

A Taxonomy of Financial Crises:

And How It Can Explain the Puzzling Persistence of Financial Crises

Charles W. Calomiris and Matthew Jaremski

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Financial Crises Are Costly

- Crisis defined as time when asset values decline sharply related to change in risk perception. Applies to all classes of assets (stocks, bonds, land, loans)
- If high pre-crisis period's risk is identifiably different from other times and avoidable, it appears not to be worth the enormous cost. (*Banking crises see declines of 5.5% of real GDP on average and output losses are even larger when that distress culminates into a full-scale crisis; the median fiscal costs associated with resolving distressed banks during crises are about 16% of GDP for the more than 100 banking crises that occurred around the world since 1980*).
- Is the risk of a crisis identifiably unique from other episodes? And if so, why aren't these risks avoided?

Some Existing Answers

- Minsky-Kindleberger view: Behaviorist theory based on oscillating fear and greed, producing endogenous cycles of high risk, followed by crisis, followed by low risk. Irrationality may explain why this is not avoided. **But...**
- Historical particularity view: All crises are different in some respects, so it may be hard to learn from past. **But...**
- Crisis prediction literature has identified some useful predictors of (1) banking crises (high loan growth, government protection); (2) exchange rate collapses or sovereign debt crises (unsustainable fiscal and monetary policies); and (3) stock collapses (returns extrapolation).
- Also, many crises have common narrative features (Mexico 1994 a replay of Chile 1983, Greece 2010 is a replay of East Asia 1997).
- **So why do we enact regulations and institutional rules of various kinds to prevent these recurring patterns?**

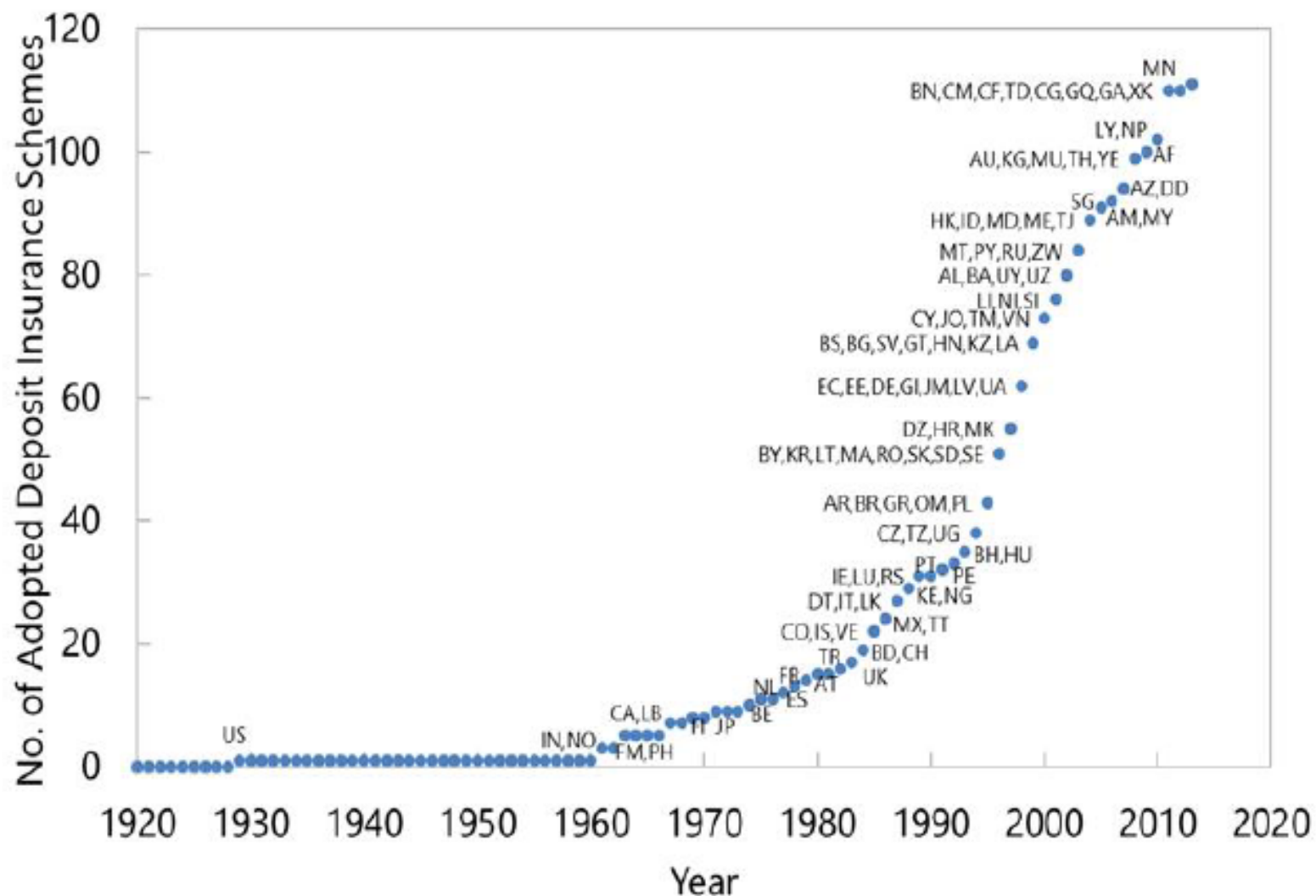
Adaptive Crises?

- Perhaps crises are actually part of an adaptive equilibrium. Crises may not be worth the risk if viewed in isolation, but perhaps *allowing crisis risk creates gains* (for someone, or possibly for everyone) that discourage society from enacting regulations that would prevent them.
 - **Domestic political economy** (Calomiris-Haber on the Game of Bank Bargains: design a fragile system may be the most effective way to get rents). **Mortgage risk subsidies; Dep Ins. (Figs 3, 2)**
 - **Geopolitics** (countries may take risks on purpose because of competitive pressures to catch up, where the cost of failing to catch up may be catastrophe for the state). **Early Modern Europe; EMs.**
 - **Learning/innovation advantages** (crisis-avoiding regulation may prevent socially beneficial innovation). Shares view that risks are at least sometimes new. **Florida in 1920s, stocks in 1920s .**
 - **Extent of risk may hard to see ex ante**, especially in a free, market-based society (**fraud** as magnifier that is very costly to prevent ex ante). **Florida in 1920s, banking crises. We like privacy.**
 - **Market economy/ fiat money** may create sudden shocks that sometimes contribute to crises, perhaps even predictably and wrongly, but which are part of beneficial system that may be hard to improve. **Monetary policy in 1929, 2002-2007. (Fig 1) Eichengreen on fixed exchange rate, and role of inflation in winning wars.**

Adaptive Crises? (Cont'd)

