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AS THE CREDIT CYCLE TURNS

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WORRIED ABOUT THE END OF THE CREDIT CYCLE?

CONCENTRATION RISK REVISITED

Concentration risk has been the bane of banks since the financial crisis. This article discusses best practices in identifying, mapping, measuring, and monitoring concentration risk along the ERM chain. By incorporating these mappings into early warning systems, banks can design a practical system for stress testing, scenario analysis, and commercial scorecard development—all with the aim of more effective risk management and profitable business development.

BY RICK BUCZYNSKI AND KENT KIRBY

"We are seeing pricing and underwriting loosen, consumer debt levels back to high levels, and corporate balance sheets leveraged at some of their highest levels." That was the view offered by Edward Schreiber, chief risk officer of Zions Bancorporation, in an address at RMA's Annual Risk Conference last November.

Recall that banks of all sizes suffered losses during the financial crisis because of real estate concentrations that were not captured with traditional asset-quality metrics. All segments—commercial and industrial, commercial real estate, and consumer lending—were affected. Concerns continue to mount that complacency is leading to an easing of efforts to monitor and manage concentration risk. And, with the presumed relaxing of DFAST, many fear this complacency may have invaded the regulatory universe of compliance and sound lending practices.

Let's start with the notion that current methods for managing concentrations suffer from several primary deficiencies. Here are two self-inflicted wounds.

- Bank systems commonly fail to adequately address concentrations, especially in the mapping of hidden or latent risks across lines of business. They also fall short in developing meaningful early warning systems (EWS) and scenario analysis tools.
- Few banks place the management of concentration risk within an enterprise risk management

(ERM) function. Consequently, the management of concentration limits and a bank's risk appetite suffers.

The following issues are pertinent in the arena of concentration risk and were often raised by senior regulators speaking at recent RMA conferences:

- Many banks, failing to properly heed regulations and interagency guidance on prudent risk management practices, succumb to over- or under-segmentation. In other words, some large banks over-segment lines of business to feign diversification. This often leads to "matters requiring attention" issued by the regulators. On the other hand, smaller banks don't have the scale to diversify, and many are concentrated in a small geographic area—a serious, ongoing challenge.
- Few applications use concentration risk, early warning systems, and scenario analysis tools to find new business opportunities.

Where should we focus? Data collection, risk identification, scenario analysis, and stress testing should support EWS, while providing a resource for business development.

Key Areas of Concentration Risk

Several articles on concentration risk have been published in *The RMA Journal* over the years.[1] They should make for good reading as the current, rather rocky credit cycle fatigues. From an ERM perspective, there are several well-known types of concentration risk, the most important being credit, operational, market, and liquidity risks, as shown in Figure 1.[2]

Although the focus here is on credit risk concentrations, there are additional correlations along the ERM chain that require consideration:

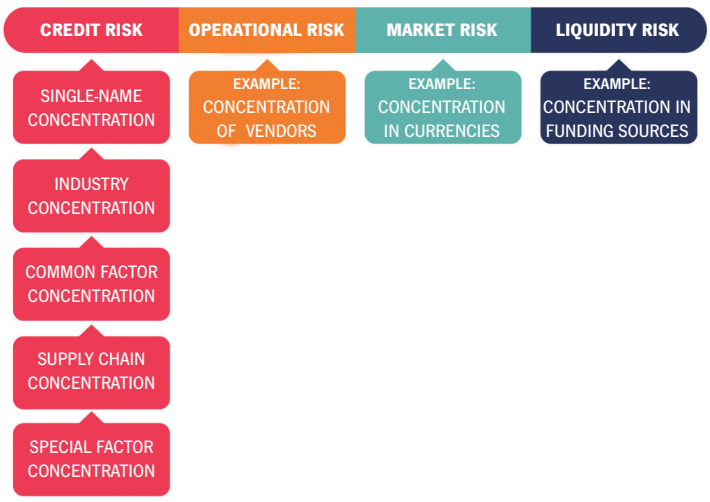
Credit and operational risk: A simple example is where one of a bank's vendors is also a borrower. Think of vendor financing programs offered by many banks to equipment and vehicle dealers and lessors. Here, a bank provides the funding for a dealer/lessor to help finance purchases or leases of equipment. The bank may also have made a C&I loan to the same customer. This is third-party risk on steroids.

