# EXIM's Exit: Industrial Policy, Export Credit Agencies, and Capital Allocation*

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**Abstract**

We study the role of Export Credit Agencies—the predominant tool of modern industrial policy—on exports and firm investment by using the effective shutdown of the Export-Import Bank of the United States (EXIM) from 2015–2019 as a natural experiment. We document sizable real effects of the shutdown: a \$1 reduction in EXIM trade financing reduces exports by approximately \$4.50. EXIM-dependent firms experience a contraction in total revenues, investment, and employment. EXIM's shutdown has the largest effects for exporters facing financing frictions and selling to markets with high contractual frictions, indicating a plausible underprovision of trade financing by private financial institutions. Consistent with these findings, we find that the shutdown increased the misallocation of capital because it particularly affected firms with a higher ex-ante marginal revenue product of capital. Our results provide a framework for the conditions under which Export Credit Agencies can boost exports and firm growth, and can act as a tool of industrial policy without distorting the allocation of resources in the economy.

The paper has been certified as "Perfectly Reproducible" by CASCaD.

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# 1 Introduction

Export Credit Agencies (henceforth "ECAs") are public or semi-public institutions that aim to promote exports and ultimately to stimulate the domestic economy by providing exporters with trade financing. These institutions are ubiquitous, operating in over one hundred countries that generate more than 92% of global trade. They are the predominant tool of industrial policy worldwide, especially for advanced economies with well-developed financial markets (Juhász, Lane, Oehlsen and Pérez, 2022). Despite their importance for financing trade, however, there is limited evidence on how these institutions affect firm behavior and the allocation of resources in the economy.

The role of ECAs in shaping the real economy has been the subject of a heated policy debate. The economic rationale in favor of ECAs is that exporting provides growth opportunities for productive firms, but market imperfections in cross-border financing constrain these firms to remain below their optimal size. By offsetting these frictions, ECAs can theoretically enable productive domestic firms to increase exports and investment, and thus spur economic growth.[1] However, as government institutions, ECAs face risks of regulatory capture. A more critical view thus holds that ECAs often provide inframarginal financing to firms that would have secured funding from the private sector anyway, resulting in a pure "profit windfall" for the beneficiaries. Moreover, even if ECAs are successful at boosting exports, they may do so by directing capital toward less productive firms, thereby distorting the allocation of capital in the economy.

In this paper, we study the causal effect of ECAs using a unique natural experiment: the temporary shutdown of the Export-Import Bank of the United States (EXIM) between 2015 and 2019. Our analysis draws on a comprehensive administrative dataset that records all of EXIM's financial support, including direct loans, loan guarantees, and insurance of foreign receivables, allowing us to precisely measure firm- and product-level exposure to EXIM. During the shutdown, the total value of EXIM's support for exporting activities collapsed by 84% relative to prior years. Because firms and industries differed in their reliance on EXIM, we can compare the evolution of their outcomes before and after to identify the impact of EXIM's shutdown on exports, revenues and investment using a difference-in-differences empirical design. By studying the distributional effects of the shutdown in the cross-section of firms, we are also able to estimate how EXIM affects the (mis)allocation of capital in the economy.

In the first part of the paper, we assess whether EXIM achieves its primary policy objective of increasing the export of US products. Using bilateral customs data, which records the value of exports disaggregated by product and destination country, we estimate the effect of EXIM's

[1] The Export-Import Bank of the United States (EXIM), for example, states in its official mandate that it seeks to promote jobs and investment in the US "*by facilitating the export of US goods and services [...] when private sector lenders are unable or unwilling to provide financing.*"

shutdown net of market share reallocation among US firms. Accounting for such reallocation allows us to test whether ECA support merely enables some firms to increase their market share at the expense of other domestic firms, or if it boosts overall exports, which could have a positive effect on economic growth.

Our empirical strategy compares changes in US exports of products that had received EXIM support with those that had not, and also compares these exports with those of the same products sold by other developed countries to the same destination. Using this within-product, across-exporter variation in EXIM dependence means that we can account for changes in demand specific to a destination-product pair as well as changes in supply specific to an exporting country. Importantly, we do not need to assume that the exports of all products would have evolved similarly in the absence of the shutdown. Nor do we require a random allocation of EXIM financing across products, or randomness in the timing of the shutdown itself. Instead, our identifying assumption is that there were no US-specific product-level shocks correlated with EXIM exposure that occurred exactly at precisely the same time as the shutdown.

We find that the shutdown led to a large relative decline in US exports of EXIM-dependent products. Our estimates suggest that for every \$1 decrease in EXIM support, export sales fall by around \$4.5. This magnitude is consistent with the financing-intensive nature of cross-border trade transactions. For instance, a typical estimate is that \$1 of exports requires $\$0.20 - 0.25$ of working capital, implying a multiplier of 4-5.

Several pieces of evidence support the interpretation that our estimates capture the causal effect of the shutdown rather than a correlation with a general contraction of US exports in EXIM-supported products starting in 2015. First, the shutdown was arguably not driven by economic considerations, but rather by the Tea Party's political strategy of systematically blocking President Obama's policies and nominations in Congress. Second, we do not observe differential pre-existing trends, and the reduction in the exports of affected products starts precisely after the shutdown midway in 2015, persisting all the way through 2019. As such, any concurrent shock would have had to occur exactly at the time of EXIM's shutdown. Third, our results are robust to the inclusion of product-by-year, destination-by-year, and product-by-destination-by-year fixed effects, indicating that they cannot be explained by differential exposure to demand or supply shocks correlated with the ex-ante intensity of EXIM trade financing. Fourth, the distribution of our point estimates is tightly concentrated around the baseline estimates when we exclude individual industries, implying that our effects are not due to specific industries such as transportation, or those that might have been affected by the 2018 "trade war" with China. Finally, as we discuss below, our results also hold in a firm-level analysis where we can directly control for US-specific industry and product shocks, which relaxes the identifying assumptions we require to hold at the industry-level.

While the results above show that EXIM support boosts overall US exports, EXIM's shutdown could still have limited negative or even positive effects on the US economy for two reasons. First, EXIM-backed firms may be able to partially compensate for their export market losses with domestic sales. Second, if EXIM increases the misallocation of capital across firms in the economy such that there is a reduction in aggregate TFP, these additional costs could outweigh any potential benefit of EXIM support.

To better understand the impact of EXIM's shutdown on firms, we draw on transaction-level data of US firms' maritime exports, for which we observe individual products and destination countries. We classify firms as EXIM-dependent if they had received support prior to the 2014 shutdown. Econometrically, the firm-level analysis of bilateral exports allows us to use firm-level variation within US industries and to control for US-specific product and destination shocks. This firm-by-product-by-destination level analysis thus relaxes the identifying assumption in our aggregate bilateral trade analysis that EXIM's shutdown is uncorrelated with unobserved US-industry-specific shocks. We find similar magnitudes to the industry-level analysis, consistent with a limited role of EXIM in simply reallocating market share across US exporters.

Having shown the direct effects of EXIM on firm-level exports, we next turn to understanding the impact on the domestic economy by studying the behavior of publicly listed firms, which generate the majority of exporting activity.We find that EXIM's shutdown reduced the total revenues of EXIM-backed exporting firms by an average of 12% relative to non-supported exporting firms. These estimates remain quantitatively similar and statistically significant after including additional firm-level controls such as firms' lobbying behavior, ex-ante profitability, leverage, and size. As additional robustness checks, we show that the results are unchanged if we exclude the top recipients of EXIM financing, individual industries, or industries that rely on government contracts in general. We find similar effects when we restrict our sample to firms that had obtained large loans requiring board approval, which EXIM could not authorize due to lack of board quorum. The latter analysis further tightens the empirical strategy by using variation in the type of support *within* the set of EXIM-financed firms. Using quarterly data, we also find that the effects materialize exactly after the shutdown begins in June 2015.

Given the magnitude of EXIM's shutdown on firm exports and overall sales, we calculate a positive pass-through from export losses to domestic sales of 3–7%, indicating that firms were unable to offset export losses in domestic markets. Instead, the positive pass-through is consistent with models of within-firm scope and scale (e.g., Ding, 2024), which can arise from financing frictions and internal capital markets (e.g., Stein, 1997; Lamont, 1997).

Following the loss in revenues experienced by EXIM-dependent firms, we next trace out how these firms adjust their investment and hiring. We find that EXIM-financed firms see a relative contraction of -14% and -10% in capital and labor, respectively. In conjunction, our results provide causal evidence that EXIM support affects real activity for both the average firm and industry.

In the second part of the paper, we turn to understanding the channels underlying the effect of EXIM on firms and trade flows. Guided by the institutional details of EXIM's operations, we show that the effects of the shutdown are concentrated along two dimensions. First, firms that are ex-ante financially constrained experience the largest losses in revenues and investment, consistent with EXIM's mandate stipulating it should support export transactions for which the private sector provides inadequate funding. Second, exports contract more when trade with the destination countries subject to higher contractual frictions, for instance because of a limited rule of law (e.g., Nunn, 2007), higher perceived country risk (e.g., Hassan, Schreger, Schwedeler and Tahoun, 2023), or higher financing constraints due to limited financial development. These empirical findings indicate that alternative sources of financing are particularly difficult to obtain for export transactions that are subject to higher financing and destination-specific frictions.

In the final part of the paper, we systematically estimate the allocative effects of the shutdown by using an empirical framework that draws on the misallocation literature, in which frictions may distort the allocation of capital across firms. In this framework, a policy that reduces financing frictions improves the economy's allocative efficiency if it redirects capital toward firms with a higher ex-ante marginal revenue product of capital (henceforth "MRPK"). In particular, we follow the methodology of Bau and Matray (2023), which links changes in misallocation to within-firm changes in investment across high and low MRPK firms. Measuring MRPK using a variety of methods, including those in Hsieh and Klenow (2009) and Baqaee and Farhi (2019*a*), we consistently find that the cut in EXIM's financing particularly affects the investment of high MRPK firms, while low MRPK firms exhibit minimal or no changes in investment behavior. These results indicate that EXIM's shutdown *increased* capital misallocation. While these findings speak only to changes in misallocation among publicly listed firms, these firms receive much of EXIM's financing and contribute to a large share of aggregate output.

The heterogeneous responses of high- and low-MRPK firms also speak to two important dimensions of the ECA debate. First, the limited investment response among low-MRPK firms—which are typically less financially constrained—indicates that ECA support does not mechanically translate into higher growth, and in fact aligns with concerns that such financing can be inframarginal. Second, because the effect of EXIM's shutdown is concentrated among firms with high MRPK, where capital is most productive, our findings suggest that ECA support could help to overcome genuine barriers to the efficient allocation of capital.

Our evidence naturally raises the question of why the private sector did not finance the exports that ended up receiving EXIM support, and why it did not extend such financing during EXIM's shutdown. We argue that such funding gaps can emerge for two reasons. First, fundamental frictions like asymmetric information and incomplete contracts—which are considerable in cross-border trade finance—can lead profit-maximizing private banks to optimally constrain quantities in order to satisfy incentive compatibility constraints. Second, the specialized nature of international trade finance creates conditions in which banks may exercise market power and find it privately optimal to charge high markups and ration credit.[2] Under these conditions, credit rationing by private banks represents their privately optimal/in: equilibrium response, suggesting that the funding gaps during EXIM's shutdown were not just temporary distortions.

In contrast to the private sector, a public institution like EXIM can help to bridge funding gaps in several ways. First, as a government agency representing a major geopolitical power, it has access to additional enforcement mechanisms through international frameworks (e.g., transforming commercial claims into sovereign claims and negotiating them at the Paris Club), and it may possess superior information about country risks (e.g., through interagency cooperation). Second, and perhaps more fundamentally, even without such technological advantages, public financing can improve the allocation of capital by expanding credit supply in the presence of rationing, even when facing the same information and contractual constraints as the private sector (Bulow and Summers, 1986).[3] The key mechanism is that a government that places positive weight on social objectives—in EXIM's case, domestic employment—will optimally charge lower markups compared to purely profit-maximizing banks, thereby expanding credit access.

We conclude by discussing the role of ECAs in contributing to broader industrial policy goals. Our framework clarifies that ECAs can target social wedges in the economy while continuing to meet their own output objectives to the extent that those wedges correlate positively with firm and destination-market financing frictions. In addition, because trade financing can target specific firm-product-destination market transactions, it can be applied selectively and thus potentially minimize introducing other costly distortions.

**Related literature.** Our paper connects to several strands of the literature. First, as export credit agencies are one of the most important tools of industrial policy (Juhász, Lane, Oehlsen and Pérez, 2022), our work contributes to a growing literature that uses modern empirical methods or provides new theories on how industrial policy affects firms and economic development (e.g., Juhász, 2018; Itskhoki and Moll, 2019; Criscuolo, Martin, Overman and Van Reenen, 2019; Kantor

[2] Rysman, Townsend and Walsh (2022) and Cavalcanti, Kaboski, Martins and Santos (2023) show that even in competitive banking environments, pre-emptive behavior allows banks to exert market power to maximize profits. This behavior results in capital misallocation, as banks restrict credit despite borrowers having high returns to capital.

[3] Bulow and Summers (1986) models rationing in the context of the labor market, where employers face asymmetric information and set wages higher than the Walrasian frictionless wage, resulting in endogeneous wage differentials and excess demand. The conclusion that industrial policy is able to improve the allocation of resources by promoting employment in sectors with high constraints apply in the context of banks rather than employers as well.

and Whalley, 2019; Kim, Lee and Shin, 2021; Garin and Rothbaum, 2022; Lane, 2023; Choi and Levchenko, 2024; Lashkaripour and Lugovskyy, 2023; Ottonello, Perez and Witheridge, 2024).

We also contribute to recent work on how policies affect capital misallocation in the presence of financing frictions, which shows theoretically how these frictions lead to capital misallocation (e.g., Buera, Kaboski and Shin, 2011; Midrigan and Xu, 2014; Moll, 2014; Kehrig and Vincent, 2024), and empirically how government interventions can mitigate or amplify it (e.g., Bau and Matray, 2023; Carrillo, Donaldson, Pomeranz and Singhal, 2023; Giovanni et al., 2024).[4] Because our results point to a role of ECAs in lowering the misallocation of capital by reducing financing frictions that are specific to trade, our paper also contributes to the literature that specifically studies the connection between trade and misallocation (e.g., Khandelwal, Schott and Wei, 2013; Edmond, Midrigan and Xu, 2015; De Loecker, Goldberg, Khandelwal and Pavcnik, 2016; Brooks and Dovis, 2020; Berthou, Chung, Manova and Bragard, 2020; Finlay, 2021; Bai, Jin and Lu, 2024).

Since EXIM finances trade, we also contribute to the broader literature examining how institutions and market structure in international trade affect resource allocation (Khandelwal, Schott and Wei, 2013; Gollin, Lagakos, Ma and Mandi, 2025) and firm behavior (e.g., Bernard, Redding and Schott, 2011), particularly in the presence of policy uncertainty (e.g., Ramondo, Rappoport and Ruhl, 2013; Pierce and Schott, 2016*a*) and domestic frictions (Ramondo, Rodríguez-Clare and Saborío-Rodríguez, 2016). While this literature has mostly focused on the role of tariffs, we show that public institutions that alleviate financing frictions, such as ECAs, can also have first-order effects on economic activity in the tradable sector.[5]

Second, we relate to the literature studying the real effects of ECAs on firms. Existing work has almost entirely relied on firm-level correlations between exports and ECA credit, investigating the case studies of, among others, Germany (Felbermayr and Yalcin, 2013; Heiland and Yalcin, 2021), Austria (Badinger and Url, 2013), Pakistan (Zia, 2008; Defever, Riaño and Varela, 2020), and Korea (Hur and Yoon, 2022).[6] In contrast to these studies, the natural experiment of EXIM's shutdown 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 highlight that export credit agencies can have first-order effects on firms' investment and employment, particularly when they are financially constrained.

[4] See also the empirical literature studying how financial markets affect capital misallocation more broadly: Gopinath, Kalemli-Özcan, Karabarbounis and Villegas-Sanchez (2017), Burga and Céspedes (2021), Cingano and Hassan (2022).

[5] Recent work on the role of tariffs include Amiti, Redding and Weinstein (2019), Fajgelbaum, Goldberg, Kennedy and Khandelwal (2019), Costinot, Rodriguez-Clare and Werning (2020), Cox (2022), Antras, Fort, Gutiérrez and Tintelnot (2024), and Handley, Kamal and Monarch (2024). See also Harrison and Rodriguez-Clare (2010).

[6] Zia (2008) and Agarwal et al. (2023) are exceptions that provide causal evidence on the role of export credit programs in Pakistan and Sweden respectively. Zia (2008) finds that a Pakistani program affected publicly-listed firms' profit rates but not their investment, and that these firms were the main recipient of government support, suggesting capital misallocation due to political capture. Agarwal et al. (2023) uses a regression discontinuity design based on a marketing campaign of the Swedish ECA and finds a positive effect on exports.

A few papers also study the US EXIM bank in particular. Agarwal and Wang (2018) and Kurban (2022) use a gravity framework and the EXIM shutdown, respectively, to study whether EXIM affects exports, and reach opposite conclusions. Benmelech and Monteiro (2024) also use the EXIM shutdown as a shock to study the specific case of Boeing.[7] Relative to these papers, we make three contributions. First, we study the allocative effects of EXIM's shutdown both in the aggregate and at the firm-level under milder identifying assumptions, which allows us to provide plausible causal estimates. Second, we study how EXIM affects both the average firm and industry, and we also analyze its distributional effect and provide theoretically-grounded estimates of its impact on misallocation. Third, we develop a general framework backed by empirical evidence to assess whether ECAs can have a positive effect on aggregate output.

Finally, 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; Manova, Wei and Zhang, 2015; Demir, Michalski and Ors, 2017; Xu, 2022; Beaumont and Lenoir, 2023; Friedrich and Zator, 2023; Bruno and Shin, 2023), and how banking networks can affect trade patterns (Michalski and Ors, 2012; Niepmann and Schmidt-Eisenlohr, 2017*a*,*b*; Xu and Yang, 2024).[8]

Our paper contributes to this literature in two ways. First, we identify the effect of a shock to credit supply specific to exports separately from a broader effect of changes in financing conditions that would affect firm production in general, and thus indirectly also its exporting behavior. Second, our context focuses on the role of government-backed export credit and assesses both its impact on average firm outcomes as well as the allocation of capital.

## 2 Institutional Context and Theory

This section discusses the importance of financing for export sales and the role of export credit agencies in supplying trade financing. We provide an overview of the activities of the Export-Import Bank of the United States (EXIM) and its shutdown from 2015–2019. We also discuss a framework for how ECA financing impacts firm export decisions.

[7] Our empirical results are quantitatively identical when we remove Boeing from the analysis.

[8] An earlier literature has used variation in external finance dependence as in Rajan and Zingales (1998) to study the role of different institutions or sources of financing on export patterns, for instance by exploiting country level shocks such as equity market liberalization (Manova, 2008) or variation in a country's financial development (Chan and Manova, 2015). For surveys of this literature, see Foley and Manova (2015) and Leibovici, Szkup and Kohn (2022). Models of how financing frictions and financial development can affect international trade include Manova (2013), Caggese and Cuñat (2013), Chaney (2016), and Leibovici (2021).

## 2.1 Financing Needs of Trade

Export transactions involve distant counterparties operating in different legal jurisdictions, which creates two distinct financial challenges for exporters. First, firms must finance extended working capital needs arising from the significantly longer delay between the time they pay for their inputs and the time they receive payment from their buyers relative to domestic transactions (Feenstra, Li and Yu, 2013). Second, exporters face heightened counterparty risk across different legal jurisdictions.[9] To mitigate these risks, firms rely on specialized financial instruments such as export credit insurance, factoring, and receivables financing, which effectively transform invoiced exports into secured financial instruments.

While cash-rich exporters can self-finance and self-insure their transactions, doing so exposes them to the potentially high costs of holding cash reserves and to significant trade-related risks. As a result, even firms with internal liquidity may prefer to access external trade financing in order to avoid accumulating unproductive cash reserves and to offload counterparty and political risks. Financial institutions play a critical role by providing not only capital, but also risk mitigation through export credit insurance and other instruments that protect against international trade risks including price volatility, currency fluctuations, and political instability.

**Frictional markets.** With access to complete and frictionless financial markets, exporters can finance and insure all profitable opportunities and invest optimally based on their productivity. However, financially constrained exporters must operate at suboptimal scale because they cannot fully cover working capital requirements or adequately insure against international cash-flow risks (Rampini and Viswanathan, 2010).

Three frictions are particularly relevant for financing and insuring international trade, and can lead to market gaps. First, *firm-specific frictions* stem from asymmetric information between lenders and borrowers (e.g., Stiglitz and Weiss, 1981; Holmstrom and Tirole, 1997) and incomplete contracts that restrict firms' ability to credibly pledge future cash flows (Banerjee and Newman, 1993). These informational and contractual limitations lead banks to ration credit as a profit-maximizing strategy, since restricting loan quantities helps to manage default risk by maintaining incentive compatibility. The resulting underprovision of financing particularly affects firms with limited collateral or credit history, creating significant financing constraints.

Second, *destination-specific frictions* characterize cross-border transactions due to exacerbated information asymmetries and contractual uncertainties with foreign counterparties. These frictions intensify when transactions involve partners in countries with weak institutions or unfamiliar legal frameworks. Financial institutions respond by imposing stricter credit limits for exports to these

[9] Counterparty risk is inherent regardless of payment terms: buyers risk non-delivery after prepayment; sellers risk non-payment after shipping. Schmidt-Eisenlohr (2013) and Antras and Foley (2015) provide theoretical frameworks for these contractual frictions and their implications for trade financing.

destinations, generating additional financing constraints that impede otherwise economically viable international transactions.

Third, *market power* in international finance enables financial institutions to impose markups that artificially constrain credit and insurance availability. This market power derives from the substantial fixed costs of establishing international operations, including developing correspondent banking networks, acquiring market-specific expertise, and implementing complex cross-border compliance systems.[10] These significant entry barriers produce concentrated banking markets where profit-maximizing behavior results in restricted credit supply and elevated pricing compared to competitive market conditions.

Any one of these three frictions—contractual limitations, informational barriers, and bank market power—would generate systematic underprovision of export financing, forcing exporters to artificially constrain investment below the optimal level dictated by their productivity (Manova, 2013). This financing gap also likely results in a misallocation of capital among exporting firms, skewing the distribution of capital toward financially unconstrained firms with lower MRPK (Chaney, 2016).

## 2.2 Export Credit Agencies

The existence of frictions in the private market for trade financing provides a theoretical justification for Export Credit Agencies (ECAs). These government-backed institutions are mandated to support domestic exporters and overseas investments by providing financial services that commercial lenders are unwilling or unable to offer due to political, commercial, or country risks. Appendix D.1 provides more details on these organizations, including a complete list of ECAs and the history of their establishment.

**Role and tools of ECAs.** ECAs relax the constraints on financing exports through two primary types of products: loans and insurance.

- Loans: These predominantly take two forms: direct loans and loan guarantees. Direct loans address capital needs by providing financing directly from the ECA. Loan guarantees involve commercial banks, with the ECA assuming default risk. This reduces the bank's exposure, enabling lower interest rates or broader access to credit.

- Insurance: Export credit insurance protects exporters against non-payment by foreign buyers due to commercial risks (such as buyer default, insolvency, or payment delays) and politi-

[10] Market power in international finance typically exceeds that in domestic lending markets due to the specialized investments required. Banks need established correspondent relationships or foreign subsidiaries, detailed knowledge of counterparties' credit and legal environments, and compliance systems for international regulations that impose additional due diligence requirements. Default scenarios involve costly cross-border enforcement proceedings. These high, heterogeneous fixed costs naturally create concentrated markets dominated by a few large institutions, as documented empirically by, among others, Niepmann and Schmidt-Eisenlohr (2017*a*) and Paravisini, Rappoport and Schnabl (2023).

cal risks. ECAs issue policies covering a specified percentage of the invoice value, thereby addressing market gaps where private insurers are reluctant to operate due to difficulties in evaluating foreign buyer creditworthiness, monitoring compliance across jurisdictions, or absorbing the high correlation of risks during economic or political crises. This insurance also transforms uncertain export receivables into secure assets that can be used as collateral to obtain additional financing from commercial lenders.

**Economic incidence of ECA funding.**

Regardless of whether financing is formally extended to the exporter or importer, ECA funding serves the same economic function: easing financial constraints that impede international trade. When exporters receive direct financing, their constraints are relaxed, enabling them to fulfill orders they otherwise would be unable to produce or deliver. When importers receive financing, they can prepay exporters, effectively transferring liquidity and reducing enforcement risks by removing the threat of default. In both cases, ECA intervention alleviates the market frictions that would otherwise block the transaction.

Operationally, ECAs predominantly structure programs so that funds flow to domestic exporters, even when the official borrower is a foreign importer. Disbursements are typically made directly to the exporter, ensuring that support reaches the intended party. This design underscores the core objective of ECAs to target domestic export activity constrained by private-sector financing gaps.

### 2.2.1 EXIM's Implementation Framework and Institutional Design

Established during the New Deal, the Export-Import Bank of the United States is the country's official export credit agency, and its mandate is to support jobs in the US by supplying export financing.[11] We highlight the main elements of EXIM that are important for our analysis here, and we provide an in-depth discussion of its institutional background in Appendix D.2.

**Market role and positioning.**

- Instruments: EXIM has four main types of instruments that fall under the broad categories of loans and insurance. Appendix D.2.2 provides detailed descriptions.

    1. Direct loans: EXIM offers direct loans, primarily for medium- to long-term financing with maturities exceeding seven years. Interest rates are set according to the OECD Commercial Interest Reference Rates (CIRRs), which are calculated monthly based on average US Treasury rates plus a margin, with separate risk premiums applied based on country risk classification.

[11] EXIM's initial mission in 1934 was to support both exports and imports. The bank subsequently focused on exports, although the name remained unchanged.

2. Working capital loan guarantees: short-term (maturity less than 1 year, fixed or floating rates) to meet operational needs at market-based rates set by participating lenders with EXIM providing guarantees on the principal and interest.
3. Loan guarantees: EXIM guarantees payment on both principal and interest in case of borrower default, which can be issued in conjunction with commercial loans.
4. Insurance against customer credit losses: EXIM guarantees payment to the exporter in case of importer default. EXIM's insurance product is unique in that it offers comprehensive coverage of *all* country risks, including the "force majeure" events that are explicitly excluded from private contracts (political risks, catastrophic events, crises). In addition, EXIM's coverage tends to have longer terms and higher coverage percentage.

For clarity, in the rest of the paper, we use the term "EXIM financing" to encompass all instruments used by EXIM to alleviate constraints faced by US exporters.

- Market segmentation: One of the key eligibility requirements is that the *firm has not secured trade financing on the private market*. This eligibility structure is designed to make EXIM a complementary financing source rather than a competitor to private financial institutions. The market segmentation precludes EXIM from "cream skimming" the market for trade financing. Instead, EXIM serves the residual demand for external finance that remains after private financial institutions have set their credit provision to maximize profits.
- Process for obtaining EXIM support: Firms seeking EXIM financing must first demonstrate that they could not secure financing from private lenders. EXIM also requires that the exported goods and services must originate and ship from the United States, and that the applicant firm must have at least three years of operating history with one full-time employee and positive net worth. EXIM then evaluates applications for credit risk before setting specific financing terms and collateral requirements for approved transactions.

**Institutional advantages.** As a US government agency, EXIM has access to capabilities for risk assessment and recovery of potential losses that the private sector does not have.

- Information and risk assessment capabilities: EXIM benefits from access to government information networks and formal risk assessment processes that may be unavailable to private lenders. EXIM is statutorily required to consult with the Departments of State and Treasury on transactions involving significant country risk, creating established channels for risk assessment.[12] It can also draw on country-specific assessments from US embassies where Foreign Commercial Service officers monitor local business conditions, institutional stability, and

[12] Since its 2019 reauthorization, EXIM has also increased its coordination with national security agencies on transactions with geopolitical implications.

contract enforcement. Finally, as a member of the Trade Promotion Coordinating Committee (TPCC), EXIM regularly exchanges information with 19 federal agencies including the Departments of Commerce, State, and Treasury. These intelligence networks and structured interagency processes provide EXIM with contextual understanding of markets and counterparties that purely commercial institutions may lack, especially in markets where public information is limited or unreliable.

- Enforcement and recovery capabilities: As an agency of the United States government, defaulting on an EXIM loan is equivalent to defaulting on the US government itself, giving EXIM access to loss recovery technologies that the private sector does not have. For example, it can convert commercial claims into sovereign obligations and participate in Paris Club negotiations for sovereign debt restructuring. It also has the ability to declare defaults on sovereign obligations and to coordinate with other government agencies to pursue claims. Legally, EXIM has standing in international courts and can pursue claims against debtor assets in foreign jurisdictions with authority to seize those assets if necessary.

**Operational constraints.** EXIM also operates under a unique set of constraints that distinguishes it from both private banks and typical government agencies.

- Fixed lending capacity: Unlike commercial banks, EXIM cannot accumulate its profits to expand activity over time. Instead, it operates under two Congressional constraints: an overall exposure limit, and annual spending limits set through the appropriations process in which Congress authorizes how much of EXIM's own revenue it can spend on operations. This Congressional oversight process means that EXIM operates with "balance sheet constraints" that reflect political budgeting decisions rather than investment opportunities or profitability.

- Profitability requirements: International organizations like the OECD and WTO as well as domestic US federal law require that EXIM operates profitably, i.e., at a price above its own marginal cost (Appendix D.1). EXIM charges interest on loans and fees on insurance and guarantees to offset the expected cost of default, the cost of borrowing from the US Treasury, and other operational expenses.[13]

  In addition, EXIM's charter specifies a strict 2% cap on its default rate.[14] The default rate is defined as the value in default (including late payments and renegotiations) relative to

[13] EXIM does not receive a subsidy on its cost of borrowing: it pays a higher interest rate to the Treasury than the 30-year Treasury bond rate, which is the US government's cost of long-term borrowing. The 30-year rate is also substantially higher than the deposit and wholesale funding rates that private banks pay to raise funds.

[14] During the Covid pandemic beginning in 2020, the default rate cap was temporarily raised to 4%, but this is outside our sample period.

total loans outstanding. Breaching the default rate cap causes the bank's operations to be immediately frozen by Congress.

As we show in more detail in Section 6.4.1, EXIM appears to have successfully operated within these constraints and returned an average annual profit of $50 million to the US government in our sample period.

