Nicola Cetorelli, James McAndrews, and James Traina

Evolution in Bank Complexity

- In the 1980s, the top ten bank holding companies accounted for about 20 percent of total bank assets; that percentage is now above 50 percent.
- Bank holding companies have not only grown in size, but they have also become substantially more complex, incorporating a large number of subsidiaries that span the entire spectrum of business activities within the financial sector.
- The authors document and analyze banks' organizational evolution, posing questions about the forces driving the industry and firm structures evident today.
- The findings suggest that greater complexity is a natural adaptation on the part of banks to a new model of finance oriented to securitization.

1. Introduction

The financial intermediation industry has experienced significant structural transformations over the past twenty to thirty years. Some of these changes are well known. Since the 1980s, for instance, the number of commercial banks operating in the United States fell from about 14,000 to 6,000. Most of this reduction was the result of a well-documented process of consolidation, encouraged in large part by geographic deregulation. Along the way, both the average size of bank holding companies (BHCs) and their market shares increased remarkably. In the 1980s, the top ten BHCs accounted for about 20 percent of total bank assets; that percentage is now above 50 percent. Not only did they grow in size, but the remaining entities also grew substantially in organizational complexity, incorporating a large and growing number of subsidiaries spanning the entire spectrum of business activities within the financial sector.

In particular, the transformation of the financial intermediation industry has generated a few banking behemoths, and public debate has focused on ways to regulate such supersized institutions. There are a number of proposed

Nicola Cetorelli is an assistant vice president, James McAndrews an executive vice president and the director of research, and James Traina a former senior research analyst at the Federal Reserve Bank of New York.

Correspondence: nicola.cetorelli@ny.frb.org

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approaches to such regulation, including breakups, size caps, or business activity limits. Other suggestions include enhanced regulations in the form of capital and long-term debt requirements, capital surcharges, stress tests, and improved resolution planning.

Although the discussion around the largest entities is certainly important, we suggest that their emergence is part of a larger process that has transformed the financial intermediation industry more broadly. In this paper, we document and analyze how the industry evolved and pose questions about what might have been the forces that drove the industry and firm structures we see today.

Despite the intense debate on bank complexity, very little documentation or analysis exists on the dynamics leading to the current industry configuration. In fact, even the meaning and metrics of complexity are debatable; in both comparative and absolute terms, we lack a clear consensus on how to assess an entity's complexity. This problem is important not only from a positive angle, as we strive to understand the economics behind the phenomenon, but also from a normative angle, as we decide on policy measures exclusively for complex institutions. How do we establish how complex entities are? Where do we draw the line across institutions?

In this paper, we focus on *organizational* complexity.[1] We look at organizational structure as gauged by the number and types of subsidiaries organized under common ownership and control. A focus on organizational complexity has multiple implications for policy analysis. It seems, for instance, a natural way to look at issues of resolvability and systemic importance. An institution with more legally organized affiliates, perhaps engaged in diverse business activities or located across geographic borders, presents greater challenges for orchestrating an orderly resolution. Similarly, entities with complex organizational structures may experience systemic events of broader scope: shocks can spread to multiple industries within the financial sector as they propagate across the many affiliates of the organization, perhaps accelerated by "cross-default" clauses in debt and derivative contracts. Finally, a complex organizational structure is a direct gauge of how complex regulation itself might be, or need to be, and thus of the challenges to effective oversight of complex organizations.[2]

This paper is the first to offer a rich documentation of the evolution in organizational structure of U.S. financial intermediation firms. Using comprehensive data on the universe of U.S. financial mergers and acquisitions over the past thirty years, we track the process of consolidation and cross-industry acquisitions and show a significant expansion in the complexity of banking institutions. Our study indicates that banks have transformed into increasingly expanding holding companies, extending their organizational footprint into nontraditional bank business lines through acquisitions of already formed specialized subsidiaries. This process of organizational transformation is substantial and far-reaching and is not confined simply to the largest entities of today. The massive sequence of transactions was also surprisingly gradual and "hidden in plain sight": given the regulated nature of bank holding companies, this process occurred with the explicit authorization of the regulator.

