Why Banks Matter: Measuring the Impact of Banks on Missouri's Economy

A report prepared for the Missouri Bankers Association

by

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Executive Summary

Throughout Missouri, banks are the economic engines for their communities, funding business activity and supporting community needs that fuel local and state economies. In turn, this spurs community development affecting homes, schools and businesses.

However, what would happen to Missouri communities if banks did not exist? Individuals trust banks to keep their finances, typically checking, savings and certificates of deposit, secure. If this money was not available, banks would no longer be able to secure loans for borrowers seeking to establish or enhance their businesses or for borrowers wishing to purchase homes in the community. Would communities thrive if there was no one to support business development? Would schools have resources to teach students? Does a bank significantly impact the livelihood of a community?

In short, the answer is yes.

People trust their deposits for safekeeping in their banks. This allows borrowers to obtain funding through banks to purchase homes, establish and operate businesses, pay employees and invest in equipment. When considering the role banks play in their communities, it is clearly obvious that banks are critical to economic growth.

The purpose of this study is to quantify the impact that Missouri banks have on the state's economy, as well as local communities. The most commonly used measure of the Missouri economy is real gross domestic product (GDP), which is the market value of goods and services purchased by final users within the state boundaries. We can determine the economic impact of banks on their communities by examining the difference in Missouri's real GDP when banks operate as usual as compared to the real GDP when banks stop making loans. When banks

operate as usual, the Missouri economy grows at the same rate each year as the average annual growth rate between 1997 and 2014. The business-as-usual case is called the control. However, suppose banks stopped loaning money to their customers ― entrepreneurs, businesses, farmers ― for one year. Without these loans, there would be fewer new businesses started, fewer investments in machines and buildings, and smaller harvests, all resulting in less production and a decline in real GDP. The no-loan scenario is called the treatment. The economic impact is the difference between the control and the treatment value of real GDP measured throughout a 25 year period.

In addition, the economic impact of Missouri banks does not rest solely on loans. Rather, one also must acknowledge and quantify the major philanthropic contributions that banks make at the state level and in their local communities. In almost every community, banks contribute to local youth sports, support the area/regional arts and meet various other community needs, both monetarily and through individual volunteer hours and service. Organizations such as Kiwanis, the Lions Club and others greatly benefit from the banks' involvement.

The report's main findings are summarized as follows.

- Based on the last three years' worth of data on financial institutions, we have compiled data on all of the Missouri Bankers Association's member banks. These banks have made loans associated with expanded production capabilities totaling no less than $10.8 billion a year to Missouri businesses.
- Therefore, more than 25 percent of the investment spending in Missouri is attributable to loans made by Missouri banks. Suppose member banks stopped making $10.8 billion worth of loans to Missouri businesses. The economic impact is measured by the difference in real GDP with member banks operating as normal and

member banks not loaning $10.8 billion to Missouri businesses. Throughout 25 years, economic impact measured by the discounted sum of these differences in real GDP is $170.2 billion.

- This loss is roughly two-thirds of Missouri's 2014 real GDP. In other words, the Missouri economy would lose eight months' worth of production over a generation if Missouri banks stopped making loans to Missouri businesses.
- In terms of jobs, real GDP losses correspond to more than 130,000 jobs that would be lost because Missouri banks are not making business loans.
- There also are losses of public goods and services. With a smaller Missouri economy, state government will suffer lost revenues. The discounted sum of lost revenues throughout the 25 year period is $6.5 billion. The lost revenue over a generation is more than 80 percent of what state government spent in 2015. The implication is that roads, schools and other government services will shrink accordingly.
- Even if the value of loans was partially offset by future loans made by other banks to Missouri businesses, there is a sizable loss as Missouri real GDP approaches nearly $90 billion.
- In addition, banks and their employees are involved in their community activities in various ways, including, but not limited to, volunteer activity and charitable giving. Based on the net income reported by member banks, and assuming that banks give at the same rate as corporations in other industries, the estimated 2014 value of charitable giving was $31.3 million.

Policy Recommendations

Our research clearly shows the quantitative importance of banks to the Missouri economy. Yet, are there ways in which changes to policy and/or regulations could improve the manner in which banks operate and in turn increase the value they provide to both individuals and communities? It is clear that the recent increase in banking regulation was fueled by the 2007-2009 financial crisis. Despite the well-intentioned desire to "do something" to avoid future crises, the risk is that new policies and regulations will "throw the baby out with the bathwater."

As shown by this report, community banks play significant roles in bringing together lenders and borrowers. Just one year of inactivity by community banks would result in a huge cost to the Missouri economy. Any new policies or regulations aimed at curtailing the work performed by community banks or the number of community banks would have a long-lasting deleterious effect on the Missouri economy. Therefore, as policymakers consider various changes to banking regulation, it is imperative they completely understand the consequences associated with disrupting community banks and their operations. Their choices on banking regulations will determine if Missouri's local and state economies flourish or deteriorate.

1. Introduction

Savers are essential for economies to grow. The simple act of saving provides funding for capital investment projects. But it is also important to understand the various ways that funds get from savers to the people using the monies for new buildings and equipment. Banks play a critical role in taking what savers have and providing the funding for capital investment projects. Of course, banks do lots of other things – they provide loans to help smooth consumption spending, give depositors a higher return than if they went to borrowers on their own, and lower total costs associated with monitoring loans. Banks are vital parts of the communities in which they operate.

The Missouri Bankers Association is a collection of 294 member banks. Many of these banks operate only in Missouri, others have locations in a handful of other states, and a handful are national banking operations. In this report, the goal is to quantify the impact of banks on the economy. More specifically, I compute the value of economic loss associated with banks not making loans to people and businesses who are attempting to expand their productive capabilities. The data are for banks that are members of the Missouri Bankers Association.

Economic impact is principally about two things. The first is to identify what is being lost. Most frequently, real Gross Domestic Product (GDP) is used as the measure of aggregate economic activity. Real GDP is defined as the market value of all final goods and services produced in a geographic region over time.

The second is to determine how to measure the impact that is associated with a change. For the purposes of this report, it is important to start with the premise that real GDP is produced by people making decisions. People decide how much they want to work, how much they want to save, how many people to hire, etc. In this report, our focus is on the saving decision. Saving provides the raw materials that companies can borrow in order to finance things like big equipment and building projects. We know that banks are important, bringing savers and borrowers together. But if banks stopped making loans to borrowers, the quantity of inputs available to produce goods and services would decline. With fewer inputs, there would be a gap in a given year between what real GDP would have been with “normal” bank loans and what real GDP would have been without the loans. Moreover, modern aggregate economics

focuses on dynamics so that the economic impact is considered over time. To provide a quantitative measure of the economic impact, we need to measure the gap in real GDP over time. Thus, economic impact is measured as the sum of the differences between real GDP in Missouri if banks continued to operate as usual (the control) and real GDP in Missouri under the assumption that banks ceased operations by making no loans associated with expanding productive capacity (the treatment).

So soon after the 2007-09 Financial Crisis, ceasing operations sounds draconian enough to create a major depression. There is one critical difference between our notion of ceasing operations and events that accompany a financial crisis. By assumptions, depositors are not harmed by the definition of ceasing loans made for expanding productive capacity. Depositors' funds are available, but are not used to finance new buildings, equipment, etc. Typically, in a financial crisis, the underlying value of the bank results in the value of deposits falling.[1] There is no loss suffered by depositors in the analysis. Rather, member banks stop making the loans that are necessary for funding investment projects in Missouri. By the author's estimates, members of the Missouri Bankers Association accounted for an average of $10.8 billion in loans directed toward capital purchases over two years in 2013 and 2014.

The economic impact is large. If we subtract $10.8 billion worth of loans in 2015 from the Missouri economy, there is a lasting effect. It is true that the Missouri economy will grow over time, but that one-time reduction in capital purchases means that there is a smaller base in 2015. After discounting the future real GDP losses in current dollars, the economic impact is $170 billion between 2015 and 2040. Alternatively, suppose member banks do not make loans in 2015, but depositors are capable of partially offsetting that one-year loss by making $5.4 billion in "extra" loans in 2016. The author's calculations indicate that the discounted sum of lost real GDP is $104 billion over the 2015-2040 period. The bottom line is that banks play a big role in the Missouri economy.

[1] This is certainly what happened during the bank failures of the Great Depression. In the 2007-09 Financial Crisis, the decline in value occurred in the Shadow Banking Sector. According to Gorton (2010), financial institutions deposited funds with other financial institutions, primarily in the form of repurchase agreements. As mortgage-backed securities, which were used as collateral in the shadow banking deposit arrangements, declined in value, financial institutions began withdrawing their deposits by not renewing the repurchase agreements. Gorton referred to this as a classic bank run with financial institutions—shadow banks—acting as withdrawers. See, Gorton, Gary, (2010), *Slapped by the Invisible Hand: The Panic of 2007*, Oxford: Oxford University Press.

In addition, banks play other important roles in their communities. Philanthropic efforts, including youth sports, cultural exhibits, and other sponsorships, do not show up in standard economic impact measures.

1. How have Missouri banks performed over time?

There is no doubt that the Great Recession, or if you prefer, the 2007-09 Financial Crisis, affected financial corporations. In contrast to the Great Depression, commercial banks did not experience bank runs during the 2007-09 Financial Crisis. But the banking industry could not escape the large fluctuations in asset values that occurred.[2]

An important question is, how have banks and their operations in Missouri changed over time? Rather than look at performance measures for Missouri banks, it is useful to compare key performance measures for Missouri banks *relative to* banks across the United States. Because of the Great Recession, it is natural to look at Missouri banks and United States banks in terms of amplitude of cyclical fluctuations. For instance, did Missouri banks record larger or smaller fluctuations in these performance measures than United States banks? The data go back to 2000, so there is some evidence relating to longer-term trends emerging for Missouri banks relative to United States banks.

To begin, it is useful to get a sense of how Missouri banks have performed. There are 21 measures of bank performance obtained by the Federal Reserve Bank of St. Louis FRED dataset that represent important performance measures for banks at both the state level and the national level. In addition to providing a look into how Missouri banks are doing relative to banks across the country, it is important to get a sense of how these relative performances have changed over time.

There is a common time frame for this historical review; specifically, the data are quarterly observations, beginning in the first quarter of 2000 and ending in the first quarter of 2015. The unit of observation is the activity in all the commercial banks headquartered in Missouri. In addition, data for all the commercial banks headquartered in the United States are also used. Throughout the remainder of this report, 'commercial bank' is used as a synonym for the commercial banks headquartered in Missouri or the United States. Therefore, the data will

[2] For example, stock price indexes declined by 40 percent.

focus on the following question: for a given measurement of bank activity, how have commercial banks in Missouri behaved relative to commercial banks in the United States?

By taking observations from 2000 to 2015, the data cover two full business cycles and the expansion that began in 2009.[3] A business cycle peak occurred in the first quarter of 2001. The recession ended in the fourth quarter of 2001. The business cycle expansion lasted from the fourth quarter of 2001, ending in the fourth quarter of 2007. The Great Recession ended in the second quarter of 2009, and the United States economy has been in an expansion since.

In this section, the chief purpose is to provide a description of banks in Missouri relative to banks in the rest of the country. A number of different measures will be presented and each will provide insight into the decisions made by bank management. The data will lay the groundwork for understanding bank activity and the relationship with broader measures of economic activity at the state level. Keep in mind that banks are an important source of funding for businesses. By providing working capital and the machines and buildings that produce goods and services, banks are an important link between savers and borrowers. Furthermore, this link can account for the pace of economic growth in a region.

The first data presented are the number of commercial banks in Missouri divided by the number of commercial banks in the United States. Figure 1 plots this ratio for the 2000:Q1 through 2015:Q1 period. The ratio indicates that the fraction of United States banks headquartered in Missouri has increased from 4.3 percent to 5.1 percent over the past 15 years. By looking at the number of Missouri commercial banks, you learn that compared to 2000, there are 80 fewer banks in Missouri in 2015.

[3] Business cycle dates are taken from the National Bureau of Economic Research. The complete set of dates can be found at http://www.nber.org/cycles.html.

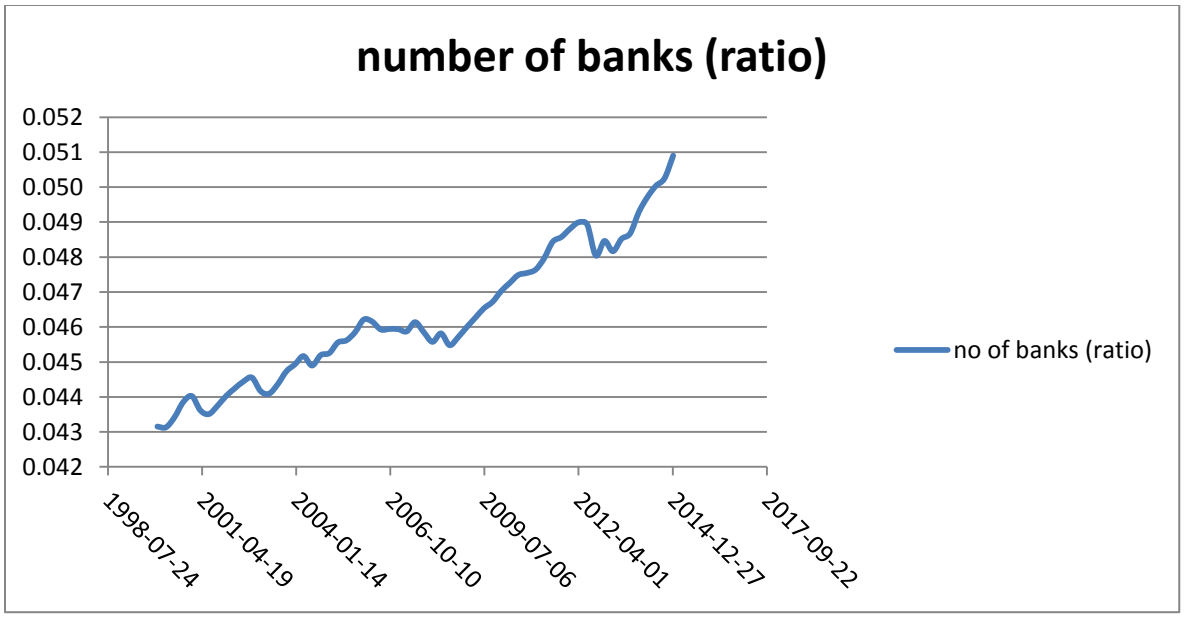

Figure 1. Numbers of commercial banks in Missouri divided by number of commercial banks in United States. *Source St Louis FRED database*

One can infer that the increase in the ratio of Missouri commercial banks to United States banks is due to the fact that the number of United States banks decreased by a larger number. Indeed, there are nearly 3,000 fewer banks in the United States in 2015 compared with 2000. Based on the movements in the number of banks in the United States and the number of banks in Missouri, one can infer that the number of commercial banks has been declining across the United States, but has been shrinking at a lower rate in Missouri.

Simply counting the number of commercial banks in one state or another does not tell us anything about the health or the operations of the commercial banking industry. The remaining figures presented in this review of Missouri banking will concentrate on different outcomes affecting bank balance sheets and income statements.

For commercial banks, there were more loan defaults and income losses during the 2007-09 Financial Crisis. Did Missouri banks experience the losses to the same extent as banks in the rest of the United States? Figure 2 starts with the ratio of net loan loss to average total loans. The blue line depicts this ratio for Missouri banks, while the red line depicts the ratio of United States banks. Figure 2 shows that there was a spike in this ratio for both Missouri banks and for United

States banks, starting in 2006 and peaking in 2009. The implication is that banks across the country were affected by the downturn in economic conditions and the corresponding

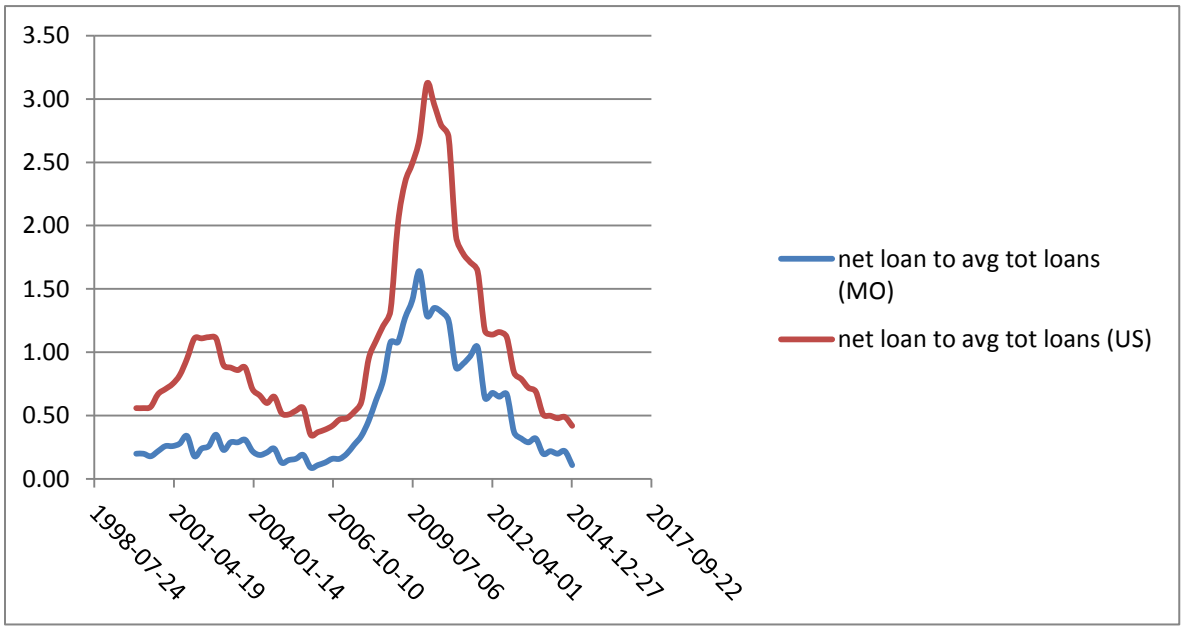

Figure 2. Net Loan loss to average total loans for Missouri (blue) and for the United States (red). *Source: St Louis FRED database.*

defaults associated with declining incomes. For United States banks, the net loan losses relative to average total loans peaked at around 3 percent. Missouri banks recorded smaller losses as the net loan losses divided by average total loans peaked at around 1.5 percent. Figure 2 shows that the ratio is strictly lower for Missouri banks compared with United States banks in each quarter during the entire 15-year period plotted.