**Takeaway.** EXIM is designed to fund profitable but liquidity-constrained export projects, particularly in markets in which exporters face informational or contractual frictions and where the agency's tools provide a technological advantage.[15]

### 2.2.2 The 2015 Shutdown of EXIM's Operations

Two events in July 2015 led to a significant disruption in EXIM's operations. First, on July 1st, EXIM's charter, which requires periodic re-authorization by Congress, was allowed to lapse for the first time since the agency's inception in 1934. Second, on July 20th, the Bank's board of directors lost its quorum, which was necessary for many of EXIM's activities.

The lapse in EXIM's charter was primarily caused by a political dispute in the highly polarized environment following the 2012 Presidential and 2014 midterm elections. EXIM's lack of board quorum, which lasted for much longer than the initial shutdown, was led by Republican Richard Shelby, the chair of the Senate Banking Committee, opposing all nominees for board positions during the second Obama Administration.[16]

During the four years from 2015 to 2019 when EXIM lacked a charter and board quorum, the bank's operations collapsed by 84% relative to the years prior even as applications stayed constant.[17] Figure 1 shows the change in the agency's total supply of new financing over all its different instruments.

## 2.3 Theoretical Predictions

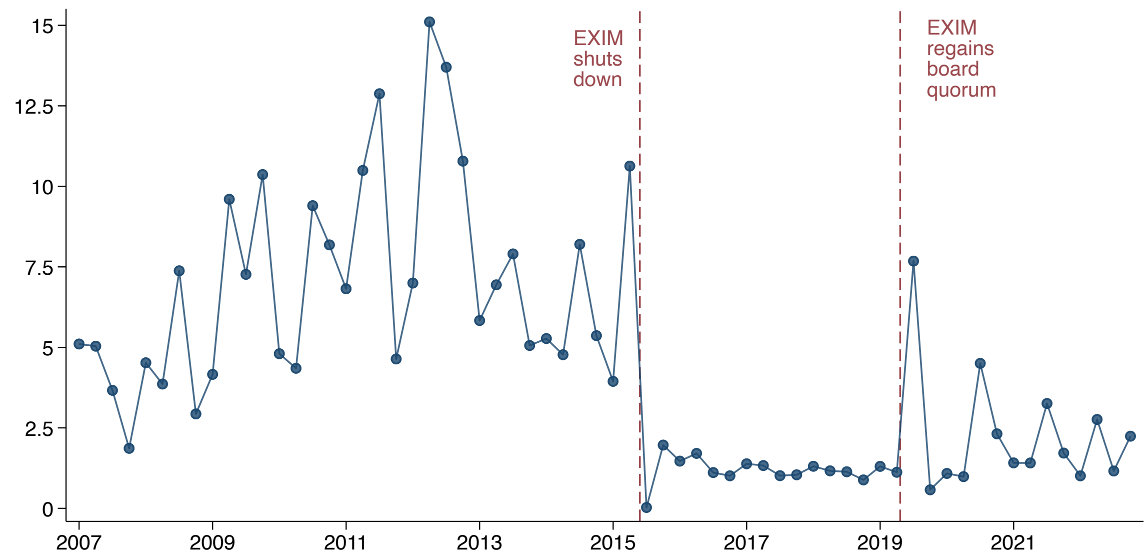
In Appendix Section D.4, we develop a one-period model in which firms maximize their profits from foreign sales by choosing their capital investment for exporting using trade financing obtained from private market and/or ECA debt. The model generates predictions on how firm investment responds to changes in the supply of trade financing from export credit agencies.

[15] We would like to thank Natalia Ramondo for suggesting this summary of EXIM's objective as financing "solvent but liquidity-constrained firms."

[16] An article in the New York Times on February 2016 described Shelby as having the "distinction of running the only committee in the Senate that has not acted on a single nominee in this Congress." https://www.nytimes.com/2016/02/24/us/politics/anxious-for-re-election-senator-richard-shelby-refuses-to-act-on-banking-nominations.html

[17] When EXIM regained its full operational status in 2019, it had accumulated $40 billion in active applications in the pipeline.

Figure 1: EXIM's Supply of Trade Financing




*Notes:* This figure plots the quarterly amount of new trade financing issued by EXIM in $ billions.

The key result is that if ECAs offer financing at a lower cost than the market, firms that are unconstrained in their access to trade financing will not expand but will instead treat the ECA financing as a windfall. In contrast, constrained firms will use ECA trade financing to expand their exporting activity until they become unconstrained. While firms' uptake of ECA financing implies that it is priced more attractively than their outside option, ECAs like EXIM can plausibly remain profitable by either operating more efficiently than private lenders or by charging lower markups, as discussed in Section 2.2.1.

# 3 Data and Empirical Strategy

## 3.1 Data

We use four main data sources: (1) financing authorizations by EXIM; (2) bilateral (origin-by-destination country) product-level export values; (3) firm-level maritime export transaction data (product-by-destination) from Datamyne; (4) firm-level variables from various sources including balance sheets and outcomes from Compustat.

**EXIM authorization data.** We use comprehensive records of EXIM loan authorizations and disbursements originating from 2007 to 2022, obtained from a FOIA request. These records include the date of authorization, the amount disbursed, the export product, and the exporting firm. Products are reported at the NAICS-4 level, which we convert to HS-4 using the concordances provided by Pierce and Schott (2012).

**Aggregate product export data.** We construct a panel of bilateral trade flows at the origin-destination-product-year level. We use the trade flows reported in BACI (Gaulier and Zignago, 2010), which cleans and accounts for irregularities in the raw COMTRADE bilateral trade data. We define products at the HS-6 digit level, which contains 5,047 distinct products and is the most detailed level of global product harmonization for international trade statistics, exported to 220 distinct destinations. We use a time-consistent definition of products from the 2007 vintage in order to account for updates to product classifications.

**Firm export data.** We measure exports at the firm level using data from Datamyne, a private vendor that collects and cleans maritime bills of lading.[18] Datamyne provides detailed information on individual shipments, including product codes, destination countries, and the weight of the shipped products (see Appendix C.4 for more details). We hand-match firms in Datamyne to EXIM's loan portfolio using company names combined with information on the firms' location and types of exports (see Appendix C.1 for more details).

**Firm data.** We measure outcomes for publicly listed firms incorporated and located in the US, which we observe in Compustat. We restrict our sample to non-financial, non-governmental US firms with positive assets and revenues. Publicly listed firms account for approximately half of the value of authorizations, and they generate approximately 80% of aggregate exports.[19]

We hand-match firms in Compustat to EXIM's authorizations using the firm's name, address, and industry. From Compustat, we take real outcomes such as overall firm size (total assets), employment, capital, and total sales (the sum of all domestic and foreign sales), and financial measures such as leverage and return on assets. We provide a detailed description of the cleaning and definition of the variables in Appendices C.1, C.2, and C.3.

In order to identify whether a firm is an exporter, we use four measures. First, all firms that appear in the EXIM loan database or maritime exports data are by definition exporters. Second, in Compustat's historical segment data, we flag firms that report non-domestic sales in the geographic segment data. Third, from Hoberg and Moon (2017), we identify firms that report international activities in their 10-Ks. Fourth, we flag firms that report paying taxes on foreign income.

We measure lobbying activity using LobbyView (Kim, 2018) and use the firm identifier to match this information to Compustat.

Table 1 reports descriptive statistics for the matched firm level dataset covering 2010–2019. 5.2%

[18] These data have previously been used by Cavallo, Gopinath, Neiman and Tang (2021) and Lashkaripour and Lugovskyy (2022), among others.

[19] The US Census Bureau, which collects the customs trade data, does not report separate information for publicly-listed firms. We thus infer public firms' contribution to total US exports using the following estimates: approximately 70% of listed firms (i.e., approximately 2,000 firms) are exporters, and the top 2,000 exporters in the US contribute 80% of the value of exports. Assuming that the largest exporters are also publicly listed, we arrive at our final value of 80%. A more conservative assumption that the top 500 exporters in the US are publicly listed (and *none* of the other publicly listed firms are exporters) generates a value of 60%.

of our firm-year observations are from firms that received EXIM financing before the shutdown. The average firm has revenues of \$3.9 billion; one quarter of those sales are generated abroad.

Table 1: Summary Statistics

| | Mean | Std. Dev. | p25 | Median | p75 |
|---|---|---|---|---|---|
| EXIM | 0.05 | 0.22 | 0.00 | 0.00 | 0.00 |
| Exporter | 0.73 | 0.44 | 0.00 | 1.00 | 1.00 |
| Total revenues | 3,946.31 | 17,142.27 | 49.62 | 430.18 | 2,085.41 |
| Employees | 12.29 | 56.94 | 0.16 | 1.37 | 7.08 |
| Tangible Capital | 2,720.56 | 15,032.01 | 17.93 | 172.72 | 1,040.00 |
| Intangible Capital | 2,483.42 | 11,337.79 | 43.25 | 243.15 | 1,123.51 |
| Total assets | 4,754.64 | 19,424.28 | 68.31 | 489.75 | 2,360.14 |
| Share foreign sales | 0.26 | 0.28 | 0.00 | 0.17 | 0.45 |
| MRPK | 4.28 | 5.02 | 1.14 | 2.51 | 4.91 |
| Profit margin | -0.45 | 1.58 | -0.05 | 0.06 | 0.13 |
| ROA | -0.05 | 0.29 | -0.05 | 0.06 | 0.11 |
| Dividend intensity | 0.11 | 3.26 | 0.00 | 0.00 | 0.11 |
| Leverage | 0.29 | 0.29 | 0.03 | 0.22 | 0.44 |
| Observations | 28,468 | | | | |

*Notes:* This table presents summary statistics for the main firm sample. The EXIM indicator variable takes the value of 1 if a firm was supported by an EXIM loan before the lapse in its authorization (July 1st 2015). Total revenues, Employees, Tangible Capital, Intangible Capital, and Total assets are reported in thousands. Profit margin is operating income (income before extraordinary items plus depreciation and amortization) over total revenues. ROA is EBITDA over assets. Dividend intensity is dividends over EBITDA. Leverage is long-term debt plus debt in current liabilities divided by total assets. Variables that are calculated as ratios are winsorized at the 5% level.

## 3.2 Empirical Strategy

### 3.2.1 Aggregate Exports

To assess whether EXIM generates net exports for the US, we analyze bilateral country-by-product-level data using dynamic difference-in-differences regressions of the following form:

$$\Delta^{2014} Export_{p,o,d,t} = \sum_{k=2010,k\neq 2014}^{2019} \beta_k \Big[ \; EXIM_{p,o} \times \mathbb{1}(t=k) \Big] + \gamma_{p,d,t} + \delta_{o,t} + \varepsilon_{p,o,d,t} \tag{1}$$

where the dependent variable $\Delta^{2014} Export_{p,o,d,t}$ is the percentage change in export values relative to 2014, measured at the product $p$, exporting country $o$, destination country $d$, and time $t$ level. Defining our dependent variable as a growth rate relative to 2014 (the year before the shutdown) eliminates all time-invariant differences across origin-destination countries and products, which is equivalent to first-differencing a log-level specification, and it removes the need for a unit fixed effect.[20] We cluster standard errors at the HS-4 product-level.

[20] For example, the log-levels specification with a unit fixed effect (country-product $\mu_{po}$) would take the form: $log(Export_{p,o,d,t}) = \sum_{k=2010,k\neq 2014}^{2019} \beta_k \Big[ \; EXIM_{p,o} \times \mathbb{1}(t=k) \Big] + \gamma_{p,d,t} + \delta_{o,t} + \mu_{p,o} + \varepsilon_{p,o,d,t}$. First differencing relative to the reference year 2014 eliminates the unit fixed effect: $log(Export_{p,o,d,t}) - log(Export_{p,o,d,t=2014}) = \sum_{k=2010,k\neq 2014}^{2019} \beta_k \Big[ \; EXIM_{p,o} \times \mathbb{1}(t=k) \Big] + \gamma_{p,d,t} + \delta_{o,t} + \varepsilon_{p,o,d,t}$. The dependent variable can equivalently be expressed

Our estimation includes the relevant control group of countries $o$ that have similar export patterns to the US (e.g., Autor, Dorn and Hanson, 2013; Hombert and Matray, 2017), and does not rely on EXIM support.[21] By including trade flows from these countries, we are able to tightly control for unobserved demand shocks with product-destination-year fixed effects ($\gamma_{p,d,t}$) and for exporter supply shocks with origin-year fixed effects ($\delta_{o,t}$).

EXIM dependency $EXIM_{p,o}$ is defined as the amount of EXIM trade financing a product received over 2007–2010, scaled by export flows in that product:

$$EXIM_{p,o} = \sum_{t=2007}^{2010} \sum_{i \in p} EXIM_{i,o,t} \Big/ \sum_{t=2007}^{2010} Export_{p,o,t}$$

where $i$ denotes an individual EXIM contract and $p$ denotes an HS-4 product. Since EXIM is a US institution, $EXIM_{p,o}$ is by definition always equal to zero for non-US exporters ($EXIM_{p,o} = 0$ for $o \neq US$). Figure 2 plots the distribution of treatment intensity across 3-digit industries, which shows substantial variation across sectors.

The collapse of EXIM's financing during the shutdown means that pre-shutdown cross-sectional variation in EXIM dependency ($EXIM_{p,o}$) directly captures the supply shock to each product. This measure parallels the "reduction in expected values" approach in Pierce and Schott (2016*b*). An additional attractive feature of this construction is that it is plausibly exogenous to export dynamics after 2015 that are not directly related to EXIM dependency.

The sequence of $\beta_k$ coefficients captures the percentage point difference in exports between treated and control units within each exporter-product-destination cell, relative to 2014. These coefficients therefore directly capture the policy object of interest: the impact on overall US exports by industry, net of market share reallocation between firms.

To quantify the overall magnitude of EXIM's shutdown effect on exports, we estimate a pooled regression that combines the dynamic effects:

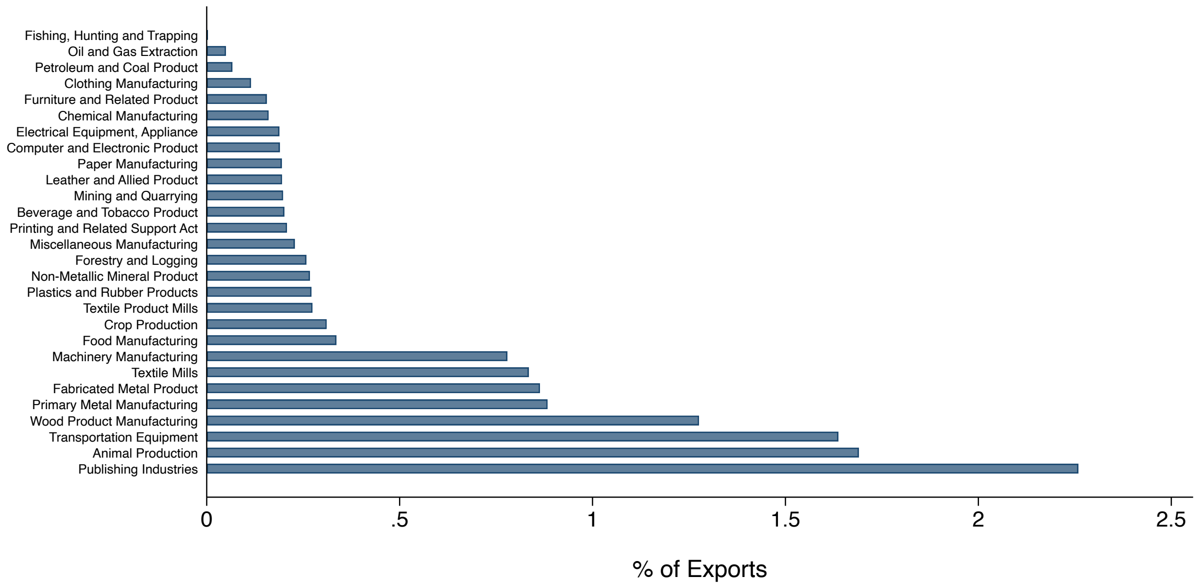
$$\Delta^{2014} Export_{p,o,d,t} = \beta EXIM_{p,o} \times Post_{t \geq 2015} + \gamma_{p,d,t} + \delta_{o,t} + \varepsilon_{p,o,d,t} \tag{2}$$

**Interpretation of the coefficient of interest.** Our treatment variable $EXIM_{p,o}$ captures the supply shock to ECA financing with the total exposure across *all* EXIM products. This approach reflects the reality that firms that were financed under one program prior to 2015 would likely have obtained financing under alternative EXIM programs if the shutdown had not occurred. These patterns of flexible and intermittent usage strengthen our identification by capturing the real-

as $log(\frac{Export_{p,o,d,t}}{Export_{p,o,d,t=2014}})$, which is a growth rate that we can abbreviate as $\Delta^{2014} Export_{p,o,d,t}$.

[21] The list of countries includes: Australia, Denmark, Finland, Germany, the UK, Japan, New Zealand, Spain, and Switzerland. Appendix Table A.1 provides robustness when we define similar countries based on their export patterns prior to 2014 by using the cosine similarity of the vector of their export market shares across product-destinations.

Figure 2: EXIM Financing Intensity By Industry (%)




*Notes:* This figure plots the intensity of EXIM support (EXIM financing in dollars scaled by US exports in dollars) at the NAICS-3 level for all industries that received at least one dollar from EXIM over the period 2007–2010. In Appendix Figure C.1, we plot the distribution at the NAICS 4-digit level, which we convert into HS-4 in our difference-in-differences estimation.

world adaptability that exporters have in accessing EXIM's instruments, and does not require us to assume that firms are constrained to accessing identical financing arrangements.[22] Thus, the interaction term $EXIM_{p,o} \times Post_{t\geq 2015}$ captures the financing loss experienced by US exporters of product $p$ in the post-shutdown period, compared to a counterfactual scenario in which EXIM had continued operating at pre-shutdown levels.

Because $EXIM_{p,o}$ and $\Delta^{2014} Export_{p,o,d,t}$ are both normalized by pre-shutdown export values, $\beta$ can be directly interpreted as *the dollar pass-through* of EXIM financing to US exports.

**Accommodating entry and exit in the trade data.** Our empirical strategy controls flexibly for unobserved demand shocks that might correlate with treatment by including product-by-destination-by-year ($\gamma_{p,d,t}$) fixed effects. However, this specification requires using annual export data disaggregated by product and destination, which exhibits substantial entry and exit. These changes on the extensive margin create zeros in the data, which raise challenges when estimating regressions in growth rates.[23]

The trade literature has therefore relied either on estimating the intensive and extensive margins separately (e.g., Roberts and Tybout, 1997), or on using non-linear count estimators like poisson

[22] While it is theoretically possible to estimate the impact of each EXIM program separately, doing so would require having as many instruments as programs. In Appendix Table A.6, we show that the estimated effects are very similar for each broad category of support (loans and insurance), although we do not interpret these as separate mechanisms given firms' tendency to substitute across programs.

[23] While transformations of the log function have been used to accommodate zeros (e.g., log(x+1) or the arcsin-log function), they can lead to biased estimates because they are sensitive to small variations around zero and are not invariant to the unit measurements for a value (Cohn, Liu and Wardlaw, 2022; Chen and Roth, 2024).

(e.g., Silva and Tenreyro, 2006). However, such estimations are unable to deliver the full elasticity (in the case of estimating results on the intensive and extensive margin separately), or they do not allow for aggregation or decomposition along different margins (in the case of non-linear estimators).

We overcome these challenges by using the methodology introduced by Beaumont, Matray and Xu (2024) that relies on value-weighted regressions in which we measure the dependent variable $\Delta^{2014}Y_{p,o,d,t}$ as a midpoint growth rate:

$$\Delta^{2014}Y_{p,o,d,t} = \frac{Y_{p,o,d,t} - Y_{p,o,d,t=2014}}{[Y_{p,o,d,t} + Y_{p,o,d,t=2014}] \times 0.5}$$

We implement this methodology by creating a balanced panel including every export market (product-destination) that is present at any point during the sample period, and we fill missing observations, which reflect changes to the extensive margin, with zero.

Beaumont, Matray and Xu (2024) shows that this methodology has two important and appealing properties: First, it captures the full causal elasticity along both intensive and extensive margins by handling entry and exit without ad hoc log transformations or non-linear estimators. Second, it ensures that the coefficients at the origin-product-destination level aggregate exactly to any higher level, as long as correct weights are used, which is not possible with non-linear functions.[24] This aggregation property makes it possible to transparently see how additional control variables at disaggregated levels impact the final aggregate estimate.[25]

**Industry-level identifying assumptions and threats to identification.** Our identifying assumption is that products that received more EXIM financing in the pre-period were not subsequently differentially exposed to unobserved shocks specific to the US that are correlated with a product's EXIM dependency, conditional on the rich set of fixed effects. This identifying assumption does not require random assignment of EXIM financing, nor does it require that products have similar characteristics in levels. Rather, we rely on the standard parallel trends assumption that outcomes for treated and control would have evolved similarly absent the shutdown.

We can visually assess the plausibility of the parallel trend assumption using event study estimates with the sequential addition of controls. The lack of differential trends prior to EXIM's shutdown would indicate that any unobserved differences correlated with EXIM financing that could be confounding our estimates must have been irrelevant before 2015 (otherwise we would observe pre-trends) and only have mattered afterwards.

A threat to identification in the baseline equation with no additional fixed effects would be that

[24] This property is made possible by weighting the regression with the denominator of the midpoint to recover the aggregate growth, or by defining weights as the share of the denominator in a higher level cell. To be precise, what we mean by "aggregate" is not the general equilibrium effect of a shock, but simply how a micro shock shows up in the overall rate at the economy-wide level.

[25] Fonseca and Matray (2024) provides a detailed explanation and an application to firm entry and exit across cities and industries.

products that receive more EXIM financing face demand shocks or changes in exporting risks when selling to specific countries. For example, a country may levy a tariff on products that receive more EXIM financing in the US. An important advantage of the bilateral product data is that it allows us to control for such confounders (which would be absorbed by $\gamma_{p,d,t}$) on a granular level, so that we only compare the exports of the same HS-6 product to the same destination at the same time. Differences in the estimated $\beta$ with and without these controls are informative about the extent to which such unobserved demand shocks might bias the estimates.

The remaining threat to identification is an unobserved shock to US products that correlates with EXIM exposure and occurs exactly when EXIM shuts down. Examples of such shocks would be a tariff that is levied specifically on US products but not on the same product from other developed countries, or a change in ECA financing from the other developed countries used in our control groups that is not caused by EXIM's shutdown, but which still correlates with the distribution of US products receiving EXIM financing. It is worth noting, however, that our estimates remain causally valid even if other countries adjust their ECA financing in response to EXIM's shutdown (e.g., through strategic competition). In that case, $\beta$ captures the total causal effect of EXIM's shutdown operating through two channels: the direct effect of tightening US exporters' financial constraints, and the indirect effect of inducing strategic responses from foreign competitors.

Including a US-product-by-year fixed effect would relax the identifying assumption and allow us to capture the first direct impact of EXIM's shutdown. While that is not possible with country-product data, because our treatment varies by US-product-by-year, the firm-level bilateral exports analysis that we outline next uses firm-level exposure and thus creates variation in EXIM dependence within a given product. We can therefore fully saturate the specification with exporter-by-product-by-destination-by-year ($\zeta_{p,o,d,t}$) fixed effects and absorb all unobserved demand shocks that are specific to US exporters. In our analysis of overall firm-level effects, we can similarly include US industry-by-year fixed effects.

### 3.2.2 Firm-level Effects

At the firm level, we estimate event study regressions of the following form:

$$\Delta Y_{i,j,t} = \sum_{k=2010, k\neq 2014}^{2019} \beta_k \Big[ \ EXIM_i \times \mathbb{1}(t=k) \Big] + \gamma_{j,t} + Exporter_{i,t_0} \times \delta_t + X_{i,t_0} \times \delta_t + \varepsilon_{i,j,t} \tag{3}$$

where $\Delta Y_{i,j,t}$ is the growth rate of various firm outcomes for firm $i$ in industry $j$ at time $t$ relative to the year 2014.[26] $EXIM_i$ is an indicator variable that takes the value of one if firm $i$ received

[26] At the firm level, we do not need to accommodate entry and exit so we use a standard growth rate defined as

support from EXIM during the pre-shutdown period. $\beta_k$ captures the yearly semi-elasticity of firm outcomes to the supply of EXIM trade financing. It is estimated by comparing outcomes for firms that relied on EXIM financing relative to firms that did not each year relative to 2014.

The standard difference-in-difference is estimated using the following specification:

$$\Delta Y_{i,j,t} = \beta EXIM_i \times Post_t + \gamma_{j,t} + Exporter_{i,t_0} \times \delta_t + X_{i,t_0} \times \delta_t + \varepsilon_{i,j,t} \quad (4)$$

As in equation (1), we do not include time invariant unit fixed effects (firms in this case) because the dependent variables are measured in differences. This strategy ensures that we remove time-invariant heterogeneity across firms, which accounts for possible ex-ante differences in characteristics between treated and control firms. Industry-by-year fixed effects $\gamma_{j,t}$ restrict the identifying variation to comparing firms within the same industry each period and controls for time-varying unobserved heterogeneity across US industries, such as differences in industry cycles or shocks correlated with industry-level EXIM exposure.

$Exporter_{i,t_0}$ is an indicator variable that takes the value of one if firm $i$ reported positive EXIM trade financing, foreign sales in Compustat Segment, international activity in their 10-Ks, exports in Datamyne, or taxable foreign income over the pre-shutdown period. $Exporter_{i,t_0} \times \delta_t$ restricts the identifying variation to exporting firms that would be eligible for EXIM financing and are exposed to similar worldwide aggregate demand shocks. Because this vector of fixed effect ensures that EXIM-dependent exporters are compared to a set of non-dependent exporters, the identifying variation is the same as that from dropping firms that were not exporting prior to 2015 from the sample.[27] $X_{i,t_0} \times \delta_t$ is a vector of firm characteristics defined prior to 2015, where each characteristic is separately interacted with year fixed effects. We cluster standard errors at the level of the shock, which is at the firm-level.

Figure 3 shows that treated and control firms are very similar along most observable dimensions. We plot the average (normalized) differences and confidence intervals at the 95% and 99% levels for various observable ex-ante characteristics. These differences are estimated unconditionally, conditional on exporter fixed effects, and conditional on industry and exporter fixed effects.

Unconditionally, treated and control firms are different, which is to be expected given that, by definition, only exporters are eligible for EXIM support. Once we include exporter fixed effects, the difference between treated and control firms for most variables is statistically insignificant at conventional levels (the red bars), with the exception of total revenues. Including industry fixed effects, as we do in our baseline specification, yields point estimates for the standardized differences

$(Y_{i,t}$-$Y_{i,2014})/Y_{i,2014}$. All growth rates are winsorized at the 5% level. We show the results are very similar when we use the midpoint growth rate and when we winsorize outliers in different ways in Appendix Table A.8.

[27]We report this exercise in column 5 of Table 4 and show the point estimate and standard error are the same as when we use the full sample.

that are almost equal to zero (the blue bars) and are well below the threshold for covariate balance of 0.20 recommended by Imbens and Rubin (2015).

Along the remaining significantly different dimension of firm size, treated and control firms still share a large overlap, which ensures that effects can be identified across firms of similar size. In addition, treated and control firms are similar in terms of their share of foreign sales and financing frictions proxied by their leverage and dividends intensity (defined as dividends over EBITDA). They also have similar growth rates of their sales and investment intensity (both in terms of physical investment and R&D), and they have similar ROA.

**Firm-level identifying assumptions and threats to identification.** Our identifying assumption is that there is no unobserved shock to EXIM-supported firms, conditional on the rich set of controls, that would impact their outcomes after 2015. As before, we do not need random assignment for EXIM support nor similarity in levels between EXIM-backed and non-backed firms.

Our firm-level data also allow us to use a *quarterly* frequency to test whether the EXIM shutdown began to affect firms precisely in mid-2015, which help to alleviate the concern that unobserved correlated shocks may particularly affect EXIM-dependent firms.

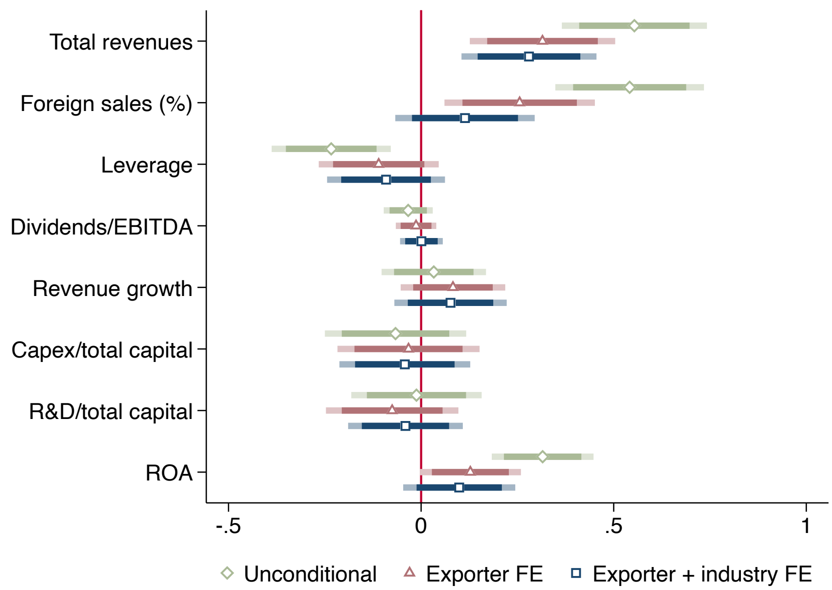
Including additional control variables, such as firms being in the same industry-geography and a battery of firm characteristics (size, balance sheet metrics, lobbying activities, government contract dependency) interacted with time fixed effects, absorbs the impact of unobserved shocks correlated with these characteristics. For example, including total asset tercile-by-year fixed effects ensures that our coefficient of interest $\beta$ is not driven by differences in time-varying unobserved shocks affecting firms of different sizes, effectively matching firms within comparable size categories. Similarly, controlling for lobbying behavior matches firms with similar political engagement, ensuring that the estimated effects are not attributable to shocks to the value of political connections.

Our approach of controlling flexibly for observable characteristics acts similarly to propensity score matching, but with notable advantages: it maintains transparency, preserves the full sample without dropping observations, and accommodates non-parametric relationships between covariates and outcomes rather than imposing linearity assumptions typical in matching methods.