Multiple factors likely drove the rise in organizational complexity of banking institutions in the early 1990s. The process of geographic deregulation that has taken place in the past thirty years or so, which allowed banks to consolidate and expand both within and across state lines, may be one such factor; it allowed banks to reach sufficient scale to expand into nonbank sectors. The passage of the Gramm-Leach-Bliley Act (GLB), also known as the Financial Modernization Act of 1999, sanctioned and reinforced this process, even though, as we show in the data, a great deal of nonbank acquisition activity had already taken place.[3]

Banks became complex bank holding companies with control over many subsidiaries and across multiple sectors of the financial sector. However, we posit that this intense transformation was the result of a natural process of adaptation to a changing financial intermediation "technology." The traditional bank-centered model, familiar from textbooks on banking, puts banks as the central brokers between funding supply and demand. With this

[1] Alternative metrics focus instead on what an entity does. For instance, the methodology for the designation of global systemically important banks proposes as metrics of complexity the notional value of over-the-counter derivatives, the balance-sheet presence of "Level 3" assets (assets for which prices cannot be inferred by either markets or models), and the size of the trading and available-for-sale books. This is a narrower definition of complexity, likely captured adequately by metrics of scope and diversity in business lines of the subsidiaries of an organization.

[2] This implication applies directly to the regulation of U.S. bank holding companies. The Federal Reserve is the regulator of BHCs. However, other agencies are the principal regulators of specific types of subsidiaries.

[3] There is ample literature on the dynamic evolution of the original Glass-Steagall Act restrictions on banks' activities. See, for example, Carpenter and Murphy (2010) and Omarova and Tahyar (2011). Also see Fein (2004): "Although the Gramm-Leach-Bliley Act was expected to trigger a cascade of new consolidation proposals, the onslaught had not materialized . . . perhaps because much of the consolidation had already occurred prior to the Act."

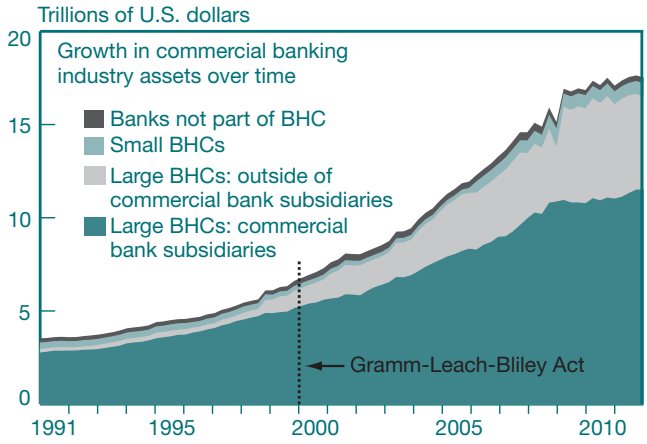
model, general-purpose deposit-taking and loan-making operations define an intermediary and its organizational boundaries. However, asset securitization changed the technology of intermediation. Loans no longer have to reside on the balance sheet of an intermediary. Alternatives to bank deposits can fulfill the liquidity needs of fund suppliers. Hence, general-purpose banks—in their traditional form—are less necessary for all intermediation services. Instead, highly specialized entities have emerged, each able to offer specific services that taken together fulfill the functions traditionally provided by banks. This is the model of intermediation that we are now accustomed to describing as *shadow banking* (see, for example, Pozsar et al. [2010], and Adrian, Ashcraft, and Cetorelli [2013]). This transformation in the technology of intermediation can also explain the observed evolution in bank organizational form: as modern intermediation increasingly relies on nonbank entities to provide specialized services, banking organizations can adapt and survive by incorporating these specialists as subsidiaries under common ownership and control. Hence, as shadow banking has grown and become a prevalent model of intermediation, we should expect banks to enlarge their organizational footprint. In other words, and in truly Coasian terms (Coase 1937), the *boundaries* of the banking firm have expanded progressively to include the activities of nonbank intermediaries, and this evolution should be reflected in the forms of increasingly complex bank holding companies.

