the post period.

Figure 3: Global Sales for Treated and Control Firms

(A) Raw data



(B) Event study D-i-D



This figure plots the average sales of control and treated groups, indexed to 1 if the firm received EXIM trade financing support over 2010–2014. Panel (A) shows the evolution in the raw data, while panel (B) reports the point estimate and 95% confidence interval when estimating the event study version of equation (1) with firm fixed effects and industry-by-year and destination-by-year fixed effects. Destination fixed effects refers to a vector of all the combination possible between the top ten destinations where a firm has foreign sales as reported in its 10-K filings over the period 2010–2014 and extracted by Hoberg and Moon (2017). Standard errors are clustered at the firm level.

the figure shows that the sales of EXIM-supported firms trended similarly to firms not supported by EXIM up to the second quarter of 2015, and diverged only after mid-2015. The higher frequency of the data here allows us to further narrow down identification concerns to unobserved shocks that were correlated with EXIM's support and occurred in the exact quarter of the shutdown.

Table 2 reports the average estimated post-shock coefficient for the cumulative growth in global sales using different specifications. In Appendix Figure A.6, we plot the full set of dynamic coefficients for each specification and confirm visually the absence of pre-trends. The coefficient estimate for the interaction $EXIM_i \times Post_t$ is negative and always statistically significant at the 1% level. Column 1 shows the result with firm and year fixed effects. Column 2 simply includes a fixed effect exporter-by-year fixed effect to account for the mechanical correlation between the treatment exposure to export shocks (since by definition firms that received trade financing from EXIM are exporters). In column 3, we add the vector of the full set of top ten export destinations-by-year fixed effects to account for fine time-varying export demand shocks that could be correlated with firms' reliance on EXIM. In particular, these fixed effects control for the fact that EXIM's support might support firms exporting to specific markets that are more volatile or have experienced larger demand shock during the post-period. Column 4 adds industry-by-year fixed effects, which is our preferred specification.[31] The estimated effect of the EXIM shutdown on firm global sales is stable across the different set of controls, ranging from an average drop in global sales of 25% in column 1 to a drop of 18% in column 4 when we restrict our identification to firms exporting to similar destinations that are also in the same industry.

Within-treatment variation. Our empirical setting also allows us to use within-treatment variation to compare the outcomes of firms that were all dependent on EXIM but varied only in the intensity of the support they received.

Estimating the heterogeneous effects within the group of firms that received EXIM

31. We use 1 digit SIC codes to identify industries. Appendix Table A.1 shows that using a more granular industry grouping produces similar results.

Table 2: EXIM Trade Financing and Firm Global Sales

Dependent variable	Global sales					
	(1)	(2)	(3)	(4)	(5)	(6)
EXIM×Post	-0.25***	-0.18***	-0.19***	-0.18***		
	(0.030)	(0.030)	(0.037)	(0.037)		
EXIM×Post×Large loan					-0.19***	
					(0.069)	
EXIM×Post×Long term loan						-0.20***
						(0.068)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Year	✓	—	—	—	—	—
Exporter×Year	—	✓	—	—	—	—
Industry×Year	—	—	—	✓	✓	✓
Destinations×Year	—	—	✓	✓	✓	✓
EXIM×Year	—	—	—	—	✓	✓
Observations	28,386	28,386	28,386	28,386	28,386	28,386

This table reports the estimated effects of EXIM's shutdown on firms' global sales. The dependent variable is the change of a firm's global sales relative to its value in 2014, $Global\ sales_t$ / $Global\ sales_{t=2014}$. Post_t is a dummy variable equal to 1 for the years 2015 to 2019, and 0 otherwise. *EXIM* is a dummy variable that equals 1 if the firm received EXIM trade financing support over 2010–2014. Exporter fixed effect is a dummy that equals one if the firm has either received EXIM support, reported foreign sales in Compustat Segment, has positive exports in Datamyne, or reports taxable foreign income. Destinations fixed effects refer to a vector of dummy variables for a firm's top ten export destinations over the period 2010–2014 based on data from Hoberg and Moon (2017). Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

support allows us to absorb all possible effects of unobserved firm characteristics that could be correlated with being EXIM-dependent in the first place. For example, one concern about the average effects in Section 4.1 is that EXIM-dependent firms might have been negatively selected, and therefore the characteristics that led these firms to depend on EXIM also caused them to shrink after 2014. The heterogeneity analysis in this section provides evidence on the impact of EXIM treatment intensity, net of the overall effects of EXIM exposure such as those correlated with ex-ante selection.

EXIM supply of loans over $10 million was particularly affected because EXIM lacked the board quorum to approve such transactions even after the reinstatement of the agency's charter in December 2015. As a result, firms that received such large support prior to 2015 were considerably more likely to be cut off from EXIM support until the quorum

was reached in 2019. Our empirical analysis thus divides EXIM-dependent firms into two groups based on whether they received a loan larger than $10 million before EXIM's charter lapse or not. To do so, we interact the $EXIM_i \times Post_t$ term with a dummy *Large loan* that takes the value of one if the firm received any loan over $10 million during the pre-shock period, which allows us to include EXIM $\times$ Year fixed effects in the specification. In this case, the coefficient on $EXIM \times Post \times$ *Large loan* is estimated by comparing EXIM dependent firms that only received loans lower than $10 million with other EXIM dependent firms that received larger loans.

We find that firms experience a drop in global sales of 19% (Table 2 column 5). The fact that we find a substantial drop of 19% relative to the average of 18%implies that the impact on global sales for EXIM dependent firms is unlikely to be driven by other shocks that may disproportionately affect treated firms.

Similarly, EXIM's lack of board quorum affected long-term loans. In fact, EXIM issued no long-term loans during the lapse period between July 2015 to May 2019. Similar to the exercise based on the exact loan size firms relied on prior to the shock, we divide EXIM-dependent firms into two groups based on whether they received a long-term loan before EXIM's lapse or not. We then interact the $EXIM_i \times Post_t$ term with a dummy *Long term loan* that takes the value of one if the firm received any long-term loan during the pre-shock period. Because this also creates variation within EXIM-dependent firms, we can again include EXIM $\times$ Year fixed effects. We find that firms that previously relied on long-term loans from EXIM experience a drop in global sales of 20%, which we report in Table 2 column 6. This further suggests that the impact on firm global sales we find is unlikely to be driven by other shocks correlated with firms' dependence on EXIM's funding.

The effect of EXIM supply of trade financing is permanent and becomes more pronounced over time. These results imply that EXIM support is not infra-marginal, but instead has a direct effect on firms' ability to generate revenue. This is consistent with

models in which finance enters directly in the cost function of exporters in the form of an additional iceberg trade cost (e.g., Xu, 2022), or models in which firms need to provide trade credit (in this setting trade financing) to maintain their customer relationships or acquire new customers (e.g., Arkolakis, 2010; Giannetti, Serrano-Velarde, and Tarantino, 2021; Beaumont and Lenoir, 2023).[32]

One type of model that our results are not consistent with are those in which finance only affects global sales via a one-time sunk cost as in the baseline Melitz (2003) model, or as in Das, Roberts, and Tybout (2007). In these models, financing frictions only matter because they prevent some firms from investing in the initial set-up cost to access global markets. However, EXIM beneficiaries tend to be firms that are already exporting, so this sunk cost has by definition already been paid. In this case, these models would predict that EXIM's shutdown should have no effect. The fact that the global sales of treated firms are sensitive to the removal of EXIM loans instead indicates that finance directly affects variable costs or recurring fixed costs such as the cost of maintaining shipping and distributional channels.

Robustness. Table 3 provides additional robustness tests where we control for multiple firm characteristics measured in the pre-shutdown period, all interacted with year fixed effects. Column 1 controls for the fiscal month firms report their annual accounts, column 2 includes firm economic controls (quintile of asset, debt over asset, ROA), column 3 adds the state of the firm's headquarter interacted with year dummies to account for possible differences in state tax credit (e.g., Heider and Ljungqvist, 2015; Hombert and Matray, 2018), shocks to local banking markets (e.g., Goetz, Laeven, and Levine, 2016; Muller, 2021) or state-level business cycles. Since firms benefiting from EXIM are slightly more likely to engage in lobbying, we include in column 4 an indicator variable for whether the firm has actively lobbied EXIM, as measured from Lobbyview data (Kim, 2018). Finally, column 5 excludes the ten firms with the highest reliance on EXIM support in the pre-

32. While these models deliver different predictions in terms of the exact margin of adjustment (intensive vs. extensive), our data unfortunately do not allow us to separate them.

Table 3: EXIM Trade Financing and Firm Global Sales: Robustness

Dependent variable	Global sales				
Sample	All				Exc. 10 largest recipients
	(1)	(2)	(3)	(4)	(5)
EXIM×Post	-0.17***	-0.13***	-0.16***	-0.16***	-0.17***
	(0.037)	(0.037)	(0.038)	(0.037)	(0.039)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Industry×Year	✓	✓	✓	✓	✓
Destinations×Year	✓	✓	✓	✓	✓
Fiscal month×Year	✓	—	—	—	—
Balance sheet controls×Year	—	✓	—	—	—
State×Year	—	—	✓	—	—
Lobbying×Year	—	—	—	✓	—
Observations	28,386	28,386	28,386	28,386	28,286

This table reports the estimated effects of EXIM's shutdown on firms' global sales. The dependent variable is the change of a firm's global sales relative to its value in 2014, $Global\ sales_t$ / $Global\ sales_{t=2014}$. Post_t is a dummy variable equal to 1 for the years 2015 to 2019, and 0 otherwise. *EXIM* is a dummy variable that equals 1 if the firm received EXIM trade financing support over 2010–2014. Destinations fixed effects refer to a vector of dummy variables for a firm's top ten export destinations over the period 2010–2014 based on data from Hoberg and Moon (2017). Balance sheet controls includes quintile of total assets, leverage, and ROA, measured over the 2010–2014 period. In column 4, *Lobbying* is a dummy that equal ones if the firm has reported any lobbying expenditures according to LobbyView (Kim, 2018). Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

period, which notably includes Boeing (studied by Benmelech and Monteiro, 2023). These alternative specifications yield point estimates similar to our baseline model and are all significant at the 1% level, implying that our estimation of the effect of EXIM's shutdown on firm global sales is not driven by other unobserved time-varying shocks correlated with our treatment.