# 4 Average Effects of EXIM's Shutdown

Our first set of results examines whether EXIM trade financing creates US exports. In the aggregate, we find that EXIM's exit led to a sizable decline in exports of products that received more financing prior to the shutdown. We then trace out how this contraction in foreign sales affected firm exports, total revenues, investment, and hiring decisions. We find that the shutdown had sizable negative impacts on these real outcomes, indicating that EXIM financing matters at the margin.

Figure 3: Firm Covariate Balance




*Notes:* This figure shows coefficient estimates and 95% (darker bars) and 99% (lighter bars) confidence intervals 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, and ratios are winsorized at the 5% level. "Unconditional" refers to the sample comparing treated firms to all untreated firms without conditioning on any fixed effects. "Exporter" indicates that the firm has either received EXIM support, reported foreign sales in Compustat Segment, has international activity in its 10-Ks, has positive exports in Datamyne, or reports taxable foreign income. "Industry" is defined at the SIC2 level. Leverage is defined as total debt over assets, revenue growth is the computed over 2010–2014, ROA is defined as EBITDA over assets, total capital is computed as the sum of property, plants and equipments and intangible capital measured by Peters and Taylor (2017).

## 4.1 Average Effects on Exports

We begin by estimating equation (2) at various levels of aggregation. We weigh the regressions using the value of the denominator of the midpoint growth rate in the origin-product (HS-4)-year cell in order to capture the effect of EXIM's shutdown on aggregate exports by product.[28]

Table 2 reports the results. Columns 1–3 demonstrate the aggregation property of the estimator developed in Beaumont, Matray and Xu (2024) and show that the estimated $\beta$ recovers exactly the same point estimate and standard errors whether we work at the origin $\times$ (HS-4) product level, the origin $\times$ (HS-6) product level, or at the origin $\times$ (HS-6) product $\times$ destination level, as long as we include the same set of fixed effects, weight the regressions appropriately, and cluster standard errors correctly.[29] The value of -4.49 means that a \$1 change in EXIM trade financing generates a

[28] Due to the granularity of the distribution of export values, the law of large numbers may no longer apply, which creates an inference problem when using such weighting (see a discussion of this general problem for the broader applied macro literature in Chodorow-Reich (2020)). We address this issue by winsorizing the extreme values of the weights at 5%, and we report the robustness of the results when we equal weight the data, winsorize at 1%, or use time-invariant weights in Appendix Table A.2.

[29] The number of observations reflects the increasing granularity of the data. Weights are computed in the following way: Define $A_{o,p,d,t} = (Y_{o,p,d,t} + Y_{o,p,d,t=pre}) \times 0.5$. At the origin×HS-6×destination×year, each cell is weighted by: $A_{o,hs6,t} \Big/ \left( \sum_{hs6 \in [o,hs4,t]} A_{o,hs6,t} \right)$, which guarantees that the equation provides an equal weighting at the origin×HS-4×year level. We then multiply this weight by $A_{o,p=hs4,t}$ to preserve the definition of $\beta$ as measuring the effect of EXIM on aggregate exports.

change of -\$4.49 in total US exports at the product level.

Column 4 adds (HS-6) product $\times$ year fixed effects while column 5 adds (HS-6) product $\times$ destination $\times$ year fixed effects. In this last case, we identify the effect of EXIM's shutdown by comparing different origin countries exporting exactly the same finely classified product to the same country at the same time. The point estimate is stable and if anything slightly larger and more significant after controlling for market (destination-product) specific shocks (-4.49 in column 1 vs -5.13 in column 5). The stability in the point estimates imply that the exposure to EXIM is uncorrelated with demand shocks and with product, destination, and product-by-destination specific risk shifters.

In column 6, we replace the continuous measure of EXIM exposure with a discretized measure, which allows us to weaken the identifying assumption behind our D-i-D by (i) no longer assuming constant linear dose responses (Callaway and Sant'Anna, 2021), and by (ii) eliminating the impact of outliers in treatment values. We use 0.45% as a threshold, which approximately corresponds to the top quartile of EXIM exposure in the distribution across US products.

The coefficient -0.061 indicates that EXIM's shutdown reduces exports of products highly exposed to EXIM funding relative to less exposed products by 6.1%. The average EXIM support for the group of products with exposure above 0.45% is approximately 1%, which implies an effect of -6.2 (-6.1%/1%). Econometrically, the similarity in magnitude with our estimate of -5.13 (column 5) means that the assumption of a linear effect of the dosage treatment is reasonable, but if anything underestimates the true effect of the effect of EXIM's shutdown on total exports.

In Figure 4, we plot the yearly point estimates and the 95% confidence intervals of the annual event study from (1). We find an absence of differential pre-trends prior to the shock, and a progressive decline throughout the period of EXIM's shutdown, with only a slight reduction in the gap in the last year, when EXIM regains its full status.

The primary threat to identification is that demand shocks are exporter-by-product specific (i.e., at the level of $\zeta_{p,o,t}$), in which case the time-varying product-by-destination ($\gamma_{p,d,t}$) shocks that we account for would be insufficient. However, such a demand shock is unlikely to explain our results for several reasons. First, the "tariff war" between China and the US did not begin until 2018, well after the exports of EXIM-dependent products began to decline (Figure 4). Second, in Appendix Figure B.1 we plot the distribution of point estimates and t-stats from a series of 173 distinct regressions where we remove each 3-digit product individually. The tight distribution of point estimates around the average effect in Table 2 implies that the results are not driven by a few products that may have been simultaneously affected by shocks and EXIM's shutdown. Third, our firm-level evidence in Section 4.2 directly addresses such concerns by studying the effect of EXIM *within* US exporters shipping the same product to the same destination (Table 3).

Table 2: Impact on US Product Exports

| *Dependent variable* | Exports | | | | | |
|---|---|---|---|---|---|---|
| *Level of aggregation* | HS-4 | HS-6 | HS-6×Destination | HS-6×Destination | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $\text{EXIM}_{p,o} \times \text{Post}_t$ | -4.49 | -4.49 | -4.49 | -4.20 | -5.13 | |
| | (1.60) | (1.60) | (1.60) | (1.67) | (2.28) | |
| | [0.0050] | [0.0050] | [0.0050] | [0.012] | [0.024] | |
| $\text{EXIM}_{p,o} \geq 0.45\% \times \text{Post}_t$ | | | | | | -0.061 |
| | | | | | | (0.019) |
| | | | | | | [0.0017] |
| *Fixed Effects* | | | | | | |
| Origin×Year | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Product (HS-4)×Year | ✓ | ✓ | ✓ | — | — | — |
| Product (HS-6)×Year | — | — | — | ✓ | — | — |
| Product (HS-6)×Destination×Year | — | — | — | — | ✓ | ✓ |
| Observations | 109,208 | 8,541,850 | 24,143,761 | 24,143,761 | 24,143,761 | 24,143,761 |

*Notes:* This table reports estimates on the effect of EXIM's shutdown on aggregate exports at the product-by-destination level taken from BACI. The dependent variable is the exports growth rate of origin country $o$ (exporter) to destination country $d$ (importer) of product $p$ at time $t$ relative to 2014 (the year prior to the shock), and is defined as $\Delta Y_{p,o,d,t} = (Y_{p,o,d,t} - Y_{p,o,d,2014})/[(Y_{p,o,d,t} + Y_{p,o,d,2014}) \times 0.5]$. The sample includes a control group of other exporter countries $o$ with similar export patterns as the US. EXIM intensity ($\text{EXIM}_{po}$) in columns 1-5 is defined as the total amount of EXIM (in \$) over total exports (in \$) over the period 2007–2010. In column 6, $\text{EXIM}_{po} \geq 0.45\%$ is an indicator variable for a product being in the top quartile of treatment value. Products are defined by the standard trade classification Harmonized System (HS) code. In columns 1–3, the coefficients and standard errors are identical by construction of the midpoint growth estimator (Beaumont, Matray and Xu, 2024). Standard errors are clustered at the HS-4 level and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

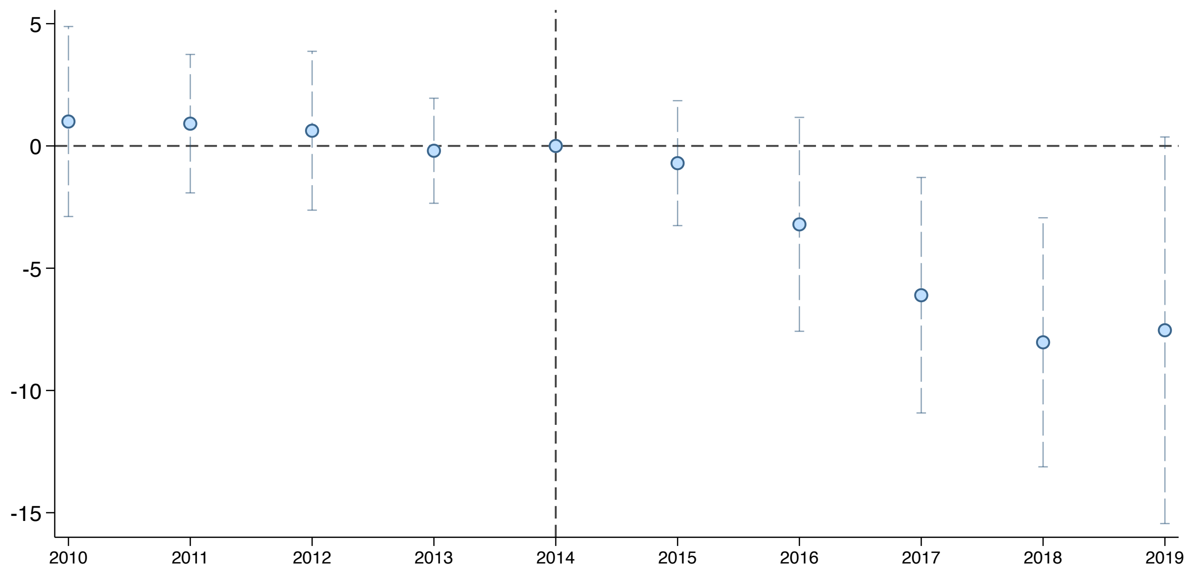
**Interpretation of magnitudes.** The coefficient estimated in Table 2 is between 4 and 5, implying that a \$1 contraction of financing impacts export revenues by \$4–5. Two points are worth noting: First, this effect is on *revenues* (the value of exports) and not on *profits* for the firm or the bank, and therefore should not be interpreted as a "return on investment." Second, this magnitude aligns with working capital multipliers: since exporters need \$0.20–0.25 in working capital per dollar of foreign sales, each \$1 of lost financing reduces exports by \$4–5.[30]

## 4.2 Average Effects on Firm Outcomes

The results above reject two hypotheses about EXIM support: (a) that such support is merely inframarginal, and thus has no effect on exports, and (b) that it merely reallocates market share across US firms, and thus does not affect overall product-level exports. Nonetheless, it is still possible that the shutdown had limited effects on firm investment and employment if EXIM-backed

[30] A study of the Bank for International Settlements from 2011 estimates this number to be around 30% (Committee on the Global Financial System, 2014). Another approach to approximating this figure considers the financing timeline: US manufacturers shipping goods internationally typically receive payment 30–90 days after shipment (Hummels and Schaur, 2010), meaning that approximately 0.1–0.3 dollars of working capital per dollar of exports remains tied up at any given moment (representing 1–3 months of the export's value in receivables). Compustat data supports these estimates, showing that for exporters, the ratio of working capital (receivables plus inventories) to total revenues averages 27%, while net working capital (working capital minus account payables) represents 17%.

Figure 4: Event Study of Impact of EXIM's Shutdown on US Product Exports




*Notes:* This figure plots the point estimates and 95% confidence intervals of the effect of EXIM's shutdown on aggregate exports at the product (HS-6)-by-destination level from the event study defined in equation (1) with product-destination-year and origin-year fixed effects. The dependent variable is the exports growth rate of origin country $o$ (exporter) to destination country $d$ (importer) of product $p$ at time $t$ relative to 2014 (the year prior to the shock), and is defined as $\Delta Y_{p,o,d,t} = (Y_{p,o,d,t} - Y_{p,o,d,2014})/[(Y_{p,o,d,t} + Y_{p,o,d,2014}) \times 0.5]$. The sample includes a control group of other exporter countries $o$ with similar export patterns as the US. EXIM intensity ($\text{EXIM}_{po}$) is defined as the total amount of EXIM (in \$) over total exports (in \$) over the period 2007–2010. Standard errors are clustered at the HS-4 product level.

firms were able to compensate the loss of their exports by increasing domestic sales.

### 4.2.1 Effect on Firm Exports

To examine this question, we now turn to studying the impact of the shutdown on firms. We observe firm exports at the product-by-destination level in Datamyne. We measure exports using Twenty-foot Equivalent Units (TEU), a standard unit for maritime cargo. To handle the dimensionality of firm-by-product-by-destination data, we collapse the data into two periods: an average pre-shutdown period (2010–2014) and an average post period (2015–2019). Because of the importance of the extensive margin at this level, we use the same Beaumont, Matray and Xu (2024) method as in Table 2, with appropriate weights.[31]

Table 3 reports the results. Column 1 shows the relative effect on exports during the shutdown for EXIM-dependent firms. In columns 2 to 4, we progressively include additional fixed effects to control for unobserved demand shocks that might correlate with the treatment. In column 5, we restrict the data to the sample of listed firms that we match with Datamyne. Columns 4 and 5 show that the effect of EXIM's shutdown remains the same when we tightly control for

[31] We show in Appendix Table A.3 that results are robust to using different measures of maritime exports and in Appendix Table A.4 to other alternative weights.

product-by-destination-by-time fixed effects. Relative to the results in the aggregate customs data, this firm-level analysis using a sample of US exporters allows us to control for even finer types of demand shocks, such as those generated by country-specific tariff shocks (e.g., China tariff shocks on certain American products), which eases the required identifying assumptions to interpret our estimates as causal.

In terms of economic magnitudes, EXIM financing accounts for approximately 3.6% of maritime exports for treated firms. The point estimate of -0.17 implies an average impact of -5.0 on export sales, which is similar to the magnitude estimated in the aggregate product exports data.

Table 3: Impact on Firm Maritime Exports

| *Dependent variable* | Maritime Exports | | | | |
|---|---|---|---|---|---|
| *Sample* | All firms | | | | Listed firms |
| | (1) | (2) | (3) | (4) | (5) |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.19 | -0.18 | -0.19 | -0.17 | -0.25 |
| | (0.023) | (0.022) | (0.022) | (0.021) | (0.046) |
| | [6.7e-16] | [8.9e-16] | [2.0e-17] | [2.3e-15] | [0.000000071] |
| *Fixed Effects* | | | | | |
| Post | ✓ | — | — | — | — |
| Product×Post | — | ✓ | — | — | — |
| Destination×Post | — | — | ✓ | — | — |
| Product×Destination×Post | — | — | — | ✓ | ✓ |
| Observations | 1,979,189 | 1,979,189 | 1,979,189 | 1,979,189 | 153,977 |

*Notes:* This table reports the estimated effects of EXIM's shutdown on firms' maritime exports. Data are collapsed as an average pre (up to 2014) and post period (2015–2019). The dependent variable is calculated as a midpoint growth rate based on the Beaumont, Matray and Xu (2024) estimator, and defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,t\leq 2014})/[(Y_{i,t} + Y_{i,t\leq 2014}) \times 0.5]$. $Post_t$ is an indicator variable equal to 1 for the years 2015 to 2019. $EXIM_i$ is an indicator variable that equals 1 if the firm received trade financing from EXIM over the pre-shutdown period. Product fixed effects are at the HS-4 level, and destination fixed effects are at the country level. Standard errors are clustered at the HS-4 level, and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

### 4.2.2 Effect on Total Revenues

**Baseline effect.** To test whether the shutdown and contraction in exports affect firms' total revenues, we begin by estimating the $\beta$ coefficient in equation (4) that captures the average change in total revenues for EXIM-backed relative to non-backed firms over the post period (2015–2019) relative to the pre-period.[32] Table 4 reports our results. Column 1 is estimated with the sparsest set of controls: only year fixed effects. Column 2 includes industry-by-year fixed effects to account for the potential correlation between the treatment exposure and unobserved industry shocks (e.g., differential demand shocks). Column 3 is our preferred specification that includes both industry-

[32]For all the D-i-D analyses, we weight the regressions by firm revenue using the same strategy as in the aggregate product exports data to ensure comparability of the results across datasets. The coefficients are, if anything, larger with other weighting schemes or no weights: see Appendix Table A.7.

by-year and exporter-by-year fixed effects, with the latter controlling for the correlation between the treatment and other trade-related shocks.

The estimated effect on total revenues is stable across the different set of controls and is always significant at the 1% level, ranging from a difference of 17% in column 1 to 12% in column 3.

In columns 4 to 8, we conduct additional robustness exercises. Column 4 includes a battery of additional firm-level controls: the fiscal month of firms' reporting of their annual accounts, firm size (terciles of total assets), firm leverage and profitability, and firm lobbying expenditure (measured using Lobbyview data), all interacted with year fixed effects.

Columns 5 to 7 show that the effect of EXIM's shutdown is not driven by certain parts of the sample. Column 5 excludes non-exporting firms from the sample and finds identical point estimates to the specifications that isolate the identifying variation among exporters by including an exporter-by-year fixed effect (column 3).[33] In column 6, we exclude the ten firms with the highest reliance on EXIM support in the pre-period, including Boeing.[34] In column 7, we remove all industries that are in the top tercile of dependence on government spending, where we construct this dependence by regressing monthly stock returns for each industry on the measure of policy uncertainty specifically related to government policies and fiscal policies from Baker, Bloom and Davis (2016). The fact that the point estimate remains unaffected indicates that the effect is not driven by a broader shock on government spending that would affect firms more dependent on such spending, but instead is specific to EXIM's shutdown.

Finally, in column 8, we estimate a triple difference where we interact the D-i-D variable with an indicator variable that takes the value of one if the firm received a large loan from EXIM prior to its shutdown, which acts as a proxy for firms' likelihood of depending on large loan financing. This test is motivated by the institutional context: larger loans require approval by EXIM's Board of Directors, which was not possible during the period without a quorum. We measure large loans as those in the top tercile of the loan distribution, and we interact all the fixed effects with an indicator variable that equals one if the firm received any EXIM loan prior to the shutdown.

In this exercise, the coefficient of interest is estimated *within* EXIM-dependent firms as the EXIM-by-year fixed effect controls for any time-varying unobserved shocks specific to all EXIM-dependent firms.[35] The coefficient and standard error remain nearly identical to the baseline effect that we estimate in column 3, indicating that our results are unlikely to be driven by endogenous selection of firms receiving EXIM financing.[36]

[33] We do not remove non-exporting firms from our baseline sample because they still participate in the estimation of the other fixed effects (e.g., industry-by-year), and later in the paper in the computation of the distribution of financing frictions, which ensures that our sample distribution will not be biased by the exclusion of certain firms.

[34] The list also includes: Cytosorbents Corp, Energy Recovery Inc, Everspin Technologies Inc, Full Spectrum Inc, Imping Inc, Mycelx Technologies Corp, Optical Cable Corp, Stereotaxis Inc, and Xtera Communications Inc.

[35] The primary D-i-D coefficient $EXIM \times post$ is no longer identified, as it is now collinear with the fixed effects.

[36] The triple difference specification likely underestimates the true effect of EXIM's shutdown as it relies on the

More generally, in all cases, the point estimates are quantitatively similar, indicating that our estimates are also unlikely to be driven by other unobserved time-varying shocks correlated with these controls and our treatment, or by specific firms.

Table 4: Impact on Firm Total Revenues

| *Dependent variable* | Total Revenues | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Sample* | All | | | | Excl. non Exporter | Excl. top 10 recipients | Excl. policy dep. industries | All |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.17 | -0.13 | -0.12 | -0.10 | -0.12 | -0.12 | -0.11 | |
| | (0.033) | (0.035) | (0.035) | (0.035) | (0.036) | (0.035) | (0.041) | |
| | [0.00000012] | [0.00028] | [0.00072] | [0.0045] | [0.0010] | [0.00079] | [0.0054] | |
| $\text{EXIM (Large loans)}_i \times \text{Post}_t$ | | | | | | | | -0.096 |
| | | | | | | | | (0.045) |
| | | | | | | | | [0.032] |
| *Fixed Effects* | | | | | | | | |
| Year | ✓ | — | — | — | — | — | — | — |
| Exporter×Year | — | — | ✓ | ✓ | ✓ | ✓ | ✓ | — |
| Industry×Year | — | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | — |
| Fiscal month×Year | — | — | — | ✓ | — | — | — | — |
| Size×Year | — | — | — | ✓ | — | — | — | — |
| Balance sheet controls×Year | — | — | — | ✓ | — | — | — | — |
| Lobbying×Year | — | — | — | ✓ | — | — | — | — |
| EXIM×Industry×Year | — | — | — | — | — | — | — | ✓ |
| EXIM×Exporter×Year | — | — | — | — | — | — | — | ✓ |
| Observations | 25,174 | 25,174 | 25,174 | 24,511 | 18,438 | 25,109 | 20,207 | 25,174 |

*Notes:* This table reports the estimated effects of EXIM's shutdown on firms' total revenue growth. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. $Post_t$ is an indicator variable equal to 1 for the years 2015 to 2019. $EXIM_i$ is an indicator variable that equals 1 if the firm received trade financing from EXIM over the pre-shutdown period. Exporter fixed effect is an indicator variable that equals 1 if the firm reports positive EXIM financing, foreign sales in Compustat Segment, international activity in their 10-Ks, exports in Datamyne, or taxable foreign income before 2014. Industries are SIC-2. Column 5 excludes firms that are not exporting prior to the shutdown, and column 6 removes the top ten recipients of EXIM support in the pre-period. Column 7 removes industries that are most dependent on government policies. Finally, in column 8 we interact *EXIM* × *Post* with an indicator variable *Large loans* that takes the value one if the support was in the top tercile of EXIM's financing distribution prior to its shutdown, as these firms were particularly affected by the loss of the bank's board quorum. We interact *EXIM* with exporter-by-year and industry-by-year, in which case *EXIM* × *Post* is no longer identified. Standard errors are clustered at the firm level and are reported in the line below the point estimate in parenthesis, and *p*-values are reported in brackets below them.

Figure 5 plots the yearly coefficients of $\beta_k$ and 95% confidence intervals of the growth of total revenues relative to 2014 for the dynamic event study in equation (3), controlling for the full set of firm characteristics (industry, exporter status, size, leverage, profitability).[37] Appendix Figure B.3 shows the event study in the quarterly data, which allows us to define the shock *within* 2015. As in our baseline specification, the figure shows visual evidence of the absence of differential pre-trends before the shock: sales of EXIM-supported firms trended similarly for firms not supported by EXIM up to the second quarter of 2015 (the last quarter prior to EXIM's shutdown), and diverged only

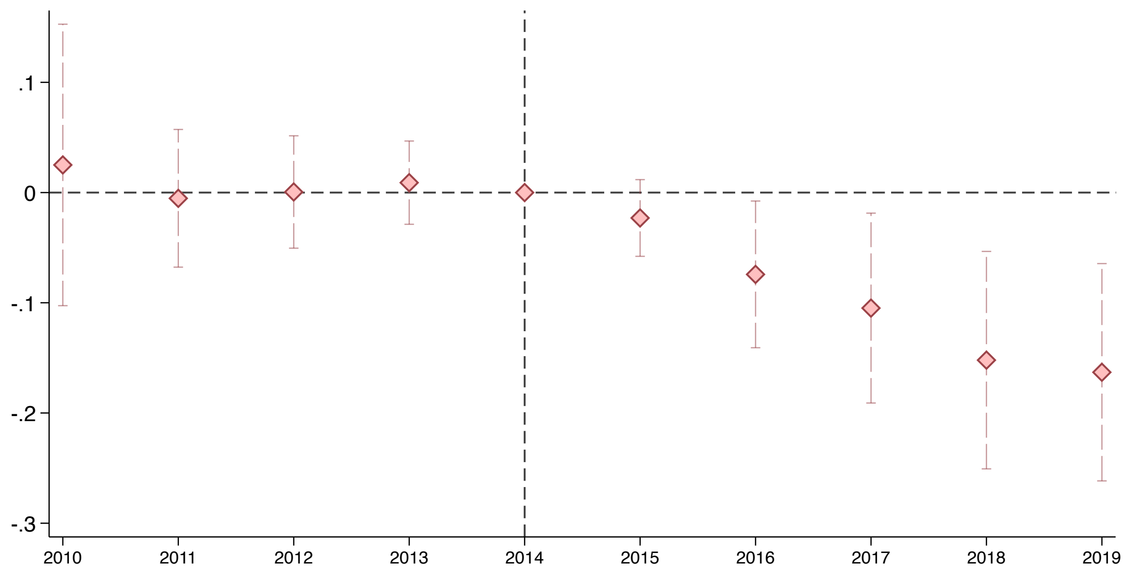
strong assumption that absent the shutdown, only firms that received a large loan initially prior to 2014 would have continued to do so, and firms that received a smaller loan would have never obtained a larger loan. The necessity of this stronger assumption is why we do not use this specification as our baseline.

[37] Appendix Figure B.2 reports robustness for the firm event study when we progressively include the different fixed effects and firm controls, and it transparently shows that the point estimates are barely affected as we control for more unobserved heterogeneity.

after mid-2015. Afterward, treated firms' total revenues decline significantly relative to control firms and remain lower throughout the post period.

This persistent decline in total revenues implies that treated firms are not able to (i) fully compensate the loss of foreign sales by an increase in domestic sales, and (ii) compensate the loss of EXIM financing with trade financing at commercial, profit-maximizing banks, for the entire duration of the shutdown.

Figure 5: Event Study Impact of EXIM's Shutdown on Firm Total Revenues




*Notes:* This figure plots the point estimates and 95% confidence intervals of the effect of EXIM's shutdown on firm total revenues from equation (3) with industry-by-year and exporter-by-year fixed effects. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. Standard errors are clustered at the firm level.

**Interpretation of magnitudes.** In our analysis, the average treated firm received financing from EXIM amounting to approximately 2.4% of its total revenues. A back of the envelope calculation thus implies that in the firm data, \$1 of EXIM financing translates into approximately \$4.9 of additional revenues (4.9 = 12%/2.4%).

We calculate the pass-through of the effect of EXIM on domestic sales from export sales as the ratio of the elasticities of sales: $\frac{\epsilon^{Domestic}}{\epsilon^{Exports}}$. We rewrite this ratio of elasticities in the following way: $\frac{\epsilon^{Domestic}}{\epsilon^{Exports}} = \frac{\Delta Domestic}{\Delta Exports} \times \frac{Exports}{Domestic}$, where $\Delta$ denotes the dollar change in sales in response to EXIM while "*Exports*" and "*Domestic*" denote initial levels of sales. We also use the accounting identity $\Delta TotalRevenues = \Delta Exports + \Delta Domestic$. From our previous estimations, we have that $\frac{\partial \text{Total revenues}}{\partial \text{EXIM}} = \hat{\beta}^{Firm} = 4.9$ and $\frac{\partial \text{Exports}}{\partial \text{EXIM}} = \hat{\beta}^{US\ exports} = 4.49$, so $\frac{\partial \text{Dom}}{\partial \text{EXIM}} = 0.51$. This allows us to write that $\frac{\partial \text{Dom}}{\partial \text{EXIM}} \times \frac{\partial \text{EXIM}}{\partial \text{Exports}} = \frac{\partial \text{Dom}}{\partial \text{Exports}} \approx \frac{\Delta \text{Dom}}{\Delta \text{Exports}} = \frac{0.51}{4.49}$.

In order to calculate $\frac{Exports}{Domestic}$ (the share of export sales relative to domestic sales), we follow Bernard, Jensen, Redding and Schott (2018), who finds that export sales account for approximately

20% among all firms that have at least one dollar of exports. Given that exporting is mostly concentrated among larger firms and that Compustat firms are larger than the average firm, this share is likely higher in our sample. For instance, the share of foreign revenues in the Compustat segment data is approximately 40%.

Taking these two values as bounds, we calculate that $\frac{Exports}{Domestic} \in [0.25 - 0.66]$.[38] Together, these magnitudes imply a pass-through of foreign to domestic sales of 2.8% to 7.5%.

**Implication for firm production functions and comparison with the literature.** Positive spillovers between foreign markets and the domestic market are at odds with the canonical Melitz (2003) model of firm-level trade that features constant marginal cost, in which demand shocks in one market do not affect a firm's sales in another.[39] However, these results are consistent with models of intra-firm spillovers, which can emerge from knowledge transfers, vertical supply linkages, or financing frictions and internal capital markets.[40]

Our findings are particularly likely to reflect the role of internal capital markets because EXIM designs its program to service financially constrained firms (Table 6 and Appendix Section D.2). When firms face financing constraints and use internal capital markets to finance projects across different markets, theory predicts positive spillovers between markets Stein (1997). In our context, the reduction in exports acts as a negative cash flow shock for treated firms, tightening their financing constraints and affecting their domestic sales.[41]

**Additional robustness.** We conduct several additional robustness checks showing results are not driven by specific firms or industries. Appendix Figure B.5 and Figure B.6 report coefficients and t-statistics from 336 regressions excluding each 4-digit industry individually. Point estimates and t-statistics cluster tightly around the average values in Table 4 and Figure 5, showing that no single industry drives the results. Appendix Table A.5 shows that more granular industry fixed effects yield similar results.

[38] If exports is 25% of total revenue, domestic sales is 100%-20% = 80%, hence $\frac{Exports}{Domestic} = \frac{0.20}{0.80} = 0.25$. If instead, exports is 40% of total revenue, we have that $\frac{Exports}{Domestic} = \frac{0.40}{(1-0.40)} = 0.66$.

[39] Our results also differ from Almunia, Antràs, Lopez-Rodriguez and Morales (2021), who show that Spanish manufacturers losing more domestic sales during the Great Recession experienced larger export growth. This work differs from ours in two important ways. First, Almunia, Antràs, Lopez-Rodriguez and Morales (2021) study spillovers from domestic shocks to foreign sales, while we examine the opposite. To the best of our knowledge, studies examining pass-through from foreign to domestic sales have found positive spillovers similar to our results in France (Berman, Berthou and Héricourt, 2015), the US (Ding, 2024), and Denmark (Jakel, 2022). Second, their setting features exposure to an aggregate shock affecting all Spanish exporters during the Great Recession, while we examine variation across firms based on their differential access to EXIM financing. As such, our results likely reflect the role of firm-specific financial constraints rather than an aggregate demand shock, which may have different implications for the pass-through of foreign to domestic sales.

