

**CAN POLICY
TAME THE
CREDIT CYCLE?**

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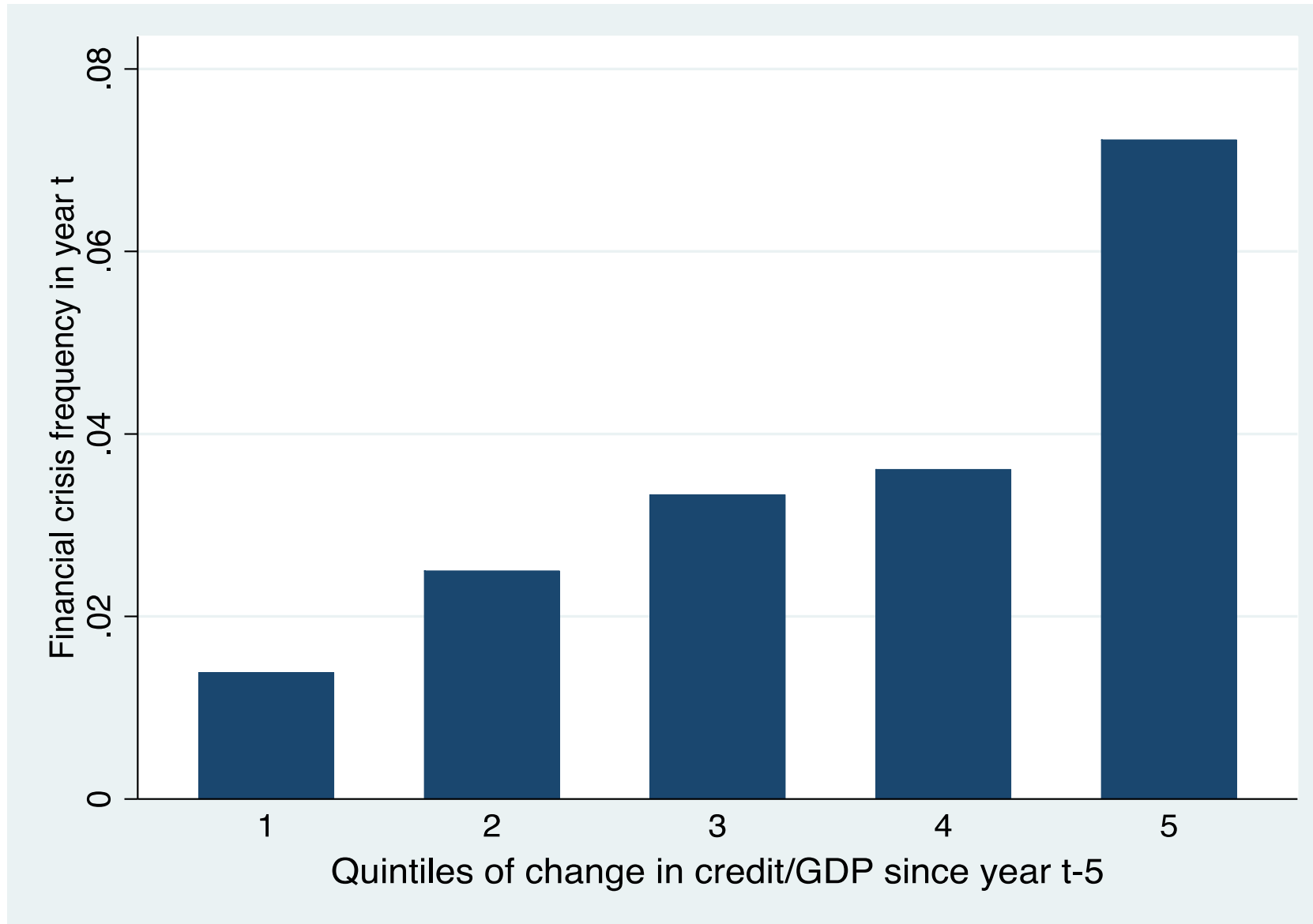
ROADMAP

- What have we learned about credit booms and busts? Some stylized facts
- Making sense of the facts: theoretical mechanisms
- The role of macroprudential regulation
- The role of monetary policy

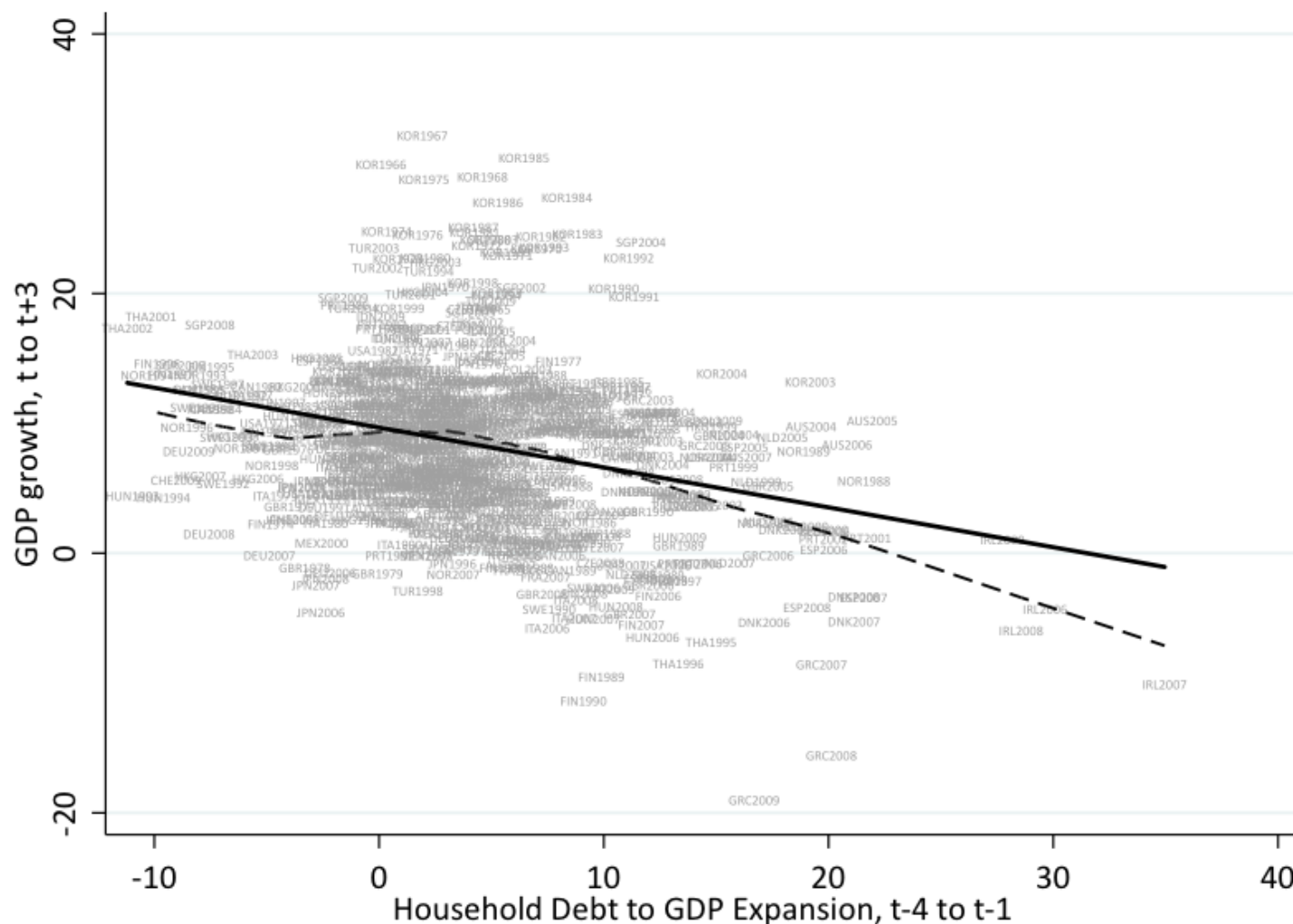
WHAT HAVE WE LEARNED? NEW EVIDENCE ON THE CREDIT CYCLE

- In long cross-country panels, rapid growth in quantity measures of credit tend to forecast recessions and financial crises.
- There is important independent information in measures of sentiment that incorporate proxies for credit pricing and quality.
 - Narrow credit spreads and large fraction of high-yield issuance forecast low returns to credit investors going forward: as if markets are overly exuberant.
 - These same credit-sentiment variables forecast reduced economic growth at a 2-3 year horizon.
- Bank shareholders are systematically disappointed in wake of rapid credit growth.
- Overall: credit booms—especially those associated with exuberant sentiment, aggressive pricing and lower-quality issuance—tend to end badly, both for lenders and the real economy.

