

Updating Retail Bank Merger Review for the Internet Age

BY MARK BOTTI, NICHOLAS HILL, SHERIDAN ROGERS, AND MATHIS WAGNER

CONSUMERS ARE INCREASINGLY banking online and avoiding trips to a brick-and-mortar branch. The 2017 FDIC National Survey of Unbanked and Underbanked Households found that 52 percent of consumers use online banking or mobile banking as their primary method of account access.¹ Conversely, only 44 percent of consumers use a primary method of account access that requires going to a branch or other brick-and-mortar location (i.e., a teller, an ATM, or a kiosk).² These figures represent a significant shift from as recently as 2013, when only 39 percent relied upon a computer or mobile device to do their banking and 57 percent of consumers primarily accessed their accounts via a brick-and-mortar location.³

This steady growth in banking using personal electronic devices is mirrored in the growth of consumers who use a virtual bank. A virtual bank is a bank at which depositors do not typically have access to a physical branch and instead conduct transactions electronically. Popular examples include Charles Schwab Bank, Capital One 360, Ally Bank, Discover Bank, Synchrony Bank, and E*Trade Bank.⁴ Customers of these banks can check balances, transfer funds, and deposit checks using their mobile devices. They use ATMs operated by brick-and-mortar banks (typically without paying a fee), and have access to robust customer service, including online chats with live representatives. Based on FDIC data, we estimate that 5.6 percent of retail banking deposits in the United States were held at online banks in 2018, up from 4.1 percent in 2013.⁵

The growth of virtual banks has important consequences for analyzing retail bank mergers. We show below that current methods for analyzing retail banking mergers will systematically underweight the competitive influence of virtual banks, resulting in biased concentration estimates.

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Bank Merger Review in the United States

Proposed bank mergers in the United States are reviewed by the Federal Reserve and the Antitrust Division of the U.S. Department of Justice. The Fed and the Antitrust Division use somewhat different approaches to analyzing bank mergers, but they are in broad agreement on many points.⁶ Both agencies typically consider two relevant product markets during a bank merger review:⁷ (1) retail banking products and services;⁸ and (2) small business banking products and services.

With respect to the geographic markets, the Fed bases its market definition on Federal Reserve banking markets, which depend upon a range of factors, including “commuting patterns, shopping patterns, interviews with local government and business leaders, and surveys of local households or small businesses.”⁹ The Antitrust Division defines geographic markets on a case-by-case basis using the tools it uses in other merger cases (e.g., the hypothetical monopolist test); it is not bound by the Federal Reserve banking markets and may define narrower or broader markets.¹⁰

The Fed typically screens proposed banking mergers using FDIC data on deposits to calculate market shares.¹¹ It performs this screening using the CASSIDI tool, which the St. Louis Federal Reserve Bank developed.¹² CASSIDI displays FDIC deposit market shares and changes in concentrations for proposed bank mergers in Fed banking markets. The Federal Reserve is likely to scrutinize any market in which a proposed transaction: (1) results in a post-merger HHI¹³ of 1800 or larger and an increase in the HHI of 200 or more, or (2) increases the market share of the acquiring firm to 35 percent or more.¹⁴

The Antitrust Division also uses FDIC deposit data as the basis for calculating market shares to prepare an initial screen.¹⁵ Following the Horizontal Merger Guidelines, the Antitrust Division generally will presume that a proposed transaction will lead to a significant reduction in competition in any market in which it will result in: (1) a post-merger HHI of 2500 or larger, and (2) an increase in the HHI of 200 or more.¹⁶ Note that because the Antitrust Division may define different geographic markets than the Fed, a transaction may pass the more stringent Fed screening limits and yet fail Antitrust Division screening.

If a transaction fails either the Fed or the Antitrust Division screens in a market, the agencies will review additional evidence to determine whether the presumption is rebutted and evaluate the transaction's likely competitive effects. For example, there are several mitigating factors that may lead the Fed or the Antitrust Division to conclude that a transaction that fails screening is unlikely to have anti-competitive effects. These factors include: (1) the likelihood of entry or repositioning in the market, (2) the number of meaningful competitors, (3) whether the market is expanding or contracting, (4) the presence of broadly available credit unions, and (5) if the bank to be acquired is failing or in financial difficulty.¹⁷ It is noteworthy, that the official bank merger guidance does not even address the role of virtual banks.¹⁸ In theory, of course, at this stage of the analysis, merging parties might argue that competition from virtual banks dispels concern.