[40] For reduced form evidence and structural estimation of shared non-rival knowledge inputs, see Ding (2024), who finds positive spillovers between export shocks and sales across multi-industry firms. Vertical supply linkages are studied, for instance, in Desai, Foley and Hines (2009) and Boehm, Flaaen and Pandalai-Nayar (2019).

[41] Similar effects have been documented in other settings: oil conglomerates reduced investment in non-oil segments post oil-shock Lamont (1997), and multi-establishment firms in the US adjusted employment in specific counties in response to shocks from distant counties Giroud and Mueller (2019).

### 4.2.3 Effect on Additional Firm Outcomes

Given that EXIM-financed firms experience a decline in total revenues after EXIM's exit, it is likely that the shutdown also affects the accumulation of production factors (capital and labor). We use the specification in equation (4) and replace firm revenue growth with firms' change in capital, labor, and operating profit margins (EBIT over revenues).

Table 5: Impact on Firm Employment, Capital Accumulation, and Profit Margins

| *Dependent variable* | Revenues | Tangible capital | Intangible capital | Employment | Profit margin |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.12 | -0.14 | -0.19 | -0.098 | 0.00024 |
| | (0.035) | (0.044) | (0.047) | (0.032) | (0.0062) |
| | [0.00072] | [0.0014] | [0.000042] | [0.0025] | [0.97] |
| *Fixed Effects* | | | | | |
| Exporter×Year | ✓ | ✓ | ✓ | ✓ | ✓ |
| Industry×Year | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 25,174 | 24,635 | 25,015 | 22,902 | 25,174 |

*Notes:* This table reports the estimated effects of EXIM's shutdown on various firm outcomes. Intangible capital is measured following Peters and Taylor (2017). Profit margin is measured as net income over revenues. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. $Post_t$ is an indicator variable equal to 1 for the years 2015 to 2019. $EXIM_i$ is an indicator variable that equals 1 if the firm received trade financing from EXIM over the pre-shutdown period. Exporter fixed effect is an indicator variable that equals 1 if the firm reports positive EXIM financing, foreign sales in Compustat Segment, international activity in their 10-Ks, exports in Datamyne, or taxable foreign income before 2014. Industries are SIC-2. Standard errors are clustered at the firm level and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

Table 5 shows that EXIM's shutdown reduced both investment and hiring. Column 2 examines tangible capital (property, plant and equipment), while column 3 shows intangible capital per Peters and Taylor (2017). Intangible capital shrinks slightly more than tangible capital (-19% vs -14%), in line with intangible capital being more sensitive to financing frictions and therefore fluctuating more with firm revenues (e.g., Aghion, Askenazy, Berman, Cette and Eymard, 2012; Hombert and Matray, 2017). Column 4 shows the effect for employment. Across all outcomes, we find that EXIM-financed firms shrink relative to non-dependent firms. In contrast, profit margins remain unaffected: the economically small and statistically insignificant estimate (column 5) indicates EXIM financing did not artificially inflate profit rates before the shutdown. Appendix Figure B.4 presents event studies for each outcome.

## 5 Channels for EXIM's Impact

Our results show that EXIM financing spurs real economic activity rather than just benefiting well-connected firms or redistributing market share, demonstrating that EXIM provides marginal funding that enables new economic activity, not just exports that would have occurred anyway.

In this part of the paper, we assess the channels for EXIM's ability to create net exports. Before examining specific frictions, it is important to emphasize that while EXIM financing may be formally directed toward either exporters or foreign buyers, the economic incidence affects the transaction itself.[42] The funding gap created by EXIM's shutdown impacts exports regardless of which party nominally receives financing, as constraints on either side of the transaction impair trade. This interdependence guides our examination of key institutional factors: (1) the financing needs of firms engaged in longer-maturity international transactions, and (2) the contractual frictions inherent to country-specific cross-border risks. We also discuss additional channels that could explain EXIM's impact on exports below.

First, EXIM's primary role is to alleviate firm financing frictions by "providing trade financing when the private sector is unable or unwilling to do so." These *firm financing frictions* can endogenously emerge out of adverse selection (e.g., Stiglitz and Weiss, 1981) or the inability of entrepreneurs to fully pledge their future cash flows (Banerjee and Newman, 1993; Holmstrom and Tirole, 1997). They are particularly high in the context of international trade in which long transactions times increase working capital needs.

Second, the cross-border nature of international trade can intensify information asymmetries and contractual frictions in *destination markets*, significantly increasing the risks associated with financing exports (e.g., Nunn, 2007; Alfaro, Antras, Chor and Conconi, 2019). These frictions can generate two types of challenges: exporters facing greater difficulty in screening solvent customers and providing trade credit (e.g., Biais and Gollier, 1997; Cuñat, 2007), and exporters encountering heightened holdup risks and challenges in enforcing contracts, especially those requiring relationship-specific investments (e.g., Williamson, 1979; Grossman and Hart, 1986; Hart and Moore, 1990).

The same cross-border frictions that impede firm-level trade financing also create barriers for financial institutions themselves. They can impose high (and potentially heterogeneous) fixed costs of entry, leading to a heavily concentrated and specialized private market for trade finance and insurance. For example, the regulatory burden of operating across legal jurisdictions imposes substantial entry costs for banks, while profitable operations require in-depth knowledge of local markets and legal systems. If these entry barriers allow banks to exert market power and to charge mark-ups, then banks could find it privately optimal to constrain quantities.

## 5.1 Firm Financing Frictions

We use four standard proxies to capture firm-level financial constraints. For each, we sort firms into terciles and define an indicator variable, *Constrained*, equal to one if the firm is in the top

[42] As discussed in Section 2.2, EXIM financing is attached to sales of goods from a specific American exporter such that even when EXIM formally contracts with the importer, it effectively finances the American firm, and foreign buyers cannot redirect those funds after securing the loan.

tercile. To assess the role of these frictions, we estimate heterogeneous effects of EXIM's shutdown using triple-difference regressions that interact $EXIM \times Post$ with each constraint proxy:

$$\begin{aligned}\Delta Y_{i,j,t} = \beta_1 EXIM_{i,j} \times Post_t \times I_i^{Constrained} + \beta_2 EXIM_{i,j} \times \delta_t \\ + \; I_i^{Constrained} \otimes \Big[\gamma_{j,t} + Exporter_{i,t_0} \times \delta_t + X_{i,t_0} \times \delta_t + \varepsilon_{i,j,t}\Big] \end{aligned} \quad (5)$$

$\Delta Y_{i,j,t}$ denotes the growth rate of an outcome between $t$ and 2014, $I_i^{Constrained}$ is an indicator variable that takes the value one if firm $i$ is constrained in the pre-period, and $\otimes$ is the outer product so that we include all possible combinations of the different terms. In particular, this allows constrained firms to evolve on different trends from non-constrained firms such that we isolate the impact of EXIM on constrained firms. The full set of fixed effects also includes EXIM $\times$ Year, which absorbs systematic differences between treated and control units.

Table 6 reports the results using firms' leverage (e.g., Giroud and Mueller, 2017; Friedrich and Zator, 2023) in column 2, dividend payments intensity (e.g., Fazzari, Hubbard and Petersen, 1988) in column 3,[43] the Hoberg and Maksimovic (2015) measure based on the textual analysis of firms' 10-K filings in column 4, and the industry coverage ratio (current liabilities over EBITDA, motivated by the fact that EXIM's trade financing is a source of short-term working capital) in column 5.

We find that within the group of EXIM-dependent firms, those that are most constrained experience larger investment cuts. This aligns with both theory and EXIM's institutional design. This heterogeneity indicates that export financing is particularly important for firms with limited alternative funding sources, highlighting its role as a complement to private sector financing.

## 5.2 Destination Market Frictions

To understand the role of destination market contractual frictions, we first show that EXIM directs more financing to riskier countries, consistent with the theoretical channel that the frictions that deter private sector lending are higher in those markets. We then empirically estimate the role of destination market frictions for aggregate US product exports.

### 5.2.1 Correlation Between EXIM Support and Country Risk

For the first exercise, we use quarterly measures of the perceived risk to transact with a country from Hassan, Schreger, Schwedeler and Tahoun (2023), which is constructed from a textual analysis of the English-language quarterly earnings calls of all publicly listed firms operating around the world. We combine these risk measures with data on EXIM's country-level financial exposure, which we

[43] Dividend payments intensity is defined as dividends over EBITDA. To simplify the reading, we use 1 minus the top tercile for dividend intensity, since firms in the top tercile of dividend payments are *less* constrained.

Table 6: Role of Financing Frictions

| *Dependent variable* | Investment | | | | |
|---|---|---|---|---|---|
| *Financing frictions proxy:* | | Leverage | Dividends intensity | Hoberg and Maskimovic (2015) | Coverage ratio |
| | (1) | (2) | (3) | (4) | (5) |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.12 | | | | |
| | (0.032) | | | | |
| | [0.00017] | | | | |
| $\text{EXIM}_i \times \text{Post}_t \times \text{I}_i^{\text{Constrained}}$ | | -0.16 | -0.10 | -0.12 | -0.071 |
| | | (0.044) | (0.039) | (0.047) | (0.039) |
| | | [0.00034] | [0.010] | [0.0097] | [0.068] |
| *Fixed Effects* | | | | | |
| Exporter×Year | ✓ | — | — | — | — |
| Industry×Year | ✓ | — | — | — | — |
| EXIM×Year | — | ✓ | ✓ | ✓ | ✓ |
| *Fixed Effects (interacted)* | | | | | |
| Exporter×Year | — | ✓ | ✓ | ✓ | ✓ |
| Industry×Year | — | ✓ | ✓ | ✓ | ✓ |
| Observations | 24,635 | 23,994 | 23,963 | 22,294 | 24,635 |

*Notes:* This table reports the estimated effects of EXIM's shutdown on firms' investment. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. $I_i^{\text{Constrained}}$ is an indicator variable that takes the value one if the firm is in the top tercile of the financing friction proxy. In column 3, we use 1 minus the top tercile to simplify the reading, such that $I_i^{\text{Constrained}}$ identifies the firms that are financially constrained. $Post_t$ is an indicator variable equal to 1 for the years 2015 to 2019. $EXIM_i$ is an indicator variable that equals 1 if the firm received trade financing from EXIM over the pre-shutdown period. Exporter fixed effect is an indicator variable that equals 1 if the firm reports positive EXIM financing, foreign sales in Compustat Segment, international activity in their 10-Ks, exports in Datamyne, or taxable foreign income before 2014. Industries are SIC-2. In columns 2 to 5, Exporter×Year and Industry×Year fixed effects are also interacted with the variable $I_i^{\text{Constrained}}$. Standard errors are clustered at the firm level and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

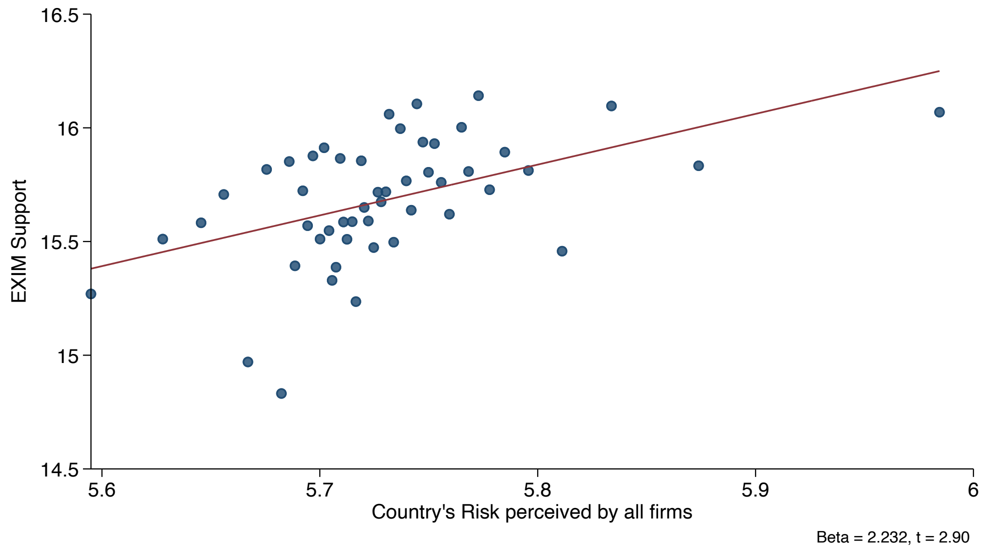
digitized from EXIM's Annual Reports. These exposure measures capture the total outstanding value of EXIM-backed loans, guarantees, and insurance for each country.

Figure 6 shows the relationship between EXIM's total financial exposure to a country relative to the perception of country risks by all firms, residualized with respect to country and year fixed effects. The strong positive relationship indicates that, holding fixed time-invariant country characteristics and accounting for shocks across years, EXIM systematically provides more support to precisely those markets where private sector firms perceive the highest risks. In Appendix Table D.2, we also report the relationships between exposure and risk perceptions by subsets of different types of firms. Strikingly, the effects are most relevant for financial and foreign firms, which are precisely the ones whose views are relevant for international trade and trade financing.

### 5.2.2 Heterogeneity by Destination Market Frictions

Next, we use three proxies for different dimensions of destination market frictions: firms' (perceived) risk of a country; the quality of rule of law in the destination country; and finally a proxy for the severity of financing frictions in the destination market.

Figure 6: EXIM Support and Country Risk




*Notes:* This figure plots the relationship between the amount of EXIM's total financial exposure to a country as a function of perceived country risks (by all firms), controlling for country and year fixed effects. Standard errors are clustered at the country level. The measure of perceived country risks comes from Hassan, Schreger, Schwedeler and Tahoun (2023).

The first proxy uses the Hassan, Schreger, Schwedeler and Tahoun (2023) measure, which we separate between all firms, financial institutions, and foreign firms. The second friction, the likelihood of recovery after default, is proxied by the degree to which the destination country abides by rule of law, motivated by Nunn (2007). The measure is obtained from the Worldwide Governance Indicators (WDI) Database (Kaufmann, Kraay and Mastruzzi, 2010), which measures perceptions of trust and adherence to societal rules, including contract enforcement, property rights, police, courts, and the likelihood of crime and violence. The index is constructed such that a higher value corresponds to better governance.

Finally, we proxy for the severity of financing frictions in the destination country by its financial development, measured by outstanding private credit relative to GDP from the World Bank. We provide more details about these data in Appendix D.3.1.

Our triple differences regression specifications relate changes in exports to exposure to the EXIM shutdown interacted with each proxy of destination market frictions. We create the indicator variable $I_d^{\text{Constrained}}$ that takes the value one if the destination country (destination $d$) is in the top two quintiles of the distribution of the proxy. We interact this indicator variable both with our main treatment variable ($\text{EXIM}_{p,o} \times \text{Post}_t$) and with all other fixed effects. In order to maintain tractability, we collapse the data into an average pre and post period. We therefore have fewer observations than in Table 2 by construction, but the coefficients remain similar.

One challenge when estimating these triple differences specifications is that the new sorting variable may be correlated with other characteristics of the importing country that would bias the triple differences, even if the D-i-D is unbiased. Given that EXIM matters more for US exporters when export competition with other countries is fiercer, we include controls where we interact the D-i-D variable ($\text{EXIM}_{p,o}\times\text{Post}_t$) with measures of competition intensity both at the country and country-by-product level.

Table 7 reports the results for the different proxies of destination market frictions. Since the variable $\text{EXIM}_{p,o}\times\text{Post}_t\times\text{I}_d^{\text{Constrained}}$ estimates the *marginal* effect of EXIM's shutdown when destination market frictions are high relative to when they are low, the negative sign indicates that the effect of the shutdown is two times larger when US firms export to countries with high frictions.[44]

Table 7: Role of Destination Market Frictions

| *Dependent variable* | Exports | | | | |
|---|---|---|---|---|---|
| *Market frictions proxy:* | Risk perception | | | Rule of law | Financial development |
| | All | Financial | Foreign | | |
| | (1) | (2) | (3) | (4) | (5) |
| $\text{EXIM}_{p,o}\times\text{Post}_t\times\text{I}_d^{\text{Constrained}}$ | -2.08 | -3.10 | -2.28 | -1.55 | -2.05 |
| | (0.96) | (1.21) | (1.05) | (0.90) | (0.98) |
| | [0.030] | [0.010] | [0.030] | [0.085] | [0.037] |
| *Fixed Effects* | | | | | |
| Product (HS-6)×Destination×$\text{Post}_t$ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Origin×$\text{Post}_t\times\text{I}_d^{\text{Constrained}}$ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $\text{EXIM}_{p,o}\times\text{Post}_t$ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $\text{EXIM}_{p,o}\times\text{Post}_t\times\text{Controls}_{p,d}$ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 1,677,054 | 1,677,054 | 1,677,054 | 3,471,365 | 3,275,185 |

*Notes:* This table reports estimates on the effect of EXIM's shutdown on aggregate exports at the product-by-destination level taken from BACI. Data are collapsed as an average pre (up to 2014) and post period (2015–2019). The dependent variable is calculated as a midpoint growth rate based on the Beaumont, Matray and Xu (2024) estimator, and defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,t\leq 2014})/[(Y_{i,t} + Y_{i,t\leq 2014}) \times 0.5]$. EXIM intensity ($\text{EXIM}_{p,o}$) is defined as the total amount of EXIM (in \$) over total exports (in \$) over the period 2007–2010. Country risk perception is from Hassan, Schreger, Schwedeler and Tahoun (2023), where it is defined as aggregated risk associated with a given country perceived by "All," "Financial," or "Foreign" (to the country) firms around the world. "Rule of law" is the indicator from the Worldwide Governance Indicators (WDI) Database (Kaufmann, Kraay and Mastruzzi, 2010) measuring the overall quality of rule of laws and good governance in a country. "Financial development" is the ratio of private credit over coutry GDP and is from the World Bank. All regressions control for changes in import intensity by interacting $\text{EXIM}_{p,o}\times\text{Post}_t$ with country imports over GDP, import market share of product $p$ in total imports, imports of product $p$ over GDP, and the number of different exporters in a given market $p, d$. Appendix section D.3 provides further detail. Standard errors are clustered at the HS-4 level and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

### 5.3 Discussion of Other Potential Channels

While our analysis shows that financing and contractual frictions play a key role in explaining EXIM's effects on trade and firm outcomes, we now discuss potential alternative mechanisms.

First, we consider the possibility that ECAs sometimes operate alongside broader export promotion initiatives. Although EXIM is primarily a financing institution rather than an export

[44] The total effect of EXIM's shutdown when the destination country has high frictions is the sum of the coefficients of $\text{EXIM}_{p,o}\times\text{Post}_t\times\text{I}_d^{\text{Constrained}}$ and $\text{EXIM}_{p,o}\times\text{Post}_t$.

promotion agency, its activities could theoretically facilitate trade relationships and provide market intelligence. However, given EXIM's institutional focus on credit provision and risk mitigation rather than traditional export promotion activities such as trade missions or market research, we believe these promotional channels play at most a minor role in explaining our results, since EXIM does not provide any "marketing-related programs."

A second potential channel relates to market uncertainty during EXIM's shutdown period. Private financial institutions may have hesitated to fill the gap in trade financing due to uncertainty about when EXIM would resume operations, leading to a "wait-and-see" approach in the trade finance market. This uncertainty channel could help to explain why private sector alternatives did not fully materialize during EXIM's absence. However, given that the shutdown lasted for many years, it is plausible that uncertainty was not the primary driver of private sector entry. Moreover, since EXIM is institutionally designed to operate only in market segments where private lenders are unable or unwilling to participate, the lack of entry is unlikely to be explained by fears of future competition with the agency. Finally, it is difficult to reconcile a general aversion to uncertainty with the cross-sectional heterogeneity by firm and destination market.

Lastly, we note a limitation in assessing the long-term persistence of these effects. Our study ends in 2019 in order to avoid conflating our estimates with the disruptions of the global Covid pandemic. It is therefore not possible to speak to whether the effects would have persisted beyond the shutdown itself, which would suggest a role for mechanisms such as those studied by Cox (2022) or Xu (2022). It is also possible that, given enough time, there potentially would have been a full recovery as more private banks entered this market.

# 6 Implications for the Allocation of Capital

Our analysis shows EXIM's effects vary systematically with economic frictions at the firm and destination level. This heterogeneity suggests EXIM helps to bypass market imperfections that distort capital allocation. Since capital misallocation determines aggregate TFP, examining how EXIM affects capital distribution across firms with varying MRPK levels is crucial for evaluating its economic impact.

## 6.1 Framework

We formalize this analysis using a misallocation framework where heterogeneous firm-level input cost wedges encompass underlying sources of trade financing frictions (e.g., Hsieh and Klenow, 2009; Baqaee and Farhi, 2020). Following Section D.4.2 and consistent with the results in Section 4.2.2, we model the effect of EXIM financing as a cost shifter that reduces the firm's cost of capital.

The firm's profit function is:

$$\Pi_i = p_i \times q_i(K_i) \quad - \quad (1 + \tau_i - EXIM_i) \times r_i \times K_i$$

where $r_i$ is the "risk-adjusted" cost of capital for firm $i$, and $\tau_i$ is the potentially non-zero input wedge that governs the marginal return necessary to invest in an input, which introduces a gap between the firm's TFPQ and the firm's TFPR.[45] The firm's technological efficiency, i.e., its total factor productivity of quantity (TFPQ, usually denoted $A$ in the production function), is embedded in $q_i(K_i)$ and is conceptually distinct from the firm's total factor productivity of revenue (TFPR), which also contains the firm's output price markup and the input cost wedge.

It is crucial to stress that our analysis of whether EXIM improves the allocation of capital is *not* about whether EXIM finances firms with high or low TFPQ, but rather about whether EXIM finances firms facing ex-ante high or low wedges for a given level of TFPQ.

A profit-maximizing firm will invest and consume $K_i$ units of capital until its marginal revenue returns $p_i \partial q_i(K_i)/\partial K_i$ are equal to its cost:

$$\underbrace{p_i \frac{\partial q_i(K_i)}{\partial K_i}}_{\text{MRPK = Marginal revenue returns to capital}} \qquad = \underbrace{(1 + \tau_i - EXIM_i) \times \ r_i}_{\text{Marginal cost of capital}} \tag{6}$$

When wedges are heterogeneous, it is possible to quantify how a policy or an institution like EXIM would affect treated industries' aggregate productivity via its effect on misallocation on a generic input $x$ (capital in our setting) by using a first order approximation of the change in the treated industry's TFP (e.g., Petrin and Levinsohn, 2012; Baqaee and Farhi, 2019*b*; Bau and Matray, 2023). In this case, the TFP change in discrete time of the set of treated firms in industry $J$ is given by:

$$\Delta TFP_{J,t} \approx \underbrace{\sum_{i \in J} \lambda_i \ \Delta \log A_i}_{\text{Technological efficiency}} \ + \underbrace{\sum_{i \in J} \lambda_i \ \alpha_i^x \ \frac{\tau_i^x}{1 + \tau_i^x} \ \Delta \log x_i}_{\text{Allocative efficiency}} \tag{7}$$

where $\lambda_i$ is the ratio of firm $i$'s sales to industry $J$'s net output, $\Delta \log A_i$ is the change in total factor productivity (TFPQ), $\alpha_i^x$ is the output elasticity with respect to $x$, $\tau_i^x$ is the level of firm-specific input wedges prior to the policy change, and $\Delta \log x_i$ is the change in the log input $x$ consumed by firm $i$, which itself is endogenous to $A_i$.

[45] We use "risk-adjusted cost of capital" rather than the "price of inputs" term more common in the literature to highlight the fact that dispersion in MRPK can come from mismeasurement in the dispersion of investment risks. David, Schmid and Zeke (2022) shows that this can over-estimate cross-sectional misallocation by up to 25%.

We rewrite the "allocative efficiency" component of equation (7) and focus on capital below:

$$\sum_{i \in J} \lambda_i \, \alpha_J^k \, \frac{\tau_i}{1+\tau_i} \, \Delta \log K_i \tag{8}$$

$\Delta \log K_i$ is the growth rate in capital produced by the shock, $\lambda_i$ is the share of a firm's sales in its industry (which is a scalar that does not affect the estimation of the reallocation of capital), and $\alpha_J^k$ is a production function parameter that is industry-specific and therefore does not vary across firms within the same industry (or within a pre-determined cell such as an industry-by-size bin).

Equation (8) illustrates that an increase in the total amount of capital used by industry $J$—i.e., an increase in investment for the average firm—will not in itself mechanically increase industry TFP. The overall change in TFP can be negative if investment ($\Delta \log K_i > 0$) is concentrated among firms for which $\frac{\tau_i}{1+\tau_i} < 0$, such that the positive change in inputs is multiplied by a negative value. Since EXIM enters as an additional negative wedge, it may create or exacerbate allocative inefficiency by making it privately optimal for low MRPK firms to expand. Appendix D.5 illustrates this point graphically.

## 6.2 Estimating the Impact of EXIM on Misallocation

In theory, it is possible to assess if EXIM lowers or increases misallocation by directly correlating a firm's EXIM financing and its ex-ante wedges $\tau_i$. Empirically, this requires measuring EXIM financing (which we directly observe), and the firm's $\tau_i$ (which we do not). Under the strong assumption that the empirical dispersion in MRPK is only produced by firms' heterogeneous wedges, it is possible to use equation (6) and the empirical variance of MRPK to recover the values of $\tau_i$.

However, a well-documented empirical challenge of using cross-sectional dispersion in $\text{MRPK}_i$ to infer $\tau_i$ is that the dispersion in MRPK can reflect unobserved differences across firm rather than wedges. This upward bias in measures of misallocation has been shown to emerge from measurement error, model misspecification, productivity volatility paired with the costly adjustment of inputs, or informational frictions and uncertainty.[46] In short: any unobserved heterogeneity across firms limits the researcher's ability to accurately infer the firm wedge from simply inverting the empirical distribution of firms' MRPK.

We therefore adopt the methodology developed in Bau and Matray (2023), which controls for unobserved time-invariant differences across firms by estimating individual firms' heterogeneous changes in input usage to a policy. By restricting the estimation to using within-firm variation over time, this methodology requires milder identifying assumptions to estimate the effect of a

[46] See Haltiwanger, Kulick and Syverson (2018) on model misspecification; Asker, Collard-Wexler and De Loecker (2014) and Kehrig and Vincent (2019) on costly adjustment of inputs; and David, Hopenhayn and Venkateswaran (2016) and David and Venkateswaran (2019) on informational frictions.

policy on misallocation. Indeed, rather than attributing all the cross-sectional variation in MRPK to misallocation, this methodology studies how firms' input usage changes in relation to the firm's initial MRPK. This approach makes it possible to include firm fixed effects, which will account for all time invariant differences among firms that might generate MRPK dispersion in the data that is not directly related to the capital wedge affected by the policy change. Therefore, even though the Bau and Matray (2023) method requires empirically estimating the initial distribution of MRPK, it is able to reduce the risk of wrongly attributing this empirical dispersion to misallocation by focusing solely on changes in firms' behavior.[47]

**Measuring MRPK.** In our baseline analysis, we construct MRPK in the data using the standard assumption in the production function estimation literature that firms have Cobb-Douglas revenue production functions and that, within industries, MRPK can be approximated by the average return to capital:[48]

$$Revenue_{ijt} = TFPR_{ijt} K_{ijt}^{\alpha_j^k} \tag{9}$$

where $i$ denotes a firm, $j$ denotes an industry, and $t$ denotes a year. $Revenue_{ijt}$, and $K_{ijt}$ are measures of sales and capital and $TFPR_{ijt}$ is the firm-specific unobserved revenue productivity. In this case, $MRPK = \frac{\partial Revenue_{it}}{\partial K_{it}} = \alpha_j^k \frac{Revenue_{it}}{K_{it}}$. Thus, $\frac{Revenue_{it}}{K_{it}}$ provides a within-industry measure of MRPK, under the assumption that all firms in an industry share the same $\alpha_j^k$.

In Appendix Table D.3, we show that we obtain similar results when we fully estimate the production function following the control function approach of Olley and Pakes (1996), when we use the user-cost approach similar to Baqaee and Farhi (2019*a*), and if we compute the capital input cost wedge relative to other inputs under the assumption that the production function is a more general CES.

**Estimating changes in misallocation from differential changes in capital allocation.** Misallocation declines within industry $J$ when the allocation of inputs changes such that TFP increases, which occurs when firms with high MRPK expand relatively more. We therefore directly

[47] Carrillo, Donaldson, Pomeranz and Singhal (2023) makes a similar argument for why looking at within-firm variation reduces mismeasurement in firm capital wedges. A somewhat related method would be to look directly at the changes in industry-level variance of (empirical) TFPR. While this method would also deal with the problem time invariant unobserved differences among firms that will produce dispersion in TFPR that are not related to dispersion in wedges, Bau and Matray (2022) show that this change in industry variance in TFPR only identifies a change in misallocation in the data under the assumption of joint log-normality of TFPR and TFPQ, which in practice implies that firms with high and low capital wedges should react in the exact symmetric opposite way to the policy shock. Instead, the method we use allows for firms with high and low capital wedges to react differently. Detailed derivations and examples of cases where changes in industry variance in TFPR would be misattributed to changes in firm wedges when joint log-normality breaks can be found in Bau and Matray (2022).

[48] This assumption is for simplicity; the methodology accommodates any production function.

estimate the differential response by firm type with the following regression:

$$\begin{aligned}\Delta^{2014}[K_{i,j,t}] = & \beta_1 \; EXIM_i \times Post_{t\geq 2015} \times I_i^{High\; MRPK_{i\in j}} \\ & + \beta_2 \; EXIM_i \times Post_{t\geq 2015} \\ & + I_i^{High\; MRPK_{i\in j}} \otimes \Big[\gamma_{j,t} + Exporter_{i,t_0} \times \delta_t + X_{i,t_0} \times \delta_t + \varepsilon_{i,j,t}\Big]\end{aligned} \tag{10}$$

where $\Delta^{2014}[K_{i,j,t}]$ denotes the growth rate of capital between $t$ and 2014, $I_i^{High\; MRPK_{i\in j}}$ is an indicator variable that takes the value one if firm $i$ is above the industry (SIC 4-digit)-level median MRPK computed over 2010–2013, and $\otimes$ is the outer product so that we include all possible combinations of the different terms, which in particular allows for high MRPK firms to be on a different time trend.