Figure 3 plots the ratio of loan loss reserve to total loans for Missouri commercial banks and United States banks. Loan loss reserves are how banks account for future loan losses. With an increase in bank loans, the bank will increase the account entry for loan loss reserves. An increase in loan loss reserve relative to total loans, for example, is consistent with the belief that a larger fraction of the loans will not be repaid. According to Figure 3, the pattern of loan loss reserve-to-total loans is similar over time to the pattern of net loan loss-to-total loan. The loan loss reserve ratio begins to increase in 2006 and peaks in 2009. Figure 3 shows that Missouri

banks did not record as sharp an increase in loan loss reserves compared with United States banks.

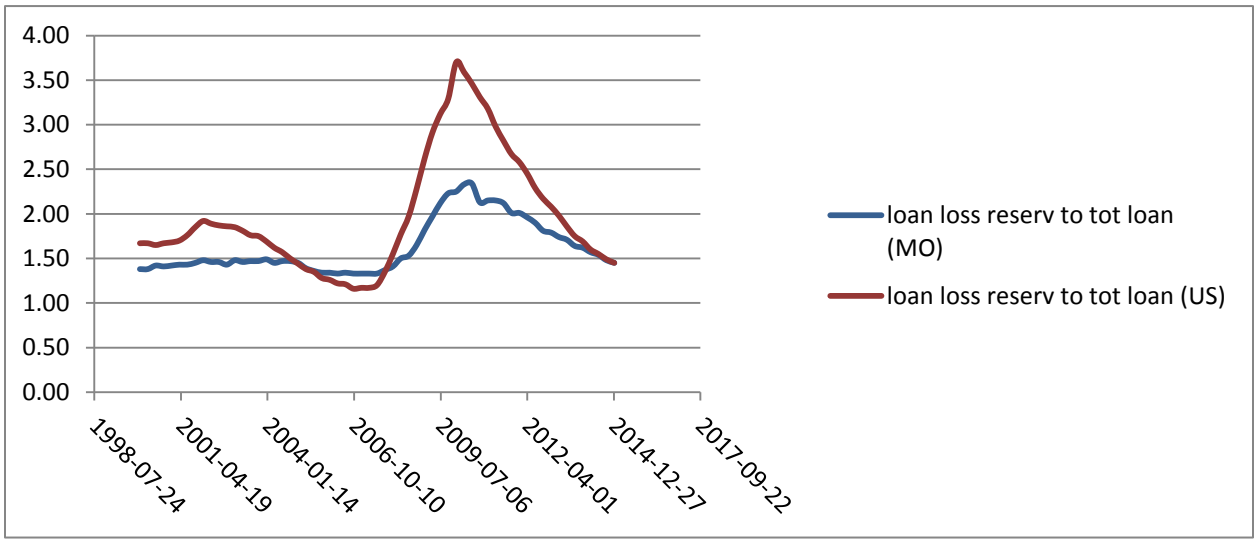

Figure 3. Loan loss reserve to total loans for Missouri (blue) and United States (red). *Source: St Louis FRED database.*

Together, Figures 2 and 3 indicate that Missouri banks recorded a smaller percentage of loan losses than did commercial banks in the rest of the country. As incomes fell during the Great Recession, loan losses increased across the country. However, as a fraction of total loans, Missouri banks recorded smaller losses than did other commercial banks in the United States. The loan loss reserve accounts did not increase by as much in Missouri banks as in United States' banks. This evidence suggests that Missouri banks were subject to less default risk than banks in the rest of the country, and expected a higher percentage of the loans would be repaid.

Loan loss captures the flow of interest and principal repayments made to the bank. The existing stock of loans can be divided into performing loans and nonperforming loans. Nonperforming loans are those in which a series of interest payments or the principal payment has not been paid to the bank. Figure 4 plots the ratio of nonperforming loans to total loans for Missouri banks and United States banks. The data provide a clear picture of the Great Recession's impact on the banking industry and are consistent with what we observed in loan loss data. Beginning in 2007, banks began seeing an increase in the ratio of nonperforming loans to total loans. Missouri banks followed the nation as the fraction of nonperforming loans to total

loans peaked in 2010. For the last five years, the ratio of nonperforming loans to total

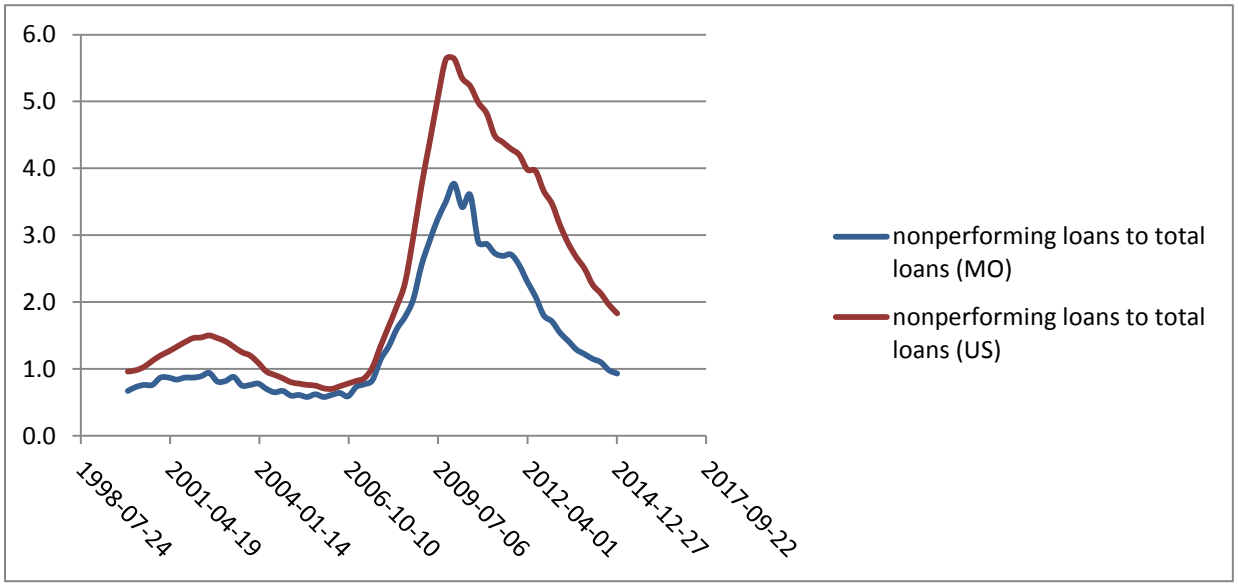

Figure 4. Ratio of nonperforming loans to total loans for Missouri (blue) and the United States (red).. *Source: St Louis FRED database.*

loans has been trending downward. At the time this report was written, the ratio remains above pre-Great Recession levels. Figure 4 further shows a strong contemporaneous correlation between the ratio for Missouri banks and United States banks; in other words, the ratio in Missouri banks tended to increase when the ratio for United States banks increased and tended to fall when the ratio for United States banks fell. As observed in loan loss and loan loss reserve figures, Missouri banks recorded a smaller increase in the fraction of nonperforming loans to total loans when compared with the United States banks. On average, therefore, loans made by Missouri banks have been more likely to pay off than loans made by United States banks.

Figure 5 plots the ratio of nonperforming loans in Missouri banks to nonperforming loans in United States banks. In this case, the comparison removes the value of total loans as a scale variable. Instead of looking at how Missouri banks compared to United States banks conditioned on the value of total loans outstanding, Figure 5 gives an unconditional ratio of nonperforming loans in Missouri banks divided by the value of nonperforming loans in commercial banks in the United States. Figure 5 shows that the value of nonperforming loans in Missouri banks increased just before and during the Great Recession. After reaching a low value of 0.6 percent in 2002, the

fraction of nonperforming loans in Missouri banks climbed to 1.1 percent during the 2006-08 period.

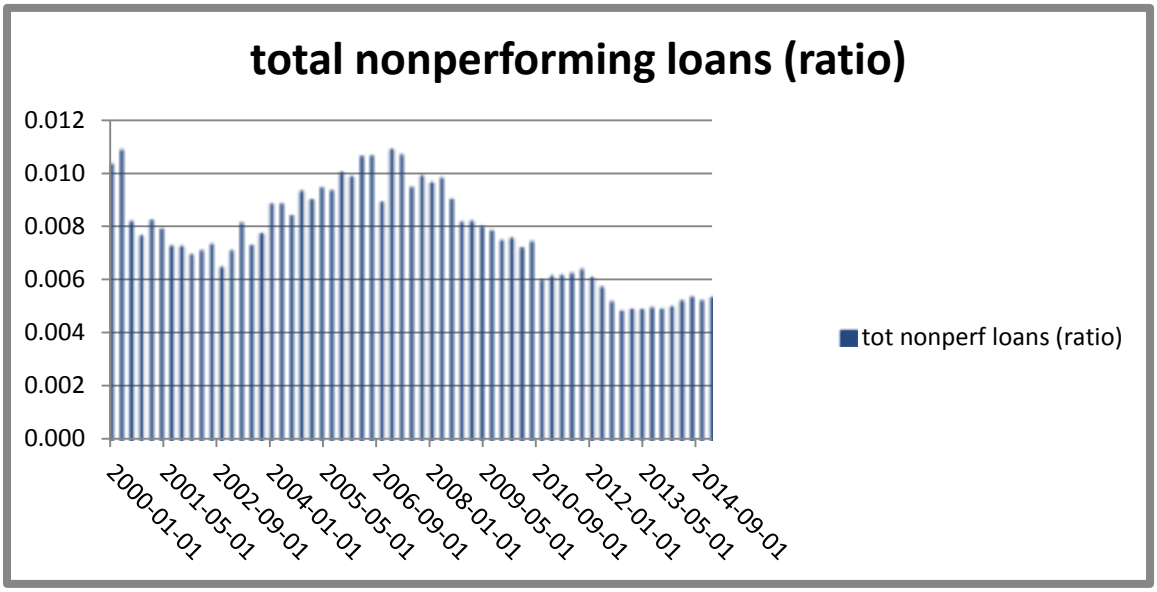

Figure 5. Ratio of total nonperforming loans for Missouri banks to United States banks. *Source: St Louis FRED database.*

Together, Figures 4 and 5 imply that Missouri banks were subject to an increase in nonperforming loans relative to the rest of the country. By this comparison, the evidence suggests that Missouri banks were subject to greater losses than banks in the rest of the country. However, when one takes into account the value of total loans, we see that the fraction of nonperforming loans was smaller for Missouri banks than it was for United States banks. Thus, by itself, Figure 5 casts doubt on the performance of Missouri banks during the Great Recession. When one takes into account the relative scale of total loans, the evidence in Figure 4 is consistent with the data reported in the loan loss and loan-loss reserve figures.

It is possible to dig deeper into losses associated with loan losses. As a nonperforming loan continues, the bank decides to write off the value of the loan. This is called a charge-off. Total net charge-off is the difference between the gross value of loans that are written off and any recoveries that occur as previously charged-off loans actually offer some repayment. Figure

6 plots the ratio of total net charge off for Missouri banks to total net charge off for United States banks. As a fraction of the United States banks, Missouri banks record total net charge off between 0.2 percent and 1 percent. For Missouri banks, the dollar value of total net charge offs

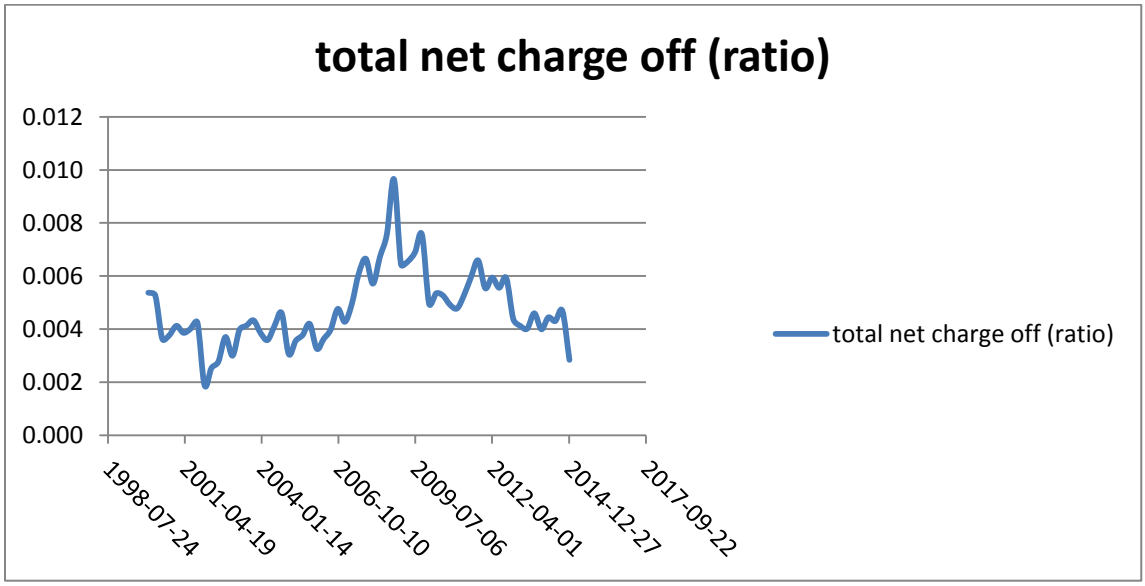

Figure 6. Ratio of total net charge off for Missouri banks to United States banks. *Source St Louis FRED database*

reached $1.2 billion in the third quarter of 2009. In terms of the ratio, the evidence suggests that Missouri banks were reporting an increasing amount of total net charge offs compared with commercial banks in the rest of the country during the Great Recession. As the expansion started in 2009, total net charge offs in Missouri banks have been trending downward relative to United States banks. The flow of total net charge offs is consistent with observed patterns in nonperforming loans: by not conditioning total net charge offs by any income or loan value, Missouri banks recorded larger losses during the Great Recession than commercial banks in the rest of the country. Since the end of the Great Recession, Missouri banks have been reporting declining losses compared with United States banks.

In the next graphs, the focus is on the accounting for anticipated unrepaid loans and leases. Specifically, the allowance for loan-and-lease loss provides a measure of the credit risk that banks anticipate. Banks account for expected losses on loans and leases by setting aside part

of their equity capital, using that capital to absorb future losses associated with holdings of loans and leases. Figure 7 plots the ratio of this allowance for Missouri banks divided by the allowance for United States banks. An increase in the allowance indicates that Missouri banks anticipate an increase in future loan and lease losses compared with the losses anticipated

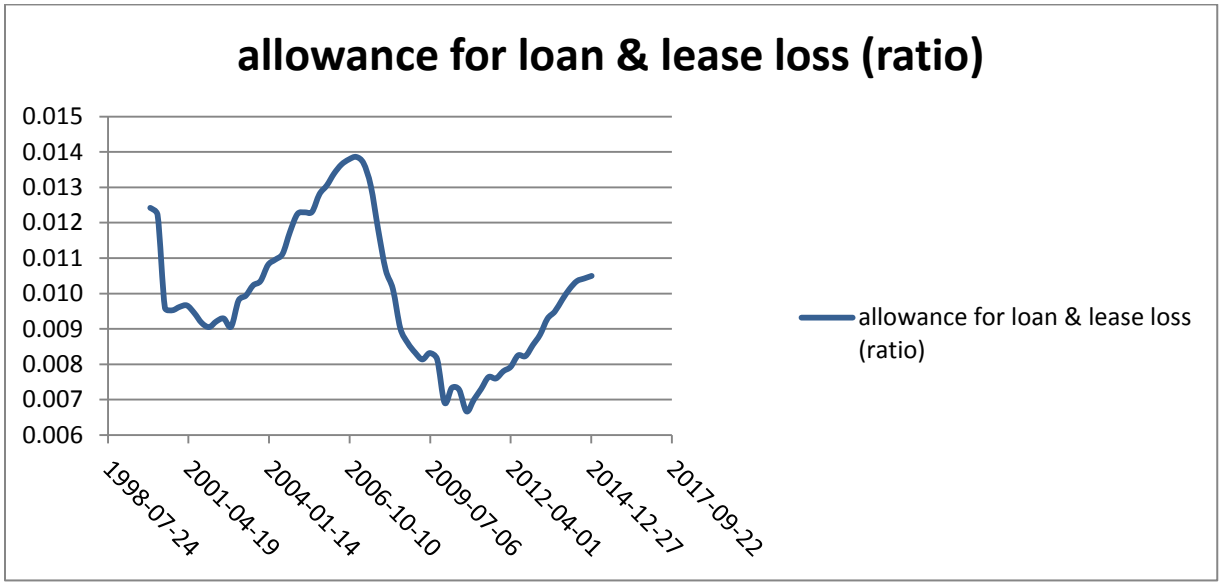

Figure 7. Ratio of allowance for loan & lease losses for Missouri banks to United States banks. *Source: St Louis FRED database.*

by United States banks. Put another way, Missouri banks believe their exposure to credit risk has increased relative to United States banks.