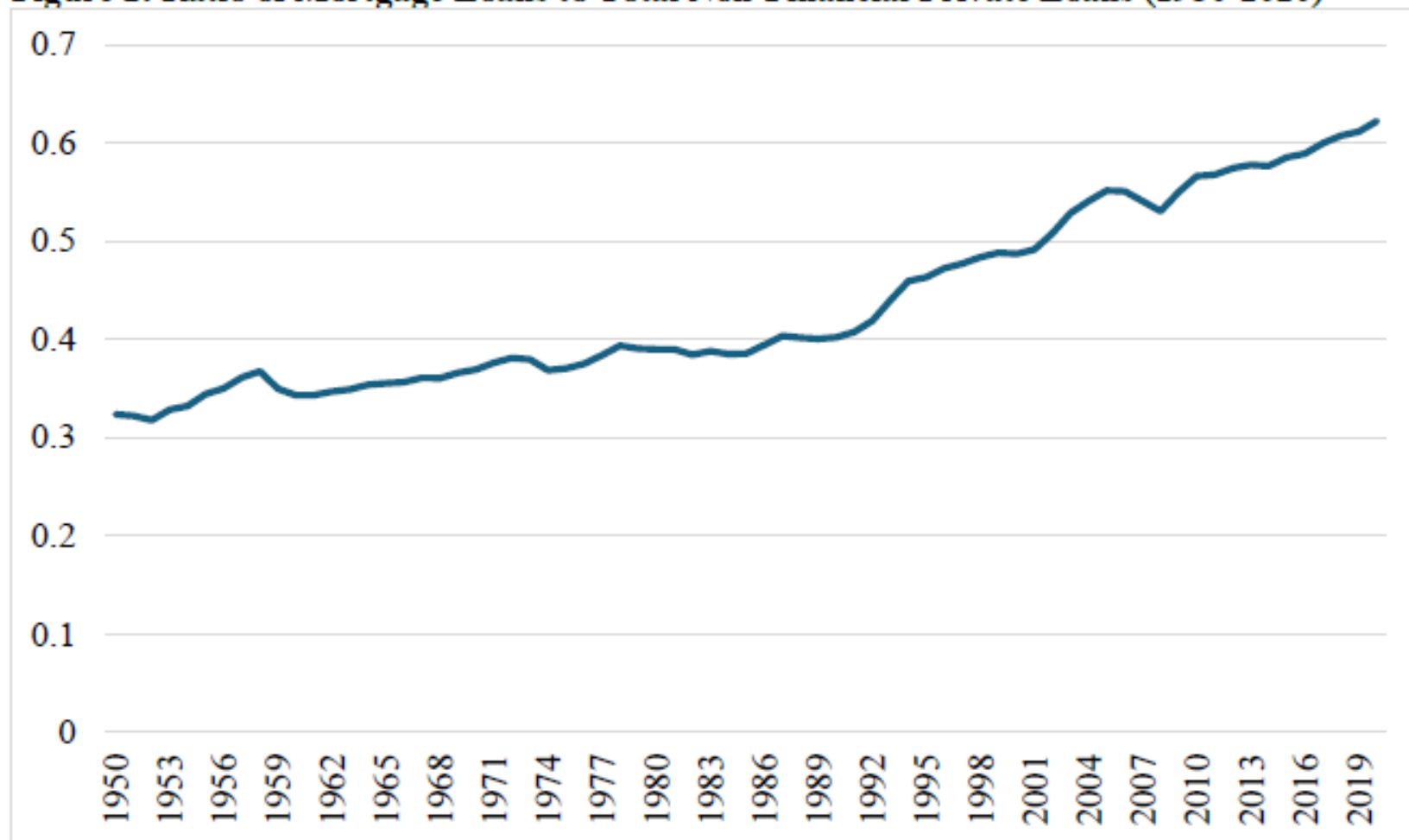
- Understanding why crises persist is akin to understanding what kind of society we have chosen to be.
- Choosing to have crisis risk is a window into who we are across many dimensions.
- The motto of this lecture might be “Know Thyself”.

Figure 3: Deposit insurance adoption (1920-2020)



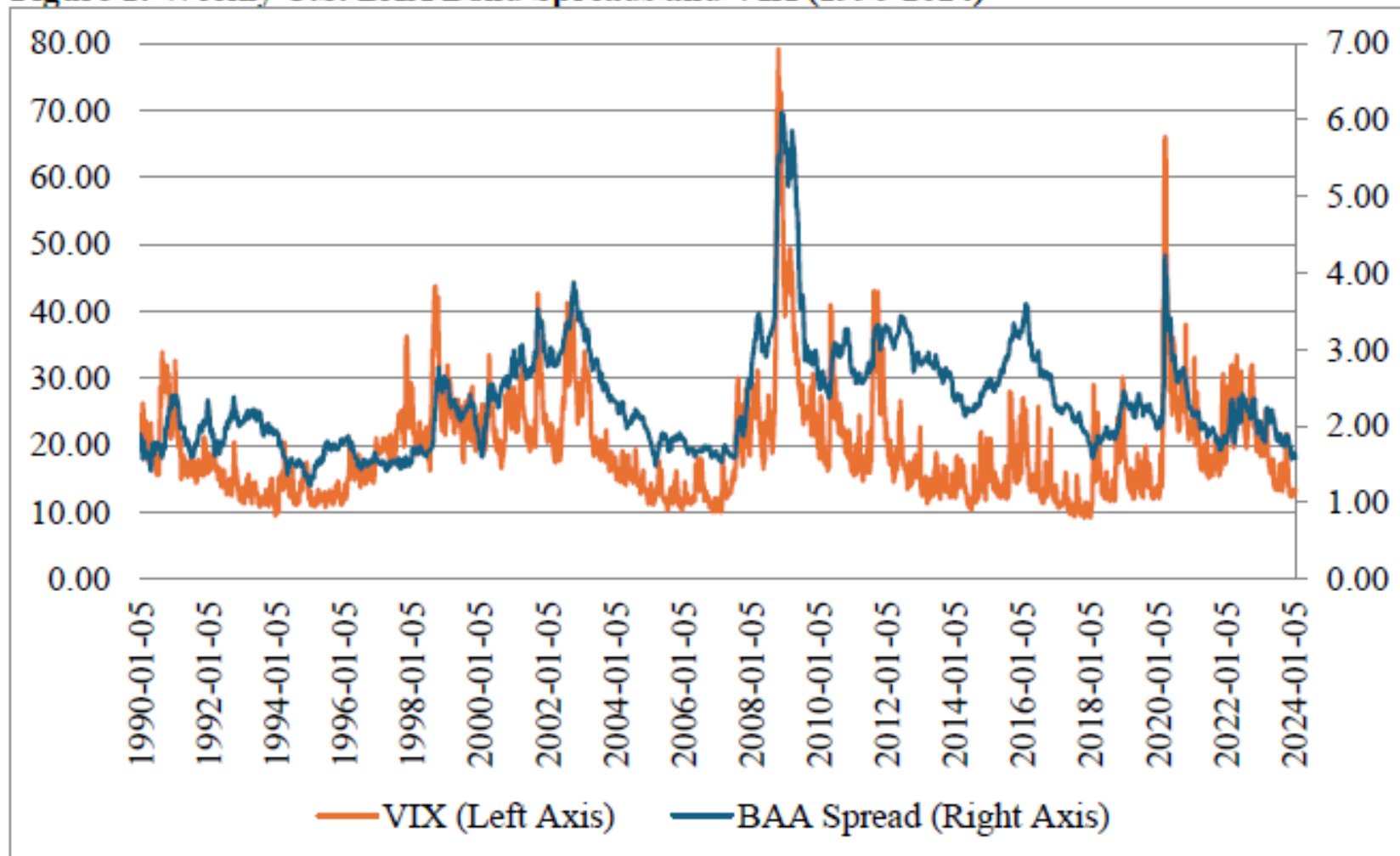
Notes: Figure plots the year of deposit insurance adoption by country. Taken from Calomiris and Chen (2020, Figure 1).

Figure 2: Ratio of Mortgage Loans to Total Non-Financial Private Loans (1950-2020)



Notes: Figure provides the average ratio of mortgage loans to non-financial private sector to total loans to non-financial private sector for the 18 countries contained in Jorda et al. (2015).

Figure 1: Weekly U.S. BAA Bond Spreads and VIX (1990-2024)



Notes: Figure provides Moody's Seasoned Baa Corporate Bond Yield Relative to Yield on 10-Year Treasury Constant Maturity and CBOE Volatility Index. Data taken from St Louis Fed and Chicago Board Options Exchange. Information provides for end of each week.

A Taxonomic Approach

- This list suggests *both persistent variety and similarity* across time.
- Perhaps there's a small number of contributing influences, and crises are not all the same, but subsets of them share (one or more) commonalities related to the above list.
- Framework is illustrated in this paper by ten crises, picked based on our historical knowledge to span important categories of influences (we mention additional crises that are similar to each of the 10 we choose). (Our book will contain about 35 crises.)
- We ask a common set of narrative questions that organize our case studies, from which we build a taxonomy (Fig 4).
- We include all types of asset classes in our review of crises because influences are often not asset-specific.

