Financial Liberalizations, Booms, and Crashes ⋆

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Abstract

Financial liberalization is often seen as a way to deepen credit markets and stimulate economic growth, but it may also fuel credit booms that end in crisis. We construct a new cross-country database of banking regulation policies covering 21 regulatory indicators for 18 advanced economies since World War II. We distinguish liberalizations that directly relax constraints on credit supply from broader financial reforms. Liberalizations that directly affect credit supply lead to substantial expansions in private credit. Credit expansion is concentrated in non-tradable sectors and is not accompanied by higher interest rates or credit spreads in the short run, consistent with an outward shift in credit supply. Real GDP rises over the following 2 to 4 years, but the gains are temporary. On average, GDP returns to trend in the medium run, and there is an increase in the risk of financial crisis and worse downside growth outcomes. These boom-bust dynamics are confined to credit-supply liberalizations. Based on these estimates, financial liberalization is welfare-improving for coefficients of relative risk aversion below 7.2, a moderately high value.

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1 Introduction

Financial liberalization is seen as a way to deepen credit markets and raise economic activity, but it may also fuel credit booms that end in crisis. This tradeoff has attracted renewed attention amid recent debates over whether to roll back regulations put in place after the 2008 financial crisis.[1] In this paper, we study this tradeoff using a new cross-country database of banking regulation policies for 18 advanced economies since World War II. Our main finding is that liberalizations that directly relax constraints on credit supply are associated with a credit expansion and a temporary boom in GDP, but also raise the risk of a financial crisis and economic crash in the medium term.

Our analysis is based on a new cross-country dataset of banking regulation. We hand-code 21 regulatory indicators capturing balance sheet restrictions, bank entry barriers, mortgage market regulation, and restrictions on international finance. The backbone of the dataset is a set of historical accounts compiled for each country-year in the sample, drawing on more than a thousand sources from central banks, regulators, and the secondary literature.[2] The database is designed to capture discrete shifts in the stance of regulation rather than changes in regulatory intensity, and we document 386 distinct policy changes. The broad temporal and geographic coverage of our database helps address the small-sample challenge posed by the rarity of systemic financial crises.

A central contribution of this paper is to isolate liberalizations that directly relax constraints on credit supply. These include reforms affecting restrictions on bank assets, lending rates, and barriers to entry into credit markets. In theory, such reforms may generate large gains by deepening credit markets (McKinnon, 1973). However, they may also pose the greatest risks by fueling credit booms that can go bust (Schularick and Taylor, 2012; Mian et al., 2020). We distinguish these credit-supply liberalizations from broader financial reforms that operate through other channels—or only affect credit supply indirectly—including liability structure, market structure, international capital allocation, or credit demand.

We first show that liberalizations that directly expand credit supply lead to substantial increases in credit to the private sector. Liberalizing a single credit-supply regulation raises real private credit by about 3.5% over the next five years. A major credit-supply liberalization, in which at least three regulations are liberalized, boosts real private credit by over 12% after five years. Moreover, the nature of liberalization matters. The association

[1] For instance, U.S. authorities aim to unlock $2.6 trillion of additional lending through banking deregulation (The Financial Times, 2025), but European regulators are more wary of regulatory rollback (Bailey, 2025; Lagarde, 2025). Many developing economies, by contrast, still face fundamental regulatory constraints that advanced economies abolished decades ago (Calice et al., 2020; World Bank, 2021).

[2] The Historical Accounts are available online (link).

between liberalization and credit is twice as strong for credit-supply-related regulatory policies as for other types of banking deregulation.

The rise in credit following credit-supply-related liberalization is concentrated in sectors where firms are more likely to be financing-constrained and exposed to collateral feedbacks, especially real estate and other non-tradable sectors (Müller and Verner, 2024). Moreover, these credit expansions are not accompanied by higher interest rates or credit spreads in the short run. These patterns are consistent with an outward shift in credit supply rather than an increase in credit demand (Mian et al., 2017; Krishnamurthy and Muir, 2025).

Next, we show that financial liberalization generates a boom-and-bust cycle in real economic activity. Real GDP rises significantly in the first few years after liberalization. However, the gains reverse in the medium term, and output returns to trend after roughly eight years. Credit-supply-related regulatory policies are the drivers of this pattern; other types of banking reform have little effect on real outcomes. Among credit-supply liberalizations, the removal of the most direct quantity and price controls produces the strongest hump-shaped responses in both credit and real activity.

Why does banking deregulation predict medium-term growth reversals? We answer this question by connecting two literatures that have largely developed in parallel. Credit booms, especially those in the credit-supply-sensitive non-tradable sector, often end in systemic financial crises (Schularick and Taylor, 2012; Kalantzis, 2015; Müller and Verner, 2024), which impose severe and persistent costs on the real economy (Cerra and Saxena, 2008; Reinhart and Rogoff, 2009). A separate, mostly theoretical literature on the consequences of financial liberalization emphasizes that banking deregulation heightens financial fragility (e.g., Díaz-Alejandro, 1985; Hellmann et al., 2000). Higher crisis risk thus reconciles the short-term booms with the medium-term deterioration in macroeconomic outcomes we document after banking deregulation.

We find evidence consistent with heightened financial fragility following liberalization. After a short period of low-risk growth, the risk of financial crises rises sharply and remains elevated for several years. Eight years after liberalization, the cumulative risk of a financial crisis is 10 percentage points higher compared to the no-liberalization counterfactual. This pattern holds only for credit-supply-related regulatory policies, consistent with credit supply being the key channel linking deregulation to financial fragility. We also find that deregulation predicts a higher likelihood of left-tail GDP growth events. To further support the argument that the risk of financial crises is related to the deregulation-induced boom, we show that deregulation is followed by an increase in the fragility of bank balance sheets via a rise in the loan-to-deposit ratio and in the use of non-core funding.

To identify these effects, we combine local projections, synthetic control methods, and

a narrative approach to identification. Across methods, the results point to the same conclusion: liberalizations that directly expand credit supply generate credit booms and short-run gains in real activity, but also increase financial fragility and medium-run crash risk. The results are robust to a range of potential confounders, including standard macroeconomic controls, trade liberalization policy, and the ideology of political leaders. Moreover, while financial liberalization could be undertaken partly in response to stronger growth prospects and higher credit demand, it is less plausible that such policies would be introduced in response to heightened financial crisis risk in three to six years.

In the final part of the paper, we use our empirical estimates in a simple welfare exercise to illustrate the policy tradeoff created by financial liberalization. While deregulation increases short-run consumption through faster growth, it also increases crisis risk and thus the risk of left-tail macroeconomic outcomes. For risk-averse agents, the *net effect* of banking deregulation on welfare is *a priori* ambiguous. We use our empirical estimates to construct counterfactual consumption paths under reform and non-reform, accounting for the increase in tail risk. Our counterfactual exercise suggests that financial liberalization improves welfare when the coefficient of relative risk aversion is below $\gamma = 7.2$. This value is higher than conventional levels of risk aversion used to calibrate macroeconomic models, but it is within the range commonly assumed in macro-finance and asset pricing, highlighting that the medium-term downside risks are economically meaningful.

Related literature This paper contributes to three strands of the literature.

First, we build on a growing literature that uses composite indices to measure complex government policies that cannot be captured by single data series. Rather than relying on quantitative metrics, this literature constructs multi-dimensional indices from qualitative information by defining clear coding rules that systematically map historical information into quantitative scores across different policy dimensions.[3] Several indices capture broad financial liberalization policies (e.g., Demirgüç-Kunt and Detragiache, 1998; Mehrez and Kaufmann, 1999; Kaminsky and Schmukler, 2008; Abiad et al., 2010). Our paper makes three contributions to this literature. First, we extend the time coverage of existing indices. Second, we incorporate policy dimensions not captured in previous studies. Third, we systematically document every regulation policy based on a clearly defined Coding Guide in comprehensive Historical Accounts. As a result, our dataset covers a much broader set of banking regulation policies over a longer horizon than existing studies, while

[3]Notable examples outside the financial liberalization literature include Cukierman et al. (1992; central bank independence), La Porta et al. (1998; legal protection of creditors and shareholders), Nicoletti and Scarpetta (2003; product market regulation), La Porta et al. (2006; securities laws), Kholodilin (2020; rental market regulation), Reddy et al. (2020; immunity of politicians), and Herre (2023; ideology of political leaders).

minimizing discretion through transparent documentation. We discuss comparisons with other chronologies in more detail after introducing our database.

Second, we provide new evidence on the consequences of financial liberalization. Several studies find that financial liberalization often precedes banking crises (Demirgüç-Kunt and Detragiache, 1998; Kaminsky and Reinhart, 1999; Mehrez and Kaufmann, 1999). More recent studies find that the liberalization of credit ceilings, one of 21 components in our index, predicts credit growth and financial crises (Baron and Green, 2025) and reallocation of credit toward real estate (Dai et al., 2025). Henry (2000) and Bekaert et al. (2005) find that their equity market liberalization measures predict real investment and economic growth, respectively. Rancière et al. (2006) use the binary indicator of Bekaert et al. (2005) and find that equity market liberalization increases long-run growth despite its positive association with financial crisis risk. Using the index of Laeven (2003), Galindo et al. (2007) find that financial liberalization improves the efficiency of investment allocation.[4] Our novel database provides new estimates of the consequences of financial liberalization that, importantly, distinguish between various types of liberalization. We show that financial liberalization leads to booms and busts, along with an elevated risk of financial crisis, but only for certain types of liberalization that more directly affect credit supply. As such, we show that the type of liberalization matters, which helps understand why studies differ in their assessment of the benefits of financial liberalization. Moreover, our synthetic control and narrative identification strategies, evidence on bank balance sheet fragility, and welfare calculations are also new to this literature.

Finally, we relate to the broader literature on credit cycles and financial crises. A robust finding is that credit expansions predict financial crises and growth slowdowns (Schularick and Taylor, 2012; Jordà et al., 2013; Baron and Xiong, 2017; Mian et al., 2017; Greenwood et al., 2022; Müller and Verner, 2024). This literature has argued that relaxations in credit supply are an important driver of credit booms (e.g., Mian and Sufi, 2018; Mian et al., 2020; Sufi and Taylor, 2022; Krishnamurthy and Muir, 2025). But there is limited systematic evidence on where such shifts come from.[5] We specifically classify liberalization policies that directly relaxed restrictions on credit supply and find substantially stronger effects on credit growth than the effects implied by other indices. Our findings thus identify one

[4]The meta study of Bumann et al. (2013) finds a positive albeit weak relationship between financial liberalization and economic growth. Marchionne et al. (2022) measure banking regulation with the Heritage Foundation Financial Freedom Index (FFI) for the period 1996–2017. Marchionne et al. (2022, p. 3) note that the alternative to the FFI "would have been specific measures of banking regulations", which "are not available because specific regulatory measures suffer from incompleteness, lack of standardization, and inconsistency across countries."

[5]Evidence for the United States indicates a causal relationship between banking deregulation, credit supply expansions, and macroeconomic outcomes (Favara and Imbs, 2015; Koch, 2015; Di Maggio and Kermani, 2017; Mian et al., 2020; Adelino et al., 2025; Drechsel and Miura, 2026).

important underlying source of credit supply expansion and trace out its consequences, consistent with case-study evidence from the Nordic and Japanese credit booms of the 1980s (Kindleberger and Aliber, 2005). The predictable boom and reversal induced by supply-based liberalizations is consistent with the view that business cycles can arise due to endogenous boom-bust phenomena from financial frictions (Beaudry et al., 2020) or overoptimistic beliefs (Bordalo et al., 2018).

Roadmap The next section outlines theoretical predictions for the effects of banking deregulation on credit, real activity, and financial stability risk. Section 3 describes our new dataset on banking regulation policies, compares it with existing databases, and provides a descriptive overview of (credit-supply-related) banking regulation across time and space. Section 4 presents our empirical analysis of the effect of banking liberalization on credit supply using local projections, synthetic control methods, and a narrative approach. Section 5 documents a post-deregulation boom-bust pattern in real economic activity and provides evidence that systemic financial risk explains the medium-term crash. Section 6 discusses the net welfare implications of deregulation, and Section 7 concludes.

2 Predictions on the effects of financial liberalization

Credit-supply-related financial liberalization Financial liberalization is a multidimensional process, covering relaxations on restrictions across a range of financial activities. Our classification focuses on liberalization of banking regulations. Within banking regulations, we distinguish conceptually between policies that directly relax constraints on the availability of credit, which we refer to as *credit-supply-related policies*, and other reforms. Credit-supply-related policies capture direct restrictions on credit, lending rates, bank asset holdings, and market contestability. These policies should have the clearest first-order effects on credit expansion. Other policies capture risk-taking incentives, risk sharing, liquidity provision, the liability structure of the financial system, access to international finance, and credit demand. To be clear, some of these policies are also likely to have effects on credit supply, but the mechanisms are more indirect.

The distinction between credit-supply-related liberalizations and other policies is useful because different dimensions of liberalization may have different implications for credit and growth. Theories of the benefits and risks of liberalization stress this credit supply channel, as we discuss next, so the distinction allows us to more sharply test theoretical predictions. In the data, we will confirm that credit-supply-related policies indeed have stronger effects on credit, supporting this argument.

Financial liberalization boosts credit and growth A prominent view holds that relaxing policies that constrain credit supply expands financial intermediation and thereby economic growth. This argument goes back to McKinnon (1973) and Shaw (1973), who emphasize that restrictions such as interest-rate ceilings, directed credit programs, and barriers to bank entry and expansion (all captured by our supply index) reduce savings, limit intermediation, and distort the allocation of capital. Removing such restrictions should therefore expand the supply of external finance and improve the ability of banks and other intermediaries to fund productive investment (Fry, 1997).

The finance-and-growth literature identifies several channels through which liberalization can raise economic activity through expanded credit (Levine, 2005). Expanded credit supply should ease financing constraints, raise investment, and reallocate capital toward firms and sectors with stronger growth opportunities (Rajan and Zingales, 1998; Wurgler, 2000; Bertrand et al., 2007). A large empirical literature links credit market deepening to long-run economic growth (e.g., King and Levine, 1993; Beck et al., 2000; Jayaratne and Strahan, 1996). Liberalization, especially of credit-supply constraints, may be one force for deepening credit markets.

Financial liberalization causes unsustainable credit booms and financial crisis risk A more pessimistic view emphasizes that financial liberalization increases the risk of financial crises because it removes restrictions that, perhaps incidentally, perform prudential functions. This view goes back at least to Díaz-Alejandro (1985), writing on the liberalizations in Latin America. Such risks might arguably be highest for credit-supply-related liberalizations, as this can supply the central fuel of financial fragility: the accumulation of excessive debt.

One mechanism for increased fragility operates through competition and bank incentives. By intensifying competition and compressing intermediation rents, liberalization can erode banks' franchise values and increase risk-taking (Hellmann et al., 2000). Deregulation that expands the scope of permissible activities may create new opportunities for risk-taking and make intermediaries larger, more complex, and thus harder to monitor and discipline effectively (Barth et al., 2004).

The initial liberalization-induced credit expansion may then become self-reinforcing through several channels. Credit growth may boost the economy and spur optimism (Minsky, 1977; Kindleberger and Aliber, 2005; Bordalo et al., 2018). Low default rates may, for a time, justify that optimism, reinforcing credit growth (Greenwood et al., 2019). Financial liberalization can generate asset price bubbles because it triggers credit booms that inflate asset prices (Allen and Gale, 1999, 2000). Zeira (1999) shows that financial liberalization

can generate a boom and crash in asset prices by setting off an expansion whose scale the market learns only gradually. Asset price increases relax collateral constraints, leading to more borrowing and pushing up prices further (Kiyotaki and Moore, 1997).

The expansion in credit, however, may sow the seeds of a potential bust and crisis when expectations are disappointed. Once a negative shock occurs, defaults can trigger a banking crisis and a reversal in credit supply. Moreover, elevated debt constrains demand. Even under rational expectations, the liberalization-induced expansion in credit can be socially excessive because agents do not internalize that the increase in leverage negatively impacts asset prices and aggregate demand when a negative shock occurs (Lorenzoni, 2008; Farhi and Werning, 2016).

Reconciling the two views A smaller literature studies financial liberalization as a tradeoff between higher average growth and greater crisis risk. In these models, liberalization relaxes borrowing constraints, expands investment, but also increases leverage and financial fragility. The result is that liberalization can raise average growth even as it increases the probability or severity of crises.

In Rancière et al. (2008), liberalization relaxes borrowing constraints and raises investment and growth, but also induces systemic risk-taking and occasional crises. Rancière and Tornell (2016) show that financial liberalization raises aggregate growth by freeing external-finance-dependent firms from their borrowing constraints through new financing instruments, thereby raising production efficiency, but the new financing instruments also create systemic risk. In Daniel and Jones (2007), liberalization generates a hump-shaped response of crisis risk. Risk rises during the transition as competition erodes franchise values and encourages gambling incentives, but falls later as the economy matures and the efficiency gains from liberalization persist.

3 Data

Our aim is to quantify the regulatory stance of advanced economies' commercial banking systems over time and to assess the impact of banking regulation and liberalization on financial markets and the macroeconomy. To achieve this, we construct a new dataset of regulatory policies affecting commercial banks for 18 OECD countries covering the entire post-WWII period. We compile qualitative evidence from approximately 1200 primary and secondary sources and code policies along five dimensions: mortgage-market regulation, international financial restrictions, bank entry barriers, banks' asset-side restrictions, and

banks' liability-side restrictions.[6]

This section outlines the strategy and methodology we employ to construct a dataset of banking regulation policies that spans all five liberalization dimensions across all countries and years in our sample. Additionally, we explain how we convert this qualitative information into a quantitative commercial banking liberalization index and provide a descriptive overview of the resulting index.

3.1 Coverage and interpretation of regulatory policies

We begin by specifying 21 questions, listed in Table 1. The specification of these questions builds on and extends Abiad et al. (2010).[7] As is common in the literature outlined above that creates quantitative indices from qualitative historical information, we code each question as a binary indicator ("yes / liberalized" or "no / regulated") for every country-year in the sample. Taken together, the 21 indicators capture key aspects of the stance of banking regulation.

Our empirical analysis focuses on how changes in regulation that shift banks' willingness and capacity to lend affect financial markets and the real economy. To more precisely trace a credit-supply channel, we identify those questions that map most directly into bank-loan-supply. We define *credit-supply-related policies* as those that (i) directly restrict the quantity or regulate the interest rates of domestic bank lending, (ii) constrain banks' allocation of assets toward private credit through mandatory reserve or government securities holdings, or (iii) restrict competition and entry into credit markets. This selection rule yields the nine policies in Questions (1)–(9) of Table 1.

These nine policies affect credit supply through transparent, first-order margins even absent changes in borrowers' demand. Entry and competition restrictions (Questions (1)–(4)) govern the number and scope of intermediaries and thereby the effective supply of intermediation services. Quantity and price controls on lending (Questions (5)–(7)) directly restrict loan origination or its terms. Reserve requirements and mandatory holdings of government debt (Questions (8)–(9)) directly constrain banks' allocation of assets toward private credit.

The remaining Questions (10)–(21) capture other important aspects of regulation such as prudential requirements, funding conditions, the structure of financial markets, international capital allocation, and borrowing constraints. Maximum LTV ratios (Question (12)), for instance, constrain borrowers' leverage rather than lenders' balance sheets. Relaxing

[6]Our index is hand-coded. We did not employ AI tools, in part because the data construction for this project started before the availability of large language models.

[7]Specifically, Questions (2), (3), (4), (6), (7), (8), (13), (14), and (20) are similar to those in Abiad et al. (2010).

Table 1: *Overview of the banking regulation questions.*

Dimension	Question
Credit-supply-related policies	(1) Can commercial banks operate in the mortgage market?
	(2) Do regulations restrict entry by foreign banks?
	(3) Do regulations restrict entry by domestic banks?
	(4) Do regulations limit geographic expansion or branching?
	(5) Do authorities regulate mortgage interest rates?
	(6) Do ceilings limit overall credit expansion?
	(7) Do authorities control lending rates?
	(8) Do reserve requirements apply?
	(9) Must banks hold government securities?
Other liberalization policies	(10) Do capital adequacy requirements cover residential mortgages?
	(11) Does a public mortgage securitization program exist?
	(12) Do regulations set maximum LTV ratios for residential mortgages?
	(13) Can commercial banks conduct investment-banking activities?
	(14) Is the exchange rate system unified?
	(15) Do regulations restrict inflows of portfolio investment?
	(16) Do regulations restrict capital inflows into domestic bank accounts or as bank loans?
	(17) Do regulations restrict outflows of portfolio investment?
	(18) Can banks lend to nonresidents/foreigners?
	(19) Do regulations specify capital adequacy rules?
	(20) Do authorities control deposit rates?
	(21) Can banks issue certificates of deposit?

Notes: Appendix B details how we code each of these questions.

these constraints shifts credit demand outward and thus puts upward pressure on interest rates. In the framework of Justiniano et al. (2019), this represents a change in credit demand rather than supply. Nevertheless, we emphasize that some of these regulations in Questions (10)–(21) could also affect credit supply. Capital adequacy requirements (Questions (10) and (19)), may also affect credit supply in the presence of financing frictions, but their primary purpose is prudential rather than to affect credit allocation.[8] Similarly, regulations on deposit rates and certificates of deposit (Questions (20) and (21)) may also affect banks ability to lend by affecting funding conditions. Thus, our classification identifies a subset of regulations that directly govern bank lending, portfolio allocations, or market participation, rather than all policies that may influence credit supply. Ultimately, it is an empirical question which types of policies have the largest impact on credit expansion.

[8]The theoretical effect of capital requirements on lending is ambiguous (e.g., Thakor, 1996; Admati and Hellwig, 2013; Begenau, 2020). The empirical evidence suggests that tighter requirements canreduce bank lending at the bank level (e.g., Behn et al., 2016; Fraisse et al., 2020).

3.2 Construction of narrative accounts and the quantitative dataset

We aim to measure the evolution of banking regulation across time and countries while minimizing discretion in interpreting historical events by creating a structured documentation framework that is comparable across contexts.

Specifically, we answer the 21 questions of Table 1 for all countries using a four-step procedure. First, we review Monthly and Annual Reports, Quarterly Bulletins, and related publications of national central banks. These documents form the backbone of our historical accounts and provide reliable, detailed information on many questions of Table 1—especially interest rate regulations, capital adequacy rules, credit ceilings, and reserve requirements.[9] Second, we consult legal texts in countries where banking regulation has historically been grounded in statutory law (e.g., the United States), rather than shaped predominantly by discretionary administrative practice (e.g., the United Kingdom). Third, we identify potential gaps in the historical accounts such as policies announced but not explicitly repealed, or inconsistencies between the formal regulatory framework and economic reality (e.g., annual reports noting the absence of foreign banks despite no legal barriers to entry). Fourth, we draw on secondary literature to close these gaps and validate our interpretation of historical events.

To minimize discretion in the coding process, we define clear terms and rules for each question in a Coding Guide. Appendix B shows this Coding Guide. Some regulations do not switch cleanly from restricted to liberalized in a single year. For instance, several U.S. states lifted individual branching restrictions as early as the 1970s and 1980s, yet full geographic deregulation occurred only when the Riegle-Neal Act's interstate branching provisions took effect in 1997. Our Coding Guide addresses such gradual phase-outs with an explicit rule: a regulation is coded as restricted (0) until the last binding constraint is lifted, ensuring that two coders working from identical sources reach identical conclusions. Applying this rule, branching in the United States is coded as 0 through 1996 and as 1 from 1997 onward. [10] This rule follows directly from our binary coding framework and avoids the arbitrary thresholds that partial codings would require: since each indicator measures whether a regulation is fully lifted, any remaining binding constraint justifies a coding of 0.

[9] Extracting information from historical sources is itself a contribution of this study and may prove useful for other researchers. A case in point is the novel evidence we assemble on reserve requirements. To our knowledge, the most comprehensive cross-country dataset on reserve requirements to date is Federico et al. (2014). This dataset provides quarterly data from the 1970s onward, with coverage for most of our countries beginning only in the 1980s or missing entirely. By digitizing historical monthly and annual reports of central banks, we extend this work and construct monthly series of reserve requirements for our entire sample period.

[10] The same rule governs two other well-known cases of gradual phase-out. France progressively removed credit growth limits between 1985 and 1987 (Bertrand et al., 2007), and we date its liberalization to 1987. The Bank of Japan announced the abolition of credit ceilings as early as 1982 (Werner, 2002) but continued to apply them through 1991, as we outline in our historical accounts, and we date its liberalization to 1991.

Our dataset does not fully capture the complexity of all underlying regulatory changes of banking systems. For example, we do not measure the intensity or tightness of certain policies such as capital adequacy requirements. Moreover, some policy types are excluded because they cannot be assessed consistently across countries and years due to data limitations. For instance, we do not account for the extent of public ownership of banks, which likely affects intermediation and growth (La Porta et al., 2002).

For each country i and year t, we answer each of the 21 questions with either 'liberalized' or 'regulated', coding the former as '1' and the latter as '0'.[11] Summing these values yields $Lib.Index_{i,t}$. This variable ranges from 0 (fully regulated) to 21 (fully liberalized). $Supply\,Index_{i,t}$ denotes the corresponding supply-side index and equals the sum of the nine credit-supply-related indicators in Questions (1)–(9) of Table 1; it ranges from 0 to 9. $\Delta Lib.Index_{i,t} = 1$ means that one of the regulations has been liberalized in year t compared to year $t-1$. Similarly, $\Delta Supply\,Index_{i,t} = 1$ means that one of the credit-supply-constraining policies has been abolished in year t.

Our final banking regulation database covers 18 OECD countries over 1946–2020. For Germany, we begin in 1948, after the June 1948 currency reform restored a market economy. For Japan, we begin in 1949 when the postwar banking framework had stabilized. Appendix Figure A1 lists all included countries and shows the evolution of *Lib. Index* and *Supply Index* for each country over time.

Unless otherwise noted, all other variables come from the 6th release of the Macrohistory Database (Jordà et al., 2017).[12] This database includes macrofinancial data at annual frequency and a narratively identified chronology of the starting year of systemic banking crises for all 18 countries covered by our banking regulation database.