Figure 7 shows that the allowance for loan and lease loss for Missouri banks relative to United States banks increased before the Great Recession. Since 2009, however, the ratio of allowance for loan and lease loss declined. The allowance for loan and lease loss follows a similar pattern to the ones we observed in nonperforming loans and total net charge offs. Compared with the rest of the country, Missouri banks reported an increasing share of the allowance, rising to nearly one percent during the Great Recession. During the current expansion, the allowance for loan and lease losses has been shrinking. The allowance measure does not take into account the size of the loan and lease portfolio in Missouri banks relative to banks in the rest of the country.

Once banks set aside resources for future loan and lease losses, the outcome is either unrepaid or repaid. Once the loan or lease is deemed unrepaid, there is a charge-off against the

equity capital in the allowance account. Figure 8 plots the ratio of charge-off against the allowance for loan and lease loss by Missouri banks to the amount by United States banks. An increase in the ratio means that Missouri banks have charged off a larger amount against the

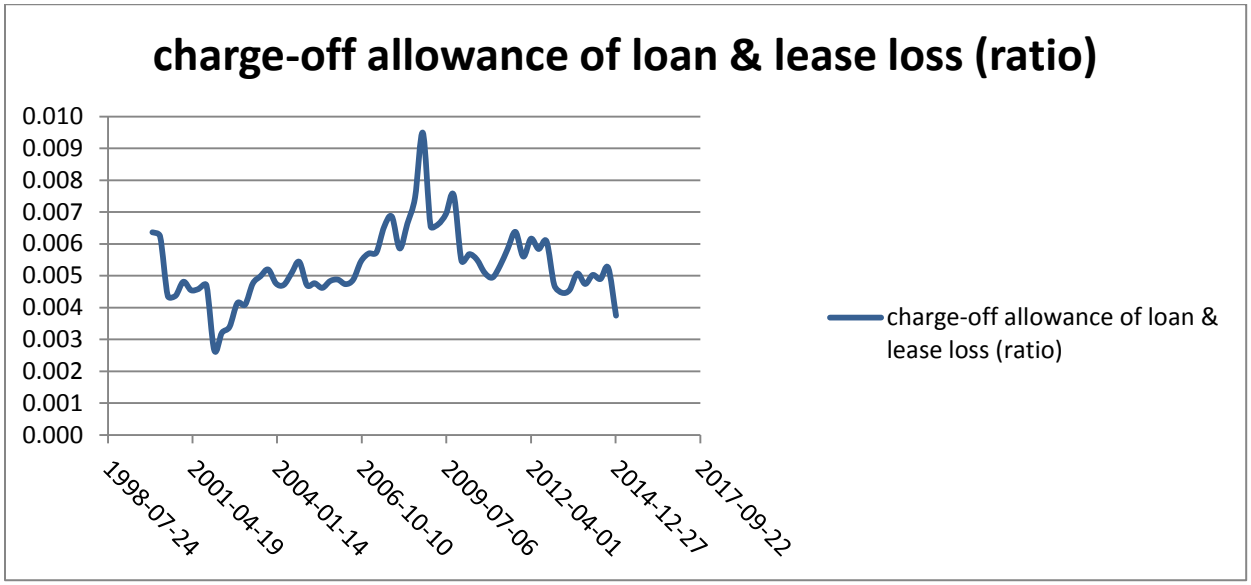

Figure 8. Ratio of charge-off allowance for loan & lease losses for Missouri banks to United States banks. *Source: St Louis FRED database.*

allowance than United States banks. Insofar as the allowance measures the expected losses on the loans and leases held by a bank, the charge off occurs when the losses on loans and leases is realized. If the allowance for loan and lease loss represents the bank capital set aside for future losses, then the charge-off represents the point at which the bank actually writes off balances against that allowance. Figure 8 indicates that Missouri banks were charging off relatively more than United States banks before and during the Great Recession. Since 2009, however, Missouri banks have been charging off relatively less. With the charge-off against the allowance for loan and lease loss, the pattern is consistent with the pattern observed in other measures of nonperforming and defaulting loans. Missouri banks recorded relatively larger losses before and during the Great Recession than United States banks. However, the cautionary note is that the losses are not scaled to loan values for Missouri banks and for banks in the rest of the country.

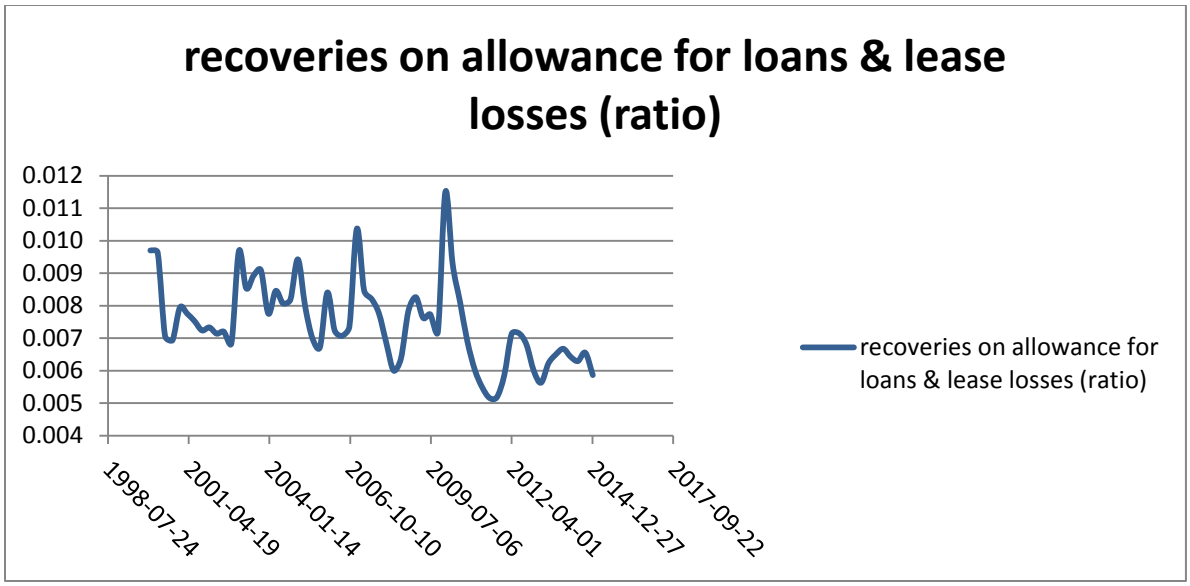

Figure 9. Ratio of recoveries on allowance for loan & lease losses for Missouri banks to United States banks. *Source: St Louis FRED database.*

Figure 9 looks specifically at the recoveries on the allowance for loan and lease losses. Even as banks allow for expected non-repayment on loans and leases, there are unexpected recoveries. In this case, equity capital is unexpectedly added to the bank's net worth by at least partially offsetting the losses owing to charge offs. Figure 9 plots the recoveries on allowance for loans and lease losses for Missouri banks divided by the same measure for United States banks. There is no discernible trend in the recoveries measured. The fluctuations reflect unanticipated recoveries. So, the ratio in Figure 9 reflects the fact that there is no systematic increase or decrease in unanticipated recoveries by Missouri banks relative to United States banks.

Figure 10 focuses on one specific element associated with the flow of bank profits. For a particular bank, net interest margin measures the difference between the interest income earned by the bank on its assets and the interest payments made by the bank to its lenders. The difference is then divided by the level of average earning assets. One takeaway from Figure 4 is that Missouri banks have generally had a higher net interest margin than United States' banks. As a measure of the success of banks' investment strategy, the evidence suggests that Missouri's banks have been, on average, more successful than the United States' banks. The other takeaway

is the downward trend in the net interest margin for both United States banks and Missouri banks. Such a trend might be more foreboding, except for the prevailing

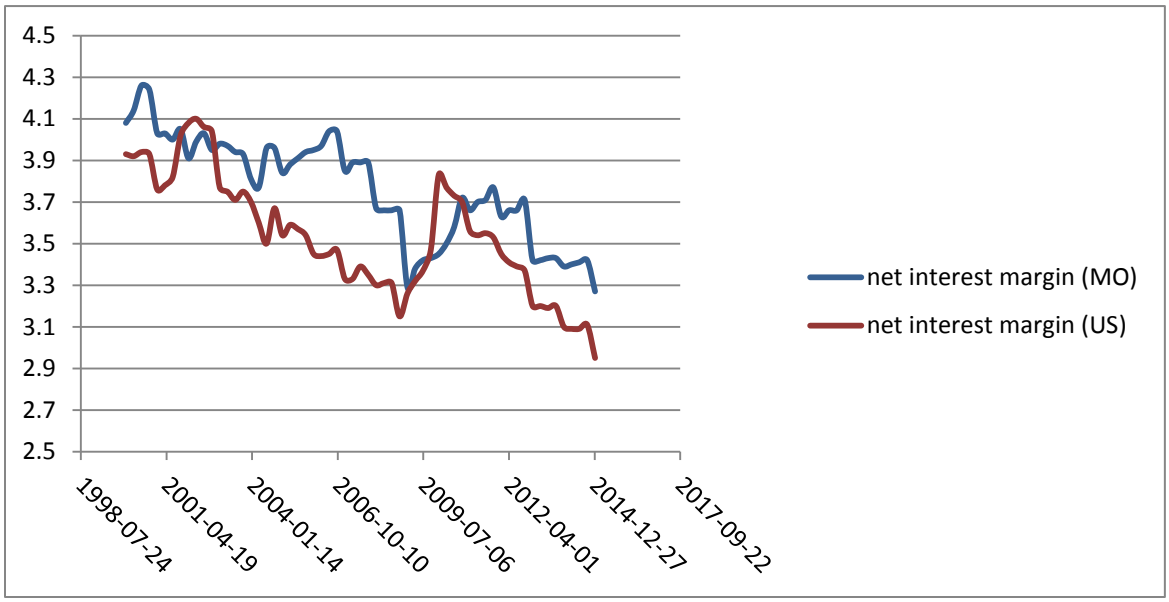

Figure 10. Net interest margin for Missouri (blue) and the United States (red). *Source: St Louis FRED database.*

interest-rate environment. Since December 2008, the risk-free return on short-term United States Treasury securities has been between 0.10 and 0.35 percent. It makes sense that with returns near zero, the net interest margin would decline.

A more general way to measure bank profitability is to measure the return on average assets. Net interest margin focuses the return on bank assets relative to its deposits. The return on assets takes into account the bank's others costs, including, for example, labor and utility costs. Figure 11 plots the return on average assets for Missouri banks and for United States banks. Both Missouri and United States banks reported the return on average assets declined by about one-percentage point in 2009. For Missouri banks, the return on average assets was negative in each of the four quarters of 2009. United States banks reported only one quarter with negative return on average assets. Overall, the data on return on average assets show that Missouri banks and United States banks is eight basis points higher than the sample mean

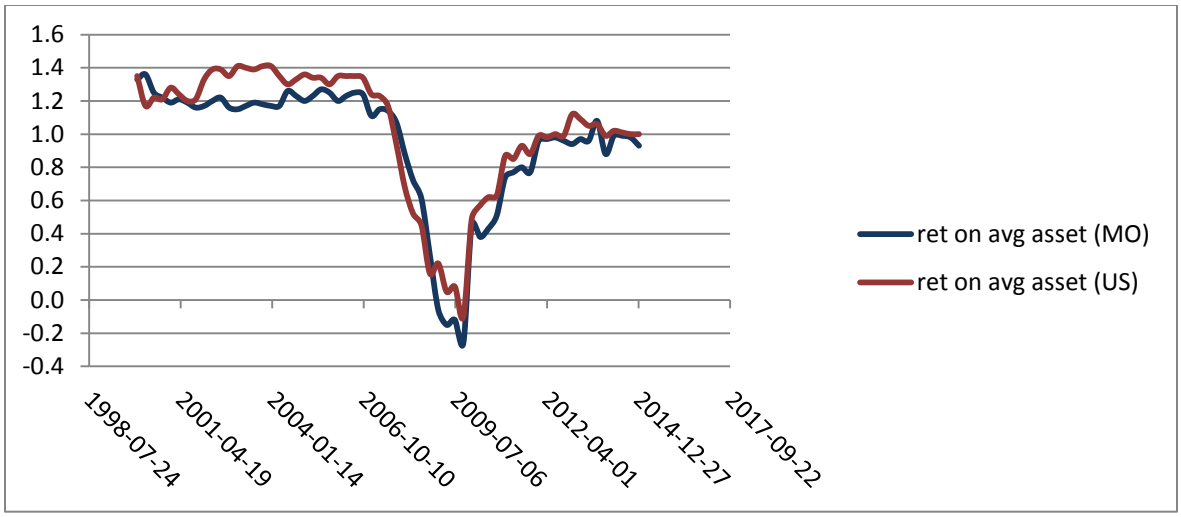

Figure 11. Return on average assets for Missouri (blue) and the United States (red). *Source: St Louis FRED database.*

for Missouri banks. So, there is very little difference between United States banks and Missouri banks based on the return on average assets: both followed a similar pattern over the 15-year sample and both had a similar average value over the sample period.

Some analysts prefer the return on equity to the return on assets. Figure 12 plots the return on average equity.[4] There is not much difference in terms of the overall pattern of movements in the return on equity for Missouri banks and United States banks. There is a more sizeable difference in the sample mean; the return on average equity for United States banks is 59 basis points greater than the return on average equity for Missouri banks. Remember that with a smaller denominator, the return on average equity will be larger. Thus, based on the observations in Figure 11, the higher sample mean is consistent with the notion that United States banks tend to have less equity than Missouri banks.

[4] For example, if United States banks typically had smaller equity values, the return on average equity could be much higher.

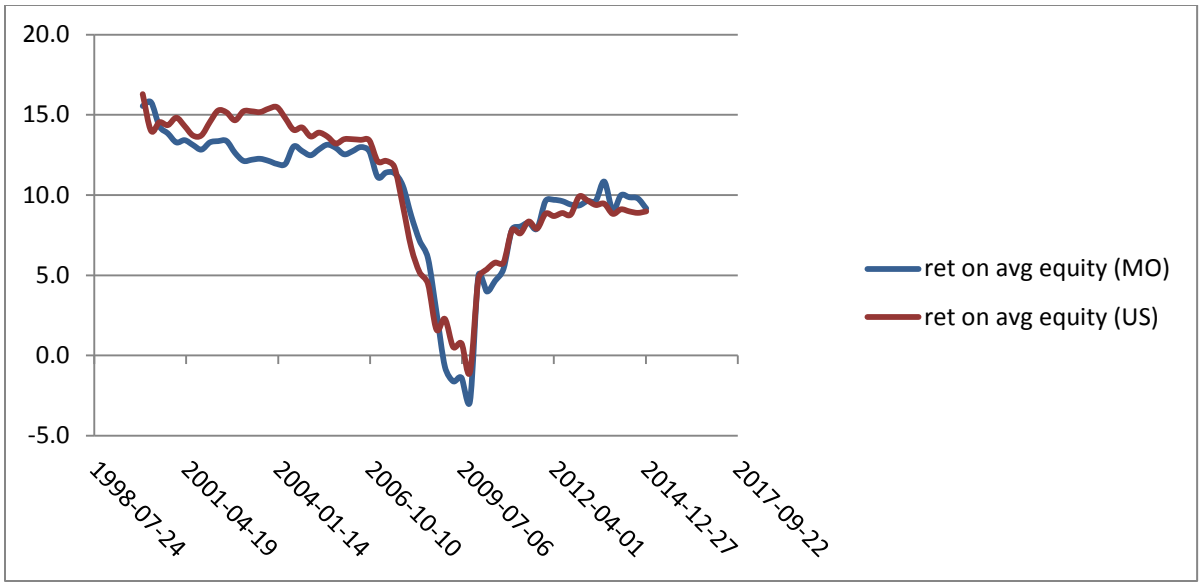

Figure 12. Return on average equity for Missouri (orange) and the United States (blue). *Source: St Louis FRED database.*

Figure 13 plots the ratio of average total assets in Missouri banks to the average total assets in United States banks. The ratio declines from about 1.4 percent in 2000 to about 0.9 percent in 2014. This is not a huge swing. The evidence does indicate that Missouri banks have shrunk compared with commercial banks in the rest of the country over the last decade and a half.