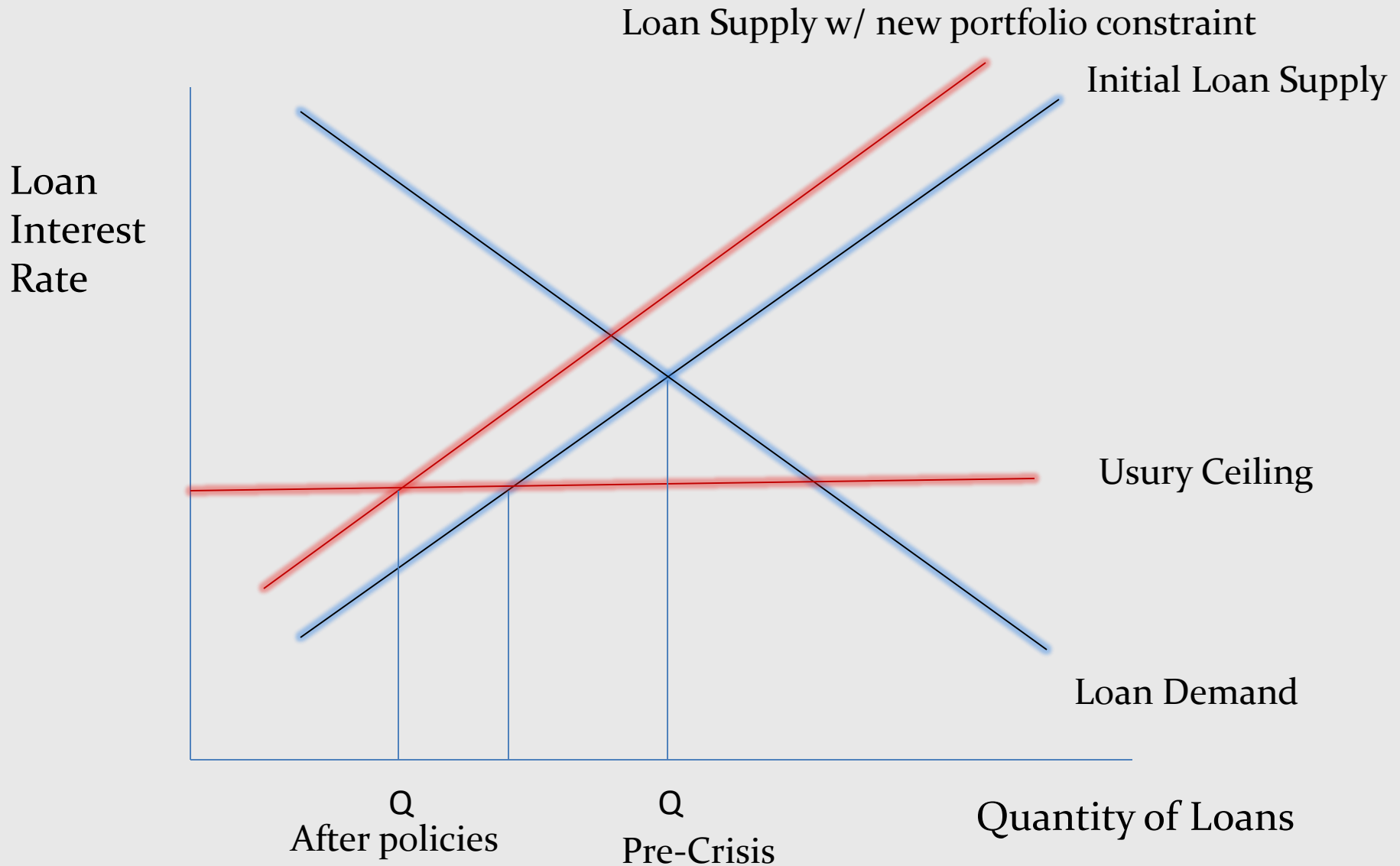
Table 1: Summary Characteristics of 10 Financial Panics

	Panic of AD 33	Mississippi Bubble	South Sea Bubble	Florida Land Boom	US Stock Crash of 1929	Great Depression Bank Crises	Mexican Crisis	Korean Crisis	Spanish Crisis	US Subprime Crisis
Period	Early Roman Empire	1720s	1720s	1920s	1920s	1930s	1994-1995	1997-1998	2008	2008
Initial Affected Markets	Bank Credit/ Italian Land	Sov. Debt/ Stocks/ Currency	Sov. Debt/ Stocks	Florida Land/ Banks	Stocks	Banks	Banks/ Currency	Banks/ Currency	Spanish Land/ Mortgages	US Land/ Mortgages
Political Environment	Preserving Imp Expansion	Global Early Modern Comp	Global Early Modern Comp	US 20th C. Democracy	US 20th C. Democracy	US 20th C. Democracy	PRI Dominance	Crony Capitalism	EU and ECB Formation	US 20th C. Democracy
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Collapse Predictable Pre-Crisis?	No	Yes	Yes	Unclear	Unclear	No	Yes	Yes	Yes	Yes
Prior "Excess Price Boom"?	No	Yes	Yes	Yes	Unclear	No	No	No	Yes	Yes
Political Risk Subsidies?	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes
Preference, Interest rate, Risk shifts?	No	No	No	No	Yes	Yes	No	No	Yes	Yes
Learning about new markets?	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes
Endogenous fraud?	No	Yes	No	Yes	No	No	Yes	Yes	No	Yes

Roman Bank Panic of AD 33

- Roman lending occurred both through deposit banks and money lenders, where the latter was dominated by the political elite. Lending was regulated for political purposes.
- By the time of Julius Caesar, two elements of lending regulation favored the elite (**perhaps to ensure political stability of an expanding empire**): a usury ceiling on loans (which varied over time and by loan type), and a requirement that lenders hold a minimum fraction of their wealth in Italian land.
- Under Julius Caesar, abundant money and low interest, under Tiberius this was reversed and usury ceiling became binding. Some members of the elite (presumably borrowers) pressed to enforce the usury law.
- Collapse of credit and Italian land prices.
- To boost land prices, Senate tightened requirement on Italian land holding to 2/3 of lenders' wealth, but this furthered the decline in credit supply and land prices.
- Tiberius made 3-year loans to lenders at zero interest to end crisis.

Roman Credit Policy and the Panic of 33 AD



What Lessons Would One Expect To Learn?

- There was no repeat of the specific circumstances.
- But capital controls and usury laws are still used as political tools today. (**Political economy of usury laws**)
- And the concern about divisions emerging within the Empire as power becomes scattered was real, as subsequent history showed.

