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Foreign banks, financial structure and industry growth:
Evidence from the European Union

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Abstract

This study examines whether foreign bank presence supports the growth of financially dependent manufacturing industries in EU countries and whether this effect depends on the structure and development of the domestic financial system. Following the industry-level identification strategy of Rajan and Zingales (1998) and Bruno and Hauswald (2014), the analysis uses a panel of 28 EU countries and 23 manufacturing industries over 2008-2019. The study finds support for both hypotheses. Foreign bank presence is positively associated with growth in financially dependent industries, suggesting that foreign banks help relax external financing constraints. However, this effect is conditional on domestic financial development and financial structure. The foreign bank effect weakens as domestic financial systems become more market-based and more developed in EU countries. In particular, the access dimension of financial structure yields a significant moderating effect. This suggests that where firms have broader access to financial markets, they rely less on bank credit, reducing the additional contribution of foreign banks to industry growth. The results also suggest that in the most market-based financial systems, the foreign bank effect becomes insignificant or negative, consistent with possible crowding out or adverse selection. Overall, the findings suggest that foreign banks still improve access to finance in the EU, but primarily in countries with less developed and more bank-based financial systems.

Abstract

Diese Studie untersucht, ob die Präsenz ausländischer Banken das Wachstum von den finanzierungsabhängigen verarbeitenden Industrien in EU-Ländern unterstützt und ob dieser Effekt von der Struktur und Entwicklung des heimischen Finanzsystems abhängt. Die Analyse folgt der Identifikationsstrategie auf Industrieebene von Rajan und Zingales (1998) und Bruno und Hauswald (2014). Dafür sind ein Panel von 28 EU-Ländern und 23 Sektoren von verarbeitenden Industrien über den Zeitraum 2008-2019 verwendet. Die Studie findet Unterstützung für beide Hypothesen. Die Präsenz ausländischer Banken ist positiv mit dem Wachstum in finanzierungsabhängigen Industrien verbündet, was darauf hindeutet, dass ausländische Banken dazu beitragen, externe Finanzierungsengpässe abzumildern. Aber dieser Effekt ist von der heimischen Finanzentwicklung und Finanzstruktur abhängig. Der Effekt ausländischer Banken schwächt sich ab, je marktbasiert und entwickelter das heimische Finanzsystem in den EU-Länder werden. Insbesondere die Dimension des Zugangs innerhalb der Finanzstruktur hat einen signifikanten moderierenden Effekt. Dies weisen darauf hin, dass Unternehmen dort, wo sie einen breiteren Zugang zu Finanzmärkten haben, weniger auf Bankkredite angewiesen sind, was den zusätzlichen Beitrag ausländischer Banken zum Industriewachstum verringert. Die Ergebnisse weisen zudem darauf hin, dass der Effekt ausländischer Banken in den am stärksten marktorientierten Finanzsystemen unbedeutend oder negativ wird, was mit einer möglichen Verdrängung oder adversen Selektion übereinstimmt. Insgesamt weisen die Ergebnisse darauf hin, dass ausländische Banken den Zugang zu Finanzmitteln in der EU verbessern, vor allem jedoch in Ländern mit weniger entwickelten und eher bankenbasierten Finanzsystemen.

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List of abbreviations

BIS - Bank for International Settlements
CPI - Consumer Price Index
CRD - Capital Requirements Directive
ECB - European Central Bank
EBRD - European Bank for Reconstruction and Development
EU - European Union
FDI - Financial Development Index
FE - Fixed Effects
FI - Financial Institutions Index
FAI - Financial Institutions Access Index
FIDI - Financial Institutions Depth Index
FIEI - Financial Institutions Efficiency Index
FinDep - External Financial Dependence Index
FinStr - Financial Structure Ratio
FinStrAI - Financial Structure Access Ratio
FinStrDI - Financial Structure Depth Ratio
FinStrEI - Financial Structure Efficiency Ratio
FM - Financial Markets Index
FMAI - Financial Markets Access Index
FMDI - Financial Markets Depth Index
FMEI - Financial Markets Efficiency Index
ForBkAS - Foreign Bank Asset Share
GFC - Global Financial Crisis
GDP - Gross Domestic Product
GMM - Generalized Method of Moments
HDFE - High-Dimensional Fixed Effects
IMF - International Monetary Fund
ISIC - International Standard Industrial Classification
LShare - Lagged Industry Share
OECD - Organisation for Economic Co-operation and Development
OLS - Ordinary Least Squares
PCA - Principal Component Analysis
pp - Percentage Points
SD - Standard Deviation
SE - Standard Error
SSM - Single Supervisory Mechanism
SSI - Structural Statistical Indicators
UK - United Kingdom
UNIDO - United Nations Industrial Development Organization
VA - Value Added

1. Introduction

Economic theory suggests that open economies benefit from foreign entry through increased competition, efficiency gains and broader consumer choice. When foreign firms enter domestic markets, they intensify competition, compress margins and pressure existing players to improve efficiency or exit. Banking is no exception. Entry of a foreign bank brings additional loanable funds, competitive pressure on lending rates and potentially superior screening technology that improves credit allocation (Claessens et al., 2001). Yet historically banking has been one of the most protected sectors in any economy. Governments and central banks restrict foreign bank entry out of concerns about financial and monetary stability and national sovereignty. For example, under EU banking law, any acquisition of a qualifying holding in a credit institution requires prior regulatory notification and approval. Notification is mandatory when the proportion of voting rights or capital reaches 20%, 30% or 50% or when the credit institution would become a subsidiary of the acquirer (Article 22, CRD). And many countries including several from EU countries, have actively limited foreign bank expansion or even reversed earlier privatizations through deliberate renationalization policies. The fundamental question is whether foreign bank presence contributes to real economic activity and under what financial conditions this contribution is the largest.

Despite decades of EU financial integration and technological advances that have reduced information barriers to cross-border lending, foreign bank presence in the EU remains highly uneven. It has declined in several member states following the Global Financial Crisis, as parent banks retrenched to their home markets under regulatory pressure and funding constraints. This suggests that financial integration, even within a deeply integrated economic union, can reverse when conditions deteriorate.

Even where foreign banks are present, their economic impact may differ fundamentally across EU countries. In eastern EU economies, where domestic financial systems remain relatively underdeveloped, foreign banks may genuinely fill a financing gap for credit-constrained firms. In advanced Western EU economies with deep domestic banking sectors and well-developed capital markets, firms already have access to multiple sources of external finance. In such environments, the additional benefit of foreign bank presence is unclear. The question is not simply whether foreign banks matter, but where and under what financial conditions they matter.

This study examines whether foreign bank presence relaxes financing constraints for manufacturing industries in EU member states, contributing to faster industry growth, and whether the level of financial development and the structure of the financial system conditions this effect. The European Union provides an ideal setting for this analysis. EU member states share a common regulatory framework under EU banking directives and ECB supervision yet exhibit substantial heterogeneity in both foreign bank presence and financial system development.

Foreign bank asset share ranges from below 10% in France and Germany to over 90% in Czechia and Estonia. This variation across both advanced Western EU and Eastern EU economies provides the cross-country identification necessary to test whether financial structure moderates the foreign bank channel.

The empirical literature on foreign banks and real economic activity is anchored by Bruno and Hauswald (2014), who apply the industry-level identification strategy of Rajan and Zingales (1998) to a global sample over 1995-2003. They find that foreign bank presence stimulates growth for financially dependent industries, with effects concentrated in developing economies. This study extends their analysis to EU countries over 2008-2019. It introduces financial structure ratios which are constructed from the multidimensional IMF Financial Development Index of Svirydzenka (2016) as moderators of the foreign bank channel.

There are two hypotheses. First, foreign bank presence improves access to external finance for manufacturing industries, enabling faster growth in financially dependent sectors. Second, this effect is weaker in more market-based financial systems where firms have alternative sources. While Hypothesis 1 replicates and extends Bruno and Hauswald (2014) to the EU sample, Hypothesis 2 is the main contribution of this study. For heterogeneity this study introduces four financial structure ratios constructed by dividing financial markets sub-indices by their parallel financial institutions sub-indices. These ratios directly capture whether a country's financial system is bank-based or market-based across depth, access, and efficiency dimensions simultaneously. This multidimensional approach identifies which dimension specifically determines whether foreign banks add value.

The structure of the financial system, whether bank-based or market-based has long been recognized as a determinant of real economic activity (Demirgüç-Kunt and Levine, 2001; Levine, 2002). In bank-based systems, firms depend heavily on bank relationships for external financing, making foreign banks a genuine source of additional credit. In market-based systems, firms can access external finance through equity markets, corporate bond markets, and other instruments, reducing their dependence on any single intermediary including foreign banks. Where capital markets are accessible, the marginal contribution of foreign bank presence to industry growth should therefore be smaller. This mechanism is the theoretical foundation of Hypothesis 2.

Using a panel of 28 EU countries and 23 manufacturing industries over 2008-2019, the study finds support for both hypotheses. The interaction between financially dependent industry and foreign bank asset share is positive and significant. Industries in countries with higher foreign bank presence grow faster, consistent with foreign banks relaxing financing constraints. The effect diminishes systematically as financial development increases, with breakeven points clustering around the sample mean and median of financial development indices. At maximum financial institutions depth, corresponding to the most advanced EU financial systems, the effect turns significantly negative, suggesting potential crowding out where foreign banks compete with rather than complement domestic financial

intermediation. More market-based financial systems significantly weaken the foreign bank channel, with the effect operating specifically through the accessibility dimension. Eastern EU economies exhibit a significantly larger foreign bank effect than Western EU advanced members, consistent with the financial development heterogeneity findings.

This study makes three contributions. First and most importantly, it introduces financial structure ratios across depth, access, and efficiency dimensions as moderators of the foreign bank channel. More market-based financial systems, specifically those with greater relative accessibility of financial markets, significantly weaken the foreign bank effect. Second, it applies the Bruno and Hauswald (2014) methodology to EU countries over a more recent period, confirming the persistence of the foreign bank effect in European economies. Third, it employs the multidimensional IMF Financial Development Index to identify which specific dimensions of financial development drive the weakening of the foreign bank channel.

2. Literature review

2.1. Finance and economic growth

Many studies establish that financial development promotes economic growth. King and Levine (1993) show that financial intermediation predicts future economic growth, capital accumulation and productivity improvements across a broad cross-section of countries. Levine (2005) surveys the finance and growth literature and concludes that financial systems promote growth by mobilizing savings, allocating capital to productive uses, monitoring managers and facilitating risk management consistent with the broader view that well-developed financial systems ease external financing constraints for firms.

Rajan and Zingales (1998) provide a more precise industry-level test of the finance and growth relationship. They show that in countries with more developed financial systems industries grow faster if they rely more on external finance. Their identification strategy links country-level financial conditions to industry-level growth by exploiting cross-industry differences in external financial dependence. The idea is that industries with higher external financing needs should benefit more from better financial conditions if finance relaxes binding constraints. This cross-industry approach forms the methodological foundation of the present study.

2.2. Foreign banks and real economic activity

Foreign bank entry can affect host economies through two competing channels. On the one hand, foreign banks may increase the supply of loanable funds, intensify competition, reduce borrowing costs, and improve credit allocation through superior screening and monitoring technologies (BIS, 2001, 2006; Claessens et al., 2001). On the other hand, foreign banks may face informational

disadvantages in host markets. Because acquiring borrower-specific information is costly, foreign entrants may focus on transparent and high-quality borrowers, a process known as cream-skimming (Dell'Ariccia and Marquez, 2004; Sengupta, 2007). Local banks, facing a deteriorating borrower pool, may respond by reducing lending, potentially worsening overall credit availability (Gormley, 2010; Petersen and Rajan, 1995). Detragiache et al. (2008) further argue that foreign banks benefit high-end customers while hurting other borrowers, with ambiguous welfare effects. The net effect of foreign bank presence is therefore uncertain.

Empirical evidence at the firm and industry level is mixed. Giannetti and Ongena (2009) find that foreign bank lending stimulates firm sales and asset growth in Eastern Europe, particularly for young firms. Gormley (2010) finds the opposite for India, firms are less likely to obtain credit after foreign bank entry due to a systematic drop in local lending. These contrasting findings suggest that the real effect of foreign banks depends on the host country's financial environment.

Bruno and Hauswald (2009, 2014) provide the closest empirical foundation for this study. They apply the Rajan and Zingales (1998) identification strategy to a global panel of manufacturing industries from 1995 to 2003. Their key explanatory variable is the interaction between industry-level external financial dependence and country-level foreign bank presence. They find that foreign bank presence stimulates growth in financially dependent manufacturing industries, suggesting that foreign banks relax financing constraints.

Their heterogeneity results are particularly relevant. Bruno and Hauswald (2009, 2014) show that the foreign bank effect is strong in developing economies, where domestic financial systems are weaker and firms have fewer alternative sources of external finance. In advanced economies, foreign banks have a much weaker effect on real activity, consistent with the idea that developed domestic banking systems and capital markets already provide firms with access to finance. They also find that foreign banks partly offset the adverse effect of banking crises on financially dependent industries, suggesting that foreign owned banks may stabilize credit supply when domestic banks are constrained.

Schnabel and Seckinger (2019) extend this line of evidence to Europe and find that foreign bank presence had a stronger growth effect during the Global Financial Crisis than in normal times. This suggests that the impact of foreign banks is not constant over time and may become stronger during periods of financial disruption.

2.3. Financial development heterogeneity

An important finding of the foreign bank literature is that the effect of foreign banks depends on the level of domestic financial development. Bruno and Hauswald (2014) show that foreign banks matter primarily in countries with less developed financial systems, while conventional measures of domestic financial development are more important in advanced economies. This suggests that foreign banks and

domestic financial development may act as alternative mechanisms for relaxing financing constraints.

This distinction is important to this study. If domestic financial systems are underdeveloped, foreign banks may provide additional credit, better screening and access to external funding. However, if domestic banks and capital markets are already well developed, the marginal contribution of foreign banks may be smaller. In such cases, firms may already have access to domestic credit, equity markets, bond markets or other sources of external finance.

Kroszner, Laeven, and Klingebiel (2007) provide related evidence on the importance of credit-supply conditions. Using an industry-level framework like Rajan and Zingales (1998), they show that industries with greater external financial dependence are more negatively affected during banking crises.

2.4. Financial structure and real economy

The structure of the financial system is important for this study because it determines whether firms depend primarily on banks or can obtain external finance through capital markets. Demirgüç-Kunt and Levine (2001), Levine (2002), and Beck and Levine (2002) examine whether bank-based or market-based financial systems are more supportive to growth. Their main conclusion is that overall financial development and legal institutional quality matter more than whether a system is bank-based or market-based.

Beck and Levine (2002) are particularly relevant because they apply the Rajan and Zingales (1998) cross-industry methodology to financial structure. But they find no support for the view that either bank-based or market-based financial systems are systematically superior for industry growth. Their results support that overall financial development and legal system efficiency matter more than financial structure.

Sahay et al. (2015), an IMF Staff Discussion Note that presents the analytical foundation for the IMF Financial Development Index later developed by Svirydzienka (2016), offer a policy-oriented perspective on financial system development. While their evidence on market structure is inconclusive, they argue that the relative role of financial institutions and financial markets may change as economies develop. This supports the view that a simple bank-based versus market-based classification may be too broad to capture specific financing channels. Allen, Gu, and Kowalewski (2017) review the financial-structure literature and summarize evidence suggesting that market-based systems can be advantageous or disadvantageous for the financially dependent industries depending on the state of the economy.

Earlier studies usually measure financial structure using ratios such as stock market capitalization relative to bank credit or stock market activity relative to banking activity. These measures are useful for distinguishing market-based from bank-based systems, but they mainly capture the relative size or activity of capital markets and banks. The IMF Financial Development Index developed by

Svirydzenka (2016) allows a more detailed measurement by separating financial institutions and financial markets into depth, access and efficiency dimensions.

