Discussion of ‘The importance of technology in banking during a crisis’ by Nicola Pierri and Yannick Timmer

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The paper

This paper tackles a timely and interesting question: **what will the intensification of IT use in the financial system mean for financial stability?**

To address the question, the authors examine the impact of **US banks' IT adoption in the mid-2000s** on the subsequent performance of the loans they originated

They find that:

- Tech-adopting banks experienced significantly smaller NPLs during the crisis than other banks. Outside of the crisis though, the effect disappears
- Mortgages sold to Freddie Mac by tech-adopting banks fared better than those sold by other banks
- The authors explore a battery of exercises to convince the reader that their measure of tech adoption isn't just a proxy for how well the bank is run

The paper

- The key variable used in the analysis is a measure of IT adoption based on a survey of personal computers per employee
  - —Proxy for other measures like the bank's IT budget
  - —The survey was conducted in years 1999, 2003, 2004, 2006

- Their main approach measures IT adoption as the bank fixed effect in a regression of PCs per employee on establishment type, county, time and number of employees:

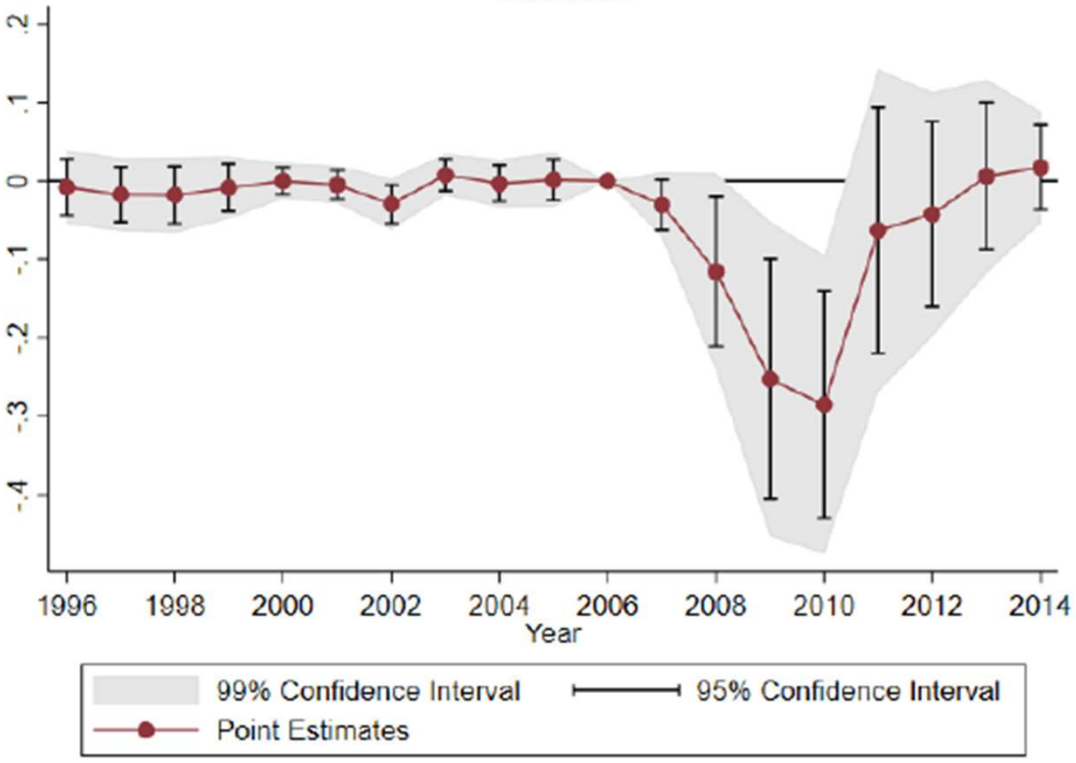
$$PCs/Emp_{i,t} = \widetilde{IT_b} + \theta_{type} + \theta_c + \theta_t + \gamma \cdot Emp + \epsilon_{i,t}$$

- Small comment here: The rationale for controlling for these factors isn't so clear. Why include a location control?

The paper

Bank-level regressions:

$$NPL_{b,t} = \alpha_b + \delta_t + \sum_{\tau \neq 2006} \beta_\tau IT_b \cdot 1[t = \tau] + \epsilon_{b,t}$$



Key result: 1 sd increase in IT use is associated with a 9-11% reduction in NPLs

This estimate is robust to the inclusion of various controls

—(a) loan share, (b) exposure to regions that suffered large house price falls, (c) bank size, (d) pre-crisis capital ratio, (e) pre-crisis wholesale funding reliance, (f) RoA, (g) average employee wage

Other variables: credit growth, LTV?

The paper

Loan-level regressions for mortgages sold to Freddie Mac:

$$Delinquent_l = \alpha_{z(l)} + \delta_{o(l)} + \beta \cdot IT_{b(l)} + X_l'\gamma + \eta_l$$

X here includes the borrower's FICO score, her LTV ratio and her debt service to income ratio at origination

Key result: A loan originated by a bank with 1 sd higher IT adoption is delinquent for c. 10% less time than the average loan

Note

—IT-adopting banks were not offloading low-quality loans to GSEs, ie not risk-shifting

—IT-adopting banks either conditioned on more information or were more sophisticated in using data

The paper

Main concern: IT adoption might be correlated with how well a bank is run, and it was better management rather than IT use that shielded some banks during the GFC

One approach for addressing this is to look at the **"tech orientation" of bank executives**

—The authors calculate a measure based on a text analysis of executives' bios

—Banks run by more tech-savvy executives experienced a smaller increase in NPLs

—The effect remains even if they control for CEO compensation (total and bonuses)

Another is to look at the **supply of technical skills near location of BHC HQ**

—The authors use the location of "land grant" technical universities as an instrument for the supply of local skilled labour (Did they hire disproportionately from these institutions?)

—Some evidence that proximity of technical knowledge drives IT use

Comments

The mechanism is a bit **abstract**

- Is there any information on the number of rejected loan applications at these banks?
- Or other ex ante metrics of lending standards? Were the IT-laggards known to be go-to banks for poor credits?
- Did the tech-savvy issue fewer risky mortgages? (subprime, teaser rates, low doc..)
- How does the IT-usage measure compare to surveys of banks' use of credit scoring? (eg as that used by Berger, Cowan and Frame (2011))
- Monitoring metrics? (eg see Gustafson, Ivanov and Meisenzahl (2020))

Comments

For the main part of the analysis, the authors look at total NPLs. One concern is that this might mask a **composition effect**

- IT investment may be more applicable to some lending categories than others (eg those where lending decisions require less soft information), which may also happen to be less risky?
- I think it would be interesting to break the analysis down into specific categories of loans, eg NPLs at residential mortgages (and segments within), CRE, C&I loans (small business and otherwise)

Comments

What is the impact of technology adoption on **other metrics beyond NPLs**?

- How about bank failure? Share price?
- Is there any information on ex ante loan pricing? Was the risk better priced at IT-heavy banks?

Comments

- Which banks were the tech adopters? How much actual variation was there during this period in the use of PCs per employee?

- Useful to see some descriptive stats on the sample of banks