3.3 Comparison with existing liberalization chronologies

Several indices have already been developed to measure financial liberalization policies. Demirgüç-Kunt and Detragiache (1998) construct a dummy variable that captures interest rate liberalization dates for 53 countries from 1980 to 1995. Building on this work, Mehrez and Kaufmann (1999) separate different types of financial liberalization policies—capital account liberalizations, domestic financial sector liberalizations, and stock market liberal-

[11] There are two exceptions. First, where a question cannot be answered with confidence, we leave it unanswered, as documented in the Historical Accounts. Seven country-question pairs remain unanswered throughout the sample: Question (5) for France, Questions (3) and (21) for Denmark, Question (9) for Portugal, Questions (16) and (18) for Belgium, and Question (18) for Norway. An unanswered question does not contribute to the indices. Second, Question (9) takes the value 0.5 if government debt is an eligible asset under a secondary reserve requirement or another liquidity rule, but banks are not explicitly required to hold it; see Appendix B.

[12] https://www.macrohistory.net/database/.

izations. The index of Kaminsky and Schmukler (2008) also separates policies targeting the capital account, domestic financial sector, and stock market. However, even this multi-dimensional approach leaves considerable room for discretion.[13] Focusing on a specific regulation directly relevant to credit markets, Baron and Green (2025) identify 13 credit ceiling removals between 1970 and 1990, while Dai et al. (2025) record 37 directed credit policy liberalizations in a broader sample of advanced and emerging markets.[14] Abiad and Mody (2005) and Abiad et al. (2010) construct the most detailed financial liberalization index to date, covering developing and industrialized countries from 1973 to 2005.

Other financial liberalization indices emphasize different aspects. They focus, for instance, on developing countries (Bandiera et al., 2000; Laeven, 2003), equity markets (Henry, 2000; Bekaert et al., 2005), or the United States (Philippon and Reshef, 2012).

We concentrate on advanced economies and contribute to this literature in three ways. First, we substantially extend the time horizon. Our dataset traces the regulatory stance and evolution of commercial banking systems over a sufficiently long period of time to systematically quantify the opportunities and risks of banking (de-)regulation. All existing cross-country liberalization indices listed above only start in the 1970s or later. Scholars often justify this focus on the 1980s and 1990s based on the observation that the last quarter of the 20th century was the great era of liberalization. This paper not only provides novel insights into the third quarter of the 20th century, which can be characterized as the great era of *regulation*, but also identifies numerous additional liberalization policies in countries at the forefront of banking deregulation, such as Germany and Switzerland.

Second, our dataset covers policy dimensions that prior studies neglect. For instance, we assemble systematic information on multiple forms of mortgage market regulation[15], which many advanced economies actively used. Given the central role of mortgage credit

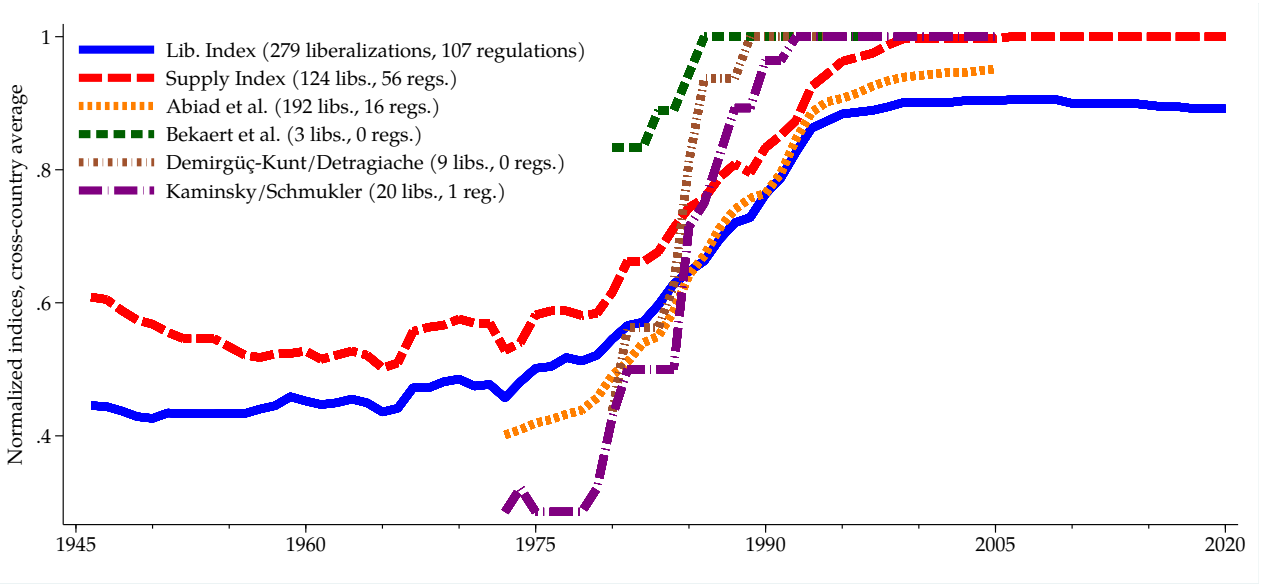
[13] Consider, for instance, France. Kaminsky and Schmukler (2003, Annex Table 1) summarize French domestic financial sector liberalization as follows: "In 1985, (deposit and lending) interest rate ceilings were mostly eliminated. In 1986, the ceiling and selectivity of credit policies were abolished. Credit selectivity was replaced by explicit credit subsidies. In January 1987, credit controls were completely removed. The compulsory ratio for assets was abolished." Based on this information, Kaminsky and Schmukler (2008) treat the French domestic financial sector as "fully liberalized" from January 1985 onward.

While Kaminsky and Schmukler (2008) date French liberalization to 1985 based on interest rate ceiling elimination, Demirgüç-Kunt and Detragiache (1998)—who equate financial liberalization with the elimination of interest rate controls—code France as liberalized over their entire sample period starting in 1980.

[14] Credit ceilings represent one of nine components in our credit-supply liberalizations and one of 21 components of our overall liberalization measure. Relative to these papers, we study a longer sample starting in 1945, we capture both regulations and deregulations, and we code multiple instances of regulation and deregulation where applicable (e.g., the U.K.). Our credit ceiling liberalizations generally agree with the dates in these papers. In three instances where liberalization was gradual (France, Italy, and Japan), our liberalization dates are coded a few years later, as we require all binding constraints to be lifted before coding a question as liberalized (see discussion above).

[15] Agnello and Schuknecht (2011) construct a *mortgage market deregulation dummy* for 18 industrialized countries from 1980 to 2007. This dummy equals 1 after a country's deregulation process and 0 otherwise.

Figure 1: *Comparison with other liberalization indices for 18 advanced economies.*



Notes: Normalized indices of this paper, Abiad et al. (2010), Bekaert et al. (2005), Demirgüç-Kunt and Detragiache (1998), and Kaminsky and Schmukler (2008), for the 18 advanced economies covered in our study. 0 (1) indicates complete regulation (liberalization). Parentheses show the number of liberalization and regulation policies identified in each study.

on bank balance sheets in the post-WWII era (Jordà et al., 2016), any banking regulation index that omits these policies is incomplete. The wide range of policy types we cover allows us to distinguish reforms that map directly into a bank-loan-supply channel from those operating primarily through other margins.

Third, we document every regulatory reform systematically according to a clearly defined Coding Guide in comprehensive Historical Accounts. These accounts, based on more than one thousand primary and secondary sources, enhance transparency and reproducibility and limit discretionary coding choices such as the one outlined in Footnote 13. The result is a database of banking regulation policies for advanced economies that is more comprehensive, granular, and transparent than existing datasets.

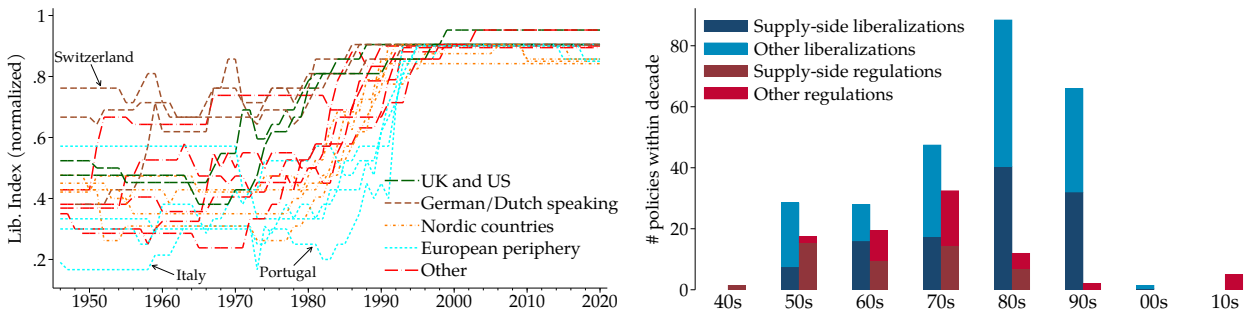
Figure 1 illustrates the granularity of our index relative to existing indices for the 18 advanced economies in our study. In total, we identify 386 regulatory policies, roughly equally split between credit-supply-related policies (180) and other banking regulation policies (206).

We cover significantly more banking regulation policies than prior studies[16] for two

[16]Notice that we cover only banking regulation policies, while Abiad et al. (2010) also covers other policy dimensions (banking supervision, privatization, and securities market policies). When leaving out these policy dimensions, the number of policies identified by Abiad et al. (2010) falls from 208 to 130. In Sections 4 and 5.2, we compare our main results with estimates obtained using the Abiad et al. (2010) database.

Figure 2: *Banking regulation over time.*

(a) *By country* (b) *By direction*



reasons. First, our more granular approach identifies a larger set of policy changes. The cross-country average of our liberalization index appears smoother than in previous work, which reflects our ability to capture gradual shifts in the regulatory stance of banking systems.

Second, we span a much longer time horizon. The relatively flat cross-country average over the pre-1970 period masks substantial variation: many countries experienced major regulatory changes during this period, with some liberalizing and others re-regulating their banking sector. The longer time horizon also captures both regulatory tightening and liberalization. As the legend of Figure 1 shows, existing indices are predominantly unidirectional, focused almost exclusively on liberalization with minimal coverage of regulatory episodes. Our broader range allows us to compare the macroeconomic effects of both regulatory expansions and contractions.

3.4 Data description

Countries took very different paths to liberalization in terms of timing, speed, and chronological order. For instance, the gradual process towards liberalization in Germany that started as early as 1957 with capital account and bank entry deregulation is in stark contrast with the rapid (credit-supply-related) deregulation of the British financial system during the Thatcher era. The British deregulation, in turn, was due to very different political motivations than the Italian, Portuguese, and Spanish liberalizations of the early 1990s, which were, to a large extent, driven by directives of the European Economic Community. Portugal stands out for the speed and scale of its comprehensive banking deregulation in the early 1990s. We list all policies with corresponding references in the Historical Accounts.

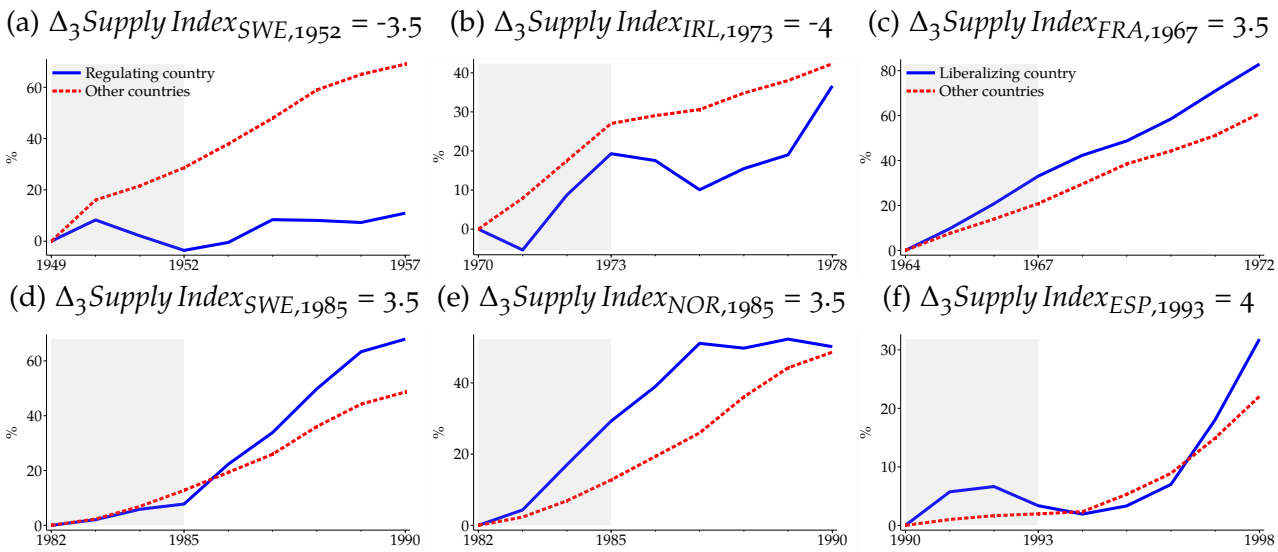
Figure 2 (a) illustrates this cross-country heterogeneity in the paths to banking liberalization. The panel traces the evolution of banking regulation separately for each country.

We group countries into five broad categories to highlight commonalities in the stance and evolution of banking regulation within Nordic countries, the UK & US, the Dutch & German-speaking countries, and the European periphery countries (Ireland, Italy, Portugal, Spain). This pattern mirrors the 'regional waves' of democratization documented by Acemoglu et al. (2019) and suggests that cross-border diffusion drives financial reforms, much like political transitions.

In the immediate post-WWII period, the cross-country average of our liberalization index remained essentially unchanged, as most banking systems stayed under heavy regulation. Moves toward liberalization in some countries, often through capital account measures, were offset by new regulations elsewhere. These new regulations typically constrained the quantity and terms of banks' credit supply, e.g., by imposing credit and lending rate ceilings (Questions (6)–(7)) and mandatory holdings of government debt (Question (9)). Notably, none of the 18 countries experienced a systemic banking crisis before 1974, providing initial suggestive evidence that tight regulation of banks' credit origination helped maintain financial stability.

Panel (b) of Figure 2 shows the number of regulatory and liberalization policies by decade, separately for the credit-supply-related policies and other policies. The figure highlights the importance of credit-supply-related policies in the early decades—first predominantly taking the form of regulations, later shifting to liberalizations—as well as a broad shift toward a liberalized banking system from the 1970s onward across all countries. Yet the transition from regulation to deregulation was neither linear within countries nor homogeneous across them, and some countries experienced temporary reversals. A prominent example is the United Kingdom. After the Competition and Credit Control plan of September 1971 abolished credit controls and clearing banks' cartel of deposit and lending rates, a dramatic credit boom ensued, fueled by "the increasingly prevalent view [...] that property values could only go up" (Reid, 1982, pp. 62–63). The financial excesses culminated in the Secondary Banking Crisis, the first systemic banking crisis among OECD economies in the post-WWII era. In response, the UK reversed course in late 1973, reimposing rate ceilings on small bank deposits and introducing a supplementary deposit scheme known as the *Corset*. By the decade preceding the Global Financial Crisis, however, all countries in our sample had largely converged to a similar regulatory stance.

Figure 3: *Credit growth during major credit-supply regulations and liberalizations.*



Notes: The panels show the cumulative log-approximated growth in real private credit for countries undergoing major regulation or liberalization (solid lines), defined in the text, relative to other countries in the sample (dashed lines). In panel (d), Norway is excluded from the comparison group. In panel (e), Sweden is excluded from the comparison group.

4 Booms

4.1 Credit supply expansions

Case studies of major reforms Figure 3 illustrates the dynamics of credit growth around major episodes of credit-supply-related commercial banking regulation and liberalization. We define major regulatory episodes as periods when more than three policies were enacted within a three-year window, i.e., $|\Delta_3 Supply\ Index| > 3$. Appendix Figure A2 (b) shows the distribution of supply index changes. Our database covers 2 major regulatory episodes and 4 major liberalization episodes that satisfy this criterion. The panels plot cumulative log-approximated growth rates in real private credit for reforming countries relative to others in the sample.

Across diverse historical and institutional contexts, ranging from the Swedish interest rate and credit controls of the early 1950s to the wave of Southern European liberalizations in the 1990s, the evidence points to a consistent pattern: credit in regulating (liberalizing) economies decelerates (accelerates) markedly relative to other countries once restrictions are imposed (lifted). Although the magnitude and persistence vary across episodes, the broad tendency is clear: while restricting banks' credit supply curtails credit growth at economically relevant scales, abolishing these restrictions boosts bank lending.

Local projection impulse responses for credit To move beyond these specific episodes and exploit all regulatory variation in our panel while controlling for macroeconomic conditions, we estimate impulse response functions using local projections (Jordà, 2005). Control variables help mitigate omitted variable bias arising from policymakers' discretionary response to macroeconomic conditions such as stagnating credit or weak growth. However, this approach does not fully address endogeneity concerns. For instance, financial liberalization may be a response to increased (or decreased) credit demand that is, in turn, associated with higher (or lower) growth. We return to this discussion in Section 4.2, where we implement two complementary approaches (synthetic control and narrative identification) to isolate exogenous variation in banking regulation policies and validate the LP results.

We regress the h-period-ahead cumulative change in country i's outcome variable $y_{i,t+h}$ on current and lagged annual changes in banking regulation *lib*, a set of macro-financial controls, and lags of the dependent variable for $h = 1, \ldots, 10$:

$$\Delta_h y_{i,t+h} = \alpha_i^h + \sum_{k=0}^{5} \beta_k^h \, \Delta lib_{i,t-k} + \sum_{k=0}^{5} \mathbf{\Gamma}_k^h \, \mathbf{X}_{i,t-k} + \sum_{k=0}^{5} \delta_k^h \Delta \, y_{i,t-k} + u_{i,t+h} \quad . \tag{1}$$

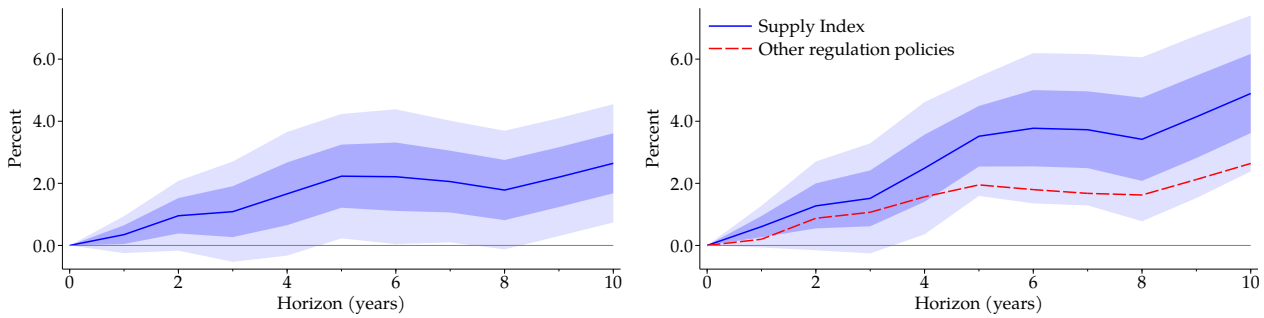
$\boldsymbol{X}$ is a set of control variables and includes annual changes in log real GDP per capita, log consumer prices, log exchange rates vis-à-vis the U.S. Dollar, real short-term interest rates, and the ratio of private credit to GDP. Country fixed effects α absorb time-invariant heterogeneity across economies such as differences in legal origins and institutional frameworks. The coefficients $\{\beta_0^h\}_{h=1}^{10}$ trace out the impulse response of the outcome variable to a marginal change in the stance of banking regulation, conditional on the control set. We show LP-OLS estimates of these responses, together with 68% and 95% confidence intervals based on Driscoll and Kraay (1998) standard errors.

Figure 4 plots our baseline results for our complete liberalization index (panel (a)) and for the credit-supply index (panel (b)). Panel (a) indicates that banking deregulation predicts a significant and persistent growth in bank lending to the private sector. Specifically, we find that an individual liberalization policy is associated with an increase in real private credit of about 2.2% over the following five years. Given the large number of such policy changes we identify, often clustered within the same year (see Appendix Figure A2), these estimates are economically meaningful. The light-shaded areas verify that these estimates are statistically significant at the 5% level.

While some dimensions of banking regulation directly constrain the quantity of credit banks are willing to lend, other regulatory policies operate through more indirect margins such as risk-taking incentives, credit demand, or funding. Since credit supply shifts are

Figure 4: *Financial liberalization and real private credit growth.*

(a) *Lib. Index* (b) *Credit-supply Index*



Notes: LP-OLS estimates of $\{\beta_0^h\}_{h=1}^{10}$ of model (1). y refers to log real private credit. *lib* refers to the complete liberalization index in panel (a) and to the supply index (blue solid line) or to an index aggregating the other regulation policies captured by Questions (10)–(21) in Table 1 (red dashed line) in panel (b). Credit-supply-related policies are defined in Table 1. Shaded areas indicate 95% and 68% confidence intervals based on Driscoll-Kraay standard errors with ceiling($1.5 \times h$) lags.

likely to be key drivers of boom-and-bust cycles, these direct credit-supply-related policies may be particularly informative for understanding deregulation-induced macro-financial dynamics.

Therefore, we narrow our focus to the supply index in panel (b) of Figure 4. This panel shows that the supply index passes the first test of relevance: a marginal liberalization policy that directly affects credit supply is associated with an increase in real private credit of about 3.5% over the following five years. The point estimates are larger than in panel (a). Panel (b) also shows that the credit supply index generates substantially larger increases in credit compared to the liberalization of other regulatory policies.

Having confirmed that the supply index is informative for shifts in credit, the remainder of our analysis focuses on this index and its implications for boom-and-bust cycles, credit allocation, and financial stability. Our presentation of the results follows the same structure as in panel (b) of Figure 4: while the supply index is our main independent variable of interest, we also present point estimates for the complement set of regulation policies.

Robustness Before providing evidence that credit supply liberalizations indeed shift credit supply, rather than demand, we demonstrate the robustness of our baseline results. We summarize these robustness checks in Appendix Figure A3. Panel (a) of this figure shows that although the exclusion of control variables leads to less precise estimates, the point estimates remain positive, significant, and economically meaningful. Panel (b) shows results when excluding one question at a time from the construction of our supply index, while

panel (c) presents estimates when excluding one country at a time. These leave-one-out estimates confirm that no single policy type or country drives our results.

We next compare our results with those using the financial liberalization index from Abiad et al. (2010). The association between the Abiad et al. (2010) index and credit is insignificant (Appendix Figure A3 panel (d)). We attribute this lack of association to the index's combination of banking-related and non-banking regulatory policies, as well as its substantially smaller number of regulatory actions.

Banking deregulation may occur as part of a broader package of economic reforms. For example, a newly elected market-oriented government might liberalize trade, thereby increasing the economy's exposure to external shocks. In panel (e) of Appendix Figure A3, we address this concern by controlling for the timing of trade-liberalization episodes from Wacziarg and Welch (2008). To capture policymakers' broader orientation toward market-based policies, in panels (f) and (g), we additionally control for the economic ideology of political leaders from Herre (2023) and the parliament's emphasis on open-economy, free-market, and supply-side policies from Lehmann et al. (2025). These robustness checks do not materially change our results, suggesting that political economy factors do not drive the observed association between banking deregulation and credit growth.

Finally, panel (h) suggests that our results are largely symmetric; while deregulation increases credit, regulation decreases it by a roughly similar magnitude.

Our setting cannot fully rule out that unobserved confounders drive both banking deregulation and credit. Therefore, we are cautious in applying a causal interpretation to these results. We return to a discussion of causality in Section 4.2. In that part, we confirm the findings of this section using synthetic control methods and a narrative approach.

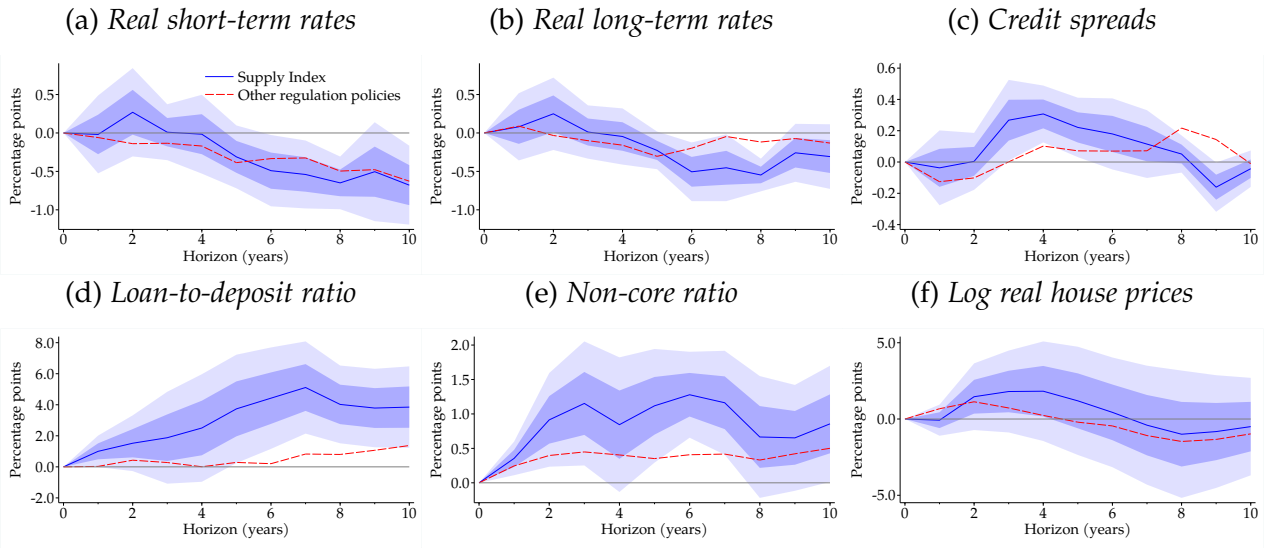
Evidence for credit supply shifts We now turn to the question of whether the observed increase in credit is due to supply or demand effects by analyzing the response of interest rates and the sectoral allocation of credit.[17] We start with the post-deregulation dynamics in real short-term and long-term interest rates in panels (a) and (b) of Figure 5. Despite the surge in credit in the aftermath of deregulation, interest rates do not increase in response to banking deregulation.