Assets are a stock variable and, therefore, can be measured at a point in time. Income is a flow measure that is computed over an interval of time. Figure 14 plots the ratio of income before taxes and extraordinary items for Missouri banks to United States banks. An increase in the ratio indicates that Missouri banks realized an increase in income relative to United States banks before paying any taxes and accounting for any extraordinary events. Except for a few quarters in which the income measure swings from increase to decrease and back to an increase,

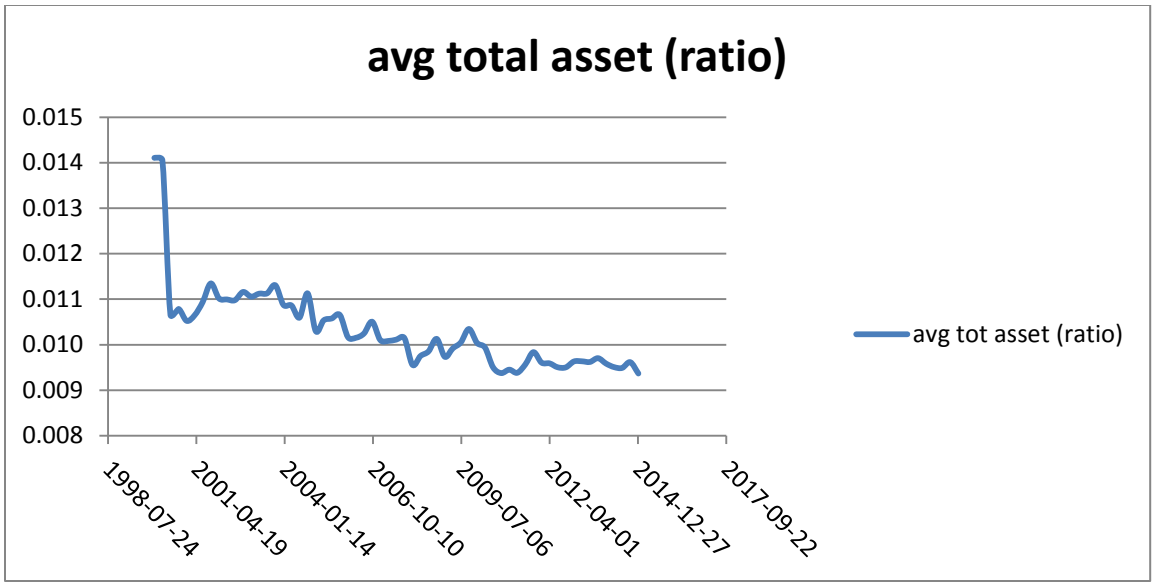

Figure 13. Ratio of average total assets for Missouri banks to United States banks. *Source: St Louis FRED database.*

there is not much movement in the ratio. Income for Missouri banks is typically around one percent of income for all the United States banks. Figure 14 does indicate a period of short-term volatility occurring during and right after the Great Recession. Missouri banks reported increases in income relative to United States banks in two quarters. In the third quarter of 2008 and the third quarter of 2009, income reported by Missouri banks increased to over two percent and to over four percent, respectively. In the first quarter of 2009, Missouri banks reported a decline in income relative to income reported by United States banks. Except for a period during the Great Recession, the evidence suggests that Missouri banks have performed consistently in terms of income, relative to United States banks.

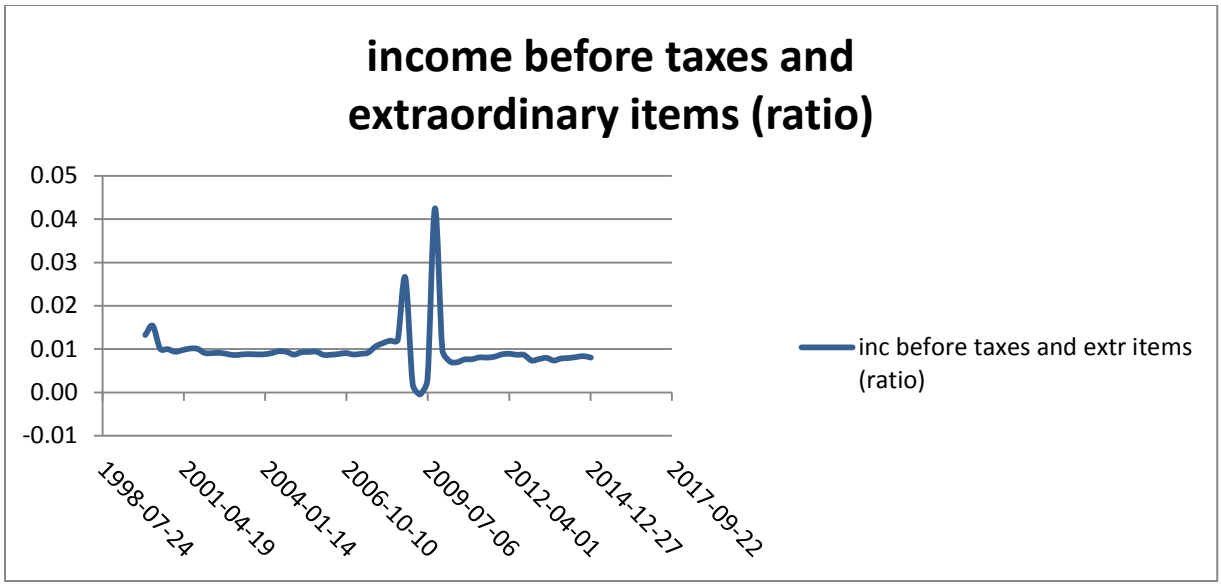

Figure 14. Ratio of income before taxes and extraordinary items for Missouri banks to United States banks. *Source: St Louis FRED database.*

Figure 15 plots the ratio of interest-bearing balances held by Missouri banks to the interest-bearing balances held by United States banks. Note that interest-bearing balances are the unpaid, interest-bearing assets held by commercial banks. There is a large increase in interest-bearing balances in 2008. In this case, it is important to remember that the Federal Reserve began paying interest on reserves. Both Missouri banks and United States banks reported a sharp increase in interest-bearing balances in 2008. So, why did the ratio jump in Figure 15? Such evidence is consistent with Missouri banks holding a relatively larger amount of bank reserves.

Figure 15 indicates that the ratio has been trending downward, suggesting that United States banks are increasing their reserve holdings as the Federal Reserve implements its asset purchase programs, also known as Quantitative Easing. At the time this report was written, Missouri banks are holding 0.3 percent of interest-bearing reserves, which is in line with the pre-Great Recession values.

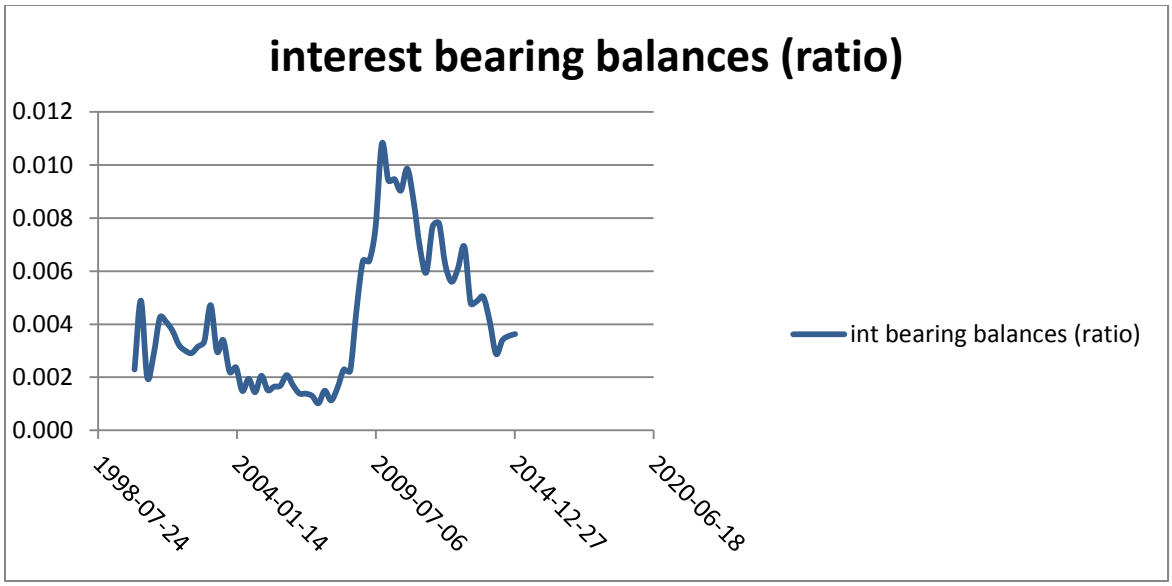

Figure 15. Ratio of interest-bearing balances for Missouri banks to United States banks. *Source: St Louis FRED database.*

Figure 16 plots the weighted-average of total equity capital in Missouri banks divided by the weighted-average of total equity capital in United States banks. In both Missouri and United States banks, the weighted-average of total equity capital has been increasing since 2000. The ratio of equity in Missouri banks to equity in United States banks has been trending downward. In other words, Missouri banks have been getting smaller relative to United States banks in terms of the equity capital. The pattern for total equity capital is very similar to the pattern observed for the value of total assets.

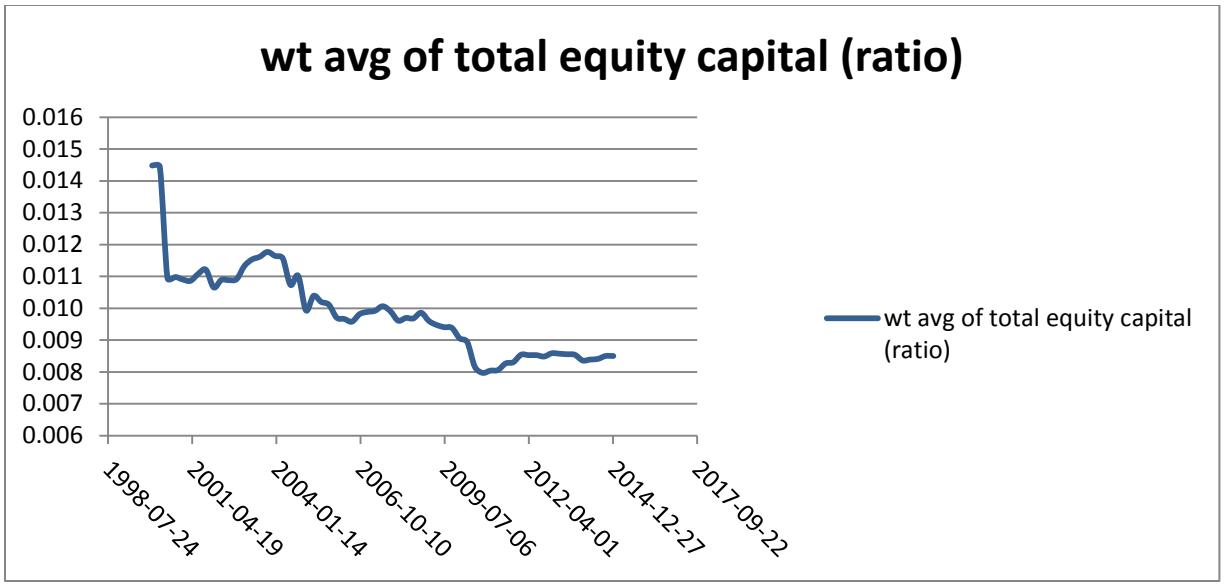

Figure 16. Ratio of weighted-average total equity capital for Missouri banks to United States banks. *Source: St Louis FRED database.*

The weighted average of total loans and leases net of unearned income is a measure of a bank's reliance on loan and leases as a fraction of its portfolio. Figure 17 plots the weighted average of total loans and leases net of unearned income for Missouri banks divided by the same measure for United States banks. The data indicate that there is a downward trend in this measure of Missouri banking activity. It appears mostly in a downward step that occurred in 2000 and another in 2009. The signal is that Missouri banks are shrinking in terms of their reliance on loans and leases when compared with United States banks. Indeed, this is virtually the same pattern recorded for total assets and for total equity. As such, the evidence is accumulating: Missouri banks are shrinking in size relative to commercial banks in the rest of the country.

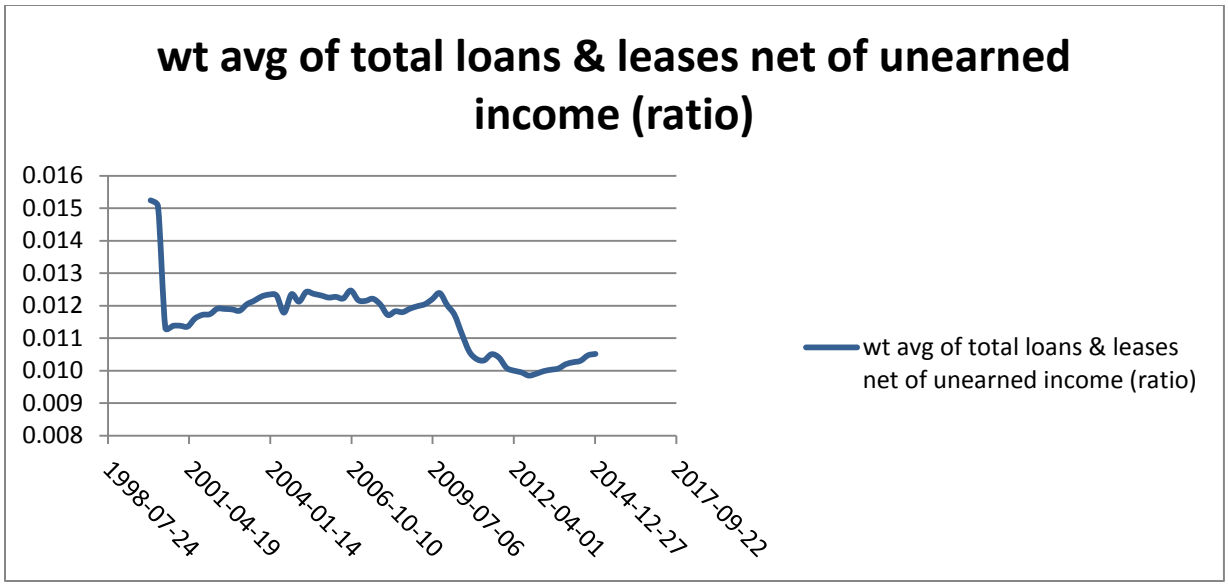

Figure 17. Ratio of weighted-average total loan& leases net of unearned income for Missouri banks to United States banks. *Source: St Louis FRED database.*

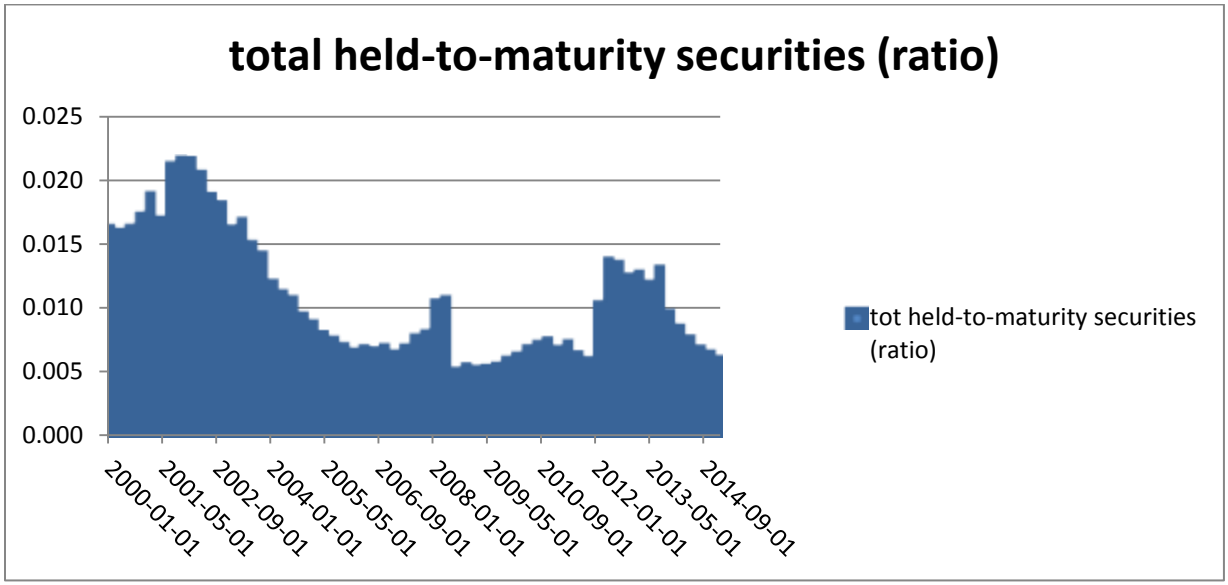

Figure 18. Ratio of securities held to maturity for Missouri banks to United States banks. *Source: St Louis FRED database.*

Figure 18 plots the ratio of the total value of securities held to maturity by Missouri banks to United States banks. A security held to maturity is an indicator of a commercial bank's reliance on secondary markets. If, for example, the commercial bank originates loans and then sells them, then the value of securities held to maturity declines. Missouri banks held about two percent of the securities held to maturity by United States banks before the Great Recession began. As Figure 18 shows, Missouri holds between 0.5 percent and one percent of the securities held to maturity since 2004. There has been an increase in the ratio beginning in 2012 and lasting about a year, but it has returned to the lower range in 2013. One way to interpret the evidence is that Missouri banks have shrunk relative to commercial banks in the rest of the country.

Before loan and lease repayments occur, they are treated as a receivable. The loan is performing but repayment has not yet begun. Figure 19 plots the ratio of total loan and lease receivables for Missouri banks divided by the same account for all United States banks.