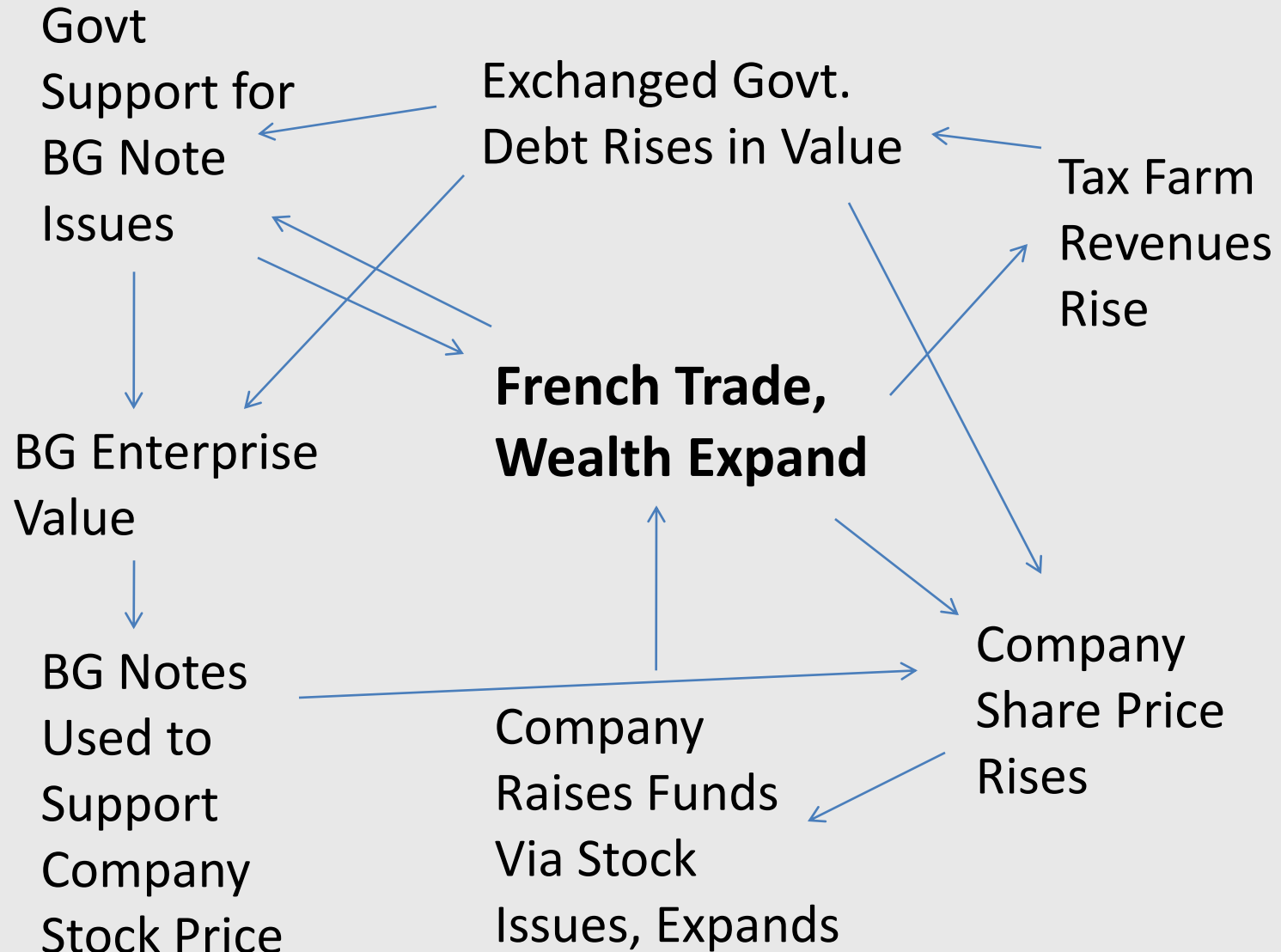
Rise of the Modern World

- Modern nations, vying over trade and territory, emerged c. 1600.
- The modern world reflected changes in technology of weapons, shipping, and navigation, which centralized national power.
- A new coalition of rulers and merchants formed to expand the territorial reach of the state. Trade routes expanded as the primary focus of trade shifted from the Mediterranean to the Atlantic Ocean.
- Important tools of conquest and trade expansion included new institutions guiding the mercantilist system: granting of monopoly rights, the chartering of privileged corporations funded by a wide range of investors, the issuance of new types of sovereign debt, and the chartering of banks.
- The period's financial crises were almost always the result of rising sovereign default risk or outright sovereign default, which was itself reflecting of new international competition (big navies and armies, big fiscal needs).
- Mississippi and South Sea Bubbles occurred in latecomer countries trying to catch up with incumbents.

Mississippi Bubble

- John Law was a colorful figure and a schemer, but his approach to using finance for nation building and economic development is not regarded as inherent wrong, just overdone.
- He created an entity that coordinated all the economic monopoly rights of government: colonial markets, tax collection, debt management, banking.
- System produced significant gains for the government, but abuse of monetary power and fraud led to unsustainable prices, ultimate collapse and discrediting of Law himself.

The Bootstrapping Economics Logic of Law's System



South Sea Bubble

- Glorious Revolution of 1688 begins a period of British war with France and others that will last till 1815.
- A key goal was to improve sovereign creditworthiness. Both the Bank of England (1694) and South Sea Co. (1711) did sovereign debt swaps that raised the value of sovereign debt by enhancing liquidity and credibility of the sovereign. One was controlled by Whigs, the other by Tories.
- The SSC had monopoly rights on trade with Spanish colonies in America in exchange for sharing trade profits with the Crown and swapping SSC shares for outstanding government notes. The swap granted the government a reduction in interest expenses and investors a share of profits of the company's trading agreements.
- War with Spain hurt the SSC, which then adopted a scheme to profit on sovereign debt speculation via various manipulations, which proved unsustainable.

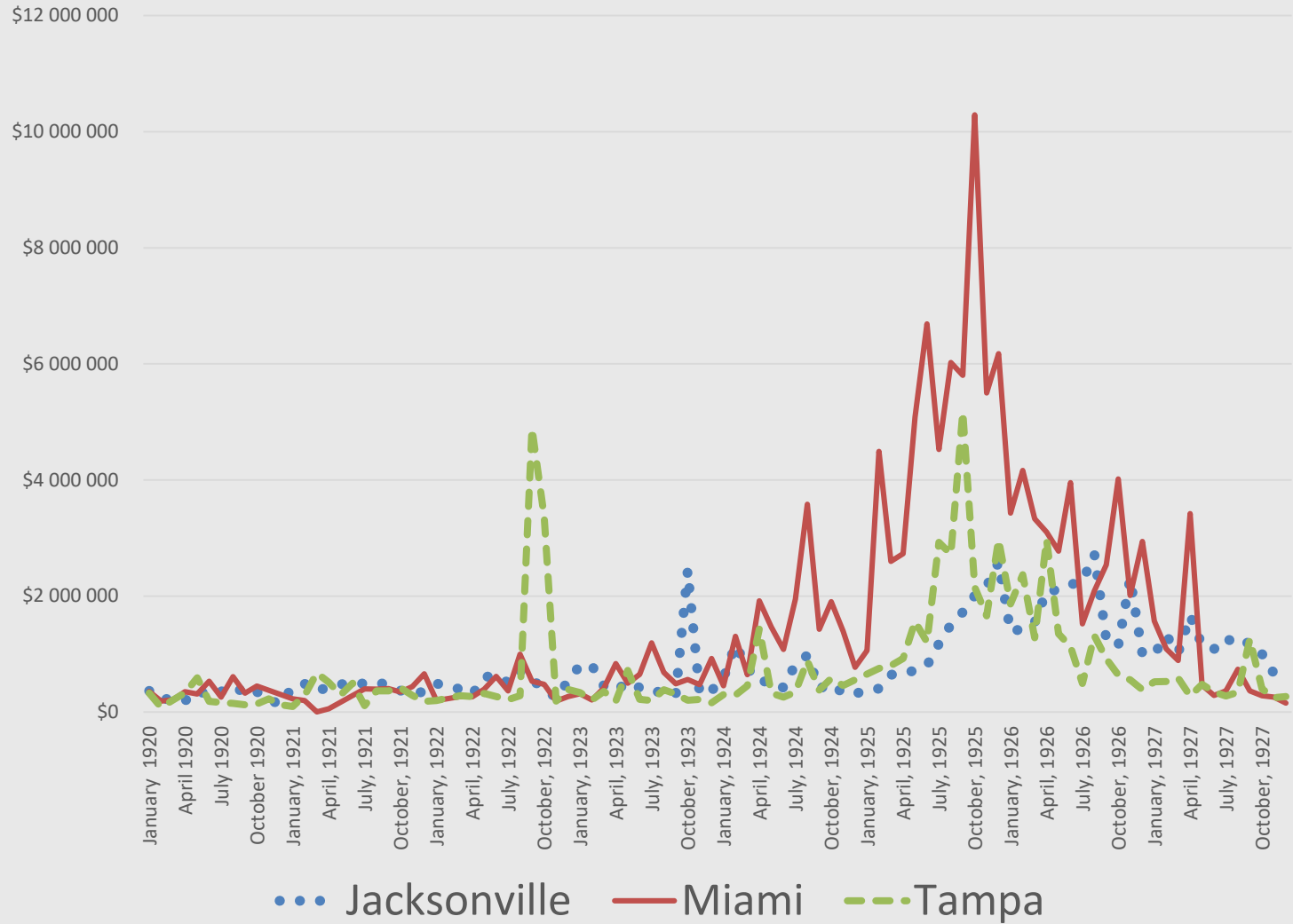
What Lessons Would One Expect To Learn?

- There was no repeat of the specifics. And there were regulations to limit risk going forward: in France an abandonment of banking as a development strategy for over two centuries; Bubble Act in Britain at the behest of the SSC during its decline (forbidding incorporation without Royal Charter). Were those smart? Probably adverse consequences for development.
- Sovereign defaults for LDCs and EMs reflect similarly risky strategies to propel growth quickly as part of the international competition among nations.

Florida Land Boom and Bust of 1920s

- Florida in the 1920s is the first national land boom, with people purchasing homes sometimes from long-distance based on advertisements and aggressive sales tactics based on sketches.
- Railroad boom and new technologies to access Florida and develop its land made it attractive to middle class.
- Lack of aggregation of data across developers and across locations limited market analysis.
- New technologies for creating usable land affected supply unpredictably, also made analysis difficult, given lack of experience with anything like this before.
- Bank funding through deposits was widespread, but bank failures were limited to banks with developer conflicts and regulatory corruption was important in allowing fraud.
- In general banks maintained conservative postures ex ante and losses were limited ex post.