Practically, however, the finding of a presumption of anti-competitive effects based on market concentration will likely drive the review of the Fed and the Antitrust Division. Even if the presumption were "rebutted," the agencies would likely give significant weight to an inference of effects from their view of market concentration. This stems in part from practical considerations and is reflected in the enforcement record:

In the case of a straightforward combination of banking assets, the parties often address DOJ and Federal Reserve Board concerns by agreeing to divest branches (with associated deposits, loans and personnel). If the parties refuse to divest sufficient assets, the Federal Reserve Board may deny their application or the DOJ may sue to block the transaction. As a practical matter, the parties rarely contest a government decision to require a divestiture.¹⁹

The Fed is particularly wedded to the concentration analysis. For example, in a recent transaction the DOJ concluded that branch divestitures would eliminate the potential for anticompetitive effects from the transaction.²⁰ The divestiture to an "out-of-market" competitor resulted in the same number of competitors with a market structure, "approximately the same both before and after consummation," with a de minimis increase in concentration under the Horizontal Merger Guidelines.²¹ Nonetheless, because of the slight structural increase in concentration, the Fed "view[ed] the competitive effects in this market as presenting a close case."²² The Fed gave no weight to the role of virtual banks in their analysis, and given the Fed's close coordination with and consideration of DOJ's conclusions, neither did the Antitrust Division.

The Rise of Virtual Banks

Figure 1 depicts the primary method that U.S. households used to access their bank accounts per the 2013, 2015, and 2017 editions of the FDIC National Survey of Unbanked and Underbanked Households. The percent of households that used mobile banking as their primary access method

increased from 6 percent in 2013 to 10 percent in 2015 and 16 percent in 2017.²³ This represents a growth of 174 percent in 4 years.

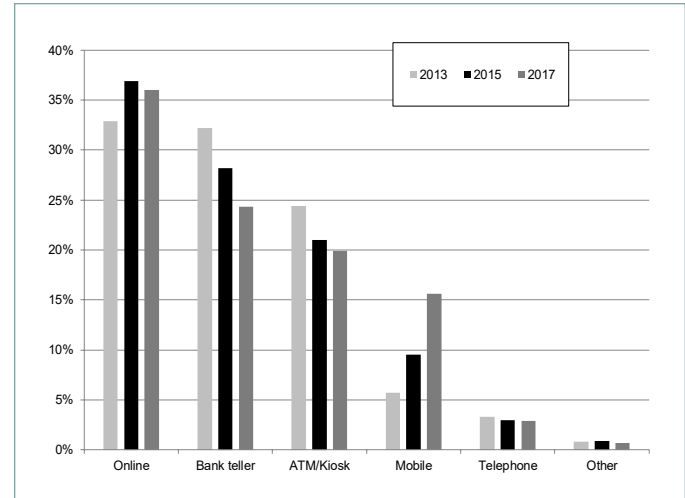


Figure 1: Primary banking methods

Source: 2017 FDIC National Survey of Unbanked and Underbanked Households, table 4.3, p. 26.

Use of bank tellers, ATMs, and kiosks, on the other hand, fell significantly from 2013 to 2017.²⁴ If recent years' trends continued, then online banking and mobile banking likely became the two most common access methods sometime in 2019.

Figure 1 shows that consumers are increasingly comfortable banking electronically and eschewing trips to the branch. Not surprisingly, this shift in attitudes is reflected in the share of deposits held at virtual banks in the FDIC deposit data. Virtual banks have existed since around the mid-1990s,²⁵ and the FDIC data suggests that they initially grew slowly, only exceeding 1 percent in 2003. Their growth has quickened since then, however, and virtual banks now account for 5.6 percent of all FDIC deposits in the United States.²⁶ This growth includes a doubling of virtual banks' share of total deposits over the last 10 years.

The FDIC deposit data contain information on all deposits at retail banks in the United States, including virtual banks. Deposits are assigned to the branch at which they are held. For example, a customer's deposits at a bank branch in Ann Arbor, Michigan, will be listed in the data as being in Ann Arbor.

The dataset works well for analyzing brick-and-mortar banks. It is problematic for virtual banks, however, because they do not have branches and the data do not allow for determining the geographic location of the customer. Consequently, all of a virtual bank's deposits are instead listed in the FDIC deposit data as being located at the virtual bank's headquarters. For example, the deposits of a Charles Schwab virtual bank customer located in Boston are listed in the FDIC deposit data as being in Reno, Nevada, where the

bank is headquartered. This means that Charles Schwab's virtual bank will appear to have a significant share of deposits in Reno, Nevada, but no other location in the United States.