4.2 Effect on Firm Capital, Labor, and Profitability

The observed decline in total revenues for EXIM-dependent firms after the shutdown suggests that it may not be optimal for firms to operate at the same capacity afterwards relative to before. We therefore next estimate the impact on overall firm size and input accumulation (capital and labor).

Table 4 reports the results of EXIM's shutdown on capital accumulation and employment and shows that firms shrink along all of these dimensions.[33]

Table 4: Effect on Employment, Capital Accumulation, and Profitability

Dependent variable	Tangible capital	Intangible capital	Total asset	Employment	ROA
	(1)	(2)	(3)	(4)	(5)
EXIM×Post	-0.16***	-0.18***	-0.13***	-0.093***	0.0062
	(0.040)	(0.044)	(0.041)	(0.034)	(0.0074)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Industry×Year	✓	✓	✓	✓	✓
Destinations×Year	✓	✓	✓	✓	✓
Observations	27,972	28,245	28,386	25,938	25,114

This table reports the estimated effects of EXIM's shutdown on several firm outcomes. Variables in levels (columns 1 to 4) are computed as the change of a variable relative to its value in 2014, $Outcome_t$ / $Outcome_{t=2014}$. In column 2, intangible capital are measured following Peters and Taylor (2017). $Post_t$ is a dummy variable equal to 1 for the years 2015 to 2019, and 0 otherwise. *EXIM* is a dummy variable that equals 1 if the firm received EXIM trade financing support over 2010–2014. Destination fixed effects refer to a vector of dummy variables for a firm's top ten export destinations over the period 2010–2014 based on data from Hoberg and Moon (2017). Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

In column 1, we start by looking at tangible capital (property, plant and equipment). Column 2 shows the results when we use intangible capital as computed by Peters and Taylor (2017). Intangible capital shrinks slightly more than tangible capital (18% vs. 16%), in line with the idea that intangible capital is more affected by financing frictions and as a result fluctuates more with firm revenue (e.g., Aghion, Askenazy, Berman, Cette, and Eymard, 2012; Hombert and Matray, 2017). Column 3 shows the impact on total assets, and column 4 shows the effect for employment. Across all outcomes, we find that EXIM-dependent firms shrink after EXIM's authorization lapsed, with magnitudes roughly in proportion to the reduction of the firm's global revenues. Taken together, these results indicate that the steep contraction in firm sales due to the lapse of EXIM's authorization led to an overall decline in firm scale.

We next examine whether the change in EXIM funding affects firms' return on assets (i.e., profits adjusted for the reduction in firm scale) and find a small and statistically

33. Appendix Figure A.7 shows the event studies for each outcome.

insignificant result. The fact that we observe a decline in revenues, capital and labor, but no change in the average return on assets is consistent with the interpretation that EXIM's support is not infra-marginal in a way that would merely boost firms' profits without real effects. If it was, EXIM's shutdown would have led to a corresponding decline in profits, but the results instead indicate that EXIM's supply of trade financing offers marginal financing for global sales. As a result, EXIM's supply of trade financing has a direct effect on both sales and production factor accumulation (capital and labor) rather than simply increasing the profits of beneficiary firms.[34]

5 Channels

We now provide evidence on the channels through which EXIM's supply of trade financing affects firms' global sales and factor accumulation. First, we show that the exporting activity directly targeted by EXIM shrinks in line with the reduction in global sales. These effects are larger for maritime trade and for products that are more substitutable and therefore have lower mark-ups and are more financing-dependent. We then directly assess the role of financial frictions and show that along standard proxies for external financing constraints, EXIM-dependent firms that were more constrained experienced larger losses to their sales.

5.1 Effect on Exports

We first assess a direct channel through which EXIM's shutdown impacted firms' global sales, which is through their ability to export. We begin by estimating equation (1) using three different proxies for firm exports: foreign sales from Compustat Geographical Segment, the number of mentions of destinations in firms' 10-K filings from Hoberg and

34. This finding is in sharp contrast with, for example, the export subsidies analyzed by Zia (2008) in the case of Pakistan. They find evidence of inefficient capture for a large set of beneficiary firms. A key difference between the EXIM setting in the US and the setting for developing countries is that government agencies may be more prone to political capture from well-connected firms in the latter.

Moon (2017), and data on maritime shipments obtained from Datamyne. The last dataset allows us to observe exporting activity at a much finer level (country of destination and product shipped) and therefore to account for additional sources of unobserved heterogeneity that may affect our estimates, such as product or destination specific demand shocks.[35]

These more disaggregated firm outcomes exhibit substantial entry and exit at the extensive margin, which creates potential challenges for how best to handle zeros and how to work with disaggregated data that can preserve the aggregate results at the firm level. In order to handle zeros in a well-defined manner that ensures this aggregation property, we modify our baseline specification in two ways. First, we create a balanced panel by assuming that each firm we observe in an export market at any point is present during the whole sample period, and we fill missing observations with zero. Second, we collapse the data into two periods: the "pre" ($t < 2015$) and the "post" ($t \geq 2015$). We then compute the mid-point growth rate for all our different outcomes, which we define for a variable X at the level of firm i, product p, destination d as: $g^{X}_{i,p,d} = (X_{i,p,d,t} - X_{i,p,d,t-1})/[(X_{i,p,d,t} + X_{i,p,d,t-1}) \times 0.5]$. This method ensures that we have a balanced panel that captures extensive margin changes.[36]

The mid-point growth specification has two important and appealing properties.[37] First, it handles entry and exit of markets (destination-by-products) without relying on transformations of the log function (such as "x+1"), which are sensitive to small variations around zero and are therefore not invariant to the unit measurements for a value (for example, thousands versus millions). Second, it ensures that the coefficients at the firm-product-destination level aggregate exactly to the coefficients at the firm level when using

35. The product classification code in Datamyne corresponds to the standard Harmonized Tariff System 6-digit level. Datamyne sometimes report only the more aggregate HS code, which we simply treat as a different code. We use 6 digit level in the baseline specification, but show in Appendix Table A.4 that the results are unchanged when we use the 6-digit level when possible. Appendix Table A.3 shows the results when we use different measures of export shipments.

36. Firms that do not export in both periods of a specific measure will not have a defined growth rate.

37. For a detailed explanation and an application to firm entry and exit across industries, see Fonseca and Matray (2022).

the correct weights, which is not possible with non-linear functions. The weights are defined as the share of the denominator in the total firm-period cell. For each firm i shipping product p to destination d, we compute the weight as $g^X_{i,p,d} / (\sum_{i \in i,p,d} g^X_{i,p,d})$.

In the analysis at the product–destination level, this specification allows us to estimate the following equation at the level of a firm i that belongs to industry j, and exports product p to destination d in period t:

$$\Delta Y_{i,j,p,d,t} = \beta \text{ EXIM}_i \times \text{Post}_t + \gamma_{j,t} + \delta_{p,t} + \mu_{d,t} + \varepsilon_{i,p,d,t} \tag{2}$$

Since $\Delta Y_{i,p,d,t}$ is the change between the pre and post period, time-invariant firm characteristics are already differenced out, as if we had included firm fixed effects in a level regression.[38] All of the individual time fixed effects are now captured by a single indicator variable that equals one in the post period. The two new vectors of fixed effects for product and destination absorb extra demand shocks that might affect firm exports. $\delta_{p,t}$ ensures that we compare firms shipping the same product at the same point in time, and $\mu_{d,t}$ ensures that we compare firms shipping to the same destination at the same point in time. This most stringent specification addresses the possibility that EXIM-dependent firms might concentrate their exports to certain destinations, and that demand from these destinations might have declined after 2015 independently of the EXIM shutdown. It also addresses the possibility that EXIM-dependent firms might be specialized in certain types of goods that may have experienced unobserved demand shocks post-2015.

We report the results in Table 5. Column 1 shows that firms' foreign sales measured in the Compustat Segment file experience a 16% drop if they benefited from EXIM loans prior to the institution's shutdown.[39] Column 2 proxies for firm export activity with the

38. To see this, note that the two periods (average pre and average post period) level equation is: $Y_{i,j,p,d,t} = \beta \text{ EXIM}_i \times \text{Post}_t + \alpha_{i,j,p,d} + \gamma_{j,t} + \delta_{p,t} + \mu_{d,t} + \varepsilon_{i,p,d,t}$, where $\alpha_{i,j,p,d}$ is a time invariant fixed effect at the firm-industry-product-destination level, and t can take only two values, pre or post. First differencing this equation gives: $Y_{i,j,p,d,post} - Y_{i,j,p,d,pre} = \beta \text{ EXIM}_i \times \text{Post}_t + (\alpha_{i,j,p,d} - \alpha_{i,j,p,d}) + \gamma_{j,post} + \delta_{p,post} + \mu_{d,post} + \varepsilon_{i,p,d,t}$. Note also that since we are left with only one cross section after first differencing the two period model, estimating equation (2) would be equivalent to estimate the equation by dropping the *Post* dummy.