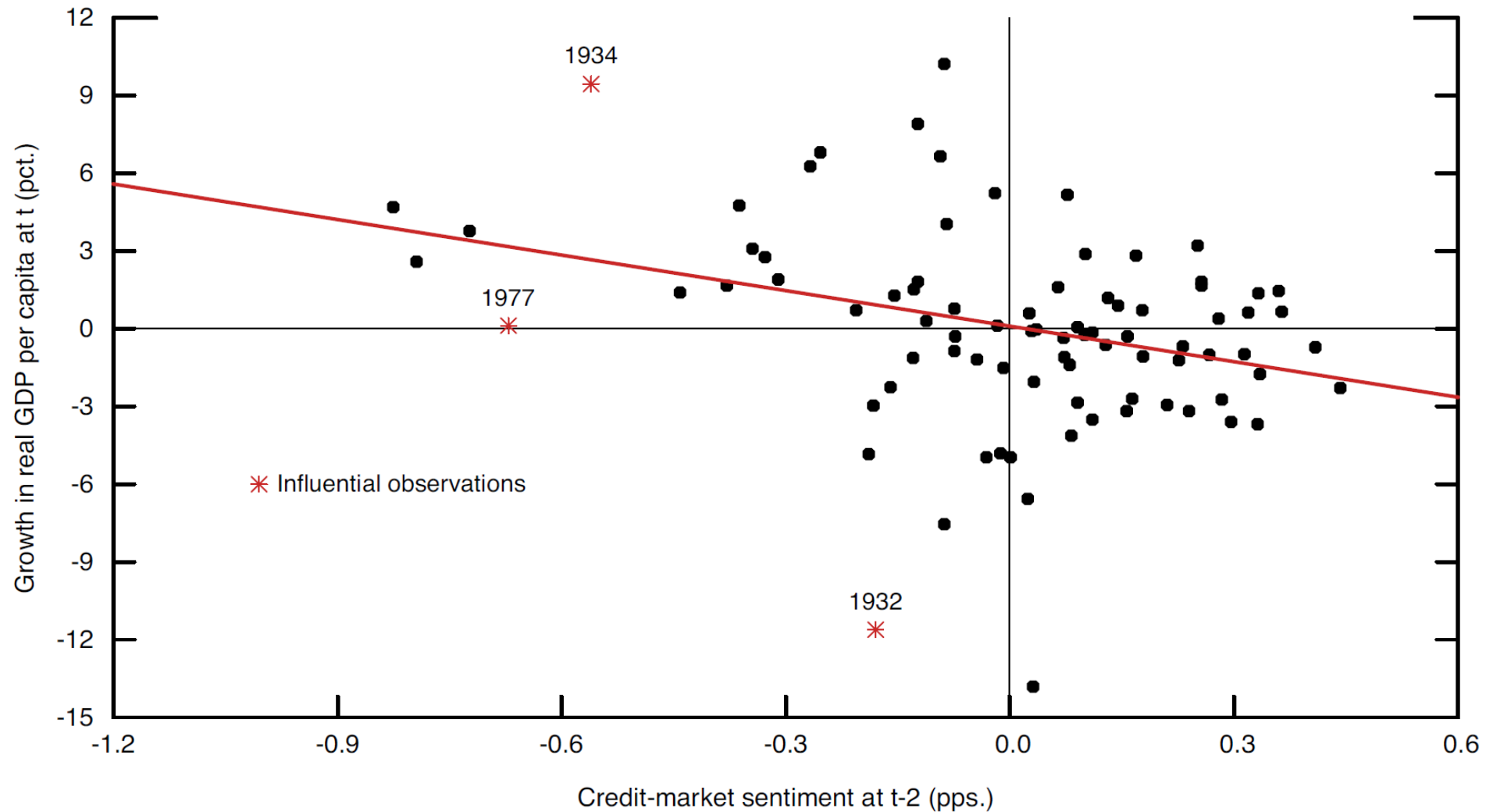
SCHULARICK-TAYLOR (2012): RAPID CREDIT GROWTH FOLLOWED BY CRISES



MIAN-SUFI-VERNER (2017): RAPID HOUSEHOLD CREDIT GROWTH FOLLOWED BY SLOWER ECONOMIC GROWTH



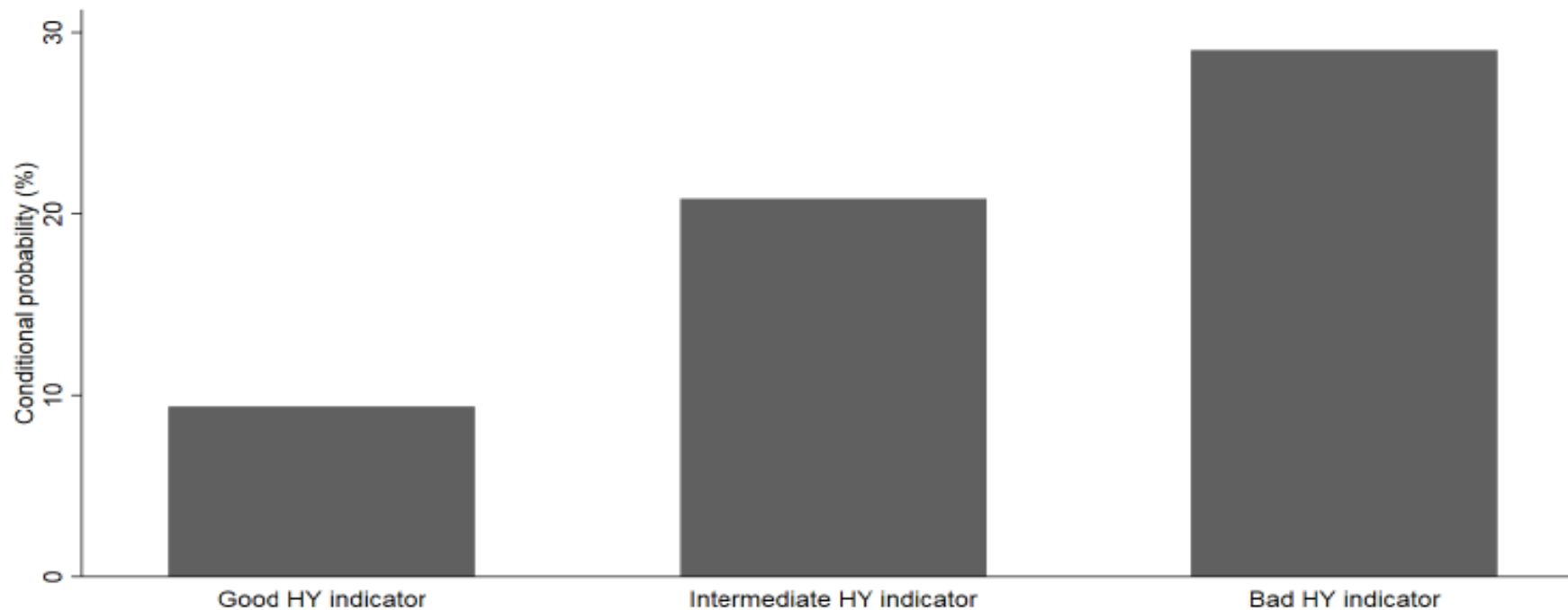
LÓPEZ-SALIDO, STEIN, AND ZAKRAJŠEK (2017): EXUBERANT CREDIT-MARKET SENTIMENT FOLLOWED BY SLOWER GROWTH



KIRTI (2018): HIGH-YIELD SHARE AND BAD VS. GOOD CREDIT BOOMS

Figure 9: Probability of bad boom by change in HY share during boom

Notes: This figure shows the conditional probability of subsequent three year real GDP growth being in the lowest quintile, conditional on a credit boom at year t . The horizontal axis partitions the set of credit booms into quintiles based on the average change in the HY share over the previous five years. 'Good HY indicator' refers to the lowest quintile increase in HY share, 'Bad HY indicator' refers to the highest quintile increase in HY share, and 'Intermediate HY indicator' combines the remaining three quintiles.