Credit and market risk: Rapid, unforeseen movements in interest rates are an ongoing concern. From a market risk standpoint, interest rate risk is germane to holders of fixed-income securities given that an increase in market interest rates undermines the value of fixed-income securities. Banks can be holders of fixed-income assets, as well as lenders to clients that are also holders. Plus, many small, thin-margin businesses that are debt heavy—and that have little control over their operational costs or the prices of what they sell—are vulnerable to increasing credit costs.[3] Many banks have substantial exposures to "mom and pop shops" in the form of C&I loans.

Credit and liquidity risk: Markets froze during the financial crisis. It wasn't just a question of banks being under-capitalized; rather, it was about liquidity that can evaporate in days, if not hours, during times of extreme financial stress. Unfortunately, during the crisis, everyone wanted to sell and few wanted to buy. According to an analysis from the Federal Reserve Bank of San Francisco, "The 2007-08 financial crisis was the biggest shock to the banking system since the 1930s, raising fundamental questions about liquidity risk. The global financial system experienced urgent demands for cash from various sources, including counterparties, short-term creditors and, especially, existing borrowers. Credit fell, with banks hit hardest by liquidity pressures cutting back most sharply."[4] As the funding sources for banks' retail and wholesale borrowers—dependent on short-term lines of credit—dried up, their credit risk increased virtually overnight.

The salient feature of these interrelated risks is that they are difficult to code and track because they often reside in different line-of-business silos. Hence, the importance of a strong enterprise risk management function, which can provide a central place for comprehensive data collection, helping to establish bank-wide standards and oversight. ERM can also provide the process for aggregating concentrations across business lines and even risk types such as interest rate and

FIGURE 1: FUNDAMENTALS OF CONCENTRATION RISK: ERM LINKAGES



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operational risk. Most importantly, ERM can provide the communication channels for timely reporting of concentration risk and give early warning signs to all relevant business lines, risk managers, and senior management.

Sources of Concentrations and How to Manage Them

Here are a few real-world examples of credit risk concentrations.

Single-name Concentration

Are you lending too much to a single obligor? How are you coping with this challenge? Do you have someone in charge of monitoring single-name risks and cross-selling opportunities across lines of business?

This is very tricky stuff here. Imagine if your bank's line-of-business segments include a dentist's practice (C&I), the same dentist's ownership of the strip mall where she operates her practice (owner-occupied commercial real estate), her husband's financial advisory LLC (perhaps defined as a mezzanine line of business), the couple's home equity line of credit, and their two auto loans. This morass of linked risks is often neglected given the existence of line-of-business reporting silos.

Industry Concentration

Are you lending excessively to a particular industry or industry group? Have you identified latent industry risks using the North American Industry Classification System (NAICS)? Have your systems red-flagged overexposure in lending segments that are approaching their limits? If so, how?

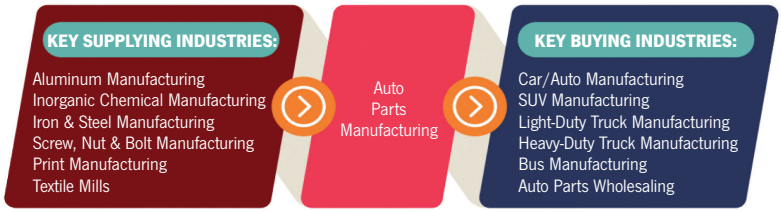
In this category, the monitoring of exposures according to NAICS mappings of industries should be straightforward—but only if data collection and coding systems are up to par. Banks don't always link industry codes across loan segments. For example, when a tobacco plant in the South went under, its lender didn't realize that it held many mortgages and car loans of the plant's workers.

Moreover, NAICS is based on a production-oriented concept, which means that it groups establishments into industries according to similarities in the processes used to produce goods or services. For example, plastic bottles are not in the same industry classification as glass bottles, even if the end user is the same. This can hinder the process of identifying correlated risk pools.

FIGURE 2: KEY INDUSTRIES AFFECTED BY 30-YEAR MORTGAGE RATES

Source: IBISWorld

FIGURE 3: THE SUPPLY CHAIN: KNOW YOUR EXPOSURES



Source: IBISWorld

Common Factor Concentration

Do you understand which economic drivers are most critical to the health of your portfolio? The credit risk category of common factors is determined through factor analysis. For example, certain borrowers and loans are more sensitive to interest rates than others. Energy prices and trade policies are other timely factors. These relationships must be analyzed and mapped. Consider the impact of an increase in 30-year mortgage rates on industry performance, as shown in Figure 2.

