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COVID-19, the Accelerated Adoption of Digital Technologies, and the Changing Landscape of Branch Banking

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This article examines how COVID-19 has affected, and may continue to affect, bank branches operations by examining closures in urban and rural counties. The net number of bank branches has been steadily declining since 2009 (Stackhouse, 2018), and recent industry publications have reported an acceleration of branch closures and a shift from branch banking to digital channels due to COVID-19 (Alix, 2020). In the information-intensive industry, bank closures, even in crowded markets, are shown to decrease local credit supply as lender-specific relationships are hard to replace (Nguyen, 2014). We also see evidence of branch closure clusters (Simpson and Buckland, 2016; Tranfaglia, 2018), but most research examining local effects is focused on suburbs and metropolitan areas. Others find that in locations underserved by traditional banking institutions, alternative financial service providers (AFSPs) like check cashing outlets, payday lenders, and other relatively high-priced services fill the financial void (Simpson and Buckland, 2016; Smith, Smith, and Wackes, 2008). These issues of credit access, retail banking prices, and financial voids may be exacerbated as online and mobile banking continue to take hold, especially in a post-COVID-19 world. To understand how we might expect banks to operate their branch networks into the future, this article examines how digital banks have handled branch operations in the past and during the first year of the pandemic.

Measuring Bank Digitalization

COVID-19 has hastened technological adoption in many spheres. We observe advances in remote work, with education being particularly quick to adapt and adopt new technologies. Banking and other financial services are also experiencing accelerated digitalization (Deloitte, 2020). The efficiency ratio can be used as a proxy for the level of bank digitalization. The efficiency ratio is defined as total overhead expense expressed as a percentage of net interest income plus noninterest income. Total overhead expense includes salaries and employee benefits, expenses of premises and fixed assets, and other noninterest expense divided by average assets. We expect that digital banks may have lower efficiency ratios, as adopting new technologies may reduce noninterest expenses. This is not a perfect measure, and more research is needed on creating measures of bank digitalization, but we do see evidence that banks which adopt Internet delivery channels and other online features exhibit measured improvements in financial performance (Acharya, Albert, and Srinivasa, 2008). This increased performance also reflects increased efficiency through reduced staffing costs and other noninterest expense (Hernando and Nieto, 2007). The efficiency ratio also allows for standardized bank comparisons across multiple asset classes and is sourced from the Federal Financial Institutions Examination Council's (FFIEC's) Uniform Bank Performance Report (UBPR), which aggregates publicly reported bank financial data. Limitations to this proxy and alternative measurements are discussed in the concluding section of this article.

Bank Digitalization and Branch Operations

Because of rapid digitalization, we might expect that branch operational decisions of the most digitalized banks in the past may reflect branch operations during COVID-19 as well as the post-pandemic period. To investigate the relationship between bank digitalization and branch operational decisions, I organize banks into quintiles based upon their second quarter (Q2) 2009 efficiency ratios. The Dodd–Frank Act, drafted in the second half of 2009 and passed into law in 2010, influenced commercial banks operational and asset allocation decisions (Bouwman, Hu, and Johnson, 2018) and increased efficiency ratios; that is, it made them less efficient, largely due to increased compliance costs (Deacle, 2017). As such, Q2 2009 is chosen to be the base-year for measuring bank digitalization as it should be more representative of banks making the proactive decision to adopt digital technologies before being compelled to find efficiencies. That is, banks choosing to adopt a digital platform by 2009 were more likely to have

done so by their own volition. For behavior during COVID-19 and looking forward, I organize banks into quintiles based on their Q2 2019 efficiency ratios.

To complete the analysis, I use annual Federal Deposit Insurance Corporation (FDIC) bank branch data to examine how the most and least digital banks in Q2 2009 operate their branch networks throughout the decade ending in Q2 2019, as well as their behavior from Q2 2019 to Q2 2020. Due to the June 30 deadline for annual branch reporting and the persistence of COVID-19 throughout the year, the reported statistics are expected to be a lower bound on bank closures due to the pandemic. I dichotomize the branch activity into urban and rural counties, with urban being defined by the U.S. Census Bureau's definition of metropolitan statistical areas, and I summarize branch closures by digitalization quintile.

Results: Highly Digital Banks Close More Branches and COVID-19 Has Accelerated Digitalization

We see in Table 1 that more digital banks closed a larger share of their branches over the period 2009 to 2019. This result holds in both urban and rural areas, but the closures are more pronounced in urban areas, consistent with findings that online banking adoption is clustered (Hernández-Murillo, Llobet, and Fuentes, 2010) and branch closures are clustered (Tranfaglia, 2018). The annual closure rate is a ten-year average of closures per year; fully 25% of all urban branches that existed in 2009 closed by 2019; at the same time, 18% of rural branches closed. These results suggest that the COVID-19 pandemic resulted in further incentives for technological adoption, the implication being that we should expect more bank branch closures. Further, these closures will likely be concentrated among the most digital banks. Indeed, we see in Table 2 that efficiency ratios decreased from Q2 2009 to Q2 2019 at an average annual rate of 0.94 percent; in the early months of the pandemic, from Q2 2019 to Q2 2020, we see a higher-than-average annual decrease of 1.76%. With the efficiency ratio as our proxy for digitalization, these results indicate the adoption of digital technologies at banks is accelerating.