The FDIC deposit data therefore cannot be used to calculate the deposit share of virtual banks in any narrower geography.²⁷ They can, however, be used to calculate the nationwide aggregate deposit share of virtual banks. And as we explain below, we believe that the Antitrust Division and the Fed should use these national shares as a rough proxy for the shares of virtual banks when calculating bank shares in local geographic market shares.

Ignoring Virtual Banks Overstates Concentration

When the Fed and the Antitrust Division review a proposed retail bank merger, they customarily calculate market shares using FDIC deposit data. As mentioned earlier, these data assign deposits to the branch at which they are held. Since virtual banks do not have branches, the FDIC deposit data typically assign all of a virtual bank's deposits to a single location for (the bank's headquarters). This is potentially problematic for merger analysis, because, as described above, the location of a virtual bank's customers is not tied to the location of its headquarters. This treatment of the deposits of virtual banks causes regulators to understate the significance of virtual banks (and overstate the significance of brick and mortar branches) when applying market share screens.

Ignoring Virtual Banks Biases the HHI Upwards.

The first step in calculating an HHI value is defining a market. In this section, following the DOJ and the Fed, we take as our product market retail banking products and services. When the DOJ and the Fed calculate an HHI value in this product market, they use the FDIC deposit data. What we show below is that these calculations are biased upwards in most areas unless one explicitly takes the presence of virtual banks in the data into consideration. That is, we are not making a product market argument that virtual banks must be included—the DOJ and the Fed are *already* doing that. Instead, we show that their calculations are flawed because they do not recognize that virtual bank deposits are dispersed and not concentrated at the headquarters of the virtual bank.

Suppose that virtual banks have in aggregate α percent of the deposits in geographic market m . Suppose further that none of the virtual banks are headquartered in geographic market m , and so their deposits are credited elsewhere in the FDIC deposit data. Then the true market share of brick-and-mortar bank i in market m is:

$$S_{i,m}^{True} = (1 - \alpha_m) * S_{i,m}^{FDIC},$$

where $S_{i,m}^{FDIC}$ is the observed share of bank i in the FDIC deposit data in market m . In any market in which virtual banks have a positive share (i.e., $\alpha > 0$) and no virtual banks are headquartered, every brick-and-mortar bank's share will be overestimated by the FDIC data. For example, if the share

of virtual banks in market m is equal to 20 percent, then the true share of every brick-and-mortar bank is only 80 percent of the share one would calculate using the FDIC data. For example, a brick-and-mortar bank with 50 percent of the FDIC deposits would have a true share of 40 percent.

This overestimate of brick-and-mortar bank market shares will distort the market's HHI. It is straightforward to show that the true HHI in market m is given by:

$$HHI_m^{True} = (1 - \alpha_m)^2 * HHI_m^{FDIC} + \alpha_m^2 * HHI_m^{Virtual},$$

where HHI_m^{FDIC} is the HHI calculated using shares based on the deposit data in market m and $HHI_m^{Virtual}$ is the HHI for virtual banks in market m . For example, if the HHI calculated using the deposit data is 2,500, the share of virtual banks (α_m) is equal to 5 percent, and the virtual bank HHI is 10,000 (i.e., there is only one virtual bank with customers in market m), then the true HHI is actually only 2,281. The HHI calculated using the deposit data overstates the true HHI by 219 points, even with a monopolist virtual bank. This example shows that if the market share of virtual banks is 5 percent—i.e., below the actual national average share for virtual banks—incorrectly excluding them will meaningfully bias the HHI and lead one to overstate significantly the retail banking concentration in market m .

Another way to show the same thing is to calculate what the deposit data HHI must equal for the true HHI to equal or exceed a particular threshold, say 2,500 (i.e., the lowest concentration level at which the DOJ considers a market to be highly concentrated). For the true HHI in market m to equal or exceed 2,500, the deposit data HHI must equal or exceed:

$$HHI_m^{FDIC} \geq (2500 - \alpha_m^2 * HHI_m^{Virtual}) / (1 - \alpha_m)^2$$

Figure 2 depicts the deposit data HHI necessary for the true HHI to be exactly 2,500 for selected values of α (i.e., virtual banks' collective market share in a market). The second column corresponds to the case in which there is a monopolist virtual bank (i.e., the lower bound), while the third column corresponds to the case in which there are a lot of very small virtual banks (i.e., the upper bound). The table shows that if virtual banks collectively have even 5 percent of the deposits in a geographic market, then relying upon the deposit data HHI significantly biases concentration upwards. It also shows that the higher is the share of virtual banks in a geographic market, the higher is the bias associated with excluding them. Given that virtual banks have grown steadily over the past decade, this implies that the bias resulting from ignoring virtual banks and their deposits will likely grow worse over time.