39. We also estimate the full event study of the impact on foreign sales in Appendix Figure A.8 using the

number of mentions of exporting in firms' 10-K filings from Hoberg and Moon (2017). These effects are similar in magnitude (12% drop), although less precisely estimated.

Table 5: Effect of EXIM's Shutdown on Firm Exports

Dataset	Compustat Segment	Hoberg–Moon	Datamyne				
Dependent variable	Δ Foreign sales	Δ # 10-K mention	Δ Maritime export				
Unit of analysis	Firm	Firm	Firm	Firm×destination×product			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
EXIM×Post	-0.16**	-0.12*	-0.39**	-0.39**	-0.33*	-0.44***	-0.31**
	(0.077)	(0.070)	(0.18)	(0.17)	(0.19)	(0.16)	(0.15)
Fixed Effects							
Industry×Post	✓	✓	✓	✓	✓	✓	✓
Product×Post	—	—	—	—	✓	—	✓
Destination country×Post	—	—	—	—	—	✓	✓
Observations	2,012	3,131	600	126,938	126,938	126,938	126,938

This table reports the estimated effects of EXIM's shutdown on various measures of firm exports. In all columns, regressions are estimated in first difference, with data collapsed into an average "pre" ($t \leq 2014$) and average "post" ($t > 2014$) period, and each dependent variable is defined as the midpoint growth rate $g_i^X = [(X_{i,t} + X_{i,t-1}) \times 0.5]$ and estimated using equation (2). In column 1, exports are proxied by foreign sales taken from the Compustat Geographical Segments files. In column 2, exports are proxied by the number of 10-K mentions from Hoberg and Moon (2017). In columns 3–7, exports are the number of maritime containers from Datamyne that we can merge with Compustat. In columns 1–3, each cell is equally weighted. In columns 4–7, the dependent variable is the midpoint growth rate at the firm-destination-product level (i, d, p) and is weighted by $g^X_{i,d,p} / (\sum_{(d,p)\in i} g^X_{i,d,p})$. See page 33 for a detailed explanation. *Destination country* is a fixed effect for the exact country the good is shipped to. Standard errors are clustered at the firm level (columns 1 and 2) and firm and product level in columns 3–7. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Columns 3 to 7 focus on maritime exports among the subsample of firms that export in this manner, which are captured in Datamyne. First, we estimate the overall impact at the firm level and recover an even larger magnitude of -39%. Column 4 shows that the point estimate is *identical* at the firm-destination-product level with the weighting described above when we use the same set of fixed effects. Columns 5 to 7 progressively add product-by-time fixed effects (column 5), destination-by-time fixed effects (column 6), and both set of fixed effects (column 7) to control for unobserved demand shocks that might bias the effect of EXIM's shutdown. The point estimate ranges from -31% to 44% depending on the additional fixed effects we include. The fact that the point estimate is relatively stable with higher dimensional fixed effects indicates that even in the baseline firm-level specification where we cannot control as finely for product or destination-

same specification as for global sales

specific demand shocks, we can interpret the drop in global sales for EXIM-supported firms as being the causal effect of EXIM's shutdown net of any unobserved foreign demand shocks.

We cannot exactly compare the point estimates across the different export measures because they cover different aspects of engaging in foreign activities and are therefore not perfectly correlated with each other.[40] But taken at face value, the larger point estimates for maritime exports align with the impact of financing frictions on trade activities one would expect in theory.[41] Indeed, maritime routes are particularly sensitive to trade financing because of the length of the journeys, meaning firms would need more financing and potentially face greater payment default risk while their goods are in transit (e.g., Amiti and Weinstein, 2011; Xu, 2022). These larger magnitudes therefore likely reflect larger financial constraints, which we analyze directly in Section 5.3.

5.2 Role of Product Substitutability

We also examine the channels through which EXIM's shutdown impacted firms by estimating heterogeneous effects across product types. Having shown that trade financing affects firms' ability to export, we would expect a larger effect on goods that are more financing-intensive or for which offering trade financing to customers is an important source of competitiveness, for instance because the product itself is very homogeneous and has low mark-ups.

To do so, we use the same specification as equation (2) and interact the variable $EXIM_i \times$

40. In addition, the process through which the underlying data are collected varies by measure. For example, "foreign sales" from Compustat Segment is self-reported and contains only segments that account for more than 10% of total firm revenue, while Datamyne covers close to the universe of maritime exports shipping from US ports.

41. The magnitudes in Table 5 are similar when we focus on the subset of firms for which we have information on both foreign sales and maritime exports.

$Post_t$ with a variable that measures product attributes:

$$\Delta Y_{i,j,p,d,t} = \beta\ EXIM_i \times Post_t \times Product\ attribute_p + \gamma_{j,t} + \delta_{p,t} + \mu_{d,t} + \varepsilon_{i,p,d,t} \tag{3}$$

where we interact all the fixed effects with Product attribute$_p$ and include EXIM-by-year fixed effects. The coefficient of interest β reflects the differential effect of the EXIM shutdown depending on product characteristics.

Table 6 reports the results. In columns 1, we draw on the intuition that more differentiated products have fewer potential substitutes, which should partially shield them from a shock to trade financing that would increase the cost of the good (e.g., Xu, 2022). To test this hypothesis, we use the classification of Rauch (1999) to identify homogeneous goods. The coefficient estimate in column 1 is negative and statistically significant for "homogeneous" goods.

In column 2, we test the related idea that products of higher quality may be more difficult to substitute when an exporter is cut off from EXIM's support. To classify high-quality goods, we use the quality ladder measure developed by Khandelwal (2010), which estimates products with higher markups. Consistent with the results on product differentiation, we find a positive effect when proxying for differentiation with quality.

Column 3 examines the impact of a product's financing intensity directly by using the share of a good's exports that were supported by EXIM loans before the agency's shutdown as a proxy. We merge the data on EXIM loans to product-level export data from Schott (2014), and then calculate the ratio of support by EXIM to total exports prior to EXIM's shutdown.[42] We create indicator variables for products in the top quintile of EXIM support-to-exports ratio, which we interpret as being highly dependent on trade financing. The coefficient estimates are negative throughout and statistically significant, implying that more financing-intensive goods were more affected by the EXIM shutdown.

42. We thank Peter Schott for generously providing these data on his website. The data on EXIM loans contain information on an exporter's NAICS code, which we can merge to HS-level export volumes using the crosswalk in Schott (2014).

Table 6: Firm Exports and Product Substitutability

Dependent variable	Δ Maritime export		
	(1)	(2)	(3)
EXIM×Post×Homogeneous	-0.80*		
	(0.45)		
EXIM×Post×Quality ladder		1.12**	
		(0.54)	
EXIM×Post×EXIM dependence			-0.47**
			(0.23)
Fixed Effects (interacted)			
Industry×Post	—	✓	—
Product×Post	—	✓	—
Destination country×Post	—	✓	—
Fixed Effects (not interacted)			
Treated×Post	✓	✓	✓
Observations	122,402	75,466	122,418

This table reports the estimated effects of EXIM's shutdown on various measures of firm exports. Data are collapsed into an average "pre" ($t \leq 2014$) and average "post" ($t > 2014$) period, and each dependent variable is defined as the midpoint growth rate $g_i^X = [(X_{i,t} + X_{i,t-1}) \times 0.5]$. We estimate equation (3). In column 1, *Homogeneous* is a dummy that equals one if the product is substitutable according to Rauch (1999). In column (2), we use the measure of quality ladder from Khandelwal (2010). In column (3) *EXIM dependence* is a dummy that equals one if a product's HS code is in the top 20% of the ratio of EXIM trade financing support over total export prior to the shutdown. *Destination country* is a fixed effect for the exact country the good is shipped to. All fixed effects are interacted with the cross variable. Standard errors are clustered at the firm and product level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

5.3 Direct Evidence of the Role of Financing Frictions

The evidence that EXIM-dependent firms substantially contract after the EXIM shutdown implies that these firms are not able to fully substitute to alternative sources of funding. These sources could be both external, such as from private commercial banks, or internal from the firms' own reserves in the form of trade credit to customers. The lack of substitution of the first type is consistent with evidence that lending relationships are sticky, for instance due to informational frictions (e.g., Darmouni, 2020), or with the fact that most commercial banks do not offer services equivalent to EXIM's (Niepmann and Schmidt-Eisenlohr, 2017). The ability to extend trade credit would require firms to have

ample cash reserves that they can draw on, or frictionless access to external financing sources. In both cases, financially constrained firms would be the least able to substitute and would therefore experience the largest real effects.

We empirically analyze the role of financial constraints by estimating the heterogeneous effects of the EXIM shutdown among more versus less constrained firms. To do so, we interact the EXIM-dependency term ($EXIM \times Post$) with an indicator variable for the firm being financially constrained. As in the heterogeneity analyses in Section 4, testing for heterogeneous effects also allows us to tighten our control group by including EXIM-by-year fixed effects, which absorb the changes to all EXIM-dependent firms and accounts for systematic differences between treated and control firms.

We use three standard proxies to capture the degree of financial constraints: firm leverage (e.g., Giroud and Mueller, 2017) in column 2, firm dividend payment intensity (e.g., Fazzari, Hubbard, and Petersen, 1988) in column 3, and the measure developed by Hoberg and Maksimovic (2015) based on the textual analysis of firms' 10-K filings in column 4. For each proxy, we sort firms into quintiles and categorize firms as being financially constrained if they are in the highest two quintiles.

