
MERGER ADJUSTING BANK DATA: A PRIMER

Analysis of banking trends often focuses on specific industry subgroups. The analyst tracks the performance or characteristics of an industry subgroup over time, and the results, if compelling, can serve as input to policy decisions. When conducting such research and considering its results, it is important to remember that different ways of analyzing the same bank data can produce seemingly different conclusions. This article focuses on the merger adjustment analysis technique.

Researchers face challenges when attempting to analyze the characteristics of groups of institutions over time.¹ Membership in a particular group can change as new institutions form and older institutions merge, fail, or close. Institutions may also change their characteristics over time in ways that cause them to move from one group to another.

The process that FDIC analysts use to account for mergers is called *merger adjusting*.² This article describes how and when FDIC analysts use merger adjustment when analyzing change in the banking industry and includes merger adjusting of the number of bank offices, balance sheet data, and income statement data. It discusses when to merger adjust and when not to merger adjust, and offers caveats for interpreting results. The appendix includes citations to publicly available data needed to perform merger adjustments.

How and When to Perform Merger Adjustment

Merger adjustment is often appropriate when analyzing a subset, or group, of the industry over time. Consider the regular reporting in the FDIC's *Quarterly Banking Profile* (QBP) of year-over-year loan growth at all community banks.³ The group of community banks today is not necessarily made up of the same institutions that constituted the group a year earlier; institutions merge, fail, or close, or they can change and no longer meet the criteria to be a community bank. Also, new community banks are chartered, and sometimes noncommunity banks become community banks. Given these ongoing structural changes, how should analysts measure year-over-year loan growth at community banks?

The QBP calculation of year-over-year loan growth measures what is called the "organic growth" of loans held by currently operating community banks—the portion of growth that is independent of the effects of mergers. For example, if two institutions each had \$100 million in loans one year ago, and they merged, and the combined institution ended the year with \$200 million in loans, then the organic growth, or merger-adjusted growth, is zero. Although the acquiring institution doubled its loan portfolio, for the two institutions as a group there was no net increase in loans.

Merger-adjusted calculation of year-over-year loan growth involves identifying the community banks as of the most recent quarter, identifying institutions that those community banks acquired over the period being analyzed, and adding the assets and liabilities of the acquired institutions to the acquiring institutions in previous periods. The analysis treats acquired and acquiring institutions as if the merger had already occurred by the beginning of the period being analyzed.⁴

¹ For example, see S. A. Rhoades and A. J. Yeats, "Growth, Consolidation, and Mergers in Banking," *Journal of Finance* 29, no. 5, December 1974: 1397-1405. Also, see George J. Stigler, "The Statistics of Monopoly and Merger," *Journal of Political Economy* 64, no. 1, February 1956: 33-40.

² In this article, "merger" refers to any absorption of one institution by another where the absorbed institution no longer maintains a separate existence, whether or not both institutions are owned by the same holding company, as well as whether or not the absorption involves a failed institution.

³ Community banks are defined according to the FDIC's research definition. See Chapter 1 of *FDIC Community Banking Study* (2012). In general, the FDIC considers as community banks both larger institutions that are not specialty banks (that are not, for example, bankers' banks, credit card banks, or industrial loan companies) and that rely primarily on core deposits to fund local lending and operate within a limited geographic area, as well as smaller institutions that are not specialty banks.

⁴ Typically, FDIC analysts merger adjust data between two periods—for example an earlier quarter and the current quarter—by considering the current quarter's insured institutions as constituting the group about which information is desired. So, analysts drop from the earlier quarter any institutions not also present in the current quarter if they have closed without an acquirer, were acquired by a nonbank such as a credit union, or relinquished FDIC insurance during the interval between the earlier quarter and the current quarter. New institutions that formed during the interval, and which report in the current quarter but did not report in the earlier quarter, are kept in the data. One can think of newly formed institutions as reporting values of zero for their assets and liabilities in the earlier quarter.

Why Merger Adjust?

Data are merger adjusted so that year-over-year growth calculations are made on data from only one group of institutions, and to reduce calculation distortions caused by mergers. When one bank purchases another, it acquires the assets and liabilities of the purchased bank. It would be confusing to report a change in the amount of the acquiring bank's total assets without accounting for the merger.

Suppose a researcher wishes to compare the number of offices operated by the four largest banks, measured by total assets, in 2018 with the number of offices operated by the same four banks in 1998. A simple comparison of these two numbers will tell us that the number of offices operated by these four banks has greatly increased. The simple comparison will not tell us whether the increase was the result of new offices being opened, or the result of acquisitions of the offices of other banks.

Another situation in which merger adjusting makes a crucial difference is when comparing industry size groups over time. Suppose a researcher is interested in determining total deposits of institutions with less than \$1 billion each in assets over the past 20 years. For any given asset-size threshold, fewer and fewer banks will fall under that threshold as time goes on simply because of inflation. Banks that are under the threshold at the beginning of the period may grow or be acquired by larger institutions. So, over time there could be fewer banks, and potentially fewer deposits, under the \$1 billion asset size threshold. A merger-adjusted analysis would be appropriate if the researcher is interested in determining the growth of deposits at the current group of institutions in this size range, rather than tracking the total deposits of all institutions in the group over time.

Three Examples of Merger Adjustment

These examples will show the methods, advantages, and drawbacks of merger adjustment. Readers will note references to the types of information needed to merger adjust banking data. The appendix contains instructions on where to find and how to use this publicly available information.

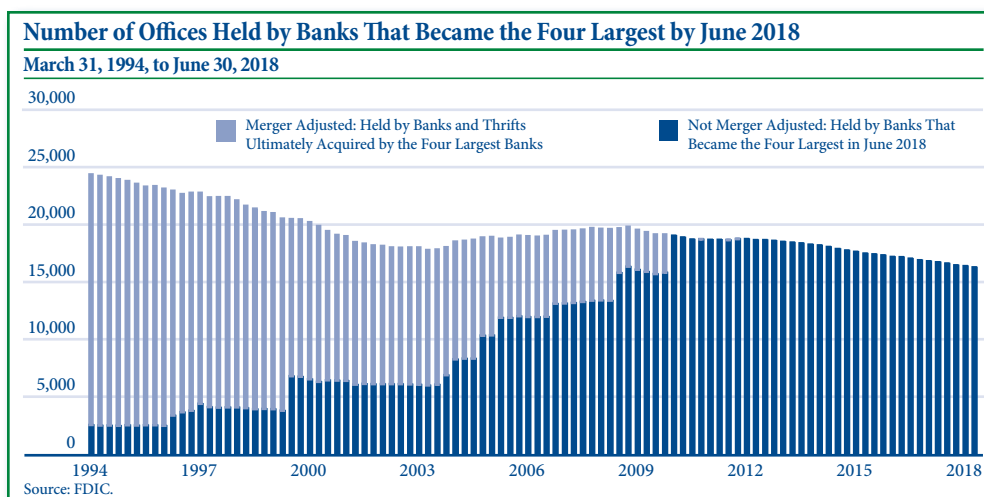
Example One: Tracking the Number of Offices of Large Institutions