Increase in Concentration Associated with a Merger Will Be Biased Upwards. Estimates of the change in concentration due to a merger in a market will also be biased if virtual banks are not accounted for properly. For any two

FDIC deposit data HHI necessary for true HHI to equal 2,500		
Virtual bank share	Monopolist virtual bank	Many, small virtual banks
5%	2,742	2,770
10%	2,963	3,086
15%	3,149	3,460
20%	3,281	3,906
25%	3,333	4,444

Figure 2: Highly-concentrated cutoff bounds when using deposit data HHI

merging firms A and B , the change in the HHI due to the merger in market m can be calculated as:

$$\Delta HHI_m = 2 * S_{A,m}^{True} * S_{B,m}^{True},$$

where $S_{A,m}^{True}$ is A 's true market share in market m and $S_{B,m}^{True}$ is B 's true market share in market m . If instead of true market shares one uses deposit data shares, then one can calculate the true change in the HHI as:

$$\Delta HHI_m^{True} = 2 * (1 - \alpha)^2 * S_{A,m}^{FDIC} * S_{B,m}^{FDIC} = (1 - \alpha)^2 * HHI_m^{FDIC},$$

where ΔHHI_m^{FDIC} is the change in the HHI calculated using the deposit data. If, for example, the change in the HHI calculated using the deposit data is 200 and the aggregate share of virtual banks is 5 percent, then the true change in the HHI is 181. That is, even a virtual bank share of 5 percent—i.e., less than the current national average share for virtual banks—is sufficient for the HHI calculated using deposit data to be biased upwards to a significant degree.

Figure 3 shows the minimum increase in the HHI necessary in the deposit data for the increase in the HHI to equal 200 points. It shows that the higher is the share of virtual banks in a geographic market, the higher is the bias that results from using shares based on the deposit data if one does not account for virtual banks.

Adjusting for Virtual Banks

The rise of virtual banks (and virtual bank deposits) has two important implications for how the Antitrust Division and the Fed should calculate market shares and concentration measures in banking markets. First, when they use FDIC data the agencies should remove deposits of virtual banks from their headquarter markets. Failure to do so will make it appear that certain virtual banks dominate the markets in which they are headquartered.

Second, the agencies should adjust market shares and concentration measures calculated with FDIC deposit data to account for the presence of virtual banks. This is more difficult because there is no publicly available data source that shows where virtual bank deposits belong. We discuss this problem and a simple way to solve it below.

FDIC deposit data delta HHI necessary for true delta HHI to equal 200	
Virtual bank share	
5%	222
10%	247
15%	277
20%	313
25%	356

Figure 3: Minimum deposit data increase in HHI for actual increase in HHI to equal 200

A central challenge in adjusting market shares and concentration measures calculated with FDIC deposit data to account for virtual banks is determining where virtual bank customers are located. Ideally, one would collect data on the locations and deposits of virtual bank customers and then account for these when constructing HHIs in particular geographic markets. Unfortunately, such data are not publicly available.

The lack of information on the locations of virtual bank customers presents two related problems for adjusting for the presence of virtual banks in a particular geographic market m . First, it means that one cannot determine the aggregate share that virtual banks have in market m . Second, it means that one cannot calculate how that aggregate virtual bank share is distributed across particular virtual banks in market m . In the following two sub-sections, we propose a simple solution to both these challenges.

Estimating the Share of Virtual Banks in Market m .

One solution to estimating the share that virtual banks have in geographic market m is to assume that virtual banks have the same share in geographic market m as they have nationally. Using this assumption (and the additional assumption discussed in the following subsection), one can adjust concentration measures to account for virtual banks using only the information contained in the FDIC deposit data. A strength of this approach is that it needs no data beyond the FDIC deposit data and simplifies calculations.

The approach is not perfect: it is likely that the share of virtual banks varies systematically by market. The FDIC survey on unbanked and underbanked consumers, for example, finds that the likelihood of relying upon online and mobile banking increases with income and education, decreases with age, and rises in metropolitan areas.²⁸ This means that assuming that the market share of virtual banks equals its national average is likely an underestimate in some areas and an overestimate in others. As richer data on the prevalence of virtual banking in different banking markets become available, it will be possible to refine estimates of virtual banks' market share.