Panel (c) of Figure 5 illustrates the response of credit spreads to regulatory policies.[18] We measure credit spreads as the yield differential between lower-grade bonds and a safe benchmark using data from Krishnamurthy and Muir (2025). Spreads remain largely

[17]We note that, when credit is rationed by lenders, a relaxation of supply constraints can raise lending without an increase in its price (Stiglitz and Weiss, 1981).

[18]Ideally, we would measure the response in loan rates to borrowers of a given credit quality, but we are not aware of consistent cross-country loan rate data.

Figure 5: *Credit-supply deregulation and other credit market indicators.*



Notes: LP-OLS estimates of $\{\beta_0^h\}_{h=1}^{10}$ of model (1). y is specified in the titles of the panels. Shaded areas indicate 95% and 68% confidence intervals based on Driscoll-Kraay standard errors with ceiling($1.5 \times h$) lags. Data on credit spreads come from Krishnamurthy and Muir (2025). Data on all other variables come from the Macrohistory Database.

unchanged in the first few years after deregulation but then rise significantly above their pre-deregulation level. Combined with falling risk-free rates and expanding credit, this pattern is consistent with an outward shift in effective credit supply followed by a gradual build-up and repricing of systemic risk. In the short run, stronger activity and improving borrower balance sheets can keep expected losses contained even as quantities expand. Over the medium run, however, the build-up of leverage can raise systemic fragility and induce a repricing of aggregate risk, leading spreads to widen.

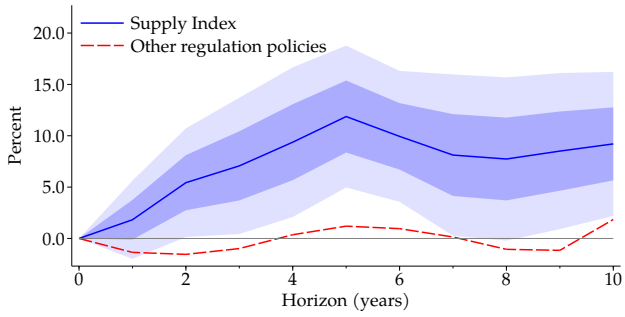
Consistent with this interpretation, the next section shows that the response of credit spreads closely tracks the response of financial stability risk, in line with models in which liberalization increases systemic risk taking during the transition (Rancière et al., 2008) and with evidence that financial crises are accompanied by sharp spread spikes (Krishnamurthy and Muir, 2025). Panels (d) and (e) of Figure 5 further corroborate this mechanism by showing that banks' loan-to-deposit and non-core funding ratios rise significantly after banking deregulation. Rising reliance on non-core funding is often used to fund credit booms. It is thus a signal of elevated bank risk-taking that predicts future banking sector distress (Hahm et al., 2013; Correia et al., 2026).

Figure 6 shows that the surge in credit following supply-side banking deregulation flows disproportionately into non-tradable sectors, especially construction and real estate.[19]

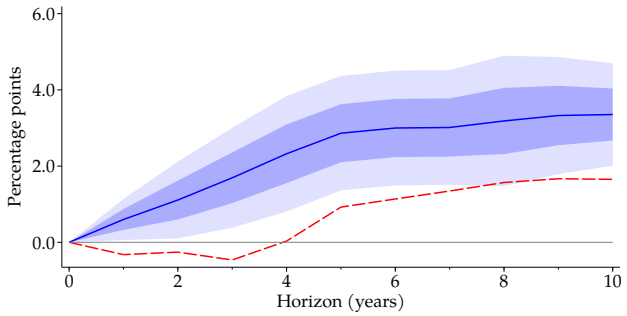
[19]Non-tradable sectors are defined as construction and real estate; wholesale and retail trade; accommoda-

Figure 6: *Credit-supply deregulation and sectoral credit allocation.*

(a) *Log real credit to real estate sector*



(b) *Non-tradable sector credit / (non-tradable plus tradable sector credit)*



Notes: The same notes as in Figure 5 apply. Data on sectoral credit come from Müller and Verner (2024).

The rise in credit to real estate of over 10% in the five years after liberalization is especially large. Non-tradable sector firms are often small, more likely to be financing-constrained, and more reliant on credit secured by real estate. Sectoral credit reallocations akin to those documented in Figure 6 are thus characteristic of credit supply expansions and predict growth slowdowns and financial stability risks (Müller and Verner, 2024). Appendix Figure A4 shows that mortgage credit and household credit also rise following supply-index deregulation, though the responses are smaller in magnitude than for real estate credit and total private credit.

Since firms in non-tradable sectors are smaller and more reliant on credit secured by real estate than firms in tradable sectors, non-tradable sectors are more sensitive to variations in collateral values. Figure 5 (f) shows a hump-shaped response of house prices to banking deregulation. While the positive short-run response of house prices generates feedbacks that likely contribute to the strong reallocation of credit toward non-tradables, the subsequent reversal raises financial fragility (Kiyotaki and Moore, 1997). Hellmann et al. (2000) highlight that banking liberalization increases financial fragility by exposing banks to new activities such as real estate lending and, therefore, new gambling opportunities.

4.2 Causality

Synthetic control method The LP results provide evidence that credit supply regulations are relevant determinants of credit supply. However, these estimates may be biased if unobserved forces correlated with the timing or intensity of reforms also drive macro-

tion and food services; and transport and communication. Tradable sectors are defined as agriculture, mining, and manufacturing.

financial outcomes. Such forces include latent growth prospects or gradual changes in risk appetite for which we cannot fully control.

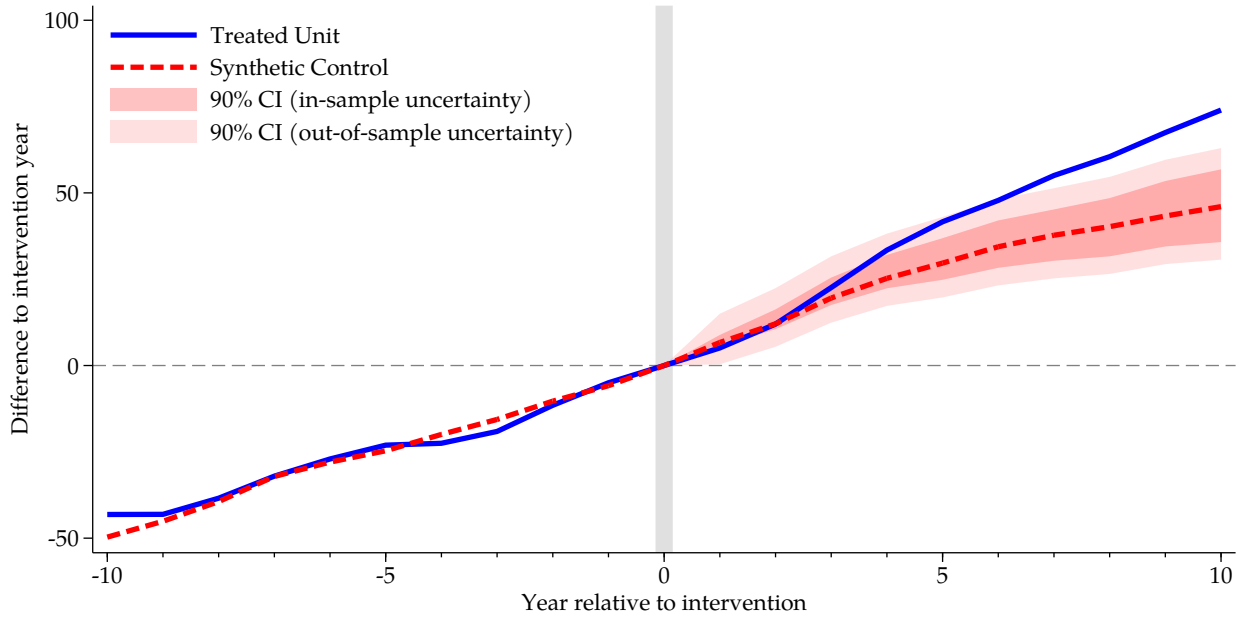
To address this concern, we complement our LP analysis with a synthetic control method (SCM) design. For each major supply-side episode in our sample (defined below), we build a data-driven counterfactual for the treated country as a convex combination of non-reforming countries. Following Abadie et al. (2010), we construct this *Synthetic Control* by choosing country weights that minimize the distance between the pre-reform trajectories of treated and non-treated countries. This data-driven approach reduces discretion in selecting comparison countries and safeguards against extrapolation (Abadie et al., 2010). Under the assumption that, absent reform, the treated country would have continued to follow the path of its synthetic counterpart, the post-reform gap between the two provides an estimate of the liberalization effect (Abadie and Gardeazabal, 2003; Abadie et al., 2010; Abadie, 2021).

We define a *Treated Unit* as a country i with a *major supply-side liberalization* in year t if $\Delta_3 Supply\ Index_{i,t} \geq 3$. This threshold balances sample size against economic meaningfulness. There are 10 *major supply-side liberalizations* in our sample. We then construct a *Synthetic Control* for each of the 10 episodes in our sample based on a ten-year time frame. Robustness checks ensure that our results are not sensitive to this choice. The estimation of country weights follows Abadie et al. (2010). These weights are non-negative, sum to one, and minimize the pre-intervention root-mean-squared prediction error of the outcome between the Treated Unit and the Synthetic Control. Choosing an estimator that depends only on pre-intervention outcomes follows the literature (Abadie, 2021) and keeps the model sparse and transparent while delivering a good pre-intervention fit. In a robustness check below, we include additional covariates in the weight selection. We interpret the subsequent divergence after year t as the effect of banking deregulation.

In a first step, we estimate the model separately for each of the 10 liberalization episodes. In a second step, we average the estimates across all 10 episodes, similar to Funke et al. (2023). Estimation precision of post-reform gaps depends on the quality of the pre-reform fit. We quantify uncertainty using the prediction-interval framework of Cattaneo et al. (2021, 2025). This approach accounts for two sources of uncertainty: (i) in-sample uncertainty arising from synthetic weight selection, and (ii) out-of-sample forecast error from unpredictable post-treatment shocks. We report 90% prediction intervals.

Figure 7 displays our main SCM result. The figure presents synthetic-control estimates for log real private credit, normalizing the intervention year to 0 and averaging across the 10 major liberalization episodes. In the pre-reform window, the treated paths (solid blue lines) closely track their synthetic counterparts (dashed red lines), indicating good

Figure 7: *Synthetic-control estimates: Effect of credit-supply liberalization on log real private credit.*



Notes: Country i is a *Treated Unit* with intervention in year t if $\Delta_3 Supply\ Index_{i,t} \geq 3$ and $\Delta_3 Supply\ Index_{i,t-1} < 3$. The latter condition ensures that we capture only the first year of a major liberalization episode. We construct a *Synthetic Control* for each of the included liberalization episodes based on a 10-year time frame. The *Synthetic Control* is chosen to match the full pre-intervention trajectory of the outcome variable. Countries with $\Delta_3 Supply\ Index_{t+k} \geq 3$ for some $k = -10, \ldots, 10$ are excluded from the donor pool. The figure shows average effects across all liberalization episodes. The 90% prediction intervals are based on Cattaneo et al. (2021, 2025).

pre-trend fit and ruling out spurious divergence.

Following deregulation ($t = 0$), the treated economies separate sharply from their synthetic controls in credit. The gap opens within a few years and widens steadily throughout the post period. For instance, our estimates suggest that ten years after reform, log real private credit in the treated unit exceeds the synthetic counterfactual by approximately 32%. The 90% prediction intervals indicate that these post-reform gaps are statistically significant. Overall, the SCM evidence corroborates the LP results: the abolition of controls that prevent banks from expanding credit is followed by economically meaningful and sustained expansions in bank lending, with no detectable pre-trend differences that would undermine a causal interpretation.

Appendix Figure A5 summarizes a series of additional results and robustness checks using the SCM framework that support the causal interpretation and economic relevance of our main results. Panel (a) illustrates the post-treatment divergence in real estate credit between treated and synthetic units, showing that major supply-side deregulations coincide

with large credit reallocations. This finding confirms our results from the previous part and reinforces the view that credit-liberalizing reforms induce credit supply expansions fueled by a lending boom in the non-tradable sector.

Next, we consider various modifications to the SCM approach. First, starting from our baseline SCM that matches only the pre-treatment path of the outcome variable, we add macro-financial predictors to the model. Appendix Figure A5 panel (b) shows that the direction, timing, and persistence of the post-reform gaps are broadly similar. Second, we assign placebo interventions to untreated countries in the synthetic control donor pool, similar to Abadie and Gardeazabal (2003) and Abadie et al. (2010). These *in-space placebos* form an empirical reference distribution of post-intervention gaps. Panel (c) verifies that these placebos show no post-reform divergence. Third, we move the intervention date to pre-treatment years for the treated units, similar to Heckman and Hotz (1989) and Abadie et al. (2015). Panel (d) displays this *in-time placebo test* or *preprogram test* and finds no evidence of anticipation effects. Finally, we vary the pre-intervention window from 10 years to 5 or 15 years in panels (e) and (f), respectively. Our main results remain qualitatively unchanged.

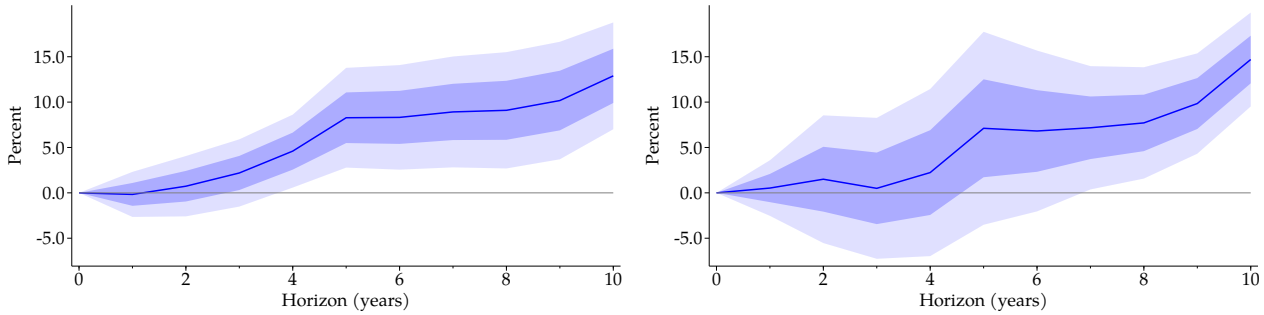
Narrative identification As a complementary identification strategy, we narratively classify exogenous reforms. We systematically review our historical accounts of financial liberalization, consult additional sources, and identify reforms whose timing was driven by institutional or external factors plausibly unrelated to contemporaneous macro-financial conditions.

One example is the German judicial abolition of branch licensing requirements in 1958. Prior to 1958, opening a new branch of an existing bank required proof of economic need. In June 1958, the Federal Constitutional Court declared the need-based assessment for new pharmacy licenses unconstitutional in its so-called 'Pharmacy Ruling' (BVerfG, 1958). Shortly thereafter, in July 1958, the Federal Administrative Court applied this precedent to banks, effectively abolishing the need-based assessment for new bank branches (BVerwG, 1958). The change occurred via judicial review rather than economic policy legislation and was triggered by legal reasoning in a non-financial domain.

We construct a variable z that takes the value 1 for exogenous liberalizations such as the German one of 1958, -1 for exogenous regulations, and 0 otherwise. We identify 13 exogenous liberalizations ($z = 1$) and 4 regulations ($z = -1$) across a diverse range of countries, time periods, and regulatory policy dimensions. 8 of these 17 events are supply-side reforms. Appendix C provides documentation justifying why we classify these 17 events as exogenous. Appendix Table A1 supports the exogenous nature of these events

Figure 8: *Narratively identified liberalization policies and real private credit growth.*

(a) *All narrative events* (b) *Supply-side narrative events*



Notes: The same notes as in Figure 4 with one modification; in model (1), *lib* is replaced with z as defined in the text.

by showing that macro-financial and policy variables do not systematically predict z.

We then re-estimate our LP-OLS model (1), replacing *lib* with z. Figure 8 shows the estimation results. For instance, panel (a) suggests that an exogenous liberalization ($z = 1$) is associated with an increase in real private credit of about 8.3% over the following five years. Panel (b) focuses on the subset of supply-side narrative events, i.e., those that fall under Questions (1)–(9) of our coding scheme summarized in Table 1. Since we only have 8 supply-side narrative events, the confidence intervals are wider than in panel (a). This panel also suggests a significant positive association between exogenous supply-side liberalizations and credit growth.

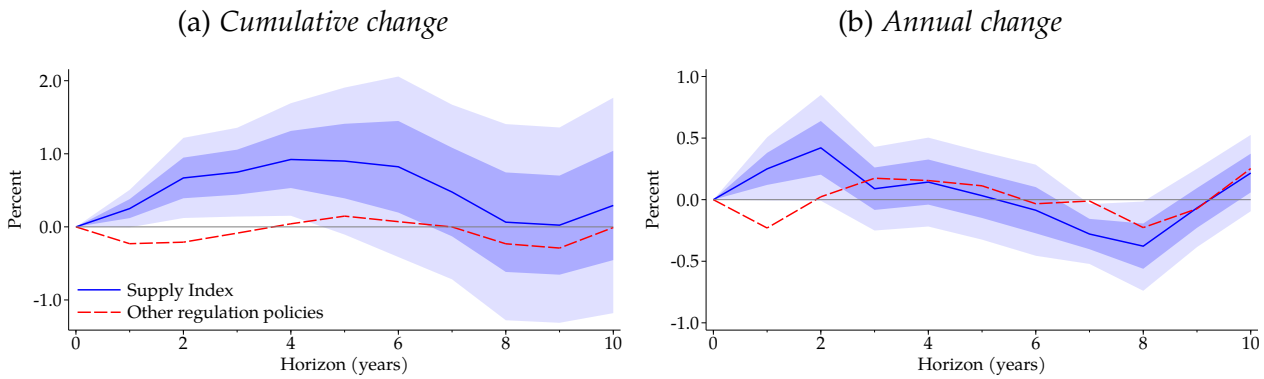
5 Crashes

5.1 Real economic activity

The evidence so far suggests that banking liberalization expands bank credit supply, particularly to non-tradable sectors. We now address the key question of whether this credit expansion translates into higher real economic activity. While this real activity channel is the core argument of proponents of financial liberalization, the answer to this question is ambiguous because of opposing forces outlined in Section 2. On the one hand, financial deepening caused by relaxing financing constraints may finance productive investment and improve allocative efficiency. On the other hand, if the additional credit supply flows to low-productivity, financing-constrained, collateral-dependent firms, the resulting misallocation and leverage build-up could in principle raise systemic fragility and induce a growth slowdown.

Figure 9 indicates that real GDP per capita rises significantly in the immediate years

Figure 9: *Credit-supply deregulation and real GDP growth.*



Notes: The same notes as in Figure 5 apply. The dependent variable is log real GDP p.c. In panel (b), $\Delta_h y_{i,t+h}$ is replaced with $\Delta y_{i,t+h}$. The Driscoll-Kraay standard errors in panel (b) use 2 lags at all horizons.

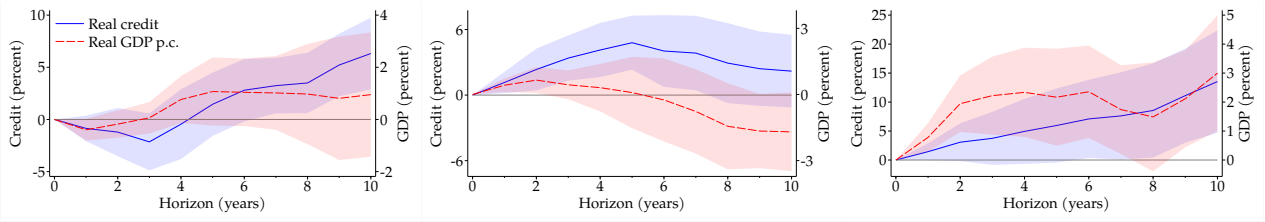
following a supply-side banking deregulation. We estimate the local projection specification (1) using log real GDP as the dependent variable. Panel (a) shows that liberalization predicts a cumulative increase in real GDP per capita of about 0.75% over the following three years. This positive response aligns with Daniel and Jones (2007), who predict low-risk growth in the short run but high risk during the medium-run transition. Consistent with this view, we find that the positive response of real GDP per capita is not persistent; it peaks around year four and then gradually declines. Banking deregulation predicts negative annual GDP growth rates in the medium-term (panel (b)). The cumulative response of real GDP per capita returns to its pre-deregulation level by year eight. Appendix Figure A6 confirms that no single policy type or country drives this result. Appendix Figure A7 shows that this boom and bust also appears in unemployment and investment.

The boom-and-bust pattern, characteristic of credit supply expansions and the credit reallocations documented in Figure 6, is absent for other types of banking regulation policies (red dashed lines in Figure 9). This finding underscores the economic relevance of credit-supply-related policies and their role in shaping aggregate credit supply.

Decomposing the supply index into three sub-components reveals heterogeneity in how different policy types transmit to the macroeconomy. Figure 10 distinguishes between entry and competition regulations (Questions (1)–(4)), quantity and price controls on lending (Questions (5)–(7)), and restrictions on banks' asset allocation (Questions (8)–(9)) and shows the corresponding impulse response functions for real private credit and real GDP per capita. While this more granular decomposition comes at the cost of statistical precision, the point estimates suggest that all types of supply-side liberalization policies are associated with significant credit expansions in the medium term.

Figure 10: *The three sub-components of the supply index, credit, and GDP growth.*

(a) *Entry and competition* (b) *Quantity and price controls* (c) *Asset allocation*



Notes: The same notes as in Figure 4 apply with the following modifications. The dependent variable y refers to log real private credit (blue solid lines) or real GDP p.c. (red dashed lines). *lib* refers to an index aggregating policies captured by Questions (1)–(4) (panel (a)), (5)–(7) (panel (b)), and (8)–(9) (panel (c)) in Table 1. Shaded areas denote 90% confidence intervals.

However, the path leading to this medium-term association differs across policy types. Figure 10 shows that the association between entry and competition liberalization and credit growth takes several years to materialize. The lag likely reflects the time needed for new charters to be issued, capital raised, branches built, and relationships formed. In contrast, the association between liberalizing banks' lending business and credit growth emerges more quickly.

For each sub-component, the response of real GDP per capita closely tracks the credit response (Figure 10). This finding suggests that banking regulation transmits to real activity through credit supply. Most notably, the hump-shaped GDP response in Figure 9 emerges most clearly after deregulating quantity and price controls (arguably the most direct form of credit supply restrictions), which is also the only sub-component that predicts a boom-bust pattern in credit. On the other hand, just like credit, output exhibits a more persistent and steadily increasing response following the liberalization of other supply-side regulations.

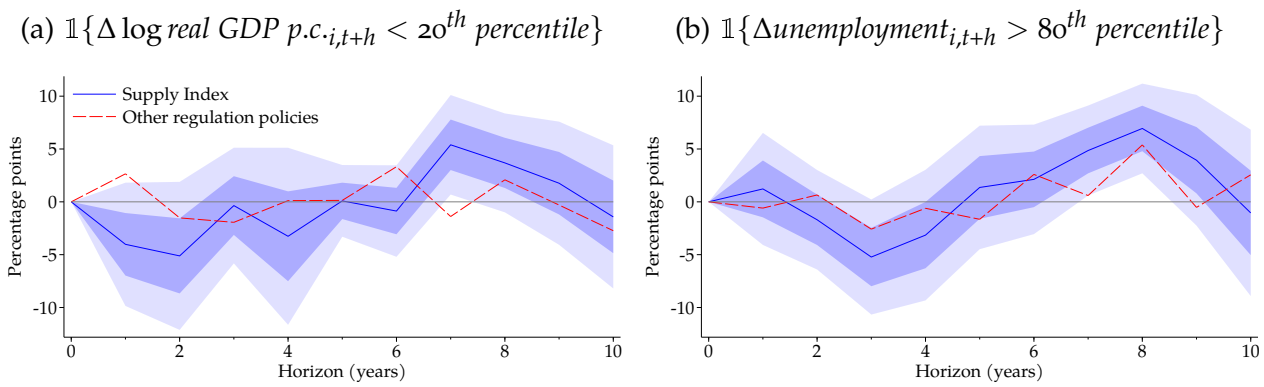
Figure 11 suggests that a higher risk of left-tail outcomes drives the subsequent decline in real economic activity after the initial boom we document in Figure 9. This figure shows average marginal effects from maximum likelihood estimates of the logit model

$$\log\left(\frac{p_{i,t+h}}{1-p_{i,t+h}}\right) = \alpha_i^h + \sum_{k=0}^{5} \beta_k^h \Delta lib_{i,t-k} + \sum_{k=0}^{5} \mathbf{\Gamma}_k^h \mathbf{X}_{i,t-k} + u_{i,t+h} \tag{2}$$

for $h = 0, \ldots, 10$.

Estimates of β_0^h trace the predictive power of banking deregulation for the probability $p_{i,t+h}$ that country i experiences a binary outcome event in year $t+h$. The binary outcome refers to the left tail of the distribution of real economic activity, defined as either a decline in real GDP per capita below the 20^{th} percentile or an increase in the unemployment rate

Figure 11: *Credit-supply deregulation and left-tail risk in real economic activity.*



Notes: Maximum likelihood estimates of $\{100\beta_0^h\}_{h=1}^{10}$ of model (2). Point estimates refer to average marginal effects. Shaded areas indicate 95% and 68% confidence intervals based on country-based cluster-robust standard errors. p_{t+h} is specified in the panel titles.

above the 80^{th} percentile of their full-sample distribution. α and $\boldsymbol{X}$ are as before.