Table 3 displays similar trends for bank closures based on 2019 bank digitalization scores. The second

Table 1. Historical Bank Digitalization and Branch Closures, 2009-2019

	Branch Closures			
Digitalization Quintile	**Urban**		**Rural**	
1 (most digital)	7,524	41%	1,159	33%
2	3,210	18%	700	20%
3	2,316	13%	676	19%
4	2,616	14%	553	16%
5 (least digital)	2,647	14%	460	13%
Total closures	18,313	100%	3,548	100%
Total 2009 branches	72,277		19,597	
Annual closure rate	2.53%		1.81%	

Source: FFIEC, FDIC; digitalization proxied using efficiency ratios.

Table 2. Efficiency Ratio (ER) Quintile Cutoff Points

Digitalization Cut-offs	Q2 2009	Q2 2019	Q2 2020	Annual Average Change (2009–2019)	COVID-19 Change (2019–2020)
1	0.0	0.0	0.0	-0.47%	-1.37%
2	58.5	55.7	55.0	-0.65%	-1.73%
3	67.8	63.4	62.3	-0.90%	-1.61%
4	77.3	70.3	69.2	-1.42%	-0.34%
5	91.7	78.7	78.4	-1.28%	-3.74%
Average ER	80.7	70.4	67.8	-0.94%	-1.76%

Source: FFIEC.

Table 3. COVID-19 Bank Digitalization and Branch Closures, 2019-2020

	Branch Closures			
Digitalization Quintile	**Urban**		**Rural**	
1 (most digital)	712	33%	119	31%
2	836	39%	132	34%
3	274	13%	56	15%
4	226	10%	51	13%
5 (least digital)	121	6%	24	6%
Total closures	2,169	100%	383	100%
Total 2019 branches	68,311		18,081	
Annual closure rate	3.18%		2.12%	

Sources: FFIEC, FDIC; Digitalization proxied using efficiency ratios.

digitalization quintile holds the largest share of bank branch closures, suggesting that the most digital banks are achieving optimization in their branch networks. We also observe that a larger share of branches closed between 2019 and 2020 than the average closure rate for the preceding decade, implying that COVID-19 has contributed to a relatively high number of branch closures. These results are only representative of the first few months of the pandemic and serve as a lower bound on closures; several banks permanently closed branches that were not reflected in the June 30 FDIC reporting (Alix, 2020; Guilas, 2020).

Conclusion

Highly digital and efficient banks close bank branches at a significantly higher rate than those that are less digital and efficient. In both urban and rural areas, there was a larger-than-average annual increase in bank branch closures from Q2 2019 to Q2 2020, encompassing the beginning months of the pandemic. We also observe that COVID-19 has accelerated digital transformation and initiatives to increase bank efficiency, as measured by the efficiency ratio, at an annual rate much faster than average over the previous decade. As such, we can expect that COVID-19 will continue to increase the number of bank branch closures in the coming years, as at least several individual banks have already indicated. Although closures now outpace openings on net, an extension to this paper could incorporate branch opening behaviors and a spatial component to examine the locations of branches owned by digital and nondigital banks. Doing so would help answer questions about access to financial services more comprehensively.

This article uses the efficiency ratio as a proxy for bank digitalization. It is an imperfect measure, but it does capture many of the noninterest expenses associated with running a large branch network. Future research should explore alternative measures of bank digitalization; these might include current public data such as average personnel expense per employee, assets per employee, occupancy expense ratios, transactional functionality of bank websites, and others. Future work should seek to determine the best way to measure bank digitalization by using publicly available data.

Another limitation that should be addressed in future research, particularly relating to rural credit markets, is that of mergers and acquisitions (M&A). Although the financial metrics used in this paper normalize all banks using income and assets, M&A activity may influence efficiency ratios and branch closures in ways unmeasured by this paper. Are banks that adopt digital technologies more likely to remain independent over time? What happens to the branches of acquired rural banks, and do operational decisions differ if the acquiring bank operated primarily in urban or rural banking markets beforehand?

Finally, there is a need to better understand how bank digitalization and continued branch closures affect access to credit and other banking services. Will digital technologies replace the nuanced information gathering conducted by a hometown lender? And what is the role of bankers and policy makers to ensure equitable access to low-cost credit in the face of these industry-wide transformations? The answers to these questions provide many avenues for future research on regional banking and affected communities.

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