In this example, we will consider how many offices today's four largest FDIC-insured institutions have operated since 1994. The chart on page 33 shows the number of offices operated since 1994 by the four largest FDIC-insured institutions, measured by total assets, as of June 30, 2018. The chart on page 33 shows both a merger-adjusted series, represented by light blue bars, and an unadjusted series, represented by dark blue bars.

The adjusted series is made by adding the number of offices of the four largest banks to the number of offices of all banks they acquired in every quarter during the analysis period.⁵ Suppose that Bank A, one of today's four largest banks, acquired two other banks between 1994 and today: Bank B in 2001 and Bank C in 2007. To merger adjust the office count for Bank A, analysts would add to the offices of Bank A those of Bank B between 1994 and 2001, and those of Bank C between 1994 and 2007. In other words, the analyst treats the offices of Bank B and Bank C as belonging to Bank A as of the period when the analysis begins.⁶

⁵ The exception is institutions newly chartered during or after 1994 that were acquired by one of the four largest banks. The office count of a newly chartered and later acquired institution is added to that of whichever of the four largest banks acquired it as of the new institution's first Call Report filing.

⁶ To elaborate, suppose Bank A had ten offices in 1994, while Bank B had five offices and Bank C had one office. Suppose also that Bank B opened a sixth office in 1999. The unadjusted office counts of the three banks over time are as follows: Bank A, ten offices between 1994 and 2000, sixteen offices between 2001 and 2006, and seventeen offices between 2007 and today. Bank B had five offices between 1994 and 1998, and six offices between 1999 and 2000. Bank C had one office between 1994 and 2006. Adjusting for mergers, Bank A has 16 offices between 1994 and 1998, and 17 offices between 1999 and today. Bank A's merger-adjusted office growth rate between 1994 and today was 6.25 percent, compared with an unadjusted rate of 70 percent.



The unadjusted series shows that the number of offices of the four institutions has increased. But have the banks opened new offices? Or were the offices acquired from other banks? The adjusted series shows that the total number of offices operated by the four largest banks, and by all the banks they ultimately acquired at some point during the period, has declined since 1994. A more thorough analysis could determine how much of the decline is attributable to office closures by the four largest banks, and how much is attributable to office closures made by the acquired banks before they were acquired.

By analyzing the effects of mergers in this way, analysts get a different view of how acquisitions affected the number of offices, as well as of the net effect of branching and acquisitions of the four largest banks on the total number of U.S. banking offices.

Both series in the chart above convey useful information. The unadjusted series depicts how today's four largest banks grew their office networks as they became the largest banks. The adjusted series depicts that the number of offices operated by the four largest banks and the banks they acquired has declined, and suggests the need for further analysis of which banks closed offices and why.⁷ Neither series alone presents a full picture, especially not without an accompanying discussion of underlying data and assumptions.

Example Two: Adjusting Balance Sheet Data

Community banks play an important role in small business lending, so a researcher may want to determine whether small business lending is growing at community banks. Finding a correct answer could require the researcher to merger adjust the balance sheet items that reflect small business lending.⁸ This example describes how balance sheet items are merger adjusted in the FDIC's QBP.

⁷ FDIC analysts examined trends in offices between 2012 and 2017. They found that the aggregate decline in total offices over this period was driven by larger institutions reducing the number of offices they operate. Among institutions that closed offices on net between 2012 and 2017, average total assets were approximately \$12.4 billion in 2017, compared with approximately \$1.7 billion among institutions that opened offices, and approximately \$630 million among institutions that neither opened nor closed offices on net. Other factors correlated with closing offices between 2012 and 2017 include reporting high per-office premises expenses in 2012, and having offices located in counties with high rates of population loss. See Nathan L. Hinton, Derek K. Thieme, and Angela N. Woodhead, "Factors Shaping Recent Trends in Banking Office Structure for Community and Noncommunity Banks," *FDIC Quarterly*, vol. 11 (4), 2018. <https://www.fdic.gov/bank/analytical/quarterly/2017-vol11-4/fdic-v11n4-3q2017-article1.pdf>.

⁸ The specific data items on the Call Report capture *small loans* to businesses and farms, which include commercial and industrial loans and loans secured by nonfarm nonresidential properties, with original balances of \$1 million or less, as well as loans to finance agricultural production, and loans secured by farmland, with original balances of \$500,000 or less. We may reasonably suppose that loan size will increase as the size of a business receiving the loan increases, so *small* loans to businesses are more likely to be small business loans compared with large loans to businesses. However, the Call Report data items likely understate the true amount of small business loans originated by banks, especially among banks with less than \$10 billion in assets. See 2018 *FDIC Small Business Lending Survey*, FDIC pp. 9–19. <https://www.fdic.gov/bank/historical/sbls/full-survey.pdf>.

Merger adjusting would not be necessary if the question was: What is the share of small business loans on the balance sheets of community banks, compared with noncommunity banks, operating at any given time over the period between 1994 and 2018?

The subject of the question above is not a specific group of banks at a particular point in time; rather, it is any community bank operating from 1994 to 2018. Also, if one views the question as how the changing structure of the industry affects where loans are housed on bank balance sheets by type of institution, it would not be appropriate to remove the effects of mergers from the data.

However, what if the question was: How much did the community banks that existed on June 30, 2018, grow their loans over the year ending on that date? The subject of this question is community banks as of June 30, 2018, and should be answered by describing actual, or “organic,” loan growth, not loan growth that occurs when one bank buys another. Given the nature of the question, the researcher should merger adjust the balance sheet data from a year ago.