The debate around the repeal of the Glass-Steagall Act, which brewed for decades before the passage of GLB, actually reflected the argument that the technology of intermediation was changing. For instance, already in 1988, Isaac and Fein wrote, "Congress [should not] ignore the technological, economic, and competitive forces shifting the financial markets away from traditional banking channels toward increased use of the securities markets for financial intermediation. . . .The securitization of assets has reduced the need for bank loans even further." (Isaac and Fein 1988). And two years earlier, the president of the Federal Reserve Bank of New York stated that "if securitization were to continue to spread rapidly to other types of credit, the historic role of the deposit-based credit intermediation process could be seriously jeopardized" (Federal Reserve Bank of New York 1986).[4]

In the next section, we develop this rationalization of the observed organizational evolution of banking firms in further detail. In our discussion, in line with the observation above, we purposefully use the terms *banks* and *bank holding companies* interchangeably, in recognition of the dynamic evolution in the organizational structure of entities involved in intermediation activities. We are, of course, aware of specific regulatory meanings attached to these terms and to the existence of other types of entities that are authorized to conduct banking activity without a BHC organizational form,[5] but in practice it turns out that the BHC "model" is the one that dominates over this time period. Chart 1, from Avraham, Selvaggi, and Vickery (2012), clearly shows that dominance. In terms of dollars of assets, BHCs have consistently represented almost the totality of all bank assets. Section 3 presents the data, a comprehensive panel of merger-and-acquisition transactions that have occurred in the U.S. financial sector over the past thirty years. Section 4 illustrates our method of using transaction data to construct metrics of complexity for bank "families," matched to regulated bank holding companies. Section 5 describes our findings and our interpretation of the observable evolution of the complexity of bank holding companies. Section 6 draws concluding remarks.

Chart 1

Trends in Number and Total Size of U.S. Bank Holding Companies (BHCs)



Source: Avraham, Selvaggi, and Vickery 2012.

Note: This chart presents financial data up to fourth-quarter 2011. A large bank holding company is defined as a top-tier firm that files a Federal Reserve Y-9C report. Commercial bank assets of large BHCs are measured as the sum of consolidated assets reported by each banking subsidiary in its Federal Financial Institutions Examination Council Call Report filing. Nonbank assets of large BHCs are the difference between total assets as reported in the Y-9C and commercial bank assets as defined above. Assets of small BHCs reflect only their commercial bank subsidiaries.

[4] Pavel (1986) documents the growing importance of asset securitization and its implication for traditional banking.

[5] Likewise, we are aware of the regulatory evolution even in the meaning of the word bank (see, again, Omarova and Tahyar [2011]).

2. A Rationale for Increasing Bank Complexity

Our approach places the evolution of financial intermediaries within the broader context of the evolution of the financial intermediation industry. In a recent special issue of the *Economic Policy Review*, Cetorelli, Mandel, and Mollineaux (2012) expounded the main thesis that, with the rising importance of asset securitization, banks adapted and remained central players in the process of financial intermediation.[6] They did so by embracing the new activities related to securitization (Cetorelli and Peristiani 2012) and expanding the footprint of their organizations, with bank holding companies increasingly adding a vast array of nonbank subsidiaries (Avraham, Selvaggi, and Vickery 2012; Copeland 2012).[7]

Intermediation services are no longer necessarily housed in a single, one-stop-shop, general-purpose entity. Instead, highly specialized entities work in parallel and in sequence to fulfill the functions of the traditional intermediary. For example, asset managers provide liquidity services and products that are close substitutes for demandable deposits; specialty lenders originate loans independent of deposit liabilities; issuers and underwriters guarantee packaging into securities and market placement; and brokers and dealers manage the funding and collateral pledging that are at the center of the securities markets (Kirk et al. 2014).

While this model of intermediation is usually said to allow for a more efficient allocation of risk and for a solution to some of the associated agency frictions (such as the asymmetric information between borrowers and lenders or banks and depositors), it also creates new frictions across the newly emerging specialized intermediaries (extensively documented, for instance, in Ashcraft and Schuermann [2008]). Hence, we argue that while the model allowed for the emergence of specialized intermediaries, their organization as separate subsidiaries within a common hierarchy internalized some of these frictions by sharing sources of intermediation information, coordinating deal flow, benefiting from cross-guarantees within different parts of the organization, and centralizing the credit standing of the organization in its entirety.[8] Adapting to this new industrial environment, the complex holding company structures offered key advantages by collecting specialists together under one corporate organization. Our hypothesis is that those economic advantages drove the emergence of complex bank holding companies. This conglomeration underpins the value-creation part of complexity.

[6] The volume *The Evolution of Banks and Financial Intermediation* is available at http://www.newyorkfed.org/research/epr/2012/EPRvol18n2.pdf.