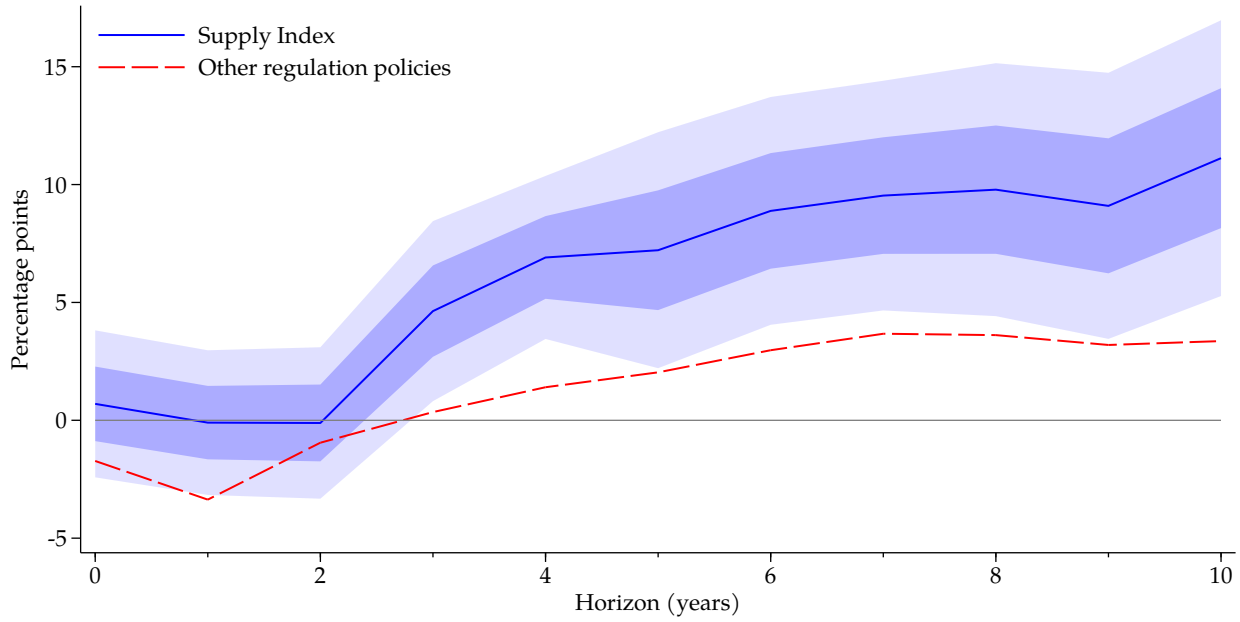
The estimates of β_0^h are positive and statistically significant in the medium run, suggesting that banking deregulation raises the medium-term risk of severe downturns, partly explaining the observed decline in real GDP per capita after the initial boom.

Why does banking deregulation fail to sustain a persistent expansion in real economic activity, as some theories predict? The literature we review in Section 2, which links banking deregulation to a gradual build-up of systemic risk, provides a candidate explanation. Connecting our findings to empirical work on credit booms and financial crises supports this explanation. Credit booms and credit reallocations like the ones documented in Figures 4 and 6 predict financial crises, which in turn have large costs for the real economy. While the association between credit and financial instability is well documented, the causes of credit expansions—and which causes lead booms to bust—remain poorly understood. We therefore examine next how banking deregulation affects financial stability risk.

5.2 Financial crises

To quantify financial stability risk, we re-estimate logit model (2) with an indicator for a systemic banking crisis occurring between years t and $t+h$ as the dependent variable. We take the binary definition of systemic banking crises from Jordà et al. (2017). Robustness checks consider alternative crisis chronologies. $\boldsymbol{X}$ includes the same control variables as before except the change in the private-credit-to-GDP ratio. We do not control for credit growth here since it is the main channel through which banking deregulation affects financial stability risk. Thus, controlling for credit would absorb part of the effect of interest.

Figure 12: *Credit-supply deregulation and financial crisis risk.*



Notes: Maximum likelihood estimates of $\{100\beta_0^h\}_{h=0}^{10}$ of model (2). Point estimates refer to average marginal effects. Shaded areas indicate 95% and 68% confidence intervals based on country-based cluster-robust standard errors. p_{t+h} refers to the likelihood that a financial crisis occurs between years t and $t+h$.

Figure 12 shows the estimation results, specifically the average marginal effects of a banking deregulation policy on the likelihood that a financial crisis occurs between t and $t+h$.

We find that crisis risk is unresponsive to banking deregulation in the short run. This null result aligns with the theoretical predictions that the post-liberalization build-up of systemic risk takes time (Daniel and Jones, 2007) and with our finding that it takes several years for credit to expand significantly after a deregulation event.

The previous section showed that the association between credit-supply-related banking deregulation and the quantity and allocation of credit becomes pronounced after about two to three years (Figures 4 and 6). Figure 12 shows that the association between banking deregulation and crisis risk follows a similar pattern, rising significantly from a three-year horizon onward following this credit expansion. At this horizon, the marginal effect of a one-unit increase in our supply index corresponds to an average increase in crisis probability of 4.6 pps.

The estimated association remains elevated for several years thereafter. For instance, after 8 years, an economy faces a cumulative crisis probability that is about 9.8 pps higher than an economy that has not changed its regulatory framework. These effects are large

given that the annual unconditional crisis probability in the estimation sample is about 2.5% (about 22% cumulative over eight years). The steep medium-horizon increase of the impulse response function echoes the theoretical predictions of Daniel and Jones (2007) that we outline in Section 2. Overall, our results suggest that credit-supply-related banking deregulation predicts crashes through its effect on the quantity and allocation of credit supply that in turn generates financial fragility.

The red dashed line in Figure 12 illustrates that the predictive power of other types of banking regulation policies that do not directly target credit supply for crisis risk is significantly weaker. This weak association is in line with the null results for credit growth and sectoral credit allocation documented in the previous section. Those and only those deregulation policies that predict significant expansions in (non-tradable) credit, which the literature has identified as key predictors of financial crises and boom-and-bust cycles, also predict financial stability risk.

Robustness Our findings are robust to a variety of alternative specifications and estimation methods. Appendix Figure A8 demonstrates robustness to alternative crisis chronologies from Baron et al. (2021) and Reinhart and Rogoff (2009). Appendix Figure A9 replaces the logistic model with a probit model and a linear probability model and reaches similar conclusions. In Appendix Figure A10 (a), we exclude country fixed effects to prevent look-ahead bias and force predictors to carry the full predictive weight. In Appendix Figure A10 (b), we exclude all control variables. These specifications yield similar results. Appendix Figure A11 confirms that no single policy type or country drives our results. Appendix Figure A12 replaces our continuous independent variable of interest with quartile dummies that capture the varying intensity of liberalization and regulation events. While large liberalizations (top quartile) significantly increase crisis risk, large regulations (bottom quartile) such as those implemented in the 1950s and 1960s reduce crisis risk.

The financial liberalization index of Abiad et al. (2010) does not predict systemic banking crises in advanced economies (Appendix Figure A13 (a)). In contrast, our index of credit-supply-related banking regulation retains similar predictive power even when estimated on their restricted sample (Appendix Figure A13 (b)). This lack of predictive power of the Abiad et al. index for crisis risk is not surprising given that it also fails to predict credit growth (Appendix Figure A3 (d)). This lack of predictive power likely stems from the inclusion of non-bank domains and coarser granularity, as discussed above.

As also mentioned in the previous section, banking deregulation may coincide with other market-oriented reforms. Such policies (e.g., trade liberalization) could influence financial markets and real activity and thus represent the underlying, unobserved drivers

of the association between banking liberalization and financial stability risk. We validate the robustness of our credit growth results to controlling for trade liberalization and political economy factors in the previous section. We proceed in the same spirit for our crisis risk results. Appendix Figure A14 (a) accounts for the timing of trade-liberalization episodes. To proxy for policymakers' broader market orientation, we further control for the economic ideology of political leaders (Appendix Figure A14 (b)) and for the parliament's emphasis on open-economy, free-market, and supply-side policies (Appendix Figure A14 (c)). Controlling for these complementary policy dimensions does not materially affect the significant predictive power of banking deregulation for systemic banking crisis risk.

Appendix Figure A15 extends the SCM analysis from Section 4.2 to crisis risk. Because crises are rare, the pre-intervention path of crisis risk is uninformative for matching. Therefore, we take the donor weights from our baseline SCM of Figure 7 to construct the synthetic control. We then plot, at each post-intervention horizon h, the average Treated Unit and Synthetic Control probabilities of having entered a financial crisis since the intervention year. The figure validates the findings from our crisis prediction exercise. After a short period of tranquility, the Treated Unit's crisis risk rises markedly relative to its synthetic counterpart. For example, we find that the probability of having entered a financial crisis within 10 years is about 22 pps higher for a country that has undergone a major liberalization than for its synthetic counterpart.

6 Welfare implications

The positive short-term response of real economic activity does not, by itself, imply that a welfare-maximizing policymaker should deregulate since the higher medium-term risk of left-tail outcomes may more than offset the initial boom. The average post-deregulation path is a weighted combination of two different paths: one in which the economy experiences a financial crisis after deregulation and one in which it does not. This heterogeneity caveats narrative evidence, underscores the need for a large sample of deregulation episodes, and may explain why the literature has not reached a consensus on the effects of banking deregulation on real economic activity.

One strand of the literature stresses the benefits of banking liberalization (McKinnon, 1973; Shaw, 1973), the other highlights its costs (Díaz-Alejandro, 1985). One points toward success stories of countries such as Malaysia and Korea (Caprio et al., 1994), the other cites the post-liberalization boom-and-bust cycle of the Nordic countries and Japan in the late 1980s (Kindleberger and Aliber, 2005). One advocates financial liberalization (Williamson, 1990), the other urges caution (Hellmann et al., 2000).

Since financial crises can lead to large and long-lasting output losses, the expected

post-deregulation utility of a risk-averse agent may be far lower than the utility of the average post-deregulation consumption path. This section accounts for this heterogeneity and conducts a simple welfare analysis comparing the expected utility of a representative risk-averse agent under different regulatory and crisis regimes.

Consider a representative agent with CRRA period utility $u(c) = \frac{c^{1-\gamma}-1}{1-\gamma}$ over consumption. Let $r \in \{\text{policy in t}, \text{no policy in t}\}$ denote the regime, characterized by the presence or absence of a marginal supply-side deregulation in year t. In year t, the agent's expected consumption h years in advance is

$$E_t[c_{t+h}|r] = S_h^r \, c_{t+h}^{\text{no crisis},r} + \sum_{k=0}^{h} f_k^r \, E_t[c_{t+h}^{\text{crisis}_{t+k},r}] \quad . \tag{3}$$

Here, $c_{t+h}^{\text{no crisis},r}$ denotes the counterfactual level of consumption in year $t+h$ under regime r if no financial crisis starts between t and $t+h$. Similarly, $c_{t+h}^{\text{crisis}_{t+k},r}$ refers to consumption in $t+h$ if a crisis starts in year $t+k$ with $k \leq h$. Let $\pi_{t+k}^r = \text{Prob}(\text{crisis}_{t+k} \mid \text{no crisis before } t+k, r)$ denote the period-k hazard rate. $f_k^r = \pi_{t+k}^r \prod_{j=0}^{k-1}(1-\pi_{t+j}^r)$ is the probability that the first crisis arrives at $t+k$, and $S_h^r = \prod_{j=0}^{h}(1-\pi_{t+j}^r)$ is the probability of surviving through $t+h$ without any crisis.

We model the cost of financial crises as a multiplicative loss in consumption. Specifically, we assume $c_{t+h}^{\text{crisis}_{t+k},r} = X_{h-k} \, c_{t+h}^{\text{no crisis},r}$, where X_{h-k} denotes the fraction of consumption that remains $h-k$ years after the onset of a crisis. We could treat crisis costs as deterministic and calibrate X to the historical average crisis loss. This approach, however, would obscure the substantial heterogeneity in crisis costs across episodes (Romer and Romer, 2017). For instance, output losses in the United States after 1930 were far larger than those following the S&L crisis of the early 1980s. Consequently, fat tails matter: the expected utility loss of financial crises is higher than the utility loss of the average crisis. We incorporate this uncertainty by treating X as a random variable. For a given horizon k, we assume crisis costs are independent across crisis episodes and lognormally distributed: $\log X_k \sim N(\mu_k, \sigma_k^2)$.

To discipline the distribution of crisis losses, we use the complete Macrohistory Database. For each systemic banking crisis $j = 1, \ldots, J$ in our sample[20], we define crisis loss k years after the onset of crisis j as $X_{j,k} = \frac{c_{j,k}^{\text{crisis}}}{c_{j,k}^{\text{no crisis}}}$. We measure $c_{j,k}^{\text{crisis}}$ as the post-crisis-j consumption path of the country experiencing crisis j.[21] The corresponding counterfactual $c_{j,k}^{\text{no crisis}}$ equals

[20]The crisis chronology of the Macrohistory Database covers 88 systemic banking crises. In six cases, the dataset has no consumption data for the crisis country. Hence, $J = 82$.

[21]No country in our post-WWII sample experiences a second systemic banking crisis within 15 years of a prior onset, so $X_{j,k}$ isolates a single-crisis consumption factor, matching the first-arrival interpretation in Equation (3).

the average consumption path of those countries that do not experience a crisis within ± 15 years around crisis j. This procedure yields the empirical distribution $\{\{X_{j,k}\}_{j=1}^{J}\}_{k=0}^{15}$. We visualize this distribution at different horizons k in Appendix Figure A16 and use the sample mean and variance of $\{\log X_{j,k}\}_{j=1}^{J}$ as estimates $\hat{\mu}_k$ and $\hat{\sigma}_k^2$ of μ_k and σ_k^2, respectively.

We recover $c_{t+h}^{\text{no crisis},r}$ and $E_t[c_{t+h}^{\text{crisis}_{t+k},r}]$ from Equation (3) by identifying all other elements of this equation from the data. Denote by $\hat{c}_{t+h}^r$ and $\hat{\pi}_{t+h}^r$ our estimates for $E_t[c_{t+h}|r]$ and π_{t+h}^r. We obtain these objects by estimating our baseline models (1) (with log real consumption p.c. as the dependent variable) and (2) up to a horizon of 15 years, respectively. From $\hat{\pi}_{t+k}^r$ we construct $\hat{f}_k^r = \hat{\pi}_{t+k}^r \prod_{j=0}^{k-1}(1-\hat{\pi}_{t+j}^r)$ and $\hat{S}_h^r = \prod_{j=0}^{h}(1-\hat{\pi}_{t+j}^r)$.

Given these ingredients, consumption h years ahead in the absence of a financial crisis under regime r is

$$c_{t+h}^{\text{no crisis},r} = \frac{\hat{c}_{t+h}^r}{\hat{S}_h^r + \sum_{k=0}^{h} \hat{f}_k^r \, e^{\hat{\mu}_{h-k} + \frac{1}{2}\hat{\sigma}_{h-k}^2}} \quad . \tag{4}$$

Appendix Figure A17 plots these no-crisis counterfactual consumption paths for the two regimes. Conditioning on no financial crisis, deregulation delivers higher consumption. However, this first-moment advantage does not settle the welfare comparison, because deregulation simultaneously raises the probability and severity of left-tail outcomes.

Expected utility h years ahead, conditional on a crisis having started k years earlier, is

$$E_t[u(c_{t+h}^{\text{crisis}_{t+h-k},r})] = \frac{(c_{t+h}^{\text{no crisis},r})^{1-\gamma} e^{(1-\gamma)\hat{\mu}_k + \frac{1}{2}(1-\gamma)^2\hat{\sigma}_k^2} - 1}{1-\gamma} \quad .$$

To assess the welfare effect of banking deregulation, we compare the expected discounted sum of utilities under liberalization,

$$V_{\text{policy in t}}(\gamma) = \sum_{h=0}^{15} \beta^h E_t[u(c_{t+h})|\text{policy in t}] \quad , \tag{5}$$

with the corresponding expression in the absence of deregulation,

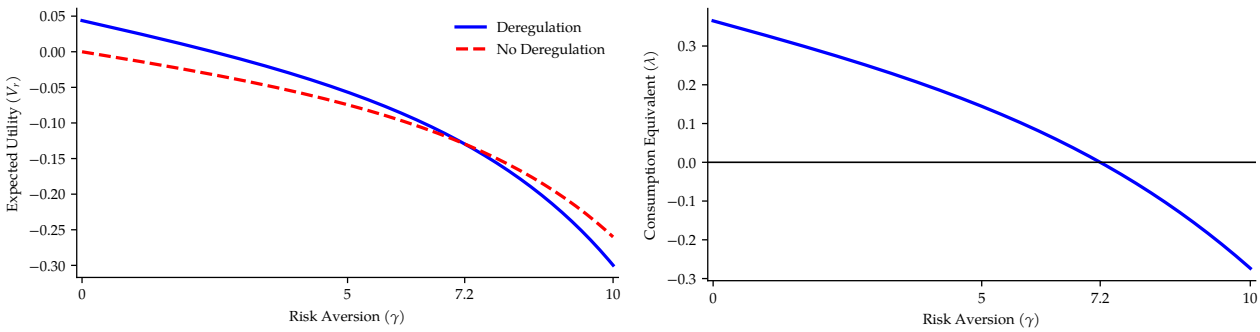
$$V_{\text{no policy in t}}(\gamma) = \sum_{h=0}^{15} \beta^h E_t[u(c_{t+h})|\text{no policy in t}] \quad , \tag{6}$$

with $\beta = 0.96$ as a function of the coefficient of relative risk aversion γ.

Figure 13 (a) maps a frontier for the tradeoff between growth and stability. We identify the threshold at $\gamma = 7.2$. Below this level, the first-moment gains from deregulation outweigh the utility losses associated with higher variance and negative skewness. The

Figure 13: *Welfare with and without credit-supply deregulation.*

(a) *Expected utility* (b) *Consumption equivalent in %*



Notes: Panel (a) shows estimates of Equations (5) and (6). Panel (b) shows estimates of Equation (7). See text for details.

consensus range for risk aversion based on individual-level experiments and calibrations of macroeconomic models lies between 1 and 3 and thus falls well within this pro-liberalization domain (e.g., Layard et al., 2008; Gandelman and Hernández-Murillo, 2015). However, macro-finance models commonly employ higher levels of risk aversion, often above this threshold for γ, to match the equity premium (e.g., Bansal and Yaron, 2004; Cochrane, 2009). The finding underscores that deregulation is not a free lunch. For a policymaker sufficiently concerned with tail risk, the insurance provided by the regulatory status quo exceeds the value of foregone growth.

We can also express the welfare effect in consumption-equivalent terms. Let $\lambda(\gamma)$ denote the constant proportional increase in consumption under the no-deregulation regime that makes a representative agent with risk aversion γ indifferent between the two regimes:

$$\sum_{h=0}^{15} \beta^h E_t[u((1+\lambda(\gamma))c_{t+h}^{\text{no policy in t}})] = \sum_{h=0}^{15} \beta^h E_t[u(c_{t+h}^{\text{policy in t}})] \quad .$$

Under CRRA utility, this indifference condition yields

$$\lambda(\gamma) = \left(\frac{W_{\text{policy in t}}(\gamma)}{W_{\text{no policy in t}}(\gamma)} \right)^{\frac{1}{1-\gamma}} - 1 \quad \text{with} \quad W_r(\gamma) = \sum_{h=0}^{15} \beta^h E_t[(c_{t+h}^r)^{1-\gamma}] \quad . \tag{7}$$

Figure 13 (b) plots $100\,\lambda(\gamma)$. A value of $\lambda(\gamma) = x$ means that increasing consumption by x percent in every year (and in every state) under no liberalization delivers the same expected discounted utility as credit-supply-related deregulation. For instance, $\lambda(1) = 0.0033$, implying that a roughly 1% permanent increase in consumption under no deregulation is required

to match welfare under a large supply-side banking deregulation (Δ*Supply Index* = 3).

7 Conclusion

We construct a new database of 386 distinct banking regulation policy shifts across 21 regulatory dimensions for 18 advanced economies spanning the entire post-WWII era. The regulations are documented transparently in comprehensive Historical Accounts based on more than a thousand primary and secondary sources. A key feature of our data is the distinction between policies that directly constrain banks' ability and incentive to lend and those operating through other channels. Our results suggest that deregulation-induced outward shifts in credit supply generate boom-and-bust cycles in real economic activity and heightened medium-term risk of financial crashes.

Credit-supply-related deregulation is associated with significant expansions in bank lending. The expansions flow disproportionately into non-tradable sectors. Meanwhile, interest rates and credit spreads do not rise—patterns characteristic of outward shifts in credit supply. The deregulation-induced credit expansion leads to a boom-and-bust cycle in real activity: real GDP rises significantly in the first years after deregulation but subsequently reverts as financial fragility builds. The risk of systemic banking crises increases sharply at medium horizons, tracking the build-up of leverage, the reallocation of credit toward non-tradable sectors, the rise in spreads, and the hump-shaped response in house prices. Banking regulations that do not directly target credit supply are not associated with these patterns.

A simple welfare exercise quantifies the tradeoff policymakers face. Deregulation raises expected consumption in normal times but fattens the left tail of the consumption distribution through higher crisis risk. We find that the growth gains dominate unless risk aversion exceeds 7.2, a moderately high level.

These findings connect two literatures that have largely developed in parallel: the credit supply view of macroeconomic fluctuations and the debate over the gains and risks arising from financial liberalization. Our results identify banking deregulation as a concrete, policy-driven origin of the credit supply shifts that the former literature treats largely as given. At the same time, our results clarify why the liberalization debate has arrived at conflicting conclusions: the net effect depends on which policies change, through which channel they operate, over what horizon one evaluates outcomes, and how much weight one places on tail risk.

Our analysis carries implications for current policy debates. Many non-advanced economies still face the core regulatory constraints that shaped advanced economies earlier in the postwar period. Our evidence suggests that if policymakers in those economies aim

to remove constraints that bind credit intermediation, these liberalizations should be paired with stronger supervision and macroprudential safeguards that limit the medium-term tail risks that arise during the transition. Meanwhile, some advanced economies are moving toward relaxing restrictions introduced after the 2008 Global Financial Crisis, such as stricter capital requirements and banking supervision. While our analysis does not directly study such intensive margin deregulations, our evidence suggests that if these policies expand credit supply, they may carry medium-term risks that warrant policymakers' vigilance.

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Appendices

A Supplemental Figures and Tables **A1**

A.1 Appendix Figures A1

A.2 Appendix Tables A15

B Coding Guide **B1**

C Narrative Accounts of Exogenous Events **C1**

C.1 Australian Liberalization 1984: Lifting of Barriers Between Trading and Merchant Banks and Abolition of Domestic Bank Entry Restrictions C1

C.2 Australian Regulation in 1988: Implementation of Basel I Capital Requirements C2

C.3 Belgian Liberalization in 1993: Repeal of 1934–35 Law separating Commercial and Investment Banking C2

C.4 Danish Liberalization in 1975: Liberalization of Foreign Bank Entry C3

C.5 German Liberalization in 1957: Removal of all Restrictions on Capital Exports by Residents C4

C.6 German Liberalization in 1958: Abolition of the "Bedürfnisprüfung" (Branch Licensing Requirement) C5

C.7 German Liberalization in 1967: Nationwide liberalization of Deposit Interest Rates C6

C.8 Irish Liberalization in 1992: Full liberalization of Capital Movements (EU Single Market Compliance) C6

C.9 Italian Liberalization in 1962: Liberalization of Capital Movements per EEC Directive C7

C.10 Italian Liberalization in 1990: Abolition of "Economic Needs" Test for Banking Licenses (Opening to New Entrants) C8

C.11 Italian Liberalization in 1992: Liberalization of Entry for Foreign Banks . . . C8

C.12 Japanese Regulation in 1949: Abolition of Universal Banking C8

C.13 Japanese Regulation in 1993: Commitment to Basel I Capital Standards . . . C9

C.14 Portuguese Regulation in 1991: Introduction of Capital Adequacy Rules . . . C9

C.15 Portuguese Liberalization in 1992: Full liberalization of Capital Flows and Foreign Bank Branching C10

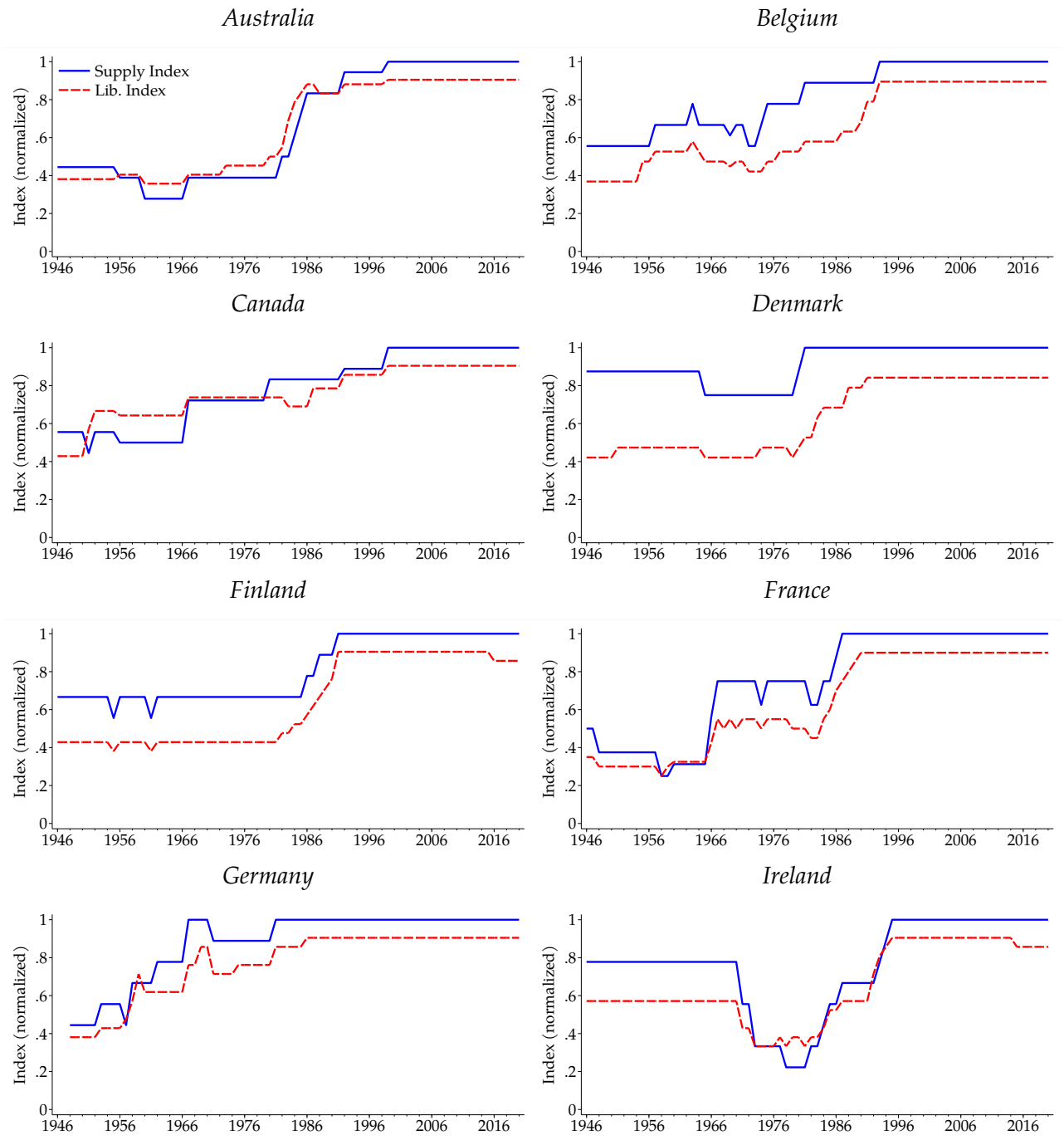
C.16 Spanish Liberalization in 1992: Final Removal of all remaining Currency and Capital Controls C11

C.17 Spanish Liberalization in 1993: Liberalization of Foreign Bank Entry C12

A Supplemental Figures and Tables

A.1 Appendix Figures

Figure A1: *Stance of banking regulation for individual countries.*



Continued on next page.