To merger adjust the balance sheet data, the researcher identifies all institutions acquired between June 30, 2017, and June 30, 2018, and combines the June 30, 2017, balance sheets of the acquired institutions with the balance sheets of their acquirers. Any institution that closed without an acquirer, was acquired by a nonbank such as a credit union, or relinquished FDIC insurance between June 30, 2017, and June 30, 2018, would be dropped from the June 30, 2017, dataset. Finally, the community bank designations as of June 30, 2018, would be used for both the June 30, 2018, dataset and the June 30, 2017, dataset to aggregate the results for community and noncommunity banks. In addition to accounting for structural change over the intervening year, merger adjusting allocates loan balances as of June 30, 2017, according to an institution’s June 30, 2018, community bank designation (Tables 1 and 2).⁹

As shown in Tables 1 and 2, following the steps described above yields merger-adjusted growth rates of small business loans between June 30, 2017, and June 30, 2018, of 3.1 percent at community banks, compared with 1.4 percent at noncommunity banks. Without adjusting for mergers, growth over the past year at community banks was 0.3 percent, and growth at noncommunity banks was 3.4 percent.

Table 1

Merger Adjustment of Small Business Loans at Community Banks				
		June 30, 2017	June 30, 2018	Growth
Step	Unadjusted Loan Balances (Thousands)	\$296,787,281	\$297,665,043	0.3%
1	Subtract the loans of community banks that became noncommunity banks during the year	-\$4,916,746		
2	Add the loans of noncommunity banks that became community banks during the year	+\$3,844,040		
3	Subtract the loans of community banks acquired by noncommunity banks	-\$7,159,659		
4	Add the loans of noncommunity banks acquired by community banks	+\$226,678		
5	Subtract the loans of community banks that closed but were not acquired by another FDIC-insured institution	-\$118,350		
	Merger-Adjusted Loan Balances (Thousands)	\$288,663,244	\$297,665,043	3.1%

Source: FDIC.

⁹ Because Call Report and Community Bank data are subject to revisions, readers who perform their own merger adjustment on small business loan data, following the guide in the appendix, may calculate figures that do not match those in Table 1 or Table 2.

The results of the loan growth comparison flip depending on the methodology used. Not merger adjusting, in this and similar examples, would emphasize the effects of acquisitions on which institutions are holding loans, whereas merger adjustment measures the actual or “organic” growth of loan portfolios at open institutions.

Tables 1 and 2 show how merger adjustment accounts for structural change and for changes in the community bank designations at institutions. With the exception of institutions that close without an acquirer, are acquired by a nonbank, or relinquish FDIC insurance, line items subtracted from Table 1 are added to Table 2, and vice versa.

As Tables 1 and 2 show, no changes are made to the data for the most recent period when merger adjusting. However, some banks that were community banks in the previous period are treated in the analysis as noncommunity banks in the previous period, if they became noncommunity banks or were acquired by noncommunity banks during the period being analyzed. Similarly, if noncommunity banks became, or were acquired by, community banks during the interval, then they are treated as community banks in the previous period. Over this specific period—June 30, 2017, to June 30, 2018—eight institutions closed but were not acquired by other FDIC-insured institutions, and all of those that had small business loans were community banks. Those eight institutions are dropped from the June 30, 2017, dataset. The effect of dropping those institutions from the previous period’s dataset on the analysis is trivial in this case: their combined small business loans represented less than 0.05 percent of all small business loans at community banks. Nearly all FDIC-insured institutions that close are acquired by another FDIC-insured institution, so this effect is not likely to substantially change the results of merger-adjusted analysis of the banking industry.

Neither the unadjusted nor the adjusted calculation is wrong. However, the calculation that is not adjusted for mergers shows growth rates between two different groups of banks—community banks on June 30, 2017, and community banks on June 30, 2018—without accounting for structural change or changes in community bank designations over the year.

Table 2

Merger Adjustment of Small Business Loans at Noncommunity Banks				
		June 30, 2017	June 30, 2018	Growth
Step	Unadjusted Loan Balances (Thousands)	\$397,980,014	\$411,584,879	3.4%
1	Add the loans of community banks that became noncommunity banks during the year	+\$4,916,746		
2	Subtract the loans of noncommunity banks that became community banks during the year	-\$3,844,040		
3	Add the loans of community banks acquired by noncommunity banks	+\$7,159,659		
4	Subtract the loans of noncommunity banks acquired by community banks	-\$226,678		
5	Subtract the loans of noncommunity banks that closed but were not acquired by another FDIC-insured institution	-\$0		
	Merger-Adjusted Loan Balances (Thousands)	\$405,985,701	\$411,584,879	1.4%

Source: FDIC.

Example Three: Adjusting Income Statement Data

Income statement data—information on the earnings and expenses of institutions—present special challenges. First, while balance sheet items measure assets and liabilities at a point in time, income statement items measure earnings and expenditure flows and are reported on a year-to-date basis. For example, net income reported on bank Call Reports as of June 30, 2017, represents the first two quarters of net income in 2017. It would not be appropriate to compare it with net income reported as of September 30, 2017, which represents nine months of net income. This makes it important for researchers to determine whether the income statement variable they are using has been altered from the reported year-to-date value to show an annualized or quarterly figure.¹⁰

Another challenge is that earnings results for a single quarter tend to be more volatile than earnings for a full year. So, when looking at earnings trends over time, it sometimes can be important to consider whether one-time events led to particularly good or bad results in a particular quarter.

Finally, analysis of earnings trends is complicated by the fact that there are two general types of merger accounting methods: pooling-of-interests and acquisition.¹¹ The Financial Accounting Standards Board voted to end the use of the pooling-of-interests method in 2001. However, an analyst should be familiar with this method because it may still be used when accounting for mergers between entities under common control, such as those within the same bank holding company.¹² In the pooling-of-interests method, the reported assets, liabilities, and income of the two entities that merged are simply added together, as if they had always operated as a single entity.

In contrast, the acquisition method of accounting is used in the majority of bank mergers. It requires that the assets of the acquired institution be recorded at fair value.¹³ Income that the acquired institution earned before the acquisition is not reported as income of the acquirer, even if it was earned during the same calendar year. Rather, the acquiring institution reports income generated from the acquired institution beginning on the date of the merger.

To illustrate the difference between the treatment of earnings when a merger is accounted for under acquisition accounting compared with pooling of interests, consider two hypothetical institutions that each earn net income of \$25 per quarter at all times. Net income at each of these institutions is \$100 per year, for a total of \$200 per year. Suppose that one institution acquires the other on July 1, 2018. If this merger were accounted for like a pooling-of-interests merger (this would be permissible only if both institutions were part of the same holding company), then the acquirer's year-end 2018 Call Report would show \$200 in full-year net income, since the two institutions' income amounts would be added together as if they had been a single entity for all of 2018.