Table 7 reports the results. For each proxy of financial constraints, we find that within the group of EXIM-dependent firms, those that are most constrained experience a large decline in their global sales. These heterogeneous effects conditional on financing constraints provide an explanation for the limited ability of firms to substitute EXIM trade financing with alternative sources, and hence why EXIM loans are not infra-marginal.

6 Implications for the Allocation of Capital and Exports

In this section, we build on the evidence that EXIM-dependent firms were financially constrained, and we explore the empirical evidence for whether these constraints led to an overall reduction in efficiency among the firms we study. Indeed, the average negative

Table 7: Role of Financing Frictions

Dependent variable	Global sales			
Financing frictions proxy:		Leverage	Dividends	Hoberg and Maskimovic (2015)
	(1)	(2)	(3)	(4)
EXIM×Post	-0.18***			
	(0.037)			
EXIM×Post×Constrained		-0.16**	-0.21**	-0.25***
		(0.077)	(0.087)	(0.081)
Fixed Effects (not interacted)				
Firm	✓	—	—	—
Destinations×Year	✓	—	—	—
Industry×Year	✓	—	—	—
Treated×Year	—	✓	✓	✓
Fixed Effects (interacted)				
Firm	—	✓	✓	✓
Destinations×Year	—	✓	✓	✓
Industry×Year	—	✓	✓	✓
Observations	26,732	25,592	25,297	25,438

This table reports the estimated effects of EXIM's shutdown on firms' global sales. The dependent variable is the change of a firm's global sales relative to its value in 2014, *Global sales*$_t$ / *Global sales*$_{t=2014}$. *EXIM* is a dummy variable that equals 1 if the firm received EXIM trade financing support over 2010–2014. Destination fixed effects refer to a vector of dummy variables for a firm's top ten export destinations over the period 2010–2014 based on data from Hoberg and Moon (2017). In column 2, *Constrained* is a dummy that equals one if the firm is in the largest two quintile of average leverage distribution, in column 3 *Constrained* is a dummy that equals one if the firm is in the bottom three quintile of average dividend payment (dividends over asset) distribution. In column 4, *Constrained* equals one if the firm is in the top two quintile of average of the measure of financing frictions of Hoberg and Maksimovic (2015) based on 10-K textual analysis. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

effects of EXIM's shutdown might be of limited consequence or could even be positive for total output if EXIM initially distorted the competition across US firms and fostered capital misallocation.[43] We proceed by constructing measures for firms' export opportunities and returns to capital as a way of capturing the likely profitability of their sales. Contrary to the hypothesis that the EXIM primarily supported low-quality firms, we find that EXIM dependency had the biggest negative effect on the firms that were likely to be most profitable.

6.1 Export Opportunities

We examine the impact of the EXIM shutdown across firms based on their export opportunities. In particular, we construct a measure of firms' export opportunities that is exogenous to their own characteristics, and we sort firms according to this measure. The first measure of industry-level export dynamism is based on overall US export patterns that likely capture the industries and markets that our firms are in. However, there may be a concern that exports from the US reflect American firms' productivity rather than pure potential demand for certain products. We therefore also implement a classic approach that constructs this measure only using exports from countries similar to US in terms of economic development.[44] Export dynamics from these countries predict export dynamics of the US well: a panel regression at the industry-year level of export growth

43. This would happen if beneficiary firms are simply less productive than other firms, which could make exporting infeasible for these unproductive firms without EXIM credit. If this was widespread, shutting down EXIM could increase overall efficiency. This argument is one of the classic costs attributed to industrial policies, where the policy is wasteful because it only aids the preservation of low-quality firms. For recent reviews of this literature, see for instance Lane (2020), Juhász, Lane, and Rodrik (2023), and Juhász and Steinwender (2023).

44. The list of countries we use is the same as in Autor, Dorn, and Hanson (2013) and Hombert and Matray (2018) and includes Australia, Denmark, Finland, Germany, Japan, Spain and Switzerland. We operationalize this procedure by measuring exports of the US and other developed countries at the product level from BACI, which is a harmonized version of the universe of bilateral trade flows similar to Comtrade. We use the 6-digit Harmonized System vintage 2002 definition of a product, and we map these products into SIC codes by using the crosswalk used in Autor, Dorn, and Hanson (2013) and adapted for Compustat in Hombert and Matray (2018). One limitation of this method is that we must restrict ourselves to manufacturing firms, as these crosswalks always map trade product classifications into manufacturing industry codes.

from the US on export growth from these other countries has a point estimate of .4 and a F-test of 40.

Unlike the other analyses along dimensions of firm heterogeneity, which are based on sorting firms according to ex-ante measures of their characteristics, by construction this exercise sorts firms according to plausibly exogenous export demand shocks that are independent from EXIM's shutdown. Firms with higher export demand shocks will have higher demand for financing, and at a given cost of capital, a higher likelihood of having a positive NPV project. Therefore, if private capital markets are able to meet the financing needs of these productive firms, we would expect that their contraction in sales will be relatively lower than the sales of firms with low demand shocks.[45]

Table 8 reports the results of this analysis. We focus on global sales as the outcome variable, although results are similar for other firm outcomes like capital, labor, and assets. In column 1, we first replicate our baseline result for the subset of manufacturing firms and find the same point estimate as before. In column 2, we interact the $EXIM \times Post$ term with an indicator variable that equals one if the firm is in an industry in which US export opportunities are above the sample median. In column 3, we use the same interaction but use the exports from non-US developed countries to measure export opportunities. In both cases, we include EXIM $\times$ Year fixed effects such that the $EXIM \times Post$ term is no longer estimated, and we compare firms with different export opportunities within the group of EXIM beneficiaries.

The coefficient of interest, the triple interaction $EXIM \times Post \times Export\ Opportunities$, captures the outcomes of firms that have high export opportunities relative to those that do not within the group of EXIM-dependent firms. Whether we proxy for export opportunities using US exports (column 2) or exports from other countries (column 3), we find that the decline in global sales is much larger for EXIM-dependent firms operating in industries with higher export opportunities relative to EXIM-supported firms operating

45. As in the other analyses that use within-treatment variation, the empirical design allows us to absorb any effects due to EXIM dependency in the first place.

in a market with lower export opportunities, and this decline is of similar magnitudes whether we use US exports (23% in column 2) or total exports from other developed countries (28% in column 3).

These additional negative effects indicate that EXIM-dependent firms that faced a positive demand shock had an even larger decline in sales compared to the non-EXIM-dependent firms with that same shock. These effects indicate that losing EXIM support led to an even greater tightening of financial constraints, especially among firms with the most profitable export opportunities. These heterogeneous effects are the opposite of what would be expected if the private sector were able to adequately provide credit for profitable projects, and they support our interpretation that EXIM support did not just sustain firms in sluggish markets.

6.2 Misallocation

To study whether EXIM benefited more efficient or inefficient firms and how its shutdown affected the reallocation of inputs across listed firms, we follow the approach in Bau and Matray (2023) and Matray (2023) and sort firms according to their level of marginal return to capital (MRPK).

We use the fact that under the assumption that firms' production functions are Cobb-Douglas, a firm's MRPK is equal to $MRPK = \frac{\partial Revenue_{it}}{\partial K_{it}} = \alpha_j^k \frac{Revenue_{it}}{K_{it}}$. Provided that all firms in a group share the same α_j^k, $\frac{Revenue_{it}}{K_{it}}$ is a within-group measure of MRPK. To determine whether firms had a high or low MRPK prior to the reform, we average each firm's values of MRPK over 2010–2014, and split values along the median within a (4-digit) industry cell.

Table 9 shows the results for global sales and capital. We report the outcomes when we split the regression (columns 1, 2, 4, 5) or estimate the triple interaction (columns 3 and 6) and control for EXIM $\times$ Year fixed effects. We find that firms with higher ex-ante MRPK are much more affected by the shutdown of EXIM relative to low MRPK

Table 8: Does EXIM Support Unprofitable Trade?

Dependent variable	Global sales		
Proxy for export opportunities		US exports	Other countries exports
	(1)	(2)	(3)
EXIM×Post	-0.13***		
	(0.041)		
EXIM×Post×Export opportunities		-0.23***	-0.28***
		(0.088)	(0.089)
Fixed Effects (not interacted)			
Firm	✓	—	—
Destinations×Year	✓	—	—
Industry×Year	✓	—	—
EXIM×Year	—	✓	✓
Fixed Effects (interacted)			
Firm	—	✓	✓
Destinations×Year	—	✓	✓
Industry×Year	—	✓	✓
Observations	12,281	11,319	11,308

This table reports the estimated effects of EXIM's shutdown on firms' global sales. The dependent variable is the change of a firm's global sales relative to its value in 2014, $Global\ sales_t$ / $Global\ sales_{t=2014}$. *EXIM* is a dummy variable that equals 1 if the firm received EXIM trade financing support over 2010–2014. Destination fixed effects refer to a vector of dummy variables for a firm's top ten export destinations over the period 2010–2014 based on data from Hoberg and Moon (2017). Export opportunities is computed by using the growth rate of total export in the industry the firm belongs to. Total exports are measured from BACI at the HS level, and matched to manufacturing firms, which explains why the sample is smaller. In column 2, we use exports from the US. In column 3, we use exports from other developed countries: Australia, Denmark, Finland, Germany, Japan, Spain and Switzerland. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

firms, with global sales dropping by 16% (column 3) and capital going down by 21% (column 6). The fact that capital goes down more for high MRPK firms in particular implies that the reallocation of capital across firms deteriorates among listed firms and that misallocation increases after EXIM's shutdown. While we cannot speak to the effect on aggregate productivity, as we are not able to observe the universe of firms, our results do not support the notion that EXIM's supply of trade financing initially produced an inefficient allocation of resources across publicly traded firms.