Figure A1 (continued).

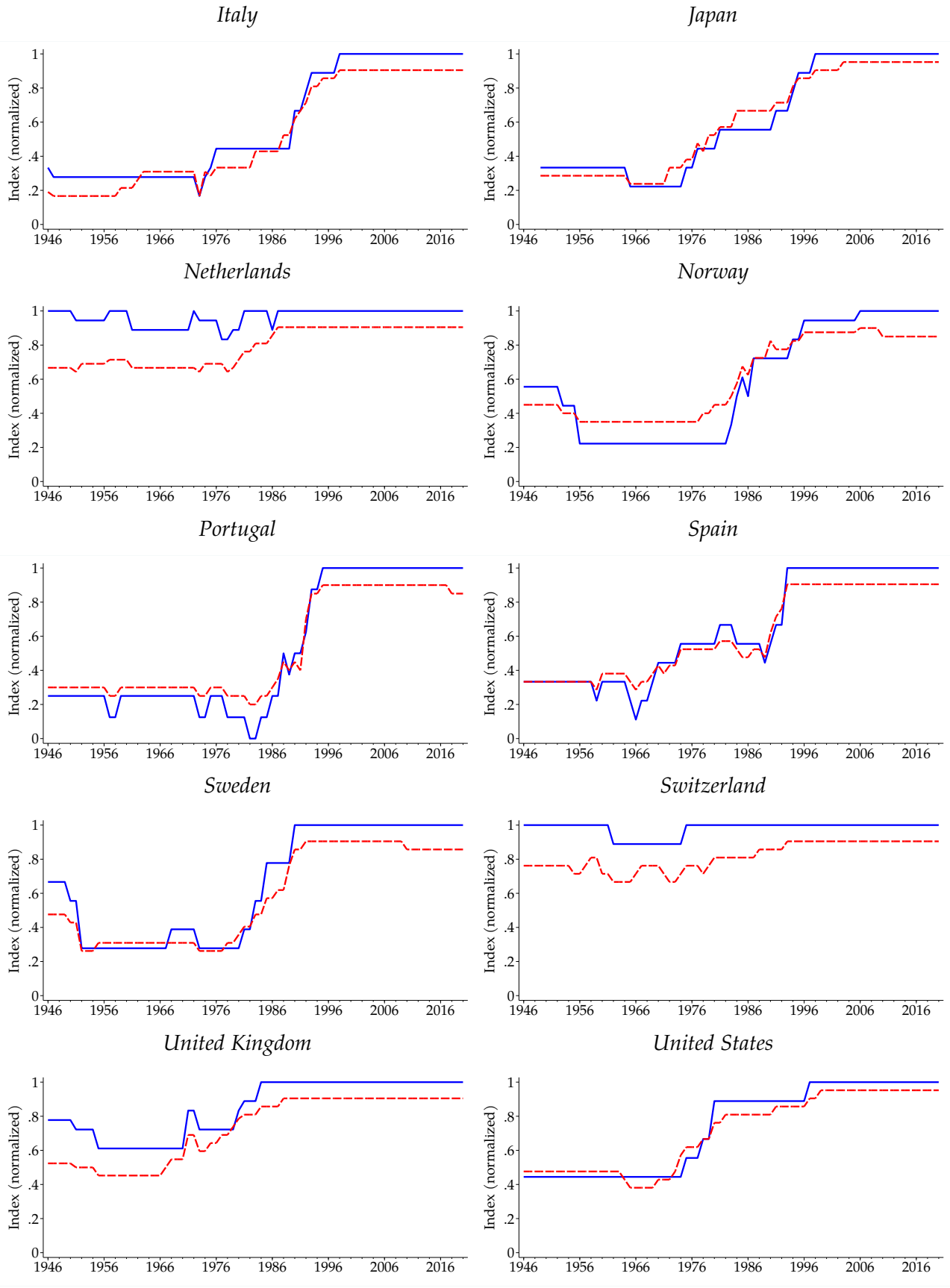
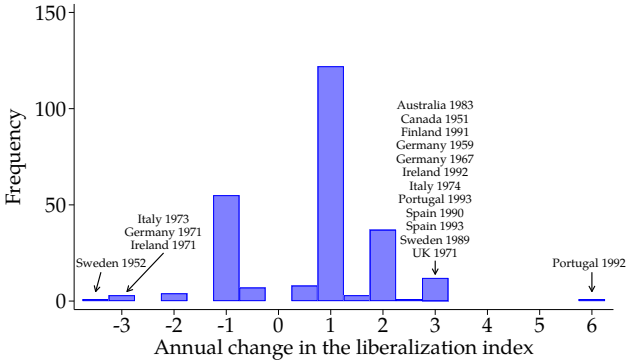


Figure A2: *Distribution of index changes.*

(a) *Distribution of* Δ*Lib. Index* $\neq$ 0



(b) *Distribution of* Δ*Supply Index* $\neq$ 0

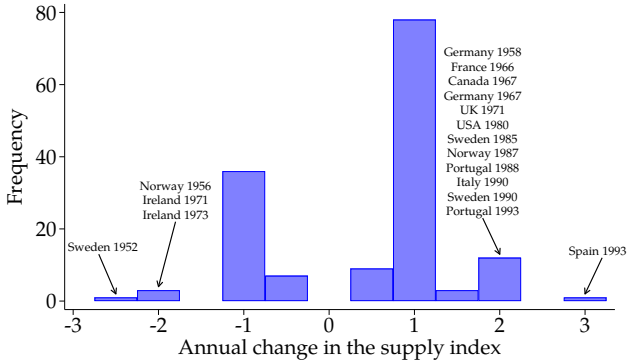
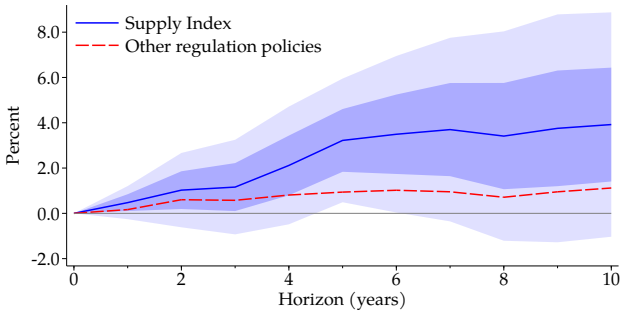
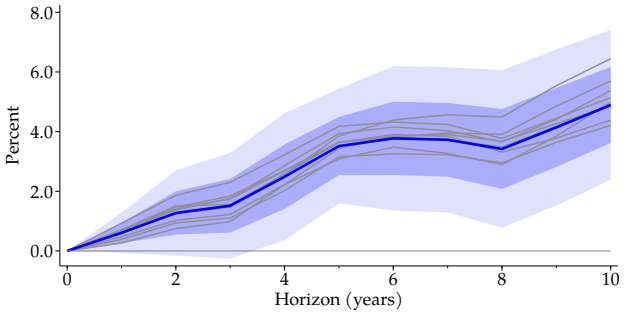


Figure A3: *Credit-supply deregulation and real private credit growth: robustness checks.*

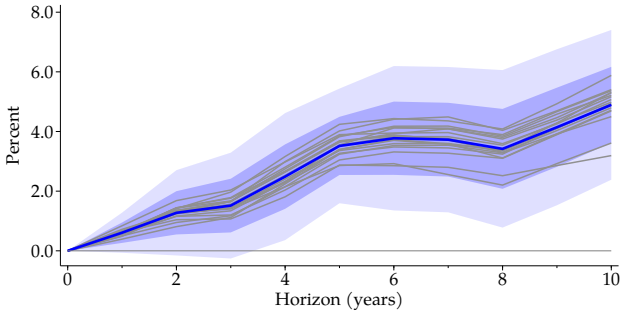
(a) *No controls*



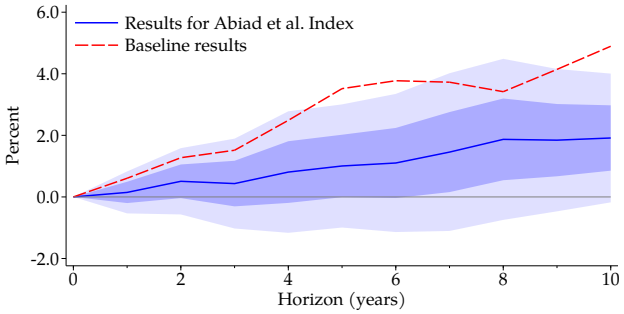
(b) *Excluding one question at a time*



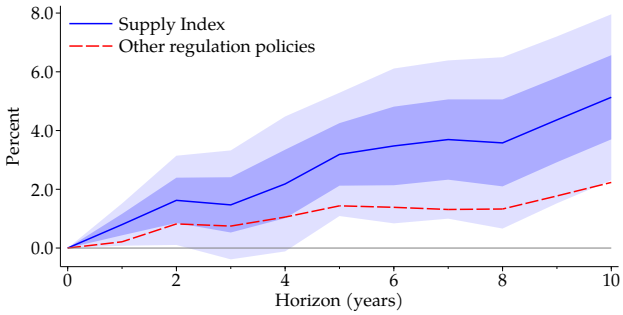
(c) *Excluding one country at a time*



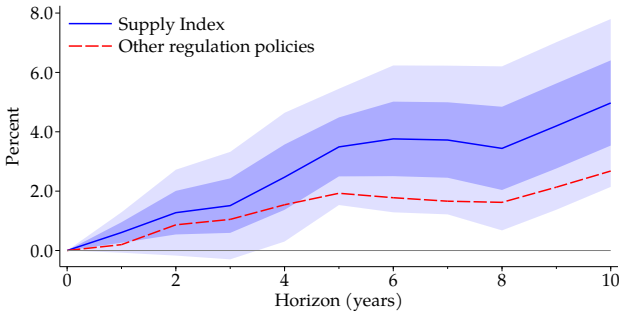
(d) *Responses to the Abiad et al. (2010) index*



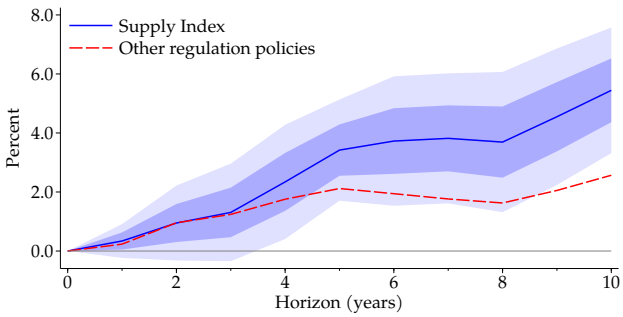
(e) *Controlling for trade liberalization*



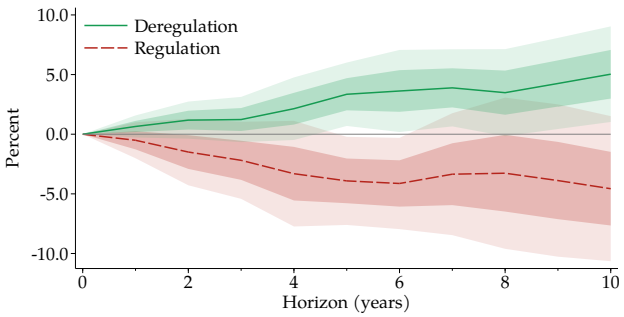
(f) *Controlling for the ideology of political leaders*



(g) *Controlling for parliamentary econ. orientation*



(h) *Symmetry*



Notes: See next page.

Notes for Appendix Figure A3

Panel (a): The same notes as in Figure 4 apply, except that we do not control for any covariates in model (1).

Panel (b): The blue lines and shaded areas are the same as in Figure 4. We then exclude one of the 9 questions of our supply index and re-estimate model (1). We do that for each question. The 9 gray lines show the corresponding LP-OLS estimates of $\{\beta_0^h\}_{h=1}^{10}$.

Panel (c): The blue lines and shaded areas are the same as in Figure 4. We then exclude one of the 18 countries of our supply index and re-estimate model (1). We do that for each country. The 18 gray lines show the corresponding LP-OLS estimates of $\{\beta_0^h\}_{h=1}^{10}$.

Panel (d): The same notes as in Figure 4 apply with one modification; we replace the supply index with the Abiad et al. (2010) financial liberalization index.

Panel (e): The same notes as in Figure 4 apply with one modification; we additionally control for lags 0 to 5 of Wacziarg and Welch (2008) trade liberalization dates.

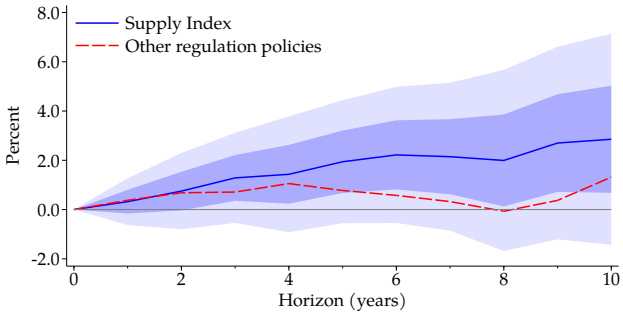
Panel (f): The same notes as in Figure 4 apply with one modification; we additionally control for the ideology of political leaders in year t. See Notes in Appendix Figure A14 (b) for details on these data.

Panel (g): The same notes as in Figure 4 apply with one modification; we additionally control for the parliamentary economic orientation in year t. See Notes in Appendix Figure A14 (c) for details on these data.

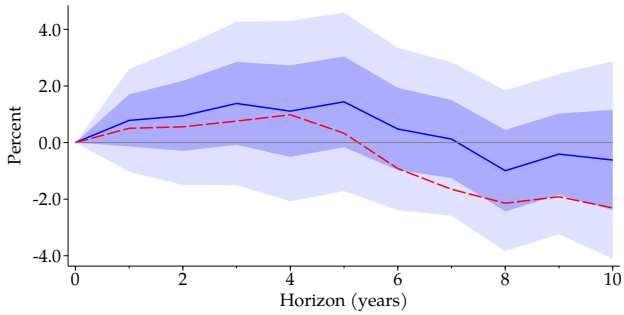
Panel (h): OLS estimates of $\{\beta_L^h\}_{h=1}^{10}$ and $\{\beta_R^h\}_{h=1}^{10}$ of $\Delta_h y_{i,t+h} = \alpha_i^h + \beta_L^h \Delta Supply\ Index_{i,t} \mathbb{1}\{Supply\ Index_{i,t} > 0\} - \beta_R^h \Delta Supply\ Index_{i,t} \mathbb{1}\{Supply\ Index_{i,t} < 0\} + \sum_{k=1}^{5} \beta_k^h \Delta Supply\ Index_{i,t-k} + \sum_{k=0}^{5} \mathbf{\Gamma}_k^h \mathbf{X}_{i,t-k} + \sum_{k=0}^{5} \delta_k^h \Delta y_{i,t-k} + u_{i,t+h}$. Shaded areas indicate 95% and 68% confidence intervals based on Driscoll-Kraay standard errors with ceiling$(1.5 \times h)$ lags.

Figure A4: *Credit-supply deregulation and mortgage and household credit.*

(a) *Log real mortgage credit*



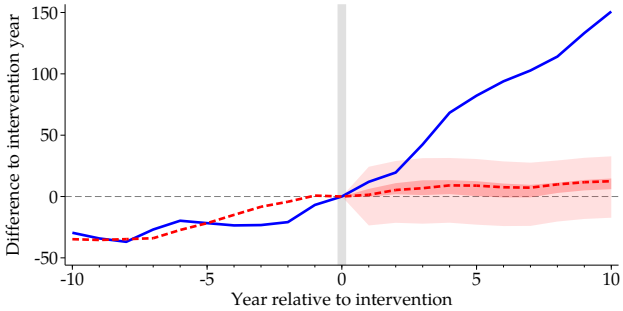
(b) *Log real household credit*



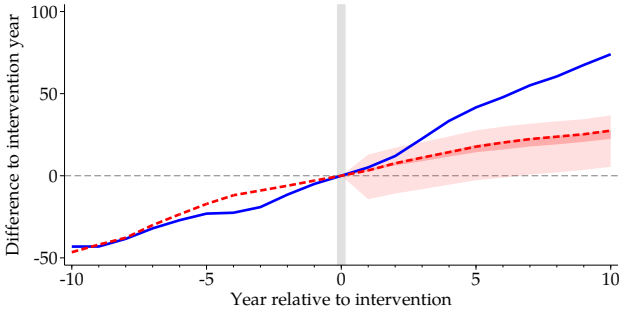
Notes: The same notes as in Figure 5 apply. Data on mortgage and household credit come from Müller and Verner (2024) and the Macrohistory Database, respectively.

Figure A5: *Synthetic control: extensions and robustness checks.*

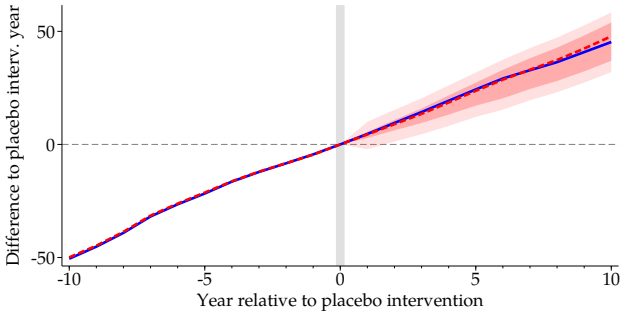
(a) *Log real credit to real estate sector*



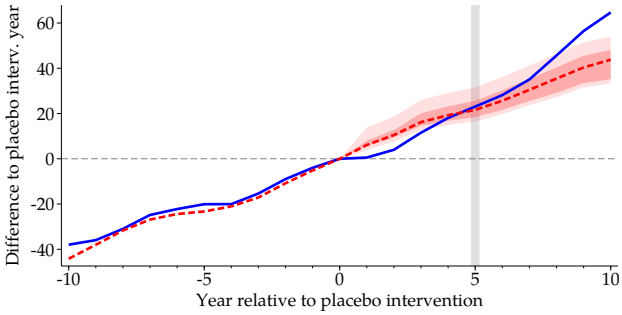
(b) *With additional predictors*



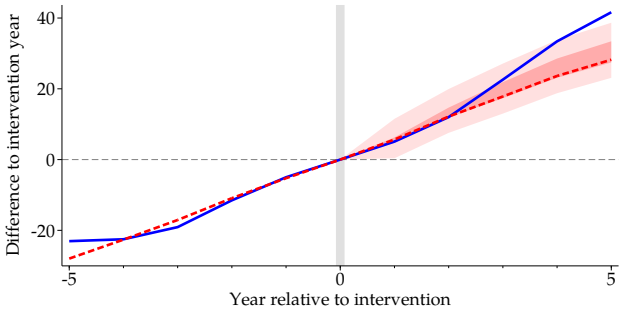
(c) *Country placebos*



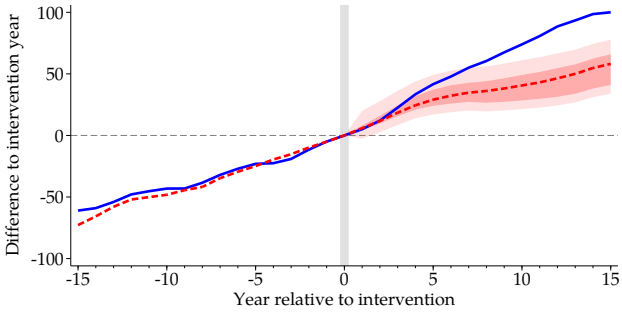
(d) *Time placebos*



(e) 5-*year time frame*



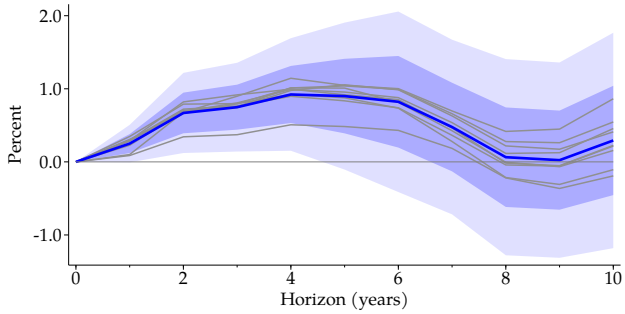
(f) 15-*year time frame*



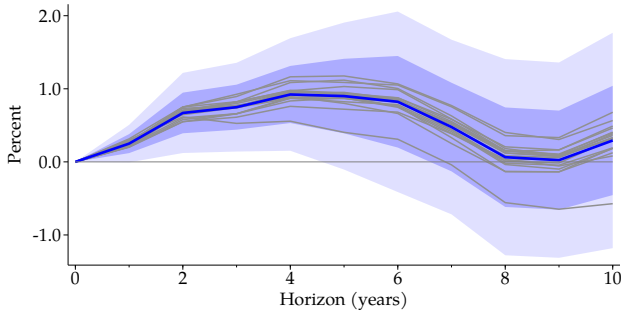
Notes: The same notes as in Figure 7 apply with the following modifications. In panel (a), we replace the outcome variable with log real credit to the real estate sector.
In panel (b), the synthetic control is chosen to match the full pre-intervention trajectory of the outcome variable and the pre-intervention average of changes in log CPI, log real GDP p.c., and the supply index.
In panel (c), we assign the intervention to another country in the donor pool, include the treated unit in the donor pool, and re-estimate the model in the same way as for Figure 7. We do that for all countries and intervention years and show average treatment and synthetic control paths.
In panel (d), we shift the treatment of all interventions five years backward and show average treatment and synthetic control paths.
In panels (e) and (f), we construct the Synthetic Control based on a 5-year or 15-year time frame, respectively.

Figure A6: *Credit-supply deregulation and real GDP growth: excluding one question or one country at a time.*

(a) *Excluding one question at a time*



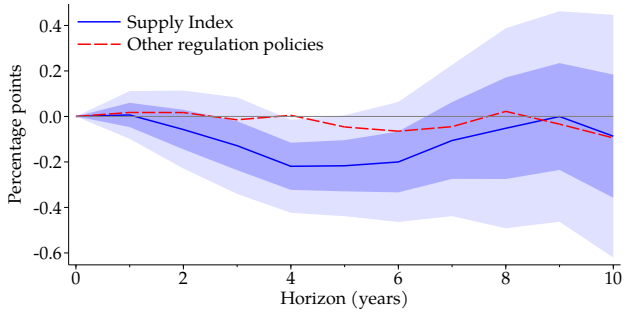
(b) *Excluding one country at a time*



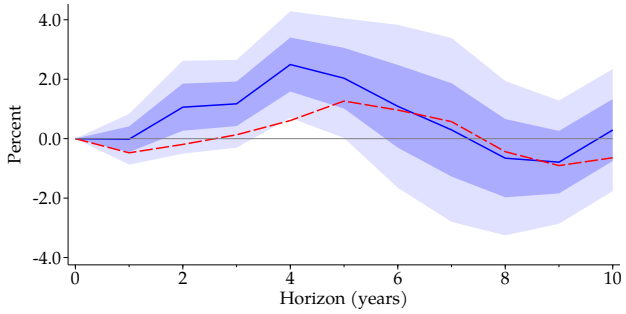
Notes: The blue lines and shaded areas are the same as in Figure 9 (a). We then exclude one of the 9 questions of our supply index (panel (a)) or one of the 18 countries (panel (b)) and re-estimate model (1). We do that for each question and each country. The gray lines show the corresponding LP-OLS estimates of $\{\beta_0^h\}_{h=1}^{10}$.

Figure A7: *Credit-supply deregulation, unemployment, and investment.*

(a) *Unemployment rate*



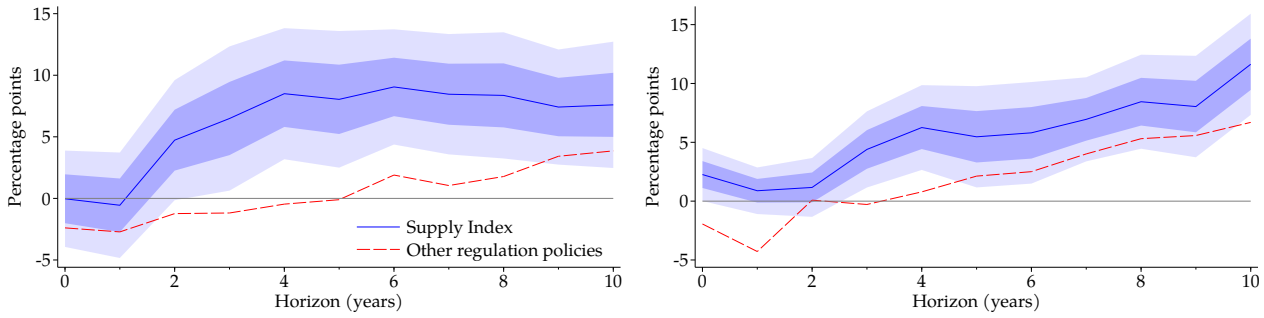
(b) *Log real investment p.c.*



Notes: The same notes as in Figure 5 apply.