Panel B: Monthly Building Permits By City

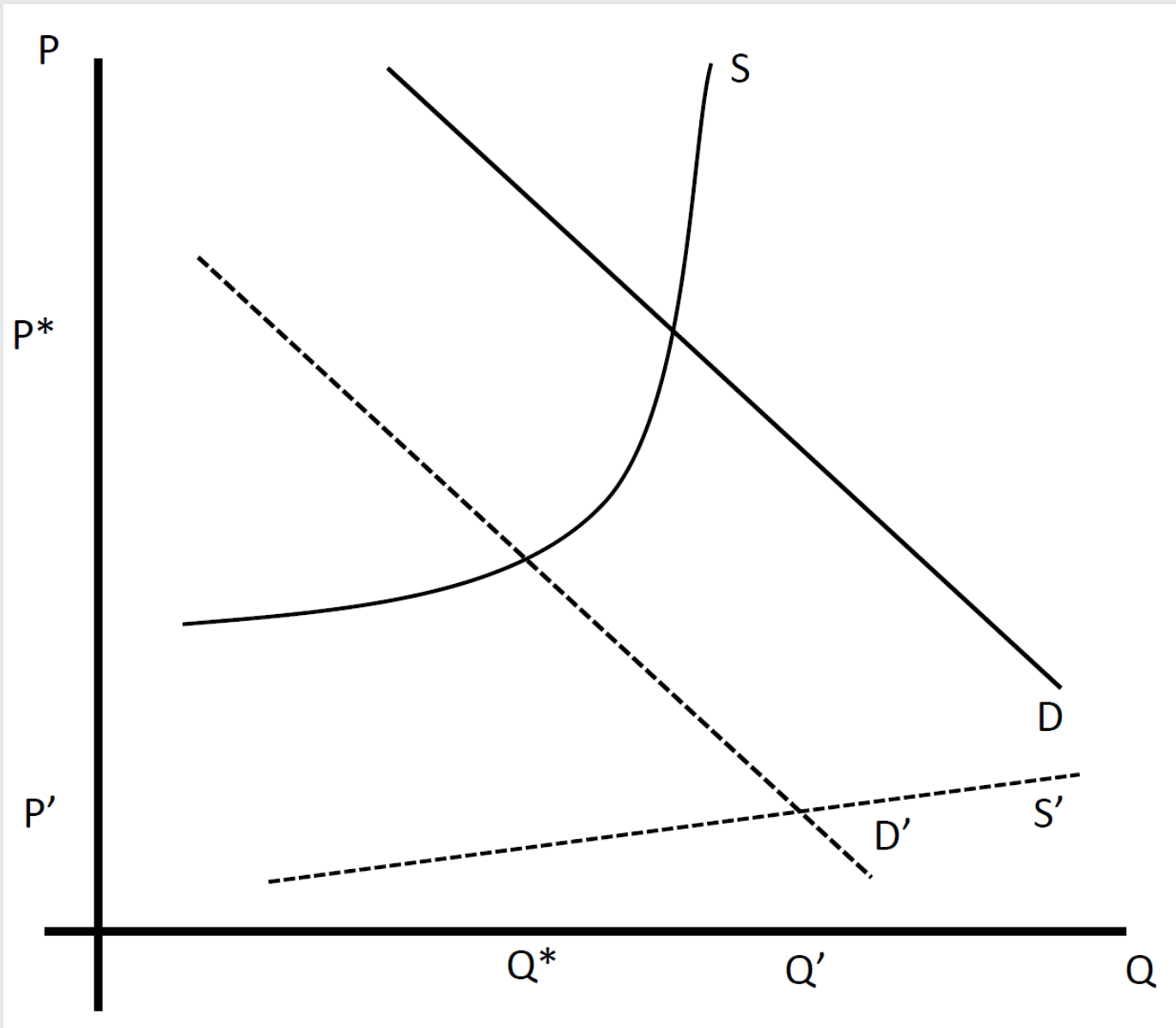




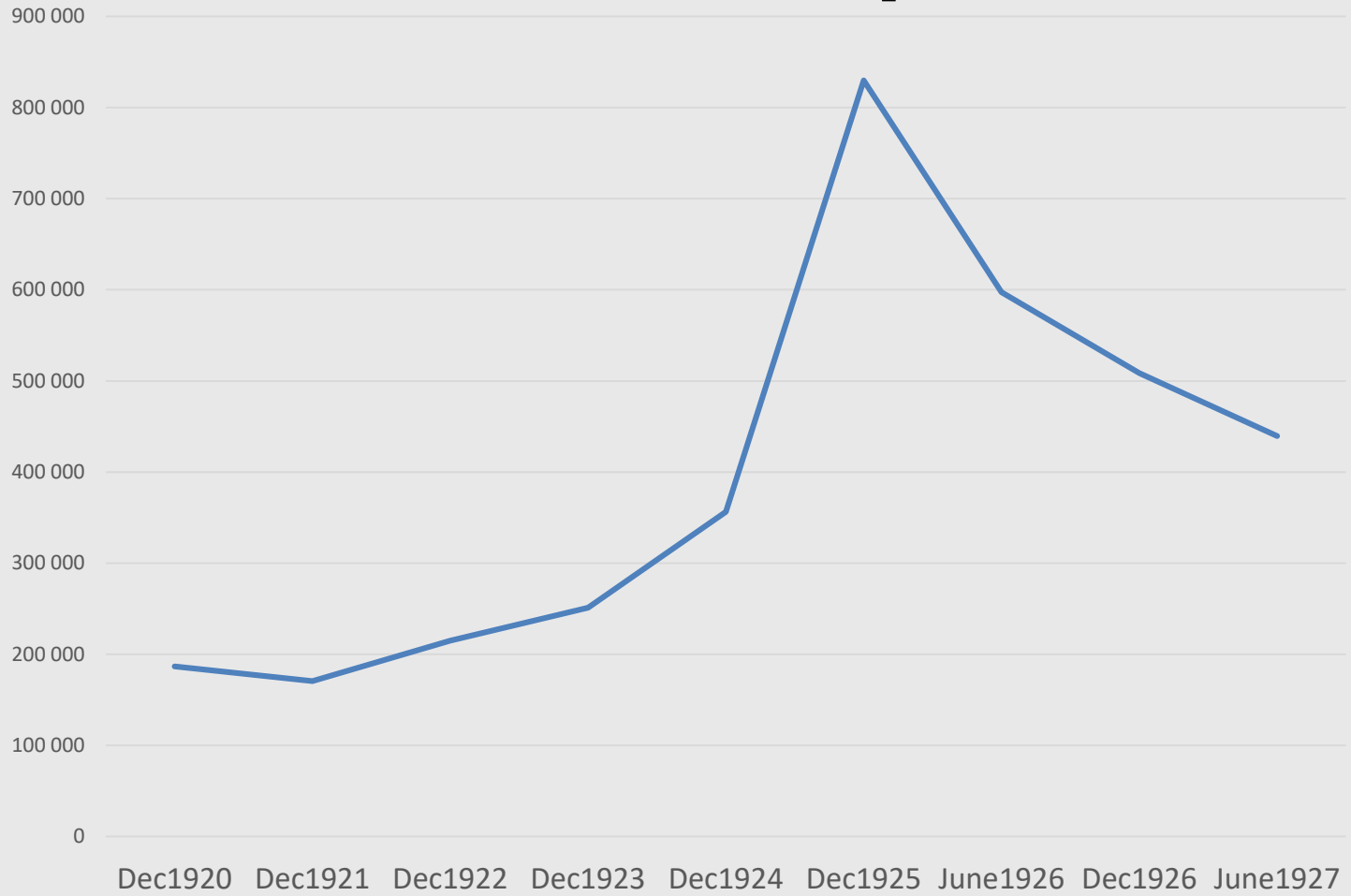
Reasons for Villa Rica's Values

- 1.-The Atlantic Ocean
- 2.-Ocean Boulevard
- 3.-Florida Coast Line Waterway
- 4.-Dixie Highway
- 5.-Florida East Coast Railway
- 6.-Midway between Palm Beach and Miami
- 7.-Private beach for residents
- 8.-Beautiful Casino on Ocean Front
- 9.-Famous Townend Studios
- 10.-Magnificent Villa Rica Inn
- 11.-Broad Avenues and Boulevards
- 12.-Complete City White Ways
- 13.-Its Own Railway Passenger Station
- 14.-Program of Beautification
- 15.-Improvements now under way