Supply-Chain Concentration

Is your bank unknowingly exposed to suppliers or end markets of a particular group of borrowers? Do you fully appreciate the environment in which your borrowers operate? Do you know who they buy from? Who they sell to? Are you exposed upstream, downstream, or in both directions, resulting in unintended concentrations?

Worse yet, are you neglecting solid and safe lending opportunities given your bank's institutional knowledge in a particular segment (that is, not lending enough to a segment's suppliers and end markets)? Figure 3 presents a hypothetical book of C&I business for a bank's auto parts segment with its suppliers (upstream) and buyers (downstream).

Special Factors

Have you considered other forms of concentration risk? This is a hodgepodge of factors that are relevant to a bank's specific business profile and footprint. The most obvious examples are the geographic concentration of obligors, product concentration, and collateral clusters (especially real estate), which can subtly exhibit their own clandestine correlations.

These special factors often go unnoticed

TABLE 1: ENGINEERING AN EARLY WARNING SYSTEM: THE BASICS

INDUSTRY GROUPS (BASED ON NAICS)	KEY RISK INDICATORS					KEY PERFORMANCE INDICATORS				
	IBISWORLD/ RMA RISK RATING	IBISWORLD/ RMA RISK TREND	IBISWORLD/ RMA VOLATILITY	OCC INDUSTRY	OTHER EXTERNAL DATA	EXPOSURE	DELINQUENT 30-89 DAYS	DELINQUENT 90-PLUS DAYS	CHARGE-OFFS	ETC.
Agribusiness ▸ Soybean Farming	-	-	-	-	-	-	-	-	-	-
CRE ▸ Single Family ▸ Land Development ▸ REIT ▸ Owner Occupied	-	-	-	-	-	-	-	-	-	-
Retail ▸ Online ▸ Auto ▸ Indirect Auto	-	-	-	-	-	-	-	-	-	-
Commercial Services										
Consumer Services										
Transportation ▸ Airlines	-	-	-	-	-	-	-	-	-	-
Health Care ▸ Hospitals	-	-	-	-	-	-	-	-		-
Energy ▸ Pipelines	-	-	-	-	-	-	-	-	-	-
Manufacturing ▸ Textiles	-	-	-	-	-	-	-	-	-	-
Utilities										
High Tech ▸ Biotech	-	-	-	-	-	-	-	-	-	-
Gov't/Education ▸ Private Schools	-	-	-	-	-	-	-	-	-	-

Source: IBISWorld

and can be most serious at smaller banks, which, by the nature of their size, have difficulty diversifying—which leads to concentrations that are difficult to manage. Think of a small bank that has significant exposure through a single strip mall.

What Should Banks Do?

Banks employ early warning systems regularly, but they are often housed in silos. And that is unfortunate because an EWS, in conjunction with stress testing, can help a bank develop more effective concentration limits.

In any discussion of an EWS, it's best to begin with data. There are two types of indicators: key risk indicators (KRIs) and key performance indicators (KPIs).

KRIs refer to external factors outside of a bank's control. They include such variables as interest rates, economic growth, commodity prices, foreign exchange rates, and government policy parameters. Think of monetary, fiscal, and trade policies that concern most banks at the time of this writing. KRIs also include structural factors such as the rapid introduction of new technologies—a factor that is typically undervalued.[5]

Meanwhile, KPIs represent internal bank indicators such as delinquencies, loan-to-value ratios, margins, and loan exceptions. Managed (or mismanaged) by the banks themselves, KPIs provide a high-level overview of the institution's performance. Organizations use KPI metrics to obtain an early signal of emerging risks and increasing risk exposures in various areas of the enterprise. Here's a more comprehensive sampling of KPIs:

- Loan underwriting and policy exceptions.
- Loan-to-value (LTV) ratio.
- Debt-to-income ratio.
- Cash down-payment or cash equity.
- Margins and fees.
- Delinquencies.
- Charge-offs.
- Growth of exposure against concentration and other imposed limits.

Ideally, the performance indicators are compiled with data on each business segment (consumer, small business, CRE, and C&I) and with as much data granularity as possible.

