



Stress Testing Banks' Digital Capabilities

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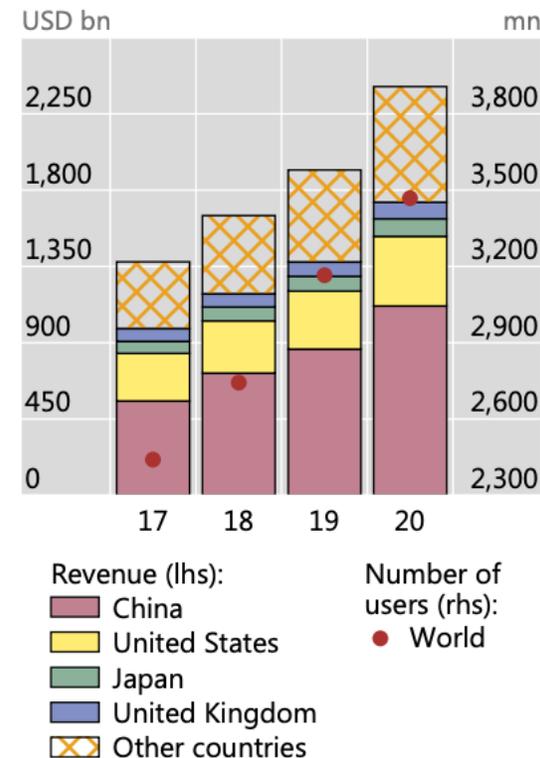
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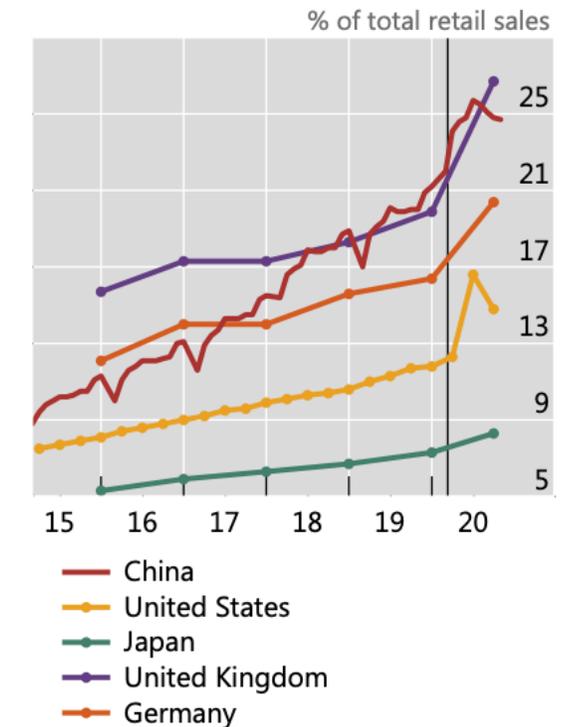
Background & research question

- Covid-19 and the rise of the digital economy
 - Virus and movement restrictions have forced us to work remotely, shop online, or discuss papers at conferences via Zoom
 - Similarly, customers rely increasingly on online banking/digital banks/fintechs etc
- Research question: have banks' IT capabilities helped banks to better serve their customers digitally?

Online orders in retail industry in selected countries¹



Share of e-commerce in overall retail sales has spiked²



Summary of results: Covid-19, IT and the demand for digital services

- Did bank IT matter during Covid-19 to serve clients digitally?
- Banks with stronger IT capabilities see
 - larger reductions in customer visits to physical branches
 - Especially in areas with tougher restrictions on mobility
 - a larger increase in website traffic at the onset of mobility restrictions
 - react significantly faster to the pandemic on their websites
- These results are consistent with a change in the demand for digital banking services
 - Authors argue that IT banks are better able to satisfy this demand