Figure A8: *Credit-supply deregulation predicts financial crisis risk: alternative crisis chronologies.*

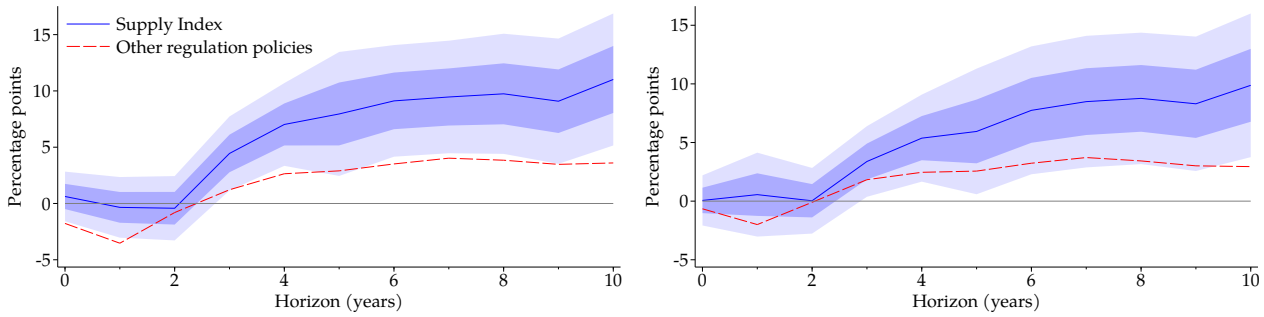
(a) *Baron et al. (2021) crisis chronology* (b) *Reinhart and Rogoff (2009) crisis chronology*



Notes: The same notes as in Figure 12 apply with one modification; here, we replace the JST financial crisis dates with those provided by Baron et al. (2021) (panel (a)) and Reinhart and Rogoff (2009) (panel (b)).

Figure A9: *Credit-supply deregulation predicts financial crisis risk: alternative estimation methods.*

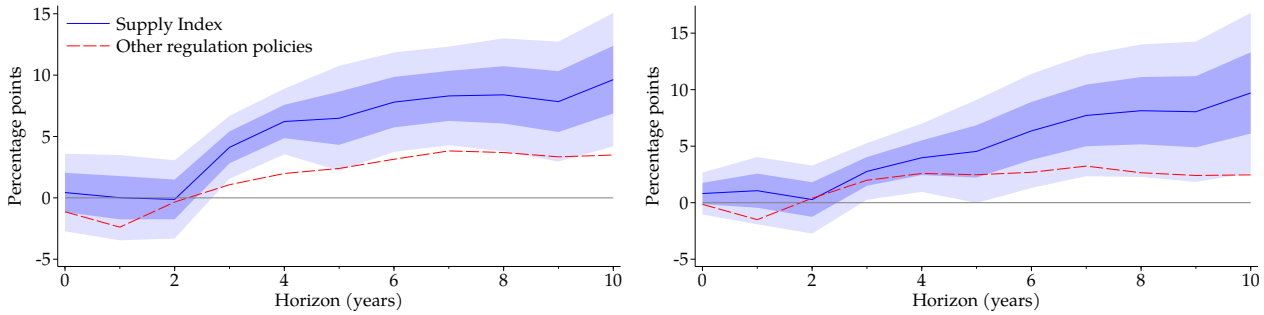
(a) *Probit* (b) *OLS*



Notes: The same notes as in Figure 12 apply with one modification; here, we re-specify model (2) as a probit model (panel (a)) or linear probability model (panel (b)).

Figure A10: *Credit-supply deregulation predicts financial crisis risk: excluding country fixed effects or control variables.*

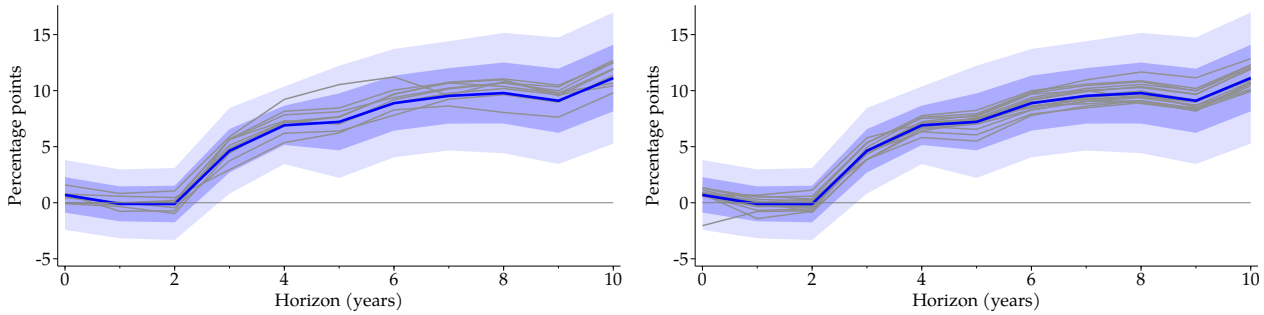
(a) *No country fixed effects* (b) *No controls*



Notes: The same notes as in Figure 12 apply with one modification; here, we exclude country fixed effects (panel (a)) or all control variables (panel (b)).

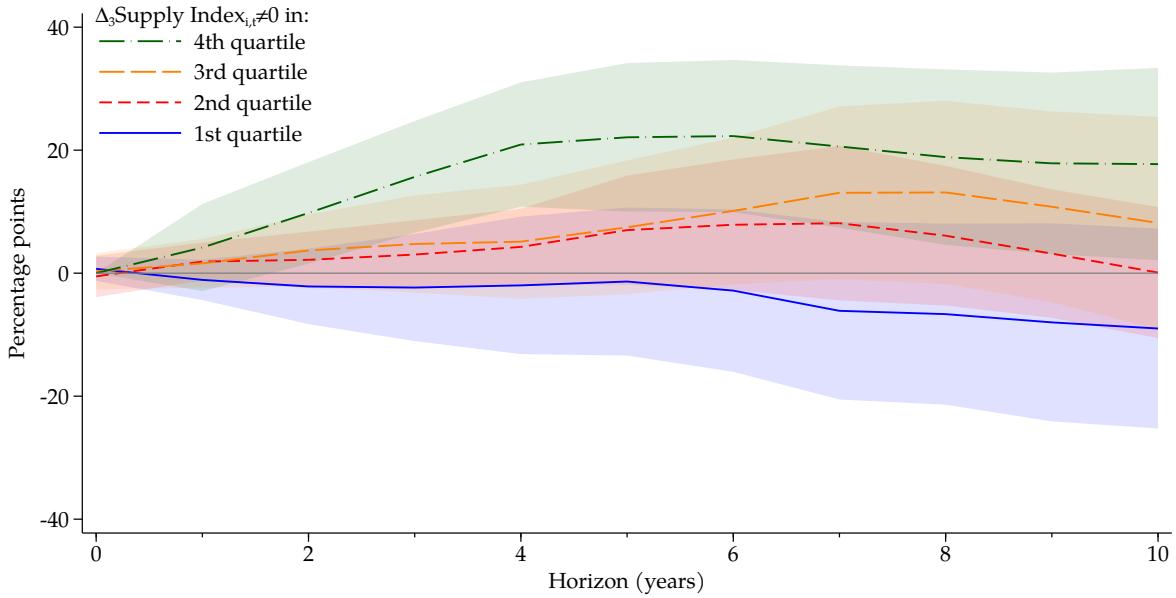
Figure A11: *Credit-supply deregulation predicts financial crisis risk: excluding one question or one country at a time.*

(a) *Excluding one question at a time* (b) *Excluding one country at a time*



Notes: The blue lines and shaded areas are the same as in Figure 12. We then exclude one of the 9 questions of our supply index (panel (a)) or one of the 18 countries (panel (b)) and re-estimate model (2). We do that for each question and each country. The gray lines show the corresponding average marginal effects.

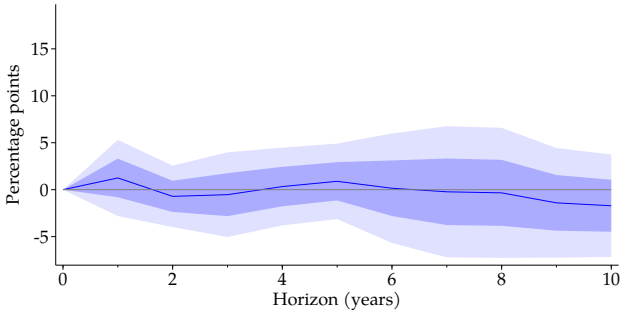
Figure A12: *Credit-supply deregulation predicts financial crisis risk: quartile regressions.*



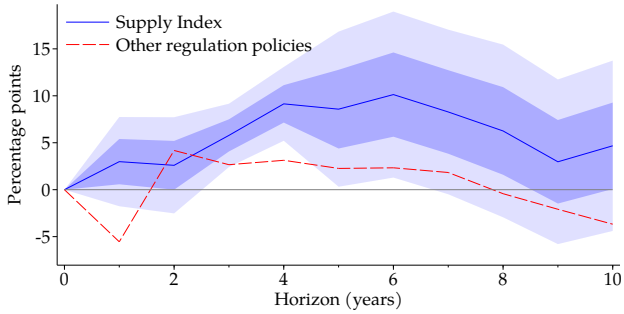
Notes: Maximum likelihood estimates of $\{100\beta_1^h\}_{h=0}^{10}$, $\{100\beta_2^h\}_{h=0}^{10}$, $\{100\beta_3^h\}_{h=0}^{10}$, and $\{100\beta_4^h\}_{h=0}^{10}$ of $\log\left(\frac{p_{i,t+h}}{1-p_{i,t+h}}\right) = \alpha_i^h + \beta_1^h \mathbb{1}\{\Delta_3 Supply\ Index_{i,t}\ in\ Q_i^1\} + \beta_2^h \mathbb{1}\{\Delta_3 Supply\ Index_{i,t}\ in\ Q_i^2\} + \beta_3^h \mathbb{1}\{\Delta_3 Supply\ Index_{i,t}\ in\ Q_i^3\} + \beta_4^h \mathbb{1}\{\Delta_3 Supply\ Index_{i,t}\ in\ Q_i^4\} + \sum_{k=0}^{5} \boldsymbol{\Gamma}_k^h \mathbf{X}_{i,t-k} + u_{i,t+h}$. Q_i^j refers to the j-th quartile of country i's distribution of $\Delta_3 Supply\ Index_{i,t}$. Point estimates refer to average marginal effects. Shaded areas indicate 90% confidence intervals based on country-based cluster-robust standard errors. $p_{i,t+h}$ refers to the likelihood that a financial crisis occurs between years t and $t+h$.

Figure A13: *The Abiad et al. (2010) index does not predict financial crisis risk.*

(a) *Abiad et al. index*



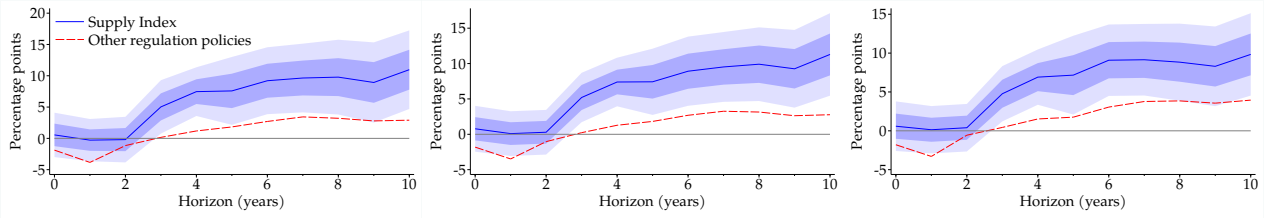
(b) *Supply Index using the Abiad et al. sample*



Notes: The same notes as in Figure 12 apply with one modification. In panel (a), we replace *Supply Index* with the Abiad et al. financial liberalization index. In panel (b), we use *Supply Index* but restrict the sample to those observations covered by the Abiad et al. index. The dependent variable refers to cumulative financial crisis risk between t and $t+h$.

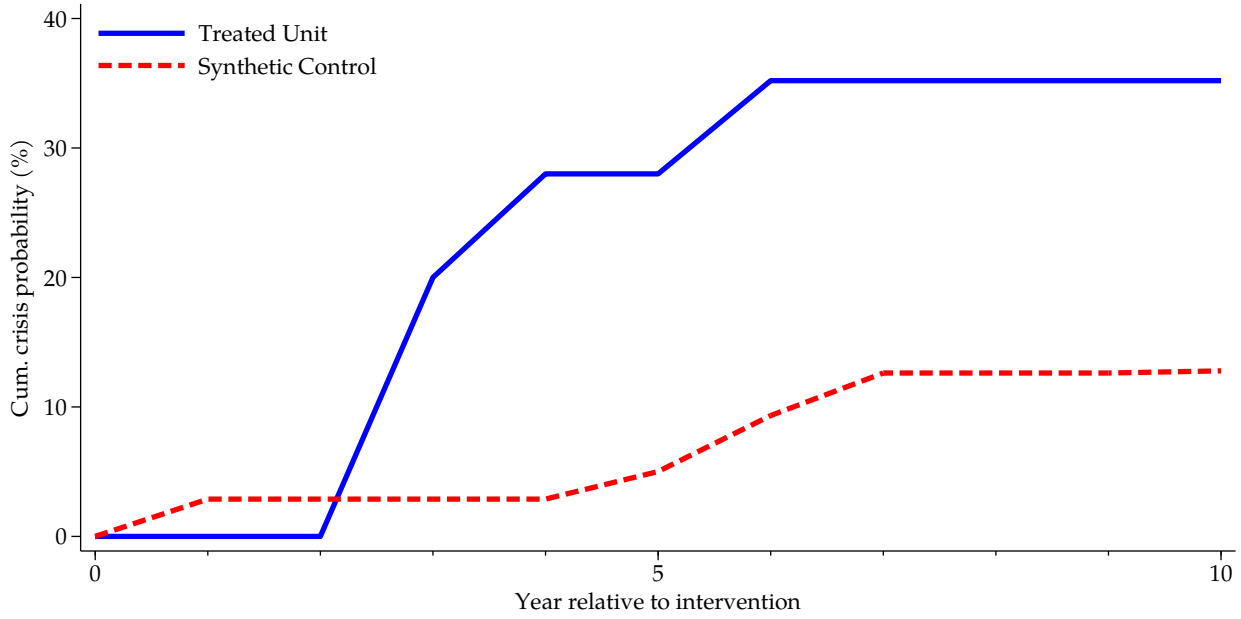
Figure A14: *Credit-supply deregulation predicts financial crisis risk: controlling for other policy dimensions.*

(a) *Trade liberalization* (b) *Ideology of political leaders* (c) *Parliamentary econ. orientation*



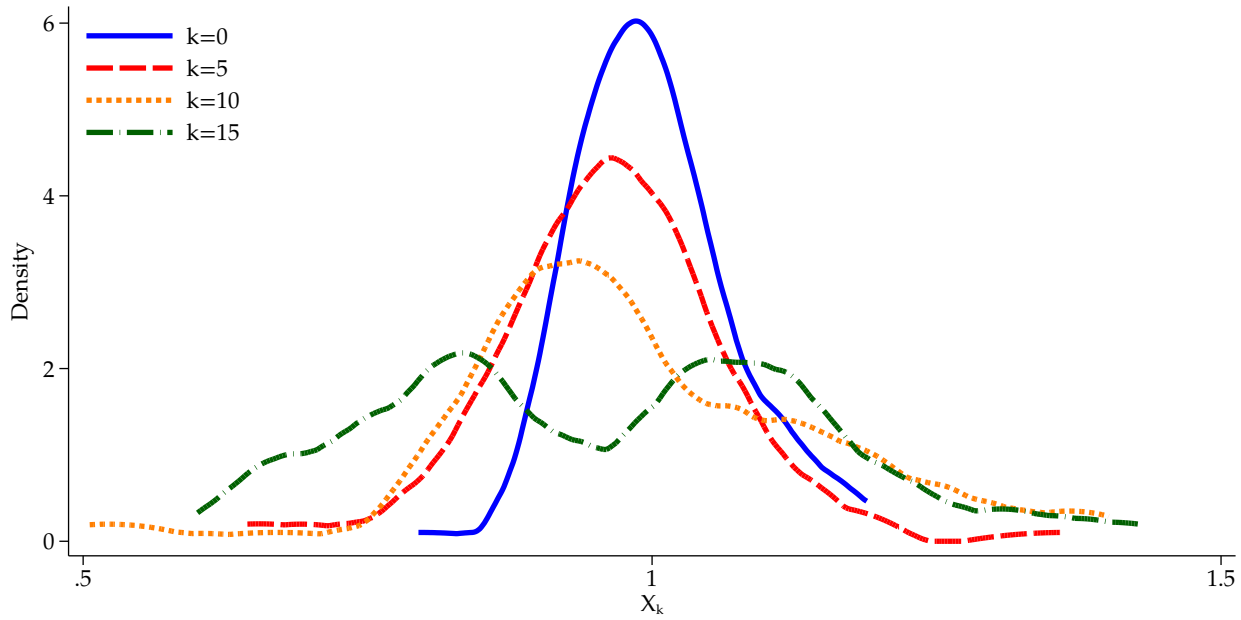
Notes: The same notes as in Figure 12 apply with the following modifications.
In panel (a), we additionally control for lags 0 to 5 of Wacziarg and Welch (2008) trade liberalization dates.
In panel (b), we additionally control for two binary variables that capture the ideology of political leaders using the database constructed by Herre (2023). The first variable equals 1 if country i has a rightist head of government in year t and 0 otherwise. The second variable equals 1 if country i has a leftist head of government in year t and 0 otherwise. See Herre (2023) for details.
In panel (c), we additionally control for three variables that capture the relative emphasis placed on key economic policy dimensions in the manifestos of all parties represented in parliament in a given year, as coded in the Manifesto Project Dataset (Lehmann et al., 2025). The first variable (`per401`) measures favorable mentions of the free market and free market capitalism as an economic model. The second variable (`per402`) captures favorable mentions of supply side oriented economic policies (assistance to businesses rather than consumers). The third variable (`per407`) measures support for the concept of free trade and open markets and calls for abolishing all means of market protection (in the manifesto or any other country). All variables represent the share of quasi-sentences devoted to the respective topic and are expressed as percentages. See Lehmann et al. (2025) for details.

Figure A15: *Synthetic-control estimates for crisis risk.*



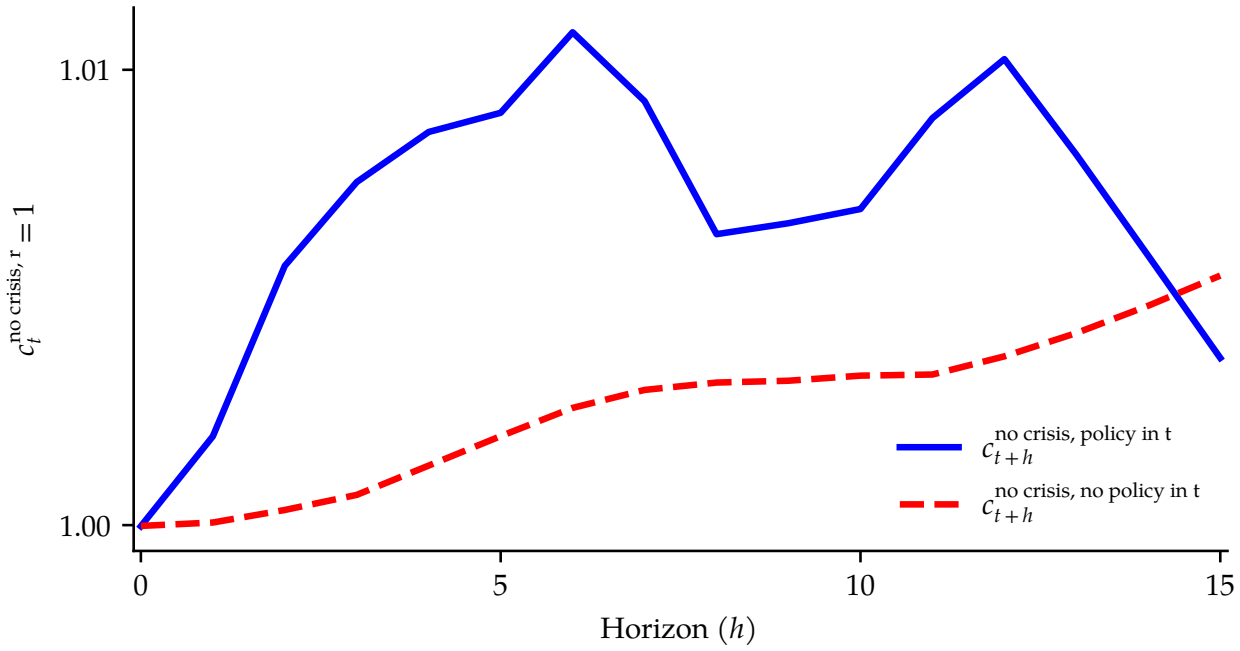
Notes: The figure plots, at each post-intervention horizon h, the average Treated Unit and Synthetic Control probabilities of having entered a financial crisis since the intervention year, $1-\prod_{k=0}^{h}(1-\hat{\pi}^{r}_{t+k})$, where $\hat{\pi}^{r}_{t+k}$ is the estimated per-period crisis probability at horizon k under regime r. See main text for details.

Figure A16: *Loss distribution k years after financial crisis.*



Notes: Empirical distribution of $\{X_{j,k}\}_{j=1}^{J}$ for different horizons k. See Section 6 for details.

Figure A17: *No-crisis counterfactual consumption paths.*



Notes: The figure plots $c_{t+h}^{\text{no crisis},r}$ from Equation (4) for $r \in \{\text{policy in t}, \text{no policy in t}\}$, normalized to one at $h = 0$. See text for details.

A.2 Appendix Tables

Table A1: *Macro-financial variables do not predict narrative regulation policies.*

	All narrative events			Credit-supply-related events		
Dep. var.: z_{t+1}	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta_3 \log CPI_t$	0.006		0.011	0.019		0.040*
	(0.011)		(0.021)	(0.012)		(0.020)
$\Delta_3 \log Real\ GDP_t$	0.087		0.148	0.050		0.083
	(0.059)		(0.089)	(0.038)		(0.056)
$\Delta_3 ST\ Real\ Rate_t$	-0.024		-0.002	-0.025		-0.027
	(0.034)		(0.054)	(0.020)		(0.026)
$\Delta_3 \log USD\ ER_t$	-0.011		-0.011	-0.010		-0.012
	(0.012)		(0.015)	(0.009)		(0.011)
$\Delta_3 Credit/GDP_t$	0.019		0.020	-0.001		0.002
	(0.019)		(0.025)	(0.013)		(0.016)
$Crisis_{t-2,t}$	0.009		0.011	0.010		0.011
	(0.012)		(0.013)	(0.012)		(0.012)
Rightist head of government$_t$		-0.010	-0.007		-0.006	-0.003
		(0.010)	(0.010)		(0.008)	(0.008)
Leftist head of government$_t$		-0.014*	-0.012*		-0.010	-0.008
		(0.007)	(0.007)		(0.008)	(0.007)
Free Market Economy$_t$		-0.000	-0.001		0.001	0.001
		(0.002)	(0.002)		(0.001)	(0.001)
Positive Incentives$_t$		-0.001	-0.001		-0.000	-0.000
		(0.001)	(0.001)		(0.001)	(0.001)
Free Trade and Open Markets$_t$		0.006	0.008*		0.009*	0.011**
		(0.005)	(0.005)		(0.005)	(0.005)
Trade Liberalization$_t$		-0.012	-0.015*		-0.009*	-0.009*
		(0.008)	(0.008)		(0.005)	(0.005)
Controls	✓	✓	✓	✓	✓	✓
Country FEs	✓	✓	✓	✓	✓	✓
Observations	1293	1198	1186	1293	1198	1186
Countries	18	18	18	18	18	18

Notes: OLS estimates of $\mathbf{\Gamma}$ of $z_{i,t+1} = \alpha_i + \mathbf{\Gamma X}_{i,t} + u_{i,t+1}$. Variables included in $\boldsymbol{X}$ are listed in the table. Parentheses indicate Driscoll-Kraay standard errors with 5 lags. $Crisis_{t-2,t}$ equals 1 if a country experiences a Jordà et al. (2017) financial crisis within $t-2$ and t and 0 otherwise. Trade Liberalization$_t$ refers to Wacziarg and Welch (2008) trade liberalization dates. We explain the other policy variables in the Notes of Appendix Figure A14. ** $p < 0.05$, * $p < 0.1$.

B Coding Guide

Question numbers refer to Table 1.

Dimension I: Regulation of the mortgage sector

(1) Can commercial banks operate in the mortgage market?

Coded as 0 if general banks are prohibited from entering the mortgage sector.
Coded as 1 if general banks are allowed to enter the mortgage market.

Clarification 1. *We consider prohibitions to provide conventional mortgage loans. That is, we still code this Question as "0" if banks are allowed to provide government-insured or government-supported loans but are prohibited from entering the conventional mortgage sector, as was the case in Canada from 1954 to 1967.*

Clarification 2. *We also code this Question as "0" if banks are not explicitly prohibited from providing mortgage loans but are prohibited from providing long-term loans. This is relevant for Belgium until 1957, for Spain until 1969, and for Italy until 1993.*

Clarification 3. *We do not take into account limitations on banks' asset share that are allowed to consist of mortgages. Such limitations were for instance in place in Canada and Spain. We only take into account outright prohibitions to enter the mortgage sector for this Question.*

(5) Do authorities regulate mortgage interest rates?

Coded as 0 if mortgage rates are set by the government or subject to a binding ceiling or floor.
Coded as 1 if mortgage rates are allowed to float without interference.

Clarification 4. *If a (de facto) mortgage rate cartel is in place that sets mortgage rates, which is allowed or even supported by authorities, we code this Question as "0". This is for instance relevant for the United Kingdom where an interest rate cartel of building societies was in place from 1939 to the 1980s. During this period, we code this Question as "0" for the United Kingdom.*

Clarification 5. *We also code this Question as "0" if it is explicitly prohibited to issue variable-rate mortgages, which is for instance relevant for Belgium.*

Clarification 6. *In the United States, state usury laws applied to first mortgages in many states and were actually binding for several states. Hence, we code this Question as "0" for the United States during this period.*

Clarification 7. *From Clarification 6 it becomes clear that the criteria to code this Question as "0" are not as strict as for the Question on general lending rates ("Are there regulations on lending rates?") which we code as "1" even if state usury laws with the motive to protect consumers were in place. The reason is that the present Question is really about one particular type of credit whereas the Question on lending rates is about credit in general. Thus, in order to code the Question on lending rates as "0", it is not enough that lending rate controls to protect consumers against usury are imposed.*

Clarification 8. *We consider mortgage rate controls for conventional loans and not for government-insured and government-supported loans and public loans more generally. This is for instance relevant for the United States where conventional but not government-insured mortgage loans were subject to state usury, for Canada where mortgage rate ceilings existed for government-insured but not for conventional mortgage loans, and for Norway where mortgage rate regulations on State Bank mortgage loans and special term loans existed longer than on conventional long-term loans.*

Clarification 9. *We also code this Question as "0" if there is no specific restriction for mortgage rates but for general long-term loans which was the case in Spain up to 1969 and in Norway in the early 1980s.*

(10) Do capital adequacy requirements cover residential mortgages?