BARON-XIONG (2017): CREDIT BOOMS PREDICT BANK STOCK PRICE DECLINES

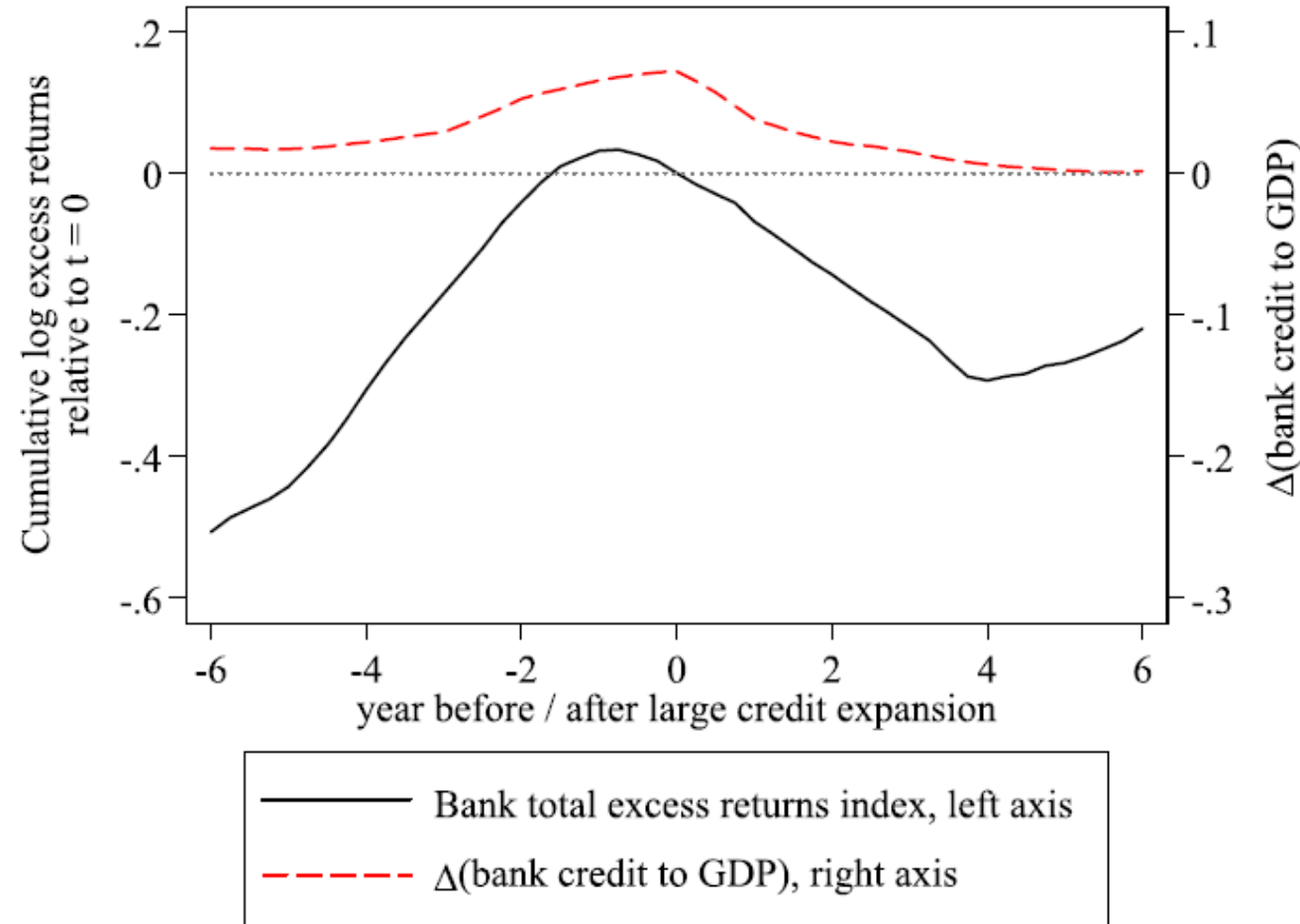


FIGURE II

Bank Equity Prices and Bank Credit before and after Large Credit Expansions

THEORIES: RATIONAL MODELS WITH FINANCIAL FRICTIONS

- E.g., Bernanke-Gertler (89), Kiyotaki-Moore (97), Brunnermeier-Sannikov (14).
- Debt contracts are primary mode of external finance, but borrowing is limited by collateral or net worth: think of a bank with a capital requirement.
- This generates amplification and propagation based on *exogenous* negative shocks. Problems are worse near the ZLB when monetary policy can't respond.
- Why so much debt if it's so dangerous and agents are rational? Externalities in leverage choice: a basis for various forms of macroprudential regulation.
- Overall: this view sees high leverage or rapid credit growth as a state variable for *vulnerability* to external shocks. Has less to say about what *triggers* the correction and downturn.
- And does not speak to evidence on credit-market sentiment—prominent role that time-variation in expected returns to credit investors plays in the data.

THEORIES: BEHAVIORAL MODELS

- In broad spirit of Minsky and Kindleberger: these models put predictability in returns to credit investors—i.e., credit sentiment—at the center of the story.
- And consistent with the evidence, see shifts in credit supply, rather than demand, as driving variations in credit quantities.
- May do better in providing account of triggers rather than just vulnerabilities: once credit is overpriced, even “average” news about fundamentals (e.g. defaults) will prove disappointing, and can trigger an endogenous reversal.
- What causes time-variation in sentiment? Recent models (Bordalo-Gennaioli-Shleifer 2018; Greenwood-Hanson-Jin 2019) emphasize over-extrapolation from recent past experience.
- But monetary policy may also play a role. We know that easy policy tends to compress risk premiums of various sorts via what appears to be a “reaching for yield” channel.
 - Easy policy reduces term premiums (Hanson-Stein 15).
 - And credit spreads (Gertler-Karadi 15).

THEORIES ARE COMPLEMENTARY

- Frictions-based models—combined with externalities in leverage choice—can explain why economy finds itself in fragile highly leveraged state. But rely on an exogenous shock to kick off the downturn.
- Sentiment-based approach, which emphasizes supply shifts and endogenous unwinding of overoptimistic beliefs, comes closer to a theory of triggers.
- Implication: measures of sentiment should have stronger predictive power for real outcomes in the presence of high debt levels.
 - I.e., natural to think in terms of an interactive specification.
 - Krishnamurthy-Muir, Lopez-Salido, et al, and Kirti provide some consistent evidence.