[7] In 2011, for instance, bank holding companies controlled about 38 percent of the assets of the largest (top twenty) insurance companies, roughly 41 percent of total money market mutual fund assets, and approximately 93 percent of the assets of the largest (top thirty) brokers and dealers (Cetorelli 2012).

[8] This argument follows directly from Stein (2002) and Rajan and Zingales (2000).

3. Acquisitions in the Financial Sector

How does the structure of the intermediation industry evolve over time? Which entities (whether banks or nonbanks) undertake significant organizational transformation? How diffuse is this process in the cross-section? When does it take place? We address these questions using the SNL Financial Mergers and Acquisitions (SNL M&A) database.

SNL captures the universe of U.S. financial acquisition deals starting in 1983 and continuing to the present using many sources, including press releases, public filings, participant surveys, adviser surveys, and news searches. SNL's coverage tracks new financial players involved in M&A activity, allowing us to track sector-wide growth in size and complexity.

We start by compiling a panel data set of acquisitions. For each deal, SNL provides information on the buyer name,[9] the target name, the buyer industry, the target industry, the value, and the completion date. Because the database lacks a unique entity identifier, we work with entity names.[10] We use SNL's general industry-type variable to bin entities by industry. SNL classifies entities by the Standard Industrial Classification code sourced from the Securities and Exchange Commission or the Federal Deposit Insurance Corporation. When such information is missing or ambiguous, SNL internally assigns an industry code based on major sources of revenue or underwriting operations. It reports the nominal value of the deal, defined as the total consideration paid to the seller, when that information is available.

The SNL M&A raw database has over 37,000 deals. We restrict our analysis to whole-entity acquisitions completed before 2013. We drop a few observations that we found to have uninformative participant names, such as "private investor," "management group," or "mortgage banking." We also filter out acquisitions in which a participant is not in the financial sector. Ten industry types remain: bank, asset manager, broker-dealer, financial technology, insurance broker, insurance underwriter, investment company, real estate,

[9] SNL lists the ultimate parent of the actual acquirer as the buyer.

[10] To make sure that names are unique within an entity and to reduce potential coding errors, we clean all names by removing all special characters and capitalizing all letters.

savings bank/thrift/mutual,[11] and specialty lender. Finally, taking advantage of the fact that some entities appear multiple times, we fill in the missing fields of an entity if those fields are unique and available elsewhere in the data set.

In total, 19,532 deals meet these criteria. The data span 23,451 unique U.S. entities (7,893 unique banks), with a total of 6,507 unique buyers, 18,402 unique targets, and 19,486 unique buyer-target pairs.

Deal value is available when disclosed, as happens with all public acquisitions. These make up 58 percent of the acquisitions in our data set. For calculation purposes, we set the value to zero if it is missing. We rely on SNL to convert all non-dollar-denominated values to U.S. dollars using exchange rates at the completion date, although this conversion is infrequent because of the U.S.-only nature of the SNL M&A database. We also normalize all deal values to 2012 dollars using the consumer price index (CPI) for all urban consumers, all items, not seasonally adjusted. Since the CPI is available only monthly but our acquisition data are daily, we linearly interpolate to get an estimate of the CPI at the deal completion date.

To measure the total acquisition activity of entities, we construct two aggregates across all acquisitions in which the entity acts as the buyer. The first consists of the raw number of deals, while the second consists of the total sum of deal values.

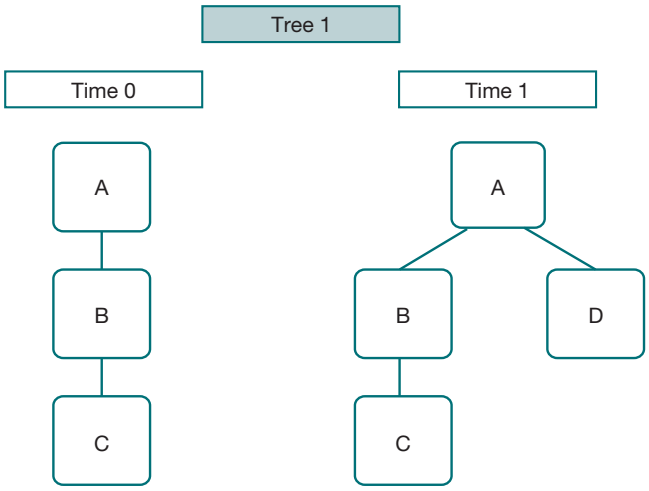
4. Data Construction

Up until now, we have focused on acquisitions. However, this limits our ability to answer questions on the cumulative effects of acquisition activity. We therefore extend our analysis to studying entire organizations, or families, themselves. We consider a family to be the complete picture of a self-owned entity and all of its subsidiaries.