¹⁰ Users of the FDIC's Statistics on Depository Institutions (SDI) comparison tool can choose year-to-date or quarterly calculations of income and expense items. However, income and expense items from the bulk download of quarterly SDI data for all FDIC-insured institutions are only year-to-date.

¹¹ Another merger accounting method, called pushdown, exists as well. Pushdown mergers represent a subset of acquisition mergers. An entity acquired through a pushdown merger continues to exist separately from its acquirer. However, its assets and liabilities will be restated at fair value (generally, fair value is the current market value) rather than book value (the price at which they were acquired minus depreciation, amortization and any impairment charges) and the difference between fair value and the price paid for the assets and liabilities will be recorded as goodwill for the acquirer. Most assets and liabilities would have been reported at book value by the acquired entity in its previous Call Report filings, so pushdown mergers change the reported values of some balance sheet items for the acquired institution and the acquirer. However, there is no way to tell what the values of those items would have been had the merger not occurred. There is no need to perform merger adjustment in a pushdown merger, because the acquired entity continues to exist.

¹² See "Transactions between entities under common control," under the "Business Combinations" entry, in the glossary of *Instructions for Preparation of Consolidated Reports of Condition and Income for a Bank With Domestic Offices Only and Total Assets Less Than \$1 billion*, September 2018, Page A-16, https://www.ffiec.gov/pdf/FFIEC_forms/FFIEC051_201809_i.pdf.

¹³ Fair value and book value are defined in footnote 11. In a pooling-of-interests merger, the acquiring entity assumes the assets and liabilities of the acquired entity at book value, while in acquisition mergers the assets and liabilities are assumed at fair value. In both pooling-of-interests and acquisition mergers, the acquired entity ceases to exist.

Since the two institutions earned a combined \$200 in 2017, and the acquiring institution reports income of \$200 in 2018, merger-adjusted income growth as measured using the approaches described thus far would be zero, the conceptually correct answer in this idealized example. This example illustrates that in an actual merger in which pooling-of-interests accounting is applied, income statement items may be merger adjusted the same way as the balance sheet items in Example Two: the earnings and expenses of the acquiring and acquired institution are simply added together in its income statement.

If, however, the merger was accounted for using the acquisition method, the acquiring institution would report full year 2018 net income of \$150: \$100 from its own operations and \$50 from the acquired bank's operations. The \$50 earned by the acquired institution during the first half of 2018 is not added to the income earned by the acquiring institution.

If a merger adjustment is performed using the approaches described thus far, 2017's combined income of \$200 would be compared with this year's reported income of \$150, showing that income contracted 25 percent—an incorrect answer for this example. In general, during periods when most banks are reporting positive earnings, the balance sheet approach to merger adjustment will tend to understate income growth, since some of the earnings of banks acquired using acquisition accounting will not be reported in the current period but did appear in the base period.

Conversely, if the income of banks acquired using acquisition accounting is not included in the base period for the growth computation, income growth will tend to be overstated. In this example, the acquiring bank's reported net income has increased 50 percent, from \$100 in 2017 to \$150 in 2018. This 50 percent growth figure, while correct for the acquiring bank, is not the correct merger-adjusted income growth of zero for the two banks taken together.

This hypothetical example illustrates why special treatment is needed when calculating the merger-adjusted growth of income and expense items of banks involved in acquisition accounting mergers. As of fourth quarter 2018, the FDIC's merger-adjusted income and expense growth calculation includes a portion of the acquired bank's earnings or expenses in the base period, with the portion depending on the acquisition date.¹⁴

The approach can be illustrated using the two hypothetical banks discussed above. Recall from that example that one bank acquires the other in an acquisition accounting merger, with an effective date of July 1, 2018. Before the merger, each bank earned \$25 in net income each quarter. The \$50 in net income earned by the acquired bank during the first two quarters of 2018 is not added to the net income of the acquiring bank, following the rules of acquisition accounting. Thus, the acquiring bank reports a full-year 2018 net income of \$150.

FDIC analysts merger adjust income statement items for the Community Bank Performance Section of the QBP by including a fraction of the acquired bank's income in the base period equal to the fraction of the current reporting period during which the acquirer owns the acquired assets. The fraction, or *discount factor*, is calculated as the number of days during which the acquired bank has been owned by the acquirer during the year, divided by the number of days that have elapsed since the beginning of the year, as of the end of the current reporting period. In this case, the end of the current reporting period—December 31, 2018—covers all of 2018. The merger is supposed to have occurred midway through the year, so the discount factor is 0.5.¹⁵

¹⁴ This is a refinement of an earlier approach.

¹⁵ If the current reporting period was instead the third quarter of 2018, then the discount factor would be 92/273, or approximately one-third. As of the end of third quarter 2018, the acquired bank has been owned by the acquirer for 92 days, and 273 days of 2018 have elapsed. As another example, if the merger had occurred in November 2017, the acquiring bank would have owned the acquired assets for all of 2018 and the discount factor would equal 1.

As it applies to the example, the approach would involve multiplying the 2017 net income of the acquired bank by the discount factor of 0.5. The result is added to the 2017 net income of the acquiring bank. The 2017 net income of each bank is \$100, so \$50 is added to the \$100 earned in 2017 by the acquiring bank, to bring the acquiring bank's merger-adjusted 2017 net income to \$150. Since the acquiring bank reports \$150 in net income for 2018, merger-adjusted growth is zero, the correct answer for this example. Put in simple terms, at year-end 2018, the acquiring bank is reporting full-year earnings on its own assets and half a year's earnings on the acquired assets, so a consistent base-year comparison should include its own 2017 earnings plus half the 2017 earnings of the acquired bank.¹⁶

This hypothetical example makes clear that the method of merger-adjusting income statement items to calculate growth rates matters greatly at the level of individual banks involved in mergers. Income growth rates for large groups of banks will also differ depending on how acquisition accounting mergers are handled by the merger adjustment method, but the differences in growth rates across different merger adjustment methods will be much smaller when the group of banks analyzed is large, since only a small portion of the banks in a large group will have been involved in an acquisition accounting merger over a one-year period.

The acquisition accounting adjustment is only one of the steps needed to calculate the merger-adjusted income growth of a group of banks. The remaining steps closely parallel the merger adjustment of balance sheet items shown in Tables 1 and 2. Tables 3 and 4 show the steps involved in calculating merger-adjusted net income growth at community and noncommunity banks between June 30, 2017, and June 30, 2018.