Estimating the Virtual Bank Concentration Level in Market m . Absent data from virtual banks themselves, we are not aware of a data source that would allow one to cal-

culate the market share of a particular virtual bank in a particular market m . This makes it difficult to calculate an exact virtual bank HHI in market m . One approach to solving this data deficiency is to assume that the virtual bank HHI in market m is equal to the national virtual bank HHI. This approach is simplistic, but there is no reason to believe that the virtual bank HHI in market m varies systematically with the demographic (or other observable) characteristics in market m . Further, because virtual banks do not depend upon brick-and-mortar assets of their own, it is not clear why their appeal should vary significantly across markets, which suggests that their national share should be well correlated with their local share. Accordingly, we assume in what follows that the virtual bank HHI in a particular market m is equal to the national virtual bank HHI. If more detailed data were to become available, this assumption would be straightforward to update.

Figure 4 depicts the national HHI for virtual banks over time. It shows that the virtual bank HHI fell significantly between 1994 and 2003 as virtual banks began to establish themselves. Since then, including over the past ten years, the concentration level has been fairly stable, with the national HHI typically being below 2,000. In 2018, our estimated HHI for deposits at virtual banks was 1,579.

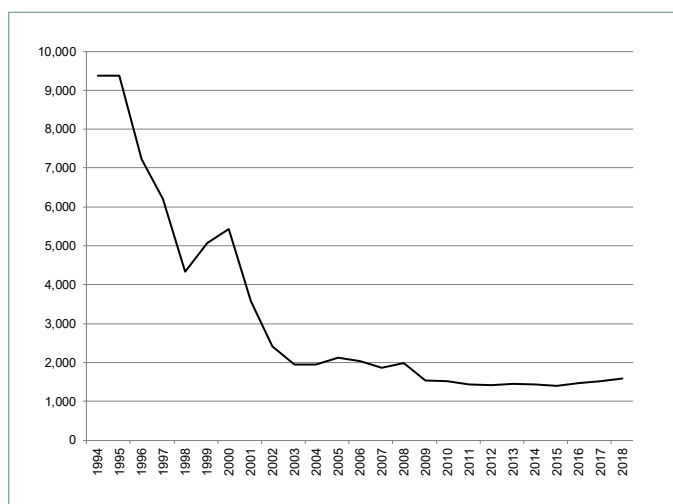


Figure 4: HHI for deposits at virtual banks, by year

Source: FDIC deposit data.

An Illustrative Example: the BB&T and SunTrust Merger

To illustrate how the rise of virtual banks impacts banking market HHIs and the evaluation of mergers, we use the proposed merger between BB&T and SunTrust as an illustrative example.²⁹ These two banks, which were both concentrated in the southeastern United States, recently closed their merger and became Truist.³⁰ In terms of deposits, BB&T and SunTrust were the tenth and eleventh largest banks in the United States, and their combined deposits made them the fifth-largest (just ahead of U.S. Bank).³¹

In 2018, the two banks had overlapping branches in about 185 counties and 81 Federal Reserve banking markets. The median pre-merger HHI in these counties was 1,581, while in Fed banking markets it was 1,295. Based on the FDIC data, we expect that the Antitrust Division screen raised initial flags in 29 counties and the Fed screen raised initial flags in 11 Fed banking markets.³²

However, these numbers do not account for the presence of virtual banks. In this section, we reapply the Antitrust Division and Federal Reserve screens after accounting for virtual banks. To do so, as discussed above, we assume that the share of virtual banks in each relevant market is equal to the national average.³³ We assume also that the virtual bank HHI in each relevant market is equal to the national virtual bank HHI.

For markets in which there is an overlap between BB&T and SunTrust, accounting for the presence of virtual banks decreases the estimated post-merger median HHI from 1,735 to 1,550 in counties, and from 1,472 to 1,316 in Fed banking markets. We estimate that an initial screening accounting for virtual banks would raise flags in only 19 counties (as opposed to 29 if they are not accounted for) and 9 Federal Reserve banking markets (as opposed to 11). One of the two Fed banking markets that moves from failing initial screening to passing it after accounting for virtual banks is Atlanta, the country's fifteenth-largest banking market in terms of deposits in 2018.