The higher the degree of granularity by segment, region, and perhaps even loan vintage, the more relevant the analysis. Tracking delinquencies over time provides some predictive power, while charge-off data is postmortem (the train has already gone off the tracks and crashed).

Be aware that the growth of exposure against concentration and other imposed limits inextricably links EWS with concentration risk pools. By comparing the movement of actual exposures to concentration limits and other bank policies, banks would have another solid signal of whether the rules were being followed. EWS indicators can help institutions develop more precise concentration limits and monitor them.

Table 1 shows a hypothetical EWS that is representative of what many banks compile on a regular basis.

The column "industry groups" defines clusters of correlated industries reflecting concentration pools. Often, critical lines of business are broken out from roll-ups. In this example, soybean farming has a separate entry from all other agribusiness since this hypothetical bank has a significant exposure in this subsegment, so it demands separate consideration.

The KRIs used in this EWS example are as follows:

- IBISWorld/RMA's industry risk rating for the NAICS-based industries[6] (very low to very high).
- IBISWorld/RMA's industry risk rating trend for the NAICS-based industries (decreasing/stable/increasing).
- IBISWorld's industry volatility index (a measure of risk variation from 2006 to 2016).
- The OCC's industry trends index.
- Other third-party KRIs.

Best Practices for Aggregating the Segments

Many OCC member banks use the OCC taxonomy as a starting point when aggregating their commercial portfolios into manageable industry roll-ups.[7] Even some non-OCC banks use this protocol.

For non-OCC banks, we suggest using the first two digits of the Census NAICS,[8] then tweaking to combine related risks such as those between construction and real estate. For example, consider linking CRE with C&I contractors like carpenters, concrete, steel framing, masonry, roofing, electricians, plumbers, elevator installers, drywall, painters, flooring installers, and paving.

Applying Early Warning Systems

The level of sophistication in applying early warning systems can vary widely from bank to bank, depending on the institution's asset size and credit culture. For the quantitatively inclined, such systems have been used to drive C&I obligor scorecards and pricing models. Qualitative applications are more commonplace because many banks build large matrices that integrate numerous KRIs and KPIs appropriate for their lines of business. They can review that collage of data on a regular basis to monitor risk and uncover lending opportunities.

Consider these examples from the real world. Industries with medium but increasing risk might be put on hold if exposure limits are being reached. Conversely, segments with high but decreasing risk might be targeted for expansion if the risk can be assessed and priced accordingly.

But perhaps the most powerful role of an EWS is to serve as a central repository of KRIs and KPIs used for major policy decisions as well as the management and mitigation of risk.

Identifying Forward-Looking Indicators

When trying to identify appropriate metrics that provide insight into portfolio or concentration analysis, a common problem is the lack of forward-looking indicators. There simply is no readily available library to access. And there are additional issues:

- Most traditional metrics—such as problem loans, nonaccruals, and charge-offs—are backward-looking indicators. Effectively, this is like taking a drive through the graveyard to predict the future.
- Macroeconomic factors are hard to integrate without advanced modeling that is beyond the expertise and budgets of most banks.
- Banks tend to want to use CCAR/DFAST stress-testing models since so much was invested in them, but these were designed for a different purpose. It's like trying to jam a square peg into a round hole when it comes to ongoing portfolio analysis.
- Probability-of-default models are forward looking, but they are generally designed for single-obligor analysis. As such, it's hard to scale the analysis to the portfolio level. And if it is done that way, it tends to be an aggregation of the financial condition of borrowers, not of underlying industry dynamics.

Data from an offering like the IBISWorld early warning system could be incorporated into the bank's own data to achieve an industry score that is both intuitive and forward looking. An example of what that could look like is shown in Figure 4.

The qualitative factors and weightings will be unique to each bank, but the overall concept is that a bank can use the forward-looking risk scores found in the EWS, the actual performance of the industry over time (including the effect of related industry risk and volatility), and the bank's own experience with a particular industry.

The outcome is an objective rating that can be used in a variety of different applications, including setting loan limits, estimating loan loss reserves, defining pricing policies, and so on. Moreover, concentrations along an industry's supply chain can be integrated into the system by identifying key upstream (supply linked) and downstream (demand linked) industries.