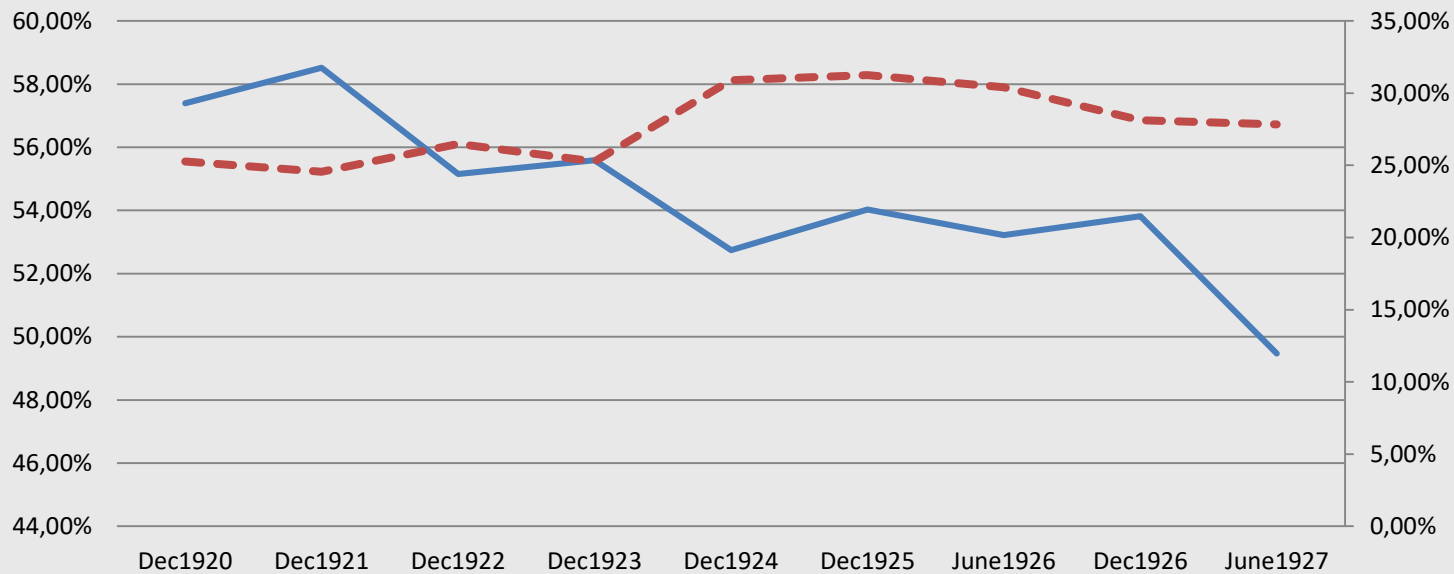
ALL these wonderful things are a part of your investment in Villa Rica at Boca Raton. They substantiate your investment in a manner that nothing else could do. There are many other excellent features in this beautiful new city by the sea, but if it possessed no others than the first five mentioned in this advertisement, that would be sufficient to make Villa Rica a truly superior investment opportunity as well as a truly delightful home site opportunity. Villa Rica is supremely accessible. It is endowed lavishly with superb natural advantages, but this is not all. A wonderfully complete improvement program has been adopted and is now being carried out. You see why those who know the real, dominating causes of true values, and profits incident thereto, have insisted upon buying properties in Villa Rica at Boca Raton.



Panel A: Total Deposits



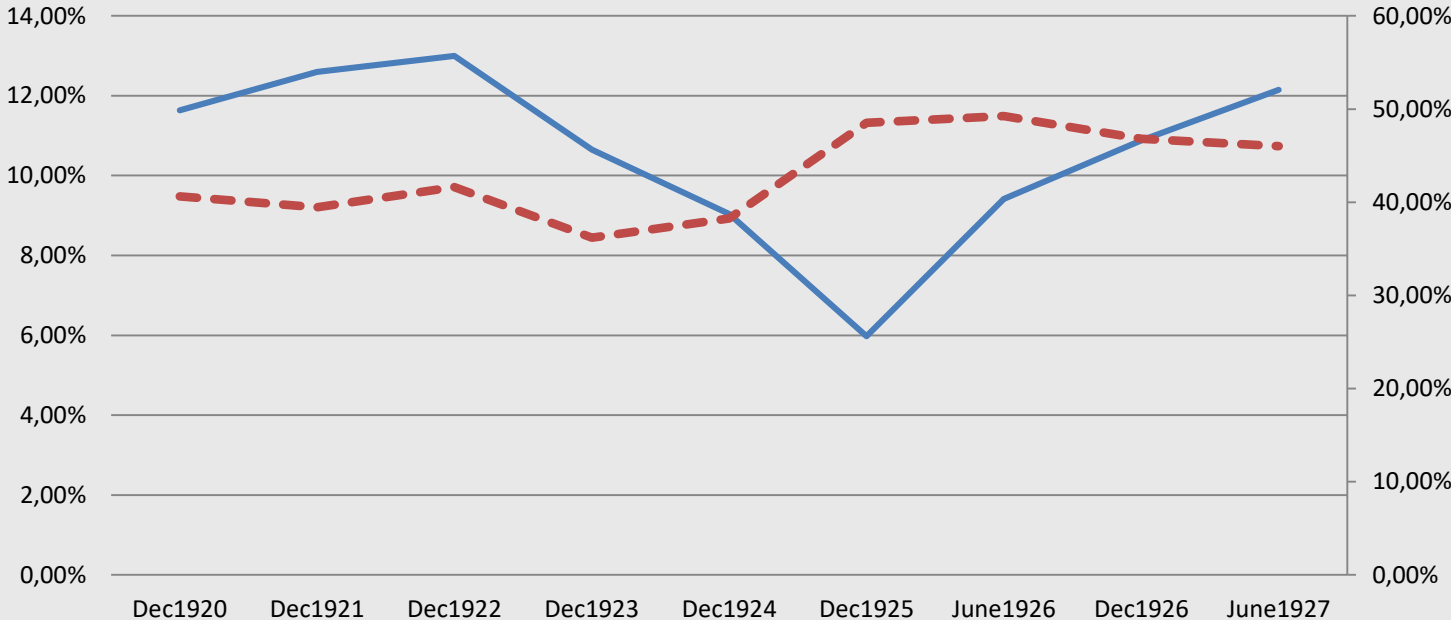
Loans and Reserves



— Loans/Assets (Left Axis)

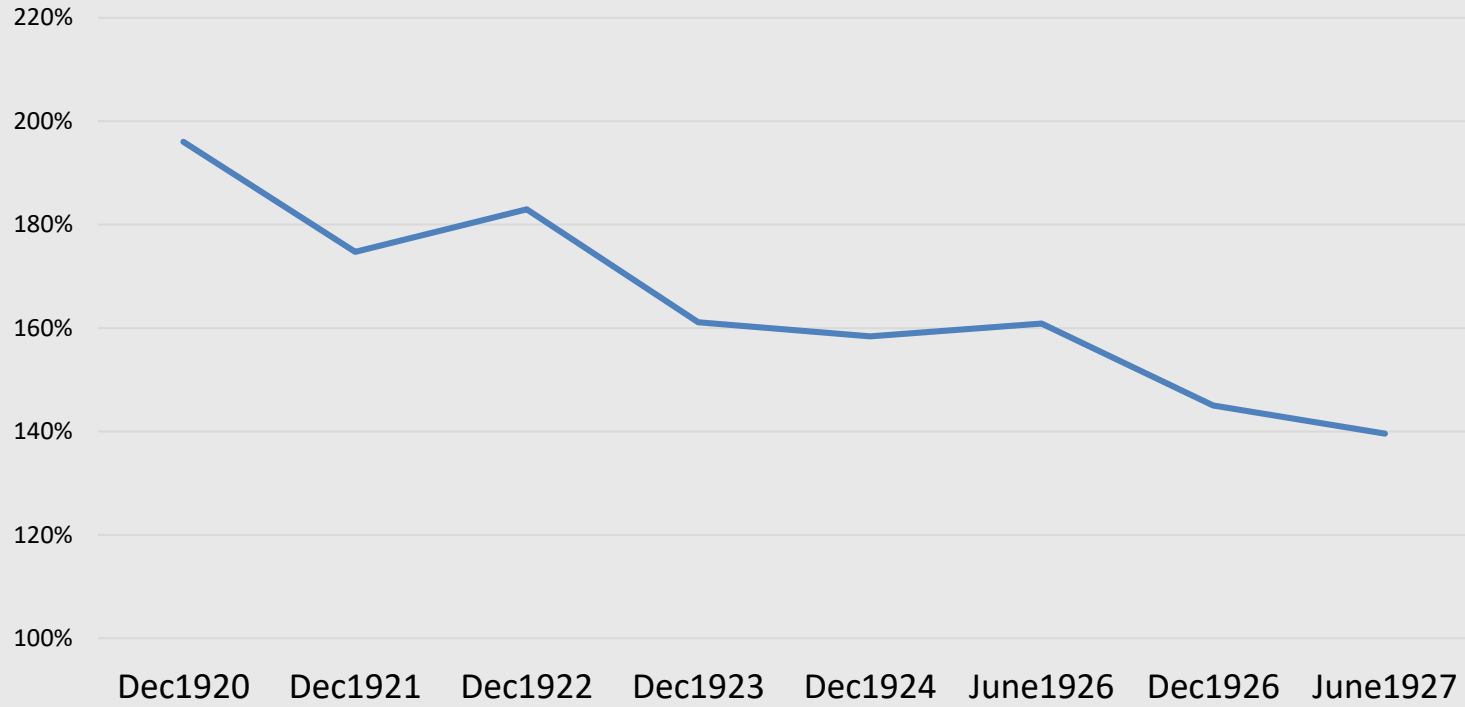
- - - (Cash+Due From Banks)/Deposits (Right Axis)