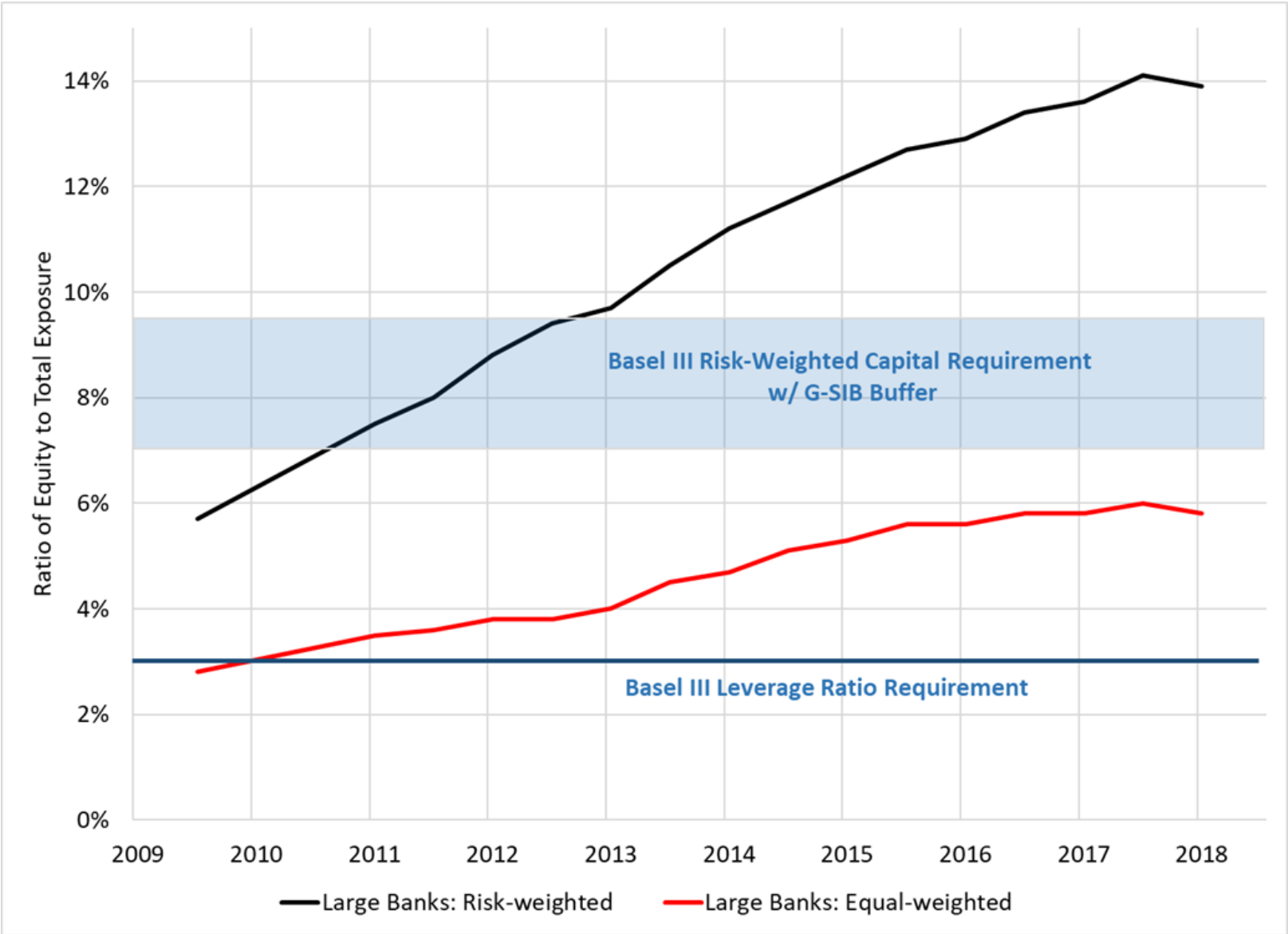
IMPLICATIONS FOR MACROPRUDENTIAL REGULATION

- Rational frictions-based theories of the cycle point to macroprudential policies based on containing quantitative measures of leverage.
- However, the macroprudential toolkit—and its likely efficacy—varies considerably across countries.
 - As a function of political economy: e.g. is it feasible to implement time-varying LTV or DTI caps on mortgage loans?
 - And the extent to which the economy is bank-dominated: harder to effectively regulate capital market credit creation.
- At least in the U.S., it's difficult to credibly argue that post-crisis regulatory reforms have fundamentally tamed the credit cycle.
 - Though they have undoubtedly been helpful, and likely reduce the probability of extreme systemic crises involving the largest intermediaries.

POST-CRISIS REGULATION: THE GOOD

- Higher capital in banks
- Stress testing
- Liquidity regulation
- A new resolution regime for large bank holding companies

HIGHER CAPITAL IN BANKS



POST-CRISIS REGULATION: THE WORRISOME

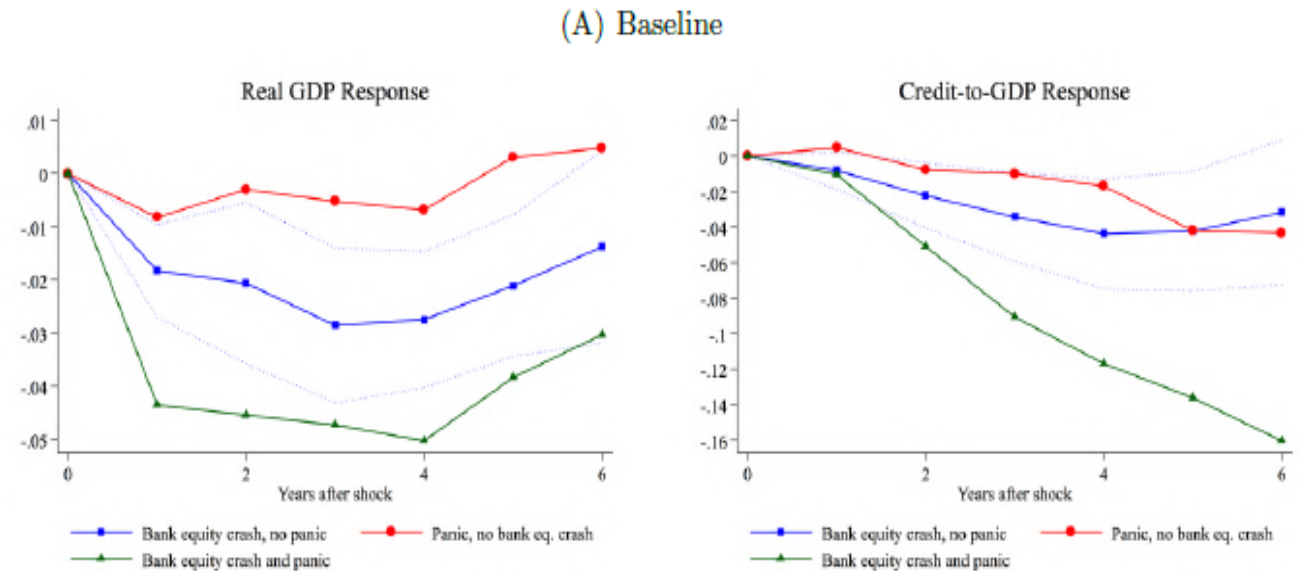
- Capital: levels vs. ability to recapitalize after a shock
- Regulatory arbitrage and regulatory backsliding *within* the banking industry
- No real time-varying macroprudential tools (in U.S.)
- What's happening *outside* the banking sector?
- Liquidity provision and the Fed's lender-of-last-resort role

CAPITAL CRUNCHES AND THE NEED FOR FAST RECAPITALIZATION

- Don't get too focused on *level* of capital. Without a mechanism to force banks to *rapidly recapitalize* after losses, will always be risk of credit crunches, even if we avoid panic meltdowns.
 - Baron-Verner-Xiong (2019) data for 46 countries 1870-2016: large (30%) bank equity declines predict persistent credit contractions and output gaps—even when there is no bank panic.
 - Greenlaw et al “Leveraged Losses” paper predicts large contraction in credit supply and GDP in Feb 2008, based solely on depletion of bank capital—well before Lehman and any widespread panic.

Figure 4: Impact of non-panic banking distress

This figure presents the response of real GDP and credit-to-GDP to 30% bank equity crashes, distinguishing between 30% bank equity crashes that coincide with a bank panic and crashes that are not associated with a panic. The impulse responses are estimated from Equation 3. Panel A presents the results from the baseline specification. Panel B defines episodes of banking sector distress as years with a 30% bank equity crash *and* narrative evidence of widespread bank failures. The responses are estimated using local projections, controlling for contemporaneous and lagged nonfinancial equity crash indicators, real GDP growth, and the change in credit-to-GDP. All specifications also control for country fixed effects. The dashed lines represent 95% confidence intervals based on standard errors double-clustered on country and year.



CAPITAL CRUNCHES AND THE NEED FOR FAST RECAPITALIZATION

- **Example: regulation forces all banks to hold 10% capital. Worst-case-scenario losses are 5%. So banks are never insolvent, and there are no runs or panics.**
 - But still, after a realization of 4% losses, if banks don't issue new equity, their assets must fall by 40% in order to maintain compliance with the regulation.
 - And banks won't want to issue equity at this point, given debt overhang problems.
 - Recall that banks paid out over \$100 billion in dividends and repurchases in 2007-08, and raised little new equity capital. This was a critical policy failure.
- **Moral of the story: imperative for regulators to promptly cut off all dividends, and compel new equity raises, as we begin to slip into next major downturn.**
 - I don't have great confidence on this point, especially the forced equity raises.
 - Ambiguity as to whether the stress test rules provide an adequate mechanism.