Table 9: Does EXIM Support Inefficient Firms?

Dependent variable	Global sales			Capital		
Sample	Low	High	All	Low	High	All
	(1)	(2)	(3)	(4)	(5)	(6)
EXIM×Post	-0.064	-0.22***		-0.044	-0.25***	
	(0.054)	(0.060)		(0.055)	(0.067)	
EXIM×Post×MRPK			-0.16**			-0.21**
			(0.081)			(0.087)
Fixed Effects (not interacted)						
Firm	✓	✓	—	✓	✓	—
Destinations×Year	✓	✓	—	✓	✓	—
Industry×Year	✓	✓	—	✓	✓	—
EXIM×Year	—	—	✓	—	—	✓
Fixed Effects (interacted)						
Firm	—	—	✓	—	—	✓
Destinations×Year	—	—	✓	—	—	✓
Industry×Year	—	—	✓	—	—	✓
Observations	14,108	11,131	25,239	14,028	10,942	24,970

This table reports the estimated effects of EXIM's shutdown on firms' global sales and capital. The dependent variable is the change of a firm's global sales or capital relative to its value in 2014, namely $Outcome_t$ / $Outcome_{t=2014}$. *EXIM* is a dummy variable that equals 1 if the firm received EXIM trade financing support over 2010–2014. Destination fixed effects refer to a vector of dummy variables for a firm's top ten export destinations over the period 2010–2014 based on data from Hoberg and Moon (2017). *MRPK* is defined as average revenues over physical capital between 2010 and 2014 and firms are sorted along their 4-digit SIC median. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

6.3 Aggregate Exports

A final question is whether the EXIM shutdown led to an overall reduction in export activities, or simply affected which firms export. If the support of EXIM is able to create additional exports for the US, we should observe that, in the aggregate, US exports went down after the shutdown. If instead EXIM support merely lowers the marginal costs of the supported US firms at the expense of other US firms, aggregate exports would not change, despite the negative effects we document at the firm level.

To address this question, we use aggregate export data at the HS-6 digit-by-country of destination level from BACI for the US and estimate the following specification:

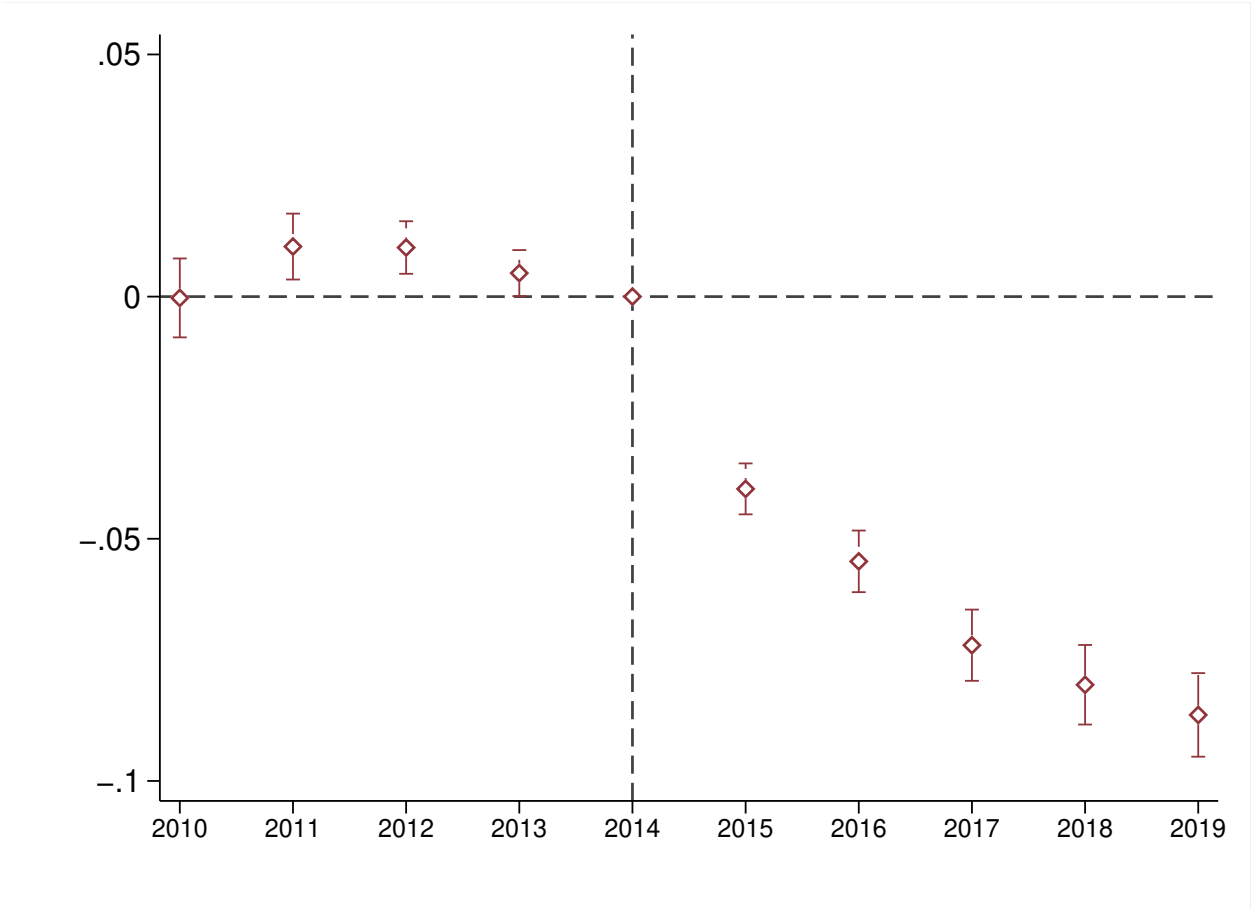
$$Y_{p,d,t} = \beta \, EXIM_p \times Post_{t \geq 2015} + \alpha_{p,d} + \gamma_{d,t} + \varepsilon_{p,d,t} \tag{4}$$

where $Y_{p,d,t}$ is the growht of export in a product p, to a destination country d, at time t relative to its value in 2014, and $\alpha_{p,d}$ and $\gamma_{d,t}$ are product-by-destination country fixed effects and destination country-by-time fixed effects. $\gamma_{d,t}$ controls for unobserved demand shocks at the country level, and ensures that the coefficient of interest β is estimated by comparing two HS products sold in the same country. The treatment intensity EXIM_p in this case is the same definition as for Table 6, and is a dummy that equals one if the HS code is in the top quintile of EXIM intensity (EXIM loans scaled by exports prior to the EXIM shutdown).

We report the results of an event study version in Figure 4, where we plot the yearly point estimate and the 95% confidence intervals. We find patterns that are extremely similar to the results at the firm level in Figure 3. The point estimates cannot be exactly compared since, in the firm level regressions, treated firms are exactly treated while when we aggregate at the product level, by definition not all firms benefited from EXIM's support prior to the agency's shutdown. Nonetheless, the similar patterns suggest EXIM *created* trade rather than *divested* it. In terms of magnitude, the estimates imply that more

exposed sectors experienced a contraction of their exports by around 7%. This result is consistent with the idea that EXIM mostly affects firms because it is able to alleviate financing frictions that prevented constrained firms to export in the first place. It is also consistent with the idea that in our setting, EXIM had relatively limited distortions within industries, since any reallocation of export market shares across US firms after EXIM's shutdown was limited enough for there to be aggregate effects on the industry level.

Figure 4: Aggregate Product Level Export



This figure reports estimates on the effect of EXIM's shutdown on aggregate export at the (6-digit) HS-by-destination level taken from BACI. The dependent variable is the change of total exports to country d for HS product p relative to its value in 2014, namely $Total\ exports_{p,d,t}$ / $Total\ exports_{p,d,t=2014}$. Treated products are products with an EXIM intensity (EXIM support in dollars scaled by total exports) prior to the shutdown in the top quintile of the sample distribution. The point estimate and 95% confidence interval are estimated from the event study version of equation (4) with product-destination and destination-year fixed effects. Standard errors are clustered at the product level.

7 Conclusion

Can governments boost exports by providing targeted trade financing? The results in this paper, based on the natural experiment of EXIM's lapse of authorization, suggests that the answer is yes. When EXIM's sudden closure cut off the exporters it previously supported, they saw a 18% drop in global sales, driven by lower exports, and cut back their capital and employment. These effects are particularly pronounced for financially constrained firms or export products that are more homogeneous and financing-intensive, and resulted in lower total exports of US industries more dependent on EXIM support.

Taken together, the effects of the EXIM lapse we document are broadly inconsistent with a pure rent-seeking explanation. While the affected firms shrank considerably, this effect was more (not less) pronounced for firms that were plausibly more productive before the shock and had more promising export opportunities. We also find no evidence that the profitability of firms cut off from subsidies decreased over and above the reduction in firm size, which is inconsistent with these firms pocketing artificially high rates of profits through subsidies beforehand.

The positive effect of EXIM on US export prior to its shutdown speaks to a renewed debate on the circumstances in which industrial policy can be successful in supporting the domestic economy (e.g., Juhász, Lane, Oehlsen, and Pérez, 2022). Nonetheless, we think it is necessary to be cautious in the generalization of our results.