$\beta_1$ measures the marginal effect of EXIM's shutdown on investment for firms with high MRPK relative to low MRPK. To the extent that $I_i^{High\; MRPK_{i\in j}} \approx I_i^{High\; \tau_i}$, equation (10) is the empirical counterpart to equation (8) (up to the two positive scalars). $\beta_1 < 0$ implies that capital differentially shrinks for firms with high ex-ante wedges, and capital misallocation rises. $\beta_2$ measures changes for low MRPK firms, and $\beta_1 + \beta_2$ measures the total effect on high MRPK firms. These coefficients therefore precisely capture the $\Delta \log K_i$ in equation (8) for high versus low $\tau_i$ firms.

Equation (10) helps to clarify the advantage of our method relative to simply correlating ex-ante MRPK and EXIM dependence. Doing so would only estimate how EXIM impacts misallocation under the strict assumption that all the ex-ante cross-sectional variation in the empirical measures of MRPK is driven by variation in wedges. Instead, our method will identify effects on misallocation only if firms with ex-ante high MRPK differentially *change* the amount of capital they use, which we can interpret as EXIM changing the firm wedges, holding fixed all the other invariant characteristics that might correlate with the ex-ante measure of MRPK.

**Identifying assumptions.** Equation (10) is identified under the standard triple difference assumption that the *difference* between high and low MRPK firms have a parallel trend for EXIM financed vs. non-financed firms. A threat to identification would be a concurrent, unobserved shock to high MRPK firms that receive EXIM financing relative to low MRPK firms that receive financing, while high and low MRPK firms not backed by EXIM do not receive this shock. Note that this threat is less severe than in the D-i-D setting, where any unobserved shock correlated with EXIM financing would compromise identification. We do not need for high and low MRPK firms to be on the same parallel trend, since this is controlled for by the interaction of $I_i^{High\; \tau_i}$ with year fixed effects, nor do we require that EXIM-backed firms and non-backed firms evolve on parallel trends, since this is controlled for by $EXIM_i \times Post_{t\geq 2015}$.

Table 8 shows the results. We report the outcomes when we estimate separate regressions for a

Table 8: Impact on Capital Misallocation

| *Dependent variable* | Investment | | | | | |
|---|---|---|---|---|---|---|
| *MRPK sorting* | SIC-4 | | | SIC-4×Size quartile | | |
| *Sample* | Low | High | All | Low | High | All |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.056 | -0.17 | | -0.044 | -0.21 | |
| | (0.038) | (0.055) | | (0.042) | (0.062) | |
| | [0.14] | [0.0016] | | [0.30] | [0.00060] | |
| $\text{EXIM}_i \times \text{Post}_t \times \text{I}_i^{\text{High MRPK}}$ | | | -0.12 | | | -0.17 |
| | | | (0.067) | | | (0.075) |
| | | | [0.072] | | | [0.022] |
| *Fixed Effects* | | | | | | |
| Exporter×Year | ✓ | ✓ | — | — | — | — |
| Industry×Year | ✓ | ✓ | — | — | — | — |
| Exporter×Size×Year | — | — | — | ✓ | ✓ | — |
| Industry×Size×Year | — | — | — | ✓ | ✓ | — |
| EXIM×Year | — | — | ✓ | — | — | ✓ |
| *Fixed Effects (interacted)* | | | | | | |
| Exporter×Year | — | — | ✓ | — | — | — |
| Industry×Year | — | — | ✓ | — | — | — |
| Exporter×Size×Year | — | — | — | — | — | ✓ |
| Industry×Size×Year | — | — | — | — | — | ✓ |
| Observations | 13,226 | 10,784 | 24,010 | 14,988 | 9,022 | 24,010 |

*Notes:* This table reports the estimated effects of EXIM's shutdown on firms' capital investment. MRPK is defined as average revenues over physical capital between 2010 and 2013. In columns 1–3, firms are sorted along their SIC-4 median. In columns 4–6, firms are sorted along the median of their SIC-4 × quartile of asset distribution. $I_i^{\text{High MRPK}}$ is an indicator that takes the value one if the firm is above the median. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. $Post_t$ is an indicator variable equal to 1 for the years 2015 to 2019. $EXIM_i$ is an indicator variable that equals 1 if the firm received trade financing from EXIM over the pre-shutdown period. Exporter fixed effect is an indicator variable that equals 1 if the firm reports positive EXIM financing, foreign sales in Compustat Segment, international activity in their 10-Ks, exports in Datamyne, or taxable foreign income before 2014. Industries are SIC-2. In columns 3 and 6, all the baseline fixed effects are interacted with $I_i^{\text{High MRPK}}$. Standard errors are clustered at the firm level and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

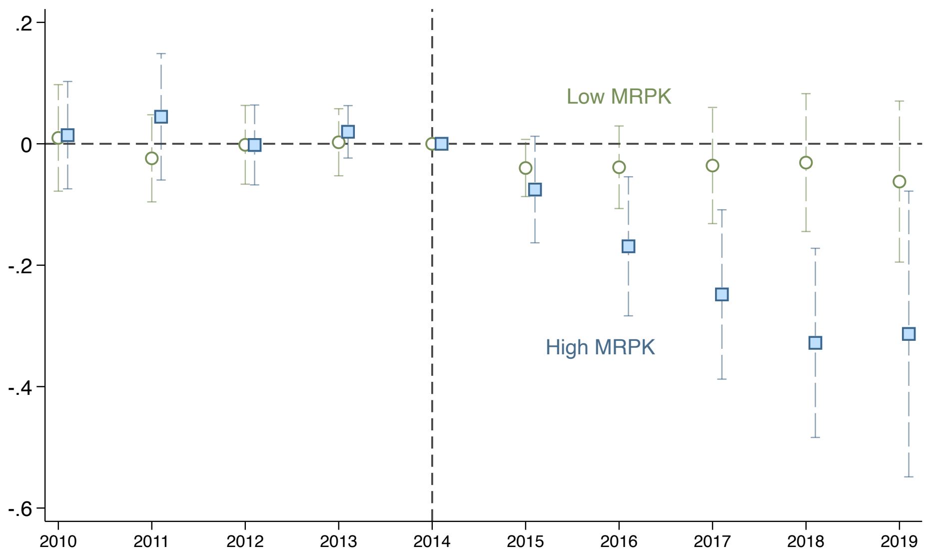
sample split by MRPK (columns 1, 2, 4, 5) or estimate a regression in the full sample with a triple interaction (columns 3 and 6). In the triple-difference regression, we directly control for EXIM × Year fixed effects such that the D-i-D coefficient $EXIM_i \times Post_t$ is not estimated.

In columns 1–3, we estimate the change in capital across the MRPK distribution computed within the same industry. Firms with higher ex-ante MRPK are more affected by the shutdown of EXIM relative to low MRPK firms. While low MRPK firms are barely affected by the shock (6%, not statistically significant), high MRPK firms reduce their invesment by 17%, such that the difference between the two groups of firms increases by 12%.

These results indicate that capital contracts relatively more for high MRPK firms such that misallocation increases following EXIM's shutdown. We provide graphical evidence of this pattern in Figure 7. The figure shows a lack of pre-trends for both high and low MRPK firms, consistent with our identifying assumption, and it shows an increasing difference after EXIM's shutdown.

The fact that only high MRPK firms react to EXIM's shutdown while low MRPK firms are mostly unaffected implies that the joint distribution of TFPR and TFPQ can no longer be log-normal.[49]

Figure 7: EXIM's Shutdown Amplifies Capital Misallocation




*Notes:* This figure plots the effect of EXIM's shutdown on investment, estimated separately for firms with high and low MRPK, along with 95% confidence intervals. We include industry-by-size quartile-by-year, and exporter-by-year fixed effects. MRPK is computed as average revenues over physical capital between 2010 and 2013. "High MRPK" firms are firms with an MRPK value above their industry median. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. Standard errors are clustered at the firm level.

The heterogeneity in these effects provides further evidence that EXIM's impact stems from its ability to reduce frictions facing constrained exporters (i.e., those facing high capital input cost wedges). When exporters are less constrained (and hence have lower MRPK), EXIM's shutdown has limited effect. This much more muted real effects for lower MRPK firms aligns with the criticism that EXIM financing would be inframarginal for recipients that can access alternative funding sources.

**Distinguishing changes in misallocation from changes in risk.** As we explain in our identifying assumption, our identification strategy using within-firm changes in capital allocation isolates misallocation effects as long as the risk-adjusted cost of capital does not *differentially* change between high and low MRPK firms.[50]

[49] The Sraer and Thesmar (2023) framework provides an alternative methodology for estimating changes in misallocation, but it also relies on the assumption that joint-normality is maintained after the policy shock. As detailed in Bau and Matray (2022), maintaining the joint log-normal distribution would imply that firms on both sides of the distribution react approximately to the same degree, such that the spread between high and low MRPK firms is reduced, while maintaining the average. The results in this paper provide additional empirical evidence in addition to, for instance (Banerjee, Breza, Townsend and Vera-Cossio, 2020) and Bau and Matray (2023), of cases in which this assumption is violated.

[50] To the extent that EXIM affects the average risk of investment, we capture this effect with the D-i-D variable $EXIM_i \times Post_{t\geq 2015}$. This is a strength of our identification strategy, which relies on comparing the investment of high and low MRPK firms *within EXIM-dependent firms*, and which controls for any direct effect between EXIM and risk reduction.

We address this identification challenge in three ways. First, in the aggregate product-level regressions, we include product-by-destination-by-year ($\gamma_{p,d,t}$) fixed effects. In this case, we identify the effect of EXIM for exporters facing the same exporting risk, at the same point in time. Given that we find, if anything, larger point estimates in Table 2 after including those controls, $\beta_1$ can reasonably be interpreted as not being driven by a differential change in risk. Our overall interpretation is thus that EXIM's larger effect on high MRPK firms is evidence that EXIM matters more for firms with higher wedges ($\tau$).

Second, we account for the possibility that even within an industry, high MRPK firms might reduce their investment more not because they now face lower wedges (a reduction in misallocation), but because their risk-adjusted cost of capital has increased. This could be the case for instance if high MRPK firms are also smaller, and smaller firms face higher risks after the EXIM shutdown, or because larger firms may access more distant, riskier markets.

Given this possibility, Table 8 columns 4–6 sorts firms within their industry *and* quartile of size. We can include an interaction in the specification between all the fixed effects and the size-quartile fixed effects, so $\beta_1$ is now identified by comparing high vs. low MRPK firms that belong to the same industry and the same size bin. We find similar point estimates and if anything of larger magnitudes (17% vs. 12%).

Finally, to further rule out differential risk adjustment as an explanation for our findings, we leverage the advantage of working with publicly listed firms by directly measuring firm risk through stock price data. This approach allows us to disentangle variation in MRPK from variation in risk by implementing a double-sorting procedure that classifies firms according to their MRPK within industry-risk bins. We employ two distinct risk measures: (1) the correlation between firm returns and market returns, following classic CAPM models where systematic risk (the "firm beta") determines the cost of capital; and (2) return volatility (the standard deviation of monthly returns), capturing both systematic and idiosyncratic risk components that may influence investor decisions. Both measures are calculated using monthly returns prior to 2015.

This refined methodology allows us to define "misallocation" as MRPK variation among firms within the same industry and risk category in which the efficient allocation would equalize MRPK within industry and risk bins, but not unconditionally within industry. By interacting all fixed effects with risk-quartile indicators, we effectively control for any differential impact of EXIM's shutdown that operates through changes in firm risk profiles.

Table 9 presents these results. Regardless of whether we measure risk using CAPM betas (columns 1-3) or return volatility (columns 4-6), we consistently find that EXIM's shutdown increased misallocation, as evidenced by the significantly larger investment decline among high MRPK firms, while low MRPK firms remained largely unaffected. These findings hold even after controlling for any risk-heterogeneous effects of EXIM's shutdown.[51]

Table 9: Impact on Capital Misallocation (Risk Adjusted)

| *Dependent variable* | Investment | | | | | |
|---|---|---|---|---|---|---|
| *MRPK sorting* | SIC-4×Risk (return $\beta$) quartile | | | SIC-4×Risk (return volatility) quartile | | |
| *Sample* | Low | High | All | Low | High | All |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $\text{EXIM}_i\times\text{Post}_t$ | -0.033 | -0.14 | | -0.054 | -0.17 | |
| | (0.048) | (0.047) | | (0.043) | (0.050) | |
| | [0.49] | [0.0025] | | [0.21] | [0.00088] | |
| $\text{EXIM}_i\times\text{Post}_t\times\text{I}_i^{\text{High MRPK}}$ | | | -0.11 | | | -0.12 |
| | | | (0.065) | | | (0.061) |
| | | | [0.079] | | | [0.044] |
| *Fixed Effects* | | | | | | |
| Exporter×Risk×Year | ✓ | ✓ | — | ✓ | ✓ | — |
| Industry×Risk×Year | ✓ | ✓ | — | ✓ | ✓ | — |
| EXIM×Year | — | — | ✓ | — | — | ✓ |
| *Fixed Effects (interacted)* | | | | | | |
| Exporter×Risk×Year | — | — | ✓ | — | — | ✓ |
| Industry×Risk×Year | — | — | ✓ | — | — | ✓ |
| Observations | 10,575 | 9,673 | 20,248 | 10,549 | 9,699 | 20,248 |

*Notes:* This table reports the estimated effects of EXIM's shutdown on firms' capital investment. MRPK is defined as average revenues over physical capital between 2010 and 2013 when firms are sorted across the median or their industry (SIC-4)-by-quartiles of risk. $I_i^{\text{High MRPK}}$ is an indicator that takes the value one if the firm is above the median. In columns 1–3, risk is defined as the firm returns' "equity beta" (i.e., the comovement between the firm stock price return and the market return). In columns 4–6, risk is defined as the volatility of firms' returns. Both are measured pre-2015. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. $Post_t$ is an indicator variable equal to 1 for the years 2015 to 2019. $EXIM_i$ is an indicator variable that equals 1 if the firm received trade financing from EXIM over the pre-shutdown period. Exporter fixed effect is an indicator variable that equals 1 if the firm reports positive EXIM financing, foreign sales in Compustat Segment, international activity in their 10-Ks, exports in Datamyne, or taxable foreign income before 2014. Industries are SIC-2. In columns 3 and 6, all the baseline fixed effects are interacted with $I_i^{\text{High MRPK}}$. Standard errors are clustered at the firm level and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

## 6.3 Interpretation of the Effects

Our results so far indicate that EXIM's shutdown increased capital misallocation among publicly listed firms. While we cannot speak to the effect on misallocation for the universe of firms, our results do not support the notion that EXIM's trade financing initially distorted the allocation of resources in the economy.

We now discuss the structural interpretation of this result, and whether the reallocation of capital toward firms with lower marginal returns after EXIM's shutdown necessarily implies an increase in "*misallocation*." While this interpretation is not important for the empirical results per se, it may have different implications for the optimal design of export credit agencies in general.

**Combined wedge, input wedge and output markup.** So far, we have assumed that the only

[51] Importantly, the stability of our misallocation estimates when controlling for risk differences does not imply that EXIM failed to reduce export risk overall. Rather, it suggests that any risk-reduction benefits EXIM provided before its shutdown were distributed relatively uniformly across high and low MRPK firms.

source of variation in MRPK among similar firms is the existence of an input wedge $\tau_i$. However, it is also possible that firms might vary along their ability to change an output wedge $\mu_i$. In this case, we can define an overall wedge as: $1 + \tau_i = \mu_i(1 + \tilde{\tau}_i)$, where $\tilde{\tau}_i$ is solely the input cost wedge, and $\mu_i$ is the output wedge. Our results do not take a stance on whether EXIM's shutdown increased misallocation by leading firms with ex-ante high MRPK to contract their investment more because it increased the firm input price wedge $\tilde{\tau}$ or because firms increased their output markup $\mu$.

This additional decomposition is not necessary in our context for two reasons. First, from the perspective of maximizing aggregate output in the economy, the decomposition of the overall wedge $\tau$ between $\mu$ and $\tilde{\tau}$ is irrelevant. The increase in output from an improved allocation of inputs are the same whether this improvement comes from capital being allocated more to firms with a higher transformation rate into output (high MRPK), or because firms with higher output wedges invest more, or because firms with higher input wedges invest more.

Second, standard macro and trade models assume that consumers aggregate goods with CES preferences and have constant elasticities across goods, which implies that markups can differ across firms, but are time invariant within firms.[52] Given that we identify within-firm changes in capital misallocation, these frameworks would conclude that removing EXIM financing reduced investment because it increased firms input wedges ($\tilde{\tau}$) rather than because firms were able to charge even higher output markup ($\mu$).

### 6.4 Discussion of EXIM as Industrial Policy

We have shown that EXIM affects many firm outcomes, including investment and employment, in particular for firms facing higher financing and trade frictions. We also find evidence that the EXIM shutdown increased rather than decreased the misallocation of capital within a set of firms that account for a large share of economic activity. We now provide a discussion of EXIM's interaction with the broader economy. First, we discuss the potential costs of financing the bank through tax revenues, which may require raising distortive taxes elsewhere. Second, we use our framework to illustrate how EXIM could target broader industrial policy goals.

#### 6.4.1 EXIM Profitability

Unlike private commercial banks, ECAs operate as government-backed agencies that theoretically have access to tax revenues, implying they may not be constrained by a profitability condition. If these institutions can benefit from tax transfers, public financing would then require levying (potentially distortive) taxes, which would impose a cost on the taxed sectors.

[52] For instance, in Melitz (2003) the only gain from trade comes from a reallocation of inputs across firms. See Atkeson and Burstein (2008) for the introduction of variable markups within firms.

We systematically collect the balance sheets and income statements from EXIM's annual reports, which allows us to reconstruct information on EXIM's profitability. EXIM generated total profits of over \$480 million during the period of our study with default rates of 0.3%. These results are consistent with the institutional constraints on ECAs that require them to be self-financing.

We find EXIM's balance sheet profitability to be economically plausible. Profitability requires that ECAs operate at a price above its own marginal cost by charging a positive mark-up: $r_{i,m}^{ECA} = MC_{i,m}^{ECA} + \mu_{i,m}^{ECA}$. First, we show in Appendix D.4 that ECAs only need to offer financing at a price lower than a firm's shadow price of capital ($r_{i,m}^{ECA} < r_{i,m}^{\tau}$), which is potentially higher than the market price, and especially so if the firm is more constrained.

Second, relative to private banks, ECAs may have different, and in particular, lower marginal costs (Section 2.2.1). As a US government agency, EXIM has access to different contract enforcement technologies that raises its recovery rates. In addition, EXIM does not need to pay all of the high costs of regulatory compliance that govern private commercial banks' domestic and international operations. EXIM's lower marginal cost does *not* appear to come from accessing the US government's cost of capital, as EXIM has historically paid interest to the Treasury on its balance sheet at a higher rate than the 30-year Treasury bond rate (Appendix D.2.4).

Third, by operating with a dual objective of both maximizing profits and boosting exports, ECAs would optimally charge lower mark-ups than a purely profit-maximizing bank. They therefore resemble government-owned banks in other development contexts, such as in Brazil (Fonseca and Matray, 2024) or Thailand (Assuncao, Mityakov and Townsend, 2022).

### 6.4.2 EXIM as a Tool for Other Industrial Policy Objectives

Industrial policies typically aim to support firms that feature external economies of scale because the privately optimal amount of investment is lower than the social optimum.

More generally, there might exist positive or negative social externalities that vary across sectors $j$, firms $i$, markets $m$, or dynamically over time $t$, which justify government interventions in the economy. We denote the input wedge that separates the private optimum from the social optimum as $\tau^s$, which can be either negative (in the case of a negative externality) or positive (for a positive externality like external economies of scale).

$$\text{MRPK}_{j,i,m,t} = (1 + \underbrace{\tau_s}_{\text{Social wedge}} - \underbrace{EXIM_{i,j,m,t}}_{\text{Financing friction targeted by EXIM}}) \times r_{j,i,m,t} \tag{11}$$

The formulation in equation 11 shows that the extent to which EXIM's financing moves the economy closer to or further away from the social optimum depends on the correlation between the trade financing wedges for firms $i, j, m$ at time $t$, and the broader social wedges carried by these firms. A strong correlation would imply that EXIM is able to target other social wedges while meeting its primary objective of providing trade financing. For example, many advanced economies have tilted their industrial policies towards speeding up the green energy transition. To the extent that firms producing and innovating in that sector face financing constraints in exporting their products, EXIM targets both objectives. Similarly, financing firms that help the US to decouple from China and encourage trade with certain nations may serve broader geopolitical stability goals. By contrast, a negative correlation would generate a trade-off between EXIM's mission of reducing trade financing wedges, and the social planner's goals.

Ultimately, the interaction between EXIM's objective and other socially desirable motives raises the broader question of complementarities among industrial policies. An advantage of EXIM (and other programs featuring targeted transactions-based interventions) is that it can plausibly target social wedges without necessarily introducing other costly distortions. However, the extent to which ECAs in fact target such wedges is an empirical question that is outside the scope of this paper.

## 7 Conclusion

Can governments boost exports by providing targeted trade financing? This paper's findings, based on the natural experiment of the US EXIM Bank's temporary shutdown, suggest the answer is yes. When EXIM's sudden closure cut off financing to previously supported exporters, those firms experienced slower revenue growth and reduced capital investment and employment. These effects were especially pronounced for financially constrained firms and for exports to riskier, less financially developed markets—consistent with EXIM financing alleviating credit constraints. Overall, US industries more reliant on EXIM experienced weaker export growth than less-dependent industries.

Taken together, these effects are inconsistent with the view that EXIM primarily transfers taxpayer funds to unconstrained firms that reap windfall profits without expanding production. On the contrary, the contraction of EXIM-dependent firms was more pronounced among those with higher marginal returns to capital, indicating that EXIM support improves rather than worsens the allocation of resources in the economy.

Our findings showing that EXIM had a positive effect on US exports contribute to the broader debate on when industrial policy can effectively support the domestic economy (e.g., Juhász, Lane and Rodrik, 2023). That said, caution is warranted in generalizing our results.

First, we estimate the effects of EXIM within its current operational scale. Our results do not address the optimal size of ECAs or imply effectiveness at significantly larger scales. We argue that EXIM's impact stems from alleviating financing constraints in the private market. Other interventions targeting similar firms—or large-scale expansions of ECA funding—could have a lower marginal effectiveness and even exacerbate capital misallocation.

Second, although we find reduced misallocation among listed firms, our data do not cover the entire economy, and we cannot rule out that EXIM increased misallocation once we account for private firms. Third, our research design cannot, by construction, assess the general equilibrium effects of EXIM's programs on the US or global economy. Understanding how these micro-level effects scale to the macro level, and how countries interact in markets for export credit subsidies, remains a promising direction for future research.

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Online Appendix for
"EXIM's Exit: Industrial Policy, Export Credit Agencies, and Capital Allocation"

Adrien Matray Karsten Müller Chenzi Xu Poorya Kabir

June 2025

## Table of Contents

# A Additional Tables

Table A.1: Impact on US Product Exports: Robustness to Alternative Control Group

| *Dependent variable* | Exports | | | | | |
|---|---|---|---|---|---|---|
| *Level of aggregation* | HS-4 | HS-6 | HS-6×Destination | HS-6×Destination | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $\text{EXIM}_{p,o}\times\text{Post}_t$ | -3.14 | -3.14 | -3.14 | -2.45 | -2.72 | |
| | (1.79) | (1.79) | (1.79) | (1.56) | (1.76) | |
| | [0.079] | [0.079] | [0.079] | [0.12] | [0.12] | |
| $\text{EXIM}_{p,o}\geq 0.45\%\times\text{Post}_t$ | | | | | | -0.058 |
| | | | | | | (0.017) |
| | | | | | | [0.00051] |
| *Fixed Effects* | | | | | | |
| Origin×Year | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Product (4-digit)×Year | ✓ | ✓ | ✓ | — | — | — |
| Product (6-digit)×Year | — | — | — | ✓ | — | — |
| Product (6-digit)×Destination×Year | — | — | — | — | ✓ | ✓ |
| Observations | 65,862 | 6,808,567 | 20,528,380 | 20,528,380 | 20,528,380 | 20,528,380 |

*Notes:* This table reports estimates on the effect of EXIM's shutdown on total export at the product-by-destination level taken from BACI. The dependent variable is the exports growth rate of origin country $o$ (exporter) to destination country $d$ (importer) of product $p$ at time $t$ relative to 2014 (the year prior to the shock), and is defined as $\Delta Y_{p,o,d,t} = (Y_{p,o,d,t} - Y_{p,o,d,2014})/[(Y_{p,o,d,t} + Y_{p,o,d,2014}) \times 0.5]$. The sample includes a control group of other exporter countries $o$ with similar export patterns as the US. The control group is defined as the five OECD countries with the highest overlap with the US in their vector of export market shares across products and destinations. EXIM intensity ($\text{EXIM}_{po}$) in columns 1-5 is defined as the total amount of EXIM (in $) over total exports (in $) over the period 2007–2010. In column 6, $\text{EXIM}_{po} \geq 0.45\%$ is an indicator variable for a product being in the top quartile of treatment value. In columns 1–3, the coefficients and standard errors are identical by construction of the midpoint growth estimator (Beaumont, Matray and Xu, 2024). Standard errors are clustered at the HS-4 level and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

Table A.2: Impact on US Product Exports: Robustness to Alternative Weighting

| *Dependent variable* | Exports | | | |
|---|---|---|---|---|
| *Weighting* | EW | VW: 1% | VW, invariant: 5% | VW, invariant: 1% |
| | (1) | (2) | (3) | (4) |
| $\text{EXIM}_{p,o}\times\text{Post}_t$ | -3.72 | -5.77 | -5.36 | -5.24 |
| | (1.89) | (2.57) | (2.32) | (2.41) |
| | [0.049] | [0.025] | [0.021] | [0.030] |
| *Fixed Effects* | | | | |
| Origin×Year | ✓ | ✓ | ✓ | ✓ |
| Product (6-digit)×Destination×Year | ✓ | ✓ | ✓ | ✓ |
| Observations | 24,143,761 | 24,143,761 | 24,143,660 | 24,143,660 |

*Notes:* This table reports estimates on the effect of EXIM's shutdown on total export at the product-by-destination level taken from BACI. The dependent variable is the exports growth rate of origin country $o$ (exporter) to destination country $d$ (importer) of product $p$ at time $t$ relative to 2014 (the year prior to the shock), and is defined as $\Delta Y_{p,o,d,t} = (Y_{p,o,d,t} - Y_{p,o,d,2014})/[(Y_{p,o,d,t} + Y_{p,o,d,2014}) \times 0.5]$. The sample includes a control group of other exporter countries $o$ with similar export patterns as the US. EXIM intensity is defined as the total amount of EXIM (in \$) over total exports (in \$) over the period 2007–2010. In column 1, the regression is equally weighted at the product (HS-6)-exporter-year level. In column 2, regression weights are winsorized at 1%. In columns 3 and 4, we use time-invariant weights based on the average exports value at the product (HS-6)-exporter-year level over the pre-shutdown period. Standard errors are clustered at the HS-4 level and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

Table A.3: Impact on Firm-level Maritime Exports: Robustness to Different Measures

| *Dependent variable* | Maritime Exports | | | | |
|---|---|---|---|---|---|
| | | | Metric tons | | |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.20 | -0.19 | -0.20 | -0.18 | -0.26 |
| | (0.022) | (0.021) | (0.022) | (0.020) | (0.051) |
| | [6.6e-18] | [4.1e-18] | [1.6e-19] | [1.3e-17] | [0.00000026] |
| | | | Containers | | |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.18 | -0.17 | -0.19 | -0.16 | -0.25 |
| | (0.023) | (0.022) | (0.022) | (0.021) | (0.045) |
| | [1.9e-15] | [3.0e-15] | [5.2e-17] | [6.0e-15] | [0.000000020] |
| | | | Value | | |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.17 | -0.16 | -0.17 | -0.15 | -0.28 |
| | (0.021) | (0.020) | (0.020) | (0.018) | (0.034) |
| | [7.5e-15] | [2.2e-15] | [7.4e-17] | [1.3e-16] | [7.0e-16] |
| *Fixed Effects* | | | | | |
| Post | ✓ | — | — | — | — |
| Product×Post | — | ✓ | — | — | — |
| Destination×Post | — | — | ✓ | — | — |
| Product×Destination×Post | — | — | — | ✓ | ✓ |
| Observations | 1,855,542 | 1,855,542 | 1,855,542 | 1,855,542 | 144,404 |

*Notes:* This table reports the estimated effects of EXIM's shutdown on firms' maritime exports from Datamyne. Data are collapsed as an average pre (up to 2014) and post period (2015–2019). The dependent variable is calculated as a midpoint growth rate based on the Beaumont, Matray and Xu (2024) estimator, and defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,t\leq 2014})/[(Y_{i,t} + Y_{i,t\leq 2014}) \times 0.5]$. $Post_t$ is an indicator variable equal to 1 for the years 2015 to 2019. $EXIM_i$ is an indicator variable that equals 1 if the firm received trade financing from EXIM over the pre-shutdown period. Product fixed effects are at the HS-4 level, and destination fixed effects are at the country level. Regressions are value weighted by firm exports. The number of observations is based on Maritime Exports measured in terms of "Value." Standard errors are clustered at the HS-4 level, and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

Table A.4: Impact on Firm-level Maritime Exports: Robustness to Equal Weighting

| *Dependent variable* | Maritime Exports | | | | |
|---|---|---|---|---|---|
| | | | Teus | | |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.48 | -0.45 | -0.46 | -0.39 | -0.25 |
| | (0.030) | (0.024) | (0.028) | (0.023) | (0.046) |
| | [4.7e-52] | [7.2e-69] | [3.3e-53] | [9.6e-56] | [0.000000071] |
| | | | Metric tons | | |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.49 | -0.45 | -0.47 | -0.39 | -0.26 |
| | (0.031) | (0.024) | (0.029) | (0.023) | (0.051) |
| | [5.3e-51] | [4.0e-68] | [8.2e-52] | [5.0e-55] | [0.00000026] |
| | | | Containers | | |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.49 | -0.45 | -0.47 | -0.39 | -0.25 |
| | (0.030) | (0.024) | (0.029) | (0.023) | (0.045) |
| | [7.5e-53] | [2.5e-70] | [3.7e-54] | [2.6e-57] | [0.000000020] |
| | | | Value | | |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.43 | -0.38 | -0.40 | -0.33 | -0.28 |
| | (0.028) | (0.024) | (0.027) | (0.023) | (0.034) |
| | [2.4e-47] | [2.1e-53] | [4.0e-46] | [1.8e-42] | [7.0e-16] |
| *Fixed Effects* | | | | | |
| Post | ✓ | — | — | — | — |
| Product×Post | — | ✓ | — | — | — |
| Destination×Post | — | — | ✓ | — | — |
| Product×Destination×Post | — | — | — | ✓ | ✓ |
| Observations | 1,855,542 | 1,855,542 | 1,855,542 | 1,855,542 | 144,404 |