WHAT TO DO ABOUT REGULATORY ARBITRAGE?

- A leading motivation for the enhanced role of the leverage ratio: in the run-up to the crisis, banks were seen to be gaming the risk-based capital rules.
 - One reason why simple leverage measures were better predictors of distress than risk-weighted capital ratios.
- But not clear you can fix the gaming of one rule by adding more rules.
- Fundamentally, a timing problem: regulator moves first, sets rules in stone. Banks then get to move, knowing the rigid rule.
- Suggests it would be better if regulators could fill in some contingencies flexibly ex post, after conditioning on observed bank behavior.
 - A potentially important role for Fed's annual stress tests (CCAR).
 - Look at where banks are growing rapidly, making large profits, and paying their traders a lot.
 - Then make pessimistic assumptions about those specific exposures in stress tests.
 - Crucial that any "transparency" reforms to stress testing not compromise this flexibility: can't give away stress scenarios before banks freeze their balance sheets for test purposes.

REGULATORY BACKSLIDING

- **Legislation: “Bipartisan Banking Act”, signed into law May 24, 2018.**
 - Mostly (but not entirely) sensible and/or benign: focused on relief for smaller banks.
 - Raises threshold for many enhanced prudential standards from \$50B to \$250B.
- **Fed rulemakings and changes to stress testing: personnel is policy.**
 - Stress test design is complex and opaque; room for substantial backsliding here on effective capital requirements for the biggest banks.
 - Again, need to think carefully about “transparency”-motivated changes.
 - Proposed rule (April 2018) to dial back leverage ratio has merit. But if no other compensating adjustment, implies a reduction in overall capital, as leverage-related constraints (pre and post-stress) have been binding for many banks.
 - October 2018 proposal would further (modestly) reduce capital and liquidity requirements for banks with assets of \$100B or more.
- **Potential rollback of post-crisis money-market fund reform.**
 - A bill to undo 2014 SEC rule was reintroduced in September 2019.

WHITHER MACROPRUDENTIAL?

- Unlike other countries (e.g. the U.K., Sweden, Norway), Fed has not deployed the countercyclical capital buffer (CCyB), in spite of strong economy, and widespread concerns about elevated asset valuations and overheating in credit markets.
- Supervisory guidance on leveraged lending has been weakened in wake of October 2017 determination by GAO that guidance was a “rule” subject to the procedural requirements of the Congressional Review Act—meaning that guidance has to be submitted to Congress for review before it can take effect.
- Bottom line: no real time-varying macroprudential tools exist in U.S.

WHAT'S HAPPENING OUTSIDE THE BANKING SECTOR?

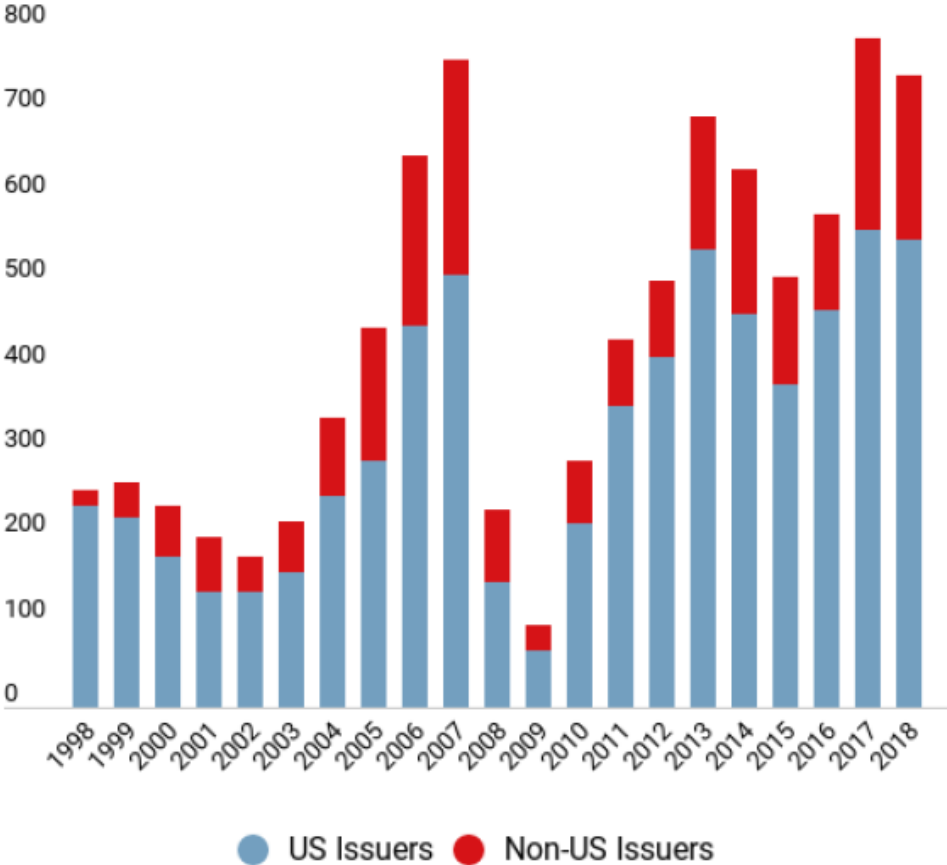
- Loose definition of shadow banking: credit provision happening outside of regulated banking sector.
 - Like structured finance, corporate bonds and non-bank leveraged-lending.
- Sharper definition: credit provision is bank-like, in that it is financed by short-term (and hence runnable) liabilities.
 - Like MBS, ABS, and CDOs funded by asset-backed commercial paper, repo in run-up to the financial crisis.

THE LEVERAGED-LENDING BOOM

Levering up

Global issuance of leveraged loans has been growing since the global financial crisis.

(in billions of dollars)



Sources: Standard & Poor's Leveraged Commentary and Data and IMF staff calculations

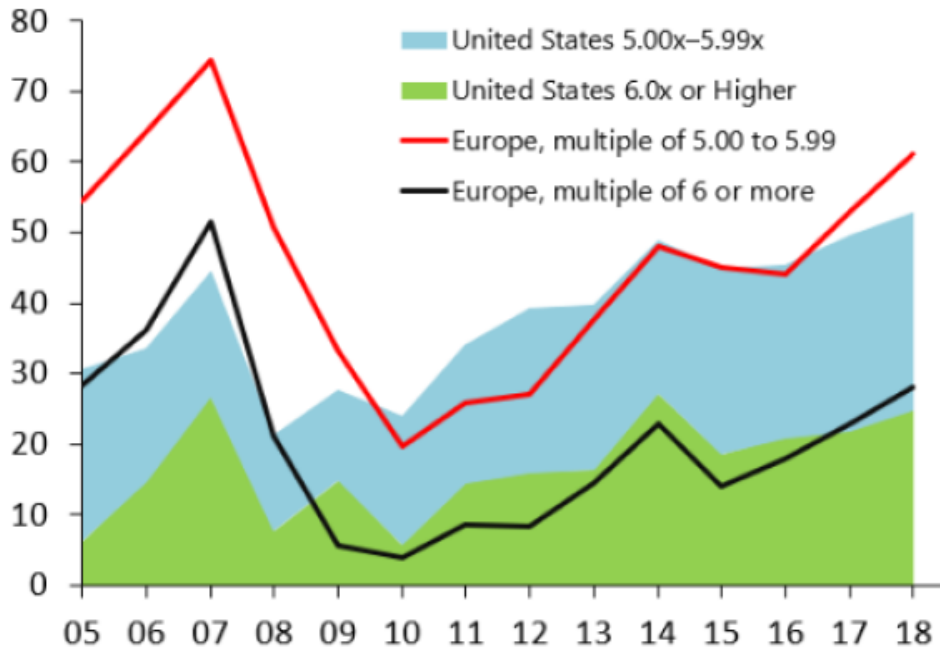
Note: 2018 data is through Q3 and annualized to estimate full-year 2018 issuance.