Chu (2020) also supports the view that financial structure should be examined across multiple dimensions. Following the mainstream literature, Chu (2020) measures financial structure in terms of size, activity and efficiency and finds that a more market-based financial structure is positively associated with economic growth when measured by activity and efficiency but not when measured by size. The paper also shows that this positive effect weakens when the financial system becomes too unbalanced. This reinforces the idea that a single aggregate measure may overlook important differences across financial structure dimensions. The present study applies this logic to the foreign bank channel by examining whether depth, access and efficiency dimensions of financial structure moderate the foreign bank effect.

2.5. Foreign banks in the European Union

The European Union is a useful setting for studying the real effects of foreign banks. While EU countries share a common regulatory framework and banking market, they still differ in foreign bank presence, financial development and financial structure.

Claessens and Van Horen (2014) document the global expansion of foreign bank ownership over the period 1995-2009 using a comprehensive bank ownership database. Their evidence shows strong heterogeneity across regions. Foreign bank penetration increased particularly strongly in Eastern Europe and Central Asia, where foreign bank presence rose sharply after transition and reached a high level by 2009. In contrast, in OECD countries, domestic banks remained the dominant providers of financial intermediation, despite the presence of foreign owned institutions.

Giannetti and Ongena (2009) study foreign bank entry using firm-level data from Eastern European economies and find that foreign lending stimulates firm sales, asset growth, and the use of debt. Their results also show that young firms benefit more, suggesting that foreign banks improve capital allocation and reduce lending problems.

Evidence from studies suggests that the effect of foreign banks in Europe is unlikely to be uniform. It may depend both on the level of foreign bank presence and on the structure of the domestic financial system.

2.6. Hypotheses

This study tests two hypotheses.

Hypothesis 1: Foreign bank presence improves access to external finance, enabling financially dependent manufacturing industries to grow faster.

Hypothesis 2: The effect of foreign bank presence on financially dependent industries is weaker in more market-based financial systems, where firms have greater access to alternative sources of external finance.

3. Data and methodology

3.1. Data

The empirical analysis covers 28 EU countries, including the UK, across 23 manufacturing industries over the period 2008-2019, yielding an unbalanced panel. The panel has three dimensions: 28 countries, 23 industries and 12 years which is a relatively short time dimension. According to the October 2024 IMF World Economic Outlook classification, 24 of the 28 sample countries are advanced economies, while the remaining four (Bulgaria, Hungary, Poland and Romania) are classified as emerging market economies. The starting year 2008 is determined by data availability for the foreign bank asset share variable, while 2019 is chosen as the primary endpoint to avoid contamination from the COVID-19 pandemic, which disrupted manufacturing output through channels unrelated to the financial constraint. Financial development index data from the IMF is unavailable after 2020, further limiting the heterogeneity analysis. The baseline foreign bank effect is estimated over extended sample periods through 2022.

The dependent variable is real growth in manufacturing value added (*Growth*), derived from the UNIDO Industrial Statistics database at the 2-digit ISIC Revision 4 classification level, covering 23 manufacturing industries. The 2-digit level is chosen to ensure adequate matching with the Rajan and Zingales (1998) external financial dependence index which covers 36 industries at the 3-digit SIC level. Using 3-digit ISIC classifications would make multiple industries sharing the same financial dependence value, reducing variation in the key interaction term. Manufacturing value added is first deflated by using harmonized CPI data from the IMF International Financial Statistics, chosen because all sample countries are European countries with harmonized price indices over the sample period¹. Growth is then computed as the first difference in the logarithm of deflated value added for consecutive years.

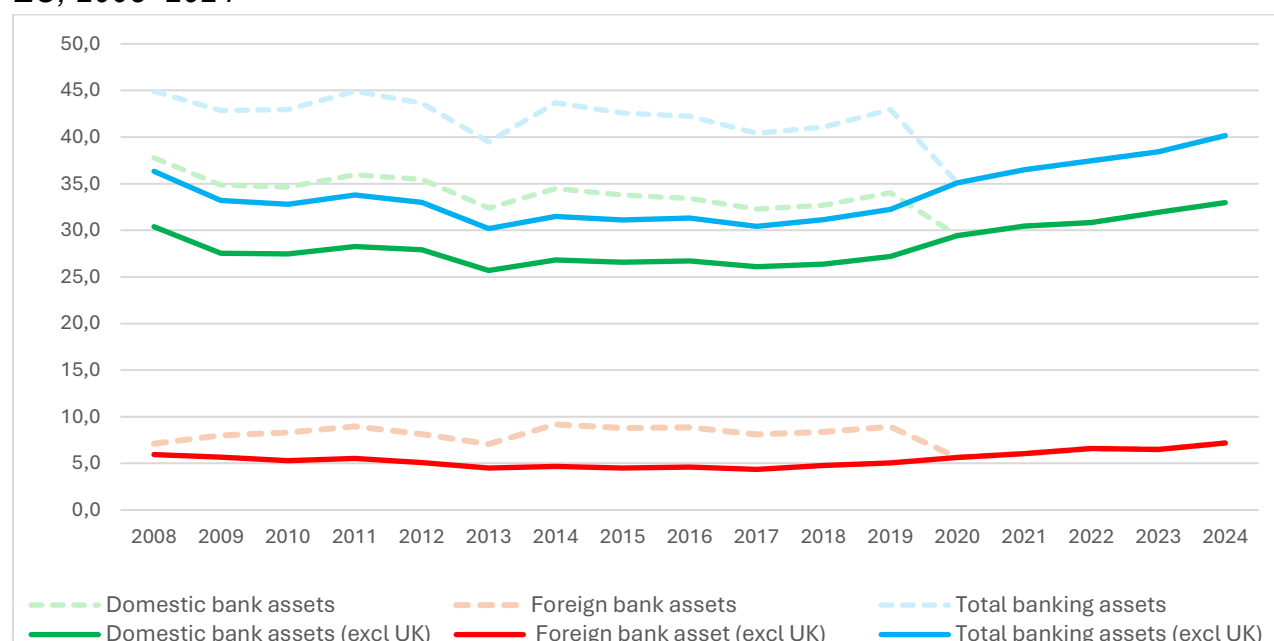
Foreign bank penetration (*ForBkAS*) is measured as the ratio of “total assets of foreign subsidiaries and branches” to “total assets of all credit institutions”, obtained from the ECB Banking Structural Statistical Indicators (SSI) dataset. Foreign subsidiaries are credit institutions incorporated in the host country but controlled by a foreign parent. Foreign branches are direct extensions of foreign parent institutions. This measure captures the extent of foreign bank ownership and activity in domestic banking systems. The average foreign bank asset share in the sample is 46.9%, substantially higher than the 27.5% reported by Bruno and Hauswald (2014) for their global sample, reflecting the high degree of banking integration among European countries.

¹ The United Kingdom's harmonized CPI data is unavailable for 2020–2022 as the UK ceased reporting harmonized indices following its departure from the European Union in January 2020. For these three years and for the UK only, the standard national CPI from the IMF International Financial Statistics is used as a substitute. This affects only the robustness specification and does not influence the baseline results.

Figure 1 shows that domestic banks account for the largest share of total banking assets in the EU throughout the period. Foreign bank assets are smaller in absolute terms, but they remain economically relevant because foreign banks may affect the allocation of credit to financially dependent industries. The visible decline around 2020 mainly reflects the exclusion of the United Kingdom from the EU aggregate after Brexit.

Table 1 presents foreign bank asset share for all 28 sample countries in years 2008, 2013, 2019 and the sample average. Panel A covers 15 Western EU member states with an average foreign bank share of 26.5%, while Panel B covers 13 Eastern EU countries including Cyprus and Malta with an average of 70.3%. The most notable country-specific patterns are as follows; France exhibits the lowest average foreign bank presence (4.2%), reflecting the dominance of large domestically owned institutions BNP Paribas, Crédit Agricole, and Société Générale. Czechia exhibits the highest average foreign bank presence (93.2%), reflecting the privatization of its banking sector. Parent banks of the three largest banks are Belgian bank KBC, Austrian bank Erste Group, and French bank Société Générale (Czech National Bank, 2002). Finland shows a sharp decline from 71.2% in 2013 to 12.0% in 2019, consistent with the relocation of Nordea Bank's headquarters from Sweden to Finland in 2018. Estonia declines from 98.9% in 2008 to 50.5% in 2019, reflecting the closure of Danske Bank's Estonian operations following the 2017 money laundering scandal. Hungary shows a gradual decline from 61.2% in 2008 to 42.9% in 2019, consistent with the government's deliberate renationalization policy during 2010 to 2015 (EBRD, 2015).

Figure 1. Domestic bank assets, foreign bank assets, and total banking assets in the EU, 2008–2024



Notes: The figure reports aggregate banking assets in the EU by ownership type. Values are expressed in trillion euros. Foreign bank assets include foreign subsidiaries and branches. Source: ECB Consolidated Banking Data.

Table 1. Foreign bank presence by country, 2008-2019

A	Countries	2008 (%)	2013 (%)	2019 (%)	Average (2008-2019, %)
1.	Austria	29.4	27.6	17.6	25.6
2.	Belgium	15.4	51.1	50.4	47.2
3.	Denmark	15.6	12.9	7.1	12.2
4.	Finland	69.9	71.2	12.0	59.8
5.	France	3.9	3.0	4.8	4.2
6.	Germany	10.0	4.1	12.9	7.1
7.	Greece	21.8	3.5	1.3	9.4
8.	Ireland	66.8	65.1	55.6	57.4
9.	Italy	8.6	8.6	6.9	8.3
10.	Luxembourg	86.8	87.5	87.2	88.0
11.	Netherlands	4.0	7.5	6.3	7.6
12.	Portugal	21.1	20.3	31.6	24.1
13.	Spain	9.6	6.2	4.8	6.5
14.	Sweden	6.8	6.2	20.9	9.1
15.	UK	13.6	27.9	36.3	31.6
	Average	25.6	26.9	23.7	26.5

B	Countries	2008 (%)	2013 (%)	2019 (%)	Average (2008-2019, %)
16.	Bulgaria	83.9	71.5	77.7	77.6
17.	Croatia	-	89.9	91.1	90.4
18.	Cyprus	30.9	33.9	21.7	27.0
19.	Czechia	95.9	92.3	91.1	93.2
20.	Estonia	98.9	95.7	50.5	88.6
21.	Hungary	61.2	55.5	42.9	52.2
22.	Latvia	65.9	59.0	66.1	59.6
23.	Lithuania	85.1	91.5	90.5	89.3
24.	Malta	82.5	74.9	46.5	69.2
25.	Poland	72.5	61.3	46.0	58.9
26.	Romania	88.5	90.0	73.6	85.0
27.	Slovakia	96.2	88.1	85.1	88.1
28.	Slovenia	28.4	31.3	49.0	35.4
	Average	68.5	71.9	64.0	70.3
	Total average	45.5	47.8	42.4	46.9

The external financial dependence index (*FinDep*) is taken from Rajan and Zingales (1998), measured as the industry median of the fraction of capital expenditure not financed through internal cash flows for US manufacturing firms during the 1980s. Following Rajan and Zingales (1998), US firms serve as the benchmark because the United States is considered to have one of the most developed and frictionless financial sectors. This index is assumed stable across time and countries, though this assumption is questioned by a recent work (Villani, 2021). Table 2 presents the 23 manufacturing industries used in the analysis, their UNIDO ISIC Revision 4 classifications, and the corresponding financial dependence index from Rajan and Zingales (1998). Computer, electronic and optical products (ISIC 26) and Electrical equipment (ISIC 27) both map to Electrical machinery (ISIC 383), and Motor vehicles (ISIC 29) and Other transport equipment (ISIC 30) both

map to Transport equipment (ISIC 384) in Rajan and Zingales (1998), and therefore each pair shares the same external financial dependence value.

Table 2. External financial dependence index mapping

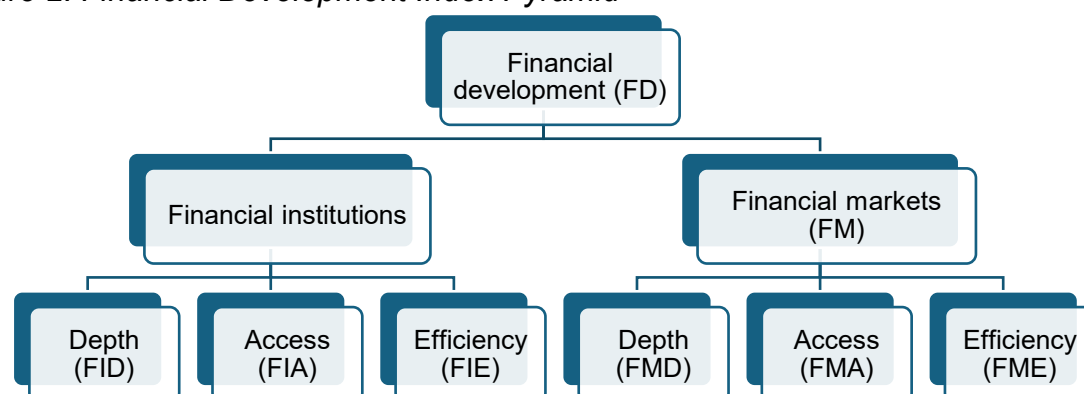
ISIC Rev. 4 Code	ISIC Rev. 4 Industry Name	ISIC Rev. 3 Code	Industry Name	FinDep
10	Food products	311	Food products	0.14
11	Beverages	313	Beverages	0.08
12	Tobacco products	314	Tobacco	-0.45
13	Textiles	321	Textiles	0.40
14	Wearing apparel	322	Wearing apparel	0.03
15	Leather and related products	323	Leather products	-0.14
16	Wood products, excluding furniture	331	Wood products	0.28
17	Paper and paper products	341	Paper and products	0.18
18	Printing and reproduction of recorded media	342	Printing and publishing	0.20
19	Coke and refined petroleum products	353	Petroleum refining	0.04
20	Chemicals and chemical products	351	Industrial chemicals	0.25
21	Pharmaceuticals, medicinal chemicals, etc.	352	Other chemicals	0.22
22	Rubber and plastics products	355	Rubber products	0.23
23	Other non-metallic mineral products	369	Non-metallic mineral products	0.06
24	Basic metals	371	Iron and steel	0.09
25	Fabricated metal products, except machinery	381	Fabricated metal products	0.24
26	Computer, electronic and optical products	383	Electrical machinery	0.77
27	Electrical equipment	383	Electrical machinery	0.77
28	Machinery and equipment n.e.c.	382	Machinery	0.45
29	Motor vehicles, trailers and semi-trailers	384	Transport equipment	0.31
30	Other transport equipment	384	Transport equipment	0.31
31	Furniture	332	Furniture	0.24
32	Other manufacturing	390	Other manufacturing	0.47

The control variable *Share* is the one-period lagged share of industry *i* in country *j*'s total manufacturing value added, following Bruno and Hauswald (2014). This variable controls for convergence effects - the tendency of larger industries to grow more slowly, and its lag ensures it is predetermined with respect to the dependent variable.

The financial development variables are taken from the IMF Financial Development Index database. The overall financial development index (*FDI*) decomposes into two dimensions, Financial Institutions (*FI*) and Financial Markets (*FM*), and each is further decomposed into depth (*FIDI*, *FMDI*), access (*FIAI*, *FMAI*) and efficiency (*FIEI*, *FMEI*) sub-indices, yielding nine indices in total (see Figure 2). Each sub-index is constructed by combining several underlying indicators into a single measure. The weights are obtained using principal component analysis, meaning that indicators contributing more to the variation within a given dimension receive greater weight (Svirydzenka, 2016). These indices provide complete coverage for all 28 sample countries over 2008–2020, normalized between 0 and 1. This complete coverage is an advantage over alternative measures such as the

World Bank ‘stock market capitalization to GDP’ and ‘private credit to GDP’ series, which have significant missing values for several EU member states.

Figure 2. Financial Development Index Pyramid



Source: Svirydzenka (2016), IMF Working Paper WP/16/05, page 5. Based on Čihák et al. (2012).

Underlying indicators of the sub-indices are presented in Table 3. Depth indices capture the size and the volume of financial intermediation which is measured by indicators such as private sector credit to GDP and stock market capitalization to GDP. Access indices measure how broadly financial institutions and markets are available to individuals and firms such as bank branches per 100,000 adults and total numbers of issuers of debt per 100,000 adults. Efficiency indices capture how effectively financial intermediaries provide financial services such as net interest margin and stock market turnover ratio (Svirydzenka, 2016; Sahay et al., 2015).