We only take this Question into account if there are capital adequacy rules in place, i.e., if we code the Question "Are there capital adequacy rules?" below as "0".
Coded as 0 if capital adequacy rules apply to residential mortgage loans in the same way as to other types of loans.
Coded as 1 if a preferential treatment–that is a risk-weighting below 100%–is applied to residential mortgage loans.

Clarification 10. *We also code this Question as "1" if preferential risk-weighting applies only to those mortgage loans that are below a certain LTV threshold.*

(11) Does a public mortgage securitization program exist?

Coded as 0 if the federal government is not actively participating in the market for mortgage-backed securities.
Coded as 1 if the federal government is either insuring or directly issuing mortgage-backed securities.

Clarification 11. *We code this Question as "1" for the United States from 1970 on. In this year, the first MBS based on federally insured loans was guaranteed (not issued) by Ginnie Mae. Note that the first MBS based on conventional (that is non-insured) loans was issued by the GSEs in 1971.*

Clarification 12. *We ignore state-level securitization programs and only consider securitization by the federal government. This is relevant for Australia where state governments created securitization programs. Whenever possible, we will also mention in the historical accounts which state-level programs were in place. We did so for Australia.*

Clarification 13. *We do not take temporary government programs into account that are used in times of crises with the clear short-term focus to stabilize markets. This is important for Australia where a RMBS purchase programme was in place during the Great Financial Crisis.*

Clarification 14. *We do not take Central Bank Liquidity Support Arrangements into account. This is for instance relevant for Australia where in October 2007, shortly after the onset of the financial market turmoil, the Reserve Bank expanded the range of securities it was willing to hold under repurchase agreements to include RMBS.*

(12) Do regulations set maximum LTV ratios for residential mortgages?

Coded as 0 if a statute that specifies that the general maximum LTV ratio for residential mortgage loans is below 100% is in place.
Coded as 1 if there is no statute whatsoever that specifies a maximum LTV ratio for residential mortgage loans below 100%.

Clarification 15. *Gentlemen's Agreements in which banks commit themselves to certain actions are somewhere in-between non-compulsory guidelines/advices and mandatory requirements. We decide to take Gentlemen's Agreements between financial institutions and authorities in which banks commit themselves to an LTV cap into account for this Question. This is only relevant for Switzerland where a Gentlemen's Agreement specified a maximum LTV ratio of 70% for the period 1951-1957. We thus code this Question as "0" over this period for Switzerland.*

Clarification 16. *If LTV limits do not exist for banks but only for specialized deposit-based institutions specializing in housing, we code this Question as "1". In other words, we only consider banks for this Question. An exception is made for periods in which banks are either not allowed to enter the mortgage sector (see Question (1), which applies for instance to Italy and Canada) or play only a minor role in the mortgage sector (which is the case for Denmark throughout the post-WWII era). In these periods, we consider LTV limits of the main non-bank mortgage lenders.*

Clarification 17. *We consider LTV limits for conventional loans and <u>not</u> for government-insured and government-supported loans and public loans more generally. This is relevant for the United States where (i) there have often been government-supported zero downpayment programs, (ii) loans guaranteed or insured by the U.S. government or its agencies were exempted from the LTV limits introduced in 1993, and (iii) different LTV limits or no LTV limits at all applied to government*

loans (e.g., FHA loans), and for Canada where government insurance of mortgage loans has existed throughout the post-1954 period and allowed for higher LTV ratios. The exception is Sweden for which we do take state loans into account, the reason being that almost all houses have been financed with the help of State loans in the post-WWII decades.

Clarification 18. *We do not take maximum LTV ratios for loans backed by mortgage bonds into account.*

Clarification 19. *We also code this Question as "1" if an LTV limit only applies to construction loans for residential property. This is for instance relevant for the period from 1993 onwards for the United States.*

Clarification 20. *If the standard maximum LTV limit is below 100% but can be raised to 100% if further insurance is provided (which is for instance relevant for Australia and the US), if additional guarantees are provided (which is for instance relevant for Italy), or if mortgage loans have to be covered by more equity (which is for instance relevant for Switzerland), we code this Question as "1".*

Dimension II: Bank entry barriers

Clarification 21. *In the following dimensions of liberalization, we consider the regulation of "general banks". Different types of banking groups may face different regulations. For instance, regulation differs for state-chartered and federally chartered banks in the United States and regulation differed for some time for trading banks and savings banks in Australia. If regulation differs, we only consider the regulation faced by "national commercial banks".*

(2) Do regulations restrict entry by foreign banks?

Coded as 0 if foreign banks are not allowed to enter the domestic banking sector, or if there are restrictive licensing requirements.
Coded as 1 if foreign banks can freely enter the domestic banking sector through branches without facing statutory discrimination vis-à-vis domestic banks.

Clarification 22. *We want to stress "restrictive licensing requirements" here. What matters for us in coding this Question is whether licenses are provided based on clear objective criteria (e.g., initial capital requirements, reciprocity (i.e., parity of treatment), and sufficient supervision in the home country) or whether there is room for discretion.*

Clarification 23. *If the only restriction on foreign bank entry is that foreign branches are not allowed to accept retail deposits (but are allowed to accept large deposits, that is wholesale funding),*

then we still code this Question as "1". This is for instance relevant for Australia where branches of foreign banks are restricted in their retail deposit activities until today.

Clarification 24. *If the only restriction on foreign bank entry is that the majority of persons in charge of the management of the bank reside in the respective country, then we still code this Question as "1".*

Clarification 25. *Note that it is possible that this Question is already coded as "1" while the following Question regarding domestic banks is still coded as "0". This is relevant for the United States where foreign banks were put on equal footing with domestic banks in 1978, but an arbitrary and discretionary needs test for obtaining a bank charter remained in place until 1980.*

Clarification 26. *For countries of the European Union, we code this Question as "1" after the Second Banking Directive–which gave credit institutions licensed in one EEC Member State access to all EEC Member States–was implemented at the latest. Consistent with this, we code this Question as "1" for Norway as soon as it allowed the entry of EEA member country banks.*

(3) Do regulations restrict entry by domestic banks?

Coded as 0 if no new domestic banks can enter the banking sector, or if there are restrictive licensing requirements for deposit-taking activities.
Coded as 1 if new domestic banks can enter the banking sector.

Clarification 27. *The same notes as in Clarification 22 apply. For instance, in Germany authorities could deny entry of domestic banks based on a "needs test" ("Bedürfnisprüfung") until 1958, up to which point we code this Question as "0".*

Clarification 28. *We focus on "deposit-taking activities" for coding this Question. For instance, in the United Kingdom of the 1980s, banks were generally free to undertake all types of financial service business except deposit-taking activities. So, if some type of banking activities are regulated and others are not, we base our coding decision on deposit-taking activities.*

Clarification 29. *Initial capital requirements for obtaining a bank license or restrictive requirements concerning per-customer-lending-limits do not suffice for coding this Question as "0".*

(4) Do regulations limit geographic expansion or branching?

Coded as 0 if there are branching or geographical restrictions.
Coded as 1 if there are no geographical and branching restrictions.

Clarification 30. *We code this Question as "0" even if there are only minimal branching restrictions. This point is important for the United States. Several states lifted certain branching restrictions already in the 1970s and 1980s. The federal government also lifted some branching restrictions in 1982 and 1995. Nevertheless, we code this Question as "1" for the United States only when final branching restrictions were abolished in 1997.*

(13) Can commercial banks conduct investment-banking activities?

Coded as 0 if banks are restricted to commercial banking due to external organizational decisions.
Coded as 1 if banks are permitted to engage in securities activities.

Clarification 31. *We want to stress here the distinction between internal and external organizational decisions in determining the (non-)existence of a universal banking system in a country (Oppolzer, 2019). Internal organizational decisions are for instance business decisions such as the free decision of UK banks during the 20th century to not engage in securities and insurance business. External organizational decisions refer to explicit prohibitions to conduct securities activities. We do not code this Question as "0" if banks decide not to become universal banks due to internal organizational decisions only. What matters for us are external organizational decisions. This is for instance relevant for pre-1980 Canada where commercial banks were de jure allowed to engage in investment banking activities but were de facto not entering this type of business.*

Clarification 32. *We deliberately use the word "permitted". We code this Question as "1" if universal banking is permitted though not unrestricted since certain obstacles remain. One such obstacle is the requirement to conduct certain investment banking activities in subsidiaries. This is for instance relevant for Germany and the United Kingdom; our coding for this Question does not change after implementation of the Trennbankengesetz and ring-fencing.*

Clarification 33. *Restrictions on proprietary trading alone do not imply a coding of "0" for this Question.*

Dimension III: International financial restrictions

Clarification 34. *We impose rather strict criteria for coding the Questions on capital account restrictions as "liberalized". In general, as long as some restrictions are in place, we code the Questions on capital account restrictions as "regulated". Consider for example Germany which abolished most restrictions on portfolio inflows in 1974 but some restrictions remained in place until 1981. In this case, we still code the Question on portfolio inflow restrictions as "0" for Germany from 1974 to including 1980.*

Clarification 35. *Restrictions on capital inflows are defined as those restrictions that affect the capital movements of the liabilities of a country. Restriction on capital outflows are defined as those restrictions that affect the capital movements of the assets of a country. One implication of this is that if authorities put restrictions on the repatriation of foreigners' investment in the domestic country, we interpret this as restrictions on capital inflows as it directly affects freedom of capital movement of a country's liabilities.*

(14) Is the exchange rate system unified?

Coded as 0 if there are dual, multiple, or parallel exchange rate systems.
Coded as 1 if the exchange rate system is unified.

Clarification 36. *We do not create new historical accounts for this Question. Rather, we directly use the existing binary classification of Ilzetzki et al. (2019).*

(15) Do regulations restrict inflows of portfolio investment?

Coded as 0 if there are restrictions on the inflow of portfolio investments.
Coded as 1 if there are at most minimal approval restrictions on the inflow of portfolio investments.

Clarification 37. *Portfolio investments are defined as purchases of shares and bonds, including short-term money-market securities such as commercial papers. Restrictions on borrowing from abroad by residents do not fall into this category.*

Clarification 38. *Gentlemen's Agreements in which banks commit themselves to certain actions are somewhere in-between non-compulsory guidelines/advices and mandatory requirements. We decide to take Gentlemen's Agreements between financial institutions and authorities in which banks commit to do whatever it takes to prevent the purchase of domestic securities by nonresidents into account for this Question. This is only relevant for Switzerland where such a Gentlemen's Agreement existed from 1960 to 1964. We thus code this Question as "0" over this period for Switzerland.*

Clarification 39. *We do not take withholding taxes on interest paid to foreign investors in domestic securities into account. This is for instance relevant in Germany, the US, and France. In all three countries, such taxes were abolished in 1984. A similar tax was abolished in Japan in 1985.*

(16) Do regulations restrict capital inflows into domestic bank accounts or as bank loans?

Coded as 0 if there are restrictions on capital flows into domestic bank accounts and provided as bank loans, i.e., if there are restrictions on foreign currency deposits and bank

borrowing in foreign currency.
Coded as 1 if there are at most minimal approval restrictions on capital inflows into domestic bank accounts and provided as bank loans.

Clarification 40. *This Question is also coded as "0" when banks are required to balance their foreign currency positions. This is for instance relevant for Switzerland in the 1970s and for Italy and Australia for many decades.*

Clarification 41. *We code this Question as "1" even if only banks but no other agents are allowed to borrow abroad.*
On the other hand, if documents never explicitly refer to banks when they discuss borrowing abroad, we consider restrictions on borrowing abroad by residents in general. This is for instance relevant for Australia where restrictions on borrowing abroad are discussed, but nowhere in this context are Australian banks mentioned.

Clarification 42. *Gentlemen's Agreements in which banks commit themselves to certain actions are somewhere in-between non-compulsory guidelines/advices and mandatory requirements. We decide to take Gentlemen's Agreements between financial institutions and authorities in which banks commit themselves on a ban on the payment of interest on foreign deposits into account for this Question. This is only relevant for Switzerland where such Gentlemen's Agreements existed at several sub-periods in the 1950s and early 1960s. We thus code this Question as "0" over these periods for Switzerland.*

Clarification 43. *In general–and in contrast to the coding of the other Questions–we try to be flexible here and take the particular country setting into account. For instance, for Germany, we code this Question as "0" as soon as a ban was imposed on interest payments on bank deposits held by nonresidents, even though borrowing abroad in general remained allowed. For the UK, we code this Question as "1" over the full period even though there were restrictions on borrowing from abroad.*

Clarification 44. *We do not consider restrictions on foreign currency financing for imports.*

Clarification 45. *We do not take reserve requirements on foreign funding/borrowing into account except they are exorbitantly high, that is if the reserve requirement on foreign funding/borrowing is much higher than on domestic funding and thus an own capital account restriction in itself. Two examples of reserve requirements on foreign funding/borrowing we do not take into account:*

- *the marginal reserve requirement of 25% on net external indebtedness in the late 1980s in Italy (see historical account for Italy for more details)*
- *the 4% reserve requirement placed on the foreign borrowings of American banks which was abolished in August 1978 (Capie, 2002)*

Two examples of an exorbitantly high reserve requirement we would take into account:

- *the Japanese marginal reserve requirement on deposits of non-residents that was reduced from 100% to 50% in January 1979 (Capie, 2002)*
- *the Swiss marginal reserve requirement of 100% imposed on foreign funds, introduced in 1971*
- *the special deposit requirement of 50% that was imposed on Irish banks' net capital inflows during the 1970s*

Clarification 46. *We do not take the abolition of reserve requirements applicable to foreign currency deposits into account.*

Clarification 47. *If banks are allowed to accept foreign deposits but are forbidden to pay interest on these deposits, this Question is coded as "0". This is relevant for some European countries such as France and Germany.*

Clarification 48. *Restrictions on borrowing from abroad by non-bank residents do not fall into this Question. Neither do these restrictions fall under any other Question. We simply ignore them. However, we will note these restrictions in the historical account. The reason for ignoring these restrictions is that our financial liberalization index focuses on banks.*

(17) Do regulations restrict outflows of portfolio investment?

Coded as 0 if there are restrictions on the outflow of portfolio investments.
Coded as 1 if there are at most minimal approval restrictions on the outflow of portfolio investments.

Clarification 49. *What about permission, license, and authorization requirements on capital outflows? It depends on the context. We tend towards coding this Question as "1" and the following Question as "0" when such requirements are in place, reflecting the fact that while this Question considers general restrictions on the purchase of foreign securities by residents, the following Question focuses on a rather specific part of the capital account, namely bank lending. This approach was followed for Switzerland. In the end, though, it depends on the strictness of the permission, license, and authorization requirements; we have to interpret this strictness which leaves of course some room for discretion.*

(18) Can banks lend to nonresidents/foreigners?

Coded as 0 if there are restrictions on domestic-currency bank lending to foreigners.
Coded as 1 if there are at most minimal approval restrictions on domestic-currency bank lending to foreigners.

Clarification 50. *What about permission, license, and authorization requirements on capital outflows? See Clarification 49.*

Clarification 51. *We code this Question as "1" even if only banks but no other agents are allowed to lend to foreigners. This point is for instance relevant for Germany. When also taking other agents into account, we would have to code this Question as "1" from 1959 onwards rather than from 1957 onwards for Germany.*
On the other hand, if documents never explicitly refer to banks when they discuss borrowing by foreigners in the domestic country, we consider restrictions on borrowing by foreigners in the domestic country in general. This is for instance relevant for Australia where restrictions on borrowing in Australia by foreigners were in place, but nowhere in this context are Australian banks mentioned.

Clarification 52. *If only foreign governments and corresponding agencies are subject to restrictions on domestic-currency lending, then we code this Question as "1". This is relevant for Australia for the period from 1983 to 1991.*

Clarification 53. *We do not consider restrictions on foreign exchange financing of export credits.*

Dimension IV: Restrictions on banks' liabilities

(19) Do regulations specify capital adequacy rules?

Coded as 0 if there is a capital adequacy rule.
Coded as 1 if there are no capital adequacy rules.

Clarification 54. *A capital adequacy rule is defined as a minimum ratio between capital and either total liabilities or total assets. We do not take rules into account that relate capital to some specific liability items such as current liabilities (see UK) or deposits (see UK, Italy, Belgium, Sweden, and Spain).*

Clarification 55. *If only loose non-compulsory guidelines are specified, then we code this Question as "1". Such "loose non-compulsory guidelines" include for instance the "Richtsätze" that were in place in Germany up to 1962. Furthermore, we do not include minimum absolute capital levels required to set up a bank, to obtain a bank charter, or to maintain bank business in our definition of "capital adequacy rule".*
In other words, we apply a strict definition of capital adequacy rules for this Question. We only code this Question as "0" if there is a clear capital adequacy rule in place that is taken seriously (which was for instance not the case in the United States in the 1950s and 1960s and in pre-1991 Norway), is actually enforced (which was for instance not the case in the United States in the 1950s and 1960s

and in pre-1991 Norway), and if supervisors have the legislative authority to actually punish banks when capital adequacy rules are broken (which was for instance not the case in the United States before 1983).

(20) Do authorities control deposit rates?

Coded as 0 if deposit rates are set by the government or subject to a binding ceiling or floor.
Coded as 1 if deposit rates are allowed to float without interference.

Clarification 56. *If an interest rate cartel is in place that sets deposit rates, which is allowed or even supported by authorities, we code this Question as "0". This is for instance relevant for the United Kingdom where an interest rate cartel of clearing banks was in place until 1971. Thus, we code this Question as "0" for pre-1971 United Kingdom.*

Clarification 57. *If the only type of "deposit" that is controlled are cheque/current accounts (i.e., transactional accounts), then we code this Question as "1". This is for instance relevant for (i) Australia where "general" deposit rate controls were removed in 1980, but a prohibition to pay interest on cheque/current accounts remained until 1984 and (ii) the United States where Regulation Q was lifted in the 1980s but prohibition against the payment of interest on demand deposits was not abolished in the 1980s but remained in place until 2011.*

(21) Can banks issue certificates of deposit?

Coded as 0 if banks are not permitted to issue (negotiable) certificates of deposit in domestic currency, or if the government controls interest on these certificates of deposits.
Coded as 1 if banks are free to issue (negotiable) certificates of deposit in domestic currency.

Clarification 58. *Note that we focus on domestic currency CDs. This is for instance relevant for the United Kingdom where dollar CDs were introduced in 1966, but sterling CDs were allowed only in 1968. Thus, we code this Question as "1" for the United Kingdom only from 1968 on.*

Clarification 59. *If a different legislation applies to different types of CDs, we consider the legislation for negotiable certificates of deposits. Negotiable certificates of deposits are non-callable, i.e., cannot be withdrawn before maturity, and negotiable, that is can be traded on secondary markets (Choudhry, 2010).*

Clarification 60. *Negotiable certificates of deposits are issued in large denomination (usually more than $100,000) (Summers, 1980). Thus, the prohibition to offer CDs in smaller denomination does not imply that we code this Question as "0". This is for instance relevant for Australia where initially CDs had to be issued in amounts greater than $50,000.*

Clarification 61. *We do not take regulations into account that set a limit on the issuance of CDs. This is for instance relevant for Japan where banks were allowed to issue CDs up to 10 percent of banks' net worth.*

Clarification 62. *The maturity of negotiable CDs is usually between one and three months, although they do trade in maturities of one to five years (Choudhry, 2010). If authorities impose maturity restrictions on CDs that still allow banks to issue CDs at some maturity between one month and two years, we still code this Question as "1", given that no interest rate controls apply. This is for instance relevant for (i) Australia where initially CDs had to be issued with maturities between 3 months and 2 years and (ii) Italy where initially CDs had to be issued with maturities over 18 months.*

Clarification 63. *We construct an index of financial market policies and not of tax policies. However, when we find evidence that tax policies create a clear barrier for the development of a market for CDs, we code this Question as "0". This is relevant for Switzerland where such tax policies were in place until 1993.*

Dimension V: Restrictions on banks' assets

(6) Do ceilings limit overall credit expansion?

Coded as 0 if there are ceilings that control the overall expansion of credit.
Coded as 1 if no such ceilings exist.

Clarification 64. *This Question is about direct, explicit credit controls. If authorities only impose loose (directional) non-compulsory "guidelines" or "advice", then this Question is coded as "1". Such loose guidelines were for instance issued in the United Kingdom before 1955 and in Ireland before 1978.*

Clarification 65. *Our goal is to capture (de-)regulation events rather than the use of macroprudential policies. Hence, if there is a clear indication that aggregate credit controls are part of a Central Bank's monetary policy toolkit but simply not used at a certain point in time due to benign credit conditions, this Question is still coded as "0".*

Clarification 66. *Restrictive requirements concerning per-customer-lending-limits do not imply a coding of "0" of this Question.*

Clarification 67. *Restrictions that affect only certain dimensions of consumer credit (e.g., Regulation W in the US after World War II) or business credit (e.g., term loans in Canada in the 1950s and 1960s) do not imply a coding of "0" of this Question.*

Clarification 68. *If there are ceilings that control the overall expansion of deposits with the explicit goal to control credit, this Question is coded as "0". This is for instance relevant for the United Kingdom where the Corset was in place in the 1970s.*

Clarification 69. *We do not take lending ceilings that only affect lending of specialized institutions into account; this is relevant for Denmark where such lending ceilings have been imposed from 1965 to 1968.*

Clarification 70. *We also code this Question as "0" if there are marginal reserve requirements.*

(7) Do authorities control lending rates?

Coded as 0 if lending rates are set by authorities or subject to a binding ceiling or floor.
Coded as 1 if lending rates are allowed to float without interference.

Clarification 71. *If an interest rate cartel is in place that sets lending rates, which is allowed or even supported by authorities, we code this Question as "0". This is for instance relevant for the United Kingdom where an interest rate cartel of clearing banks was in place until 1971.*

Clarification 72. *If lending rates are controlled only to protect consumers against predatory lending, loan-sharking, abuses, or "usury"*[22]*, we code this Question as "1". See also Clarification 7 for more details.*

(8) Do reserve requirements apply?

Coded as 0 if reserve requirements exceed 10%.
Coded as 1 if reserve requirements do not exceed 10%, or if no reserve requirement in the form defined in Clarification 73 exists.

Clarification 73. *A reserve requirement is defined as the ratio of reserves banks have to hold in their accounts with the central bank to deposits. We also take rules that are very close to these "classical" reserve requirements into account, such as the primary liquidity in Ireland, the cash ratio in Belgium, the cash ratio and cash ratio deposits in the United Kingdom, and the cash reserve agreements in Finland; see respective Historical Accounts of these countries for more details on these regulations.*

Clarification 74. *We take (Gentlemen's) Agreements between financial institutions and authorities in which banks commit themselves to hold specified amounts of reserves at Central Banks into account for this Question. This is for instance relevant for Switzerland where a Gentlemen's Agreement*

[22] Even in the 2000s, usury legislation is in place in many European countries; see Section 1.1.3 in iff/ZEW (2010) for details.

existed from 1955 to 1958. Minimum ratios were set at low values such that this Gentlemen's Agreement does not affect our coding for Switzerland during these years anyways. The same is true for the Belgium of the early 1970s.

Clarification 75. *We use the same threshold (10%) as Abiad et al. (2010). A reserve requirement of exactly 10% counts as liberalized.*

Clarification 76. *In some countries, different reserve requirements apply for different types of deposits. We construct a single time series for the reserve requirement as the average of reserve requirements applying to time and to demand deposits. We ignore reserve requirements on savings deposits.*

Clarification 77. *In some countries, different reserve requirements apply for different sizes of deposits. This is for instance relevant for Germany and Japan. Here, we construct a single reserve requirement time series by focusing on the reserve requirements applying for the largest deposits only.*

Clarification 78. *In the case of time deposits, different reserve requirements might apply for different maturities for some countries. This is for instance the case for the post-1975 United States. In this case, we only take the longest maturity into account.*

Clarification 79. *In some countries, reserve requirements only apply to domestic deposits, while in other countries they apply to all deposits. We ignore separate reserve requirements for foreign deposits which is for instance relevant for Canada where separate reserve requirements on foreign currency deposits were introduced in 1981.*

Clarification 80. *We do not make a distinction between reserve requirements that pay interest and reserve requirements that pay no interest. This is for instance relevant for Australia where the interest rate on reserves was gradually raised over time and for the United States where the Reserve Banks have started to pay interest on reserves from 2008 on. Both policy changes are not captured by our financial liberalization index.*

Clarification 81. *We do not make a distinction between regimes in which reserve requirements are the sole "liquidity rule" and regimes in which reserve requirements complement other liquidity rules. This is for instance relevant for Australia where the reserve requirement system was used in close combination with other liquidity rules.*

Clarification 82. *We ignore changes in the time period over which reserve requirements have to be satisfied. This is for instance relevant for Canada where banks had to satisfy reserve requirements on a half-monthly and no longer on a monthly basis from 1969 onwards.*

Clarification 83. *We do not take officially-called "reserve requirements" which have the purpose to finance government deficits by allowing for government debt as eligible substitutes for central bank deposits into account. Those "reserve requirements" are captured by another Question below (see Clarification 86).*

Clarification 84. *We do not take marginal reserve requirements into account for this Question since marginal reserve requirement ratios are not comparable with reserve requirement ratios on the stock of deposits. We treat marginal reserve requirements as credit ceilings (see Clarification 70).*

(9) Must banks hold government securities?

Coded as 0 if banks are explicitly required to hold government debt.
Coded as 0.5 if secondary reserve requirements or other liquidity rules are in place in which government debt is an eligible asset.
Coded as 1 if banks are not required to hold government debt.