Capital and Surplus



— $(\text{Capital} + \text{Surplus}) / \text{Assets}$ (Left Axis)
- - $\text{Surplus} / (\text{Capital} + \text{Surplus})$ (Right Axis)

Loans/(Capital+Surplus+Cash+Due From Banks)



What Lessons Would One Expect To Learn?

- Banks in general had remained conservative during the boom. Failures were limited to corrupt chains run by developers who lost their shirts as equity investors too. Bank regulators were complicit and corrupt, so there is a lessons there (but recent experience in U.S. and elsewhere suggests regulation remains politicized for a deep reason).
- It was hard to gauge price of land due to limited data and experience, and inherent challenges of identifying supply and demand in land markets (no short selling). Ultimately, places like Boca Raton were great places to retire.

Stock Market Crash of 1929

- Federal Reserve consciously worried over the stock market call loan market, and employed monetary policy (successfully!) to rein in speculation.
- Field argues innovation was in fact extremely important.
- Nicholas finds cross-section of returns reflects citation-weighted patenting . (Cross-section differences could mean relative but not absolute pricing was reasonable.)
- Kabiri finds prices were consistent with professional valuation modeling (not driven by new entrants).
- But Rappaport and White find lending propelled prices, and Calomiris and Oh find that NYC banks' stock prices were likely too high (given CEOs' decisions to delist from NYSE).
- Pricing excesses during the boom thus remain unclear.

What Lessons Would One Expect To Learn?

- Given that it remains unclear whether the stock boom of the 1920s was excessive and destined to crash, it is hard to argue that one should learn something about pricing from this example.
- The most uncontroversial lesson seems to be that monetary policy tightening was unwarranted and very damaging. But note that many people today are arguing that macro-prudential regulation should try to rein in asset market bubbles (although it may not be so easy to detect them). Are those people obviously wrong?

Great Depression Bank Crises

- Bank failures and losses (while not large by postwar standards of crises) were largest in over a century in US (very different from pre-WWI panics).
- Fundamental weakness, not panic, drove bank failures and contraction of credit. Monetary policy contraction was the primary shock.
- Fundamental weakness reflected two aspects of unit banking system in US: lack of diversification of bank portfolios, and pyramiding of reserves (with consequent liquidity risk). Both were important in producing failures and contraction of credit.
- This explains why US and Canada, with similar GDP paths, had very different banking experience.
- Crisis ended through combination of examination and recapitalization (after March 1933).

What Lessons Would One Expect To Learn?

- Primary lesson was that unit banking was a socially costly source of banking instability.
- Of course, this was a lesson that had been clear for decades (1873, 1884, 1890, 1893, 1896, 1907, 1920s). As many historians have showed, political interests that favored unit banking rather than economic efficiency preserved unit banking. (Agricultural landowners favored it.)
- The lesson chosen to be “learned” was that branching and consolidation should be stopped, and Fed Board was charged with monitoring governance.

Mexican Twin Crises of 1994

- Was in many ways a replay of Chilean twin crisis of 1983: unsustainable peg (based on fiscal and monetary policy) combined with bank insolvency produced by protection of banks that engaged in huge insider lending.
- Reflected banking system weakness from 1990 privatization, and need for government revenue, which led to the creation of 100% liability insurance and lack of bank recapitalization.
- Reflected monetary expansion (sterilization policies in wake of outflows), and fiscal expansion leading up to election of 1994.
- All of this was central to PRI's attempt to preserve power, which ultimately failed in the wake of the crises.
- Opening up to foreign banks also reflects lessons learned.

Korean Twin Crisis of 1997

- Not a fiscal or monetary expansion, and unlike Mexico no apparent over-valuation (based on looking at time series of real exchange rate).
- Crony capitalism maintained through chaebols, banks, and government relationships, with subsidized funding through banks and international bond markets, which undermined market discipline over industrial competition, and bond and bank funding, and permitted productivity growth decline (Balassa-Samuelson, which had been apparent from ~1992).
- Huge contingent liability for cleanup explains combination of dramatic bank losses and exchange rate collapse.
- Major corporate governance reforms in 1999 reflect lessons that seem to have been learned.
- But lesson wasn't learned by OTHERS! Greece in 2010.

What Lessons Would One Expect To Learn?

- There was no repeat of the specific circumstances in the specific countries. But many countries continue to suffer these problems, which have deep political roots.
- Although it is easy to tut-tut about countries' lack of learning, Calomiris and Haber argued that weak banking systems may be the best that some countries can achieve because their political economy is not easy to change.