Table 3. Financial development sub-indices and their underlying indicators

	Financial Institutions (FI)	Financial markets (FM)
Depth (DI)	1. Private-sector credit to GDP 2. Pension fund assets to GDP 3. Mutual fund assets to GDP 4. Insurance premiums, life and non-life to GDP	1. Stock market capitalization to GDP 2. Stock traded to GDP 3. International debt securities of corporations to GDP 4. Total debt securities of financial corporations to GDP 5. Total debt securities of nonfinancial corporations to GDP
Access (AI)	1. Bank branches per 100,000 adults 2. ATMs per 100,000 adults	1. Percent of market capitalization outside of top 10 largest companies 2. Total number of issuers of debt (domestic and external, nonfinancial and financial corporations) per 100,000 adults
Efficiency (EI)	1. Net interest margin 2. Lending-deposits spread 3. Non-interest income to total income 4. Overhead costs to total assets 5. Return on assets 6. Return on equity	1. Stock market turnover ratio (stocks traded to capitalization)

Source: Sahay et al. (2015) and Svirydzenka (2016)

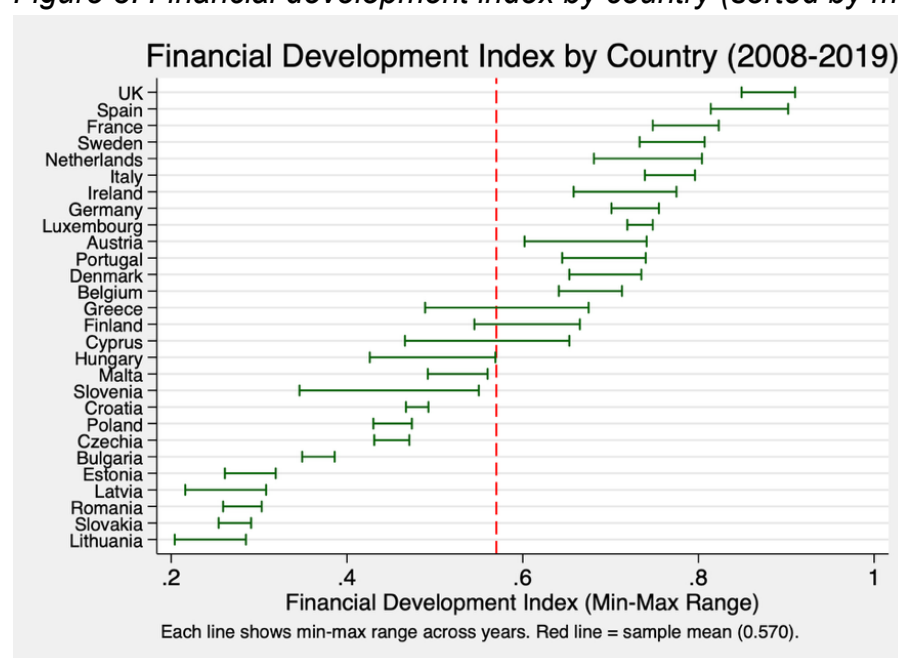
Table 4 reports the correlation matrix for all nine financial development indices, calculated at the country-year level ($N = 336$). The very high correlations ($r > 0.90$) are observed between *FDI* and *FM* ($r = 0.97$), *FDI* and *FMDI* ($r = 0.95$) and *FM* and *FMDI* ($r = 0.92$), reflecting that depth dimensions drive the overall financial development and financial markets indices. By contrast, the efficiency sub-indices *FIEI* and *FMEI* show very low correlations with most other indices (*FIEI* reaches a maximum of only 0.11), confirming they capture a distinct dimension of financial development. Access and efficiency sub-indices show negative correlations with several other indices, suggesting that more efficient financial institutions are not necessarily more accessible, and vice versa.

Table 4. Correlation matrix of financial development indices 2008-2019 (obs=335)

	FDI	FI	FM	FIDI	FIAI	FIEI	FMDI	FMAI	FMEI
FDI	1								
FI	0.88	1							
FM	0.97	0.73	1						
FIDI	0.84	0.81	0.78	1					
FIAI	0.35	0.59	0.19	0.02	1				
FIEI	0.04	0.03	0.05	0.11	-0.30	1			
FMDI	0.95	0.83	0.92	0.85	0.26	0.11	1		
FMAI	0.61	0.51	0.61	0.50	0.23	-0.24	0.48	1	
FMEI	0.69	0.38	0.79	0.47	-0.02	0.17	0.63	0.09	1

Figure 3 and Appendix Figures 2 to 9 present the min-max range of each financial development index by country over 2008-2019. Financial development varies considerably across EU member states, with higher levels generally observed in Western European countries and lower levels in Eastern European economies.

Figure 3. Financial development index by country (sorted by maximum value)



The financial structure variables are constructed following the bank-based versus market-based framework of Demirgüç-Kunt and Levine (2001) and Levine (2002) by dividing financial markets sub-indices by their parallel financial institutions sub-indices. Four financial structure ratios are constructed using financial development indices.

Overall financial structure ratio using FM and FI is as follows:

$$FinStr_{jt} = \frac{FM_{jt}}{FI_{jt}} \quad (1)$$

Financial structure ratio in terms of depth, using FMDI and FIDI is as follows:

$$FinStrDI_{jt} = \frac{FMDI_{jt}}{FIDI_{jt}} \quad (2)$$

Financial structure ratio in terms of access using FMAI and FIAI is as follows:

$$FinStrAI_{jt} = \frac{FMAI_{jt}}{FIAI_{jt}} \quad (3)$$

Financial structure ratio in terms of efficiency using FMEI and FIEI is as follows:

$$FinStrEI_{jt} = \frac{FMEI_{jt}}{FIEI_t} \quad (4)$$

A higher ratio indicates a more market-based financial system while a lower ratio indicates a more bank-based system. A ratio above 1 indicates that the financial markets dimension exceeds the financial institutions dimension. For example, a *FinStr* value of 2 means financial markets are twice as developed as financial institutions in that country. The correlation matrix of four financial structure ratios is reported in Table 5. *FinStrAI* shows a relatively low correlation with the other two ratios.

Table 5. Correlation matrix of financial structure ratios, 2008-2019 (obs=335)

	FinStr	FinStrDI	FinStrAI	FinStrEI
FinStr	1			
FinStrDI	0.77	1		
FinStrAI	0.66	0.29	1	
FinStrEI	0.81	0.62	0.21	1

Figure 4 illustrates the cross-country variation in *FinStr*, revealing a clear East-West pattern. Most of the Eastern EU economies cluster at low values reflecting bank-dominated financial systems, while Western EU member states exhibit higher ratios reflecting more developed capital markets. The cross-country distributions of *FinStrDI*, *FinStrAI*, and *FinStrEI* are presented in Appendix Figures 11 to 13.

Figure 4. Financial structure ratio by country

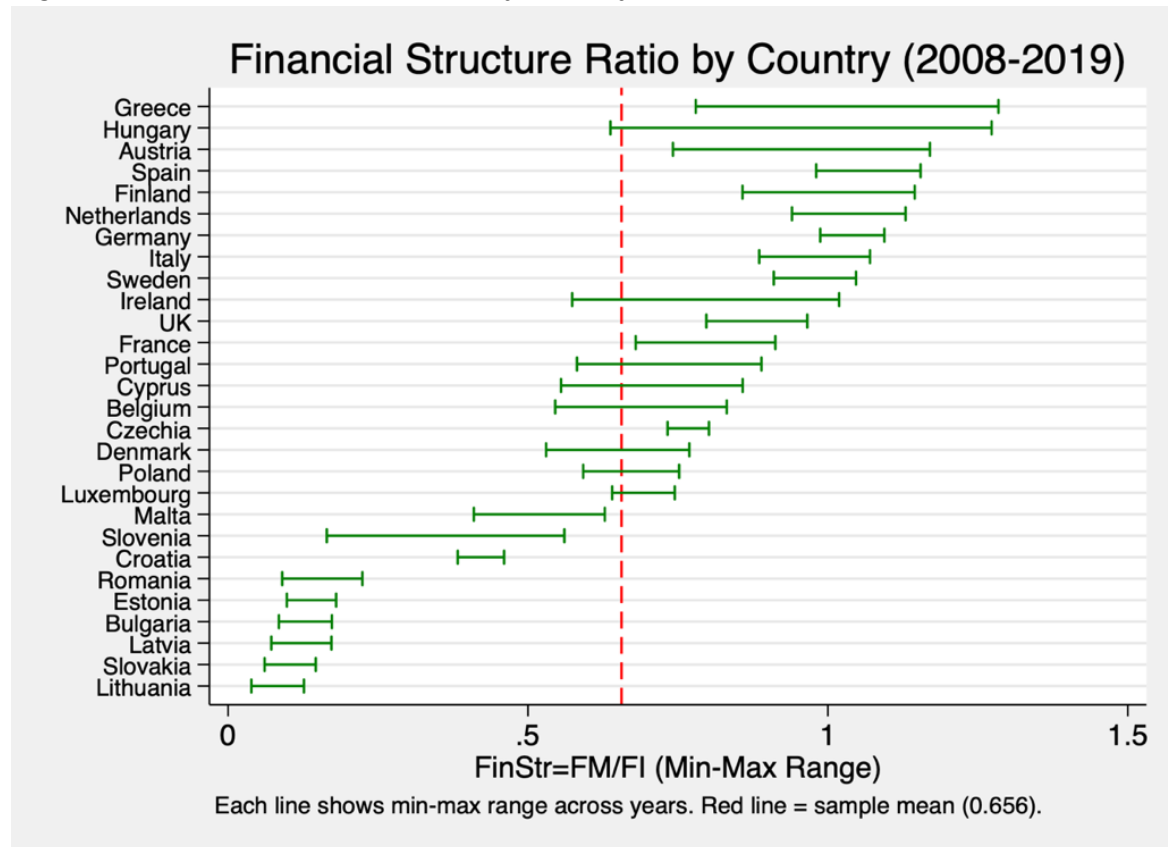


Table 6 reports summary statistics for all variables over the primary 2008-2019 sample period. The dependent variable Growth has a mean of -0.2% with a standard deviation of 22.2 percentage points. The large minimum (-515.7%) and maximum (389.8%) values confirm the presence of outliers, motivating the winsorized series Growth_w which replaces extreme values beyond the 1st and 99th percentiles with the boundary values at those percentiles. Foreign bank asset share (*ForBkAS*) averages 44.5% across the sample with a standard deviation of 32.5 percentage points, reflecting the wide variation across EU member states documented in Table 1. The financial dependence index (*FinDep*) ranges from -0.45 for Tobacco products, indicating the industry finances capital expenditure primarily from internal cash flows, to 0.77 for Computer electronics and Electrical equipment. The financial structure ratios show substantial variation, *FinStr* ranges from 0.04 to 1.28 and *FinStrAI* from 0.01 to 2.40.

Table 6. Summary statistics, 2008-2019

Variable	Short description	N	Mean	SD	Min	p25	p50	p75	Max
Growth	Real growth of industry VA	6593	-0.2%	0.222	-515.7%	-6.3%	1.1%	7.8%	389.8%
Growth_w	Winsorized Growth	6593	0%	0.172	-65.0%	-6.3%	1.1%	7.8%	57.6%
ForBkAS	Foreign bank asset share	6870	44.5%	0.325	1.3%	11.0%	45.2%	76.1%	98.9%
FinDep	External financial dependence index	6977	0.24	0.24	-0.45	0.09	0.23	0.31	0.77
Share	Size of industry	6974	4.3%	0.04	-0.8%	1.5%	3.0%	5.7%	45.9%
FinStr	Financial structure ratio	6977	0.66	0.35	0.04	0.40	0.74	0.97	1.28
FinStrDI	FinStr depth ratio	6977	0.80	0.40	0.09	0.48	0.74	1.07	1.96
FinStrAI	FinStr access ratio	6977	0.67	0.50	0.01	0.22	0.64	1.02	2.40
FinStrEI	FinStr efficiency ratio	6977	0.84	0.69	0	0.09	0.82	1.38	2.56
FDI	Overall financial development index	6977	0.57	0.20	0.20	0.43	0.61	0.73	0.91
FI	Financial institutions index	6977	0.66	0.14	0.36	0.53	0.67	0.79	0.93
FM	Financial markets index	6977	0.46	0.27	0.02	0.27	0.52	0.69	0.95
FIDI	FI depth index	6977	0.51	0.26	0.12	0.28	0.50	0.69	1
FMDI	FM depth index	6977	0.45	0.31	0.02	0.14	0.48	0.68	0.99
FIAI	FI access index	6977	0.67	0.21	0.21	0.51	0.66	0.87	1
FMAI	FM access index	6977	0.42	0.28	0.01	0.14	0.50	0.58	1
FIEI	FI efficiency index	6977	0.58	0.07	0.37	0.54	0.58	0.62	0.77
FMEI	FM efficiency index	6977	0.49	0.39	0	0.05	0.46	0.93	1

3.2. Methodology

3.2.1. Baseline model

This study follows the identification strategy of Rajan and Zingales (1998) as applied by Bruno and Hauswald (2014). The baseline specification:

$$\begin{aligned}
 Growth_{ijt} = & \alpha_0 + \gamma(FinDep_i \cdot ForBkAS_{jt}) + \delta Share_{ijt-1} + \sum_{it} \alpha_{it} 1_i 1_t + \sum_{jt} \beta_{jt} 1_j 1_t \\
 & + \varepsilon_{ijt} \quad (1)
 \end{aligned}$$

where $Growth_{ijt}$ is real growth in manufacturing value added for industry i in country j at time t . The key explanatory variable is the interaction between the financial dependence index ($FinDep_i$) for industry i and the foreign bank asset share ($ForBkAS_{jt}$) for country j at time t . The coefficient γ captures the differential effect of foreign bank presence across industries with different financing needs. A positive and significant coefficient indicates that industries with higher financial dependence grow relatively faster in countries with greater foreign bank presence, consistent with foreign banks relaxing binding financial constraints. A negative coefficient would indicate that foreign bank entry crowds out domestic lending, leaving financially dependent industries worse off. The lagged industry share $Share_{ijt-1}$ controls for convergence effect.

The primary estimator is the High-Dimensional Fixed Effects (HDFE) estimator of Correia (2017), implemented via the `reghdfe` command in Stata, which absorbs industry-year ($1_i 1_t$) and country-year ($1_j 1_t$) fixed effects simultaneously. Industry-year fixed effects ($1_i 1_t$) absorb common shocks affecting specific industry worldwide such as commodity shocks while country-year fixed effects ($1_j 1_t$) absorb all factors that change over time within each country, such as macroeconomic performance and monetary policy changes.

Because *ForBkAS* varies only at the country-year level, it is collinear with country-year fixed effects and cannot be identified as a standalone regressor. The interaction term $ForBkAS \times FinDep$ varies at the country-industry-year level, since *FinDep* differs across industries and is therefore identified after absorbing both sets of fixed effects.

As a secondary estimator, the standard within estimator is employed via the `xtreg, fe` command in Stata, which uses country-industry fixed effects and common year dummies. This specification is less demanding than the HDFE estimator. It uses common year dummies that apply equally to all countries rather than country-specific year intercepts and is expected to yield larger coefficients by retaining more variation in the interaction term. The within estimator is used as a robustness check and for the crisis heterogeneity analysis, where country-year fixed effects would absorb the crisis timing variation required for identification.

Standard errors are clustered at the country-industry level following Bruno and Hauswald (2014), to account for both heteroskedasticity and serial correlation within panel units over time. A Wooldridge (2002) test for first-order serial correlation yields $F(1,595) = 2.853$ ($p = 0.092$), providing no strong evidence of serial correlation at the conventional 5% significance level, though the result is borderline at the 10% level. As clustered and non-clustered standard errors are virtually identical in the baseline specification, any residual serial correlation does not materially affect inference.