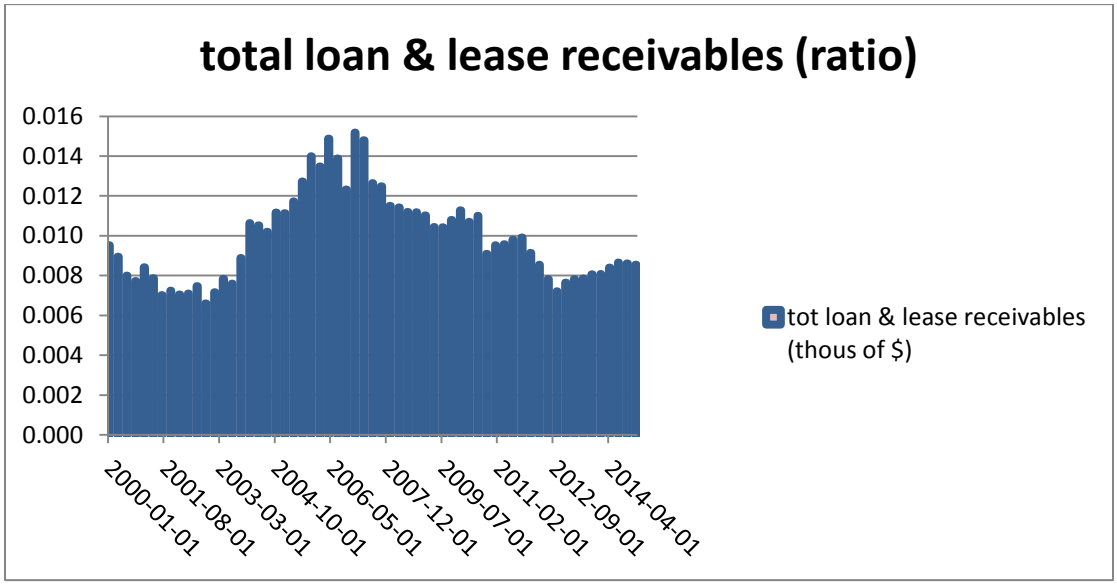

Figure 19. Ratio of total loan & lease receivables for Missouri banks to United States banks. *Source: St Louis FRED database.*

The receivables ratio follows a cyclical pattern. Missouri banks recorded an increase in loan and lease receivables relative to commercial banks in the rest of the country. Missouri banks held 0.6 percent of the United States total loan and lease receivables in 2003, then recorded increasing

fractions until right before the Great Recession began, peaking at 1.5 percent. As the Great Recession began, the fraction of total loans and leases receivables in Missouri banks declined, falling into the 0.8 percent to one percent range.

Not all receivables are the same. Before charge-offs occur, for example, loan and lease receivables are distinguished between those receivable for less than and greater than 90 days. The loans and leases are still considered performing. Figure 20 plots the ratio of total loan and lease receivables that have been outstanding for greater than 90 days for Missouri banks relative to United States banks. (Note that the receivable measure is a subset of the data in Figure 19.) Missouri banks hold a very small fraction of total loan and lease receivables greater than 90 days. As Figure 20 shows, Missouri banks frequently held less than 0.6 percent of the total loan and lease receivables for more than 90 days. The fraction is even smaller since the Great Recession, as Missouri banks held about 0.3 percent of the United States amounts since 2008.

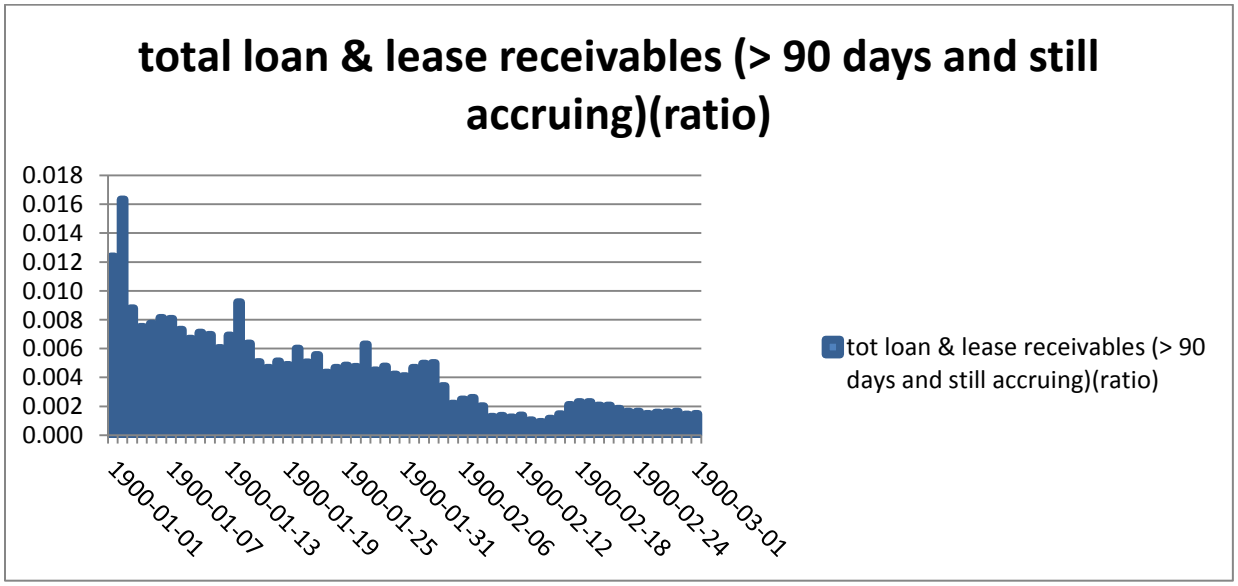

Figure 20. Ratio of total loan & lease receivables exceeding 90 days and still accruing for Missouri banks to United States banks. *Source: St Louis FRED database.*

Lastly, Figure 21 plots the value of total trading assets held by Missouri banks relative to the amount held by United States banks. Trading assets are securities that banks acquire that can be sold in the future in secondary markets. Missouri banks hold an extremely small faction of

total trading assets. The fraction held by Missouri banks is typically between 0.0002 and 0.0001 percent of the amount held in United States banks. There is no discernible trend in the fraction

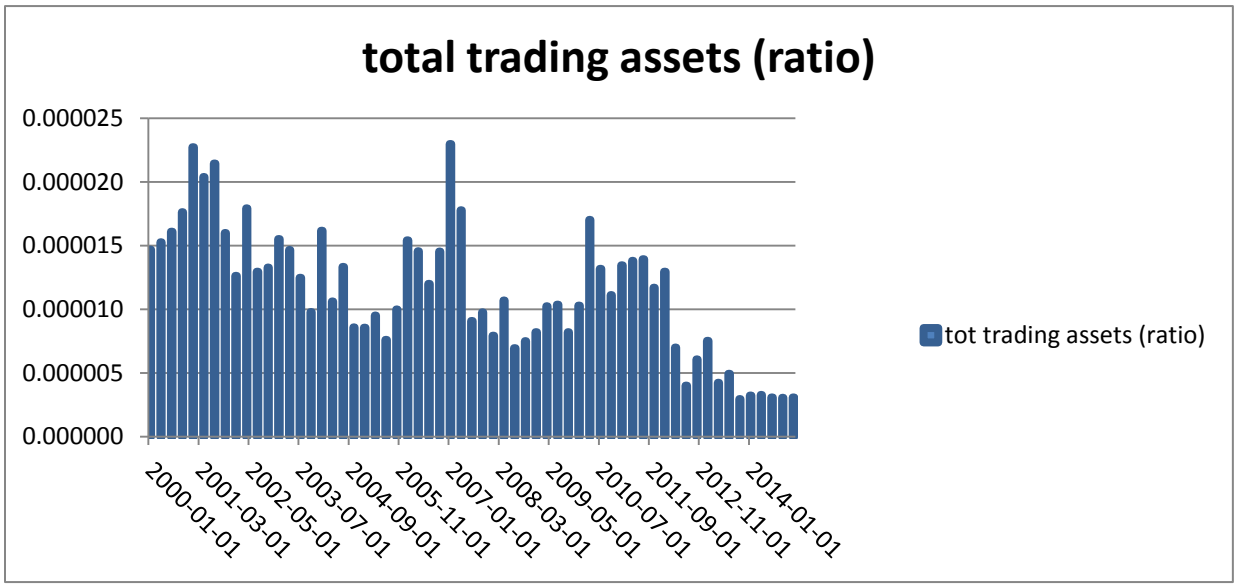

Figure 21. Ratio of total trading assets for Missouri banks to United States banks. *Source: St Louis FRED database.*

of total trading assets held by Missouri banks. The main takeaway is that Missouri banks tend to be a very small player in the secondary markets in which trading assets are bought and sold.

Overall, there are two main conclusions that are consistent with the variety of data presented in this section. First, after accounting for the scale of bank loan programs, Missouri banks tended to be less sensitive to the Great Recession than banks in the rest of the country. As incomes fell, measures of income losses on loans and nonperforming loans did rise to the same levels that were observed for United States banks. As a fraction of total loans, Missouri banks fared relatively better than commercial banks in the rest of the country in terms of recording smaller losses.

Second, Missouri banks are shrinking relative to commercial banks in the rest of the country. By both asset measures and income measures, there is a downward trend in the ratio of Missouri banks to United States banks. Thus, Missouri banks are less active in terms of making loans and leases compared with banks in the rest of the country.

The second conclusion is an important part of the story of the Missouri economy. Economic growth describes how the total value of goods and services produced changes over time. Growth is positively related investment in new physical and human capital and is also related to technological progress. New technologies include new ideas that make workers more productive. There will be more to say about the factors that explain economic growth in Section 4.

For our purposes, banks play an important role. In particular, banks provide funding that allows businesses and entrepreneurs to acquire new machines, try out new technologies, and develop human capital capable of solving problems that ultimately lower production costs. During the period from 1997 through 2013, Missouri's real GDP increased at an annual average growth equal to 1.08 percent. Only the state of Michigan grew at a lower rate than Missouri over the 1997-2013 period. The declining nature of Missouri banks means that less financing is available for Missouri companies. The bottom line is that economic growth in Missouri will slow down compared with economic growth where there is a larger amount of financing available.

The link between bank loans and economic growth play a central role in the analysis of the economic impact of members of the Missouri Bankers Association. Before we delve into measuring the economic impact, it is useful to look at changes in the bank balance sheets over time. In the following section, the focus is on a small community bank, a mid-size city bank, and a large-city bank. In each case, the balance sheet is presented at several different points of time. In this way, the reader can see how banks change their portfolios over time, corresponding to different types of investments chosen by bank management.

3. Case Study: Three Missouri banks over time

In addition to looking at aggregate measures of bank performance, changes in balance sheets and income statements shed light on how bank operations change over time. Here, three banks are selected as examples of banks across the state. Central Bank of St. Louis, Old Missouri Bank and Legends Bank are selected in an attempt to capture key elements of the diversity within Missouri. Central Bank of St. Louis is located in a large metropolitan area in eastern Missouri. Old Missouri Bank is located in a medium-size metropolitan area in southwest Missouri, and Legends Bank is located in a small town in central Missouri.

For all three banks, the balance sheet and income statements are taken from the Uniform Bank Performance Report that is collected by the Federal Financial Institutions Examination Council. The tables presented in this report are selected items from either the balance sheet or the income statement for the years 2010 through 2014. In the case of the balance sheet, the data are taken from the December 31 reports for each of those five consecutive years.

Table 1 reports the selected balance-sheet items for Central Bank of St. Louis, headquartered in Clayton, MO. As one looks across the columns from right to left, one is immediately struck by increases in the balance-sheet items for Central Bank. Total assets increased by 14.1 percent between 2010 and 2014. Net loan and leases increased by 23 percent during the 2010-14 period. Agricultural loans, Commercial loans, and Individual loans, though small in size, recorded 42 percent, 33.8 percent, and 72 percent increases between 2010 and 2014. With loans and leases reporting greater than average gains, some asset categories must have been shrinking between 2010 and 2014. For Central Bank of St. Louis, Table 1 shows that security holdings declined. Even over a short time period, Central Bank of St. Louis changed its portfolio, relatively increasing its loan and lease portion and shrinking its security holdings.

On the liability side of the balance sheet, Central Bank of St. Louis recorded a 12.9 percent increase in total liabilities. From Table 1, there is a shift in the types of deposits over time. The most liquid deposits—demand deposits, NOW and ATS deposits, and Money Market Deposit Accounts (hereafter MMDAs)—increased at rates greater than or equal to 30 percent. Meanwhile, time deposits decreased between 2010 and 2014. With liabilities increasing at a lower rate than assets, it follows that Central Bank of St. Louis increased its total equity. Between 2010 and 2014, Central Bank of St. Louis saw its total equity increase 25.6 percent.

Table 2 presents selected items from Central Bank of St. Louis' income statements. On first glance, the income statement indicates that interest income has been declining for Central Bank of St. Louis. Total interest income has fallen from $67.2 million in 2010 to $56.4 million in 2014. For most firms, declining income is associated with declining sales and declining (or vanishing) profits. Here is an obvious place in which banks are different. The most

Table 1

Selected Items from the Balance Sheet

of Central Bank of St. Louis, 2010-14

(thous of $)

	12/31/2014	12/31/2013	12/31/2012	12/31/2011	12/31/2010
Assets:					
Real Estate Loans	168,905	157,633	143,516	138,756	143,131
Commercial Loans	18,615	15,868	14,799	14,102	13,940
Individual Loans	22,699	19,343	14,222	12,864	13,198
Agricultural Loans	7,355	5,666	5,214	5,536	5,150
Loans not Held for Sale	218,470	199,678	179,237	172,925	177,370
LN&LS Allowance	2,463	2,565	2,500	2,470	2,067
Net Loans & Leases	216,007	197,113	176,737	170,455	175,303
U.S. Treasury & Agency Securities	43,882	44,714	55,750	52,787	44,591
Municipal Securities	4,714	5,810	5,981	5,509	2,381
Total Investments	62,017	62,678	76,810	71,583	68,408
Total Earning Assets	278,024	259,791	253,547	242,038	243,711
Total Assets	292,756	273,404	268,833	256,907	255,126

Liabilities:					
Demand Deposits	51,846	45,788	46,044	39,010	36,237
All Now & ATS Accounts	55,116	48,655	43,838	41,602	38,088
Money Market Deposit Accounts	15,001	13,933	13,676	13,093	11,494
Other savings Deposits	43,516	39,238	37,425	32,562	30,645
Time Deps At Or Below Insurance Limit	54,484	59,916	65,065	69,563	76,246
Time Deps Above Insurance Limit	16,576	14,267	14,532	13,547	14,794
Total Liabilities (Incl Mortg)	246,162	229,398	227,191	217,533	218,060
Total Bank Capital & Min Int	46,594	44,006	41,642	39,374	37,066

Source: Federal Financial Institutions Examination Council

probable explanation that can account for declining bank revenues is the decline in interest rates. Indeed, total interest expense has fallen from $7.3 million in 2010 to $2.3 million in 2014. It is also important to note another source of profitability for Central Bank: the sharp reduction in the provision for Loan and Lease losses. Between 2010 and 2014, Central Bank reports the provision expense for loan and lease losses fell from $10.5 million to less than $800 thousand. By reducing expenses so dramatically, a bank can increase profits even in a declining interest-rate environment.

Table 2

Selected Items from the Income Statement

of Central Bank of St. Louis, 2010-14

(thous of $)

	12/31/2014	12/31/2013	12/31/2012	12/31/2011	12/31/2010
Income on Loans & Leases (TE)	49,783	50,385	52,956	56,488	62,800
US Treas & Agency (Excl MBS)	571	385	274	699	797
Mortgage Backed Securities	906	800	1,216	1,605	1,707
All Other Securities	3,394	3,797	4,089	2,573	618
Tax-Exempt Securities Income	2,566	2,807	3,029	1,849	475
Investment Interest Income (TE)	6,252	6,493	7,210	5,872	3,377
Int on Fed Funds Sold & Resales	18	12	25	23	22
Trading Account Income	0	0	0	0	0
Total Interest Income (TE)	56,382	57,312	60,554	62,867	67,157
Total Interest Expense	2,270	2,582	3,087	4,340	7,320
Net Interest Income (TE)	54,112	54,730	57,467	58,527	59,837
Adjusted Operating Income (TE)	68,393	71,258	72,242	70,607	73,983
Non-Interest Expense	38,741	39,879	37,394	34,410	35,011
Provision: Loan & Lease Losses	777	3,032	7,011	7,567	10,583
Pretax Operating Income (TE)	28,875	28,347	27,837	28,630	28,389

Source: Federal Financial Institutions Examination Council

Table 3 reports selected balance sheet items for Old Missouri Bank located in Springfield, MO. The balance sheet for Old Missouri Bank indicates that Old Missouri's total assets more than doubled in size—a 105.7 percent increase to be exact—between 2010 and 2014. Total liabilities increased 101.8 percent and total equity increased by 150 percent. Commercial and Agricultural loans reported the largest gains among the asset categories reported in Table 3. Old Missouri Bank took a balanced approach as net loan and leases increased by 101 percent and total investments in securities increased 122.4 percent between 2010 and 2014. On the liability side, the largest gains were reported in Old Missouri Banks's liquid deposits; Table 3 reports that both Demand Deposits and NOW and ATS accounts more than tripled in size between 2010 and 2014. We also observe that MMDAs at Old Missouri Bank increased from $13 million in 2014 to more than $35 million in 2014.

Table 4 presents selected items from Old Missouri Bank's income statement for the years 2010 through 2014. Because of the growth in the scale of Old Missouri Bank, revenues generally increased despite the declining interest rates paid on assets. Total Interest Income increased from $6.8 million in 2010 to $9.8 million in 2014. Interestingly, total interest expense fell by about one half, from $2 million in 2010 to $1.2 million in 2014. The decline in interest expense was offset by increases in Non-Interest Expenses and Provisions for Loan and Lease Losses. Non-Interest Expenses increased from $3.1 million in 2010 to $5.6 million in 2014.