*Notes:* This table reports the estimated effects of EXIM's shutdown on firms' maritime exports from Datamyne. Data are collapsed as an average pre (up to 2014) and post period (2015–2019). The dependent variable is calculated as a midpoint growth rate based on the Beaumont, Matray and Xu (2024) estimator, and defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,t \leq 2014}) / [(Y_{i,t} + Y_{i,t \leq 2014}) \times 0.5]$. $Post_t$ is an indicator variable equal to 1 for the years 2015 to 2019. $EXIM_i$ is an indicator variable that equals 1 if the firm received trade financing from EXIM over the pre-shutdown period. Product fixed effects are at the HS-4 level, and destination fixed effects are at the country level. Regressions are equally weighted. The number of observations is based on Maritime Exports measured in terms of "Value." Standard errors are clustered at the HS-4 level, and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

Table A.5: Impact on Firm Revenues: Robustness to Different Industry Definitions

| *Dependent variable* | Total revenues | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.13 | -0.12 | -0.10 | -0.13 |
| | (0.033) | (0.035) | (0.032) | (0.044) |
| | [0.000038] | [0.00072] | [0.0017] | [0.0031] |
| *Fixed Effects* | | | | |
| Exporter×Year | ✓ | ✓ | ✓ | ✓ |
| Industry (1-digit)×Year | ✓ | — | — | — |
| Industry (2-digit)×Year | — | ✓ | — | — |
| Industry (3-digit)×Year | — | — | ✓ | — |
| Industry (4-digit)×Year | — | — | — | ✓ |
| Observations | 25,174 | 25,174 | 25,174 | 25,174 |

*Notes:* This table reports the estimated effects of EXIM's shutdown on firms' total revenue growth. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. $Post_t$ is an indicator variable equal to 1 for the years 2015 to 2019. $EXIM_i$ is an indicator variable that equals 1 if the firm received trade financing from EXIM over the pre-shutdown period. Exporter fixed effect is an indicator variable that equals 1 if the firm reports positive EXIM financing, foreign sales in Compustat Segment, exports Datamyne, or taxable foreign income before 2014. Standard errors are clustered at the firm level and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

Table A.6: Impact on Firm Revenues by Separate EXIM Programs

| *Dependent variable* | Total revenues | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| $\text{EXIM (working cap)}_i \times \text{Post}_t$ | -0.15 | | -0.12 | |
| | (0.053) | | (0.074) | |
| | [0.0058] | | [0.10] | |
| $\text{EXIM (insurance)}_i \times \text{Post}_t$ | | -0.13 | | -0.13 |
| | | (0.043) | | (0.049) |
| | | [0.0025] | | [0.0095] |
| *Fixed Effects* | | | | |
| Exporter×Year | ✓ | ✓ | ✓ | ✓ |
| Industry×Year | ✓ | ✓ | ✓ | ✓ |
| Size×Year | ✓ | ✓ | ✓ | ✓ |
| Observations | 24,448 | 24,775 | 24,448 | 24,775 |

*Notes:* This table reports the estimated effects of EXIM's shutdown on firms' total revenue growth. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. *EXIM* (working cap)$_i$ is an indicator variable that takes the value one if the firm received EXIM financing under EXIM's lending program. *EXIM* (insurance)$_i$ is an indicator variable that takes the value one if the firm received EXIM financing under EXIM's insurance program. Regressions are unweighted in columns 1 and 2, and they are value weighted by firm exports in columns 3 and 4. $Post_t$ is an indicator variable equal to 1 for the years 2015 to 2019. $EXIM_i$ is an indicator variable that equals 1 if the firm received trade financing from EXIM over the pre-shutdown period. Exporter fixed effect is an indicator variable that equals 1 if the firm reports positive EXIM financing, foreign sales in Compustat Segment, exports Datamyne, or taxable foreign income before 2014. Industries are SIC-4. Standard errors are clustered at the firm level and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

Table A.7: Impact on Employment, Capital, and Profit Rates: Robustness to Different Weighting

| *Dependent variable* | Revenues | Tangible capital | Intangible capital | Employment | Profit margin |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| | | | Equal weight | | |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.15 | -0.12 | -0.14 | -0.077 | -0.015 |
| | (0.032) | (0.032) | (0.034) | (0.026) | (0.014) |
| | [0.0000029] | [0.00017] | [0.000060] | [0.0030] | [0.29] |
| | | | Value weight: winsor 1% | | |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.098 | -0.17 | -0.19 | -0.088 | -0.0027 |
| | (0.036) | (0.058) | (0.066) | (0.035) | (0.0048) |
| | [0.0065] | [0.0041] | [0.0042] | [0.011] | [0.58] |
| *Fixed Effects* | | | | | |
| Exporter×Year | ✓ | ✓ | ✓ | ✓ | ✓ |
| Industry×Year | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 25,174 | 24,635 | 25,015 | 22,902 | 25,174 |

*Notes:* This table reports the estimated effects of EXIM's shutdown on various firm outcomes. Intangible capital is measured following Peters and Taylor (2017). Net profit margin is measured as net income over revenues. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. $Post_t$ is an indicator variable equal to 1 for the years 2015 to 2019. $EXIM_i$ is an indicator variable that equals 1 if the firm received trade financing from EXIM over the pre-shutdown period. Exporter fixed effect is an indicator variable that equals 1 if the firm reports positive EXIM financing, foreign sales in Compustat Segment, international activity in their 10-Ks, exports in Datamyne, or taxable foreign income before 2014. Industries are SIC-2. Standard errors are clustered at the firm level and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

Table A.8: Impact on Employment, Capital, and Profit Rates: Robustness to LHS Winsorization

| *Dependent variable* | Revenues | Tangible capital | Intangible capital | Employment | Profit margin |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| | | | LHS: winsor 1% | | |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.16 | -0.20 | -0.29 | -0.12 | 0.00033 |
| | (0.044) | (0.059) | (0.068) | (0.040) | (0.0062) |
| | [0.00028] | [0.00079] | [0.000017] | [0.0023] | [0.96] |
| | | | LHS: winsor 3× interquartile | | |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.10 | -0.11 | -0.13 | -0.092 | 0.0010 |
| | (0.033) | (0.039) | (0.038) | (0.033) | (0.0052) |
| | [0.0019] | [0.0030] | [0.00069] | [0.0057] | [0.84] |
| | | | LHS: midpoint growth | | |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.075 | -0.11 | -0.11 | -0.056 | 0.0015 |
| | (0.032) | (0.038) | (0.035) | (0.059) | (0.0059) |
| | [0.019] | [0.0051] | [0.0013] | [0.35] | [0.80] |
| *Fixed Effects* | | | | | |
| Exporter×Year | ✓ | ✓ | ✓ | ✓ | ✓ |
| Industry×Year | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 25,174 | 24,795 | 25,036 | 23,605 | 25,174 |

*Notes:* This table reports the estimated effects of EXIM's shutdown on various firm outcomes. Intangible capital is measured following Peters and Taylor (2017). Net profit margin is measured as net income over revenues. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. $Post_t$ is an indicator variable equal to 1 for the years 2015 to 2019. $EXIM_i$ is an indicator variable that equals 1 if the firm received trade financing from EXIM over the pre-shutdown period. Exporter fixed effect is an indicator variable that equals 1 if the firm reports positive EXIM financing, foreign sales in Compustat Segment, international activity in their 10-Ks, exports in Datamyne, or taxable foreign income before 2014. Industries are SIC-2. Standard errors are clustered at the firm level and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

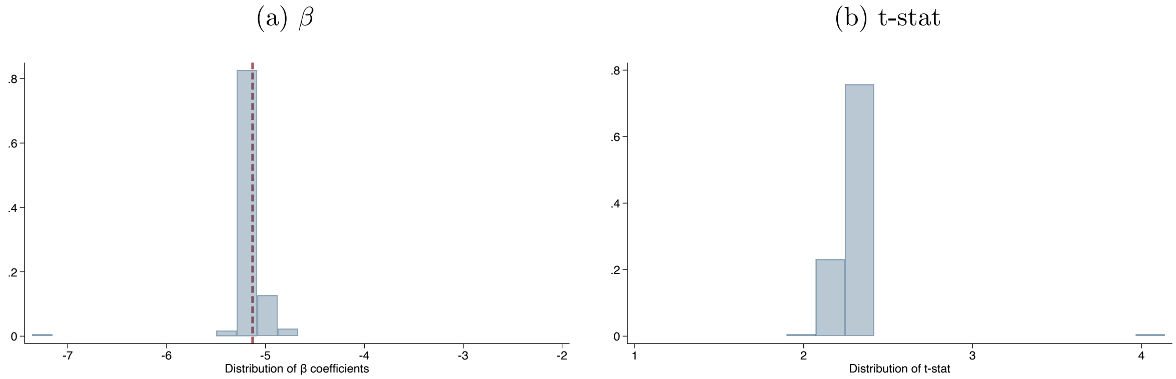
Table A.9: Impact on Employment, Capital, and Profit Rates: LHS defined in (log) level

| *Dependent variable* | Revenues | Tangible capital | Intangible capital | Employment | Profit margin |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.12 | -0.12 | -0.15 | -0.12 | -0.0048 |
| | (0.047) | (0.046) | (0.062) | (0.048) | (0.0058) |
| | [0.011] | [0.0085] | [0.013] | [0.011] | [0.41] |
| *Fixed Effects* | | | | | |
| Firm | ✓ | ✓ | ✓ | ✓ | ✓ |
| Exporter×Year | ✓ | ✓ | ✓ | ✓ | ✓ |
| Industry×Year | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 28,468 | 27,935 | 28,288 | 26,584 | 28,468 |

*Notes:* This table reports the estimated effects of EXIM's shutdown on various firm outcomes. Intangible capital is measured following Peters and Taylor (2017). Net profit margin is measured as net income over revenues. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. $Post_t$ is an indicator variable equal to 1 for the years 2015 to 2019. $EXIM_i$ is an indicator variable that equals 1 if the firm received trade financing from EXIM over the pre-shutdown period. Exporter fixed effect is an indicator variable that equals 1 if the firm reports positive EXIM financing, foreign sales in Compustat Segment, international activity in their 10-Ks, exports in Datamyne, or taxable foreign income before 2014. Industries are SIC-2. Standard errors are clustered at the firm level and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.

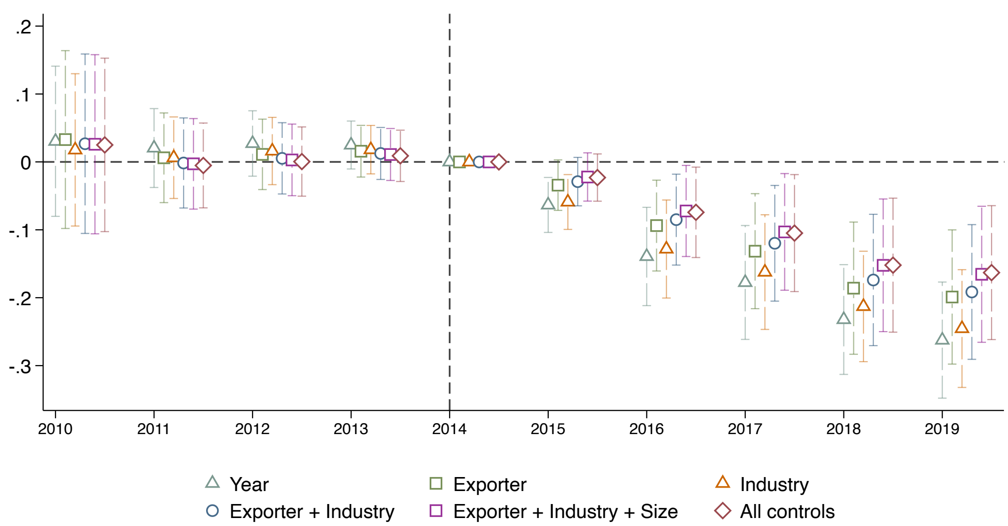
# B Additional Figures

Figure B.1: US Export Effects Excluding Products Individually: Distribution of $\beta$ and t-stats



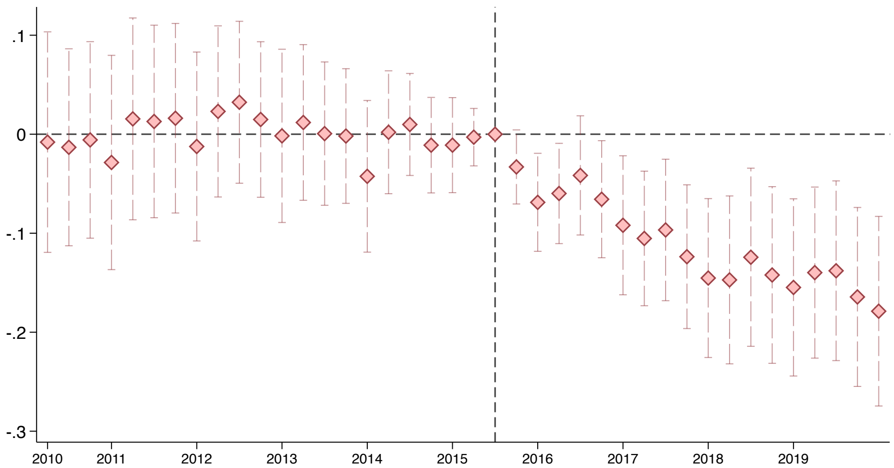

*Notes:* This figure reports the distribution of $\beta$ and t-stats for the average effect of EXIM's shutdown on aggregate export at the product-by-destination level taken from BACI, as estimated in Table 2, when we exclude products (HS-4) one-by-one. Panel (a) plots the $\hat{\beta}$ reported in Table 2 column 5 in the vertical red dotted line. The dependent variable is the exports growth rate of origin country $o$ (exporter) to destination country $d$ (importer) of product $p$ at time $t$ relative to 2014 (the year prior to the shock), and is defined as $\Delta Y_{p,o,d,t} = (Y_{p,o,d,t} - Y_{p,o,d,2014})/[(Y_{p,o,d,t} + Y_{p,o,d,2014}) \times 0.5]$. The sample includes a control group of other exporter countries $o$ with similar export patterns as the US. Standard errors are clustered at the HS-4 level.

Figure B.2: Impact of EXIM's Shutdown on Total Revenues: Robustness to Multiple Specifications



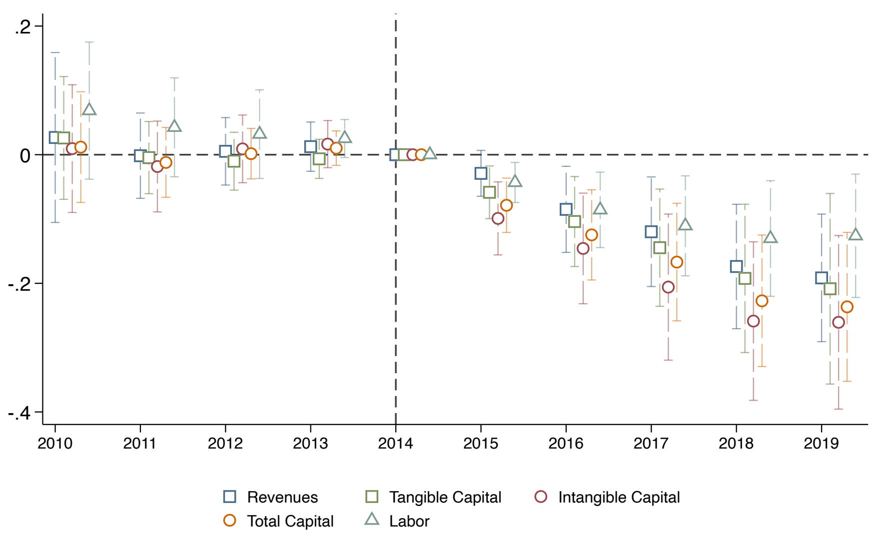

*Notes:* This figure shows the point estimates and 95% confidence intervals when estimating equation (3) and progressively including more stringent sets of fixed effects. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. Standard errors are clustered by firm.

Figure B.3: EXIM's Shutdown and Quarterly Firm Revenues



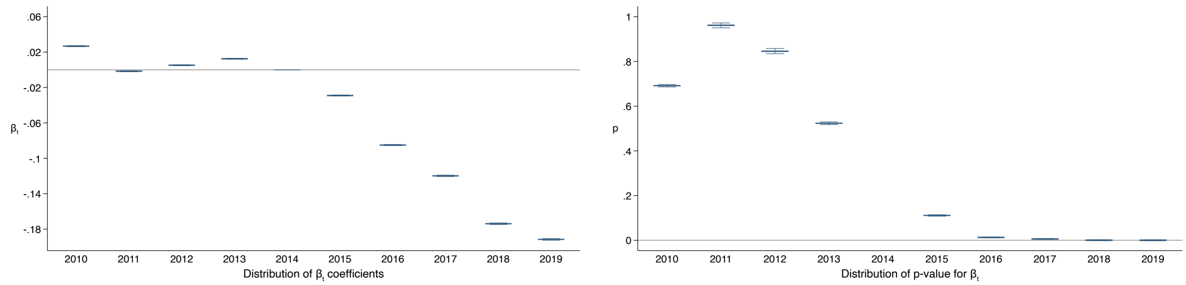

*Notes:* This figure plots the point estimate and 95% confidence intervals when estimating equation (3) with quarterly firm total revenues including industry-by-year and exporter-by-year fixed effects. The omitted time period is the second quarter of 2015, corresponding exactly to the quarter of EXIM's shutdown (July, 2015). The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. Standard errors are clustered by firm.

Figure B.4: Impact of EXIM's Shutdown on Other Firm Outcomes




*Notes:* This figure plots the point estimate and 95% confidence intervals when estimating equation (3) for the following outcomes: total revenues, tangible capital (PP&E), intangible capital (Peters and Taylor, 2017), total capital (tangible + intangible), and employment. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. Standard errors are clustered by firm.

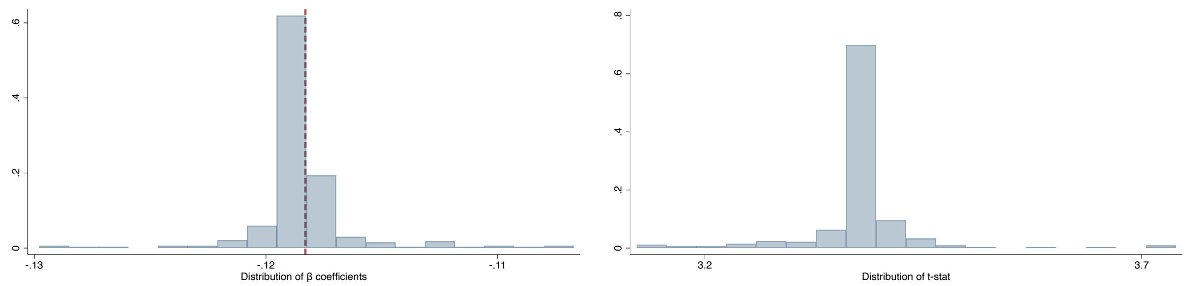
Figure B.5: Firm-level Effects Excluding Industries Individually: Distribution of $\beta$ and $p$-values




*Notes:* This figure reports the distribution of $\beta$ and $p$-values for the firm-level event study in Figure 5 when we exclude industries (SIC-4) one-by-one. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. Standard errors are clustered by firm.

Figure B.6: Firm-level Effects Excluding Industries Individually: Distribution of $\beta$ and t-stats

(a) $\beta$ (b) t-stat




*Notes:* This figure reports the distribution of $\beta$ and t-stat for the average effect of EXIM's shutdown on firm revenue, as estimated in Table 4, when we exclude industries (SIC-4) one-by-one. Panel (a) plots the $\hat{\beta}$ reported in Table 4 column 5 in the vertical red dotted line. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. Standard errors are clustered by firm.

# C Additional Details on Data Construction

## C.1 Matching between EXIM, Compustat, and Datamyne

**Algorithmic match.** All datasets are collapsed at the unique level of name (firm name), city and state. EXIM and Datamyne contain geographical information about the state and the city. Compustat does not contain city names but, it does contain the zipcode of the firm's headquarters, which allows us to recover the name of the city in which the firm is located. We harmonize the name of cities across datasets when needed. We harmonize the different company names in the usual way by removing punctuation signs, removing trailing incorporation status ("inc," "LLC," etc.) and harmonizing obvious typos errors in name (e.g., "internatoinal" becomes "international"). The details of the harmonization code can be directly obtained from the new STATA command **strclean** created for this purpose (Matray and Xu, 2024).

We match the loans in EXIM to Compustat and to Datamyne separately. For each match, we follow three steps.

In steps one and two, we impose exact matching on state and cities, and we use a fuzzy name merge using the reclink2 STATA package (Wasi and Flaaen, 2015) where we impose a threshold of word similarity of 99% and then 95%. We do so in an iterative process so that we remove matched firms with a score of 99% before starting the new procedure with a threshold of 95%.

In step 3, we merge based only on firm names to allow for errors or noise in the reporting of the city or state variables. For example, a firm may be registered in a different city between two datasets. At this final stage, given the higher risk of false positives, we impose a 99% fuzzy score threshold.

**Manual verification.** We manually inspect all the potential matches that were generated algorithmically in steps one to three. The companies we did not consider a match usually fit into one of the following three categories. The first category is companies with equivalent names but different company endings where it is unclear whether or not a potential match refers to the same company. For example, "Barnett Corp" and "Barnett Inc" could easily be mistaken to refer to the same company, and both are based in the United States. However, the former produces paper products and the latter distributes plumbing and electrical equipment, so we do not treat them as a match. The second category is companies with relatively generic or common names, such as "General Technologies," of which there are many different firms worldwide. In many of these cases, we cannot know exactly whether a firm is a match or not, so we keep them unmatched. The third category is cases of holding or group companies that may refer to several firms. For example, "Magna Group" could refer to the Canadian car parts manufacturer or to Magna International, the Korean subsidiary of lubricant producer ITW PP & F headquartered in Shanghai, or several other chemical companies called Magna. In these cases, we also do not treat them as matches.

## C.2 Data cleaning

**Compustat.** We start with the universe of Compustat. We remove financials (sic = 6) and utilities (sic= 49) as well as "foreign government entities" (sic= 8888) and "international affairs and non operating establishments" (sic= 9). We also drop observations for which the fiscal year is missing and observations where the number of fiscal periods is less than 12 months (variable $pddur \neq 12$).

Given our focus on US firms, we remove foreign firms ($fic \neq$ "$USA$") and firms with headquarters outside the US ($loc \neq$ "$USA$").

We drop observations with negative or missing revenues ($sale$) and assets ($at$). In the remaining rare cases of duplicates within a gvkey-year, we sort firms by gvkey and date and keep the first observation.

We restrict the observations to years 2010 and 2019, and we remove firms that enter after the year of the shock, 2014. We also require being able to observe the firm in 2014.

In the baseline analysis, all firm-level variables that are calculated as ratios or growth rates are winsorized at the 5% level.

**BACI.** BACI corresponds to the raw Comtrade data that have already been cleaned and harmonized, so the data requires limited cleaning. We impose two filters.

1. Remove importers that are not defined (ISO code "NA")

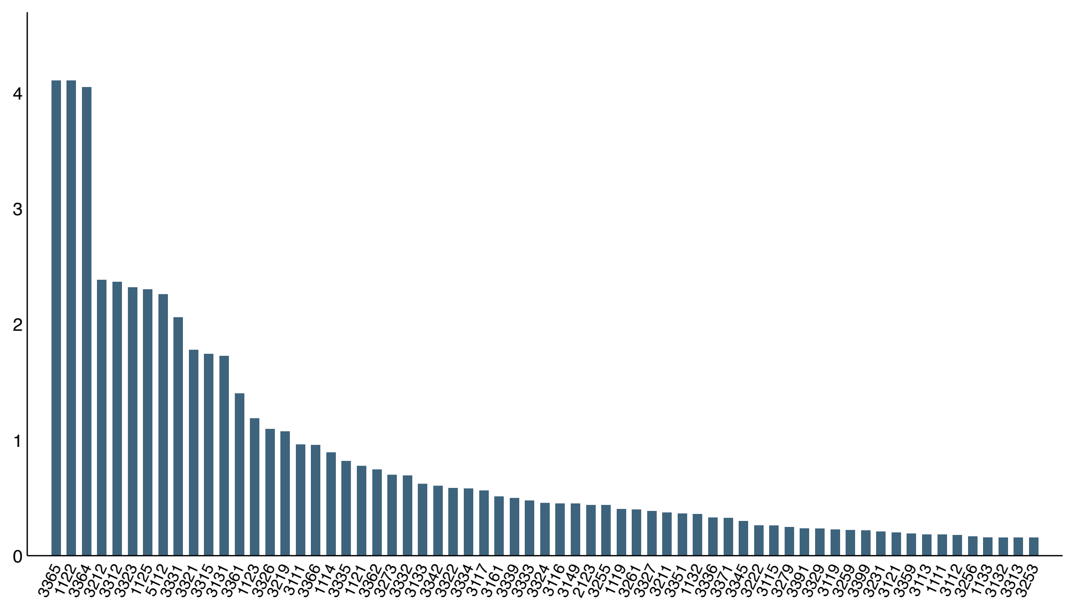
2. Remove the cells where the US never exports. We do this because our preferred specification when studying the effect of EXIM on aggregate export includes destination-by-product (HS6) interacted with year fixed effects ($\gamma_{p,d,t}$). As a result, this set of fixed effects restricts the identifying variation to destination-product-year cells in which the US exports. Including all the data yields quantitatively similar results.

**EXIM loan database.** This loan database provides information on the specific type of financing instrument (loan, guarantee, etc), the name of the US exporting firm, the NAICS code for the US product being exported, and the value of financial support. We include all financial instruments and for ease of explication, we call them all "loans." Not all loans specify the export product, so these observations are not included in the product-level measure of EXIM exposure ($EXIM_{p,o}$); this pertains to 3% of observations and 13% of the overall value of loans in the pre-shutdown period. Not all loans specify a specific firm (because multiple firms are funded), and these observations are not included in the firm-level measure of EXIM exposure ($EXIM_i$); this pertains to 4% of observations and 16% of the overall value of loans. There are 1.6% of observations and 12% of the overall value of funding that appear in neither measure (because a single loan is authorized to fund multiple firms and the export product is not specified).

Figure C.1 shows the distribution across NAICS4, conditional on the industry having at least 0.15% of its exports financed by EXIM. The top 10 industries are: "Hog and Pig Farming" (1122), "Railroad Rolling Stock Manufacturing" (3365), "Aerospace Product and Parts Manufacturing" (3364),"Veneer, Plywood and Engineered Wood Product Manufacturing" (3212), "Steel Product

Manufacturing from Purchased Steel" (3312), "Architectural and Structural Metals Manufacturing" (3323), "Aquaculture" (1125), "Software Publishers" (5112), "Agricultural, Construction and Mining Machinery Manufacturing" (3331), "Forging and Stamping" (3321).

Figure C.1: EXIM Financing Intensity By Industries (%)




*Notes:* This figure plots the intensity of EXIM support (EXIM financing in dollars scaled by exports in dollar) at the NAICS-4 level for all industries that received at least one dollar from EXIM over the period 2007–2010.

## C.3 Variable Definitions

| Variable | Definition |
|---|---|
| Exporter | Firm reports positive value of: foreign taxable income ($txfo$ and $pifo$), or maritime export in Datamyne, or EXIM financing, or appears in the Hoberg and Moon (2017) dataset |
| Asset | $at$ |
| Capital | $ppent$ |
| Employment | $emp$ |
| Total sales | $sale$ |
| ROA | $(oibdp - dp)/at$ |
| Leverage | $(dltt + dlc)/ppent_{t-1}$ |
| Lobbying | $sum\_lobby\_exp/sale$ |
| Financing friction in 10K | $delaycon$ in Hoberg-Maskimovic dataset |
| Profit margin | $(ib + dp)/sale$ |
| MRPK | $sale/ppent$ |
| Dividend intensity | $dvc/ebitda_{t-1}$ |
| Coverage ratio (industry) | Median at SIC-4 of $dlc/ebitda$ |

### C.4 Additional datasets

**Datamyne.** Datamyne provides detailed information on individual shipments—including product codes, destination countries, and the weight of the shipped products. However, the data has some limitations. First, it only covers seaborn trade, which accounts for around 35% of the total value of U.S. exports (International Trade Administration, 2022). Second, it only includes information on shipment volumes. While Datamyne provides an imputation of export values based on average values for Harmonized System (HS) codes, these estimates are missing for 18% of the shipments. Third, 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.

**Rule of Law.** The rule of law information comes from Worldwide Governance Indicators (WDI) Database. The WGI project sources its data from household and firm surveys (e.g., Afrobarometer, Gallup World Poll), commercial business information providers (e.g., Economist Intelligence Unit), non-governmental organizations (e.g., Freedom House), and public sector organizations (e.g., World Bank CPIA assessments). It measures perceptions of trust and adherence to societal rules, including contract enforcement, property rights, police, courts, and the likelihood of crime and violence. This process involves assigning individual data points to the relevant indicators, rescaling these data points from 0 to 1, and using an Unobserved Components Model (UCM) to create a weighted average that corrects for data non-comparability with final scores ranging from approximately -2.5 to 2.5 on a standard normal distribution with higher values corresponding to better governance.

A summary of the methodology of the WGI project and discusses related analytical issues and the inherent challenges in governance measurement can be found in Kaufmann, Kraay and Mastruzzi (2010).

## D Additional Institutional Detail on ECAs and EXIM

### D.1 ECAs around the world

We hand-collect new data on export credit agencies around the world. We begin with the list of ECAs maintained by the OECD, and we supplement that with the list from EXIM's 2022 competitiveness report.[1] We then systematically go through every exporting country and search additional sources like Trade Finance Global's website for additional ECAs.

We find that most exporting countries around the world have an official export credit agency. 90 countries have ECAs, and these countries account for 92% of the total value of world exports. In the OECD, 36 out of 38 countries have ECAs; the only exceptions are Costa Rica and Iceland. In the EU, 24 out of 27 countries have ECAs; the only exceptions are Cyprus, Ireland, and Malta.