First, EXIM support mostly provides on trade financing, but export credit agencies can provide more direct export subsidies, the effect of which might be more distortive. Second, while we find that, if anything, EXIM seems to be able to reduce capital misallocation among listed firms, we do not observe the universe of the US economy and we cannot rule out increase misallocation for private firms. Third, our research design cannot, by construction, answer the question of the general equilibrium effect of the existence of EXIM both for the US economy, and more generally for the world allocation. While we

can claim that EXIM support created new markets for US firms instead of just reallocating export market shares across firms, as evidence by the decline of total exports at the industry level, we cannot say much about the optimal allocation of resources across industries. In addition, while trade is created for US firms, we do not know whether at the world level, this corresponds to a reallocation of export market shares across countries or a net creation.

Understanding better how our microestimates add up at the macro level represents a fruitful avenue for future work.

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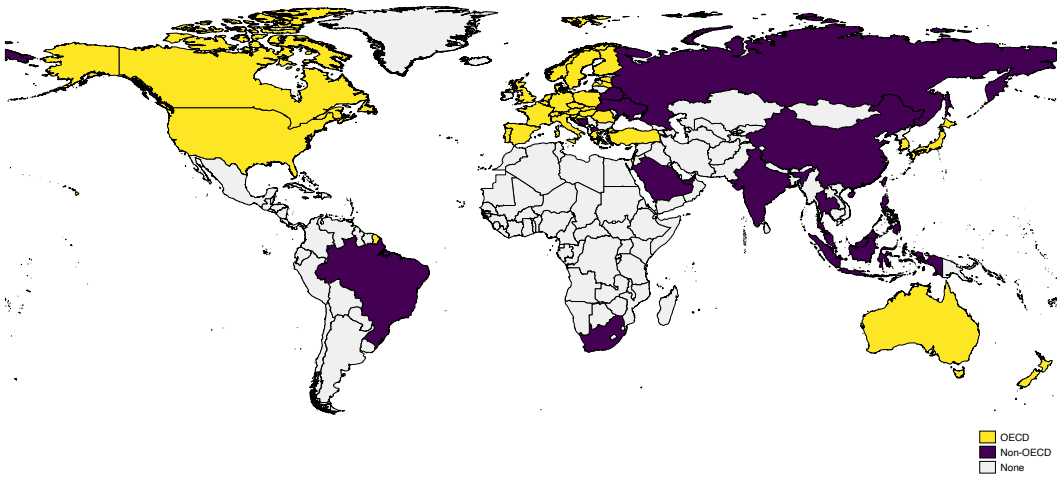
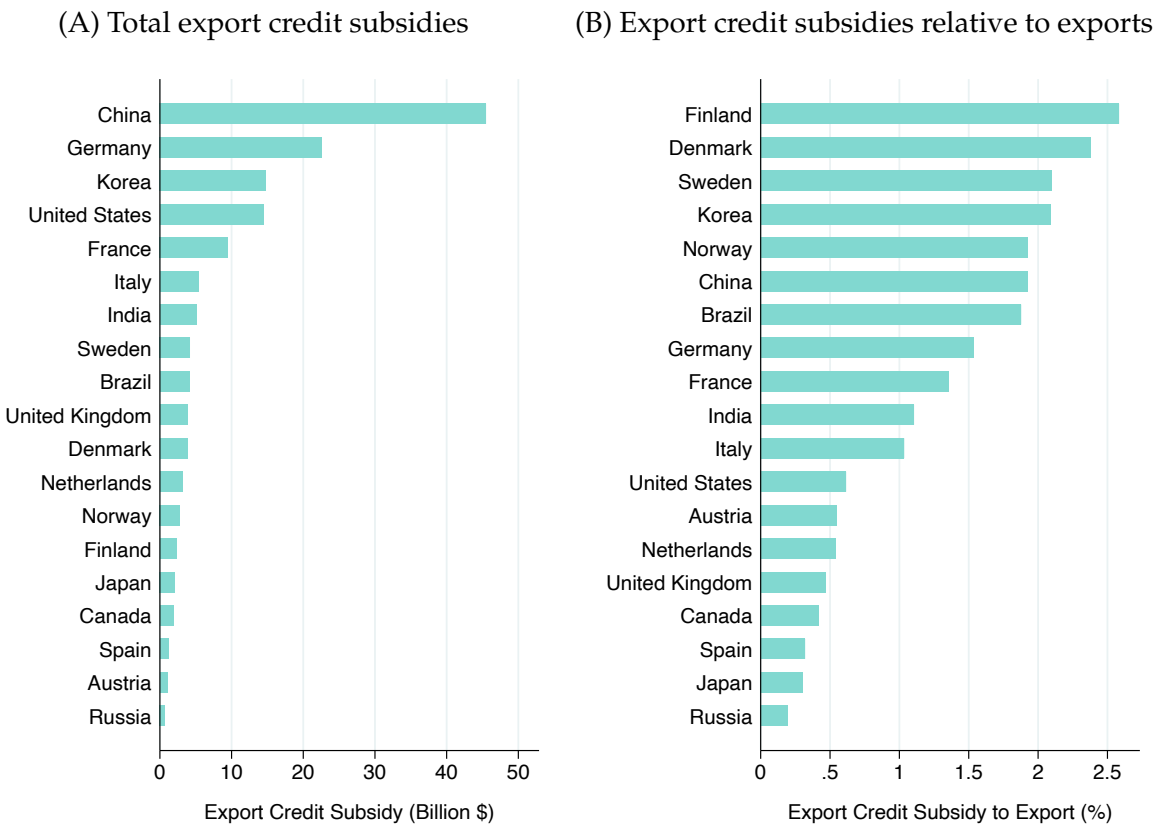
Appendix

Figure A.1: Export Credit Agencies Around The World



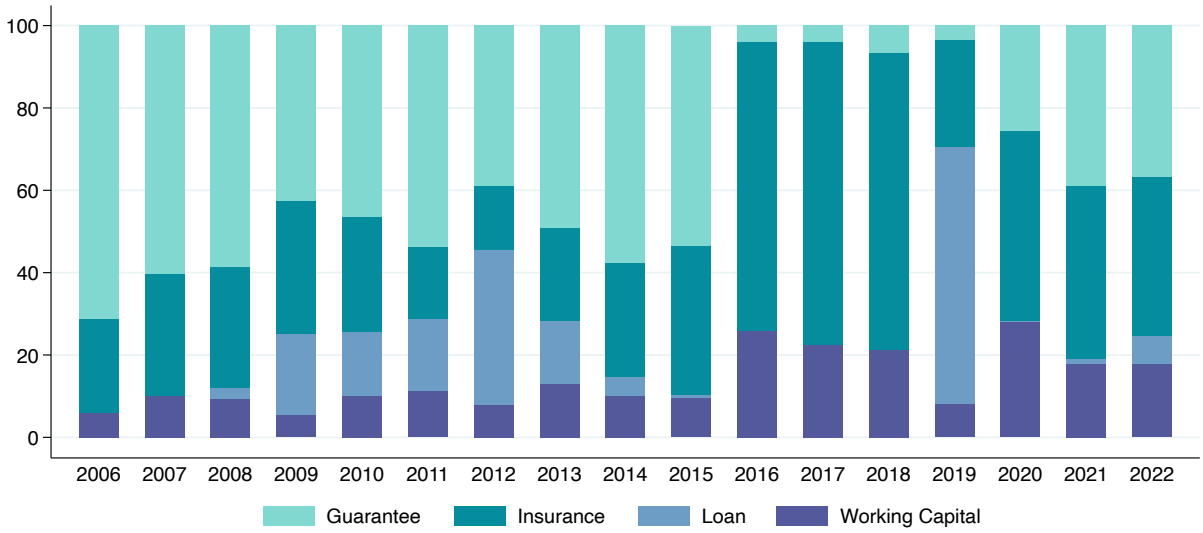
This figure shows the prevalence of Export Credit Agencies around the world using information from the U.S. Export-Import Bank's 2013 competitiveness report.

Figure A.2: Export Credit Subsidies, by Country



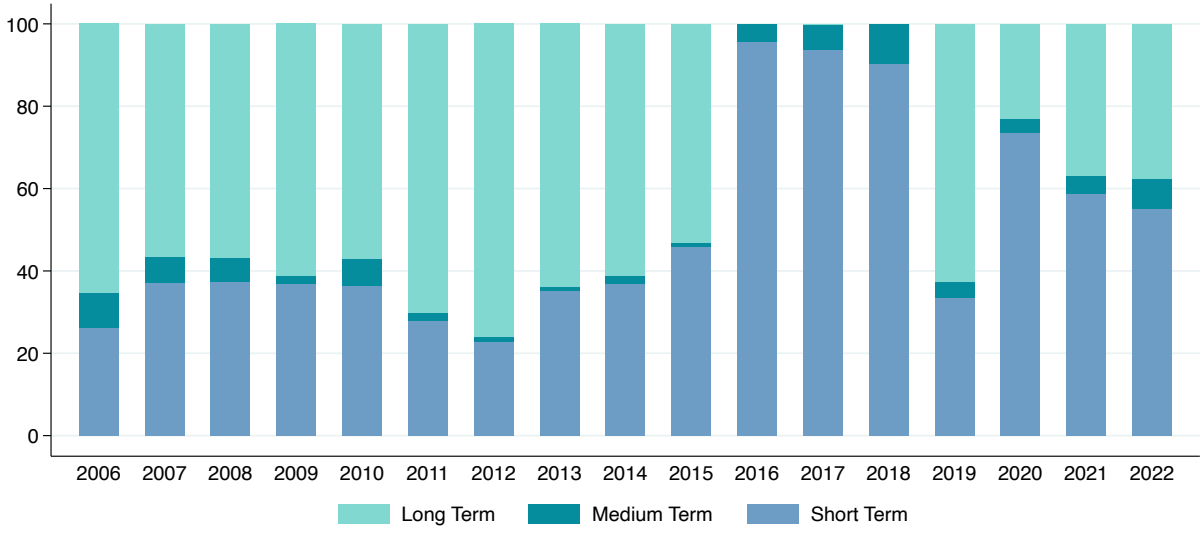
These figures document the extent to which different countries use export credit subsidies. Panel (A) plots the official medium to long-term credit amount under the OECD arrangement, collected from EXIM's competitiveness report in 2013. Panel (B) plots credit subsidies relative to export volumes in 2013, where export data is taken from the World Bank's World Development Indicators.