Table 3

Selected Items from the Balance Sheet

of Old Missouri Bank, 2010-14

(thous of $)

	12/31/2014	12/31/2013	12/31/2012	12/31/2011	12/31/2010
Assets:					
Real Estate Loans	143,734	102,661	88,930	81,035	74,381
Commercial Loans	33,760	18,000	16,327	12,954	13,253
Individual Loans	4,159	4,184	3,440	3,270	2,840
Agricultural Loans	21,554	15,991	15,176	13,355	9,974
Loans not Held for Sale	205,187	142,855	125,772	112,715	102,526
LN&LS Allowance	2,153	1,888	1,555	1,655	1,382
Net Loans & Leases	203,206	140,967	124,393	111,060	101,144
U.S. Treasury & Agency Securities	7,587	7,501	4,755	9,245	9,446
Municipal Securities	23,857	4,638	5,074	2,048	2,117
Total Investments	32,753	18,956	16,551	14,083	14,694
Total Earning Assets	235,959	159,923	140,944	125,143	115,838

Total Assets	250,620	167,179	148,104	131,295	121,843
Liabilities:					
Demand Deposits	20,588	10,489	7,395	5,704	4,129
All Now & ATS Accounts	8,665	3,240	3,245	3,365	2,095
Money Market Deposit Accounts	35,588	21,529	19,375	19,105	13,255
Other savings Deposits	5,902	1,662	1,454	1,843	1,034
Time Deps At Or Below Insurance Limit	111,008	82,155	82,882	68,614	73,255
Time Deps Above Insurance Limit	25,004	23,279	13,173	11,431	9,234
Total Liabilities (Incl Mortg)	225,159	152,654	134,958	119,894	111,628
Total Bank Capital & Min Int	25,461	14,525	13,146	11,401	10,215

Source: Federal Financial Institutions Examination Council

Meanwhile, the Provision for Loan and Lease Losses increased slightly to $0.9 million in 2014 from $0.5 million in 2010. Overall, Pretax Operating Income rose for Old Missouri Bank.

In 2010, Old Missouri Bank reported Pretax Operating Income equal to $1.5 million, rising to $2.7 million in 2014.

Legends Bank is located in Linn, MO. Table 5 presents selected items from Legends Bank's balance sheets for the years 2010 through 2014. Overall, total assets at Legends Bank increased 14.8 percent between 2010 and 2014. The balance-sheet evidence further shows that between 2010 and 2014 Legends Bank shifted assets its portfolio from securities investments to more loans and leases. Net loans and leases increased from $175.3 million to $216 million, a 23.2 percent increase between 2010 and 2014. In contrast, total investments declined $68.4 million to $62 million, a 9.6 percent decline. For Legends Bank, total liabilities increased 12.9 percent between 2010 and 2014. Increases in liquid liabilities, especially Demand Deposits, NOW and ATS accounts, and MMDAs contributed the lion's share to the increase in total liabilities. It follows that with a greater percentage increase in total assets than the percentage increase in total liabilities, Legends Bank reports a 25.6 percent increase in total equity.

Table 4

Selected Items from the Income Statement

of Old Missouri Bank, 2010-14

(thous of $)

	12/31/2014	12/31/2013	12/31/2012	12/31/2011	12/31/2010
Income on Loans & Leases (TE)	9,240	7,621	7,078	6,514	6,427
US Treas & Agency (Excl MBS)	119	99	124	237	215
Mortgage Backed Securities	0	0	0	0	0
All Other Securities	248	88	73	35	101
Tax-Exempt Securities Income	215	88	73	35	101
Investment Interest Income (TE)	477	232	234	290	368
Interest on Due From Banks	13	0	0	0	0
Int on Fed Funds Sold & Resales	3	4	3	2	3
Trading Account Income	0	0	0	0	0
Other Interest Income	33	25	28	29	28
Total Interest Income (TE)	9,767	7,882	7,343	6,835	6,826
Total Interest Expense	1,167	1,079	1,291	1,645	2,045
Net Interest Income (TE)	8,600	6,803	6,052	5,190	4,781
Non-interest Income	552	364	382	329	191
Adjusted Operating Income (TE)	9,152	7,167	6,434	5,519	4,972
Non-Interest Expense	5,601	3,974	3,488	3,298	3,058
Provision: Loan & Lease Losses	875	549	600	456	450
Pretax Operating Income (TE)	2,676	2,644	2,346	1,765	1,464

Source: Federal Financial Institutions Examination Council

Table 5

Selected Items from the Balance Sheet

of Legends Bank, 2010-14

(thous of $)

	12/31/2014	12/31/2013	12/31/2012	12/31/2011	12/31/2010
Assets:					
Real Estate Loans	168,905	157,633	143,516	138,756	143,131
Commercial Loans	18,615	15,868	14,799	14,102	13,940
Individual Loans	22,699	19,343	14,222	12,864	13,198
Agricultural Loans	7,355	5,666	5,214	5,536	5,150
Loans not Held for Sale	218,470	199,678	179,237	172,925	177,370
LN&LS Allowance	2,463	2,565	2,500	2,470	2,067
Net Loans & Leases	216,007	197,113	176,737	170,455	175,303
U.S. Treasury & Agency Securities	43,882	44,714	55,750	52,787	44,591
Municipal Securities	4,714	5,810	5,981	5,509	2,381
Total Investments	62,017	62,678	76,810	71,583	68,408
Total Earning Assets	278,024	259,791	253,547	242,038	243,711
Total Assets	292,756	273,404	268,833	256,907	255,126

Liabilities:					
Demand Deposits	51,846	45,788	46,044	39,010	36,237
All Now & ATS Accounts	55,116	48,655	43,838	41,602	38,088
Money Market Deposit Accounts	15,001	13,933	13,676	13,093	11,494
Other savings Deposits	43,516	39,238	37,425	32,562	30,645
Time Deps At Or Below Insurance Limit	54,484	59,916	65,065	69,563	76,246
Time Deps Above Insurance Limit	16,576	14,267	14,532	13,547	14,794
Total Liabilities (Incl Mortg)	246,162	229,398	227,191	217,533	218,060
Total Bank Capital & Min Int	46,594	44,006	41,642	39,374	37,066

Source: Federal Financial Institutions Examination Council

Table 6 presents selected items from Legends Bank Income Statement for the 2010 through 2014 period. At the broadest level, total interest income was flat for Legends Bank during this period. The largest contributor to Legends Bank's total interest income is income from Loans and Leases. Legends Bank did record a decline in interest income from Investments, but that amount was already fairly small. Total Interest Expense declined over time following interest rates. Non-Interest Expenses increased, thus partially offsetting the decline in Interest Expenses. Overall, Pretax Operating Income increased from 14 percent, rising from $4.3 million in 2010 to $4.9 million in 2014.

Table 6

Selected Items from the Income Statement

of Legends Bank, 2010-14

(thous of $)

	12/31/2014	12/31/2013	12/31/2012	12/31/2011	12/31/2010
Income on Loans & Leases (TE)	10,681	9,873	9,712	10,198	10,606
US Treas & Agency (Excl MBS)	195	221	325	428	561
Mortgage Backed Securities	0	0	0	0	0
All Other Securities	119	139	129	104	89
Tax-Exempt Securities Income	100	120	118	98	88
Investment Interest Income (TE)	364	420	513	580	693
Interest on Due From Banks	63	70	64	35	27
Int on Fed Funds Sold & Resales	7	4	5	4	9
Trading Account Income	0	0	0	0	0
Other Interest Income	11	10	15	23	23
Total Interest Income (TE)	11,126	10,377	10,309	10,841	11,358
Total Interest Expense	688	800	1,069	1,458	2,057
Net Interest Income (TE)	10,438	9,577	9,240	9,383	9,301
Non-interest Income	1,951	1,960	2,037	1,889	2,226
Adjusted Operating Income (TE)	12,389	11,537	11,277	11,272	11,527
Non-Interest Expense	7,044	6,653	6,403	6,416	6,606
Provision: Loan & Lease Losses	450	375	600	600	590
Pretax Operating Income (TE)	4,895	4,509	4,274	4,256	4,331

Source: Federal Financial Institutions Examination Council

4. The Aggregate Economic Impact of Banks

The purpose of this section is to compute the economic impact of Missouri banks on the state economy. What would Missouri's economy look like with and without the presence of the banks that are members of the Missouri Bankers Association?

The comparison is between the baseline or control path and the treatment path for the Missouri economy. I use the terms control and treatment intentionally to conjure up notions associated with controlled experiments. The analogy is appropriate. The baseline path serves as the control path for Missouri real GDP over the 2015 through 2040 period. In the control setting, we assume that the Missouri economy—all the businesses, households and governments—continue to behave as they have over the previous 18 years. Here the term "treatment" refers to what happens if the Missouri economy is "treated" with a change in how banks operate. In other words, the experiment considers what would happen to the Missouri economy if a particular event—the treatment—occurred. In particular, the treatment is that members of the Missouri Bankers Associations stop lending funds for capital investment projects.

4.1 Constructing the Baseline Path

I begin by describing how to construct the baseline and treatment paths for the Missouri economy. It is useful to start with a baseline view of the Missouri economy over time. The preferred measure of the economy is real Gross Domestic Product (hereafter GDP). The baseline values are then compared with the treatment values, where the latter are computed by removing Missouri banks, and their loans, from the Missouri economy. The comparison is done over a twenty-five year period. The baseline value is computed as if Missouri banks continue to operate, and the treatment value is computed as if Missouri banks ceased operations. The economic impact is the discounted sum of the differences between the baseline and the treatment values.

The baseline path is constructed using the average annual growth rate in Missouri's real GDP between 1997 and 2014. Note that real GDP is the focus, in part, because it means that one does not need to separately compute a baseline value for future inflation rates. Real GDP already takes price changes into account. Table 7 reports the values of real GDP in each year.

Table 7

(mils of 2009 chained $)

Year	1997	2014
Real GDP	$217,968	$259,847

Source: Bureau of Economic Analysis. Go to

http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=1#reqid=70&step=1&isuri=1.

According to Table 7, Missouri's real GDP was close to $220 billion in 1997 and slightly less than $260 billion in 2014.

Equation 1 is the generic formula for calculating the annual average growth rate:

$$Y_{T+n} = (1+g)^n \times Y_T \ . \tag{1}$$

Let Y_T stand for the value of Missouri's real GDP in the base, or beginning year, g is the annual average growth rate, and Y_{T+n} stands for Missouri's real GDP n years after the base year. So, use Equation 1 to compute the annual average growth rate by setting $Y_T = \$217,968$; $Y_{T+n} = \$259,847$; and $n = 17$. Thus, based on the data presented in Table 7, Missouri's annual average growth rate between 1997 and 2014 was 1.039 percent, or $g = 0.01039$.

The next step is to construct the baseline values for Missouri's real GDP for each year from 2015 through 2040. Equation 2 describes how the path for Missouri's real GDP is computed for each year. The key assumption is that in the baseline economy, Missouri's real GDP increases at the same annual rate as the annual average rate between 1997 and 2014.

$$Y_t = (1.01039)^t \times Y_{2014}. \tag{2}$$

In other words, Missouri's real GDP depends on the starting value, which we have, and the growth rate, which is constant, by assumption. To illustrate how Equation 2 works, suppose one wants to know the baseline values in 2020 and 2033. Given $Y_{2014} = 259,847$, and with $t = 6$ corresponding to the year 2020, then $Y_{2020} = (1.01039)^6 \times 259,847 = 279,345.$ Thus, the baseline path for Missouri's real GDP in 2020 is $279,345 million. Similarly, for the baseline value in

2033, $t = 19$ so that $Y_{2033} = (1.01039)^{19} \times 259{,}847 = 319{,}520.$ The baseline path for Missouri's real GDP in 2033 is $319,520 million. Table 8 presents the baseline path for Missouri's real GDP for each year from 2015 through 2040.

4.2 Constructing the Treatment Path with Banks removed

The *Ak* model yields a very simple expression for the average economic growth rate. First, the model economy exhibits growth in equilibrium; that is, markets are equating demand and supply, and no person would unilaterally change their behavior without hurting themselves. The equilibrium growth rate is given by the following equation:

$$(1+g) = (\beta R)^{1/\sigma}. \tag{3}$$

Ireland (1994) derives the economy's growth rate equation with β standing for the rate at which people discount future economic outcomes, *R* is the gross after-tax real return and σ is the rate at which people value future consumption relative to present consumption.[5] Equation 3 tells us that the economy's growth is positively related to market interest rate. The gross after-tax return on capital is represented as

$$R = (1-\tau)(A+1-\delta), \tag{4}$$

where *A* is the rate at which physical and human capital are transformed into output (the *A* is not

[5] See Ireland, Peter N., (1994), "Supply-side Economics and Endogenous Growth," *Journal of Monetary Economics*, June, 33(3), 559-71.

Table 8

Baseline Path for Missouri's real GDP, 2015-40.

year	Growth rate	baseline GDP (2009 chained $)
2015	1.01039	265,275
2016		268,031
2017		270,816
2018		273,629
2019		276,473
2020		279,345
2021		282,247
2022		285,180
2023		288,143
2024		291,137
2025		294,162
2026		297,218
2027		300,306
2028		303,426
2029		306,579
2030		309,764
2031		312,983
2032		316,235
2033		319,520
2034		322,840
2035		326,194
2036		329,584
2037		333,008
2038		336,468
2039		339,964
2040		343,496

Source: Author's calculations.

directly observable), τ is the marginal income tax rate, and δ is the rate at which capital depreciates. Following standard methods, $\beta = 0.96$ and $\tau = 0.43224,$ which is the sum of the maximum federal marginal income tax rate plus the Missouri maximum marginal income tax rate after revising for the deductibility of federal income taxes. In addition, it is common to use δ = 0.1 and σ = 1.5. With these values, and with $1+g = 1.01039,$ then it follows that $A = 0.863363.$

In the Ak model economy, the term "k" refers to the total value of human and physical capital in an economy. Technology combines these two types of capital to produce goods and services. Real GDP is determined by how much physical and human capital is available to be transformed into cars, food, clothes, financial services, etc. So, according to the Ak model,

$$Y_t = Ak_t. \tag{5}$$

Equation 5 is how real GDP moves over time. Over time, human and physical capital depreciates. Without the investment funded by Missouri banks, the capital stock, and by implication, real GDP would decrease compared with the control path. From Equation 5, it is possible to compute that the change in real GDP over time is $\Delta Y_t = A\Delta k_t$, where the symbol "Δ" stands for change. The change in real GDP is the difference between real GDP this year and real GDP one year earlier. Note that investment spending is the same as Δk_t.

Now, it is possible to specify what the treatment is. As mentioned above, banks play a critical role in providing financing for capital purchases made by companies and entrepreneurs. We have data for banks that are members of the Missouri Bankers Association. Suppose the set of member banks ceased operating in the sense that each bank stopped making loans to people and to businesses using the funds to expand productive capacity. In other words, banks made no more commercial and industrial loans and no more loans for agriculture production. More specifically, suppose the member banks ceased making loans that are associated with new capital purchases.[6] Without these loans, I assume the capital purchases financed by these loans do not

[6] The economic effects of subtracting the deposits held by these banks would be more devastating because private wealth would be lost in this scenario. There are other scenarios that could be constructed. For the purposes of this experiment, let's assume that deposits do not vanish but that loans for new capital are not made because the set of banks do not exist.

occur. Therefore, the change in the capital stock caused by the treatment is equal to the loans foregone by the member banks ceasing loan operations.

As you can see from the balance sheet items in Tables 1 through 6, there is not a category called "loans made to finance new investment spending." Four loan categories are listed: real estate loans, commercial loans, individual loans, and agricultural loans. Commercial and agricultural loans are the closest fit to what we are trying to measure. Of course, there are individual loans made to finance higher education—that is, human capital investment—and there are real estate loans made to finance apartment complexes owned by business. However, there is no way to know how the funding is going to be used. Therefore, the most conservative approach is to ignore these two types of loans and use data on commercial loans and agricultural loans. [7]

The data for commercial and agricultural loans are obtained from the call reports maintained by the Federal Financial Institutions Examination Council. Formerly referred to as Commercial and Industrial Loans and Agricultural Production Loans, the call reports are collected every quarter. In this analysis, the value of outstanding commercial and industrial and agricultural production loans are taken from the December 31 call reports for 2012, 2013, and 2014.

The next step is to convert the measures of the outstanding value of loans into the value of new loans made during a year. There are two additional steps needed. First, it is straightforward to convert the stock of outstanding loans into the flow of new loans in a given year. At the end of any given year, the stock of outstanding loans is equal to the stock of outstanding loans at the end of the previous year, plus new loans made during the year (which is what we are trying to measure) less any loans that were repaid during the year. In formal terms, the stock of outstanding loans at the end of 2013 is given by the following:

$$L_{2013} = L_{2012} + NL_{2013} - RL_{2013}. \tag{6}$$

Equation 6 is a shorthand representation of the expression that characterizes the end-of-year stock of outstanding loans. Here, L is the stock of loans with the subscript designating the year,

[7] Agricultural loans are characterized as loans made to finance seed purchases and equipment acquisition. In the model economy, seeds are an investment that yields future product and therefore should be included in measuring investment spending provided by member banks.

NL is the flow of new loans made with the subscript marking the calendar year, and RL is the flow of outstanding loans removed from the books because the loan was repaid, again with the subscript marking the year in which the repayment occurs.