Summary of results: Banks' IT and Paycheck Protection Program (PPP) lending

- How has banks' IT capability affected their ability to extend PPP loans to SMEs?
- Banks with better IT originate greater amounts of PPP loans
 - Especially in areas with more Covid-19 cases
- Firms are more likely to switch to high IT banks
 - Especially in areas with more Covid-19 cases
- Banks with stronger IT capabilities see an increase in deposits

Overview

- This is an interesting paper that studies how banks' IT capabilities have helped them serve clients during the Covid-19 pandemic
- Pros:
 - Relevant policy question
 - Very creative data work (bank IT, branch visits, website traffic, PPP data, etc)!
- Comments
 1. How is IT measured?
 2. Is it really IT or demand?
 3. Connecting the different parts of the paper
 4. The PPP program
 5. (minor comments & academic contribution)

What's in IT? How to measure IT

- Main IT measure defined as $\log(1 + \text{number of technologies})$
 - What is the rationale for choosing these 14 technologies? The authors could be correct in selecting those 14, but since this is a key measure, the paper needs to have a deeper discussion for why each measure is selected
 - Why take the log? Difficult to interpret and assumes decreasing returns!
 - If you would simply define the index as the sum, it would range from 1-14 and be easy to interpret: having one additional technology leads to eg X% more branch visits
 - With the log, you assume that going from eg 1 to 2 technologies is 10x as important as going from 13 to 14 [$\log(2/1)$ vs $\log(14/13)$] – but ordering irrelevant
 - You need to justify why you choose this specification!
- How does IT relate to other (non-Aberdeen) measures, such as loans per employee?

Interpreting the “demand for digital services” results #1

- Covid-19 has led to a general increase in the demand for digital financial services
- Authors argue that high-IT banks are more affected by this shift
 - Fewer branch visits, more web-site traffic
- But why?
 - (In principle, customers of high-IT banks could be fully digital already!)
 - Is this because high-IT banks are fundamentally better at providing these services (but identical in all other respects)?
 - Or is it because these banks serve areas (or are located in areas) that see a larger increase in the demand for digital financial services in general?
 - Potential concerns: high-IT banks could operate in areas in which firms have better IT capabilities, in which internet access is better, or where higher income or more tech-savvy HHs reside (which have seen only modest declines in their incomes during Covid-19)

Interpreting the “demand for digital services” results #2

- The authors argue it is mostly about better IT capabilities, not about differential demand
- How do they address the issue? IV!
 - They develop three different IVs:
 1. IT-index of non-financial firms located around bank branches
 2. IT-index of non-financial firms located around bank HQ
 3. Number of internet providers in counties of bank branches
- But all these IVs implicitly assume that high-IT banks operate in high-IT areas!
 - If you would remove this matching of high-IT banks to high-IT clients/areas, would your results survive?

Interpreting the “demand for digital services” results #2

- There are some results on the matching of firms and banks (Table 11), but this concern is key!
 - Would suggest to place this table more prominently and also extend the analysis
- Note that Table 11 looks at the match between IT banks and IT firms
 - Yet, even if there is no correlation between the IT of firms and the IT of their connected bank, high-IT firms and high IT could both operate in counties with higher demand (better internet, white-collar jobs, lower reduction in movement for given case numbers, etc)
 - Possible solution: focus on lending to firms in tradable industries only to exclude local demand effects?

Interpreting the “demand for digital services” results #3

- The issue of selection highlights a major shortcoming of the paper:
 - There is too little space devoted to informing the reader on the differences between high/low IT banks and the markets/clients they serve!
 - Provide balancedness tables at the bank and county level!
 - Make testing for pre-trends more explicit! (graphs on raw series and coefficient plots)
- Note that results on deposit growth in Table 8 could actually weaken your argument!
 - If high IT banks serve high-income (or white-collar) clients, then the increase in deposits would follow from the fact that their incomes remained steady while their spending opportunities declined!
 - Note that all of this could be true within the same county or state
 - Maybe move to zip code level?