3.2.2. Financial development and structure heterogeneity

To test whether financial development or financial structure moderates the foreign bank effect on industry growth, the baseline specification is augmented with a triple interaction term. Two separate augmented specifications are estimated. The first tests whether the level of financial development conditions the foreign bank channel:

$$Growth_{ijt} = \alpha_0 + \gamma_1 (FinDep_i \cdot ForBkAS_{jt}) + \gamma_2 (FinDep_i \cdot ForBkAS_{jt} \cdot FinDev_{jt}) + \delta Share_{ijt-1} + \sum_{it} \alpha_{it} 1_i 1_t + \sum_{jt} \beta_{jt} 1_j 1_t + \varepsilon_{ijt} \quad (2)$$

where $FinDev_{jt}$ denotes one of the nine IMF financial development indices for country j at time t . A negative and significant γ_2 indicates that the foreign bank effect diminishes as financial development increases, meaning that foreign banks add less value where domestic financial systems are already well developed.

The second model is augmented with financial structure ratios:

$$Growth_{ijt} = \alpha_0 + \gamma_1 (FinDep_i \cdot ForBkAS_{jt}) + \gamma_2 (FinDep_i \cdot ForBkAS_{jt} \cdot FinStr_{jt}) + \delta Share_{ijt-1} + \sum_{it} \alpha_{it} 1_i 1_t + \sum_{jt} \beta_{jt} 1_j 1_t + \varepsilon_{ijt} \quad (3)$$

where $FinStr_{jt}$ denotes one of the four financial structure ratios defined in Section 3.1 for country j at time t . A negative and significant γ_2 directly tests Hypothesis 2 that the foreign bank effect is weaker in more market-based financial systems where firms have greater access to alternative sources of external finance. The total foreign bank effect at any given level of financial development is $\gamma_1 + \gamma_2 \times FinDev_{jt}$, evaluated using linear combination tests (lincom) at specific percentiles of the financial development distribution.

3.2.3. Robustness

The baseline results are subjected to several robustness checks. First, growth is winsorized at the 1st and 99th percentiles ($Growth_w$) to assess sensitivity to outliers. Second, the sample is extended to 2022 to test whether the foreign bank effect persists beyond the COVID-19 disruption period. Third, two country exclusion checks are performed: the five Western EU countries with the lowest foreign bank penetration (France, Germany, Netherlands, Spain, and Italy) are excluded, and the four emerging economies with high foreign bank penetration (Bulgaria, Romania, Hungary, and Poland) are excluded, to test whether the results are driven by specific country groups or by the contrast between Eastern and Western EU banking structures. Additionally, the sample is split at the EU accession date into 15 Western EU member states and 13 Eastern EU economies. And a pooled regression with an Eastern EU interaction term formally tests whether the foreign bank effect differs significantly between the two groups. The ECB Single Supervisory Mechanism (SSM), launched in November 2014, is tested as a potential structural break through both pre/post SSM split regressions and a direct SSM interaction term.

4. Results

The empirical results are organized as follows. Section 4.1 presents the baseline foreign bank effect and its robustness including crisis dummy, geographic and structural break tests. Section 4.2 examines financial development heterogeneity, and Section 4.3 tests financial structure heterogeneity together addressing Hypothesis 2.

4.1. Baseline results

4.1.1. Primary estimation

Table 7 presents the baseline results estimated using the HDFE estimator across three sample periods 2008-2019, 2008-2020 and 2008-2022. The interaction term *ForBkAS* $\times$ *FinDep* is positive and statistically significant across all three specifications, providing support for Hypothesis 1.

The primary baseline result (Specification 1, 2008-2019) yields an interaction coefficient of 0.076, significant at the 5 percent level ($p = 0.018$), with an adjusted R-squared of 25.78%. The economic magnitude is meaningful given the mean of *Growth*, which is almost zero percent. Industries in countries with 32.5 percentage points higher average foreign bank presence, corresponding to one standard deviation of *ForBkAS*, grow approximately 0.6 percentage points faster per year at mean financial dependence (0.246). The industry-level growth effects implied by the baseline coefficient are reported in the appendix.

The lagged industry share coefficient is negative and significant at the 1 percent level across all specifications, consistent with the convergence effect. Extending the sample to 2022 (Specification 3) yields a coefficient of 0.063, significant at the 1 percent level ($p = 0.008$), confirming that the foreign bank effect persists beyond the primary sample period. The result is temporarily weakened when 2020 is included as the endpoint (Specification 2), consistent with COVID-19 disrupting the foreign bank channel unrelated to financial constraints, but it is fully restored in the extended 2022 sample, suggesting a temporary disruption rather than a permanent structural change.

The baseline coefficient of 0.076 closely replicates Bruno and Hauswald's (2014) full sample estimate of 0.068. And their sample standard deviation is 28.88 percent, closely comparable to the 32.5 percent in this study, meaning the implied economic magnitude is also consistent across the two studies. This provides validation that applying their methodology to the EU context yields consistent results despite the different sample period and country coverage.

Table 7. Baseline results across different periods

Specification	1	2	3
Constant	0.002	0.002	0.008
(p-values)	(0.789)	(0.644)	(0.077)
(standard errors)	(0.006)	(0.005)	(0.005)
 ForBkAS x FinDep	 0.076**	 0.056**	 0.063***
(p-values)	(0.018)	(0.026)	(0.008)
(standard errors)	(0.032)	(0.025)	(0.024)
 LShare	 -0.242***	 -0.277***	 -0.254***
(p-values)	(0.006)	(0.001)	(0.001)
(standard errors)	(0.088)	(0.086)	(0.079)

Industry-year dummies	Yes	Yes	Yes
Country-year dummies	Yes	Yes	Yes
Observations	6506	7061	8160
Adjusted R squared	25.78%	26.68%	28.08%
Sample countries	All	All	All
Number of countries	28	28	28
Period	2008-2019	2008-2020	2008-2022
Command	reghdfe	reghdfe	reghdfe

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

4.1.2. Within estimator comparison

Table 8 reports the secondary Within estimator results. The interaction coefficient is 0.206 ($p = 0.013$) for the primary 2008–2019 sample, reflecting the less demanding fixed effects, retaining more variation in the interaction term. The larger coefficients relative to HDFE are expected due to the fixed effects in the HDFE specification absorb a larger share of the variation. When the sample is extended to 2020 the coefficient loses significance (0.072, $p = 0.292$), while extending to 2022 restores it (0.145, $p = 0.005$).

Table 8. Baseline results using the within estimator

Specification	4	5	6
Constant	0.084	0.095	0.074
(p-values)	(0.037)	(0.016)	(0.036)
(standard errors)	(0.040)	(0.039)	(0.035)
ForBkAS x FinDep	0.206**	0.072	0.145***
(p-values)	(0.013)	(0.292)	(0.005)
(standard errors)	(0.082)	(0.068)	0.052
LShare	-4.165***	-4.066***	-3.753***
(p-values)	(0.000)	(0.000)	(0.000)
(standard errors)	(0.841)	(0.817)	(0.721)
Industry-year dummies			
Country-year dummies			
Country-Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	6,506	7,061	8160
Within R squared	16.14%	14.94%	14.51%
Sample countries	All	All	All
Number of countries	28	28	28
Period	2008-2019	2008-2020	2008-2022
Number of groups	607	608	611
Command	xtreg	xtreg	xtreg

4.1.3. Within estimator with the crisis dummy

Table 9 examines crisis effect by adding interaction terms for the Global Financial Crisis (GFC, 2008-2009), the European sovereign debt crisis (Euro, 2010-2012), and COVID-19 (Covid, 2020).

The GFC interaction term is negative and highly significant (Specification 7: -0.175, $p = 0.000$; Specification 11: -0.178, $p = 0.000$), while the main interaction coefficient remains significant. The foreign bank channel is therefore effectively neutralized during the Global Financial Crisis, consistent with the parent bank distress channel - during the GFC foreign parent banks facing acute funding pressures were unable to maintain credit supply to host country subsidiaries, eliminating the growth benefit for financially dependent industries.

Neither the Euro crisis nor the COVID-19 interaction terms are statistically significant, suggesting these crises did not differentially impair the foreign bank channel. The notable shifts in coefficient significance when extending the sample to 2020 further support the choice of 2008–2019 as the primary sample period.

Table 9. Estimation with crisis dummies

Specification	7	8	9	10	11	12	13
Constant	0.111	0.099	0.095	0.095	0.099	0.089	0.085
(p-values)	(0.006)	(0.012)	(0.016)	(0.016)	(0.016)	(0.027)	(0.036)
(standard errors)	(0.040)	(0.039)	(0.039)	(0.040)	(0.041)	(0.040)	(0.041)
ForBkAS x FinDep	0.133*	0.037	0.075	0.077	0.277***	0.165*	0.239**
(p-values)	(0.051)	(0.630)	(0.274)	(0.351)	(0.001)	(0.070)	(0.012)
(standard errors)	(0.068)	(0.077)	(0.068)	(0.082)	(0.083)	(0.091)	(0.095)
ForBkAS x FinDep x Crisis	-0.175***	0.073	0.100	-0.006	-0.178***	0.078	-0.036
(p-values)	(0.000)	(0.156)	(0.321)	(0.903)	(0.000)	(0.157)	(0.399)
(standard errors)	(0.048)	(0.052)	(0.100)	(0.046)	(0.049)	(0.055)	(0.043)
LShare	-4.092***	-4.057***	-4.071***	-4.067***	-4.192***	-4.156***	-4.174***
(p-values)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(standard errors)	(0.820)	(0.816)	(0.817)	(0.818)	(0.845)	(0.840)	(0.843)
Country-Industry Panel FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,061	7,061	7,061	7,061	6,506	6,506	6,506
Within R squared	15.11%	14.99%	14.97%	14.94%	16.32%	16.19%	16.15%
Number of countries	28	28	28	28	28	28	28
Number of groups	607	607	607	607	608	608	608
Period	2008-2020				2008-2019		
Specifics	gfc	euro	covid	all crisis	gfc	euro	all crisis
Command	xtreg	xtreg	xtreg	xtreg	xtreg	xtreg	xtreg

4.1.4. Structural break test

Table 10 tests for a structural break at 2014 associated with the launch of the ECB Single Supervisory Mechanism. The pre-SSM coefficient (Specification 14, 2008-2014) is 0.068 and significant at the 5 percent level.

But the post-SSM coefficient (Specification 15, 2015–2019) loses significance, a pattern that persists when extending to 2022 (0.058, $p = 0.182$), suggesting that the post-2014 period exhibits less variation in foreign bank presence across countries and over time rather than a genuine structural break. The direct SSM interaction term (Specification 16) confirms that the interaction is statistically insignificant (0.019, $p = 0.823$), indicating no structural change in 2014.

Table 10. Pre and post SSM analysis

Specification	14	15	16	17	18
Constant	-0.027	0.039	0.002	0.037	0.008
(p-values)	(0.001)	(0.000)	(0.785)	(0.000)	(0.077)
(standard errors)	(0.008)	(0.010)	(0.006)	(0.006)	(0.005)
ForBkAS x FinDep	0.068**	0.088	0.068**	0.058	0.068**
(p-values)	(0.036)	(0.235)	(0.033)	(0.182)	(0.033)
(standard errors)	(0.032)	(0.074)	(0.032)	(0.043)	(0.032)
ForBkAS x FinDep x Dummy			0.019		-0.011
(p-values)			(0.823)		(0.860)
(standard errors)			(0.087)		(0.060)
LShare	-0.275**	-0.195**	-0.242***	-0.235***	-0.254***
(p-values)	(0.036)	(0.020)	(0.006)	(0.001)	(0.001)
(standard errors)	(0.131)	(0.084)	(0.088)	(0.073)	(0.079)
Industry-year dummies	Yes	Yes	Yes	Yes	Yes
Country-year dummies	Yes	Yes	Yes	Yes	Yes
Country-Industry FE					
Year FE					
Observations	3693	2813	6506	4,467	8,160
Adjusted R squared	29.04%	10.81%	25.77%	23.37%	28.07%
Number of countries	28	28	28	28	28
Period	2008–2014	2015– 2019	2008–2019	2015–2022	2008–2022
Specifics	Pre SSM	Post SSM	SSM interaction	Post SSM	SSM interaction
Command	reghdfe	reghdfe	reghdfe	reghdfe	reghdfe

4.1.5. Geographic test

Table 11 examines whether the effect of foreign bank presence differs between Eastern and Western EU member states. The analysis begins by estimating the baseline model separately for the two regions. Separate regressions for each group are individually insignificant. The coefficient is -0.034 ($p = 0.734$) for Eastern EU countries and -0.026 ($p = 0.590$) for Western EU countries. As shown in Table 12 the standard deviation of $FinDep \times ForBkAS$ falls from 0.151 in the full sample to 0.095 in Western EU subsample. The Eastern EU subsample, despite larger interaction term variation ($SD = 0.182$), yields an insignificant coefficient.

The coefficient on lagged industry share remains negative in the Western EU subsample, consistent with the convergence interpretation, but it is not statistically significant. This likely reflects the reduced variation and smaller subsample size after splitting the sample, particularly under the demanding fixed effects structure.

Specification 21 estimates the baseline model on the full sample while interacting the baseline term with an Eastern EU dummy variable. The dummy interaction coefficient is 0.134 and highly significant ($p = 0.004$), indicating that the foreign bank effect is significantly larger in the Eastern EU.

Additional evidence is provided by two regressions with exclusions. Specification 22 excludes France, Germany, the Netherlands, Spain, and Italy, which are among the countries with the lowest levels of foreign bank penetration. The estimated coefficient increases to 0.078 and remains statistically significant at the 10 percent level. Specification 23 excludes the four IMF-classified emerging economies (Bulgaria, Hungary, Poland and Romania) thereby creating a more advanced country sample. The coefficient declines to 0.053 but remains statistically significant at the 5 percent level.

These results are directly comparable to Bruno and Hauswald (2014), who decompose their sample into developing and advanced economies. They report standalone coefficients of 0.131 ($p = 0.002$) for developing countries. The difference may partly reflect the sample period. Bruno and Hauswald's 1995–2003 sample coincides with a phase in which foreign bank asset shares increased substantially in their data, while the present study covers the post-Global Financial Crisis period, when foreign bank activity in several European markets had stabilized or declined. In their combined estimation, the developing-country coefficient of 0.078 ($p = 0.028$) closely matches the Eastern EU estimate of 0.074 ($p = 0.019$), while their advanced-country estimate of 0.056 ($p = 0.053$) is only borderline significant.

Overall, the results suggest that although separate regional regressions are individually insignificant, the pooled interaction model shows that the marginal effect is significantly larger in Eastern EU countries than in Western EU countries. This finding is consistent with Hypothesis 2 and with the broader heterogeneity results presented in the following sections, which show that the foreign bank effect weakens as financial systems become more developed.

Table 11. Eastern and Western EU analysis, 2008-2019

Specification	19	20	21	22	23
Constant	0.034	-0.002	0.006	0.002	0.002
(p-values)	(0.085)	(0.697)	(0.321)	(0.811)	(0.679)
(standard errors)	(0.020)	(0.006)	(0.006)	(0.008)	(0.005)
ForBkAS x FinDep	-0.034	-0.026	-0.060	0.078*	0.053**
(p-values)	(0.734)	(0.590)	(0.264)	(0.080)	(0.027)
(standard errors)	(0.100)	(0.049)	(0.054)	(0.045)	(0.024)
ForBkAS x FinDep x East			0.134***		
(p-values)			(0.004)		
(standard errors)			(0.047)		
LShare	-0.337**	-0.174	-0.236***	-0.263***	-0.193**
(p-values)	(0.011)	(0.117)	(0.006)	(0.007)	(0.025)
(standard errors)	(0.132)	(0.111)	(0.086)	(0.098)	(0.086)
Industry-year dummies	Yes	Yes	Yes	Yes	Yes
Country-year dummies	Yes	Yes	Yes	Yes	Yes
Observations	2950	3556	6506	5197	5458
Adjusted R squared	20.88%	35.06%	25.84%	23.99%	27.41%
Number of countries	13	15	28	23	24
Specifics	Eastern EU	Western EU	East interaction	Excl. FR, DE, NL, ES, IT	Excl. RO, HU, PL, BG
Command	reghdfe	reghdfe	reghdfe	reghdfe	reghdfe

Table 12. Summary statistic for FinDep × ForBkAS

Group	N	Mean	SD	Min	Max
All	6870	0.108	0.151	-0.445	0.762
Western EU	3766	0.058	0.095	-0.322	0.681
Eastern EU	3104	0.169	0.182	-0.445	0.762

4.2. Heterogeneity result

4.2.1. Heterogeneity with financial development indices

Tables 13 and 14 present the heterogeneity results using the nine IMF financial development sub-indices as moderators. The results are strong and consistent across multiple specifications. The overall financial development index FDI (Specification 24), financial markets index FM (Specification 26), financial institutions depth FIDI (Specification 27), financial markets depth FMDI (Specification 30), and financial markets access FMAI (Specification 31) all yield negative and significant triple interaction coefficients, indicating that as financial development increases the foreign bank effect weakens.