Second, it is necessary to make an assumption regarding the flow of loans repaid each year. Equation 6 gets one pointed in the right direction. Unfortunately, the data tell us what L_{2013} and L_{2012} are, for example, but we do not directly observe repaid loans from the call report data. The Federal Reserve Board of Governors reports the weighted average maturity of commercial and industrial loans in the Survey of Terms of Business Loans. Here, the "weight" is by the size of the loan.[8] In the May 2015 report, the average maturity is 652 days. With this information, it is possible to compute the expected value of loans repaid during a year. For commercial and industrial loans made by domestic banks, the weighted average maturity was 818 days. Assume that the loans were paid off evenly throughout the year. For loans outstanding at the end of 2012, for example, this means the repayment fraction would be $365 \div 818 = 0.446$. The Board of Governors similarly report the average maturity of non-real estate farm loans. The last reported value is for 2010. The average maturity was one year.[9] With this data, assume that 50 percent of the agricultural loans are repaid each calendar year. Thus, the value of repaid loans is given by the following equations:

$$RL_t^{CI} = 0.446 \times L_{t-1}^{CI}$$
$$RL_t^{AG} = 0.446 \times L_{t-1}^{AG}$$

With an equation for repaid loans substituted into Equation 6, it is possible to compute the value of new loans for each type.

With data for 2012, 2013 and 2014, there are values for new loans for 2013 and 2014. The average value of those two years is used as the measure of new commercial and industrial loans and new agricultural production loans for each bank that is a member of the Missouri Bankers Association.

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[8] For example, if a bank has two loans, one for $200,000 and one for $800,000, the $200,000 loan matures in one year and the $800,000 loan matures in 5 years. The weighted average maturity is computed as follows:

$$\left[\left(\frac{200,000}{1,000,000}\right) \times 1 year\right] + \left[\left(\frac{800,000}{1,000,000}\right) \times 5 years\right] = 4.2 years.$$

[9] See http://www.federalreserve.gov/releases/e15/current/pdf/databook.pdf.

In the list of member banks, some operate exclusively in Missouri while others have locations in multiple states. In order to compute the economic impact on the Missouri economy, there needs to be some way to distribute new loans between Missouri borrowers and out-of-state borrowers. The data are available for 17 member banks with locations in multiple states. Table 9 reports the banks, home state and method used to calculate the fraction of loans in Missouri. Two approaches are used. One approach assumes that the fraction of new loans in Missouri is equal to the fraction of bank locations in Missouri. This approach is built on the idea that each bank location contributes an equal share of new loans. So, if the bank has 15 branches, for example, and 6 of those branches are located in Missouri, and then $6 \div 15 = 0.4$ of the new loans are located in Missouri. The other approach uses information in the bank's annual report. In a few

Table 9

Member Banks with Multiple State Locations

Bank	**Home State**	**Method for calculating new loans in Missouri**
Regions Bank	AL	65 locations in Missouri/1647 total locations
First Community Bank	KS	3 locations in Missouri/11 total locations
Bank of Gower	AR	1 location in Missouri/5 total locations
Arvest Bank	AR	46 locations in Missouri/270 total locations
Great American Bank	KS	1 location in Missouri/4 total locations
U.S.Bancorp	OH	3.5 percent of commercial loans in Missouri
Town & Country Bank Midwest	IL	2 locations in Missouri/5 total locations
Bank of the West	CA	8 locations in Missouri/605 total locations
Equity Bank	KS	14 locations in Missouri/25 total locations
Bank of Kansas city	OK	6.19 percent of commercial loans in Missouri
Simmons First National Bank	AR	31 locations in Missouri/200 total locations
Great Southern Bank	MO	64 locations in Missouri/109 total locations
Bancorp South	MS	2.38 percent of commercial loans in Missouri
BMO Harris	IL	15 locations in Missouri/600 total locations
Carrollton Bank	IL	4 locations in Missouri/9 total locations
Peoples National Bank	IL	2 locations in Missouri/16 total locations
PNC Bank	PA	1 location in Missouri/81 total locations

Source: Bank Websites or Annual Reports

cases, the annual report gives the fraction of commercial loans by state. Thus, either the fraction of locations in Missouri or the fraction of commercial loans in Missouri is used to calculate the quantity of both types of new loans in Missouri.

Banks finance capital expenditures. The average of agricultural production loans and commercial and industrial loans for banks that are member of the Missouri Bankers Association are equal to $10.8 billion. To put this amount into perspective, the ratio of fixed investment spending in the United States was $2.7 trillion in the first quarter of 2015. Real GDP for the nation was $16.7 trillion. If the ratio of fixed investment spending to real GDP is roughly the same in Missouri as it is for the United States, then fixed investment spending in Missouri would be $42 billion. Therefore, the estimated value of financing provided by Missouri Banker's Association member banks is 25.7 percent of fixed investment spending in Missouri.

4.3 Calculating the Economic Impact

To generate the sequence of Missouri real GDP with the treatment, there is one more important element. So far, the treatment is defined as a case in which the member banks of the Missouri Bankers Association ceased operations. More concretely, suppose the member banks stopped all commercial and industrial loans and agricultural production loans in 2015. By this definition, the deposits in the member banks do not vanish. For our purposes, there are several alternatives that yield the same economic impact. For instance, suppose the deposits are withdrawn and spent by people consuming goods and services. Alternatively, the funds could be transferred to foreign banks and the loans made to individuals or single-family mortgages. The funds do not disappear, but are not used to acquire capital goods that are necessary to produce goods and services and raise incomes.[10]

Consider a Missouri economy in which member banks of the Missouri Bankers Association cease making commercial and industrial loans and agricultural production loans. In 2015, the immediate effect is that Missouri's productive capital would decline by $10.8 billion relative to the baseline economy. In this treatment, the Missouri economy continues to grow at a

[10] Because the focus is on the Missouri economy, there is a third option that has the same economic impact. The deposits withdrawn from member banks could be deposited in foreign banks and the proceeds used to finance investment projects outside Missouri. The projects would negatively affect Missouri's capital stock and its ability to produce goods and services with an equal-sized offset to capital goods purchased in the rest of the world.

1.039 percent annual rate. In other words, there are no spillovers from the reduction in the Missouri capital stock, just a one-time reduction.

Table 10

Missouri's Projected real GDP Path,

Baseline and No-Financing Cases, 2015-40

year	baseline GDP (2009 chained $)	MO GDP less MO bank investment
2015	265,275	255,936.5
2016	268,031	258,595.7
2017	270,816	261,282.5
2018	273,629	263,997.3
2019	276,473	266,740.2
2020	279,345	269,511.6
2021	282,247	272,311.8
2022	285,180	275,141.2
2023	288,143	277,999.9
2024	291,137	280,888.3
2025	294,162	283,806.7
2026	297,218	286,755.5
2027	300,306	289,734.9
2028	303,426	292,745.2
2029	306,579	295,786.8
2030	309,764	298,860.1
2031	312,983	301,965.2
2032	316,235	305,102.6
2033	319,520	308,272.7
2034	322,840	311,475.6
2035	326,194	314,711.8
2036	329,584	317,981.7
2037	333,008	321,285.5
2038	336,468	324,623.7
2039	339,964	327,996.5
2040	343,496	331,404.4

Source: Author's calculations

Table 10 provides the path for Missouri real GDP with and without the capital financing from member banks of the Missouri Bankers Association. In other words, it presents both the baseline path and the treatment path. Table 10 provides us two important points. First, there is a sense in which Missouri catches up because there is economic growth. Even with a $10.8 billion hit to capital purchases in 2015, the Missouri economy grows so that in 2019, Missouri's real GDP is back up to its 2015 baseline level. Second, the side-by-side comparison shows that in each year, Missouri's real GDP after the $9.3 billion loss in 2015 is always below its baseline path. Indeed, this difference between the two columns in Table 10 is increasing. The mathematics is simple: each year the state economy's growth rate is applied to a larger base in the baseline path than to the treatment path. The one-time loss in capital purchases, therefore, creates a widening gap in terms of how the Missouri economy could have performed with member banks making those loans to Missouri investment projects.

The natural way to summarize the economic impact is the discounted sum of the differences between the baseline and the treatment paths. Historically, the average return on savings has been around four percent. To match with this level, I discount each year at the rate $\beta = 0.96.$ Formally, the sum of the discounted differences between the baseline and treatment values of real GDP is given by the following equation:

$$\sum_{t=2015}^{2040} \beta^{t-2015} \left(Y_t^B - Y_t^* \right). \tag{7}$$

Here, Y_t^B stands for the baseline value of Missouri real GDP in a particular year and Y_t^* stands for the treatment value of Missouri real GDP is a particular year. Note that because $\beta < 1,$ future values are being discounted more heavily. The economics is saying that the longer you have to wait for the future dollar, the less that future dollar is worth to you in today's terms.

In practice, take the difference between column 2 in Table 10 and column 3 in Table 10. Multiply the difference by the appropriate discount rate. Do this for each year between 2015 and 2040 and the sum of the discounted differences is $170.2 billion. In other words, the Missouri economy is $170.2 billion smaller over the 2015-2040 period if the member banks of the

Missouri Bankers Associated were to not make loans for investment projects worth $10.8 billion in 2015.

Another way to describe the economic impact is to compute the number of jobs associated with the loss of real GDP. With less real GDP, there will be less income paid to owners of companies and to workers. Workers are typically paid between 60 percent and 70 percent of real GDP. For example, in 2015, the value of GDP declines by $9.3 billion. I assume that 60 percent of that amount would have been paid to workers. The Bureau of Labor Statistics reports that the mean annual income for Missouri workers is $42,790.[11] Therefore, a $9.3 billion reduction in real GDP corresponds to a reduction of 131,750 workers. Missouri's current payroll employment is 2.7 million. So, if real GDP declines by $9.3 billion in a year, Missouri's employment level would fall by nearly 5 percent relative to 2015 levels.

With real GDP lower, other factors will be affected in the Missouri economy. Consumption spending by households is typically 70 percent of real GDP. Therefore, people will be buying fewer goods and services. In addition, real GDP constitutes much of the basis for taxes collected by Missouri State Government. Historically, Missouri's net General Revenue—the amount collected by state government after refunds—is 3.8 percent of real GDP. With the economy $170.2 billion smaller over the 2015 through 2040 period, net General Revenue would decline by $6.5 billion over that period. Thus, the discounted sum of declines in net General Revenue between 2015 and 2040 is 81 percent of what Missouri State Government collected in fiscal year 2014.

4.4 Partial Financing Scenario

Consider an alternative case: deposits withdrawn from member banks are deposited in new Missouri banks. In this scenario, $5.4 billion of the deposits are used to finance capital purchases made by Missouri companies in 2016. In Table 11, the baseline path for Missouri real GDP and the partial financing path for Missouri real GDP is presented for the period 2015 through 2040. By allowing half of the deposits to be used to finance capital purchases in 2016, the discounted sum of foregone real GDP is $89.9 billion. The decline in Missouri's real GDP would be expected to result in less state revenues. Under the partial financing scenario, the discounted sum of net General Revenues is $3.4 billion over the period 2015 through 2040.

[11] The data can be found at http://www.bls.gov/oes/current/oes_mo.htm.

Table 11

Missouri's Projected real GDP Path,

Baseline and Partial Financing Case, 2015-40

year	baseline GDP (2009 chained $)	MO GDP less MO bank investment (Partial)
2015	265,275	255,936.5
2016	268,031	263,306.3
2017	270,816	266,042.1
2018	273,629	268,806.2
2019	276,473	271,599.1
2020	279,345	274,421.1
2021	282,247	277,272.3
2022	285,180	280,153.2
2023	288,143	283,063.9
2024	291,137	286,005.0
2025	294,162	288,976.6
2026	297,218	291,979.0
2027	300,306	295,012.7
2028	303,426	298,077.9
2029	306,579	301,174.9
2030	309,764	304,304.1
2031	312,983	307,465.8
2032	316,235	310,660.4
2033	319,520	313,888.2
2034	322,840	317,149.5
2035	326,194	320,444.7
2036	329,584	323,774.1
2037	333,008	327,138.1
2038	336,468	330,537.0
2039	339,964	333,971.3
2040	343,496	337,441.3

Source: author's calculations

Overall, the economic impact of the member banks on the Missouri economy is substantial. Banks are needed to finance local capital that is vital to the production of goods and services in Missouri. With production comes the income that Missourians use to acquire goods and services.

4.5 Charitable giving by member banks

Economic impact is felt through jobs and production, but also through charitable giving by organizations. In the case of banks, local giving is evident anecdotally when one attends baseball games, soccer matches, and local festivals. We know that banks sponsor Little League events, soccer teams, and city events because we see the bank's name emblazoned on the scoreboards, uniforms, and banners.

In this report, there is one more measure of economic impact that is considered. What if the member banks of the Missouri Bankers Association were to cease operations, including their charitable giving?

To measure charitable giving by banks, we will have to estimate. Banks do not report charitable giving in any of the call reports submitted to Federal Financial Institutions Examination Council. Banks do report net income after taxes in the Call Report. To estimate the amount of charitable giving, we use the Center on Philanthropy at Indiana University 2009 report that gives the average percent of corporate profits given to non-profit organizations.[12] According to a report on charitable giving in Kansas City, corporations, on average, give 1.8 percent of profits to non-profit organizations.

Table 12 reports net income after taxes for the member banks of the Missouri Bankers Association for the year 2014. For member banks with out-of-state headquarters, net income to Missouri branches is allocated according to the fraction of locations in Missouri or the fraction of loans in Missouri as presented in the bank's annual report. Banks with zero net income or losses are reported in Table 12 by the entry "≤ 0." For the purposes of this analysis, there are member banks with net income less than or equal to zero and these banks' contribution to aggregate net

[12] See *Giving In Kansas City: A Report prepared by The Center on Philanthropy* at https://scholarworks.iupui.edu/bitstream/handle/1805/5840/givinginkansascity_2009.pdf?sequence=1&isAllowed=y

income will be zero. When we add up net income across all the member banks, 2014 net income was $1.74 billion.

Table 12

Net Income for MBA Member Banks 2014

MBA Members	Location		Net Income 2014 (thous of $)
Adrian Bank	Adrian	MO	2427
Bank of Advance	Advance	MO	7414
Alton Bank	Alton	MO	918
Citizens Bank	Amsterdam	MO	741
FortuneBank	Arnold	MO	218
Mainstreet Bank	Ashland	MO	≤ 0
First Independent Bank	Aurora	MO	411
Belgrade State Bank	Belgrade	MO	1852
BTC Bank	Bethany	MO	5213
Bank of Billings	Billings	MO	85
Bloomsdale Bank	Bloomsdale	MO	4330
Adams Dairy Bank	Blue Springs	MO	777
America's Community Bank	Blue Springs	MO	500
Bank of Bolivar	Bolivar	MO	1371
CBC Bank	Bowling Green	MO	≤ 0
Community State Bank of Missouri	Bowling Green	MO	2806
Branson Bank	Branson	MO	1598
Central Bank of Branson	Branson	MO	2999
First Community Bank of the Ozarks	Branson	MO	375
Pony Express Bank	Braymer	MO	3048
Bank of Brookfield-Purdin, N.A.	Brookfield	MO	684
First Missouri Bank	Brookfield	MO	1822
County Bank	Brunswick	MO	739
O'Bannon Banking Company	Buffalo	MO	1264
Community First Bank	Butler	MO	2527
Cabool State Bank	Cabool	MO	167
Flowers National Bank	Cainsville	MO	136
First National Bank	Camdenton	MO	≤ 0
1st Cameron State Bank	Cameron	MO	95
Farmers State Bank	Cameron	MO	1546

Horizon State Bank	Cameron	MO	≤ 0	
Canton State Bank	Canton	MO		178
Alliance Bank	Cape Girardeau	MO		1828
First Missouri State Bank of Cape County	Cape Girardeau	MO		1456
Carrollton Bank	Carrollton	IL		6148
BANK 21	Carrollton	MO		922
Carroll County Trust Company	Carrollton	MO		1624
Hometown Bank, NA	Carthage	MO	≤ 0	
Southwest Missouri Bank	Carthage	MO		5314
First State Bank & Trust Company, Inc.	Caruthersville	MO		4869
Freedom Bank of Southern Missouri	Cassville	MO		2891
Security Bank of Southwest Missouri	Cassville	MO		1552
Heritage Community Bank	Chamois	MO		503
Citizens Bank of Charleston	Charleston	MO		1843
Focus Bank	Charleston	MO		2435
Mississippi County Savings &Loan Association	Charleston	MO	≤ 0	
Chillicothe State Bank	Chillicothe	MO		1762
Citizens Bank & Trust	Chillicothe	MO		4802
Investors Community Bank	Chillicothe	MO		769
Clarence State Bank	Clarence	MO		128
Central Bank of St. Louis	Clayton	MO		20072
Enterprise Bank & Trust	Clayton	MO		30213
Parkside Financial Bank & Trust	Clayton	MO		2869
Regions Bank	Clayton	MO		51595
Citizens Farmers Bank	Cole Camp	MO		1476
Central Bank of Boone County	Columbia	MO		20589
Landmark Bank, N.A.	Columbia	MO		21759
Providence Bank	Columbia	MO		239
Concordia Bank	Concordia	MO		1009
State Bank of Missouri	Concordia	MO		730
The Corder Bank	Corder	MO		47
Sherwood Community Bank	Creighton	MO		169
First Bank	Creve Coeur	MO		32208
First Community National Bank	Cuba	MO		2220
Peoples Bank	Cuba	MO		3198
First Midwest Bank of Dexter	Dexter	MO		2495
Mid America Bank & Trust Company	Dixon	MO		4673
Frontenac Bank	Earth City	MO		6329
The Citizens Bank of Edina	Edina	MO		1104
Community Bank of El Dorado Springs	El Dorado Springs	MO		1854
Citizens Bank of Eldon	Eldon	MO		1104