The bigger picture

- Let's assume all results are "true"
- 1. The first part of the paper shows that high IT banks experience **fewer branch visits** and **more website visits**
 - Takeaway? Banks with better digital services provide better digital services.
- 2. The second part shows that high IT banks **provide more PPP loans**. But why?
 - Is it because they serve clients/counties with higher demand for PPP loans?
 - Or because they are more efficient in granting these loans? (Faster? Cheaper? ...)

The bigger picture

- The paper currently makes little connection between parts 1. and 2.
 - Little evidence (or evidence) on whether differential demand or technology matter more for lending decisions
 - ... or why part 1 is necessary to understand part 2
- Yet the paper reads as if part 1. is explained by demand, but part 2. by better technology!
 - I would like to see much more on disentangling these two explanations
 - IV results would suggest that technology, but IV subject to several concerns
 - One possible avenue: move to the bank-zip code level and use zip code FE
 - Income (and probably internet access etc) across HHs varies much more within counties than within zip codes
 - Alternatively, use part 1. (ie higher demand) as an explanation for the findings in part 2

The PPP program

- Part 2 of the paper looks at PPP data. What do we learn from this episode?
 - PPP loans are not standard loans – they require almost no screening and monitoring
 - Subject to loan forgiveness
 - Guaranteed by the Small Business Administration
 - Interest rates are capped
- One big question (also with respect to fintech) is whether IT helps banks to screen or monitor firms
 - Is there any (even anecdotal) evidence that banks used any screening vis-à-vis firms in the PPP process? If not, one main argument pro-IT (better screening and monitoring) is void
 - The implications of using PPP data for the analysis (and how this could affect the external validity of the results) should be discussed

The PPP program

- Would like to know more: where does the money go?
 - Industry breakdown?
 - Financial inclusion
 - Breakdown by race/ethnicity and gender?
 - High- vs low-income zip codes?
 - Do we know anything about default rates, jobs created, etc yet?
 - Did high IT banks make “better” loans?

Comments on specifications and variable definitions

- Specifications vary in almost every table
 - Level of analysis changes, FE and controls inconsistent, sometimes log-level, sometimes log-difference as outcomes
 - Table 2 uses branch FE and state-date FE vs Table 5 using county FE and HQ state FE
 - Table 3 uses bank FE+date FE vs. Table 4 using bank controls and state FE
 - ...
 - First part of the analysis uses mobility restrictions as independent variable, second part uses cases. Why? (and both are likely endogenous to different fundamentals)
 - Dependent variable: PPP volume should be normalized by eg bank total loans
- Tables 3&4: number of bank-level observations is >3,100 but data on IT index is available for only 2,590 banks!
- Not sure why some results are in the paper: Table 8 on deposit growth; Table 10 on IT upgrades

What's the exact contribution?

1. "Novel evidence of the impact of technology on bank operations"
 - The literature you cite looks at information, productivity, risk-taking, diversification, ... You show that banks with more IT extend more fully-guaranteed loans during a pandemic – how does relate to existing studies on IT and lending?
2. "Related to the literature on the interplay between traditional banking and fintech"
 - Literature on fintech vs banks is mostly about better technology vs regulatory arbitrage. You could improve your contribution by highlighting the importance of IT in the absence of regulatory arbitrage!
3. "We add to the literature on the effects of Covid-19 on firms, HHs and FIs"
 - Check!
4. "Our results may have broader implications beyond banking to industries that are considering the costs and benefits of technology adoption"
 - Which ones?

Conclusion

- Interesting paper that addresses an important question: did banks' IT capabilities matter for serving clients and granting PPP loans during Covid-19?
- Paper could benefit from a clearer structure
 - Currently not clear how parts 1. and 2. are related
 - Relative importance of demand effects vs technology in granting loans?
 - Some tables only loosely connected to the overall story line (eg Tables 8 and 10)
- A deeper discussion on how high vs low IT banks differ (in terms of bank characteristics and areas/clients they serve) would make the results more transparent
 - These differences could help to inform the authors on how to disentangle demand vs technology!
 - Would also help to strengthen the contribution