Depth dimensions drive the moderating effect on both sides, FIDI and FMDI are significant while their access and efficiency counterparts are largely not. This is

consistent with the index construction of Svirydzenka (2016), who notes that the composite financial institutions and financial markets indices are primarily driven by depth indicators that capture the size of financial intermediation rather than how broadly accessible or efficiently it operates. And FIDI retains a significant negative interaction while the composite FI index becomes insignificant, suggesting that it is specifically the size of institutions rather than overall institutional development that determines the value of foreign banks.

For every significant specification the triple interaction coefficient is larger in absolute value than the double interaction coefficient. Given that all financial development indices range from 0 to 1, this implies a breakeven point within the observed distribution where the total foreign bank effect equals zero. Table 15 reports these breakeven points. They cluster around the sample mean and median across all significant moderators, meaning approximately half of the country-year observations are below the threshold where foreign banks have a positive effect on industry growth, and approximately half are above it where foreign banks have no significant benefit.

To assess whether the foreign bank effect turns significantly negative at high financial development levels, linear combination tests² are conducted at different percentiles of the distribution for each specification. At the highest FIDI level in the sample the total foreign bank effect is -0.126 , statistically significant at $p = 0.039$. The effect does not merely disappear, but it turns significantly negative at the extreme. This suggests potential crowding out in the most financially advanced EU member states where foreign banks may compete with rather than complement domestic financial intermediation. This could reflect adverse selection, foreign banks cream-skimming the best borrowers and leaving domestic banks with riskier portfolios or parent bank capital extraction in highly developed markets, as discussed in the introduction.

The economic magnitude of the moderating effect is meaningful. At the 25th percentile of FIDI, corresponding to less financially developed economies, a 32.5 percentage point increase in foreign bank presence is associated with approximately 0.5 percentage points higher annual growth at mean financial dependence. At the sample mean of FIDI the effect is essentially zero, consistent with the breakeven point falling close to the mean. At maximum FIDI, corresponding to the UK and Sweden, the effect is approximately minus 1.0 percentage points, suggesting foreign banks are associated with lower growth for financially dependent industries in the most advanced financial systems. The other significant moderators FDI, FM, FMDI and FMAI show broadly similar economic magnitudes, with the foreign bank growth benefit ranging from approximately 0.4 to 0.6 percentage points at the 25th percentile and becoming statistically indistinguishable from zero at the highest financial development levels.

² Linear combination tests evaluate the total foreign bank effect at a specific moderator value as $\gamma_1 + \gamma_2 \times \text{FD}$, with the combined standard error computed from the full variance-covariance matrix of the estimated coefficients, correctly accounting for the covariance between γ_1 and γ_2 .

Table 13. Financial development heterogeneity: upper-level indices, 2008-2019

Specification	24	25	26
Constant	0.006	0.004	0.006
(p-values)	(0.326)	(0.590)	(0.300)
(standard errors)	(0.006)	(0.007)	(0.005)
ForBkAS x FinDep	0.179***	0.189***	0.107***
(p-values)	(0.000)	(0.007)	(0.003)
(standard errors)	(0.049)	(0.070)	(0.036)
ForBkAS x FinDep x FinDev	-0.310***	-0.218	-0.237***
(p-values)	(0.002)	(0.156)	(0.006)
(standard errors)	(0.102)	(0.154)	(0.085)
LShare	-0.235***	-0.243***	-0.230***
(p-values)	(0.007)	(0.006)	(0.008)
(standard errors)	(0.087)	(0.088)	(0.086)
Industry-year dummies	Yes	Yes	Yes
Country-year dummies	Yes	Yes	Yes
Observations	6506	6506	6506
Adjusted R squared	25.83%	25.79%	25.84%
Number of countries	28	28	28
Specifics	FDI	FI	FM
Command	reghdfe	reghdfe	reghdfe

Table 14. Financial development heterogeneity: sub-indices, 2008-2019

Specification	27	28	29	30	31	32
Constant	0.006	0.001	0.001	0.005	0.005	0.002
(p-values)	(0.307)	(0.880)	(0.907)	(0.351)	(0.346)	(0.682)
(standard errors)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)
ForBkAS x FinDep	0.142***	0.021	0.236	0.092***	0.100***	0.090**
(p-values)	(0.000)	(0.731)	(0.219)	(0.007)	(0.004)	(0.011)
(standard errors)	(0.039)	(0.062)	(0.192)	(0.034)	(0.034)	(0.035)
ForBkAS x FinDep x FinDev	-0.268***	0.093	-0.259	-0.183**	-0.186***	-0.072
(p-values)	(0.001)	(0.460)	(0.416)	(0.023)	(0.004)	(0.158)
(standard errors)	(0.077)	(0.126)	(0.319)	(0.080)	(0.063)	(0.051)
LShare	-0.231***	-0.236***	-0.238***	-0.238***	-0.238***	-0.233***
(p-values)	(0.007)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)
(standard errors)	(0.086)	(0.087)	(0.088)	(0.087)	(0.087)	(0.087)
Industry-year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country-year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6506	6506	6506	6506	6506	6506
Adjusted R squared	25.85%	25.77%	25.77%	25.81%	25.85%	25.79%
Number of countries	28	28	28	28	28	28
Specifics	FIDI	FIAI	FIEI	FMDI	FMAI	FMEI
Command	reghdfe	reghdfe	reghdfe	reghdfe	reghdfe	reghdfe

Table 15. Breakeven points of financial development indices

Moderator	ForBkASxFinDep coef	Triple interaction coef	Mean	Median	p75	Breakeven
FDI	0.179	-0.310	0.569	0.614	0.734	0.577
FM	0.107	-0.237	0.459	0.518	0.692	0.451
FIDI	0.142	-0.268	0.514	0.501	0.691	0.530
FMDI	0.092	-0.183	0.453	0.479	0.682	0.503
FMAI	0.100	-0.186	0.41	0.483	0.578	0.538

4.2.2. Heterogeneity with financial structure

Table 16 presents the direct test of Hypothesis 2 using financial structure ratios as moderators. The overall ratio *FinStr* (Specification 33) and the access sub-ratio *FinStrAI* (Specification 35) yield negative and significant triple interactions of -0.124 ($p = 0.026$) and -0.105 ($p = 0.002$) respectively, indicating that more market-based financial systems weaken the foreign bank channel. The depth ratio *FinStrDI* (Specification 34) and efficiency ratio *FinStrEI* (Specification 36) are not significant, suggesting the substitution effect operates specifically through the access dimension of financial structure where firms have relatively better access to financial markets than to financial institutions, they rely less on foreign banks.

Unlike the financial development breakeven points which cluster around the sample mean and median, the financial structure breakeven points are higher and around the 75th percentile (Table 18). This means approximately 75% of country-year observations are below the threshold where foreign banks still provide meaningful benefits to financially dependent industries. Only the most market-based financial systems, the top 25% show no significant foreign bank effect.

At maximum *FinStrAI* (2.404), the total foreign bank effect is negative and statistically significant, suggesting that the foreign bank channel may weaken or even reverse in the most market-accessible financial systems. One possible interpretation is that, where firms already have broad access to capital-market financing, foreign banks may no longer provide additional financing but instead compete with existing domestic intermediation.

The economic magnitude is comparable across the two significant financial structure moderators. At mean *FinStr* (0.659), a 32.5 percentage point increase in foreign bank presence is associated with approximately 0.2 percentage points higher annual growth at mean financial dependence, and a one standard deviation increase in *FinStr* (0.351) reduces this benefit by approximately 0.4 percentage points. *FinStrAI* yields identical economic magnitudes despite its different construction, confirming the robustness of the financial structure's moderating effect.

The finding that financial structure moderates the foreign bank effect extends Bruno and Hauswald (2014). The access dimension captures the relative availability of market-based financing to firms and individuals. Where financial markets are broadly accessible, firms can obtain external finance through capital markets rather

than through banks, reducing their reliance on foreign bank credit and weakening the foreign bank channel.

Table 16. Financial structure heterogeneity

Specification	33	34	35	36
Constant	0.004	0.003	0.004	0.003
(p-values)	(0.474)	(0.561)	(0.409)	(0.635)
(standard errors)	(0.005)	(0.006)	(0.005)	(0.006)
ForBkAS x FinDep	0.110***	0.108**	0.100***	0.089**
(p-values)	(0.005)	(0.027)	(0.004)	(0.010)
(standard errors)	(0.039)	(0.049)	(0.034)	(0.035)
ForBkAS x FinDep x FinStr	-0.124**	-0.084	-0.105***	-0.048
(p-values)	(0.026)	(0.321)	(0.002)	(0.173)
(standard errors)	(0.056)	(0.084)	(0.034)	(0.035)
LShare	-0.229***	-0.242***	-0.232***	-0.233***
(p-values)	(0.008)	(0.006)	(0.008)	(0.007)
(standard errors)	(0.086)	(0.088)	(0.087)	(0.087)
Industry-year dummies	Yes	Yes	Yes	Yes
Country-year dummies	Yes	Yes	Yes	Yes
Observations	6506	6506	6506	6506
Adjusted R squared	25.82%	25.78%	25.84%	25.79%
Number of countries	28	28	28	28
Period	2008-2019			
Specifics	FM/FI	FMDI/FIDI	FMAI/FIAI	FMEI/FIEI
Command	reghdfe	reghdfe	reghdfe	reghdfe

Table 17. Breakeven points of financial structure ratio

Moderator	ForBkAS_fd coef	Triple interaction coef	Mean	Median	p75	Breakeven
FinStr	0.11	-0.124	0.659	0.743	0.973	0.887
FinStrAI	0.10	-0.105	0.662	0.626	1.017	0.952

4.3. Endogeneity

The main endogeneity concern is reverse causality. Countries with stronger growth prospects may attract more foreign banks, making it difficult to interpret the relationship between foreign bank presence and industry growth causally. Foreign banks may choose to enter or expand in countries where expected economic performance is stronger.

The empirical design mitigates this concern by following the Rajan and Zingales (1998) interaction-based approach. The key explanatory variable is not foreign bank presence alone but its interaction with industry-level external financial dependence. Identification therefore comes from whether financially dependent

industries grow relatively faster than less dependent industries within the same country-year when foreign bank presence is higher. This reduces the concern that the results simply reflect foreign banks entering faster-growing countries.

The use of country-year and industry-year fixed effects further reduces omitted-variable concerns. Country-year fixed effects absorb all time-varying country-level shocks, including macroeconomic conditions, banking-sector reforms and country-specific growth prospects. Industry-year fixed effects absorb shocks common to each manufacturing industry across countries, such as global demand, technology shocks, or input-price changes. As a result, the coefficient is identified from differential industry responses within country-years, rather than from simple cross-country differences in foreign bank presence.

A remaining concern is that the Rajan and Zingales (1998) financial-dependence measure may partly capture industry growth opportunities rather than financing constraints. Fisman and Love (2007) raise this issue by using US industry growth as a proxy for global industry growth opportunities. Bruno and Hauswald (2014) address this concern by including this growth-opportunities measure in their foreign bank specification and find that the foreign bank interaction remains significant. This supports the interpretation that the estimated effect operates through external financing constraints rather than only through industry-specific growth opportunities.

System GMM was also considered as an additional endogeneity check, but it is not used as a main specification. Although the AR(2) and Hansen tests do not reject the instrument set, the foreign bank interaction becomes statistically insignificant, and the two-step covariance matrix is reported as singular in the preliminary estimates. This suggests that the dynamic GMM specification is not stable in this sample. Therefore, the main analysis relies on the interaction-based fixed-effects specification with country-year and industry-year fixed effects, while the System GMM results are reported only as a diagnostic check in the appendix.

4.4. Robustness

This section presents additional robustness checks. First, the baseline model is estimated using winsorized industry growth to assess whether extreme growth observations drive the results. Second, the sample is restricted to industries with non-negative financial dependence to examine whether the baseline result depends on the inclusion of self-financing industries. Third, the financial development and financial structure heterogeneity results are extended to 2020 to assess whether the main patterns remain when the COVID-19 year is included.

Table 18 presents results using growth winsorized at the 1st and 99th percentiles. The interaction coefficient remains positive and significant across all *reghdfe* specifications, confirming that outliers in growth do not drive the baseline finding. The Within estimator results are also consistent, with the 2020 specification again losing significance and with the 2022 specification restoring it, mirroring the pattern in the unwinsorized results.

Table 18. Baseline results with winsorized growth

Specification	37	38	39	40	41	42
Constant	0.002	0.001	0.006	0.063	0.072	0.056
(p-values)	(0.717)	(0.818)	(0.089)	(0.036)	(0.013)	(0.033)
(standard errors)	(0.004)	(0.004)	(0.004)	(0.030)	(0.029)	(0.026)
ForBkAS x FinDep	0.059**	0.051**	0.055**	0.164**	0.052	0.118**
(p-values)	(0.020)	(0.021)	(0.011)	(0.038)	(0.433)	(0.013)
(standard errors)	(0.025)	(0.022)	(0.022)	(0.079)	(0.066)	(0.047)
LShare	-0.162**	-0.193***	-0.175***	-3.328***	-3.235***	-3.010***
(p-values)	(0.010)	(0.002)	(0.003)	(0.000)	(0.000)	(0.000)
(standard errors)	(0.063)	(0.062)	(0.058)	(0.605)	(0.586)	(0.524)
Industry-year dummies	Yes	Yes	Yes			
Country-year dummies	Yes	Yes	Yes			
Country-Industry FE				Yes	Yes	Yes
Year FE				Yes	Yes	Yes
Observations	6506	7061	8160	6506	7061	8160
Adjusted R squared	34.39%	34.67%	35.04%			
Within R squared				21.08%	19.95%	19.18%
Number of countries	28	28	28	28	28	28
Period	2008-2019	2008-2020	2008-2022	2008-2019	2008-2020	2008-2022
Number of groups				607	608	611
Specifics	Growth_w	Growth_w	Growth_w	Growth_w	Growth_w	Growth_w
Command	reghdfe	reghdfe	reghdfe	xtreg	xtreg	xtreg

Table 19 restricts the sample to industries with non-negative financial dependence ($FinDep \geq 0$), dropping self-financing industries Tobacco products ($FinDep=-0.45$) and Leather products ($FinDep=-0.14$). The interaction coefficient becomes insignificant for 2008–2019 and for 2008–2022. This sensitivity reflects the reduced variation in $FinDep$ when negative values are excluded, as the identification relies on the full range of financial dependence from self-financing to highly dependent industries.

Table 19. Baseline results excluding industries with negative financial dependence

Specification	43	44
Constant	0.007	0.012
(p-values)	(0.209)	(0.012)
(standard errors)	(0.006)	(0.005)
ForBkAS x FinDep	0.037	0.034
(p-values)	(0.111)	(0.115)
(standard errors)	(0.023)	(0.022)
LShare	-0.238***	-0.251***
(p-values)	(0.007)	(0.001)
(standard errors)	(0.088)	(0.078)

Industry-year dummies	Yes	Yes
Country-year dummies	Yes	Yes
Observations	6107	7664
Adjusted R squared	28.32%	30.36%
Number of countries	28	28
Period	2008–2019	2008–2022
Specifics	without negative FinDep industries	
Command	reghdfe	reghdfe

Tables 20 and 21 present the financial development heterogeneity results extended to 2020. The results are broadly consistent with the primary 2008–2019 specifications. Notably, the FI index becomes significant in the 2020 sample (Specification 46) which was insignificant in the primary sample and FMEI becomes borderline significant (Specification 53). These shifts in significance for the 2020 sample are consistent with COVID-19 temporarily altering the relationship between financial development and the foreign bank channel, further supporting the choice of 2008–2019 as the primary sample period. The significant moderators from the primary sample retain significance in the extended sample with similar coefficients.