Security Bank of the Ozarks	Eminence	MO		581
Jefferson Bank & Trust Company	Eureka	MO		3536
Rockwood Bank	Eureka	MO		1310
First State Community Bank	Farmington	MO		20200
Ozarks Federal Savings & Loan Association	Farmington	MO		628
Commercial Trust Company	Fayette	MO		956
Exchange Bank of Missouri	Fayette	MO		1378
Midwest Regional Bank	Festus	MO		2241
New Era Bank	Fredericktown	MO		4812
Triad Bank	Frontenac	MO		1701
Bank Star One	Fulton	MO		927
The Callaway Bank	Fulton	MO		2236
United Security Bank	Fulton	MO		672
Century Bank of the Ozarks	Gainesville	MO		3271
Lead Bank	Garden City	MO		405
First Commercial Bank	Gideon	MO		2240
First Bank of Missouri	Gladstone	MO		3916
Tri-County Trust Company	Glasgow	MO		1038
First Community Bank	Goodman	MO		2078
Bank of Gower/Union State Bank of Everest	Gower	MO		85
The Bank of Grain Valley	Grain Valley	MO		1187
Bank of Grandin	Grandin	MO		2871
Farmers Bank of Green City	Green City	MO		243
Peoples Community Bank	Greenville	MO		9745
Bank Northwest	Hamilton	MO		2250
The Hamilton Bank	Hamilton	MO		829
American Loan & Savings Association	Hannibal	MO	≤ 0	
F & M Bank and Trust Company	Hannibal	MO	≤ 0	
HNB National Bank	Hannibal	MO		8917
Bremen Bank & Trust Company	Hazelwood	MO	≤ 0	
F & C Bank	Holden	MO		1922
The Bank of Houston	Houston	MO	≤ 0	
Bank of Iberia	Iberia	MO		34
Blue Ridge Bank & Trust Company	Independence	MO		4633
Capaha Bank	Jackson	MO	≤ 0	
Home Exchange Bank	Jamesport	MO		2152
Peoples Bank of Moniteau County	Jamestown	MO		300
Central Bank	Jefferson City	MO		20385
Hawthorn Bank	Jefferson City	MO		9518
Home Savings Bank	Jefferson City	MO	≤ 0	
Jefferson Bank of Missouri	Jefferson City	MO		7940
Midwest Independent Bank	Jefferson City	MO		1359
Jonesburg State Bank	Jonesburg	MO		1107

Arvest Bank	Joplin	MO		17917
Kahoka State Bank	Kahoka	MO		176
Peoples Bank	Kahoka	MO		629
Central Bank of Kansas City	Kansas City	MO		2350
Commerce Bank	Kansas City	MO		249919
Country Club Bank	Kansas City	MO		8600
Great American Bank	Kansas City	MO		315
H&R Block Bank	Kansas City	MO		62805
Missouri Bank & Trust Company	Kansas City	MO		6127
U.S. Bank, N.A.	Kansas City	MO		193724
UMB Financial Corporation	Kansas City	MO		94832
Valley View Bank	Kansas City	MO		1187
KCB Bank	Kearney	MO		2449
Kennett National Bank	Kennett	MO		476
Table Rock Community Bank	Kimberling City	MO		587
American Trust Bank	Kirksville	MO		519
Bank of Kirksville	Kirksville	MO		2950
Northeast Missouri State Bank	Kirksville	MO		1391
Town & Country Bank Midwest	La Grange	MO		1510
La Monte Community Bank	La Monte	MO		133
Lamar Bank & Trust Company	Lamar	MO		2854
Goppert Financial Bank	Lathrop	MO		460
Lawson Bank	Lawson	MO		695
Central Bank	Lebanon	MO		3571
Heritage Bank of the Ozarks	Lebanon	MO		349
Bank of Lees Summit	Lees Summit	MO		2114
Bank of the West	Lees Summit	MO		7196
Central Bank of the Midwest	Lees Summit	MO		11861
Equity Bank	Lees Summit	MO		5673
Summit Bank of Kansas City	Lees Summit	MO	≤ 0	
Bank of Kansas City	Lee's Summit	MO		17916
Midwest BankCentre	Lemay	MO		8248
United State Bank	Lewistown	MO		1980
B & L Bank	Lexington	MO		489
BankLiberty	Liberty	MO		4122
Clay County Savings Bank	Liberty	MO		206
Farmers Bank of Lincoln	Lincoln	MO		1243
Legends Bank	Linn	MO		3084
Mid America Bank	Linn	MO		5709
Farmers Bank of Lohman	Lohman	MO		404
The Mercantile Bank	Louisiana	MO		1213
Bank of Macks Creek	Macks Creek	MO	≤ 0	
Macon-Atlanta State Bank	Macon	MO		1924

Alliant Bank	Madison	MO		1184
First National Bank	Malden	MO		1917
HomePride Bank	Mansfield	MO		927
Citizens National Bank of Greater St. Louis	Maplewood	MO		1647
Regional Missouri Bank	Marceline	MO		2785
Community Bank of Marshall	Marshall	MO		971
Wood & Huston Bank	Marshall	MO		8652
Southern Missouri Bank of Marshfield	Marshfield	MO		791
Nodaway Valley Bank	Maryville	MO		17576
Independent Farmers Bank	Maysville	MO		987
The Bank of Fairport	Maysville	MO		99
Peoples National Bank, N.A.	McLeansboro	IL		13025
Community Bank of Memphis	Memphis	MO		243
Central Bank of Audrain County	Mexico	MO		1861
Martinsburg Bank & Trust Company	Mexico	MO		2377
Bank of Minden	Mindenmines	MO		150
Bank of Cairo & Moberly	Moberly	MO		1379
Central Bank of Moberly	Moberly	MO		1122
Community National Bank	Monett	MO		1186
Bank of Monticello	Monticello	MO		1176
Montrose Savings Bank	Montrose	MO		574
First Home Bank	Mountain Grove	MO		551
Community Bank and Trust	Neosho	MO		2850
First National Bank	Nevada	MO		870
Heritage State Bank	Nevada	MO		1409
Bank of New Cambria	New Cambria	MO		178
Citizens Bank	New Haven	MO		842
RCSBank	New London	MO		87
Bank of New Madrid	New Madrid	MO		808
Home Savings & Loan Association	Norborne	MO	≤ 0	
Commercial Bank of Oak Grove	Oak Grove	MO		87
Bank of Odessa	Odessa	MO		2418
Bank of Old Monroe	Old Monroe	MO		4433
Bank CBO	Oregon	MO		559
The Bank of Orrick	Orrick	MO	≤ 0	
Central Bank of Lake of the Ozarks	Osage Beach	MO		7683
First Bank of the Lake	Osage Beach	MO	≤ 0	
St. Clair County State Bank	Osceola	MO		1332
Ozark Bank	Ozark	MO		1588
Bank Star	Pacific	MO		714
HOMEBANK	Palmyra	MO		2164
The Paris National Bank	Paris	MO		393

The Bank of Missouri	Perryville	MO		11022
First Midwest Bank of the Ozarks	Piedmont	MO		1127
Citizens Community Bank	Pilot Grove	MO		666
Simmons First National Bank	Pine Bluff	AR		7043
Platte Valley Bank of Missouri	Platte City	MO		6761
Wells Bank of Platte City	Platte City	MO		2644
Community Bank of Pleasant Hill	Pleasant Hill	MO		137
Pleasant Hill Bank	Pleasant Hill	MO		122
First Midwest Bank of Poplar Bluff	Poplar Bluff	MO		4837
First Missouri State Bank	Poplar Bluff	MO		3406
Southern Bank	Poplar Bluff	MO		11823
Sterling Bank	Poplar Bluff	MO		6495
Unico Bank	Potosi	MO		3880
Great Western Bank	Princeton	MO		4049
First State Bank of Purdy	Purdy	MO		1719
Community Bank of Raymore	Raymore	MO		2544
Peoples Savings Bank	Rhineland	MO		1364
Security Bank	Rich Hill	MO		200
Community Bank of Missouri	Richmond	MO		305
The State Bank	Richmond	MO		314
Citizens Bank & Trust	Rock Port	MO		1040
Citizens Bank of Rogersville	Rogersville	MO		825
Legacy Bank and Trust	Rogersville	MO		959
Central Federal Savings & Loan Association	Rolla	MO		105
Citizens Bank of Newburg	Rolla	MO		645
Phelps County Bank	Rolla	MO		4182
Preferred Bank	Rothville	MO		1373
Community Point Bank	Russellville	MO		687
Bank of Salem	Salem	MO		318
Progressive Ozark Bank	Salem	MO		2539
Merchants & Farmers Bank	Salisbury	MO		873
Farmers State Bank	Schell City	MO	≤ 0	
Central Bank of Sedalia	Sedalia	MO		5426
The Missouri Bank II	Sedalia	MO		1907
Senath State Bank	Senath	MO		1095
Peoples Bank of Seneca	Seneca	MO		1448
The Seymour Bank	Seymour	MO		1149
Community State Bank	Shelbina	MO		429
Montgomery Bank	Sikeston	MO		7786
Silex Banking Company	Silex	MO		596
BancorpSouth Bank	Springfield	MO		2871
Central Bank of the Ozarks	Springfield	MO		13542
Great Southern Bank	Springfield	MO		26366

Guaranty Bank	Springfield	MO		6667
Liberty Bank	Springfield	MO		18510
Metropolitan National Bank	Springfield	MO		2002
Mid-Missouri Bank	Springfield	MO		4809
OakStar Bank	Springfield	MO		2420
Old Missouri Bank	Springfield	MO		1728
Springfield First Community Bank	Springfield	MO		3701
Systematic Savings Bank	Springfield	MO	≤ 0	
BMO Harris Bank	St Louis	MO		10867
Commercial Bank	St Louis	MO		591
Scottrade Bank	St Louis	MO		176080
First State Bank of St. Charles	St. Charles	MO		2862
New Frontier Bank	St. Charles	MO		933
Farmers & Merchants Bank	St. Clair	MO		1053
Bank of St. Elizabeth	St. Elizabeth	MO		2094
St. Johns Bank & Trust Company	St. John	MO		461
Pony Express Community Bank	St. Joseph	MO		446
Concord Bank	St. Louis	MO	≤ 0	
Lindell Bank & Trust Company	St. Louis	MO		8346
Peoples National Bank, N.A.	St. Louis	MO		1628
PNC Bank	St. Louis	MO		42141
Pulaski Bank	St. Louis	MO		12487
1st Advantage Bank	St. Peters	MO		106
Farmers State Bank	Stanberry	MO		677
MRV Banks	Ste. Genevieve	MO		1013
Bank Star of the BootHeel	Steele	MO		1016
Bank of Sullivan	Sullivan	MO		3612
Community Bank, N.A.	Summersville	MO		620
The Tipton Latham Bank, N.A.	Tipton	MO		1013
ONB Bank and Trust Company	Tulsa	OK		6479
United Bank of Union	Union	MO		3841
First Security Bank	Union Star	MO		88
Farmers Bank of Northern Missouri	Unionville	MO		3672
Putnam County State Bank	Unionville	MO		2519
The Bank of Urbana	Urbana	MO		1549
The Bank of Versailles	Versailles	MO		5912
Maries County Bank	Vienna	MO		3433
Central Bank of Warrensburg	Warrensburg	MO		2214
Quarry City Savings & Loan Association	Warrensburg	MO		264
The Missouri Bank	Warrenton	MO		3048
Bank of Franklin County	Washington	MO		787
Bank of Washington	Washington	MO		976
Bank of Crocker	Waynesville	MO	≤ 0	

Security Bank of Pulaski County	Waynesville	MO	312
American Bank of Missouri	Wellsville	MO	1204
Community First Banking Company	West Plains	MO	2453
West Plains Bank & Trust Company	West Plains	MO	6099
West Plains Savings & Loan Association	West Plains	MO	606
Bank of Weston	Weston	MO	884
FMB	Wright City	MO	298

Source: Missouri Bankers Association, Federal Financial Institutions Examination Council

It is straightforward to compute the charitable giving by members of the Missouri Bankers Association. If member banks give at the same rate as corporations in the Kansas City area, which is also approximately the same rate as national corporations, then charitable giving will total $31.3 million. Thus, the estimated value is $31.3 million when we consider all the charitable giving by banks that are members of the Missouri Bankers Association. The philanthropy includes the charitable giving to local, state, and national organizations to which these member banks pledge donations. Note that the estimate value excludes things like loans that are pledged to non-profit organizations. Overall, therefore, if these member banks ceased to operate, the expected loss in charitable giving would decline by $31.3 million based on net income reported in 2014.[13]

There is an important fact that goes unmeasured by the charitable giving calculations. Bank employees are involved in many charitable and service organizations. These organizations volunteer time and effort to local causes. Because there are no data recording these efforts, it is impossible to quantify the value of this aspect of member bank charitable activities.

5. Summary and Conclusions

The Missouri Bankers Association is a statewide organization serving member banks in Missouri. There are 294 member banks included in the Association. These banks serve both depositors and borrowers and the communities in which they operate. Operations tell us that they pass one test; it is worth it to bank owners to keep the doors open. However, it is important to know how important banks are to the Missouri economy.

[13] There is anecdotal evidence that banks are more generous that other kinds of corporations in terms of charitable giving. Survey evidence suggests the percentage of net income is between two and 2.25 percent. If the level of 2014 charitable giving was recomputed with, say, two percent of net income, the value of charitable giving by member banks would be $34.8 million. If the ratio of charitable giving to net income is 2.25 percent, the 2014 value given by member banks is $39.2 million.

To measure the importance of banks, the starting point is to recognize that aggregate state economies are moving through time. The value of goods and services produced in the state economy depend critically on the quantity of inputs available. These inputs include people, equipment, and machines. Technology refers to the means used to combine people and machines that produce these goods and services. From this simple description, we can determine how banks affect the economy. At a fundamental level, banks bring savers and borrowers together. Over time, the funds deposited by savers are loaned to a variety of different borrowers, including ones that apply the funds towards purchases of capital equipment. By funding investment projects, member banks play an integral role in adding to the quantity of capital input available for production. This is a simple way to think about the collective impact that member banks have on the future value of output produced in Missouri.

In this report, our goal is to measure the collective impact that banks have on the Missouri economy. We begin by constructing a measure of the value of loans made to fund investment projects, using data for banks that are members of the Missouri Bankers Association. Over time, the economic impact is the difference between the path of Missouri real GDP with member banks making these loans and the path without the funding from member banks for investment projects.

What is happening over time is an essential part of the analysis presented in this report. We begin by presenting a set of basic bank performance measures over a fifteen-year period spanning 2000 through 2015. The focus is on the performance of banks located in Missouri compared with banks in the rest of the United States. Because of the financial crisis that coincided with the Great Recession, the comparison gives us an idea of how commercial banks in Missouri have changed over time relative to banks in the United States.

Three main results are uncovered by comparing Missouri banks to United States banks. First, the history shows that for many levels of bank performance, during and after the Great Recession, we observe that the amplitude of the cyclical fluctuation was greater for Missouri banks than for United States banks. In particular, we compute the ratio of many performance measures for Missouri banks divided by United States banks. For many of the loss and non-performing loan measures, the ratios increased as the Great Recession started, and then fell as the expansion began in 2009. So, Missouri banks reported losses increasing faster than the national

values between 2007 and 2009 followed by losses decreasing faster than national values since 2009.

Second, when the scale of Missouri banks were taken into account, Missouri banks reported smaller losses during the Great Recession compared with United States banks. When viewed with the first result, the two results seem to contradict each other. Instead, the two results combine to give a clearer picture of the changes going on in Missouri banks relative to United States banks. Missouri banks held a larger fraction of total United States loans as the Great Recession started. As the performance measures in Missouri banks reported increasing losses relative to the set of national banks, they had a larger base of total loans against which these losses were applied. The implication is that by the end of the Great Recession, Missouri banks had shrunk relative to banks in the rest of the country.

Third, the evolution of Missouri banks relative to United States banks mirrors broader measures of the Missouri economy relative to the rest of the country. Economic growth in Missouri has been less than the national rate. Indeed, between 1997 and 2014, Missouri ranked 49th out of 50 states in terms of the rate of real GDP growth. By many performance measures, Missouri banks were shrinking, especially since the Great Recession began. Banks are not the fundamental cause of the slow economic growth. Rather, the underlying factors are reflected in both less banking activity and slower economic growth. The implication is that banks are an important conduit for financing investment projects and an increase in more volume of investment projects is correlated to faster economic growth.

To calculate the economic impact, we build on the notion that commercial banks provide financing for capital purchases. Using data for banks that are members of the Missouri Bankers Association, we find that commercial and industrial loans and agricultural production loans averaged $10.8 billion over the 2013-14 period. If the member banks cease operations and these funds are redirected away from financing capital purchases, the economic impact on the Missouri economy is over $170 billion over the 2015 through 2040 period. Even if one-half of the deposits are redirected into future capital purchases, we compute that the discounted sum of foregone real GDP in Missouri is nearly $90 billion. We further show that as the size of the Missouri economy shrinks, so does the amount of taxes collected by state government.

Finally, community banks are involved. In addition to computing the impact of production, it is important to quantify what banks do for local schools, athletic activities, and the arts. So, we estimate the charitable donations to non-profit organizations. Based on the average level of corporate giving, we estimate that member banks gave $31.4 million to non-profit organizations in 2014.