CONCERNS ABOUT UNDERWRITING AND CREDIT QUALITY

Multiplier effect

The United States and Europe have seen a growing share of leveraged loans issued by highly indebted companies, as measured by the ratio of debt to earnings.

(percent)

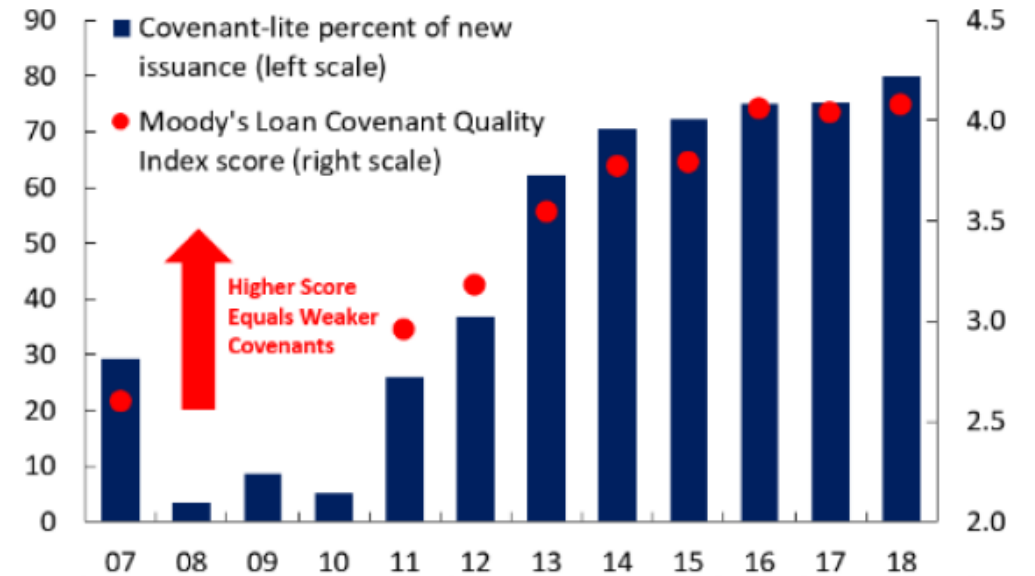


Source: Standard & Poor's Leveraged Commentary and Data and IMF staff calculations.
 Note: Leverage multiple is defined as the ratio of total debt-to-earnings before interest, taxes, depreciation, and amortization after issuance of the loan.

Less investor protection

The volume of loans with fewer investor protections, known as covenants, has grown in the United States, and quality has weakened.

(percent of issuance)



Source: Standard & Poor's Leveraged Commentary and Data; IMF staff calculations; and Moody's.

Note: 2018 data is through Q3. Moody's Loan Covenant Quality Index score is a yearly average; data are unavailable from 2008 to 2010 due to lack of rated leveraged loan issuance.



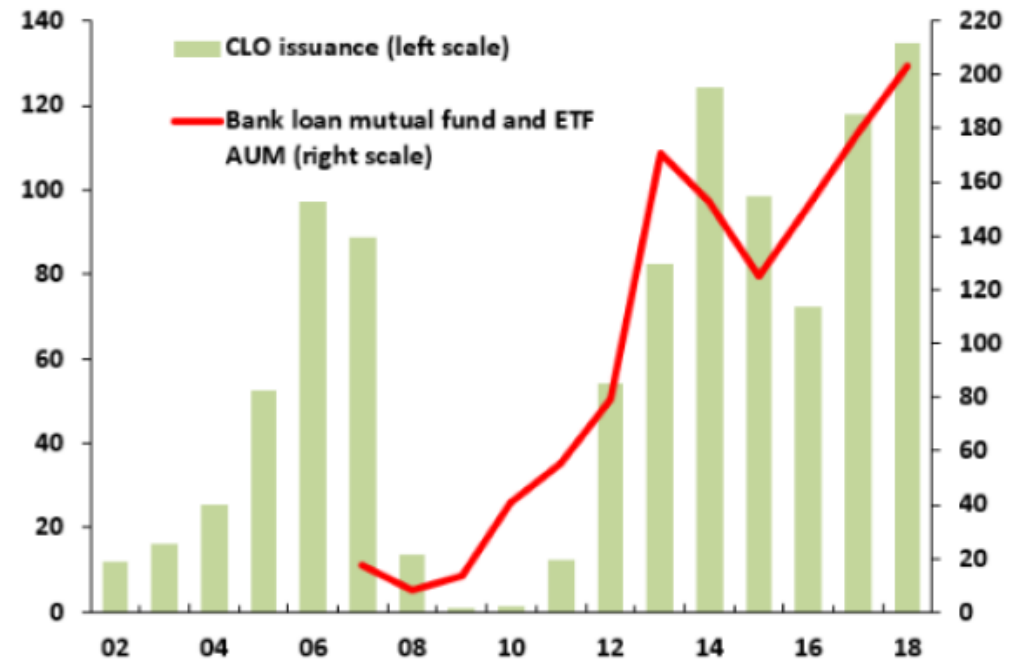
IS LEVERAGED LENDING BOOM SHORT-TERM FUNDED?

- Diamond (2013): “private financial crises are everywhere and always due to problems of short-term debt.”
- OK, but what is short-term debt? Not just deposits, but also ABCP, repo.
- What about open-end bond and loan funds, which have grown very fast?
 - Hold illiquid fixed-income assets.
 - Not debt financed, but equity is immediately demandable.
 - And there are first-mover advantages, which can create run-like dynamics: Zeng (2017), Goldstein et al (2017), Chernenko and Sunderam (2018).

Less transparent

Increasingly, leveraged loans in the United States are held by collateralized loan obligations and asset managers.

(CLO issuance and loan fund assets, in billions of dollars)



Source: EPFR Global; Standard & Poor's Leveraged Commentary and Data; and IMF staff calculations.

Note: 2018 CLO data is through Q3 and annualized to estimate full-year 2018 issuance.

AUM = assets under management; CLO = collateralized loan obligation; ETF = exchange-traded fund.



STRIKING THE RIGHT BALANCE WITH LIQUIDITY RULES?

- Two important post-crisis innovations:
- Liquidity regulation: e.g., the Liquidity Coverage Ratio (LCR).
 - Requires banks to hold minimum levels of high-quality liquid assets (Treasuries, reserves).
- Dodd-Frank restrictions on Fed lending to broker-dealer subs of bank holding companies (e.g. Goldman Sachs, Morgan Stanley).

- LCR is well-intentioned, but untested.
 - Sensibly calibrated?
 - Will firms actually draw down on their buffer stocks of liquid assets when hit with a stress scenario, as opposed to fire-selling assets?

- My view: doesn't make sense to put broker-dealer subs under same regulatory and supervisory regime as depository institutions but deny them access to lender of last resort. LCR should be thought of as a complement to LOLR, not a substitute.

A ROLE FOR MONETARY POLICY?

- Janet Yellen (2011): *“The evolving – though by no means settled – consensus is that monetary policy is too blunt a tool to be routinely used to address cyclical risks to financial stability, and that more targeted micro- and macroprudential tools should be used to address these risks.”*
- Ben Bernanke (2015): *“In light of our recent experience, threats to financial stability must be taken extremely seriously. However, as a means of addressing those threats, monetary policy is far from ideal. First, it is a blunt tool... For these reasons, I have argued that it’s better to rely on targeted measures to promote financial stability, such as financial regulation and supervision, rather than on monetary policy.”*
- These arguments implicitly assume that regulation is reasonably effective in taming the credit cycle.
- If not, opens door for monetary policy to play a supportive role.

BUT IS THE FED SMARTER THAN THE MARKET?

- A common objection: elevated sentiment cannot be reliably assessed in real time—if it could, hedge funds and other investors would have huge incentives to take contrarian positions.
- How can Fed have information and conviction to act when other highly sophisticated market participants won't?
- A limits-to-arbitrage perspective: what holds back hedge funds from betting aggressively against—and thereby correcting—long-horizon macro mis-pricings is not scarce information, but rather constraints of organizational form.
- Non-financial firms appear to be aggressive and generally successful macro market timers. Presumably not because they are smarter than hedge funds, but have a structural advantage:
 - Closed vs. open-end structure.
 - No mark-to-market: settle up by paying out cashflows as they come in.
 - If a firm issues overvalued stock or junk bond and it keeps going up, what's the problem?