Table 20. Financial development heterogeneity, 2008–2020: upper-indices

Specification	45	46	47
Constant	0.007	0.005	0.006
(p-values)	(0.183)	(0.373)	(0.189)
(standard errors)	(0.005)	(0.005)	(0.005)
ForBkAS x FinDep	0.168***	0.207***	0.087***
(p-values)	(0.000)	(0.001)	(0.001)
(standard errors)	(0.040)	(0.061)	(0.026)
ForBkAS x FinDep x FinDev	-0.338***	-0.290**	-0.240***
(p-values)	(0.000)	(0.018)	(0.001)
(standard errors)	(0.093)	(0.123)	(0.070)
LShare	-0.270***	-0.278***	-0.265***
(p-values)	(0.001)	(0.001)	(0.002)
(standard errors)	(0.084)	(0.086)	(0.084)
Industry-year dummies	Yes	Yes	Yes
Country-year dummies	Yes	Yes	Yes
Observations	7061	7061	7061
Adjusted R squared	26.75%	26.71%	26.75%
Number of countries	28	28	28
Period	2008–2020		
Specifics	FDI	FI	FM
Command	reghdfe	reghdfe	reghdfe

Table 21. Financial development heterogeneity, 2008–2020: sub-indices

Specification	48	49	50	51	52	53
Constant	0.006	0.002	0.002	0.007	0.005	0.003
(p-values)	(0.207)	(0.650)	(0.729)	(0.207)	(0.262)	(0.527)
(standard errors)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
ForBkAS x FinDep	0.120***	0.056	0.158	0.073***	0.077***	0.070***
(p-values)	(0.000)	(0.254)	(0.353)	(0.004)	(0.003)	(0.007)
(standard errors)	(0.030)	(0.049)	(0.170)	(0.025)	(0.026)	(0.026)
ForBkAS x FinDep x FinDev	-0.260***	-0.001	-0.165	-0.205***	-0.163***	-0.077*
(p-values)	(0.001)	(0.989)	(0.547)	(0.008)	(0.003)	(0.069)
(standard errors)	(0.075)	(0.089)	(0.275)	(0.077)	(0.056)	(0.042)
LShare	-0.267***	-0.277***	-0.274***	-0.273***	-0.274***	-0.268***
(p-values)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
(standard errors)	(0.084)	(0.086)	(0.086)	(0.085)	(0.085)	(0.085)
Industry-year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country-year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7061	7061	7061	7061	7061	7061
Adjusted R squared	26.75%	26.67%	26.67%	26.72%	26.73%	26.70%
Number of countries	28	28	28	28	28	28
Period	2008–2020					
Specifics	FIDI	FIAI	FIEI	FMDI	FMAI	FMEI
Command	reghdfe	reghdfe	reghdfe	reghdfe	reghdfe	reghdfe

Table 22 extends the financial structure results to 2020. The significant moderators *FinStr* and *FinStrAI* retain negative and significant interactions, confirming the robustness of the financial structure findings. Interestingly, *FinStrEI* becomes significant in the 2020 sample (Specification 57) which was insignificant in the primary sample, again reflecting the COVID-19 induced shifts in coefficient significance that motivate the choice of 2008–2019 as the primary period. *FinStrDI* becomes significant at the 10 percent confidence level in the 2020 sample, though it remains insignificant in the primary 2008–2019 specification.

Table 22. Financial structure heterogeneity, 2008–2020

Specification	54	55	56	57
Constant	0.005	0.005	0.005	0.004
(p-values)	(0.343)	(0.312)	(0.308)	(0.457)
(standard errors)	(0.005)	(0.005)	(0.005)	(0.005)
ForBkAS x FinDep	0.088***	0.104***	0.075***	0.071***
(p-values)	(0.002)	(0.007)	(0.003)	(0.006)
(standard errors)	(0.028)	(0.038)	(0.025)	(0.025)
ForBkAS x FinDep x FinStr	-0.121***	-0.128*	-0.090***	-0.058**
(p-values)	(0.008)	(0.074)	(0.004)	(0.031)
(standard errors)	(0.045)	(0.072)	(0.031)	(0.027)

LShare	-0.265***	-0.277***	-0.269***	-0.267***
(p-values)	(0.002)	(0.001)	(0.002)	(0.002)
(standard errors)	(0.084)	(0.086)	(0.085)	(0.085)
Industry-year dummies	Yes	Yes	Yes	Yes
Country-year dummies	Yes	Yes	Yes	Yes
Observations	7061	7061	7061	7061
Adjusted R squared	26.72%	26.70%	26.73%	26.70%
Number of countries	28	28	28	28
Period	2008-2020			
Specifics	FM/FI	FMDI/FIDI	FMAI/FIAI	FMEI/FIEI
Command	reghdfe	reghdfe	reghdfe	reghdfe

5. Conclusion

This study examines whether foreign bank presence relaxes financing constraints for manufacturing industries in EU countries, and whether this effect depends on the financial development and financial structure of the domestic system. The results suggest that foreign banks still matter in the EU, but their effect is conditional. Foreign bank presence is associated with faster growth in financially dependent manufacturing industries, but the effect becomes weaker as domestic financial systems become more developed and more market-based.

The baseline results provide support for the first hypothesis. The interaction between industry-level external financial dependence and country-level foreign bank asset share is positive and statistically significant. Economically, a one-standard-deviation increase in foreign bank presence is associated with around 0.6 percentage points higher annual industry growth at the average financial dependence index. The effect is strongest for highly financially dependent industries, such as computer, electronic and optical products and electrical equipment, while it is negligible or negative for industries that rely more heavily on internal finance. These results are closely consistent with Bruno and Hauswald (2014), suggesting that the foreign bank channel remains relevant in the EU context despite the later sample period and different country coverage.

The main contribution of this study is to show that the foreign bank effect depends on financial structure. The overall financial structure ratio and the access-based financial structure ratio both yield negative and statistically significant triple interactions over the primary sample period. This supports the second hypothesis: the foreign bank effect is weaker in more market-based financial systems. The breakeven points are close to the 75th percentile of the financial structure distribution, suggesting that foreign banks remain beneficial for most of the EU countries but lose importance in countries with most market-based financial systems. The financial structure access dimension yielded significant result, while other efficiency and depth sub-ratios are insignificant. When firms have easier access to

capital markets, they depend less on bank credit. As a result, foreign banks add less additional value for industry growth. This extends the financial structure literature by showing that aggregate bank versus market measures may hide important differences across depth, access and efficiency dimensions.

The financial development results provide further support for this interpretation. The foreign bank effect weakens as domestic financial development increases, with several IMF financial development sub-indices producing negative and significant triple interactions. The moderating effect is mainly driven by depth indicators, suggesting that the size of domestic financial intermediation matters for whether foreign banks add value. In countries with very high financial institutions depth, the estimated foreign bank effect becomes negative, suggesting that foreign banks may compete with domestic financial intermediaries rather than complement them.

The geographic results are consistent with this pattern. The pooled interaction model shows that the foreign bank effect is significantly larger in Eastern EU countries than in Western EU countries, although separate regional regressions are individually insignificant. This supports the view that foreign banks matter more where domestic financial systems are less developed and firms have fewer alternative sources of external finance.

The crisis analysis also shows that the Global Financial Crisis neutralized the foreign bank channel, suggesting that the growth benefit of foreign banks is mainly a normal times credit supply effect rather than a crisis stabilization effect.

6. Limitations

Several limitations should be noted. First, reverse causality cannot be fully ruled out. Countries with better industry growth prospects may attract more foreign banks, potentially biasing the estimated coefficient upward. Second, the financial dependence index is assumed to be stable across time and countries, but this assumption is questioned by Villani (2021), who finds little empirical support for the stability of financial dependence across time and countries in G7 economies. Third, foreign bank asset share measures presence rather than actual lending to financially dependent firms, which may not fully capture the credit supply channel. Furthermore, the data ends in 2020 for most countries, limiting the post-pandemic analysis. Fourth, there is an important sample period sensitivity. The temporary disruption in 2020 causes notable shifts in coefficient significance, suggesting further research with extended post-pandemic data is needed to confirm the stability of these findings. Finally, the result is sensitive to the inclusion of industries with negative financial dependence, with the baseline effect weakening when restricted to positive FinDep industries only. Despite these limitations, the findings provide consistent evidence that foreign bank presence relaxes financing constraints for manufacturing industries in EU member states, with the effect varying systematically with the level and structure of the domestic financial system.

References

- Allen, F., Gu, X. and Kowalewski, O. (2017) *Financial Structure, Economic Growth and Development*. IÉSEG Working Paper Series No. 2017-ACF-04. Available at: <https://ssrn.com/abstract=3035298>.
- Arellano, M. and Bover, O. (1995) 'Another look at the instrumental variable estimation of error-components models', *Journal of Econometrics*, 68(1), pp. 29–51.
- Bank for International Settlements (2001) *The Banking Industry in the Emerging Market Economies: Competition, Consolidation and Systemic Stability*. BIS Papers No. 4. Basel: Bank for International Settlements.
- Bank for International Settlements (2006) *The Banking System in Emerging Economies: How Much Progress Has Been Made?* BIS Papers No. 28. Basel: Bank for International Settlements.
- Beck, T. and Levine, R. (2002) 'Industry growth and capital allocation: Does having a market- or bank-based system matter?', *Journal of Financial Economics*, 64(2), pp. 147–180.
- Berger, A.N., Klapper, L.F. and Udell, G.F. (2001) 'The ability of banks to lend to informationally opaque small businesses', *Journal of Banking and Finance*, 25(12), pp. 2127–2167.
- Blundell, R. and Bond, S. (1998) 'Initial conditions and moment restrictions in dynamic panel data models', *Journal of Econometrics*, 87(1), pp. 115–143.
- Bruno, V. and Hauswald, R. (2009) *The Real Effect of Foreign Banks*. Paolo Baffi Centre Research Paper No. 2009-50. Available at: <https://ssrn.com/abstract=1289813>.
- Bruno, V. and Hauswald, R. (2014) 'The real effect of foreign banks', *Review of Finance*, 18(5), pp. 1683–1716.
- Chu, L.K. (2020) 'Financial structure and economic growth nexus revisited', *Borsa Istanbul Review*, 20(1), pp. 24–36.
- Čihák, M., Demirgüç-Kunt, A., Feyen, E. and Levine, R. (2012) *Benchmarking Financial Systems around the World*. World Bank Policy Research Working Paper No. 6175. Washington, DC: World Bank.
- Claessens, S., Demirgüç-Kunt, A. and Huizinga, H. (2001) 'How does foreign entry affect domestic banking markets?', *Journal of Banking and Finance*, 25(5), pp. 891–911.
- Claessens, S. and Van Horen, N. (2014) 'Foreign banks: Trends and impact', *Journal of Money, Credit and Banking*, 46(s1), pp. 295–326.
- Correia, S. (2017) *Linear Models with High-Dimensional Fixed Effects: An Efficient and Feasible Estimator*. Working paper.
- Czech National Bank (2002) *Banking Sector Development in the Czech Republic*. Speech by Zdeněk Tůma. Available at: <https://www.cnb.cz>.
- Dell'Ariccia, G. and Marquez, R. (2004) 'Information and bank credit allocation', *Journal of Financial Economics*, 72(1), pp. 185–214.

Demirgüç-Kunt, A. and Levine, R. (eds.) (2001) *Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development*. Cambridge, MA: MIT Press.

Detragiache, E., Tressel, T. and Gupta, P. (2008) 'Foreign banks in poor countries: Theory and evidence', *Journal of Finance*, 63(5), pp. 2123–2160.

EBRD (2015) *Transition Report 2015–16: Rebalancing Finance*. London: European Bank for Reconstruction and Development.

European Parliament and Council (2013) *Directive 2013/36/EU on Access to the Activity of Credit Institutions and the Prudential Supervision of Credit Institutions and Investment Firms*. Official Journal of the European Union.

Fisman, R. and Love, I. (2007) 'Financial dependence and growth revisited', *Journal of the European Economic Association*, 5(2–3), pp. 470–479.

Giannetti, M. and Ongena, S. (2009) 'Financial integration and firm performance: Evidence from foreign bank entry in emerging markets', *Review of Finance*, 13(2), pp. 181–223.

Gormley, T.A. (2010) 'The impact of foreign bank entry in emerging markets: Evidence from India', *Journal of Financial Intermediation*, 19(1), pp. 26–51.

King, R.G. and Levine, R. (1993) 'Finance and growth: Schumpeter might be right', *Quarterly Journal of Economics*, 108(3), pp. 717–737.

Kroszner, R.S., Laeven, L. and Klingebiel, D. (2007) 'Banking crises, financial dependence, and growth', *Journal of Financial Economics*, 84(1), pp. 187–228.

Levine, R. (2002) 'Bank-based or market-based financial systems: Which is better?', *Journal of Financial Intermediation*, 11(4), pp. 398–428.

Levine, R. (2005) 'Finance and growth: Theory and evidence', in Aghion, P. and Durlauf, S. (eds.) *Handbook of Economic Growth*. Volume 1A. Amsterdam: Elsevier, pp. 865–934.

Mian, A. (2006) 'Distance constraints: The limits of foreign lending in poor economies', *Journal of Finance*, 61(3), pp. 1465–1505.

Nordea (2018) *Nordea to Relocate its Headquarters to Finland*. Press release. Available at: <https://www.nordea.com>.

Petersen, M.A. and Rajan, R.G. (1995) 'The effect of credit market competition on lending relationships', *Quarterly Journal of Economics*, 110(2), pp. 407–443.

Rajan, R.G. and Zingales, L. (1998) 'Financial dependence and growth', *American Economic Review*, 88(3), pp. 559–586.

Sahay, R., Čihák, M., N'Diaye, P., Barajas, A., Bi, R., Ayala, D., Gao, Y., Kyobe, A., Nguyen, L., Saborowski, C., Svirydzenka, K. and Yousefi, S.R. (2015) *Rethinking Financial Deepening: Stability and Growth in Emerging Markets*. IMF Staff Discussion Note SDN/15/08. Washington, DC: International Monetary Fund.

Schnabel, I. and Seckinger, C. (2019) 'Foreign banks, financial crises and economic growth in Europe', *Journal of International Money and Finance*, 95, pp. 70–94.

Sengupta, R. (2007) 'Foreign entry and bank competition', *Journal of Financial Economics*, 84(2), pp. 502–528.

- Svirydzienka, K. (2016) *Introducing a New Broad-Based Index of Financial Development*. IMF Working Paper WP/16/05. Washington, DC: International Monetary Fund.
- Villani, M. (2021) 'External financial dependence and industry growth', *Structural Change and Economic Dynamics*, 58, pp. 361–376.
- Wooldridge, J.M. (2002) *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: MIT Press.