Figure A.3: EXIM Breakdown By Programs



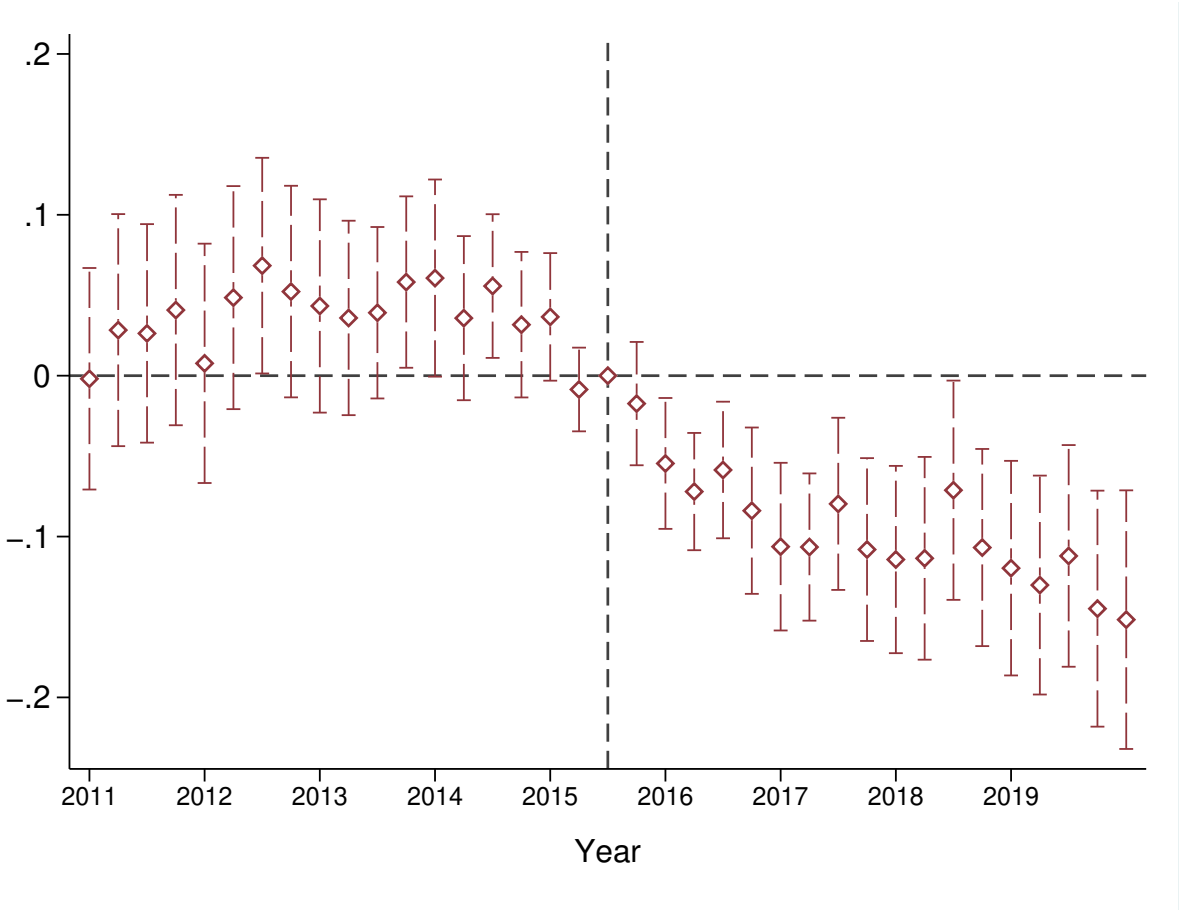
This figure plots the share of different EXIM programs over time.

Figure A.4: EXIM Breakdown By Maturities



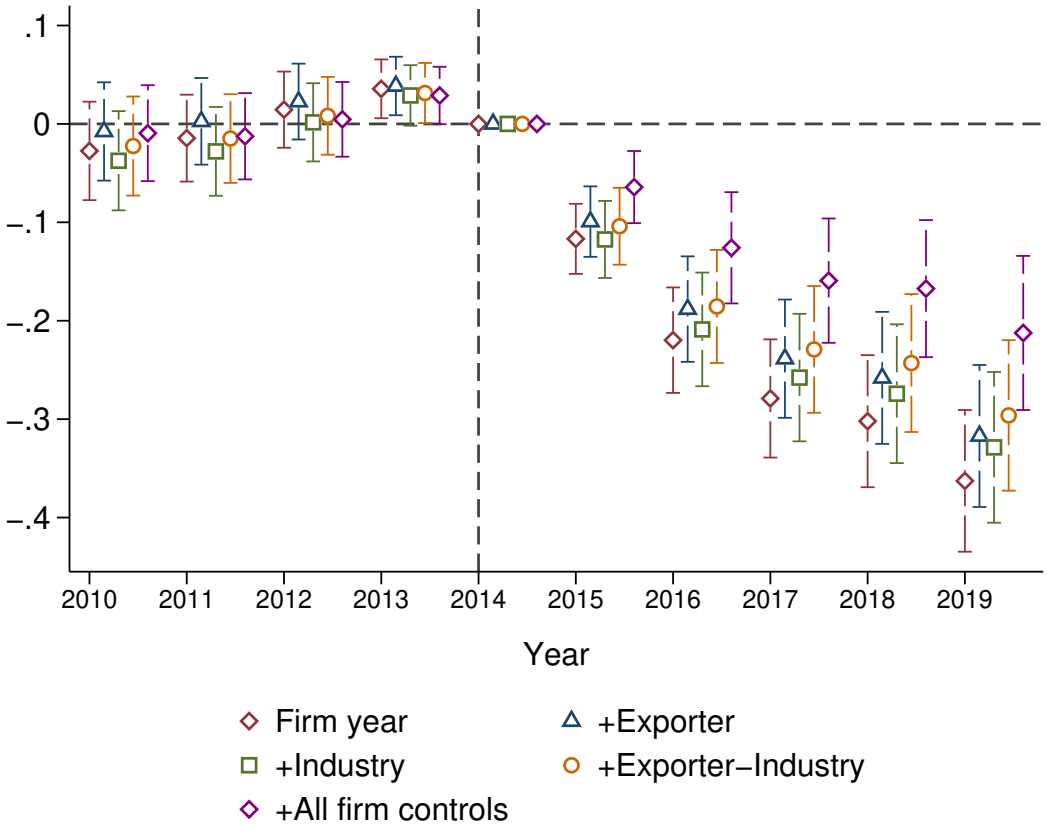
This figure plots the share of EXIM-supported loans of different maturities over time.

Figure A.5: EXIM's Shutdown and Firm Global Sales – Quarterly Event Study



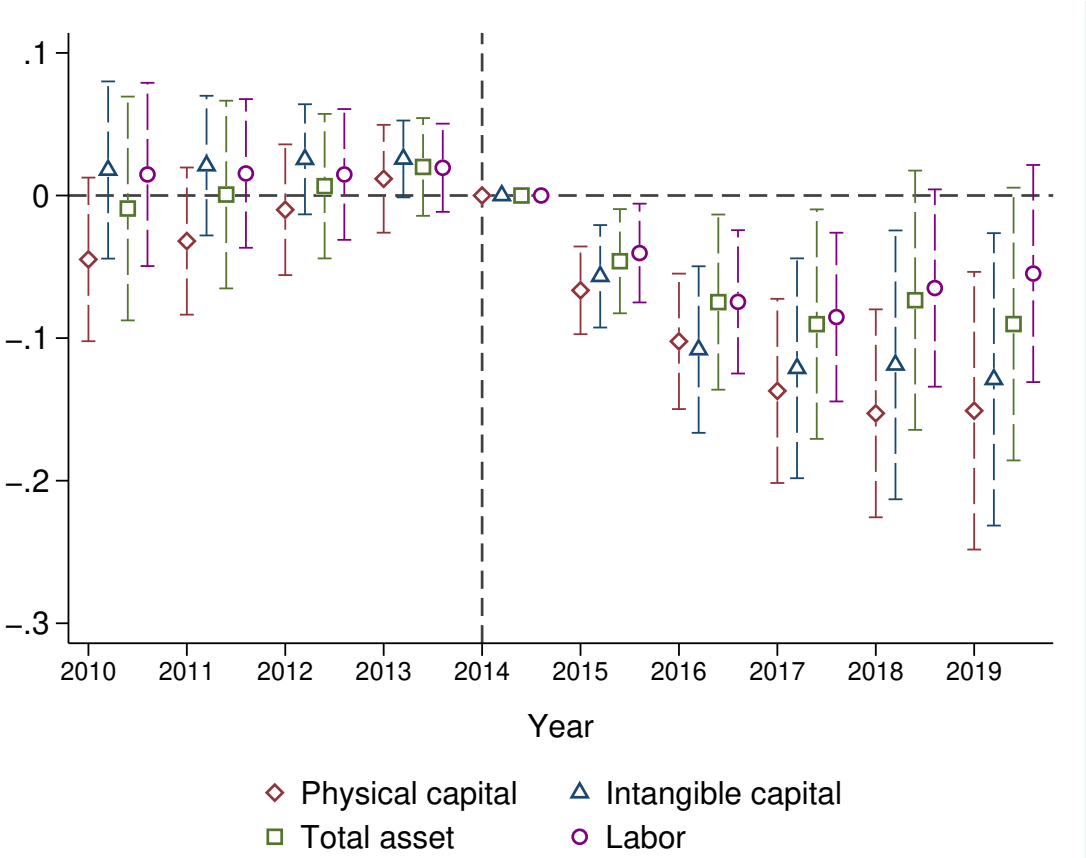
This figure plots the estimated effect of EXIM's shutdown on quarterly firm sales, estimated using a quarterly version of equation 1. Treated firms are those that were supported by an EXIM-subsidized loan at any point before the lapse in EXIM's authorization on July 1st, 2015. The second quarter of 2015 is the omitted date. The sample period is 2010 to 2019. Standard errors clustered by firm and we plot 95% confidence intervals.