NON-FINANCIAL FIRMS AS MACRO ARBITRAGEURS

- Firms appear to time the equity market: issue more equity in advance of aggregate stock market underperformance. (Baker-Wurgler 2000).
- And time the Treasury market with their debt maturity choices (Baker-Greenwood-Wurgler 2003).
 - In part by taking the other side of US Treasury debt maturity policy shifts (Greenwood-Hanson-Stein 2010).
- High ratios of junk-bond to investment-grade issuance predict poor returns on junk bonds (Greenwood-Hanson 2013).
- Cross-market arbitrage: firms borrow to repurchase shares when term premiums and credit spreads are low (Ma 2018).



BAKER-WURGLER (2000): EQUITY SHARE AND STOCK RETURNS

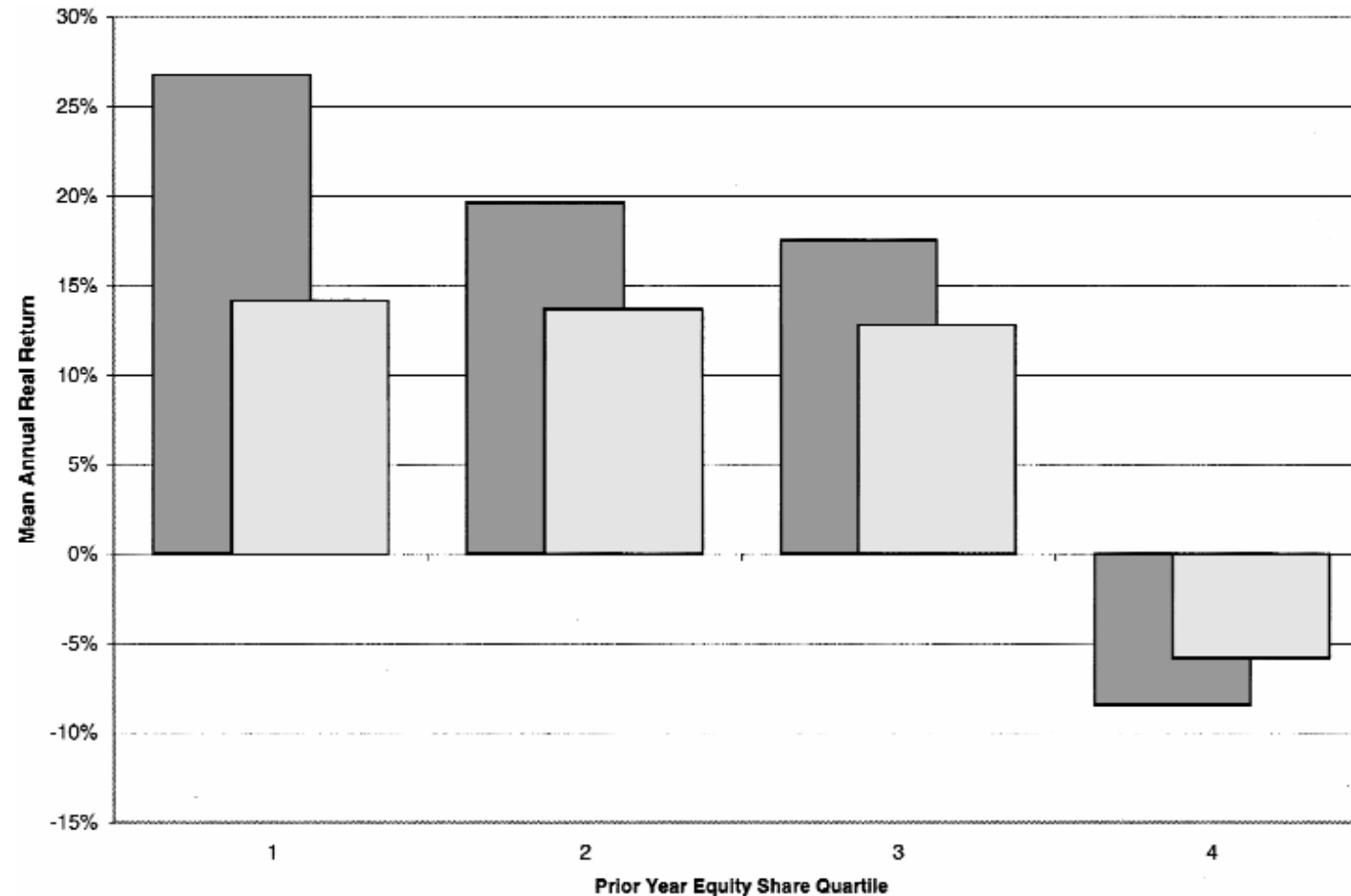
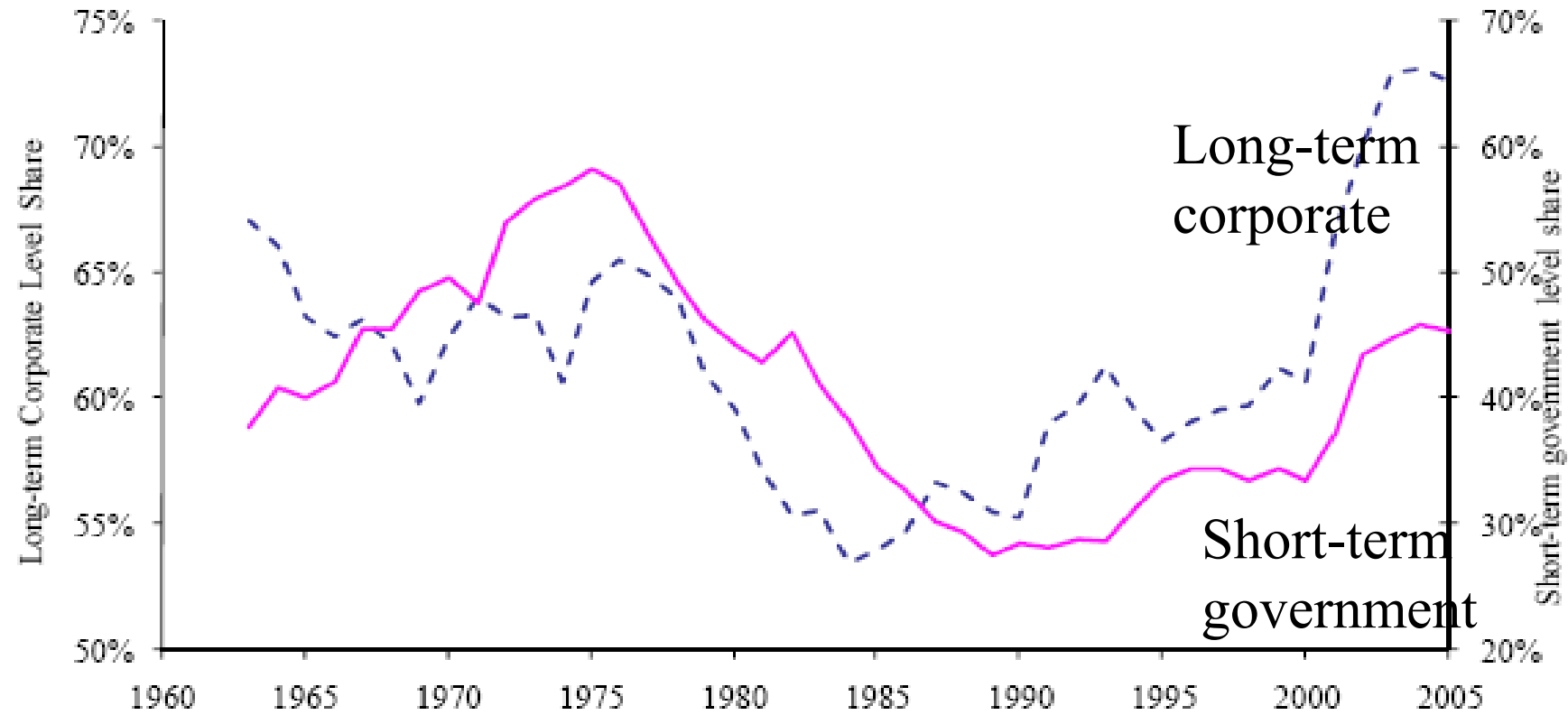


Figure 2. Mean equity returns by prior-year equity share in new issues, 1928–1997. Mean annual real returns on the CRSP value-weighted (light) and equal-weighted (solid) indexes by quartile of the prior-year share of equity issues in total equity and debt issues. Real returns are created using the Consumer Price Index from Ibbotson Associates (1998).