Table 3

Merger Adjustment of Year-to-Date Net Income at Community Banks				
		June 30, 2017	June 30, 2018	Growth
Step	Unadjusted Net Income (Thousands)	\$11,159,904	\$12,453,289	11.6%
1	Subtract the net income (or add the net loss) of community banks that became noncommunity banks during the year	-\$401,008		
2	Add the net income (or subtract the net loss) of noncommunity banks that became community banks during the year	+\$161,453		
3	Subtract the net income (or add the net loss) of community banks acquired by noncommunity banks in any type of merger	-\$361,772		
4	Add the net income (or subtract the net loss) of noncommunity banks purchased in pooling-of-interests acquisitions by community banks	+\$0		
5	Add the net income (or subtract the net loss) of noncommunity banks purchased in acquisition mergers by community banks, after discounting the net income or loss as described in the text	+\$2,037		
6	Subtract the net income (or add the net loss) of community banks purchased in acquisition mergers by other community banks, after discounting the net income or loss as described in the text	-\$20,036		
7	Subtract the net income (or add the net loss) of community banks that closed but were not acquired by another FDIC-insured institution	+\$10,291		
	Merger-Adjusted Net Income (Thousands)	\$10,550,869	\$12,453,289	18.0%

Source: FDIC.

¹⁶ This illustration of discounting a prior period's income or expense variable applies to items reported on a year-to-date basis. If an analyst wanted to merger adjust a quarterly income or expense variable, then the discount factor applied to the variable in the base period should equal the share of the current reporting quarter that the acquirer has owned the acquired institution. For example, if Bank A acquired Bank B exactly halfway through fourth quarter 2018, and an analyst wished to merger adjust Bank A's quarterly net income reported in fourth quarter 2017, then Bank B's quarterly net income from fourth quarter 2017 would be multiplied by 0.5, the share of fourth quarter 2018 during which Bank A owned Bank B. If an analyst wanted to merger adjust Bank A's quarterly net income reported in third quarter 2018, the same discount factor could be applied to Bank B's quarterly net income from third quarter 2018.

Table 4

Merger Adjustment of Year-to-Date Net Income at Noncommunity Banks				
		June 30, 2017	June 30, 2018	Growth
Step	Unadjusted Net Income (Thousands)	\$80,782,163	\$103,606,302	28.3%
1	Add the net income (or subtract the net loss) of community banks that became noncommunity banks during the year	+\$401,008		
2	Subtract the net income (or add the net loss) of noncommunity banks that became community banks during the year	-\$161,453		
3	Subtract the net income (or add the net loss) of noncommunity banks acquired by community banks in any type of merger	-\$14,299		
4	Add the net income (or subtract the net loss) of community banks purchased in pooling-of-interests acquisitions by noncommunity banks	+\$22,035		
5	Add the net income (or subtract the net loss) of community banks purchased in acquisition mergers by noncommunity banks, after discounting the net income or loss as described in the text	+\$291,461		
6	Subtract the net income (or add the net loss) of noncommunity banks purchased in acquisition mergers by other noncommunity banks, after discounting the net income or loss as described in the text	-\$16,050		
7	Subtract the net income (or add the net loss) of noncommunity banks that closed but were not acquired by another FDIC-insured institution	-\$58,289		
	Merger-Adjusted Net Income (Thousands)	\$81,246,576	\$103,606,302	27.5%

Source: FDIC.

Four Caveats Regarding Merger Adjustment

Merger adjusting bank data accounts for the fact that banks' balance sheets and income statements often change significantly as the result of a merger. However, assets and liabilities can move from one institution to another for other reasons. For example, an acquiring institution may assume some of the assets and liabilities of the institution it acquires, while other assets and liabilities could be purchased by other banks. When a bank fails, for instance, some of its assets and liabilities may be acquired by an institution other than the institution that buys the failed bank. Also, banks may purchase assets or offices from other open and operating banks. In those ways the assets and liabilities, as well as the income and expenses that those assets and liabilities generate, move between banks that did not merge. The FDIC does not collect data about these types of transactions, so merger adjustment does not control for their effects.

A second caveat is that merger adjustment is typically done over a short interval, up to approximately five years. It is less common to merger adjust historical data covering periods longer than five years because any merger adjustment introduces a phenomenon called *survivor bias*.

Survivor bias is the tendency for weaker institutions that fail or are acquired by stronger institutions to be excluded from performance analyses because they no longer exist. Since merger adjustment typically considers a set of institutions as of a recent date and studies their performance over time, it analyzes the performance only of institutions that did not fail or merge over a particular period. Survivor bias increases as the length of the period under consideration grows. A way to reduce survivor bias is discussed below, followed by a discussion of how to interpret merger-adjusted data that span a long time interval.

One way to reduce survivor bias is to include asset values from institutions that closed without an acquirer, were acquired by nonbanks, or relinquished FDIC insurance. For example, when merger adjusting small business loan data, the balances at such institutions could have been assigned a community bank designation as of June 30, 2017, since in that example all small business loans of institutions that closed and were not acquired by another FDIC-insured institution belonged to community banks as of that date. The assets and liabilities of those institutions would be assigned values of zero as of June 30, 2018 since those institutions ceased to exist over the course of the next year. Then, the growth rates calculated between June 30, 2017, and June 30, 2018, for community and noncommunity banks may be lower than the growth rates calculated based on dropping these institutions from the data.¹⁷

While including balances from institutions that close without an acquirer, are acquired by nonbanks, or relinquish FDIC insurance helps reduce survivor bias, the effect is likely to be small. The largest component of survivor bias cannot be completely eliminated: financial performance of acquired institutions may be weaker than that of institutions that are not acquired over any given period.¹⁸

A third caveat relates to how one interprets the results of merger adjustment. By adding the loans, deposits, or offices reported in past periods by unaffiliated institutions in a merger adjustment, we are conducting a counterfactual analysis in the sense that the combined institutions in those past periods exist only hypothetically. For example, in the chart on page 33, the merger-adjusted series speaks to the cohort of today's four largest institutions together with all the institutions they acquired since 1993, but specifically does not suggest that today's four largest institutions had nearly 25,000 banking offices in 1994. The researcher and the user of the research need to keep in mind that the analysis is simply a useful tool for addressing questions involving the performance of a group of institutions over time, where correcting for the effects of mergers is important. Care should be taken when presenting merger-adjusted data covering a long interval of time, so that readers do not draw the conclusion that a particular institution, or set of institutions, existed and generated that data.