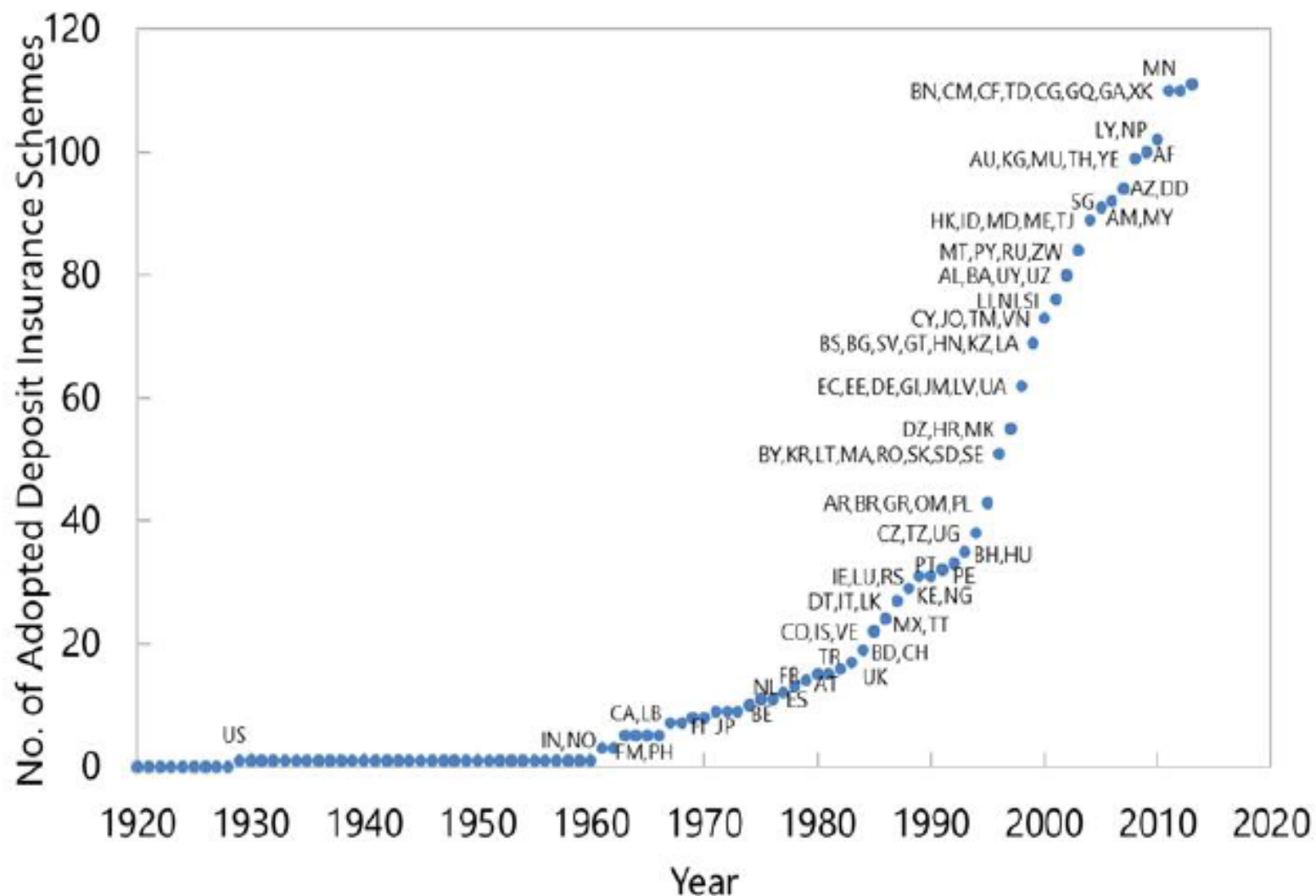
Subprime Crisis of 2008

- Ultimate causes reflected a combination of politically driven mortgage credit subsidies (due to a combination of GSE policies, CRA policies, and regulatory rules that permitted this risk to form), as well as expansionary monetary policy, which was a major deviation from implicit Taylor rule policy of 1992-2001.
- Problem was purposefully misdiagnosed by government, and regulatory response also did not focus on these causes (no credible mortgage risk reform, no credible bank capital ratio reform, and no systematic monetary policy reform), but lots of *appearance* of reform.
- The problems of bank protection and mortgage risk subsidization and lack of systematic monetary policy have deep political roots, are interrelated (Calomiris and Chen 2023), and are occurring in much of the world. A government that opposes them probably would not survive politically.

Spanish Banking Crisis 2008

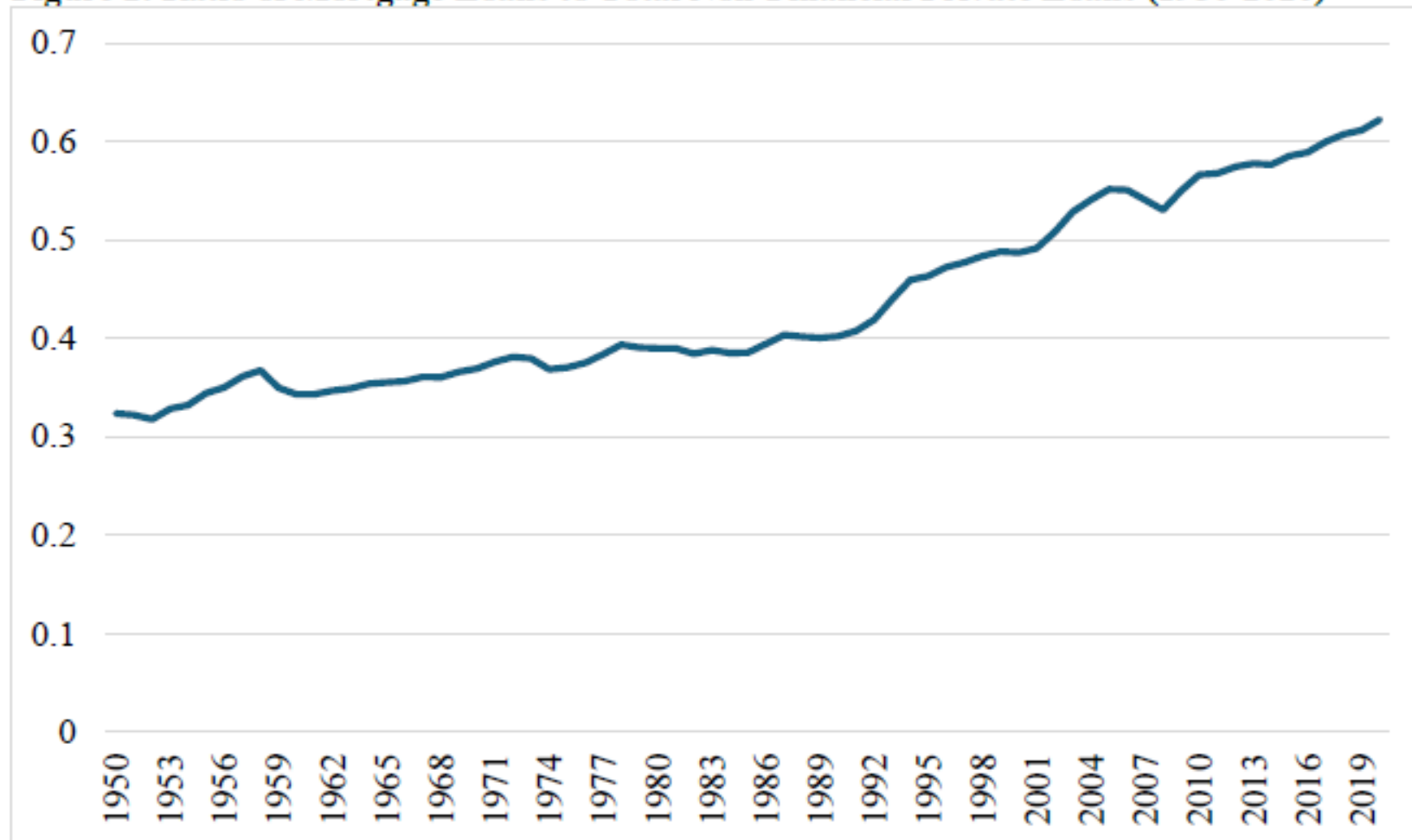
- Interest rate reductions affecting risk premia in Spain due to creation of euro.
- Between 2000 and 2007, the cumulative growth of mortgages to Spanish households exceeded 250%, and lending to the aggregate real estate sector rose to 513%.
- Cajas de ahorros saw an increasing role in the booming housing market, which reflected the fact that regional and municipal governments controlled the lending by these entities. The cajas enshrined regional and municipal political representation in their governance. Political favoritism of high-risk mortgage borrowers was a key element.
- Cajas politically motivated mortgage risk subsidies were the primary contributor to systemic risk.

Figure 3: Deposit insurance adoption (1920-2020)



Notes: Figure plots the year of deposit insurance adoption by country. Taken from Calomiris and Chen (2020, Figure 1).

Figure 2: Ratio of Mortgage Loans to Total Non-Financial Private Loans (1950-2020)



Notes: Figure provides the average ratio of mortgage loans to non-financial private sector to total loans to non-financial private sector for the 18 countries contained in Jorda et al. (2015).

What Lessons Would One Expect To Learn?

- Mortgage risk subsidies and deposit insurance continue to be major features of governments' toolkits.
- It seems unlikely that the US or other countries will see a change in this political equilibrium anytime soon.
- For example, we are seeing current proposals in the US to expand mortgage risk subsidies to deal with the current problem of expensive housing.

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Learning about new markets?	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes
Endogenous fraud?	No	Yes	No	Yes	No	No	Yes	Yes	No	Yes

Conclusions

- We develop a new approach to thinking about financial crises and learning about them, one that borrows more from biology than physics, emphasizing adaptation, competition, and innovation (in evolution, mutation, speciation).
- Crises occur for all asset classes (loans, bonds, stocks, currencies, land).
- We posit a taxonomic approach that identifies several key elements of crises in the past, and consider reasons that these elements are not eliminated over time, because risk of crises may be adaptive (learning and innovation, domestic political equilibrium, international competition).
- Taxonomies are useful to capture similarities and differences:
 - Some crises occur after expansions, but not all (Mexico and Korea).
 - Some crises reflected risks that made them predictable, others not
 - Some reflected major shocks (monetary policy), others not
 - Some reflected domestic political economy of risk subsidies, others not
 - Some reflected international competition, others not
 - Some reflected learning about risks related to new markets or products, others not
 - Some reflected systemic fraud, sometimes with government complicity (John Law, Florida), others not
- Our future work will try to build a general taxonomy of crises, looking at covariation among these factors (e.g., political subsidies, predictability >0 ?)