Thus, accounting for virtual banks could have had a significant effect on the market screening tests for the BB&T and SunTrust merger. It would have reduced the number of counties that failed screening by over one third (10 out of 29) and the number of Fed markets that fail screening by almost one fifth (2 out of 11). Further, it would have removed the large Atlanta banking market from the set of markets that failed initial screening.

Local Banking Concentration Levels Distorted by Omission of Virtual Banks

There are concerns that deregulation has led to excessive concentration in many industries, including banking.³⁴ This concern was raised in the discussion of the merger between BB&T and SunTrust.³⁵ One response to these concerns is the fact that at the national level banking is comparatively unconcentrated.³⁶ This is true but misleading: antitrust banking markets are narrower than national, and banking concentration levels are higher at the local level than at the national level. For example, based on FDIC data, in 2018 the median HHI across Fed banking markets was 2,181, and across counties it was 2,738. In 2018, 41 percent of Fed banking markets and 57 percent of counties would be considered highly concentrated by DOJ guidelines (i.e., have an HHI above 2,500).

This raises the question of whether there has been a systematic increase in concentration levels in banking. When concentration is measured by FDIC deposits without adjust-

ing for virtual banks, concentration levels do appear to have increased. Figure 5, which is based on FDIC deposit data, shows that median local banking HHIs appear to have increased significantly since the Great Recession.³⁷ Indeed, the median concentration level in Fed banking markets appears to be as high as it has been since the passage of the 1994 Riegle-Neal Interstate Banking and Branching Efficiency Act (the first year for which we have data), and the median concentration level in counties appears to be close to its highest-observed level.³⁸

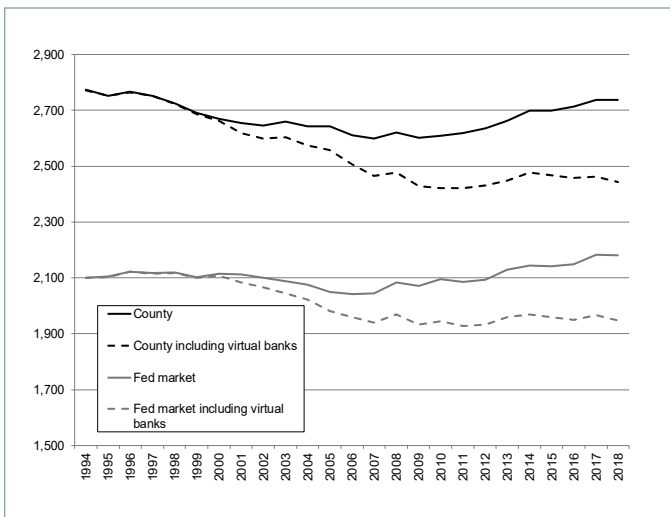


Figure 5: Median HHI in local banking markets, 1994–2018

Source: FDIC deposit data.

Note: The HHI levels that include the virtual banks are upper bounds on the HHIs as they assume that all deposits for virtual banks are for one bank. In reality, there could be multiple virtual banks, which would decrease the HHIs.

Such metrics, however, are misleading because they do not account for the growth of virtual banks. This is illustrated in Figure 5 by the dotted lines, which show concentration levels once virtual banks are accounted for. The dotted lines show that the median HHI is close to its lowest point since 1994 in both Fed banking markets and counties. That is, rather than increasing over time, concentration in local banking markets appears to have decreased (though most of this decrease took place between 2000 and 2007) once one considers the growth of virtual banks.

Conclusion

Virtual banks have grown steadily over the past 20 years and now account for almost six percent of all deposits. Regulatory agencies have not responded to this development and continue to base their assessment of proposed banking mergers on HHI calculations that do not account for deposits at virtual banks. This results in a systematic and increasing overestimate of local banking market HHIs and the increase in concentration associated with a merger. The practical implication is that in the evaluation of proposed mergers, too many banking markets are likely being flagged as potential-

ly problematic. More broadly, ignoring competition from virtual banks leads to the erroneous conclusion that local banking markets have become more concentrated over the past decade. As consumers' banking habits are changing, it is important to keep pace with new sources of competition in banking markets. This argues for the Fed and the Antitrust Division to take account of virtual banks. ■

¹ FED. DEPOSIT INS. CORP., 2017 FDIC NATIONAL SURVEY OF UNBANKED AND UNDERBANKED HOUSEHOLDS, at 5, tbl. ES.4 (Oct. 2018) [hereinafter 2017 FDIC NATIONAL SURVEY].