Employing a NAICS-based Scorecard System

Many banks incorporate industry factors in their risk-rating frameworks. Often, that involves using some sort of benchmarking tool that can either be developed internally

FIGURE 4: INDUSTRY RISK RATING SCORECARD

NAICS CODE:	483211
INDIVIDUAL INDUSTRY:	INLAND WATER TRANSPORTATION
INDUSTRY ROLL-UP:	TRANSPORTATION

RISK CATEGORY:	RATING	WEIGHT	SCORE	INDUSTRY RISK RATING
IBISWorld Risk Scores	4.14	40%	1.66	5
Industry Performance	2.87	35%	1.00	
Qualitative Factors	7.50	25%	1.88	
		100%		Average Risk

RISK CATEGORY EVALUATION

IBISWorld/RMA Risk Scores				CONTRIBUTION TO THE OVERALL RATING
FACTORS	SCORE	WEIGHT	RATING	
IBISWorld Sensitivity Score	2.94			12%
IBISWorld Growth Score	5.41			6%
IBISWorld Structure Score	5.71			6%
IBISWorld Direction of Risk	2.00			8%
Worst Through-the-Cycle Score	5.96			8%
		100%	4.14	40%

Industry Performance				
FACTORS	SCORE	WEIGHT	RATING	
Revenue Growth - Past 10 Years	5.00			7%
Related Industries Risk	4.85			7%
Risk Volatility	1.50			21%
		100%	2.87	35%

Qualitative Factors				
FACTORS	SCORE	WEIGHT	RATING	
Existence of Business Disruptors	High			6%
Technological Dependence	High			6%
Bank's Experience	Limited			13%
		100%	7.50	25%

Structure Score	5.71
Growth Score	5.41
Sensitivity Score	2.94
2018 Overall Risk Score	4.25
2017 Overall Risk Score	4.72
Risk Volatility	19.3%
Worst Through-the-Cycle Score/Year	5.96 ← 2010
Revenue Growth (10 years)	1.9%

Demand-Linked Industries	Risk Score
Corn Farming	5.55
Wheat, Barley & Sorghum Farming	6.17
Coal Mining	5.43

Supply-Linked Industries	Risk Score
Ship Building	3.52
Boat Building	3.91
Tugboat & Shipping Navigational Services	4.53

or provided through a third-party vendor. However, there are limitations to this approach:

- Benchmarking tends to be based on financial data, not industry factors. A good company in a bad industry masks some of the inherent risks faced by a borrower.
- Since benchmarking is based on financials, it's yesterday's news. What happened in the past is not necessarily a harbinger of the future.
- In some cases, the benchmark may be based on data that is older than the financial data to which it is being compared, and it may not be an apples-to-apples comparison.

Incorporating a scorecard like the one in Figure 4 has a number of advantages:

- It's based on objective industry factors, not financial factors, thus supplementing the traditional financial analysis of an obligor.
- It has a forward-looking time horizon: one to three years.
- The weight can change relative to changes in other factors in the risk-rating scorecard. Most banks assign up to a 15-20% weight to the industry score relative to an obligor's financial score, in accordance with McGahan and Porter's research.[9]

Other Applications of a Scorecard System

There are several scorecard applications. The range of possibilities is limited only by the bank's needs and resources.

Developing an objective criterion for concentration guardrails: As noted earlier, a very real risk in concentration management is the over- or under-segmentation of a bank's loan portfolio. By using the OCC taxonomy and other NAICS-based methods suggested above, the framework incorporates relevant industry analysis, which allows for clarification of what connects with what. This in turn can help achieve a more objective framework for risk assessment and limit setting.

Providing more granular hold limits: Arguably, the common approach to hold limits is one-dimensional, focusing on the risk rating assigned to the borrower. Using the scores provided in the industry risk-rating framework could create a more robust structure that would assign higher thresholds to lower-risk industries (and sub-limits based on the rating of the borrower in that industry) and lower thresholds to riskier industries (again, with sub-limits based on the rating of the borrower in that industry).

Allowing for more robust risk-based portfolio analysis: Often, the criteria for portfolio segments that merit a deeper dive are based on the financial condition of one or more borrowers in that industry or a perceived issue based on factors such as news articles or conversations with peers. Using an industry scorecard based on an early warning system means there is now an objective anchor on which to base decisions. Single-obligor credit concerns can be left where they belong—at the single-obligor level.

Building a Credit Portfolio Management System

The breakdown presented in Figure 5

shows the steps involved in building a credit portfolio management system. The phases should be sequential and transparent, but they do not require rocket science. This system is all about common sense, so mix these ingredients carefully.