Finally, merger adjusting income statement items when acquisition accounting is used presents researchers with a problem: how to adjust in a way that avoids understating or overstating growth. If income statement items of banks acquired using acquisition accounting are included in the base period, then income growth may be underestimated. If these items are excluded from the base period, income growth may be overestimated. Including a portion of the acquired banks' income in the base period, as described in this article, is a way to address the conceptual issues involved in measuring income growth for banks involved in acquisition accounting mergers.

¹⁷ To return to Example Two, a total of \$118,350,000 in small business loans belonged to community banks as of June 30, 2017, and were dropped from the merger-adjusted total because the institutions closed without an acquirer, were acquired by a nonbank, or relinquished FDIC insurance. Adding that amount back to the merger-adjusted total and recalculating yields growth of 3.08 percent in small business loans at community banks between June 30, 2017, and June 30, 2018, compared with 3.12 percent computed using the approach in Example Two.

¹⁸ FDIC analysts compared acquired community banks with their non-acquired peers from 2010 through 2016 and found that the pretax return on assets at acquired community banks was 30 basis points lower than that at non-acquired community banks over the four-quarter period ending one year before the acquisition. Asset quality, however, was found to be better at acquired community banks. See Eric C. Breitenstein and Nathan L. Hinton, "Community Bank Mergers Since the Financial Crisis: How Acquired Community Banks Compared With Their Peers," *FDIC Quarterly* 11 no. 4, 2018, <https://www.fdic.gov/bank/analytical/quarterly/2017-vol11-4/fdic-v11n4-3q2017-article2.pdf>. It is possible that these results reflect the unique economic environment that followed the financial crisis and Great Recession.

Conclusion

Merger adjustment takes into account the structural change that has occurred over a particular period. The balance sheet, income statement, or nonfinancial items of institutions that are acquired during the period are added to the acquirer's balance sheet, income statement, or nonfinancial data. This way the items appear on the acquirer's books at the beginning of the period over which the analysis is being conducted.

FDIC analysts frequently use merger adjustment as a tool to standardize comparisons over time. For example, merger adjustment is used when reporting the year-over-year performance of community banks in the *Quarterly Banking Profile*. Merger adjustment can also be used to provide context to questions about nonfinancial data in which merger activity is important, as shown in Example One.

Whether data should be merger adjusted depends on the question the researcher is trying to answer. Questions about the performance of today's institutions over a previous period, such as their loan or income growth over the previous year, should be answered with merger adjusted data so that only one group's performance is evaluated.

Four caveats associated with merger adjustment are important to keep in mind. First, merger adjustment does not perfectly control for the movement of assets and liabilities between institutions in different industry subgroups since institutions may acquire the assets and liabilities of other institutions in the normal course of business, even though no merger occurs. Second, merger adjustment introduces survivor bias since it measures the performance of the currently open institutions in a group, which tend to be better performers than institutions that left the group through acquisitions or otherwise ceased operations. Third, when data covering many years of observations are merger adjusted, it is important to remember that the institutions have been combined in past periods for analysis purposes but were not combined as legal entities. Finally, merger adjustment of income statement items requires special care.

Keeping those caveats in mind, merger adjustment is a valuable tool that can shed light on important questions in the analysis of banking trends. Examples covered in this article include how the branching and acquisition activity of large banks may have contributed to changes in their number of banking offices over time, and how to measure the growth of small business loans and net income at community banks given ongoing merger activity. For these questions, and questions of a similar form that involve tracking specific groups of banks over time, merger adjustment is a staple of accurate financial industry analysis.

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Appendix: Merger Adjustment Steps and Data Needed

This appendix provides information on how to access the necessary data and merger adjust balance sheet items, using Example 2 presented in the article as a guide.¹⁹

The Three Steps in a Merger Adjustment

1. The data to be adjusted must have a variable that uniquely identifies institutions. FDIC analysts typically use CERT, which is an institution's FDIC insurance certificate number.
2. Because the merger accounting method and merger date matter when adjusting income statement items, it may be necessary to determine what type of merger accounting was used and when the merger occurred. This appendix describes the merger adjustment of balance sheet items, so it is not necessary to pay attention to the merger accounting method. However, the merger accounting method is provided by the MERGMETH variable on the Community Banking Structure Reference Data file, described below.
3. To merger adjust the data to reflect industry structure as of the most recent quarter of data published in the *Quarterly Banking Profile*, replace the value of CERT representing the acquired institution with the value of CERT representing the acquired institution's current owner from the Community Banking Structure Reference Data file for all periods in the analysis that come before the acquisition. Acquired institutions are listed by their CERT values in the Community Banking Structure Reference Data file. The value of CERT which represents an acquired institution's current owner is displayed in the ULTIMATE_CERT variable in the Community Banking Structure Reference Data file. To complete the adjustment, sum the data by CERT once the acquired institution's value has been replaced.

Downloading the Community Banking Structure Reference Data

The Community Banking Structure Reference Data include a list of every FDIC-insured institution that started or stopped filing a Call Report or Thrift Financial Report since first quarter 1984. This list is provided by the variable CERT, which identifies an institution by its unique FDIC insurance certificate number. A researcher may use CERT on this file to join it with other FDIC data that the researcher wishes to merger adjust and that also includes the variable CERT.

For those institutions that stopped filing because they were acquired by another FDIC-insured institution, the FDIC certificate number of the institution that currently owns the acquired institution is given by the variable ULTIMATE_CERT.

The Community Banking Structure Reference Data file is available here: <https://www.fdic.gov/regulations/resources/cbi/data/community-banking-structure-reference-data.zip>.

The Notes to Users page describes the data file layout and each of the variables. It is available here: <https://www.fdic.gov/regulations/resources/cbi/data/public-ref-readme.html>.

Those interested in performing their own merger adjustments should review the Notes to Users page. A brief summary of the data file and variables necessary is below.

¹⁹ This appendix describes how to merger-adjust only balance sheet items, and only from a historical quarter to the most recent quarter, as identified by the latest quarter for which the *Quarterly Banking Profile* has been published. Readers who wish to adjust from one historical quarter to a later historical quarter should replace references to "ULTIMATE_CERT," below, with "PROXIMATE_CERT." PROXIMATE_CERT identifies the initial acquiring institution. Determine whether the initial acquiring institution has itself been acquired by checking the values of PROXIMATE_CERT against the values of CERT in the Community Bank Structure Reference Data File that have values of RPT_STOP_CALLYM before the later historical quarter. For example, if CERT A has a PROXIMATE_CERT of B, and B has a PROXIMATE_CERT of C, and C has a PROXIMATE_CERT of D, then replace the values of PROXIMATE_CERT for A and B with D. Continue in this fashion until there are no remaining values of PROXIMATE_CERT that were themselves acquired before the later historical quarter. This ensures that each PROXIMATE_CERT will have a valid community bank designation as of the later historical quarter.