GHS (2010): FIRMS FILL IN GAPS LEFT BY TREASURY



GREENWOOD-HANSON (2013): ISSUER QUALITY AND JUNK RETURNS

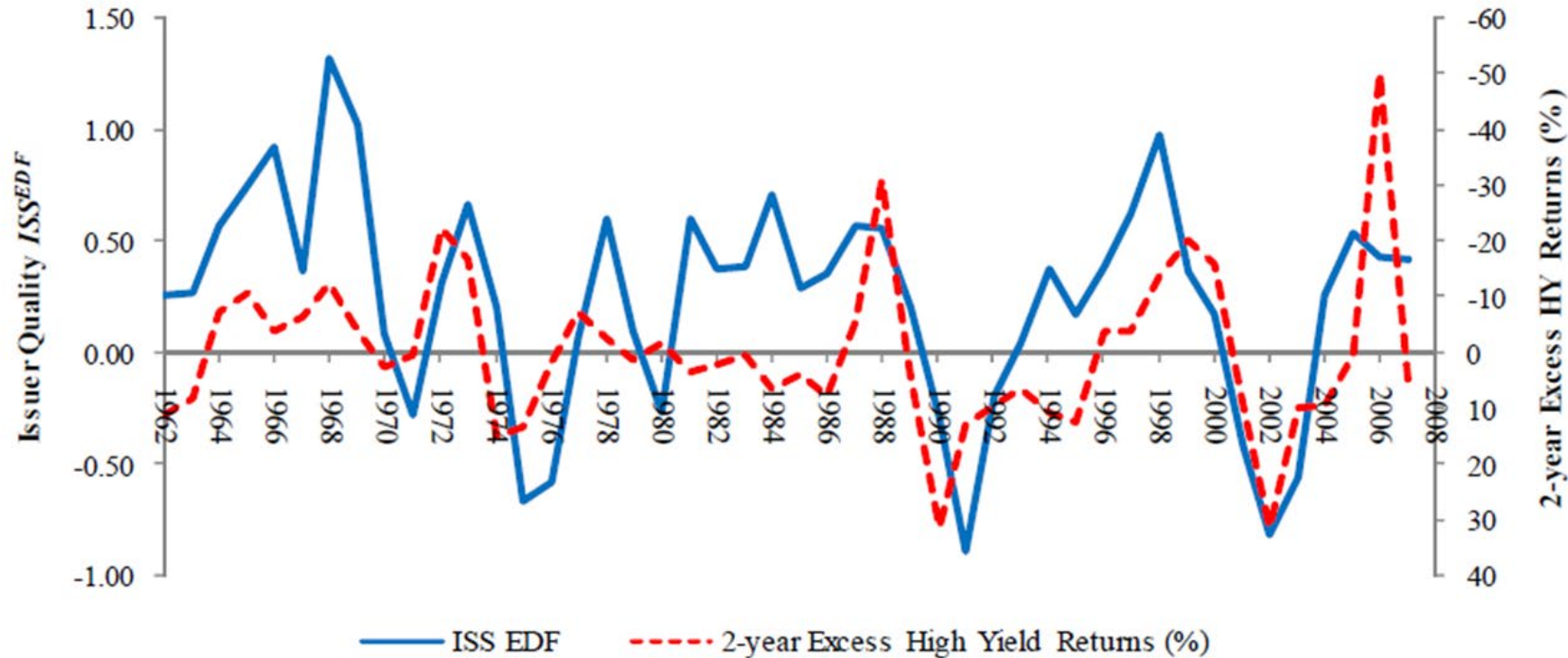


Figure 3. Issuer Quality and Subsequent High Yield Excess Returns. Issuer quality (left axis) plotted alongside cumulative excess high yield bond returns for the following two years (right axis). Returns are plotted in reverse scale, so the negative correlation appears positive visually. Issuer quality is measured with ISS^{EDF} , the difference between the average EDF decile of high and low debt issuers from 1962- 2008.



RELEVANCE FOR CENTRAL BANKS?

- Evidence suggests that simple valuation metrics and firm decisions encode valuable information on long-horizon expected returns—i.e., sentiment.
 - And credit-market sentiment in particular seems to matter for real economy.
- We know that Fed and other central banks already pay close attention to such measures of “financial conditions”.
 - E.g. credit spreads, term premiums, corporate issuance.
 - Am not proposing any clever new metrics.
- So practical question is not whether to attend to financial conditions. Rather, just how much weight to give them, and **with what objective in mind?**
- No need for a “third mandate” re financial stability. But **recognize key intertemporal tradeoff with overly easy financial conditions: can help provide stimulus today, at risk of a reversal down the road.**
 - So trading off U closer to target now, vs. potentially further from target later.

IMF ON THE INTERTEMPORAL TRADEOFF

- From October 2019 GSFR: “The shift toward a more dovish monetary policy stance....has been accompanied by a pronounced decline of longer-term yields..... Lower government bond yields have contributed to easing of global financial conditions compared with six months ago, particularly in the United States and the euro area. While easier financial conditions have supported economic growth and helped contain downside risks to the outlook in the near term, they have also encouraged more financial risk-taking and a further buildup of financial vulnerabilities, putting medium-term growth at risk.”

DON KOHN SAW THE SIGNS

- From March 2004 FOMC transcript:

“A second concern is that policy accommodation—and the expectation that it will persist—is distorting asset prices. Most of this distortion is deliberate and a desirable effect of the stance of policy. We have attempted to lower interest rates below long-term equilibrium rates and to boost asset prices in order to stimulate demand. But as members of the Committee have been pointing out, it’s hard to escape the suspicion that at least around the margin some prices and price relationships have gone beyond an economically justified response to easy policy. House prices fall into this category, as do risk spreads in some markets and perhaps even the level of long-term rates themselves, which many in the market perceive as particularly depressed by the carry trade or foreign central bank purchases. If major distortions do exist, two types of costs might be incurred. One is from a misallocation of resources encouraging the building of houses, autos, and capital equipment that won’t prove economically justified under more-normal circumstances. Another is from the possibility of discontinuities in economic activity down the road when the adjustment to more sustainable asset values occurs. Neither of these concerns, in my view, is sufficient to overcome the arguments for remaining patient awhile longer.”

THERE ARE MANY CAVEATS

- We are beginning to understand the consequences of supply-driven credit booms; less clarity on what causes these booms.
 - Recent work stresses importance of extrapolative beliefs.
 - Monetary policy also appears to play a role: reaching-for-yield behavior leads to compressed risk premiums.
 - But hard to assess quantitative importance. And event-study methodology has serious limits in gauging magnitudes.

- Nevertheless, some qualitative insights:
 - If unemployment is 8% and you are not courting some financial-stability risk with aggressive policy, you're probably not trying hard enough.
 - If unemployment is 3.5% and inflation is just a bit below target, financial-stability considerations loom relatively larger.
 - With flat Phillips curve, may have to push very hard on financial conditions to get inflation to move from 1.7% to 2.0%.

IN SUM

- **Supply-driven credit booms—accompanied by aggressive pricing and erosion of credit quality—appear to play a big role in fluctuations in economic activity.**
 - Across a wide range of sample periods, countries, and institutional arrangements.
 - Not just financial crises, but garden-variety recessions as well.
- **Hard to believe that financial regulation alone can solve the problem.**
 - Especially in economies where a large fraction of credit creation happens outside the regulated banking sector.
- **This leaves a (second-best) role for monetary policy. Qualitative point seems clear, but so far little guidance to offer on magnitudes. An important agenda for future research.**
 - If Don Kohn could go back to March 2004 in a time machine, how much higher should he set the funds rate?
 - I don't know.