Figure D.1 plots the share of world exports (including both goods and services) by each country in 2022 where countries colored in dark blue have an official ECA. Figure D.1a includes the countries that each contributes at least 0.5% of the value of world exports. In total, they account for

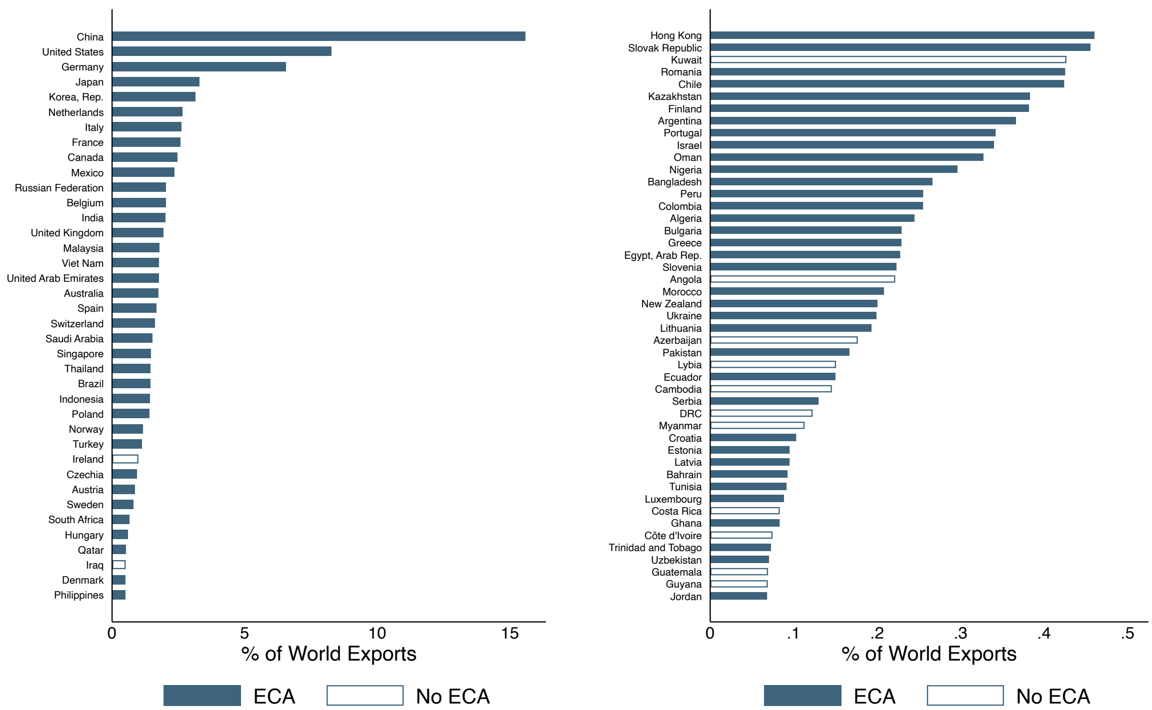
[1] OECD: https://www.oecd.org/trade/topics/export-credits/documents/links-of-official-export-credit-agencies.pdf. EXIM's competitiveness reports: https://www.exim.gov/news/reports/competitiveness-reports.

approximately 89% of the total value of world exports. Figure D.1b includes approximately fifty additional countries that account for an additional 9% of the total value of world exports. Together, all the countries represented account for 98% of the total value of world exports.

Table D.1 lists each country that has an ECA along with the country's OECD membership, the ECA's name, and the year that it was founded. While most countries have one official ECA, several countries (for example, China, Japan, and Sweden) have more than one. In addition, several countries in Africa have their own ECA (for example, Morocco, Tunisia, and South Africa) while the independent states of Africa are also all supported by the African Export Import Bank.

Figure D.1: Export Credit Agencies Around the World

(a) Countries with $\geq 0.5\%$ of World Exports (b) Countries with $< 0.5\%$ of World Exports




*Notes:* These figures plot the share of world exports (measured as both goods and services in 2022) for all countries that cumulatively account for 98% of the value of world exports. Countries with an ECA are in dark blue while those without are in white. Panel (a) includes the contries that each contributes at least 0.5% of the overall value of world exports and overall account for 89% of the value of world exports. Panel (b) includes approximately fifty additional countries that each contributes less than 0.5% of the overall value of world exports and overall account for 9% of the value of world exports.

Table D.1: Export Credit Agencies by Country

| **Country** | **OECD** | **Name** | **Year Founded** |
|---|---|---|---|
| Albania | 0 | Albania Investment Development Agency (AIDA) | 2010 |
| Algeria | 0 | Compagnie Algérienne d'Assurance et de Garantie des Exportations | 1996 |
| Armenia | 0 | Export Insurance Agency of Armenia | 2013 |

*Continued on next page*

Table D.1 – *Continued from previous page*

| Country | OECD | Name | Year Founded |
|---|---|---|---|
| Argentina | 0 | Banco de Inversion y Comercio Exterior | 1992 |
| Australia | 1 | Export Finance Australia | 1957 |
| Austria | 1 | Oesterreichische Kontrollbank AG | 1946 |
| Austria | 1 | Austria Wirtschaftsservice | 2002 |
| Bahrain | 0 | Export Bahrain | 2018 |
| Bangladesh | 0 | Sadharan Bima Corporation | 1973 |
| Barbados | 0 | Central Bank of Barbados: Export Credit Insurance Scheme | 1978 |
| Belarus | 0 | EXIMGARANT of Belarus | 2001 |
| Belgium | 1 | Credendo Group | 1921 |
| Belgium | 1 | The Brussels Guarantee Fund (Fonds Bruxellois de Garantie) | 1999 |
| Bosnia and Herzegovina | 0 | Export Credit Agency of Bosnia and Herzegovina | 1996 |
| Botswana | 0 | Export Credit Insurance & Guarantee Company | 1996 |
| Brazil | 0 | Brazilian Development Bank | 1952 |
| Brazil | 0 | The Brazilian Guarantees and Fund Management Agency | 1999 |
| Bulgaria | 0 | Bulgarian Export Insurance Agency | 1998 |
| Cameroon | 0 | Fonds d'Aide et de Garantie des Crédits aux Petites et Moyennes Enterprises | 2022 |
| Canada | 1 | Export Development Canada | 1944 |
| Chile | 1 | La Corporación de Fomento de la Producción | 1939 |
| China | 0 | Export-Import Bank of China | 1994 |
| China | 0 | China Export and Credit Insurance Corporation | 2001 |
| Hong Kong | 0 | Hong Kong Export Credit Corporation | 1966 |
| Colombia | 1 | Fondo Nacional de Garantias S.A | 1982 |
| Colombia | 1 | Banco de Comercio Exterior de Colombia | 1991 |
| Colombia | 1 | Colombia's Business Development Bank (BANCOLDEX) | 1992 |
| Croatia | 0 | Croatian Bank for Reconstruction and Development | 1992 |
| Czechia | 1 | Export Guarantee and Insurance Corporation | 1992 |
| Czechia | 1 | Czech Export Bank | 1995 |
| Denmark | 1 | Export Credit Fund | 1922 |
| Dominican Republic | 0 | National Bank for Exports (BANDEX) | 2015 |
| Ecuador | 0 | National Financial Corporation Export Promotion Fund | 1972 |
| Egypt, Arab Rep. | 0 | Export Development Bank of Egypt | 1983 |
| Egypt, Arab Rep. | 0 | Export Credit Guarantee Company of Egypt | 1992 |
| Estonia | 1 | Kredex Credit Insurance | 2000 |
| Ethiopia | 0 | Development Bank of Ethiopia, Export Credit Guarantee and Special Fund Administration Bureau | 2008 |
| Finland | 1 | Finnvera | 1999 |
| Finland | 1 | Finnish Export Credit Ltd. | 2000 |
| France | 1 | Bpifrance Assurance Export | 2017 |

*Continued on next page*

Table D.1 – *Continued from previous page*

| Country | OECD | Name | Year Founded |
|---|---|---|---|
| Germany | 1 | Euler Hermes Aktiengesellschaft | 2002 |
| Germany | 1 | KfW IPEX Bank | 2008 |
| Ghana | 0 | Ghana Export-Import Bank | 2016 |
| Greece | 1 | Export Credit Insurance Organisation | 1988 |
| Hungary | 1 | Hungarian Export Credit Insurance Ltd. | 1994 |
| Hungary | 1 | Hungarian Export-Import Bank Plc. | 1994 |
| India | 0 | Export Credit Guarantee Corporation of India | 1957 |
| India | 0 | Export-Import Bank of India | 1982 |
| Indonesia | 0 | PT. Asuransi Ekspor Indonesia | 1985 |
| Indonesia | 0 | Indonesian Eximbank | 2009 |
| Iran, Islamic Rep. | 0 | Export Development Bank of Iran | 1991 |
| Iran, Islamic Rep. | 0 | Export Guarantee Fund of Iran | 1994 |
| Israel | 1 | Israel Export Insurance Corp. Ltd. | 1957 |
| Italy | 1 | Cassa Depositi e Prestiti | 1850 |
| Italy | 1 | Servizi Assicurativi del Commercio Estero (SACE) | 1977 |
| Jamaica | 0 | EXIM Bank Jamaica | 1986 |
| Japan | 1 | Japan Bank for International Cooperation | 1999 |
| Japan | 1 | Nippon Export and Investment Insurance | 2017 |
| Jordan | 0 | Jordan Loan Guarantee Corporation | 1994 |
| Kazakhstan | 0 | Eximbank Kazakhstan | 1994 |
| Kazakhstan | 0 | KazExportGarant | 2003 |
| Latvia | 1 | SIA Latvijas Garantiju aġentūra (Latvian Guarantee Agency Ltd.) | 1998 |
| Lebanon | 0 | The Lebanese Credit Insurer (LCI) | 2001 |
| Lithuania | 1 | Investiciju ir Verslo Garantijos (INVEGA) | 2001 |
| Luxembourg | 1 | Office du Ducrorie | 1961 |
| Macedonia | 0 | Macedonian Bank for Development Promotion AD Skopje | 1998 |
| Malaysia | 0 | Export-Import Bank of Malaysia Berhad | 1995 |
| Mexico | 1 | Banco Nacional de Comercio Exterior, SNC | 1937 |
| Morocco | 0 | Caisse Centrale de Garantie | 1949 |
| Morocco | 0 | Société Marocaine d'Assurance à l'Exportation (SMAEX) | 1974 |
| Namibia | 0 | Development Bank of Namibia | 2004 |
| Netherlands | 1 | Atradius Dutch State Business | 2001 |
| Netherlands | 1 | Netherlands Enterprise Agency | 2014 |
| New Zealand | 1 | New Zealand Export Credit Office | 2001 |
| Nigeria | 0 | Nigerian Export-Import Bank | 1991 |
| Norway | 1 | Export Credit Norway | 2012 |
| Norway | 1 | Garanti-instituttet for eksportkreditt, GIEK | 1929 |
| Norway | 1 | Export Finance Norway | 2021 |
| Oman | 0 | Export Credit Guarantee Agency of Oman (S.A.O.C) | 1991 |
| Pakistan | 0 | Export Import Bank of Pakistan | 2015 |
| Peru | 0 | Corporacion Financiera de Desarrollo | 1971 |

*Continued on next page*

Table D.1 – *Continued from previous page*

| Country | OECD | Name | Year Founded |
|---|---|---|---|
| Philippines | 0 | Philippine Guarantee Corporation | 1977 |
| Poland | 1 | Export Credit Insurance Corporation | 1991 |
| Portugal | 1 | Companhia de Seguro de Créditos | 1969 |
| Qatar | 0 | TASDEER (managed by the Qatar Development Bank) | 2011 |
| Korea, Rep. | 1 | Export-Import Bank of Korea | 1976 |
| Korea, Rep. | 0 | Korea Trade Insurance Corporation | 1992 |
| Romania | 0 | Eximbank of Romania | 1992 |
| Russian Federation | 0 | Export Import Bank of Russia | 1994 |
| Russian Federation | 0 | Bank for Development and Foreign Economic Affairs (Vnesheconombank) | 2007 |
| Russian Federation | 0 | Export Insurance Agency of Russia | 2011 |
| Saudi Arabia | 0 | Saudi Arabia Export Program | 1999 |
| Saudi Arabia | 0 | Saudi Export Development Authority | 2013 |
| Senegal | 0 | Société Nationale d'Assurances du Crédit et du Cautionnement | 1998 |
| Serbia | 0 | Serbian Export Credit and Insurance Agency | 2005 |
| Singapore | 0 | Entireprise Singapore | 2018 |
| Slovak Republic | 1 | Export-Import Bank of the Slovak Republic | 1997 |
| Slovenia | 1 | Slovenska izvozna in razvojna banka | 1992 |
| South Africa | 0 | Export-Import Credit Insurance Corporation of South Africa | 1957 |
| Spain | 1 | Compañía Española de Seguros de Crédito a la Exportación (CESCE) | 1970 |
| Spain | 1 | Fondo para la Internationalización de la Empresa | 2010 |
| Sri Lanka | 0 | Sri Lanka Export Credit Insurance Corporation | 1978 |
| Sri Lanka | 0 | Sri Lanka Export Development Board (SLEDB) | 1979 |
| Sudan | 0 | National Agency for Insurance and Finance of Export | 2005 |
| Swaziland | 0 | Central Bank of Swaziland: Export Credit Guarantee Scheme | 1990 |
| Sweden | 1 | Exportkreditnämnden | 1933 |
| Sweden | 1 | Svensk Exportkredit | 1962 |
| Switzerland | 1 | Swiss Export Risk Insurance | 2007 |
| Taiwan | 0 | Export-Import Bank of the Republic of China | 1979 |
| Tanzania | 0 | Export Credit Guarantee Scheme | 2002 |
| Thailand | 0 | Export-Import Bank of Thailand | 1993 |
| Trinidad and Tobago | 0 | Export-Import Bank of Trinidad & Tobago | 1997 |
| Tunisia | 0 | Compagnie Tunisienne pour l'Assurance du Commerce Extérieur | 1985 |
| Turkey | 1 | Export Credit Bank of Turkey | 1980 |
| Ukraine | 0 | The State Export-Import Bank of Ukraine | 1992 |
| United Arab Emirates | 0 | Etihad Credit Insurance | 2017 |

*Continued on next page*

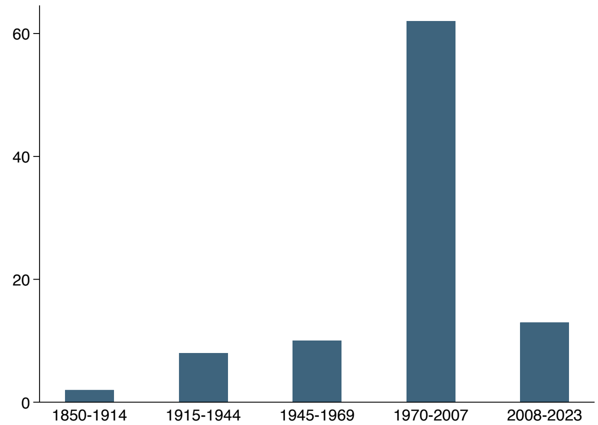
Table D.1 – *Continued from previous page*

| **Country** | **OECD** | **Name** | **Year Founded** |
|---|---|---|---|
| United Kingdom | 1 | Export Credits Guarantee Department (ECGD)/UK Export Finance | 1919 |
| United States | 1 | The Export Import Bank of the United States | 1934 |
| Uruguay | 0 | Banco de Seguros del Estado | 1911 |
| Uzbekistan | 0 | Uzbekinvest National Export-Import Insurance Company | 1997 |
| Viet Nam | 0 | Export Import Commercial Joint Stock Bank | 1989 |
| Viet Nam | 0 | The Vietnam Development Bank | 2006 |
| Zambia | 0 | Development Bank of Zambia | 1972 |
| Zimbabwe | 0 | Export Credit Guarantee Company of Zimbabwe | 1999 |
| **Region** | | **Regional ECA** | |
| Africa | N/A | African Export-Import Bank | 1993 |
| Africa | N/A | African Trade and Investment Development Insurance (ATIDI) | 2001 |

In Figure D.2, we plot the number of ECAs that were established in each period of history. We include the following periods: 1850–1914 (the first age of globalization), 1914–1944 (the world wars and interwar years), 1945–1970 (Bretton Woods), 1971–2007 (post-Bretton Woods), and 2008–2023 (post-global financial crisis). The figure shows that while many countries began establishing ECAs in the Bretton Woods period, the widespread adoption and usage of ECAs is primarily a post-Bretton Woods phenomenon.

While there is limited comprehensive data on the value of ECA support from other countries, the US EXIM along with the OECD collected information for a subset of countries for their 2013 competitiveness report. Figure D.3 panel (a) plots the value of official medium to long-term credit under the OECD arrangement. 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 Figure D.3 panel (b), we plot credit relative to export volumes in 2013, based on data from the World Bank. The Scandinavian countries, China, and Korea, are among the heaviest users of export credit agency support relative to their exports.

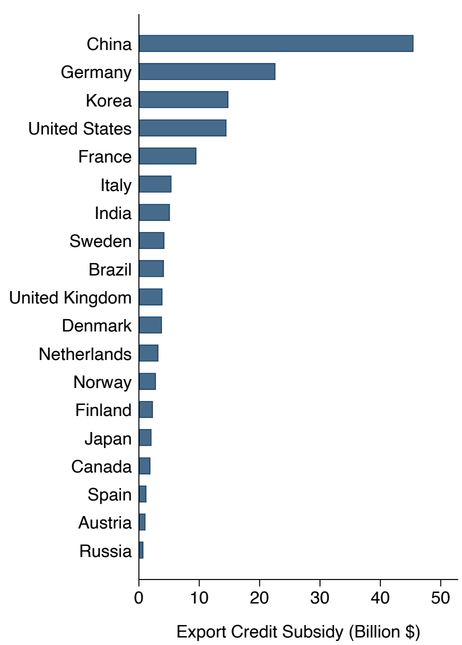
Figure D.2: Export Credit Agencies: Number Founded by Time Period



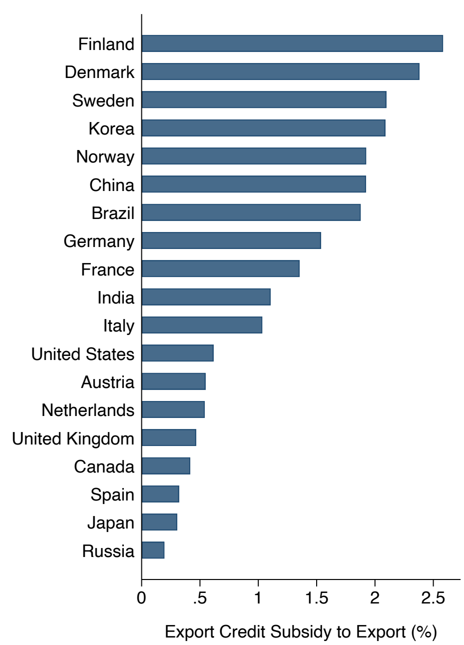

*Notes:* This figure documents the number of ECAs founded in different periods of history based on information in Table D.1. Regional ECAs are not included in this figure.

Figure D.3: Export Credit Agency Support by Country

(a) Total Value of Export Credit Support




(b) Value Relative to Exports




*Notes:* 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.

### D.1.1 International operational constraints

Most ECAs work within a regulated environment in which they are obliged to comply with a set of OECD guidelines, called the "Arrangement on Officially Supported Export Credits" (henceforth, the "Arrangement"). The Arrangement is a gentlemen's agreement amongst its Participants: Australia, Canada, the European Union, Japan, Korea, New Zealand, Norway, Switzerland, Turkey, the United Kingdom and the United States.

The Participants do not comprise a formal OECD body but they operate according to its rules and procedures. The Arrangement first came into existence in 1978, building on the export credit "Consensus" agreement among a smaller number of OECD countries in 1976. Since then, it has been regularly developed and updated to reflect Participants' needs and market developments. The resulting export credits disciplines apply first and foremost to OECD Members; however, several key non-Members regularly observe meetings of the Participants.

The Arrangement is aimed at avoiding unfair competition as a result of certain ECAs offering particularly generous financing conditions and sets out the following set of rules:

- Minimum interest rates for fixed rate loans defined as the commercial interest reference rate (CIRR). The CIRR depends on the currency of the transaction, and is adjusted by the OECD on a monthly basis.
- The maximum repayment tenor for both standard exports, as well as for specified industries through special sector understandings.
- An allowance for the financing of a percentage of local costs associated with the exported items.
- Compliance obligations associated with the Equator Principles' social and environmental standards.

The Arrangement applies to all official export credits with a repayment term of 2 years or more. It does not apply to military equipment or agricultural commodities.

The WTO's anti-subsidy legislation has been linked to the OECD's Arrangement since 1979, and the terms of the Arrangement has been recognized in various WTO dispute cases: Brazil/Canada on civil aircraft, Korea/EU on ships, US/Brazil on upland cotton. The interaction between the Arrangement and WTO rules works as follows. WTO member states are not allowed to subsidize exports, which is defined as providing financing at interest rates lower than the country's own cost of borrowing. However, if a WTO member complies with the Arrangement interest rate provisions, then loans extended by an ECA are not considered an export subsidy.

### D.1.2 ECA tools

ECA tools broadly fall under three categories: direct financing, indirect financing, and insurance.

**Direct financing.** Financing is direct when ECA lends money directly pursuant to a facility agreement. Direct financing comes in two forms:

- Tied financing: financing that is tied to a particular contract for goods or services supplied by a firm from that ECA's home country.

- Untied financing: financing that is not conditional on the procurement of goods or services from the ECA's home country. Untied financing is instead offered on the basis that the transaction is strategically in the national interest of the ECA's home country, securing broader benefits for the country. Note that untied financing falls outside the scope of the OECD Arrangement.

**Indirect financing.** Financing is indirect when the ECA lends first to a financial intermediary, which then lends to a firm from that ECA's home country. Indirect financing can also occur through interest rate support. The ECA may also pay for the difference between the relevant CIRR and the rate at which the banks fund themselves, plus a margin. This allows the firm to take advantage of an interest rate equal to the CIRR and ensures that the bank sees a commercial return on their loan.

A last type of indirect financing is ECA guarantees. ECA guarantees can take a number of forms. Credit guarantee facilities are commonly used, whereby ECAs provide guarantees to lenders in their home country for loans to foreign banks which are then on-lent to foreign purchasers of the home country goods or services.

**Insurance.** Finally, some ECAs also provide insurance products that cover commercial risk, political risk (such as imposition of foreign exchange controls, war, expropriation, rescission of licences etc), or a combination of both.

## D.2 EXIM

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.

### D.2.1 US Federal government operational constraints

There are three main federal operation constraints EXIM faces.

First, as outlined in the World Trade Organization (WTO) Agreement on Subsidies and Countervailing measures, the institution must remain self-financing. Annex I, clause (j), writes "*The provision by governments (or special institutions controlled by governments) of export credit guarantee or insurance programmes, of insurance or guarantee programmes against increases in the cost of exported products or of exchange risk programmes, at premium rates which are inadequate to cover the long-term operating costs and losses of the programmes.*" Therefore, EXIM must charge rates that realistically reflect the cost and risk of the programs in order to cover its long-term operating costs and potential losses.

As part of the Federal Credit Reform Act of 1990, each EXIM transaction must be "subsidy neutral" or generate "negative subsidy." In particular, Section 9 ("Budgetary Treatment") stipulates that "subsidies must be properly accounted for in the budgetary process," and these costs should be minimized or justified if they exceed the revenues or savings.

Finally, EXIM is also subject to congressional oversight, independent annual audits, and maximum default rates. For this purpose, the Office of Congressional and Intergovernmental Affairs (OCIA) serves as the point of contact for Congress and state and local governments at EXIM. Two main legislative texts justify its existence – Legislative Reorganization Act of 1946 and Government Corporation Control Act (GCCA) of 1945. The former is designed to enhance legislative oversight of federal agencies, attempt to regain its diminished role shaping national policy. The latter, specifically, "Congressional action on budgets of wholly owned Government corporations," was designed to establish financial and administrative control over government corporations.

**Budget procurement process.** EXIM has a structured budget procurement process that begins annually with the submission of the Congressional Budget Justification. This document outlines anticipated costs for the fiscal year, categorized into key areas such as administration, program support, and provisions for defaults and losses. Additionally, it addresses funding for other time-variant needs like cybersecurity, support for Subject Matter Experts (SMEs), and assistance programs targeting Minority and Women-Owned Businesses (MWOBs).

EXIM's primary revenues are fees on Guarantees and Insurance and interest on Loans. There are also additional revenues coming from charges associated with the administration of its credit and insurance products, such as application fees, exposure fees, and other related service charges.

### D.2.2 EXIM tools

EXIM supports US exporters through four main products: loan guarantees, insurance against customer credit losses, direct loans, and working capital loans. EXIM can therefore 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 not be able to find a bank capable of issuing letters of credit in the private market. One of the main products that EXIM offers is payment guarantees, which insures the US exporter up to 85% of the value of the contract for payment defaults by the importer.

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 covers less than 100%. Second, export credit insurance is used to encourage US exporters to provide short-term trade credit to overseas customers, whereas 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 US exporters.

EXIM's financing tools extend across various terms. Medium-term financing supports capital goods and services with repayment options of up to 7 years for amounts not exceeding $10 million. Long-term financing is available for larger projects over $10 million with typical repayment terms up to 10 years, extendable up to 12 years for specific large-scale projects like civil aircraft and non-nuclear power plants, and up to 18 years for nuclear power plants and selected renewable energy and water projects. Short-term financing options such as the Financial Institution Buyer Credit (FIBC) and Single Buyer Export Credit and Exporter Support (ELC & ESS) policies provide flexible, short-duration credit terms up to 360 days.

**Process for obtaining EXIM funding.** 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. 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 imposes underwriting requirements and independently reviews these transactions.

After EXIM receives an application, it is screened for completeness and minimum eligibility requirements. To qualify for these programs, the goods and services must be U.S.-origin and shipped from the United States to a foreign buyer. In addition, businesses that submit applications must have operated for at least three years, employ at least one full-time individual, and maintain a positive net worth. 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.

### D.2.3 The 2015 Lapse in EXIM's Authorization

The lapse in EXIM's charter was primarily caused by a political dispute in the highly polarized environment following the 2012 Presidential elections. EXIM's critics gained considerable traction in Congress in the Tea Party movement. While the arguments for and against EXIM were not new, the political gridlock resulted in a lack of common ground for re-authorizing EXIM's charter.

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.[2] It was only in May 2019 that Trump's next nominee, Kimberley Reed, was approved by the Senate.

### D.2.4 EXIM Expense

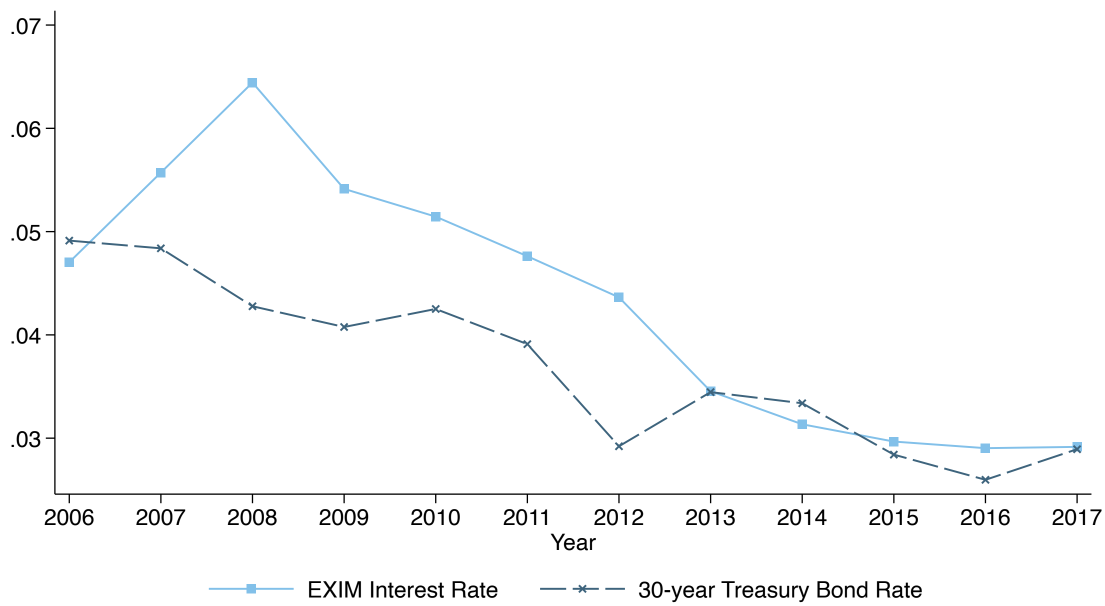
We collect all of the Annual Reports published by EXIM from 2006 to 2023 where we focus on the bank's "Balance sheet" and its "Statement of net costs" in each publication.

**Interest expense paid to the US Treasury.** We calculate EXIM's annual interest expense by combining information from the balance sheets and statement of net costs. The balance sheets provide the budget allocation from the US Treasury (named "intergovernmental debt"), which is the amount on which EXIM pays interest expense each year. The statement of net costs provides a line item for the interest expense on the loan program. We calculate the interest rate by dividing the interest expense by the stock of intergovernmental debt.

[2] 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."

Figure D.4 plots EXIM's interest expense rate along with the 30-year US Treasury bond. We include all of the years for which these data exist in full. On average, EXIM's interest rate expense is 60 basis points higher than the 30 year rate (4.3% versus 3.7%). In the pre-shutdown period (2006 to 2014 inclusive), EXIM's rate is 80 basis points higher (4.8% versus 4.0%).

Figure D.4: EXIM's Annual Interest Expense




*Notes:* This figure plots the time series of EXIM's interest expense from the authors' calculations. The data stop in 2017 because EXIM's annual statement of net costs were no longer sufficiently disaggregated to conduct this calculation.

## D.3 EXIM and Country Risks

In addition to being potentially expensive due to high markups, banks and insurance companies might not be able to insure against country-wide risks, which due to their specialization would be considered as "aggregate" instead of idiosyncratic risks. This explains why trade insurance provided by private banks is non-comprehensive and typically makes explicit exceptions for country-wide risks such as regime changes, the introduction of capital controls, military events, or natural disasters.

In contrast, EXIM appears well-suited to fill this gap due to its broad coverage of countries and investment in the fixed costs necessary to acquire the expertise to provide trade financing. Several pieces of evidence suggest that political risks are indeed one of the frictions that EXIM is able to alleviate.

### D.3.1 Data and estimation

**Perception of country risk.** Our main independent variable, country risk, comes from Hassan, Schreger, Schwedeler and Tahoun (2023), where it is defined as aggregated risk associated with a given country perceived by publicly traded firms around the world that hold earnings calls in the

English language. We also distinguish between four measures of country risk based on the subset of firms it is assessed on: any, financial, domestic, and foreign.