A Short Guide to the Community Banking Structure Reference Data File

A row is generated in this file each time an institution starts or stops filing a Call Report. Thus, if an institution filed its first Call Report in Q4-2000 and filed its last in Q3-2010, then it will appear in the file twice. One record is filled with “start” information, the other with “stop” information. To see only rows of institutions that stopped reporting, filter for non-missing values of RPT_STOP_TYPE. This summary description focuses only on institutions that stopped reporting.

Once the data have been filtered to show only rows with non-missing values of RPT_STOP_TYPE, then users will see rows of institutions that stopped filing Call Reports identified by CERT, along with variables that indicate the calendar year and quarter during which the institution stopped reporting (RPT_STOP_CALLYM), the reason why the institution stopped reporting (RPT_STOP_TYPE), the current owner of the institution, if any, (ULTIMATE_CERT), and the merger accounting method used, if applicable (MERGMETH).

The period during which an institution stopped reporting is expressed as the concatenation of the year and a two-digit representation of the quarter. Q1 is represented by 03, Q2 is represented by 06, and so on. For example, an institution that stopped reporting during Q3-2017 would have a value of 201709 for RPT_STOP_CALLYM.

The reason an institution stopped reporting is represented by an integer ranging from one to five. One represents failure, two represents a merger of institutions within the same holding company, three represents a merger between unaffiliated institutions, four represents a voluntary closing, and five represents all other liquidations, closings, and the voluntary termination of FDIC insurance.

If an institution was acquired, MERGMETH records the type of merger accounting used in an integer ranging from one to three. One represents pooling-of-interests accounting, two represents acquisition accounting, and three represents acquisition accounting for the purchase of a failed institution. If MERGMETH is missing or zero, then the institution that stopped reporting was not acquired by any other FDIC-insured institution. For example, an institution may fail without being acquired, voluntarily liquidate its assets, or be acquired by a nonbank, although the latter two events are relatively uncommon.

Downloading Bulk Financial and Demographic Data

The FDIC makes available a variety of financial and demographic data on insured institutions through the Statistics on Depository Institutions (SDI) web page: https://www5.fdic.gov/sdi/download_large_list_outside.asp.

To calculate annual growth in an item between December 31, 2017, and December 31, 2018, a researcher would download the zipped files named All_Reports_20171231 and All_Reports_20181231.

The SDI Glossary provides variable definitions, which may be downloaded from: https://www5.fdic.gov/sdi/SDIAllDefinitions_CSV.zip.

Working With the Data

To calculate annual merger-adjusted growth in small business loans at community banks, a researcher needs four items:

1. Each institution’s community bank designation as of December 31, 2018
2. Small business loans outstanding at each institution as of December 31, 2018
3. Small business loans outstanding at each institution as of December 31, 2017
4. A list of institutions acquired between December 31, 2017, and December 31, 2018, that identifies the owner of the acquired institution as of December 31, 2018

Items one and two can be found in the zipped file named All_Reports_20181231. Within this file is a spreadsheet named All_Reports_20181231_Small Business Loans, which has the variables needed to identify the amounts and number of small business loans outstanding, and the community bank designation, of each FDIC-insured institution on December 31, 2018.²⁰

Item three is available from a similarly named spreadsheet that can be found in the zipped file named All_Reports_20171231.

Finally, item four is available from the Community Banking Structure Reference Data file.

While it is possible to manually merger-adjust the data, it is easier and faster to use data manipulation software. The sample code below was written for use in SAS.

Import the Data

Extract each file from the PKZIP Archive before proceeding. To ensure that numeric variables from the downloaded files are stored as numeric variables in the SAS datasets, save each file as an Excel Workbook (with the extension .XLSX), or use Excel or other spreadsheet software to change the format of each numeric variable used in the analysis to “Number” as described in the footnote.²¹

Merger Adjusting in SAS:

```
/*
```

```
The sample program below was written in SAS version 9.4, running on
Windows 7. It may require modification to run on earlier SAS versions
or on different operating systems.
```

```
Once the location of the XLSX files are specified as described, this
program may be pasted into a SAS Program Editor window and run after
ensuring that the file names have pasted correctly, including any
dashes contained therein, removing any line brakes in file names and
variable labels, and replacing all the quotation marks. More steps
may be necessary depending on how your version of SAS renders the
text and symbols from the PDF version of the program.
```

More advanced users can consolidate some of the steps below.

Import each of the following XLSX files into SAS datasets:

```
All_Reports_20181231_Small Business Loans
All_Reports_20171231_Small Business Loans
community-banking-structure-reference-data
```

```
Replace the text “REPLACE WITH FILE PATH” with the appropriate file
path. For example, C:\LOCAL DATA\<filename>
*/
```

²⁰ The variables identifying the amounts outstanding of the four types of small business loans are LNCI4 (commercial and industrial loans), LNREN4 (commercial real estate loans), LNAG4 (agricultural production loans), and LNREAG4 (farmland loans). The variable CB equals 1 if an institution meets the FDIC’s definition of community bank that quarter, and 0 otherwise. The FDIC refreshes the entire historical community bank designation list every quarter to account for data resubmissions, corrections, and updates. When performing an analysis that relies on community bank designations that are more than five years old, a researcher should use the historical designations from the spreadsheets available under the heading Current Community Banking Reference Data on the FDIC Community Banking Study Reference Data web page, under the subheading Historical Community Banking Reference Data. These spreadsheets are available at <https://www.fdic.gov/regulations/resources/cbi/data.html>. Questions may be sent to CommunityBanking@FDIC.gov.