- Ensure that your KPI data is clean and coded properly. This nontrivial task is often the source of a regulator's "matters requiring attention." There's no choice here, and the following steps are unattainable without data integrity. For example, NAICS must be used for commercial lending.[10]
- For each line of business and subsegment, select KRIs based on expert judgment (institutional knowledge) and statistical testing, if possible. Often, simple scatter diagrams plotting KRIs versus KPIs will suffice.
- Determine appropriate concentration pools (roll-ups) for consumer, C&I, CRE, and other lending segments, as suggested above. Test for outliers within lending segments. Do they behave differently? Outliers within segments dilute the relevancy of analysis and are often the spark that lights the fire of defaults.
- Integrate the appropriate KPI/KRI data and concentration pool roll-ups into EWS (heat map) spreadsheets.
- Make sure there is action-oriented commentary devoted to policy initiatives like lending limits, pricing rules, and sales initiatives. Define your own best practices. Never forget the Five C's of Credit.
- Through mapping and coding, link KRIs with scenario analysis.
- Document this stepwise process for regulators, internal audit, and your senior bank managers—whose feedback will be invaluable. Validation and documentation are paramount.

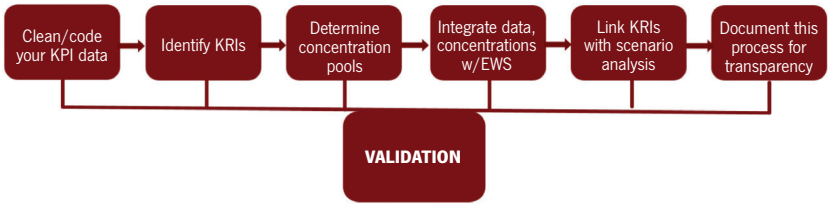
Conclusion

Having survived the financial crisis, most American banks have been on a good roll in recent years, and many are now recording solid earnings. As of early spring, some relaxation of regulatory pressure is underway. M&A activity in commercial banking is likely to pick up. The industry has recovered and remains important to the growth and prosperity of America. That's good stuff, right?

Nevertheless, reread Ed Schreiber's quote at the top of this article. And consider the late Intel Chairman and CEO Andy Grove's observation: "Success breeds complacency. Complacency breeds failure. Only the paranoid survive."

This is no time to be complacent about concentration risk. ®

FIGURE 5: INCORPORATING RISK FACTORS AND CONCENTRATION POOLS



Source: IBISWorld

Notes

1. For more on concentration risk, see the following *Journal* articles: "Concentration Risk Is Real and Deadly," by Rick Buczynski and Robert Kennedy, February 2014; "All in the Family: Mapping Industry Families Can Help When Measuring Concentration Risk in Credit Portfolios," by Gavin Smith, April 2010; and "Concentration Risk in a Loan Portfolio: Notes from an RMA Conference Session," April 2011.
2. There are other EWS risks not directly related to concentration pools—reputation risk, for example—but they are not within the scope of this article.
3. See Part 1 of "Flying Blind into the Next Recession?" *The RMA Journal,* December 2017/January 2018.
4. See "Liquidity Risk and Credit in the Financial Crisis," by Philip Strahan, Federal Reserve Bank of San Francisco *Economic Letter,* May 2012.
5. See Part 2 of "Flying Blind into the Next Recession?" *The RMA Journal,* February 2018.
6. The IBISWorld/RMA industry risk scores are based on the marriage of Porter's Five Forces with a top-down approach similar to the Federal Reserve's stress-testing model. A white paper documenting this methodology is available upon request.
7. This reference is to the OCC taxonomy found in "Concentrations of Credit," OCC Bulletin 2011-48, December 13, 2011, which was updated for OCC member banks in March 2017. It is often employed by banks as a starting point for roll-ups used for defining concentration pools. Here, every six-digit 2012/2017 NAICS code is mapped to the appropriate OCC sector and group of 21 (the latter is often used for roll-ups).
8. For details on the structure of NAICS, see https://www.census.gov/cgi-bin/sssd/naics/naicsrch?chart=2017.
9. See Anita McGahan and Michael Porter, "How Much Does Industry Matter, Really?" *Strategic Management Journal,* 18, 1997: 15-30.
10. Even so, many banks are still struggling with the obsolete standard industry data structure. There are crosswalk data mappings that can aid in the transition.

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