Appendix

Table A1. Correlation matrix of financial development indices, 2008-2020 (obs=363)

	FDI	FI	FM	FIDI	FIAI	FIEI	FMDI	FMAI	FMEI
FDI	1								
FI	0.880	1							
FM	0.966	0.727	1						
FIDI	0.842	0.802	0.780	1					
FIAI	0.354	0.597	0.187	0.016	1				
FIEI	0.024	0.024	0.023	0.097	-0.294	1			
FMDI	0.945	0.825	0.916	0.847	0.246	0.092	1		
FMAI	0.617	0.503	0.617	0.507	0.227	-0.259	0.483	1	
FMEI	0.687	0.378	0.786	0.466	-0.009	0.155	0.626	0.096	1

Figure A1. Foreign bank asset share by country

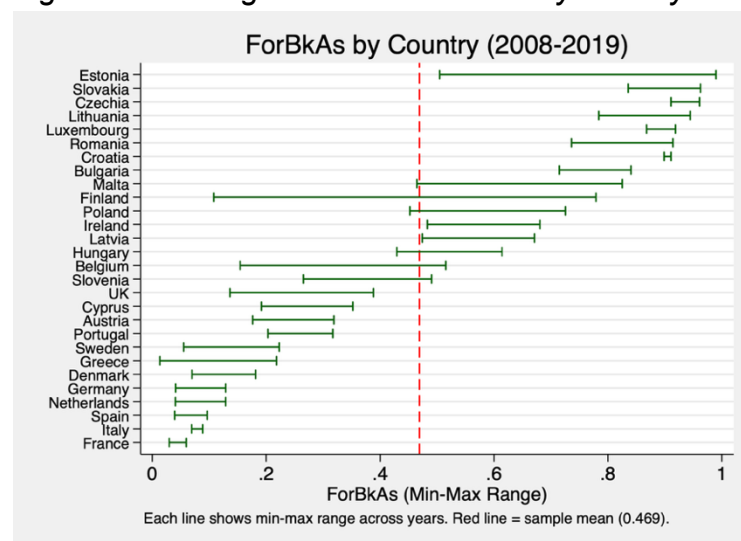


Figure A2. Financial institutions index by country

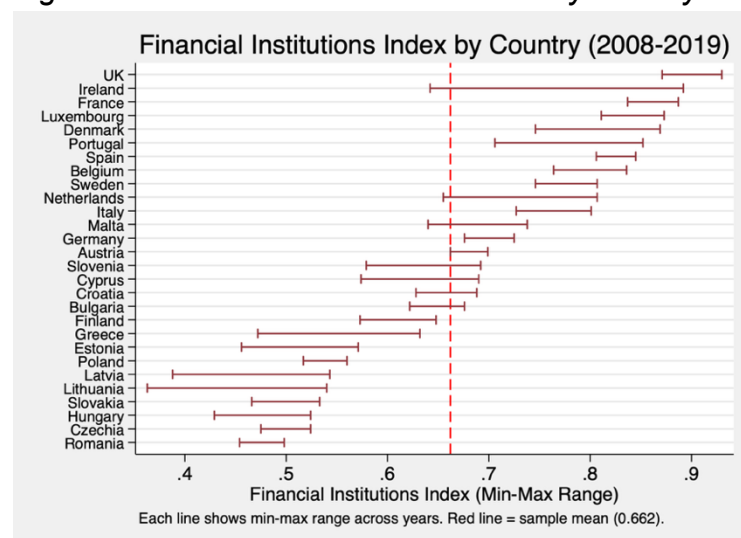


Figure A3. Financial markets index by country

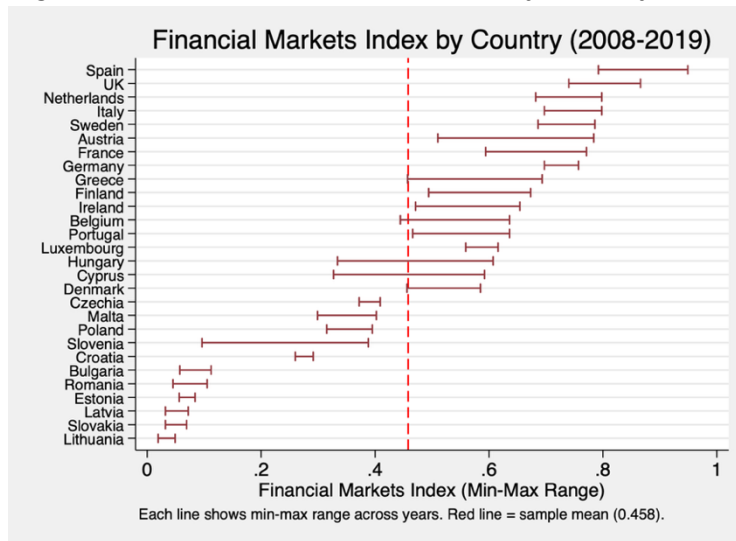


Figure A4. Financial institutions depth index by country

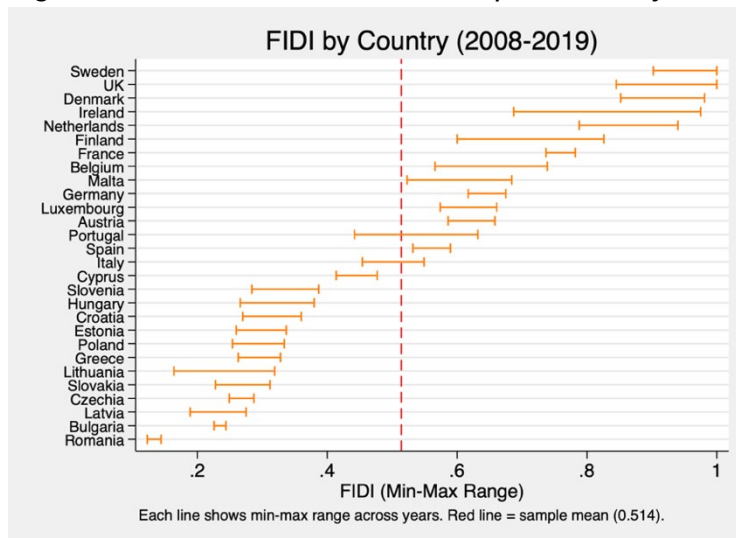


Figure A5. Financial markets depth index by country

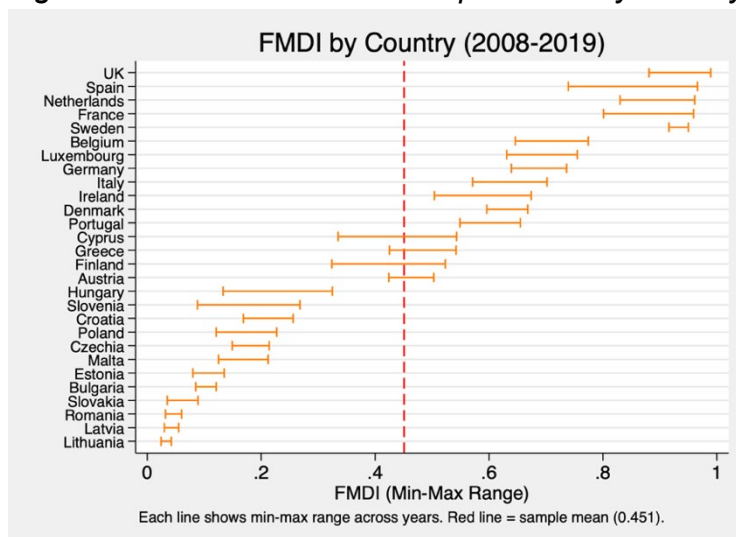


Figure A6. Financial institutions access index by country

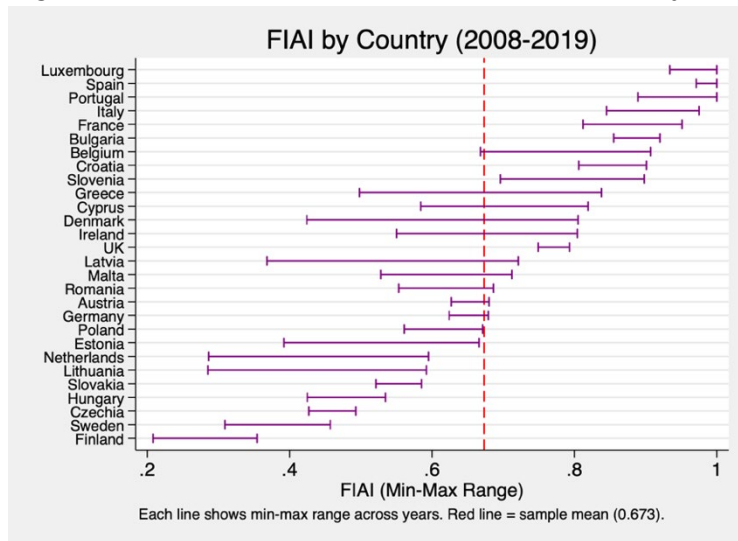


Figure A7. Financial markets access index by country

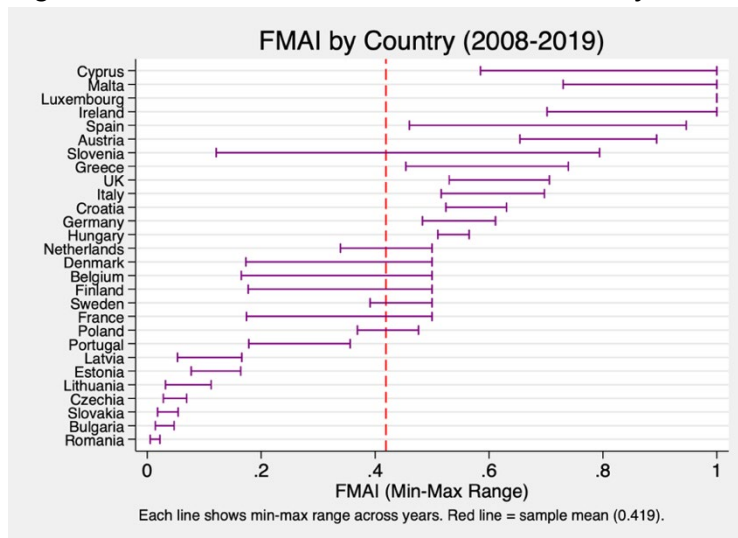


Figure A8. Financial institutions efficiency index by country

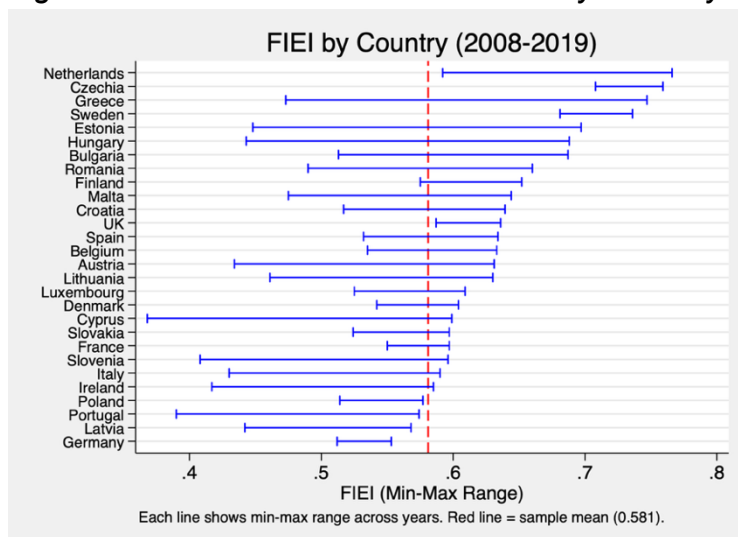


Figure A9. Financial markets efficiency index by country

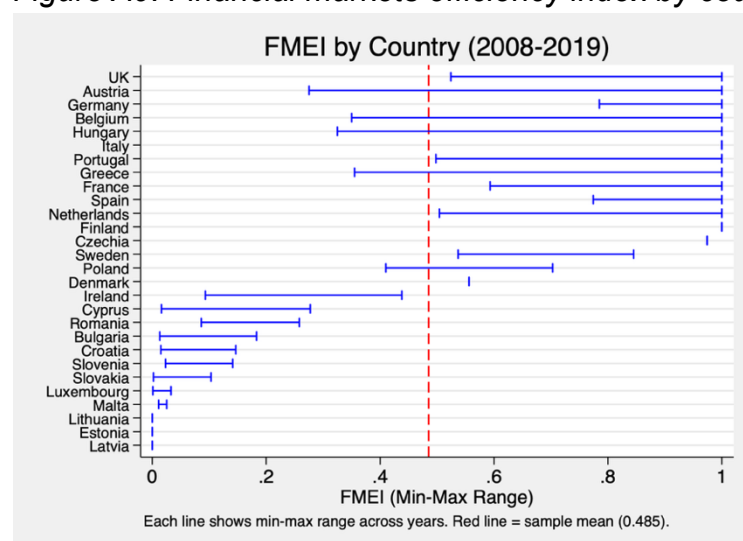


Figure A10. Histograms of financial development indices

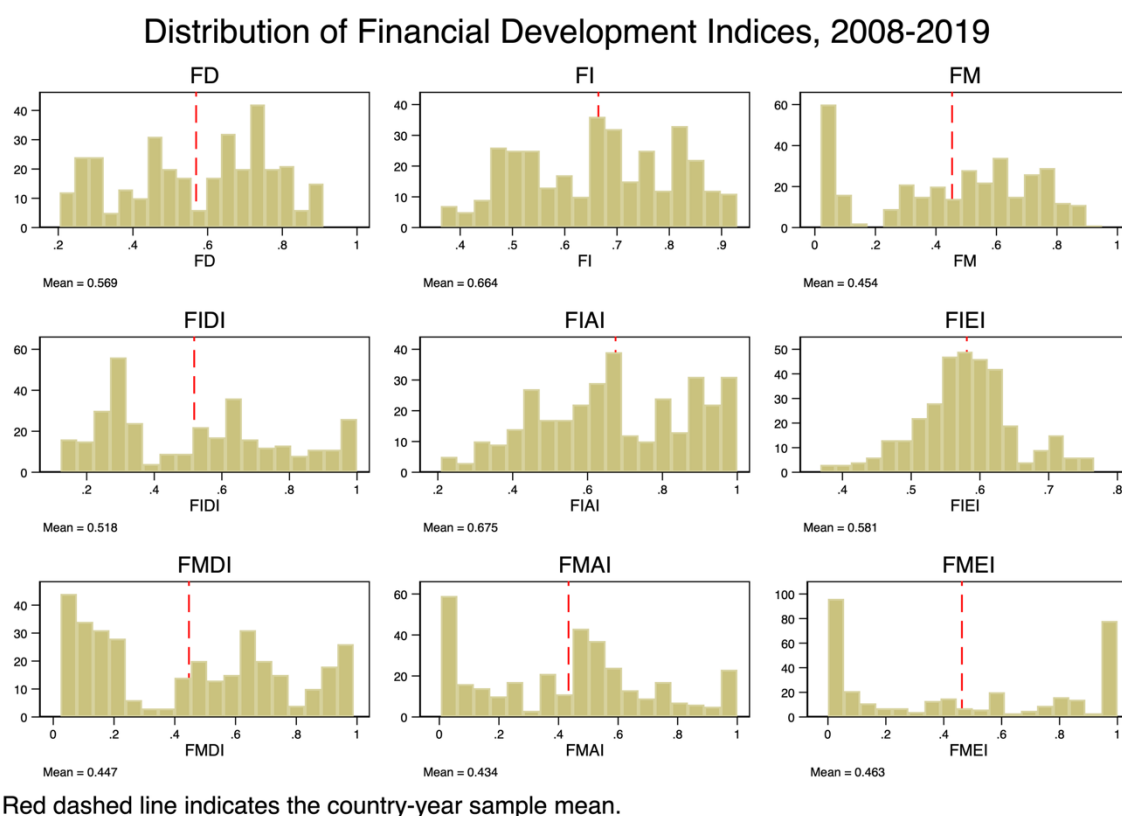


Table A2. Correlation matrix of financial structure ratios, 2008-2020 (obs=363)

	FinStr	FinStrDI	FinStrAI	FinStrEI
FinStr	1			
FinStrDI	0.772	1		
FinStrAI	0.655	0.285	1	
FinStrEI	0.806	0.619	0.205	1

