Financial Stability and Aggregate Credit: Session Discussion

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The views expressed here are my own and do not necessarily reflect the views of the Board of Governors or the staff of the Federal Reserve System.
Session papers

• Predicting distress in European banks
  Presented by: Tuomas Peltonen, European Central Bank

• The credit-to-GDP gap and complementary indicators for macroprudential policy: Evidence from the UK
  Presented by: Oliver Bush, Bank of England

• Equilibrium credit: The reference point of macroprudential supervisors
  Presented by: Martin Melecky, The World Bank
Common themes

- Papers investigate forward-looking variables that:
  - Reflect building financial-system vulnerabilities; and, thus,
  - Might serve as leading indicators of episodes of financial stress/crisis or as yardsticks for policy actions.

- Peltonen *et al.* examine indicators of the distress at individual banks – in particular, European banks over 2007 to 2011.

- Bush *et al.* examine indicators of U.K. financial crises over the past half-century, with a focus on guiding the deployment of CCBs.

- Melecky *et al.* propose a method – alternate to the credit-to-GDP ratio gap – of measuring “equilibrium credit” and thereby gauging excess credit extension.
Common themes, continued

• Peltonen et al. and Bush et al. use some similar early-warning-indicator evaluation techniques – e.g., AUROCs.

• To evaluate the usefulness of the indicator Peltonen et al. also take a loss-function based approach in which a policymaker assigns weights of $\mu$ and $(1-\mu)$ to types I and II errors.
  – Peltonen et al. consider all possible values of $\mu \in [0,1]$.
  – Bush et al. consider the extremes ($\mu=1$ and $\mu=0$) of this exercise.

• Bush et al. consider early-warning-indicator variable by variable, while Peltonen et al. consider an aggregate model-based variable.

• Peltonen et al.’s indicator variable is a model-based estimate of a bank’s probability of distress based on conditions (i) at the bank; (ii) in the banking sector, and (iii) in the macrofinancial sector.
Macrofinancial variables and bank distress

• Peltonen et al.’s set-up allows them to consider the usefulness of different sets of variables in predicting a bank’s future distress.

• They find that macrofinancial variables improve notably the ability of the model with only bank-specific-variables to predict distress.

• But cannot account for why macrofinancial variables (e.g., asset-price and credit gaps) help predict distress. Do variables proxy for:
  – Loans at the bank being written with laxer underwriting?
  – More loans at the bank being tied to the overvalued asset?
  – A build-up of risks in the country’s banking system to which the bank is then interconnected?

• The policy response will very likely differ depending on the reason.
Macrofinancial variables and bank distress, continued

• Stress tests are an alternative way to examine how macrofinancial variables can affect the financial condition of a bank.
  – They are more resource intensive.
  – They are more informative: They will illustrate how a macro-financial risk will boost a given bank’s distress probability.
  – However, if feedback across banks is not a feature of the stress test, they will miss the increased probability of distress that comes via interconnectedness with other banks in the country.

• Peltonen et al.’s model would still capture increased probability of distress coming from interconnectedness, even if the channels for macrofinancial variables affecting distress are not parsed out.
  – But if interconnectedness intensified, it would not predict well.
Structural change and focus on the recent crisis

• Structural change is an issue with any reduced-form analysis.
  – The model coefficients embed a lot of underlying features of banks and the banking-system.
  – If these change, the model may not predict distress very well.
    ▪ Example: Hong Kong house prices and LTVs in the Asian crisis.

• Peltonen et al.’s model is quite oriented to the recent crisis.
  – This governs the choice of macrofinancial variables.
  – Given the specification of the model, it is then estimated in real-time and its out-of-sample predictive usefulness is evaluated.
  – Focusing the model on the recent crisis could limit its future predictive power: Could more crisis episodes be considered?
Structural change and focus on the recent crisis, contd.

- CRE prices are not included in the model.
  - These were important in many European countries in the early 1990s’ banking crises and could be important in future crises.

Real commercial property prices

1989 = 100

[Graph 1 showing real commercial property prices for various countries over time]

Sources: Catella; Frank Russell Canada Ltd; Investment Property Databank Ltd (IPD); Jones Lang LaSalle; Ministère de l’Équipement, des Transports et du Logement; National Council of Real Estate Investment Fiduciaries (NCREIF); Nomisma; Ring Deutscher Makler; national data.

- Question: Are the standard errors for the country-specific variables adjusted for clustering? If unadjusted, aren’t they biased down?
Structural change from new policies

• Structural change is also a relevant issue for Bush et al.
  – Their indicator evaluation analysis is undertaken to inform the use of a new type of policy – countercyclical capital buffers.
  – They note the likely applicability of Goodhart’s Law.

• How the signal ratio/noise ratio trade-off for an indicator variable will change if CCBs respond to the indicator is a critical question.
  – Addressing this will require a stochastic structural model.

• There are models linking indicator variables to financial distress.
  – In Adrian and Boyarchenko (2012) intermediary-sector leverage is linked to subsequent episodes of financial distress.
  – (Admittedly this is Bush et al.’s second poorest indicator.)
Adrian and Boyarchenko note that while intermediary distress is usually preceded by high intermediary leverage ...

... distress can occur even when intermediary leverage is relatively low (i.e., type I errors)

... intermediaries can maintain high levels of leverage without becoming distressed (i.e., type II errors)
Structural change from new policies, continued

• A desirable trait for a structural stochastic model – parameterized to the current structure of the economy – is for it to be able to replicate signal ratio/noise ratio trade-offs like those in the data.