² *Id.*

³ *Id.*

⁴ Virtual banks are also called direct banks, online banks, branchless banks, or internet-only banks. From the perspective of this article, the crucial distinction between deposits at a virtual bank and brick and mortar bank is whether the deposits at a branch come from customers who bank there or whether, as is the case for a virtual bank, the deposits come from online customers (potentially from all over the country) and there is no associated physical branch a customer can visit.

⁵ FED. DEPOSIT INS. CORP., SUMMARY OF DEPOSITS (database accessed on Feb. 2, 2019), <https://www7.fdic.gov/sod/dynaDownload.asp?baritem=6> [hereinafter FDIC SUMMARY OF DEPOSITS].

⁶ FED. RESERVE, FAQs: How Do the Federal Reserve and the U.S. Department of Justice, Antitrust Division, Analyze the Competitive Effects of Mergers and Acquisitions Under the Bank Holding Company Act, the Bank Merger Act and the Home Owners Loan Act? Questions 28–32, (Oct. 9, 2014), <https://www.federalreserve.gov/bankinfo/competitive-effects-mergers-acquisitions-faqs.htm> [hereinafter BANKING MERGERS FAQs].

⁷ *Id.* Questions 9 and 29.

⁸ That is, banking products and services provided to households.

⁹ BANKING MERGERS FAQs, *supra* note 6, Questions 10–13, 14.

¹⁰ *Id.* Question 29.

¹¹ *Id.* Question 11 (“The primary data used to construct market shares and HHIs for local banking markets are deposits obtained from the Federal Deposit Insurance Corporation’s Summary of Deposits (SOD, available at <http://www2.fdic.gov/sod/>) [FDIC SUMMARY OF DEPOSITS]. These data include the location of each branch of all FDIC-insured banking institutions and the dollar value of deposits at each branch. These branch-level deposits allow the calculation of total deposits for each institution in a local banking market. Deposits are considered a reasonable indicator of the level of activity or output of a depository institution because deposit accounts are widely held by consumers and small businesses and are held in combination with other commercial banking products. In addition, for smaller institutions, deposits may be considered a measure of a bank’s lending capacity.”).

¹² *Id.* Question 7. CASSIDI stands for Competitive Analysis and Structure Source Instrument for Depository Institutions. FEDERAL RESERVE BANK OF ST. LOUIS, WELCOME TO CASSIDI, <https://cassidi.stlouisfed.org/index>.

¹³ The HHI, or Herfindahl-Hirschman Index, is a frequently used measure of concentration. It is calculated as $HHI = \sum_{i=1}^N s_i^2$, where s_i is the market share in percent of firm i in the market, and N is the number of firms; and takes on a value between 0 (all firms are infinitesimally small) and 10,000 (there is only a single firm). U.S. Dep’t of Justice & Federal Trade Comm’n, Horizontal Merger Guidelines § 5.3 (2010), <http://ftc.gov/os/2010/08/100819hmg.pdf> [hereinafter Horizontal Merger Guidelines].

¹⁴ BANKING MERGERS FAQs, *supra* note 6, Question 4.

¹⁵ *Id.* Question 29.

¹⁶ Horizontal Merger Guidelines, *supra* note 13.

¹⁷ BANKING MERGERS FAQs, *supra* note 6, Questions 22 and 32.

¹⁸ *Id.* Question 16–19.

¹⁹ ABA SECTION OF ANTITRUST LAW, BANK MERGERS AND ACQUISITIONS HANDBOOK 73 (2006).