Figure A11. Financial structure depth ratio by country

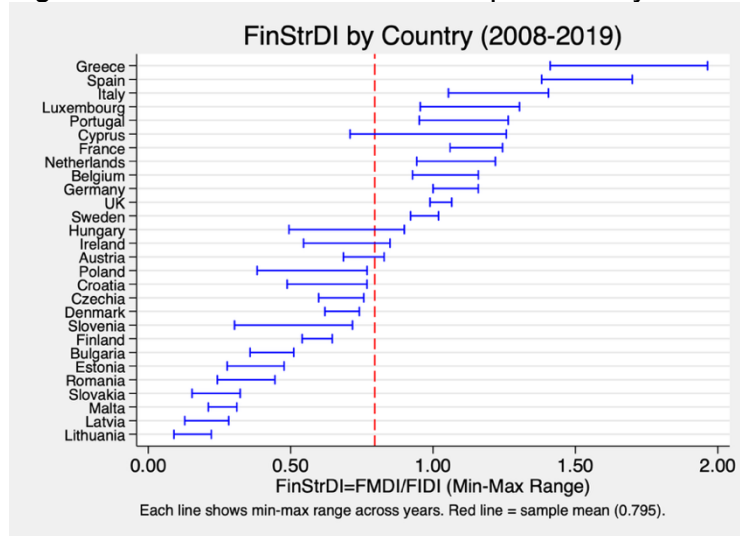


Figure A12. Financial structure access ratio by country

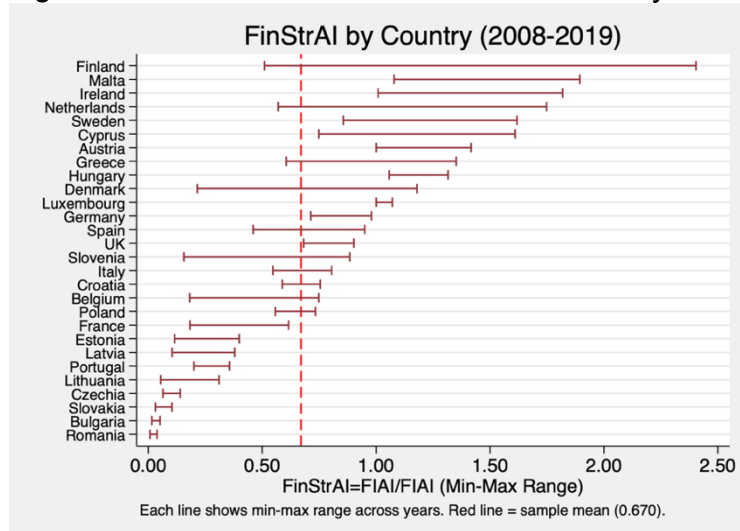


Figure A13. Financial structure efficiency ratio by country

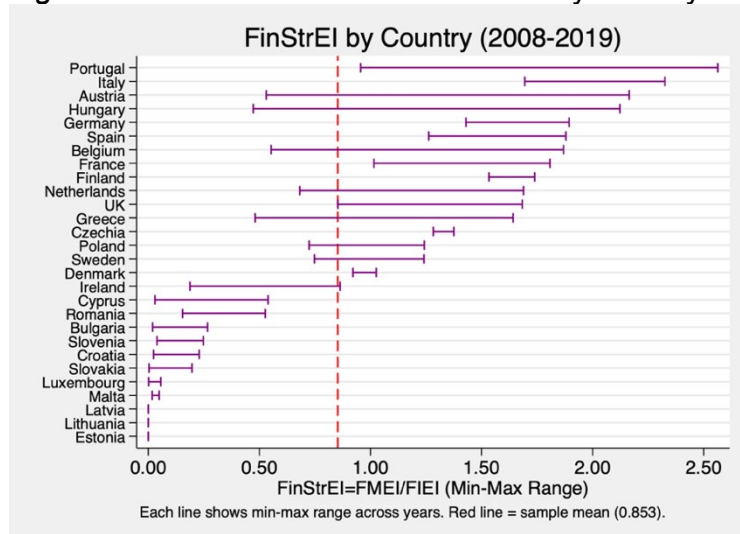
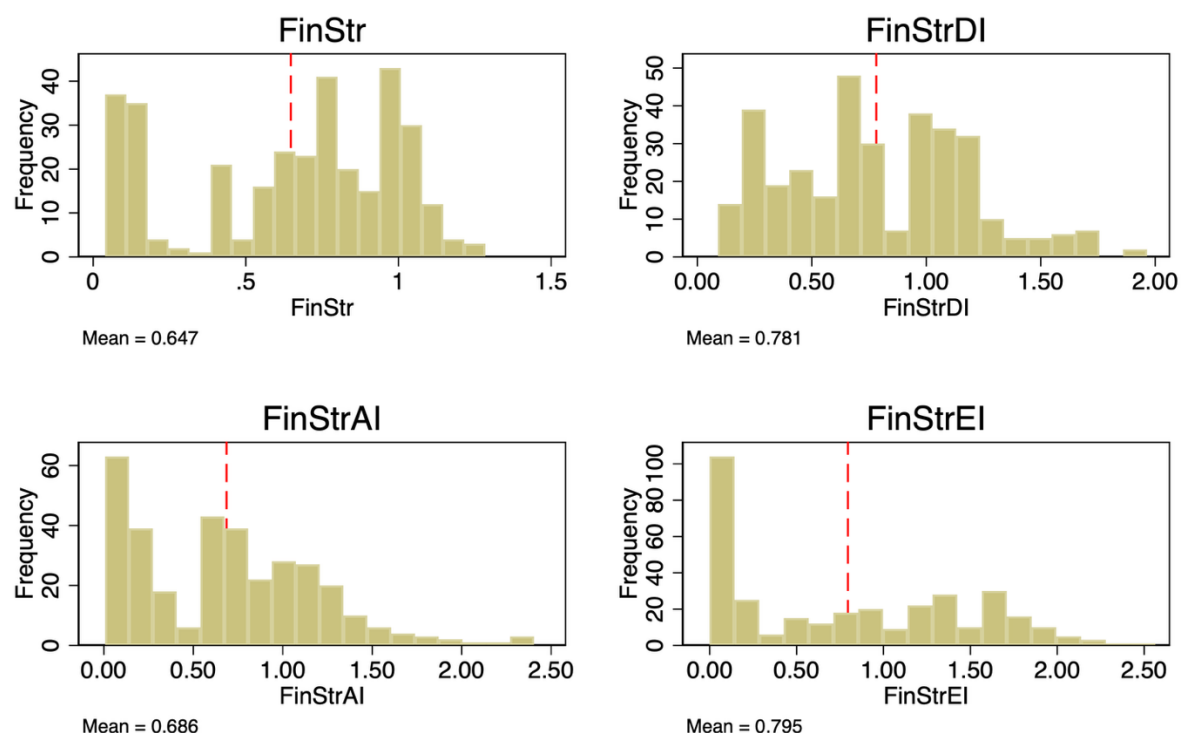


Figure A14. Histograms of financial structure ratios

Distribution of Financial Structure Ratios, 2008-2019



Red dashed line indicates the country-year sample mean.

Table A3. Summary statistics, 2008-2020

Variable	N	Mean	SD	Min	p25	p50	p75	Max
<i>Growth</i>	7148	-0.005	0.224	-5.157	-0.068	0.009	0.076	3.898
<i>Growth_w</i>	7148	-0.003	0.172	-0.65	-0.068	0.009	0.076	0.576
<i>ForBkAS</i>	7448	0.441	0.324	0	0.11	0.422	0.752	0.989
<i>FinDep</i>	7555	0.239	0.24	-0.45	0.09	0.23	0.31	0.77
<i>Share</i>	7552	0.043	0.044	-0.008	0.015	0.03	0.057	0.459
<i>FinStr</i>	7555	0.658	0.35	0.039	0.401	0.742	0.966	1.284
<i>FinStrDI</i>	7555	0.794	0.398	0.09	0.464	0.742	1.067	1.964
<i>FinStrAI</i>	7555	0.687	0.518	0.007	0.218	0.65	1.025	2.404
<i>FinStrEI</i>	7555	0.831	0.687	0	0.085	0.804	1.384	2.564
<i>FDI</i>	7555	0.568	0.195	0.204	0.433	0.612	0.733	0.91
<i>FI</i>	7555	0.659	0.143	0.363	0.524	0.671	0.782	0.93
<i>FM</i>	7555	0.457	0.266	0.019	0.27	0.512	0.686	0.949
<i>FIDI</i>	7555	0.514	0.259	0.123	0.283	0.501	0.703	1
<i>FMDI</i>	7555	0.451	0.315	0.024	0.139	0.476	0.682	0.989
<i>FIAI</i>	7555	0.665	0.207	0.208	0.493	0.655	0.855	1
<i>FMAI</i>	7555	0.421	0.282	0.005	0.14	0.5	0.582	1
<i>FIEI</i>	7555	0.581	0.074	0.368	0.537	0.581	0.62	0.766
<i>FMEI</i>	7555	0.482	0.392	0	0.051	0.463	0.872	1

Table A4. Summary statistics, 2008-2022

Variable	N	Mean	SD	Min	p25	p50	p75	Max
Growth	8247	0.003	0.223	-5.157	-0.065	0.011	0.082	3.898
Growth_w	8247	0.004	0.173	-0.65	-0.065	0.011	0.082	0.576
ForBkAS	8606	0.433	0.321	0	0.108	0.388	0.736	0.989
FinDep	8713	0.238	0.24	-0.45	0.09	0.23	0.31	0.77
Share	8710	0.043	0.044	-0.008	0.015	0.029	0.057	0.459
FinStr	7555	0.658	0.35	0.039	0.401	0.742	0.966	1.284
FinStrDI	7555	0.794	0.398	0.09	0.464	0.742	1.067	1.964
FinStrAI	7555	0.687	0.518	0.007	0.218	0.65	1.025	2.404
FinStrEI	7555	0.831	0.687	0	0.085	0.804	1.384	2.564
FDI	7555	0.568	0.195	0.204	0.433	0.612	0.733	0.91
FI	7555	0.659	0.143	0.363	0.524	0.671	0.782	0.93
FM	7555	0.457	0.266	0.019	0.27	0.512	0.686	0.949
FIDI	7555	0.514	0.259	0.123	0.283	0.501	0.703	1
FMDI	7555	0.451	0.315	0.024	0.139	0.476	0.682	0.989
FIAI	7555	0.665	0.207	0.208	0.493	0.655	0.855	1
FMAI	7555	0.421	0.282	0.005	0.14	0.5	0.582	1
FIEI	7555	0.581	0.074	0.368	0.537	0.581	0.62	0.766
FMEI	7555	0.482	0.392	0	0.051	0.463	0.872	1

Table A5. Growth effect by industry

No	Industry	FinDep	Growth effect (1SD ForBkAS)
1.	Tobacco products	-0.45	-1.1pp
2.	Leather and related products	-0.14	-0.3pp
3.	Wearing apparel	0.03	+0.1pp
4.	Coke and refined petroleum products	0.04	+0.1pp
5.	Other non-metallic mineral products	0.06	+0.1pp
6.	Beverages	0.08	+0.2pp
7.	Basic metals	0.09	+0.2pp
8.	Food products	0.14	+0.3pp
9.	Paper and paper products	0.18	+0.4pp
10.	Printing and reproduction of recorded media	0.2	+0.5pp
11.	Pharmaceuticals medicinal chemicals etc.	0.22	+0.5pp
12.	Rubber and plastics products	0.23	+0.6pp
13.	Furniture	0.24	+0.6pp
14.	Fabricated metal products except machinery	0.24	+0.6pp
15.	Chemicals and chemical products	0.25	+0.6pp
16.	Wood products excluding furniture	0.28	+0.7pp
17.	Other transport equipment	0.31	+0.8pp
18.	Motor vehicles trailers and semi-trailers	0.31	+0.8pp
19.	Textiles	0.4	+1.0pp
20.	Machinery and equipment n.e.c.	0.45	+1.1pp
21.	Other manufacturing	0.47	+1.2pp
22.	Electrical equipment	0.77	+1.9pp
23.	Computer electronic and optical products	0.77	+1.9pp

Table A6. Linear combination tests of the total foreign bank effect

Moderator	p25	Mean	Median	p75	Maximum
FDI	0.045	0.003	-0.011	-0.049	-0.103
p-value	(0.166)	(0.946)	(0.779)	(0.323)	(0.107)
FM	0.044	-0.001	-0.015	-0.056	-0.117*
p-value	(0.132)	(0.973)	(0.681)	(0.235)	(0.077)
FIDI	0.066**	0.004	0.008	-0.043	-0.126**
p-value	(0.033)	(0.903)	(0.822)	(0.306)	(0.039)
FMDI	0.066**	0.009	0.004	-0.033	-0.089
p-value	(0.031)	(0.816)	(0.917)	(0.516)	(0.217)
FMAI	0.074**	0.024	0.01	-0.008	-0.086
p-value	(0.015)	(0.421)	(0.744)	(0.820)	(0.103)
FinStr	0.06**	0.028	0.017	-0.011	-0.05
p-value	(0.040)	(0.370)	(0.600)	(0.777)	(0.355)
FinStrAI	0.077**	0.03	0.034	-0.007	-0.153**
p-value	(0.013)	(0.301)	(0.241)	(0.819)	(0.028)

Notes: The table reports the total foreign bank effect at selected values of each moderator. The total effect is calculated as the coefficient on *ForBkAS* $\times$ *FinDep* plus the coefficient on the triple interaction multiplied by the moderator value. P-values are obtained from lincom tests and account for the covariance between the estimated coefficients.

Table A7. Regression with financial structure ratio only (without foreign bank)

Specification	1	2	3	4	5	6	7	8
Constant	0.020	0.019	0.014	0.017	0.025	0.023	0.020	0.018
(p-values)	(0.000)	(0.001)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
(SE)	(0.005)	(0.006)	(0.005)	(0.005)	(0.006)	(0.006)	(0.005)	(0.005)
FinStr x FinDep	-0.082***	-0.057**	-0.042**	-0.048***	-0.104***	-0.070**	-0.069***	-0.046**
(p-values)	(0.001)	(0.012)	(0.030)	(0.000)	(0.002)	(0.015)	(0.005)	(0.011)
(SE)	(0.025)	(0.023)	(0.019)	(0.013)	(0.034)	(0.029)	(0.025)	(0.018)
LShare	-0.269***	-0.289***	-0.274***	-0.265***	-0.231***	-0.256***	-0.234***	-0.232***
(p-values)	(0.001)	(0.001)	(0.001)	(0.002)	(0.007)	(0.004)	(0.007)	(0.007)
(SE)	(0.084)	(0.086)	(0.085)	(0.084)	(0.086)	(0.088)	(0.086)	(0.086)
Industry-year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7175	7175	7175	7175	6590	6590	6590	6590
Adjusted R squared	26.95%	26.91%	26.90%	26.97%	26.12%	26.06%	26.10%	26.08%
Number of countries	28	28	28	28	28	28	28	28
Period	2008-2020				2008-2019			
Specifics	FinStr	FinStrDI	FinStrAI	FinStrEI	FinStr	FinStrDI	FinStrAI	FinStrEI
Command	reghdfe	reghdfe	reghdfe	reghdfe	reghdfe	reghdfe	reghdfe	reghdfe

Table A8. Dynamic GMM robustness: baseline model with lagged growth

	Specification A GMM Instruments: L.Growth	Specification B GMM Instruments: L.Growth + ForBkAs x FinDep
ForBkAS x FinDep	0.039	-0.019
(p-value)	(0.187)	(0.941)
(standard error)	(0.029)	(0.261)
L.Growth	0.507	0.271
(p-value)	(0.154)	(0.440)
(standard error)	(0.356)	(0.351)
LShare	-0.316**	-0.201
(p-value)	(0.032)	(0.171)
(standard error)	(0.147)	(0.147)
Year dummies	Yes	Yes
Observations	7494	7494
Number of groups	605	605
Number of instruments	19	21
AR(1) p-value	0.024	0.074
AR(2) p-value	0.428	0.78
Hansen test chi2	0.57	6.21
Hansen p-value	0.752	0.184
Sargan p-value	0.003	0
Period	2008-2022	2008-2022
Command	xtabond2	xtabond2

Notes: Dynamic System GMM Estimation: Two-step System GMM following Arellano and Bover (1995) and Blundell and Bond (1998) with collapsed instruments to limit instrument count.

Specification A uses lags 2-3 of lagged growth as GMM instruments. Specification B additionally includes lags 2-3 of *ForBkAS*×*FinDep*. Year dummies included as standard instruments in the levels equation. Corrected standard errors in parentheses. Hansen test is robust; Sargan test is not robust but not weakened by many instruments.