The main dependent variable is the total financial exposure that EXIM has to a country in its entire portfolio. We obtained this data by digitizing the EXIM's overall financial exposure by country from the Annual Reports. These exposures reflect the total outstanding value of loans, guarantees, and insurance authorized by EXIM.

**Estimation.** We estimate the following model using data from 2006 to 2022:

$$log(EXIM)_{it} = \beta_1 log(Risk)_{it} + \alpha_i + \gamma_t + \epsilon_{it} \tag{D.1}$$

$EXIM_{it}$ is the total amount of EXIM exposure to country $i$ in year $t$. $\alpha_i$ and $\gamma_t$ are country and year fixed effects. Standard errors are clustered at the country level.

Table D.2 reports the results. Column 1 shows the results when we use any country risk, and columns 2 to 5 decompose the risks among its sub-measures by different types of firms (financial, foreign, and domestic). The decomposition provides further support for the interpretation that EXIM helps to fill a gap in the private market. First, the relationship between EXIM support and risk is highest when focused on risks perceived by financial firms, which are precisely the segment of the private sector that are the closest substitute to EXIM. Second, the relationship is large and statistically significant for the perception by foreign firms, which are the ones that would trade internationally with a country. Given this interpretation, the perception of risk by domestic firms acts as a placebo, and indeed there is no statistically significant relationship. Finally, there is a "local crisis" measure, which takes the value of the number of quarters in a year that a country has risk perception measures two standard deviations above its own mean. Countries experiencing a local crisis also have higher levels of EXIM support, consistent with the rest of the evidence that EXIM provides a missing market when private firms may be particularly unwilling to engage.

## D.4 Theory: The Impact of ECA Financing on Firm Outcomes

This subsection develops a framework that generates predictions for how firm investment react in response to changes in the supply of trade financing that firms receive from export credit agencies. We set up a one period model where firms maximize profits from exporting by choosing their capital investment, which they finance with private market and/or ECA debt.

The main intuition from the model is that even if ECAs supply trade financing at a cost lower than the market, financially unconstrained firms will not change their optimal size and will instead receive the subsidized financing as a "windfall profit." If by contrast firms are constrained, they will use ECAs' financing to expand operations up to the point where they become unconstrained.

### D.4.1 Setup

We begin by describing the environment without ECAs and with the two types of firms: constrained and unconstrained.

Table D.2: EXIM Support and Country Risk

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Risk (by all) | 2.23 | | | | |
| | (0.76) | | | | |
| | [0.0048] | | | | |
| Risk (by financial) | | 1.59 | | | |
| | | (0.64) | | | |
| | | [0.016] | | | |
| Risk (by foreign) | | | 1.61 | | |
| | | | (0.93) | | |
| | | | [0.087] | | |
| Risk (by domestic) | | | | -0.018 | |
| | | | | (0.069) | |
| | | | | [0.79] | |
| Local crisis | | | | | 0.093 |
| | | | | | (0.044) |
| | | | | | [0.038] |
| *Fixed Effects* | | | | | |
| Country | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 812 | 812 | 812 | 660 | 812 |

*Notes:* This table reports estimates of equation D.1, where the amount of EXIM support a country receives and political risk are both measured in logs. The measure of perceived country risks comes from Hassan, Schreger, Schwedeler and Tahoun (2023). These risks include perceptions by all firms (column 1), and are also decomposed into risks perceived by financial firms (column 2), firms foreign to a country (column 3), and domestic firms within a country (column 4). "Local crisis" measures the number of quarters in a year that a country is perceived to have risk that is two standard deviations above its mean. Standard errors are clustered at the country level and are reported in the line below the point estimate in parentheses, and $p$-values are reported in brackets below them.

**Firm production.** We assume for simplicity that capital $K$ is the only input, and that firm $i$ has standard revenue production function $f_{i,m}(K)$ for exporting product $m$. We also assume that $f(K)$ is increasing but bounded in $K$, that $f(K)$ is twice differentiable and that $f'(K) > 0$, $f''(K) < 0$, so that the firm's revenue function is increasing but concave.[3]

This revenue function encompasses standard cases of constant prices and decreasing returns to scale in quantities produced (e.g., because of span of control as in Lucas, 1978) and monopolistic competition with firms having constant return to scale but facing downward sloping demand curves (e.g., Dixit and Stiglitz, 1977; Melitz, 2003).

Entrepreneurs have no initial wealth endowment and must raise outside trade financing $D$ in order to invest in $K$ to generate foreign sales. They face a (risk-adjusted) market price of capital $r_{i,m}$. We assume that the fixed costs of creating the firm have already been paid.

**Unconstrained firm profit maximization.** Firms choose the amount of capital that maximizes their profits, subject to their funding constraint. By definition of being unconstrained, firms face a flat debt supply curve for $D_{i,m}$, and their problem is the following:

[3] Here, we simplify notation and define $f(.)$ as the *revenue* production function, which was given by $p_i \times q_i(K_i)$ in equation (6) of Section 6. There, wedges are discussed in terms of shadow prices that explain the difference between the quantities a firm borrows and the price at which it can borrow.

$$\max_{K_{i,m}} \quad \Pi_{i,m} = f(K_{i,m}) - r_{i,m} \times K_{i,m}$$
$$\text{s.t.} \quad K_{i,m} \leq D_{i,m} \tag{D.2}$$

The FOC implies that unconstrained firms optimally choose size $K^*_{i,m}$ such that $f'(K^*_{i,m}) = r_{i,m}$, which is funded by a level of debt equal to $D^*_{i,m}$.

**Constrained firm profit maximization.** We define a firm as being constrained if it is only able to raise funding $D$ to some level $D^\tau_{i,m} < D^*_{i,m}$, implying that there is residual unmet demand at the market rate $r_{i,m}$. Firms invest up to their financing constraint such that $K_{i,m} = D^\tau_{i,m}$. We denote this level of capital as $K^\tau_{i,m}$, with $K^\tau_{i,m} < K^*_{i,m}$.

At this lower level of capital, constrained firms have a higher marginal revenue product than their market rate $r_{i,m}$: $f'_{i,m}(K^\tau) > r_{i,m}$ and therefore behave as if they face a higher cost of capital than unconstrained firms. This difference in behavior implies that there exists a positive $\tau_{i,m}$ such that $f'(K^\tau_{i,m}) = (1 + \tau_{i,m})r_{i,m}$. $\tau_{i,m}$ acts as a wedge on the market price of capital.[4]

We represent the firms' *shadow* cost of capital as $r^\tau_{i,m} = (1 + \tau_{i,m})r_{i,m}$, where unconstrained firms have $\tau_{i,m} = 0$. The firm's marginal investment decision is governed by this shadow price, and a firm will only increase investment above $K^\tau_{i,m}$ if it is able to do so at a price below $r^\tau_{i,m}$.

As discussed in Section 2.1, the $\tau_{i,m}$ wedge can arise from an exporting firm-specific financing friction and/or a destination-market specific friction. Note that the wedges that generate quantity constraints endogeneously arise out of banks' expected profit maximization. As such, even though firms find it profitable to borrow at $r_{i,m}$, banks do not find it profitable to lend at that rate.

### D.4.2 Theoretical Predictions for the Role of ECAs

We model ECA financing as allowing firms to raise some amount of capital $D^{ECA}_{i,m}$ at rate $r^{ECA}_{i,m}$. In order to more accurately capture the institutional context, we assume that ECAs face balance sheet constraints and that they will not finance firms up to their efficient scale ($D^{ECA}_{i,m} < K^*_{i,m}$). We do not impose that firms must raise a fraction of their debt from the private market.

Positive takeup of ECA financing implies that the price of ECA financing is lower than the shadow price firms face: $r^{ECA}_{i,m} \leq r^\tau_{i,m}$. Note that firms may have positive takeup of ECA financing even if $r^{ECA}_{i,m} > r_{i,m}$, indicating that the use of ECA financing does *not* imply that it must be offered at below-market rates.

With ECA financing, the firm profit maximization problem becomes:

$$\max_{K_{i,m},\ K^{ECA}_{i,m}} \quad \Pi_{i,m} = f(K_{i,m} + K^{ECA}_{i,m}) - r_{i,m} \times K_{i,m} \ - \ r^{ECA}_{i,m} \times K^{ECA}_{i,m}$$
$$\text{s.t.} \quad K_{i,m} \leq D_{i,m} \tag{D.3}$$
$$K^{ECA}_{i,m} \leq D^{ECA}_{i,m}$$

[4] $\tau$ is an explicit tax if the rate constrained firms pay is higher, or it can be an implicit shadow cost of capital that arises from a quantity constraint, as we have modeled it here. These wedges implement a given (potentially inefficient) allocation in the decentralized Arrow-Debreu-McKenzie economy. This formulation is standard in the misallocation literature (e.g., Hsieh and Klenow, 2009; Baqaee and Farhi, 2020).

The optimal behavior of a firm facing multiple sources of lending with different costs is to first fully use the external liquidity from the cheapest source of borrowing, and then to turn to more expensive sources (Banerjee and Duflo, 2014). The impact of ECAs' financing on firm outcomes therefore falls under three cases.

**Case 1: Unconstrained firm optimization.** When firms are unconstrained, ECA financing has no effect on the level of investment. The impact of ECA financing is *purely inframarginal*.

We illustrate this case in Figure D.5a and Figure D.5b. The firm's profits without ECA financing are in light blue in Figure D.5a while the additional firm profits after receiving ECA financing are in dark blue in Figure D.5b.

Unconstrained firms will only use ECA financing if $r_{i,m}^{ECA} < r_{i,m}$. In Figure D.5b the optimal behavior of unconstrained firms is to first borrow from the ECA at a price $r_{i,m}^{ECA}$ to the fullest extent possible, which we denote $D_{i,m}^{ECA}$. The firm invests in $K_{i,m}^{ECA} = D_{i,m}^{ECA}$ levels of capital. At that size, the marginal return to capital is $f'(K_{i,m}^{ECA}) > r_{i,m}$, implying that it is optimal for the firm to expand until returns are equalized at $K_{i,m}^{*}$. The firm therefore raises the remaining capital $(K_{i,m}^{*} - K_{i,m}^{ECA})$ from the market.

Investment remains at $K_{i,m}^{*}$ as before. The substitution to cheaper ECA financing generates a windfall profit for the firm equal to $K^{ECA} \times (r_{i,m} - r_{i,m}^{ECA})$.

**Case 2: Constrained firm optimization when $r_{i,m}^{ECA} < r_{i,m}$.** Receiving ECA support relaxes the firm's financing constraint, and firms increase investment.

Figure D.5c shows a constrained firm's choices of capital and its profits. Figure D.5d shows the impact of accessing ECA financing when $r_{i,m}^{ECA} \leq r_{i,m}$. We draw the figure such that firms remain constrained: $D_{i,m}^{ECA} + D_{i,m}^{\tau} < D_{i,m}^{*}$. We also provide an extension in which we relax this condition.

Firms first utilize all of the available ECA financing and invest at the level of capital $K_{im}^{ECA} = D_{i,m}^{ECA}$. At that point, $f'(K_{im}^{ECA}) > r_{i,m}$, so the firm continues to invest at the market rate until it reaches its optimal size $K_{i,m}^{*}$ or until its private financing constraint binds. Investment unambiguously increases.

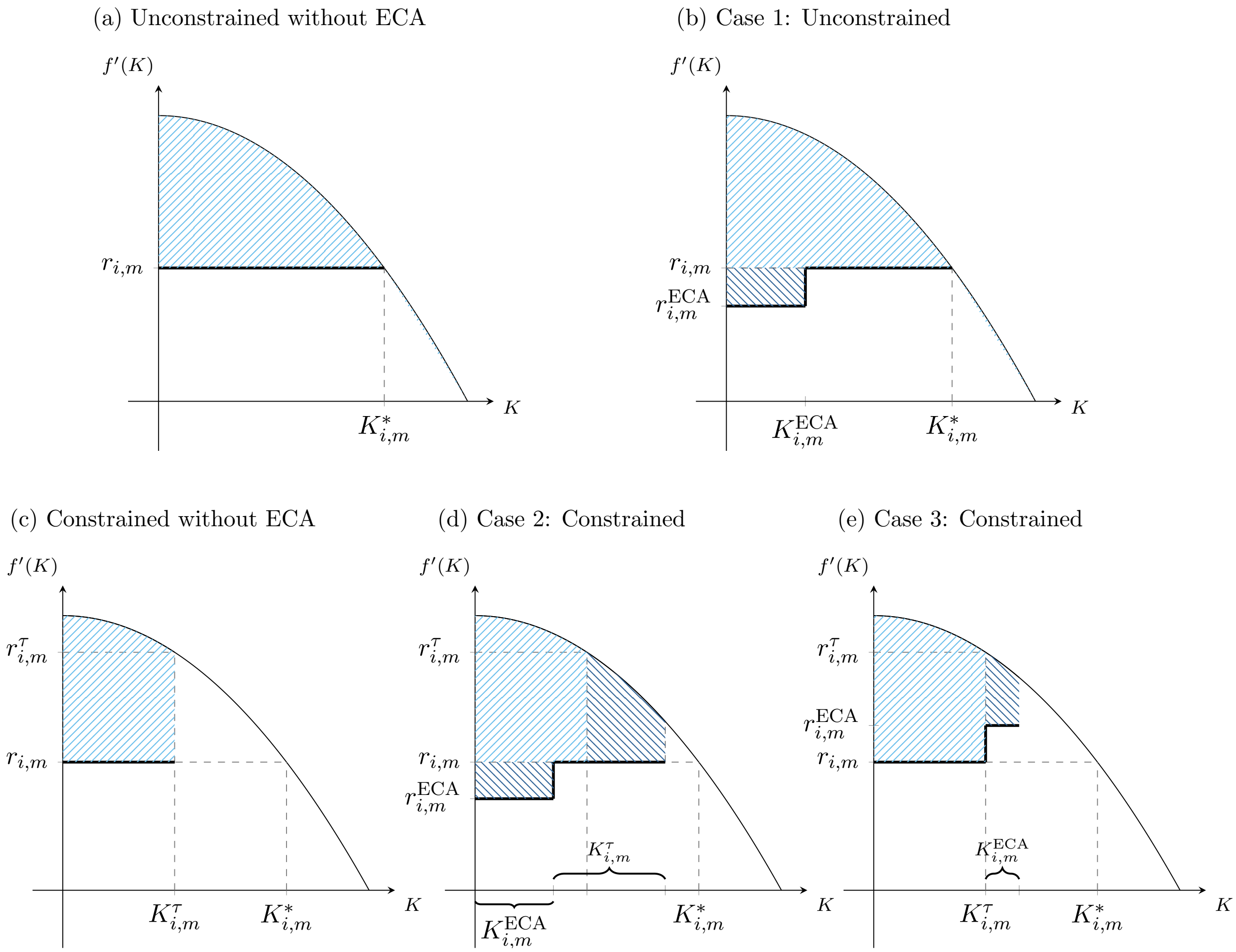
Firm profits increase, but the change in firm profit rate (total profits divided by capital) is ambiguous and depends on the value of the subsidized financing ($K^{ECA} \times (r_{i,m} - r_{i,m}^{ECA})$) relative to the decreasing returns to scale in the firm's production function.

**Case 3: Constrained firm optimization when $r_{i,m} < r_{i,m}^{ECA} < r_{i,m}^{\tau}$.** Receiving ECA support relaxes the firm's financing constraint, and firms increase investment.

Figure D.5e illustrates this case when $r_{i,m}^{ECA} < r_{i,m}^{\tau}$. Recall that constrained firms will use ECA financing as long as it is offered at a price below the firm's shadow price of capital so ECA financing does not need to be provided at below market rates. Despite ECA financing being offered at a *higher* price, firms still find it optimal to use ECA financing because it is below their shadow price of capital.

Firms first use private market financing before using the more expensive ECA financing. They invest up to a level where they face their ECA financing constraint ($K_{i,m}^{ECA} = D_{i,m}^{ECA}$) or until they reach a level of capital $K_{i,m}^{**}$ such that $f'(K_{i,m}^{**}) = r_{i,m}^{ECA}$. The new firm size is unambiguously larger, and it is between the constrained and the optimal size: $K_{i,m}^{\tau} < K_{i,m}^{**} < K_{i,m}^{*}$.

Figure D.5: Unconstrained and Constrained Firm Optimization



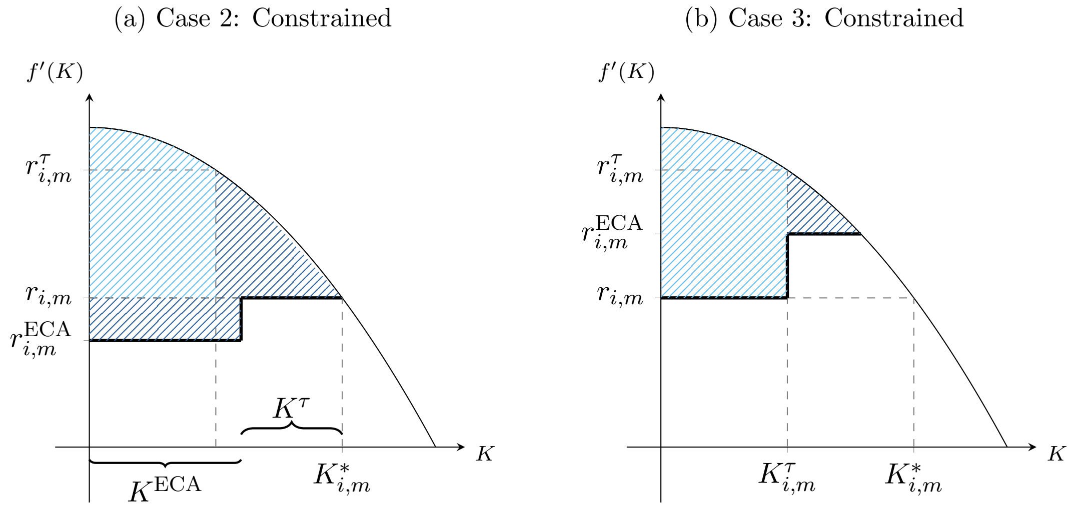

*Notes:* This figure plots the firm's marginal revenue production function. The bold black line traces out the capital that the firm invests and the rate at which it invests. The light blue shading is the firm's original profits without ECA financing. The dark blue shading is the additional new profits that come from ECA financing.

**Case 4: Extension to becoming unconstrained.** Figure D.6 illustrates the effect of access to ECA financing when firms that are initially constrained become unconstrained. We assume that firms cannot access as much ECA financing as before, but we now allow for $D^{ECA}_{i,m} + D^{\tau}_{i,m} \geq D^*_{i,m}$.

In Panel (a), the cost of ECA financing is lower than market financing, and therefore the firm uses all of its available ECA financing ($K^{ECA}_{i,m} = D^{ECA}_{i,m}$) before turning to the market source. The firm expands to the point where $f'(K^{\tau}_{i,m} + K^{ECA}_{i,m}) = r_{i,m}$ which occurs at $K^{\tau}_{i,m} + K^{ECA}_{i,m} = K^*_{i,m}$.

In Panel (b), the cost of ECA financing is below market financing, and therefore the firm uses all of its available market financing before turning to ECA financing. In this case, the firm expands to the point where $f'(K^{\tau}_{i,m} + K^{ECA}_{i,m}) = r^{ECA}_{i,m}$, which occurs at some point $K^{\tau}_{i,m} + K^{ECA}_{i,m} < K^*_{i,m}$. In this last case, the firm expands, but it ultimately is smaller than in the unconstrained case.

Figure D.6: Constrained Firm Optimization: Extension




*Notes:* This figure plots the firm's marginal revenue production function. The bold black line traces out the capital that the firm invests and the rate at which it invests. The light blue shading is the firm's original profits without ECA financing. The dark blue shading is the additional new profits that come from ECA financing.

## D.5 Industry Misallocation and Industry Average Wedge

In this section, we discuss the link between the change in the *average* wedge for firms in an industry that can explain the results in the D-i-D (section 4), and the effect on misallocation (section 6).

The overall amount of capital invested in the industry depends on the average value of wedges among firms that belong to the industry, which we denote $\overline{\tau_J} = \mathbb{E}_J[\tau_{i \in J}]$. Around this average, firms can be heterogeneous in the value of their $\tau_i$, as represented in Figure D.7a.

As discussed in section 4, a way to model how EXIM financing affects firms' real outcomes is by reducing the *average* $\tau$ for firms in a given industry, as depicted in Figure D.7b.

A policy shock like EXIM's shutdown can have an impact on average investment and misallocation that fall under four distinct cases:

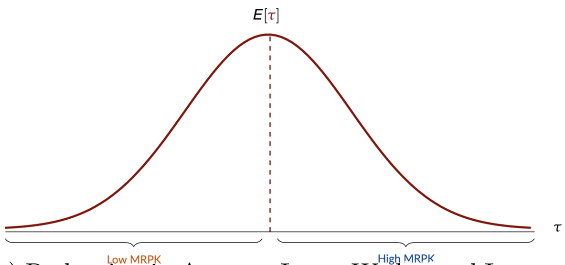
- A change in misallocation but no change on average investment: This would happen if the change in the spread of $\tau_i$ preserves the mean value $\mathbb{E}[\tau_i]$. In this case, misallocation can increase (high MRPK firms shrink, while low MRPK expand), or decrease (high MRPK expand and low MRPK shrink), but change in investment among high MRPK firms perfectly counterbalance the ones among low MRPK firms.

- No change in misallocation but a change on average investment: This would be the case if the mean changes, but the distribution of $\tau_i$ is preserved. This occurs if the entire distribution shifts to the left.

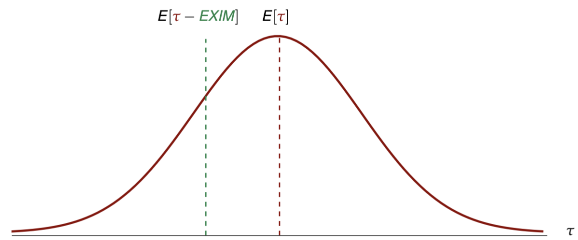
- An increase in misallocation **and** a change in average investment: This case corresponds to Figure D.7c in which the change in the average wedge in the industry is driven by a larger expansion of the low MRPK firms (Figure D.7c), which implies that misallocation increases.

Figure D.7: Effect of EXIM on Average Investment and Misallocation

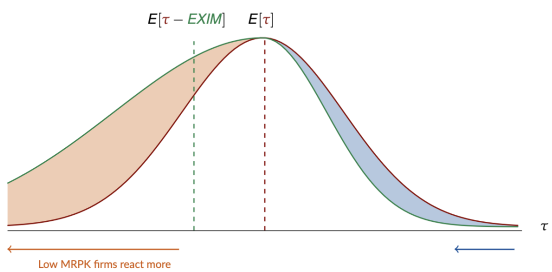
(a) Distribution of input wedge for firms $i$ around the average in industry J



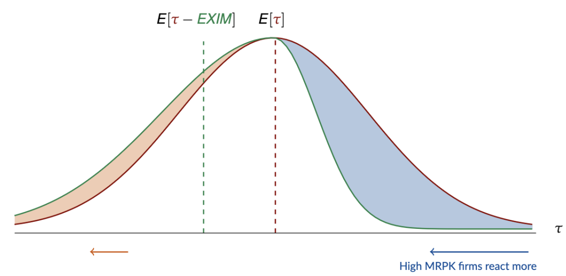

(b) Effect of EXIM's Trade Financing on Average Input Wedge




(c) Reduction in Average Input Wedge and Increase in Misallocation




(d) Reduction in Average Input Wedge and Decrease in Misallocation




- A decrease in misallocation **and** a change in average investment: This case corresponds to Figure D.7d in which the change in the average wedge in the industry is driven by a larger expansion of the high MRPK firms (Figure D.7d), which implies that misallocation decreases.

Notice in both cases 3 and 4, EXIM's supply of trade financing has exactly the same effect on the average investment in the industry ($\mathbb{E}_J[\tau_{i\in J} - EXIM_i]$), but completely opposite consequences for the industry TFP. These different cases clarify that it is never possible to infer how misallocation changes by simply looking at the *average* effect of a policy shock.

## D.6 Industry Misallocation: Alternative Measures of Capital Cost Wedge

This section discusses alternative ways of measuring the dispersion in firm capital input cost wedge and reports the results in Table D.3. In columns 1–2, we directly estimate firms' production function using the control approach of Olley and Pakes (1996), and compute firm MRPK. In columns 3–4, we follow Baqaee and Farhi (2019*a*) and adopt the user cost approach that is also used in Gutierrez and Philippon (2016), as well as Foster, Haltiwanger and Syverson (2008). This technique computes the user-cost of capital following Hall and Jorgenson (1967), where the rental price incorporates the risk-free rate, industry-specific depreciation, and industry-level risk premia. The Appendix of Baqaee and Farhi (2019*a*) provides a detailed explanation of the computation. In columns 5–6, we extend our analysis to examine the dispersion in TFPR, estimated using the technique of Olley and Pakes (1996). Following Hsieh and Klenow (2009), this dispersion reflects the dispersion in cost wedges for all inputs that the firm uses.

When firms have a more general CES production function (where Cobb-Douglas represents the special case when the elasticity of substitution across inputs equals one), it is no longer possible to estimate the capital input cost wedge specifically. However, one can still estimate the capital cost wedge relative to other inputs used by the firm, as highlighted in Whited and Zhao (2021). To formalize this intuition, assume that firms have a standard CES production function where a firm $i$ in section $s$ generates total revenue $Y$ by using capital and labor:

$$Y_{si} = A_{si} \left( \alpha_s K_{si}^{\frac{\gamma-1}{\gamma}} + (1-\alpha_s) L_{si}^{\frac{\gamma-1}{\gamma}} \right)^{\frac{\gamma}{\gamma-1}}, \tag{D.4}$$

where $\alpha_s$ is the relative weight of capital in production, $\gamma$ is the elasticity of substitution between capital and labor, and $A_{si}$ is the firm's technological efficiency parameter. In the non-distorted economy, firms pay their capital $r$ and labor $w$, but as is standard in the misallocation literature, each input can have an extra wedge. The firm's nominal profit $\pi_{si}$ is given by:

$$\pi_{si} = Y_{si} - \left[ (1+\tau^K si) r K si + (1+\tau^L si) w L si \right], \tag{D.5}$$

where $\tau_{si}^X$ represents the additional wedge on input $X$ (either capital or labor) that determines the marginal return required for investing in that input.

The firm's profit maximization problem can be solved in two steps. First, the firm minimizes its cost by choosing $K$ and $L$ subject to achieving a fixed output level $\bar{Y_{si}}$ in equation (D.4). This optimization yields the following solution for the optimal ratio of capital to labor:

$$\frac{K_{si}}{L_{si}} = \left( \frac{\alpha_s}{1-\alpha_s} \times \frac{(1+\tau^L si) w}{(1+\tau^K si) r} \right)^{\gamma}. \tag{D.6}$$

As long as $\alpha_s$ and $\gamma$ do not vary within firms in a sector or sector-by-size bin, firms in the same cell should have similar input ratios, and dispersion within a cell will reflect differences in the value of the ratio of input cost wedges. Thus, while we can no longer measure the capital cost wedge directly (which is possible under Cobb-Douglas production), we can still measure it relative to the value of the wedge on the other input. In this framework, the labor to capital ratio reveals the relative capital cost wedge.

We implement this approach empirically in columns 7–10. We use two alternative measures to capture the relative input wedges: the ratio of COGS (Cost of Goods Sold) over capital (columns 7–8) and the ratio of labor over capital (columns 9–10). COGS provides an alternative measure of variable input costs that may be less subject to measurement error than reported labor costs in some contexts.

In all the different ways of estimating the ex-ante wedge distortions that firms face, we find that EXIM's shutdown leads to larger contractions for firms that are ex-ante more constrained, confirming that EXIM's shutdown increased capital misallocation.

Table D.3: Impact on Capital Misallocation: Alternative Measures of MRPK

| *Dependent variable* | Investment | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Measure of wedge distorsion* | MRPK Olley-Pakes | | MRPK User Cost | | TFPR: Olley Pakes | | CES: Capital / COGS markup | | CES: Capital / L markup | |
| *Sample* | Low | High | Low | High | Low | High | Low | High | Low | High |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| $\text{EXIM}_i \times \text{Post}_t$ | -0.064 | -0.14 | -0.088 | -0.15 | -0.057 | -0.18 | -0.056 | -0.23 | -0.075 | -0.18 |
| | (0.036) | (0.078) | (0.043) | (0.058) | (0.039) | (0.073) | (0.037) | (0.079) | (0.040) | (0.065) |
| | [0.077] | [0.072] | [0.042] | [0.0092] | [0.14] | [0.015] | [0.13] | [0.0046] | [0.062] | [0.0059] |
| *Fixed Effects* | | | | | | | | | | |
| Exporter×Year | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Industry×Size quartile×Year | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 13,420 | 7,764 | 14,983 | 9,010 | 13,446 | 7,738 | 14,420 | 8,570 | 14,960 | 9,050 |

*Notes:* This table reports the estimated effects of EXIM's shutdown on firms' capital investment. Depending on whether a firm is high or low MRPK. We measure MRPK by estimating the firm production function following Olley-Pakes (1996) in columns 1–2. In columns 3–4, we follow Baqaee and Farhi (2019*a*) and adopt the user cost approach. In columns 5–6, we report compute firm total TFPR. Finally in columns 7–10, we use the ratio of COGS over capital (columns 7–8) and total employment over capital (columns 9–10), which when the firm has a CES production function, will reflect the capital input cost wedge relative to the other input cost wedge. In all columns, we compute the value in the pre-shock period, average at the firm level, and sort firms along the median of their SIC-4 × quartile of asset distribution. The dependent variable is the growth rate relative to 2014 (the year prior to the shock) defined as $\Delta Y_{i,t} = (Y_{i,t} - Y_{i,2014})/Y_{i,2014}$. $Post_t$ is an indicator variable equal to 1 for the years 2015 to 2019. $EXIM_i$ is an indicator variable that equals 1 if the firm received trade financing from EXIM over the pre-shutdown period. Exporter fixed effect is an indicator variable that equals 1 if the firm reports positive EXIM financing, foreign sales in Compustat Segment, international activity in their 10-Ks, exports in Datamyne, or taxable foreign income before 2014. Industries are SIC-2. Standard errors are clustered at the firm level and are reported in the line below the point estimate in parenthesis, and $p$-values are reported in brackets below them.