• Structural changes – including the introduction of new policies – could then be introduced to the model and implications for signal ratio/noise ratio trade-offs and thresholds could be analyzed.

• Once the policy was in place for a while – such that the indicator’s ability to predict crises was reduced – the policy reaction could be removed as a reminder of the contribution from policy.

• Knowing how a policy change, like CCBs, will alter the instructiveness of an indicator variable is a question of chief importance.
Real-time credit-to-GDP gap and CCB policy

• Bush *et al.* find that credit-to-GDP ratio gaps revise a lot in the U.K.
  – But argue that this is not an issue because real-time estimates in the past would still have served as useful indicators for policy.

• The real-time credit-to-GDP gap is not the credit-to-GDP gap due to the HP filter’s “unideal” real-time properties.

• One is really just looking at correlations between some transformation of the credit-to-GDP ratio and crises.
  – It seems risky to base policy on correlations.
Structural change from new policies, continued

• Bush et al. – citing Borgy et al. – suggest that the real-time gap is a better leading indicator.

• Since the real-time trend lags the actual series:
  – The actual series will cross the real-time trend earlier than the final trend; and,
  – The real-time gap will change its sign earlier.
Real-time credit-to-GDP gap and CCB policy, continued

- These outcomes result from some fairly “unideal” properties of the HP-filter around its end points (see Baxter & King).
  - There is a phase shift at t near 1 and T.
  - The gain at the cyclical frequencies is different from one at t near 1 and T.
- The real-time leading indicator property is more of a “bug” than a “feature.”
- It is not clear why the unideal properties of the real-time HP filter are optimal from a forecasting perspective.
- Question: Might stochastic volatility trend-extraction models be helpful?
Motivation for the credit-to-GDP ratio

- Question: What is the motivation for the credit-to-GDP ratio?
- One interpretation is that it represents an economy-wide debt service ratio ...
  ... Although, it includes the stock of credit and not the payments (interest and share of principal) implied by the stock of credit.
- Another interpretation is that it reflects the credit needed to support economic activity where ...
  ... Anything below means credit acting as a drag on activity; while, ...
  ... Anything above means credit is likely also fueling speculation.
- Melecky *et al.* consider the appropriate amount of credit given economic activity and propose a method – alternate to the credit-to-GDP ratio gap – to measure “equilibrium credit.”
Thinking about equilibrium credit

• Melecky et al. motivate their modeling of equilibrium credit by:
  – Drawing parallels with transactions-based money demand:
    \[ M \times V = T \times P \]
  – Noting the importance of credit-based transactions in the economy:
    \[ CR \times V = T \times P \]
  – Linearizing and relaxing the unit elasticity on transactions (real GDP) and prices and specifying an equation for velocity:
    \[ cr_t - (\beta_{gdp} \cdot gdp_t + \beta_{defl} \cdot defl_t) = v_t, \text{ where } v_t = \beta_{rates} \cdot rates_t \]
  – So giving a credit demand equation, later embedded in an ECM:
    \[ cr_t = \beta_{rates} \cdot rates_t + \beta_{gdp} \cdot gdp_t + \beta_{defl} \cdot defl_t \]
• They estimate this for many countries and examine \( \beta_{gdp} \) and \( \beta_{defl} \).
Parallels with transactions demand for money

- There are similarities between money balances and credit that could justify the modified transactions demand for money set-up.
  - Both are stock variables with ties to economic transactions.

- But there are some salient differences too.
  - Credit seems much more tied to specific purchases.
  - Once used for a purchase, it is harder to see how credit can be re-used – would it not be capped by how much savers save?
  - The stock of credit in any year/quarter may reflect purchases made much earlier so weakening the link with current activity.

- The paper moves quickly from “M x V = T x P” to “CR x V = T x P.”
  - Further discussion on suitability of the parallel would be helpful.
Issues faced with money demand estimation

• The late 1970s/early 1980s literature estimating money demand wrestled with a number of issues that Melecky et al. are silent on with regard to their credit demand function.

• Major issue: When can money demand functions estimated with single-equation techniques yield identified elasticities?
  
  – Goldfeld-Sichel (1990): When money supply variables are independent of the money demand variables and of the money demand disturbance.
  
  – Cooley-LeRoy (1981): Without “incredible” identification stories, nothing is identified, everything is endogenous/simultaneous.
Issues faced with money demand estimation, contd.

- It is hard to see how the conditions for money demand identification will be satisfied by the credit demand function given that credit supply is likely not exogenous.

- Recall the credit demand function is:
  \[ cr-d_t = \beta^{rates \cdot rates_t} + \beta^{gdp \cdot gdp_t} + \beta^{defl \cdot defl_t} + \eta_t \]

- Although not explicitly specified, credit supply:
  - Almost certainly depends on interest rates and the price level.
  - Could very likely also depend on the strength of the economy given FIs’ greater profitability, ability to build more capital, etc.

  \[ cr-s_t = \alpha^{rates \cdot rates_t} + \alpha^{gdp \cdot gdp_t} + \alpha^{defl \cdot defl_t} + \varepsilon_t \]

- Some discussion on identification seems warranted given the paper’s structural interpretations of \( \beta^{gdp} \) and \( \beta^{defl} \).