- ²⁰ First Financial Bancorp, Fed. Reserve Sys., 2018-07 FRB 13 (Feb. 22, 2018), <https://www.federalreserve.gov/newsevents/pressreleases/files/orders20180222a.pdf>. Authors Mark Botti and Nicholas Hill worked on behalf of one of the merging parties.
- ²¹ *Id.* at 12.
- ²² *Id.* at 13.
- ²³ 2017 FDIC NATIONAL SURVEY, *supra* note 1, at 5, tbl.ES.4. Fourteen percent of households report not having visited a bank branch in the past year, which is close to the 16% of households the report relying primarily on mobile banking. *Id.* at 29, fig.4.
- ²⁴ *Id.* at 5, tbl.ES.4.
- ²⁵ For example, NetBank was founded in 1996 and had its initial public offering in 1997. NETBANK INC (NTBK) IPO, NASDAQ, <https://www.nasdaq.com/markets/ipos/company/netbank-inc-10779-8582>.
- ²⁶ To calculate shares and, subsequently, HHIs we follow DOJ guidelines and weight deposits in thrifts by 50%. BANKING MERGER FAQs, *supra* note 6, Questions 5 and 16. However, all our results are robust to the treatment of thrifts since these now account for only around 5% of all FDIC-insured deposits. Weighting thrifts at 100% would decrease the share of virtual banks to 5.5%.
- ²⁷ Our basis for calculating deposits at virtual banks is the branch type “cyber office” in the FDIC data. There are challenges in calculating the share of deposits held in virtual banks using this designation, but these are not insurmountable. For example, there is inconsistent labeling of branch type as “cyber,” i.e., deposits at a virtual bank may be labeled as belonging to a cyber branch in one year and a brick and mortar branch in the next year. Further, the acquisition of virtual banks by brick and mortar banks that are starting an online-only division, e.g., the 2011 acquisition of ING Direct by Capital One to start Capital One 360, is dealt with inconsistently in the data. Similarly, brick and mortar banks that start a distinct online-only bank label the virtual bank deposit inconsistently, i.e., sometimes these are labeled as belonging to a brick and mortar branch and sometimes as belonging to a cyber branch. In order to obtain a consistent time series we only included deposits for virtual banks where (1) we could consistently track online-only deposits over time (including through episodes of mergers, acquisitions, name changes, and bankruptcies), and (2) we could verify through an internet search that the deposits plausibly belonged to online-only banking customers. As a result, we do not include deposits for all virtual bank deposits. However, some of the virtual banks we identify may have some brick and mortar offices. This is notably true for Charles Schwab. Ultimately, we designate only around 29 percent of all branches that are “cyber branches” in the FDIC data as belonging to a virtual bank. As such, we may be underestimating the true prevalence of virtual banks.
- ²⁸ 2017 FDIC NATIONAL SURVEY, *supra* note 1, at 5, tbl.4.4.
- ²⁹ The choice is topical, but the numbers should be considered entirely illustrative rather than definitive. We do not intend for this example to inform the discussion on the actual BB&T-SunTrust merger.
- ³⁰ Truist News Release, BB&T and SunTrust Complete Merger of Equals to Become Truist (Dec. 9, 2019), <https://media.truist.com/2019-12-09-BB-T-and-SunTrust-complete-merger-of-equals-to-become-Truist>.
- ³¹ FDIC SUMMARY OF DEPOSITS, *supra* note 1. In 2018, according to the FDIC deposit data, BB&T had deposits of \$167 billion and SunTrust of \$165 billion.
- ³² See the discussion above for how these agencies officially conduct their initial banking merger screening.
- ³³ We assume also that the merger results in a new bank that combines BB&T and SunTrust 2018 deposits.
- ³⁴ COUNCIL OF ECONOMIC ADVISORS, BENEFITS OF COMPETITION AND INDICATORS OF MARKET POWER 4 (2016), https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160414_cea_competition_issue_brief.pdf; *Too Much of a Good Thing*, ECONOMIST (Mar. 24, 2016), <https://www.economist.com/briefing/2016/03/26/too-much-of-a-good-thing>; Ryan Knutson & FrancisTheo, *Wave of Megadeal Tests Antitrust Limits in U.S.*, WALL ST. J. (Oct. 18, 2015), <https://www.wsj.com/articles/wave-of-megadeals-tests-antitrust-limits-in-u-s-1445213306>; The Editorial Board, *Opinion, How Mergers Damage the Economy*, N.Y. TIMES (Oct. 31, 2015), <https://www.nytimes.com/2015/11/01/opinion/sunday/how-mergers-damage-the-economy.html>.
- ³⁵ Americans for Financial Reform, *SunTrust-BB&T Merger: Deregulation Is Encouraging the Creation of Regional Megabanks*, MEDIUM (Feb. 15, 2019), <https://medium.com/@RealBankReform/suntrust-bb-t-merger-deregulation-is-encouraging-the-creation-of-regional-megabanks-ab361103b97d>.
- ³⁶ GREG BAER, BANK POLICY INSTITUTE, THE BANKING INDUSTRY IS UNCONCENTRATED, AND WILL REMAIN SO AFTER THE BB&T/SUNTRUST MERGER, (2019), <https://bpi.com/the-bbt-corp-and-suntrust-banks-merger-will-not-raise-the-concentration-of-the-banking-industry/>.
- ³⁷ The same is true for mean concentration levels.
- ³⁸ Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, 103 P.L. 328, 108 Stat. 2338.