Figure A.6: EXIM's Shutdown and Global Sales: Multiple Specifications



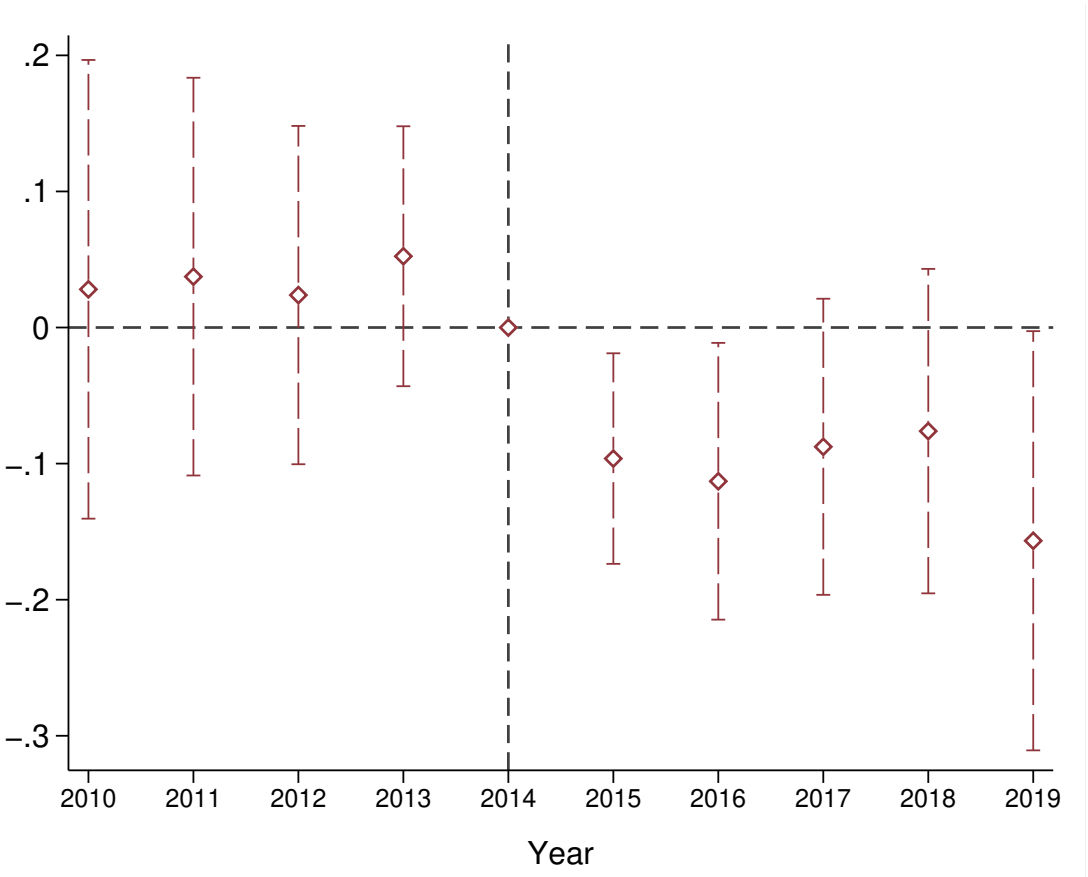
This figure shows the point estimates and 95% confidence intervals when estimating the event study version of equation (1) and progressively include more stringent sets of fixed effects. Destination fixed effects refer to a vector of dummy variables for a firm's top ten export destinations over the period 2010–2014 based on data from Hoberg and Moon (2017). "All firm controls" includes quintiles of total assets, ROA, and firm leverage averaged over 2010–2014, interacted with year dummies. Standard errors are clustered at the firm level.

Figure A.7: EXIM's Shutdown and Other Firm Outcomes



This figure plots the average sales of control and treated groups, indexed to 1 if the firm received EXIM trade financing support over 2010–2014. The figure reports the point estimate and 95% confidence interval when estimating the event study version of equation (1) with industry-by-year and destinations-by-year fixed effects for the following outcomes: physical capital, intangible capital (using the measure of Peters and Taylor (2017)), total assets, and employment. Standard errors are clustered at the firm level.

Figure A.8: EXIM's Shutdown and Firm Foreign Sales



The figure reports the point estimate and 95% confidence interval when estimating the event study version of equation (1) with industry-by-year and destinations-by-year fixed effects for foreign sales as measured in Compustat Segment. Standard errors are clustered at the firm level.

Table A.1: EXIM's Shutdown and Firm Global Sales: Different Industry Definition

Dependent variable	Global sales			
	(1)	(2)	(3)	(4)
EXIM×Post	-0.17***	-0.16***	-0.13***	-0.15***
	(0.039)	(0.040)	(0.042)	(0.049)
Fixed Effects				
Firm	✓	✓	✓	✓
Destinations×Year	✓	✓	✓	✓
Industry (1-digit)×Year	✓	—	—	—
Industry (2-digit)×Year	—	✓	—	—
Industry (3-digit)×Year	—	—	✓	—
Industry (4-digit)×Year	—	—	—	✓
Observations	28,286	28,286	28,286	28,286

This table reports the estimated effect of EXIM's shutdown on firms' global sales. The dependent variable is the change of a firm's global sales relative to its value in 2014, $\textit{Global sales}_t$ / $\textit{Global sales}_{t=2014}$. Post_t is a dummy variable equal to 1 for the years 2015 to 2019, and 0 otherwise. *EXIM* is a dummy variable that equals 1 if the firm received EXIM trade financing support over 2010–2014. Destination fixed effects refer to a vector of dummy variables for a firm's top ten export destinations over the period 2010–2014 based on data from Hoberg and Moon (2017). Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A.2: EXIM's Shutdown and Firm Global Sales: Different Winsorization

Dependent variable	Global sales					
Winsorization	1%	2%	3%	4%	5%	10%
	(1)	(2)	(3)	(4)	(5)	(6)
EXIM×Post	-0.24***	-0.20***	-0.19***	-0.18***	-0.18***	-0.15***
	(0.067)	(0.048)	(0.043)	(0.040)	(0.037)	(0.027)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Industry×Year	✓	✓	✓	✓	✓	✓
Destinations×Year	✓	✓	✓	✓	✓	✓
Observations	28,386	28,386	28,386	28,386	28,386	28,386

This table reports the estimated effect of EXIM's shutdown on firms' global sales. The dependent variable is the change of a firm's global sales relative to its value in 2014, $\textit{Global sales}_t$ / $\textit{Global sales}_{t=2014}$. Post_t is a dummy variable equal to 1 for the years 2015 to 2019, and 0 otherwise. *EXIM* is a dummy variable that equals 1 if the firm received EXIM trade financing support over 2010–2014. Destination fixed effects refer to a vector of dummy variables for a firm's top ten export destinations over the period 2010–2014 based on data from Hoberg and Moon (2017). Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A.3: Firm Maritime Exports: Different Measures

Dataset	Datamyne		
Dependent variable	Δ TEUS	Δ MT	Δ Containers
	(1)	(2)	(3)
EXIM×Post	-0.31**	-0.31**	-0.33**
	(0.15)	(0.15)	(0.15)
Fixed Effects			
Industry×Post	✓	✓	✓
Product×Post	✓	✓	✓
Destination country×Post	✓	✓	✓
Observations	126,938	128,577	126,939

This table reports the estimated effect of EXIM's shutdown on maritime exports using different measures of exports shipped. In all cases, data are collapsed into an average "pre" ($t \leq 2014$) and average "post" ($t > 2014$) period, and the dependent variables are defined as the midpoint growth rate $g_i^X = [(X_{i,t} + X_{i,t-1}) \times 0.5]$. We estimate equation (2). Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A.4: Firm Maritime Exports: Different Product Level

Dataset	Datamyne		
Product level	2 digit	4 digit	6 digit
	(1)	(2)	(3)
EXIM×Post	-0.41***	-0.37**	-0.31**
	(0.15)	(0.15)	(0.15)
Fixed Effects			
Industry×Post	✓	✓	✓
Product×Post	✓	✓	✓
Destination country×Post	✓	✓	✓
Observations	40,137	85,375	126,938

This table reports the estimated effect of EXIM's shutdown on maritime exports at the destination×product, using different levels of aggregation for the product level. In all cases, data are collapsed into an average "pre" ($t \leq 2014$) and average "post" ($t > 2014$) periods, and each dependent variable is defined as the midpoint growth rate $g_i^X = [(X_{i,t} + X_{i,t-1}) \times 0.5]$. We estimate equation (2). Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.