²¹ In Excel, for example, to ensure that CERT is stored as a number, open the downloaded file, select all the rows below CERT, right-click using the mouse while the cursor is over the selected rows, left-click on “Format Cells,” select “Number” from the Category list, and set the number of decimal places to zero. Apply this format to every observation of each numeric variable used in the analysis.

```

PROC IMPORT REPLACE
  OUT = SMLLNS1712
  DATAFILE = "REPLACE WITH FILE PATH\All_Reports_20171231_Small
Business Loans.xlsx"
  DBMS = xlsx;
RUN;

PROC IMPORT REPLACE
  OUT = SMLLNS1812
  DATAFILE = "REPLACE WITH FILE PATH\All_Reports_20181231_Small
Business Loans.xlsx"
  DBMS = XLSX;
RUN;

PROC IMPORT REPLACE
  OUT = STRUC
  DATAFILE = "REPLACE WITH FILE PATH\community-banking-structure-
reference-data.xlsx"
  DBMS = XLSX;
RUN;

/*
The files SMLLNS1712 and SMLLNS1812 have variables which detail
the amount outstanding, and number of, each of the four types of
small business loan: agricultural production loans, farmland loans,
commercial real estate loans, and commercial and industrial loans.

First, sum these four variables (LNREAG4, LNAG4, LNRENR4, LNCI4)
to get an institution's total amount outstanding of small business
loans.

Second, drop the variable CB from the file SMLLNS1712. The file
SMLLNS1812 has the most recent community bank flag, which we will use
to group small loan balances reported by institutions on the file
SMLLNS1712.

Finally, both files contain information reported by insured branches
of foreign banks. These institutions can be identified by their value
of BKCLASS, which is "OI." FDIC analysts typically exclude these
institutions, or report them separately. Below, these institutions
are dropped from the analysis.
*/

DATA LNS1712; /*Save the work in a new file.*/
  SET SMLLNS1712;

  WHERE BKCLASS ^= "OI"; /*Exclude insured branches of foreign
banks*/

  SMLLNS = SUM(LNAG4, LNREAG4, LNRENR4, LNCI4); /*New variable with
all small loans*/

  DROP CB;
RUN;

```

```
DATA LNS1812; /*Save the work in a new file.*/
    SET SMLLNS1812;

    WHERE BKCLASS ^= "OI"; /*Exclude insured branches of foreign
banks*/

    SMLLNS = SUM(LNAG4, LNREAG4, LNREN4, LNCI4); /*New variable with
all small loans*/

RUN;

/*
The STRUC file has records for every institution that started or
stopped filing a Call Report or Thrift Financial Report since
Q1-1984.

Create a new file with records of institutions that stopped reporting
during 2018.
*/

DATA STRUC2; /*Save the work in a new file.*/
    SET STRUC;

    WHERE 201712 < RPT_STOP_CALLYM <= 201812;

RUN;

/*
Create a new file by joining the variable CERT on the file STRUC2 to
the same variable on the file LNS1712. Take the variables ULTIMATE_
CERT and RPT_STOP_TYPE from STRUC2 and add them to the new file.

Every institution identified by CERT on the file LNS1712 that
closed during 2018 will have a value of RPT_STOP_TYPE, and, if an
acquisition occurred, a value of ULTIMATE_CERT identifying the
current owner.
*/

PROC SQL;

    CREATE TABLE LNS1712B /*Save work in a new file*/
    AS
    SELECT A.*,
           B.RPT_STOP_TYPE,
           B.ULTIMATE_CERT
    FROM LNS1712 AS A
    LEFT JOIN
        STRUC2 AS B
    ON A.CERT = B.CERT;

QUIT;
```

```
/*
Now, when RPT_STOP_TYPE is not missing, replace CERT on the file
LNS1712B with ULTIMATE_CERT. Otherwise, leave CERT unchanged.

This is the first step in the merger adjustment.

The second step is to sum the values of SMLLNS by the variable CERT
that has just been adjusted.
*/

/*Merger adjustment Step 1:*/
DATA LNS1712C; /*Save work in a new file*/
    SET LNS1712B;

    /*The line below swaps out the CERT of a closed bank
    with the CERT of its current owner, if any.
    */
    IF RPT_STOP_TYPE ^= . THEN CERT = ULTIMATE_CERT;
RUN;

/*Merger adjustment Step 2:
Now that CERT has been adjusted, acquiring banks appear in LNS1712C
multiple times (once for their own reporting, and again for each
bank they acquired). Banks that closed without an acquirer have
values of CERT that are either zero or missing.

Sum the values of SMLLNS by CERT to complete the merger adjustment.
*/

PROC SUMMARY NWAY MISSING DATA = LNS1712C;
WHERE CERT NOT IN (. 0); /*Drop cases in which an institution closed
without an acquirer*/
    CLASS CERT;
    VAR SMLLNS;
    OUTPUT OUT = LNS1712D /*Save work in new file*/
    SUM=;
RUN;

/*
Now join the community bank designations as of December 31, 2018,
from the file LNS1812, using the variable CERT.
*/

PROC SQL;
    CREATE TABLE LNS1712E /*Save work in new file*/
    AS
    SELECT A.*,B.CB
    FROM LNS1712D AS A
        LEFT JOIN
            LNS1812 AS B
        ON A.CERT = B.CERT;
QUIT;
```

```
/*
The final step is to calculate the aggregate amount outstanding of
small business loans, by community or noncommunity bank, in each
period, and to calculate change over the year.
*/

/*
Aggregate small business loans outstanding at December 31, 2017 held
by community and noncommunity banks.
*/

PROC SUMMARY NWAY DATA = LNS1712E;
  CLASS CB;
  VAR SMLLNS;
  OUTPUT OUT = LNS1712F /*Save work in new file*/
  SUM=;
RUN;

/*
Aggregate small business loans outstanding at December 31, 2018 held
by community and noncommunity banks
*/

PROC SUMMARY NWAY DATA = LNS1812;
  CLASS CB;
  VAR SMLLNS;
  OUTPUT OUT = LNS1812B /*Save work in new file*/
  SUM=;
RUN;
```

```
/*
The aggregate calculations may be combined into a single file by
joining LNS1712F and LNS1812B using the community bank flag. The
annual percentage change can also be calculated.
*/

PROC SQL;
CREATE TABLE CHANGE
AS
SELECT A.CB,
       A.SMLLNS AS SMLLNS1712 FORMAT = DOLLAR16.
       LABEL = "Merger adjusted Small Business Loans
       Q4-2017",
       B.SMLLNS AS SMLLNS1812 FORMAT = DOLLAR16.
       LABEL = "Small Business Loans Q4-2018",
       (B.SMLLNS / A.SMLLNS) - 1 AS PCT_CHANGE FORMAT PERCENT8.1
       LABEL = "Annual Merger adjusted Percentage Change
       in Small Business Loans"
FROM LNS1712F AS A
LEFT JOIN
LNS1812B AS B
ON A.CB = B.CB;
QUIT;
```