Clarification 85. *Government debt includes both short-term debt (i.e., treasury bills or equivalent securities) and long-term debt (i.e., government bonds or equivalent securities).*

Clarification 86. *If there is an officially-called "reserve requirement" which has the purpose to finance government deficits by allowing for government debt as eligible substitutes for central bank deposits, then we also code this Question as "0.5". This is relevant for post-WWII Italy.*

Clarification 87. *As with the Question on reserve requirements (see Clarification 74), we take (Gentlemen's) Agreements between financial institutions and authorities in which banks commit themselves to hold specified amounts of government debt into account for this Question. A Gentlemen's Agreement existed in Belgium from 1972 to 1975. Similarly, there was an agreement in post-1955 Norway in which it was first a "presupposition" that commercial banks hold government debt. This general "presupposition" later evolved into explicit requirements.*

Clarification 88. *For the same reasons as for the Question on aggregate credit ceilings (see Clarification 65), we code this Question as "0" also when the imposition of regulations on government debt holding is part of a Central Bank's monetary policy toolkit but simply not used at a certain point in time due to benign macro-financial conditions. This is only relevant in Belgium where regulations on government debt holdings were used on an on-off basis, that is as an actively used monetary policy instrument.*

C Narrative Accounts of Exogenous Events

C.1 Australian Liberalization 1984: Lifting of Barriers Between Trading and Merchant Banks and Abolition of Domestic Bank Entry Restrictions

In 1984, Australia lifted barriers between trading and merchant banks and abolished domestic bank entry restrictions (see our *Historical accounts of financial regulation* for more details).

These reforms traced to the Campbell Committee. In January 1979, the Fraser Government established the Campbell Committee to conduct a thorough inquiry into Australia's financial system (Berg, 2016). Such an inquiry "had been on the political drawing board for many years"; Malcolm Fraser had pledged a comprehensive examination of the Australian capital market and the availability of finance during the 1975 election (Berg, 2016). The committee's formation was driven by a recognition of the need for structural reform to modernize the financial sector, not a reaction to immediate economic conditions: Fraser's initial "interest in a capital market inquiry was driven by a narrow interest in small business finance" (Berg, 2016). "This motivation, rather than general concern about the efficiency of the financial sector, fits the historical record." (Berg, 2016) Crucially, "Neither the Treasury nor the Reserve Bank was keen on the idea of a full-scale enquiry into the financial system and worried about where it might lead. Prime Minister Fraser did want an enquiry but was not an advocate of large-scale financial deregulation; which is what the Campbell Committee ended up endorsing." (Bell, 2004)

The Campbell Committee conducted an extensive review over several years, culminating in its final report in November 1981 (Berg, 2016). "[W]hile pressures on the financial system explain the need for reform, they do not explain the shape of the inquiry" (Berg, 2016).

Although the Campbell Committee reported its findings in 1981, the liberalization measures were only implemented under the subsequent Hawke Government, which took office in 1983. This raises the question of why the recommendations were not immediately implemented under the Fraser government. Explanations range from Fraser's general reluctance to inertia in the treasurer's office (Berg, 2016).

The recommendations of the Campbell Report, which were not the outcome envisioned by policymakers as explained above, "were adopted almost in their entirety by the Hawke government" (Berg, 2016). Crucially, the Hawke government's "spectacular style" of directly implementing the recommendations "was a volte-face for Labor, historically the party of deregulation" (Berg, 2016).

The nine-year span from Fraser's 1975 pledge to the 1984 reforms reflects careful deliberation, not a reactive adjustment to prevailing economic conditions.

C.2 Australian Regulation in 1988: Implementation of Basel I Capital Requirements

Australia implemented a capital adequacy rule for the first time in August 1988 (see our *Historical accounts of financial regulation* for more details). More precisely, Australia adopted "a variant on the Basle International risk-based capital adequacy ratios" (Thomson and Abbott, 1998). Importantly, "[t]he new guidelines are consistent in all substantial respects with the framework agreed during July 1988 by the Basle Supervisors' Committee of the Bank for International Settlements and endorsed by the Fifth International Conference of Banking Supervisors, in which the Bank participated." (Reserve Bank of Australia, 1989)

Basel I was an international agreement under the Basel Committee on Banking Supervision to standardize global banking regulations; Australia's adoption was an obligation to align with international standards, not a response to domestic macroeconomic conditions.

C.3 Belgian Liberalization in 1993: Repeal of 1934–35 Law separating Commercial and Investment Banking

In 1993 Belgium formally abolished the prohibition on universal banking (see our *Historical accounts of financial regulation* for more details).

The initial separation between commercial and investment banking in Belgium was introduced through legislation passed in 1934 and 1935, in the wake of the Great Depression (see our *Historical accounts of financial regulation* for more details). These reforms closely mirrored the U.S. Glass-Steagall Act and were driven by a crisis-era belief that universal banking had contributed to systemic risk (Buyst, 2008). However, by the early 1990s, this belief had fallen out of favor in much of continental Europe, where universal banking had remained the norm as documented in the historical accounts above. As a result, Belgium's legal separation had become increasingly anomalous. This clear-cut Glass–Steagall-like separation had been unique in the European Community by 1992 (Chrystal and Coughlin, 1992).[23]

The decisive factor behind the 1993 reform was Belgium's obligation to comply with the European Community's Second Banking Directive (89/646/EEC), which was implemented across EC states and required member states to ensure the mutual recognition of banking licenses and allow banks to offer a full range of financial services across EU borders (Llewellyn, 1992; Molyneux, 1996; Vander Vennet, 2002). The Directive did not mandate universal banking per se but presupposed that banks would be able to offer a broad range of

[23] Italy gradually abolished barriers between commercial banks and investment banks between 1990 and 1993 (see our *Historical accounts of financial regulation* for more details).

financial services (Llewellyn, 1992; Molyneux, 1996; Vander Vennet, 2002). Belgium, as the only EC country at the time still maintaining a formal legal separation of commercial and investment banking, was effectively required to abolish the outdated distinction to remain compliant with EU law. The 1993 repeal was thus not an autonomous macroeconomic policy decision but an externally mandated legislative change driven by supranational legal harmonization.

C.4 Danish Liberalization in 1975: Liberalization of Foreign Bank Entry

Throughout the postwar period and into the early 1970s, Denmark, like the other three Nordic countries, maintained restrictive policies that effectively prohibited the establishment of foreign banks in the post-WWII decades (see our *Historical accounts of financial regulation* for more details).

The decisive turning point for Denmark was its accession to the European Economic Community in 1973. The first enlargement of the EEC in 1973, which included Denmark, Ireland, and the UK, was driven by geopolitical and trade-policy factors, not by country-specific macroeconomic conditions or banking sector concerns (Schramm, 2025). Denmark's application was contingent on the UK's entry: Denmark had close trade ties with the UK which it could not afford to lose (Dinan, 2014; Schramm, 2025). Conversely, the other three Nordic countries were constrained by neutrality and ideology. Euroskepticism and national identity led Norwegians to vote against EC membership (Dinan, 2014; Schramm, 2025). Membership for Finland and Sweden was blocked "because the Soviet Union would have considered such an enlargement an undesirable threat to the balance of power in the geographical center of Europe." (Schramm, 2025)

The EEC required compliance with the principles of the Treaty of Rome, particularly the free movement of capital and the freedom of establishment (Articles 52–58). Specifically, the 1973 EEC directive on banking coordination (First Banking Directive, 77/780/EEC) mandated that member states remove discriminatory barriers against foreign banks operating within the Community, which Denmark implemented in January 1975 (US Department of the Treasury, 1979; Tschoegl, 1980; Abildgren, 2010). The other three Nordic countries, which did not join the EEC in the 1970s, did not liberalize foreign bank entry (see our *Historical accounts of financial regulation* for more details).

Denmark's 1975 liberalization thus reflected external legal obligations under EEC accession (itself the outcome of political rather than macroeconomic conditions), rather than any domestic financial development.

C.5 German Liberalization in 1957: Removal of all Restrictions on Capital Exports by Residents

In the autumn of 1957, West Germany abolished all remaining controls on outward capital investments and transfers (see our *Historical accounts of financial regulation* for more details).

The German liberalization of its capital account was strategic, planned, and gradual and motivated by the following three factors.

1. Harmonization with OEEC and EPU Objectives A primary driver of West Germany's phased liberalization was the goal of harmonizing with the broader European recovery framework established under the Organization for European Economic Cooperation (OEEC) and the European Payments Union (EPU). The OEEC had since 1949 pressed members to move toward currency convertibility (Schmieding, 1987). West Germany eagerly participated in these collective efforts and often liberalized trade faster than other countries (Holtfrerich, 1999) in order to become a "pioneer of European liberalization" (Giersch et al., 1992).

Crucially, West German policymakers synchronized their currency and payments policies with the EPU, the multilateral clearing mechanism that from 1950 allowed European countries to settle trade balances in a collective unit (Schmieding, 1987). The EPU's rules focused on current-account convertibility while permitting capital controls during the transition (Schmieding, 1987). The Bank deutscher Länder and the Economics Ministry coordinated closely with OEEC/EPU bodies, treating European multilateral cooperation as paramount. For example, when Erhard in 1952 advocated complete currency convertibility, the BdL resisted, arguing that European cooperation, i.e., maintaining the EPU and ongoing step-by-step liberalization within the OEEC, was more important (Dickhaus, 1995).

West Germany's final removal of capital controls in 1957 was timed to align with the end-game of the EPU. Konrad Adenauer's government had earlier declared it would only declare the Deutsche Mark convertible in concert with its European partners by avoiding any "unfriendly act" of rushing ahead without the other European countries (Dickhaus, 1995). West Germany's 1957 capital account liberalization was thus a synchronized move that anticipated the multilateral return to currency convertibility that occurred in December 1958 when the EPU was replaced by the European Monetary Agreement.

2. Signaling Leadership in the Liberal Western Bloc Eliminating the last capital controls in 1957 also served to showcase West Germany's leadership in the Western bloc during the Cold War. Economically and symbolically, the Federal Republic was keen to prove that it had become a model liberal market economy at the forefront of the free world. Germany's

proactive liberalization was therefore in part an effort to establish its status as "a respected member of the Western world" (Giersch et al., 1992).

3. Erhard's Strategy for Deutsche Mark Confidence and Integration The 1957 liberalization also reflected Ludwig Erhard's long-term economic strategy to solidify the Deutsche Mark's credibility and anchor West Germany in European economic integration. Erhard had consistently advocated for removing distortions and controls in order to achieve "free convertibility of the currency. Convertibility of the currency, of course, includes complete freedom of movement of goods, services and capital." (Erhard, 2011) From as early as the early 1950s, Erhard pressed for abolishing foreign exchange controls in Europe (Dickhaus, 1995).

Conclusion The 1957 liberalization did not occur in isolation. It followed a carefully sequenced set of steps: currency reform (1948), trade liberalization under the EPU (early 1950s), removal of import licensing and quotas (mid-1950s), and repeal of exchange controls on current account transactions. The final step was anticipated and preannounced, reflecting a deliberate long-term strategy rather than a reaction to short-term economic conditions.

C.6 German Liberalization in 1958: Abolition of the "Bedürfnisprüfung" (Branch Licensing Requirement)

The "Bedürfnisprüfung" (requirement to demonstrate economic need) was a regulatory requirement in postwar West Germany that made the establishment of new business branches contingent on proving a need for such a branch in the given area (see our *Historical accounts of financial regulation* for more details).

The abolition of the "Bedürfnisprüfung" was not triggered by policymakers but by landmark court decisions in 1958. The trigger for these court decisions had nothing to do with the banking system. The pivotal event was the Federal Constitutional Court's "Apothekenurteil" (pharmacy ruling) on June 11, 1958 (BVerfG, 1958). In this ruling, the court declared Article 3, Section 1 of the Bavarian Pharmacy Act, which required a need-based assessment for new pharmacy licenses, unconstitutional (BVerfG, 1958). Shortly afterward, on July 10, 1958, the Federal Administrative Court ruled in a case from Reutlingen that denying a new bank branch license solely due to lack of economic need was likewise unconstitutional (BVerwG, 1958). The court affirmed that the refusal of a license solely on the grounds of insufficient general economic need violated professional freedom (BVerwG, 1958). These judicial decisions effectively invalidated the "Bedürfnisprüfung". Licensing

authorities could no longer deny business applications simply because existing competitors were already serving the area or because no additional need was demonstrated.

The abolition came not through financial legislation but through judicial review of a pharmacy licensing law, a development entirely unrelated to banking sector conditions.

C.7 German Liberalization in 1967: Nationwide liberalization of Deposit Interest Rates

In 1967, Germany lifted its remaining controls on bank deposit interest rates (see our *Historical accounts of financial regulation* for more details). The reform was the culmination of a structural shift driven by postwar ordoliberal competition principles, not a response to current macroeconomic conditions.

On a high level, postwar West Germany's ordoliberal doctrine enshrined competitive markets as the foundation of the 'social market economy'. Erhard, in turn, noted: "[t]he social market economy obliges me to focus my attention on, and to declare war against, all efforts to form cartels and against those aiming at a limitation of competition of whatever kind." (Erhard, 2011) By the 1960s, there was a mounting sense in policy circles that administratively fixed deposit rates could no longer be reconciled with West Germany's postwar competition laws and principles (Der Spiegel, 1967; Bundeskartellamt, 1968).

The German authorities' own statements and economic analyses show that freeing interest rates, which had been regulated for 35 years, was motivated by long-term efficiency and competition considerations (Bundeskartellamt, 1968). Contemporary evidence does not relate the liberalization to any macro-financial dynamics (Bundeskartellamt, 1968). In fact, an OECD Survey from 1965, when partial interest deregulation began (see our *Historical accounts of financial regulation* for more details), explicitly noted that changes to deposit rate rules were "not primarily to tighten monetary conditions" but "to bring various bank deposit rates into closer touch with Bank rate" (OECD, 1965). Furthermore, "Controls on bank deposit and lending rates were ultimately seen by the German government as inefficient and impractical to administer" (Mullin, 2021).

C.8 Irish Liberalization in 1992: Full liberalization of Capital Movements (EU Single Market Compliance)

The main determinant for Ireland's 1992 capital account liberalization was the framework of European integration, particularly the European Community (EC) policies and legal obligations that Ireland had to fulfill.

From 1983 on, "Freedom of cross-border capital flows became a *sine qua non* for European monetary integration" (Bakker, 2019). In 1986, the EC (of which Ireland had been a member since 1973) agreed to complete the Single European Market by 1993, including the free movement of goods, services, people, and crucially capital (Bublitz, 2018). "In June 1988 the EC Council of Ministers adopted the Commission's proposals for complete liberalization of all capital transactions by no later than end-1992" (Sevilla, 1995). This decision (Council Directive 88/361/EEC of 24 June 1988) legally required member countries to abolish remaining exchange controls within a fixed timetable. Crucially, this timetable was exogenously set by the EC; it was a commitment Ireland had signed up to as part of its obligations under European law, rather than a deadline chosen by Irish policymakers based on domestic conditions. Ireland's government and central bank coordinated the dismantling of controls to meet the EC schedule "on schedule" (Kelly and Everett, 2004).

C.9 Italian Liberalization in 1962: Liberalization of Capital Movements per EEC Directive

Italy liberalized inward portfolio investments in 1962 (see our *Historical accounts of financial regulation* for more details).

This liberalization was a direct response to Italy's commitments as a founding member of the European Economic Community (EEC). The EEC Council adopted two key directives concerning capital flows: the First Capital Movements Directive of 11 May 1960, and a Second Directive on 18 December 1962, which together constituted the Community's program for capital account liberalization (Padoa-Schioppa, 1982). These supranational legal acts effectively required Italy (and the other members) to liberalize certain categories of capital flows on a specified schedule. Member states were "unconditionally obliged to fully liberalise" long-term and direct investment flows and many securities transactions, while only "conditional" or partial liberalization was required for certain other, more speculative short-term flows (Padoa-Schioppa, 1982). The Bank of Italy explicitly acknowledged that liberalization steps were taken to comply with EEC law.[24]

[24]Example: "With European currencies freely convertible for current transactions, further steps were taken also towards the liberalization of capital movements. Italy has now given effect to the directive of the Council of the European Economic Community which is designed to liberalize capital movements among the member countries in accordance with Articles 5 and 67 of the Rome Treaty. In September 1960 general authorization was given for all capital movements indicated in Article 1 of the directive, and in February 1961 a Ministerial Decree authorized special medium- and long-term credit institutes and finance companies in Italy to hold foreign securities, as provided by Article 2 of the directive." (Bank of Italy Annual Report 1960, p. 33–34)

C.10 Italian Liberalization in 1990: Abolition of "Economic Needs" Test for Banking Licenses (Opening to New Entrants)

The Banking Laws of 1936 and 1938 imposed tight restrictions on domestic bank entry, including a discretionary needs test, which remained in place in the post-WWII decades (see our *Historical accounts of financial regulation* for more details).

An EEC Directive that was supposed to harmonize access to banking activities had been issued in 1977 (see our *Historical accounts of financial regulation* for more details). However, Italy postponed the full implementation of the Directive until end-1989 (see our *Historical accounts of financial regulation* for more details), which was the deadline for implementing the EEC directive (of Italy, 1989). 1990 was then the first year from which banks were authorized based on the new objective criteria (see our *Historical accounts of financial regulation* for more details).

C.11 Italian Liberalization in 1992: Liberalization of Entry for Foreign Banks

Italy implemented the European Second Banking Directive in December 1992 which liberalized the entry for foreign banks (see our *Historical accounts of financial regulation* for more details).

European integration was the primary driver of Italy's 1992 policy. As already noted above, in the mid-1980s, the EC started its plan to create a Single Market by 1992. This included a single market for financial services; EC directives mandated member states to eliminate barriers to the freedom of establishment and cross-border provision of banking services by the end of 1992 (Dini, 1989; Tarantola, 2009). Hence, Italy's liberalization was compelled by its obligation to implement the Second Banking Directive (Dini, 1989).

C.12 Japanese Regulation in 1949: Abolition of Universal Banking

Authorities separated commercial banking and investment banking during the US occupation in 1949 through Article 65 of the Japanese Securities and Exchange Law (Cargill and Todd, 1993).

"Article 65 creates a division between securities and banking business similar to that created by Glass-Steagall." (Cargill and Todd, 1993) Crucially, "Article 65 was proposed by Occupation authorities" (Cargill and Todd, 1993). "Given the Occupation authorities' general belief that what was good for America was also good for Japan, this may be all that Article 65 was intended to achieve." (Cargill and Todd, 1993) The separation thus had

"origins traceable directly to comparable provisions in the U.S." (Brown, 1993).

The 1949 separation of commercial and investment banking in Japan was an externally imposed, ideologically driven regulatory intervention by U.S. occupation authorities.

C.13 Japanese Regulation in 1993: Commitment to Basel I Capital Standards

We document in our *Historical accounts of financial regulation* that "[t]he Basle Accord raised the capital standard to 8% and it was to be met by March 1993." (Kim et al., 2007) The "[t]wo fundamental objectives" of the Basel Accord were "to strengthen the soundness and stability of the international banking system" and to "have a high degree of consistency in its application to banks in different countries" (Basel Committee on Banking Supervision, 1988). The Basel Committee's effort was explicitly about international regulatory convergence, not any individual country's immediate circumstances. After the Basel Accord was finalized in 1988, Japanese regulators moved to implement it on the internationally agreed schedule. In December 1988, Japan formally decided that its banks must comply with the 8% capital adequacy ratio by the end of fiscal 1992, aligning with the Basel Committee's timeline for G-10 countries (Montgomery, 2005). The long phase-in reflects an anticipatory policy commitment rather than an urgent domestic intervention.

Japanese regulators explicitly allowed banks with purely domestic business to continue adhering to a lower 4% capital ratio (the existing domestic standard) instead of the 8% rule (Montgomery, 2005). This asymmetric implementation reflects that Japan's motivation was international compliance rather than domestic financial concerns.

C.14 Portuguese Regulation in 1991: Introduction of Capital Adequacy Rules

In 1991, Portugal implemented the EU Solvency Ratio Directive (89/647/EEC), which introduced capital adequacy standards (see our *Historical accounts of financial regulation* for more details). The EC explicitly noted that the solvency directive "[t]he Directive broadly reflects the agreement reached by the Group of Ten in Basle in July 1988" (General Secretariat of the Council of the European Communities, 1990). The solvency directive required member states to put the necessary regulations in place so that banks would meet the 8% capital ratio by 1 January 1993 (89/647/EEC). Portugal's gradual implementation of this solvency directive, which started on December 31, 1990 and ended on December 31, 1992 (see our *Historical accounts of financial regulation* for more details), was a direct response to the EC directive's allowance for transition subject to its deadline.

The timelines of some other EC countries were virtually identical (see our *Historical accounts of financial regulation* and Salas and Saurina (2003) for more details). Portugal's case was no exception. This simultaneity across Europe shows that Portugal's 1991 adoption of the solvency rule was exogenously mandated by European integration authorities, which in turn were heavily influenced by the Group of Ten Basel Agreement.

C.15 Portuguese Liberalization in 1992: Full liberalization of Capital Flows and Foreign Bank Branching

Portugal's reforms of 1992, especially the removal of all remaining capital controls and the authorization of foreign bank branching (see our *Historical accounts of financial regulation* for more details), were enacted as part of Portugal's scheduled compliance with the European Community's Single Market program. These policy changes fulfilled legal obligations under key EC directives and the accession agreements.

Portugal's accession to the EC in 1986 set the stage for a broad program of financial liberalization. Accession terms and EC commitments required Portugal to eliminate capital controls and open its financial market in line with the evolving Single Market rules. Indeed, "accession to the EC in 1986 marked the beginning of a programme of capital account liberalisation [...] with a timetable agreed at the time of Portugal's accession and revised in 1988 (Directive 88/361/EEC of 24th July 1988)." (Pinto, 1996) "After becoming members of the EU in [...] 1986 (Portugal and Spain), the countries retained controls on capital flows up to 1992" under the transitional arrangements of EC law (Buch et al., 1998).

In parallel, Portugal liberalized foreign bank branching in direct response to the Second Banking Coordination Directive (89/646/EEC). The Directive, which had to be implemented by all member states by 1 January 1993, was adopted by the EC in 1989 and opened national banking markets, including Portugal's, to intra-EU competition.

Importantly, Portugal's request for membership in the EC in 1977, "only three years after the overturn of the *Estado Novo*" (Cunha, 2015), and its ultimate decision to join the EC in 1986 was "primarily a political choice" tied to the country's democratic rebirth and strategic reorientation after 1974 (Commission of the European Communities, 1979). After the revolution, the first free elections in 50 years were held in 1975 to draft a new constitution, and by mid-1976 Portugal had an elected parliament, president, and government (CVCE, 2016). Directly afterwards, "Portugal's accession to the European Communities then became a government-set target. Various meetings took place, and the President of the EEC visited Portugal. On 29 November 1976, the Portuguese Parliament authorised the Portuguese Government to apply for Portugal to accede to the European Communities." (CVCE, 2016) In other words, "[a]mongst the reasons that supported the accession request one stands

out: democratic consolidation. Indeed, several authors point out the establishment and/or consolidation of democracy as a reason for presenting the EEC membership request." (Cunha, 2015)

C.16 Spanish Liberalization in 1992: Final Removal of all remaining Currency and Capital Controls

In 1992 Spain abolished virtually all remaining currency and capital controls (see our *Historical accounts of financial regulation* for more details). Spain's reforms of 1992 had similar motivations as Portugal's reforms of 1992 outlined above. As in Portugal, liberalizations in Spain were enacted as part of its scheduled compliance with the European Community's Single Market program. Spain joined the EEC in 1986 and the removal of its currency and capital controls was part of legal obligations under key EC directives and the accession agreements. The EC's commitment to capital mobility was codified in Council Directive 88/361/EEC of 24 June 1988. "After becoming members of the EU in [...] 1986 (Portugal and Spain), the countries retained controls on capital flows up to 1992" (Buch et al., 1998). "In 1992, EEC Council Directive No. 88/361/CEE became effective in Spain (Royal Decree 1816/1991)" under the transitional arrangements of EC law (Carbonell and Werner, 2018).

Importantly, as in Portugal (see above), "[i]n requesting accession to the Community, Spain [...] made what is primarily a political choice, reflecting the concern [...] for their own consolidation" (Commission of the European Communities, 1979). After the death of General Franco in 1975, Spain underwent a democratic transition with the goal of reintegrating into the Western democratic community. Spain's new democratic government under Prime Minister Adolfo Suárez officially applied for EC membership on 26 July 1977, just one month after the first free elections. This timing reflects how EC accession was conceived as a natural extension of democratization. Suárez emphasized that after decades of authoritarian isolation, Spain belonged culturally and politically to Western Europe.[25] For the majority of Spaniards, "Spain's entry into Europe was identified with its adherence to the ideals of freedom, progress and democracy." (Márquez, 1985) "It was thus widely accepted that the democratizing process would be incomplete until it had been formally sanctioned by Brussels, while Spain's continued exclusion from the EC would represent an insult to national pride as well as a negation of democratic credibility." (Powell, 2001)

[25] "The idea of Europe has often served in the history of Spain as a reference mark: to reject it has been a sign of political incapacity and impotence; to affirm it, a stroke of imagination and an act of faith in the future. Europe was believed in because it constituted the best example of the ideals of democracy and freedom. Europe was thought of, in the last analysis, not as an abstract aspiration, but as if it were a programme of the utmost political urgency." (Suárez, 1979)

C.17 Spanish Liberalization in 1993: Liberalization of Foreign Bank Entry

Spain's 1986 EC Accession was a political and deeply ideological decision (see our *Historical accounts of financial regulation* for more details). Spain's 1993 liberalization of foreign bank entry was another reform compelled by EC legal obligations. Specifically, "Spain's entry into the EEC begins a seven year transition period during which time the Spanish regulatory authorities will gradually repeal the discriminatory regulations of Royal Decree 1388 vis-à-vis banks from other member countries of the EEC. By 1992 these banks should be legally allowed to operate as many branches as an indigenous Spanish bank." (US Department of the Treasury (1986); also see OECD (1988, 1991)) The seven year transition ended precisely as anticipated by US Department of the Treasury in 1986; by end-1992, foreign bank entry was liberalized such that foreign banks could freely enter Spain from 1993 onwards.

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