The term family lends itself to a host of other relevant terms for the structure of organizations. The exhibit on this page illustrates an example of a "family tree." An entity within a family may have an "immediate parent," the direct owner, and an "ultimate parent," the highest owner in the family tree. For example, in Tree 1 at Time 0, A is the immediate parent of B and the ultimate parent of both B and C.

We use our information on acquisitions to assemble a family-level panel data set. In our earlier data set, an observation is an acquisition, such as "A buys D." Our family-level data set looks at an entire tree as an observation, such as "Tree 1 at Time 0."

[11] Note the separation of banks and thrifts.



We start with market data using the Center for Research in Security Prices (CRSP) U.S. Stock Database, provided by Wharton Research Data Services. A key variable from this data set is the PERMCO, a unique entity identifier that is consistent through time. To bring our earlier discussion to the data, we define a family as any group of entities that share a PERMCO, thus restricting our sample to public families. We add in regulatory accounting data from the Board of Governors of the Federal Reserve System, *Consolidated Financial Statements for Bank Holding Companies* (FR Y-9C), a quarterly regulatory report filed by BHCs. To match to these databases, we add in four more linking identifiers available from the SNL M&A data set: the ticker symbol of the entity's primary exchange stock, the Committee on Uniform Security Identification Procedures code (CUSIP) of the entity's primary exchange security, the Federal Reserve Research, Statistics, Supervision and Regulation, and Discount and Credit Database identifying number (RSSD ID) of the entity,[12] and the RSSD ID of any BHC parent.

A fundamental insight that informed our data construction is that a family tree requires knowledge only of the immediate parent of each entity in the family. For instance, in the above picture, we need only "A owns B" and "B owns C" to identify "Tree 1 at Time 0." To construct our panel data set, we exploit this principle by creating a separate "dictionary" data set that lists the universe of unique entities in the cleaned SNL M&A data set. We then create two new variables that track each entity's ownership—one for the immediate parent and one for the ultimate parent. This new data set allows us to "look up" entities at different points in time, using the immediate and ultimate parent variables to build a snapshot of the family tree.

[12] A unique identifier assigned by the Federal Reserve System to all financial institutions, main offices, and branches. RSSD IDs are the primary identifier for the FR Y-9C.

Because we lack information on family structure before SNL's acquisition coverage, we set the baseline owner of each entity to itself at the beginning of our data process. Further, in defining our family structures, we include only entities that are involved in an acquisition at some point in our sample period. In other words, our data limitations anchor our results to changes in complexity relative to our baseline and through the acquisition channel exclusively; we capture neither the structure before the start of the SNL M&A data set nor changes through de novo entity creation.

Our primary algorithm updates the dictionary data set by sequentially reading from the acquisition-level data set described in section 3. As acquisitions occur, we replace the target's parent variables in the dictionary data set. We first replace the immediate parent with the name of the buyer, reflecting the change in ownership.[13] We assume that whole acquisitions carry all previously acquired entities, and thus we replace the immediate parent of all subsidiaries of the target.[14] Finally, we update the ultimate parent variable by tracing the path of immediate parents.

To illustrate our approach, consider again the family tree above. In the dictionary data set at Time 0, "A owns B," "B owns C," and some entity (perhaps itself) owns D. When we read the deal "A buys D," we change D's immediate parent to A. At Time 1, we have "A owns B," "B owns C," and "A owns D." To identify the ultimate parent, we simply trace all entities back to A.

At each quarter-end, we sum the dictionary data set from entity level to ultimate parent level, constructing a profile of variables that count the number of subsidiaries in each industry for each ultimate parent. We append all quarter-specific cross-sections to form the basis of our panel data set.

Since we capture changes in organizational structure only through the acquisition channel, we may be concerned with important missing links across ultimate parents that do not appear in our data. To resolve this potential issue, we match all owners to their CRSP PERMCO and FR Y-9C RSSD ID at each quarter. This match restricts our sample to public FR Y-9C filers but ensures a time-consistent and regulatory-based definition of a banking family. As noted above, our data from SNL include neither PERMCO identifiers nor RSSD ID identifiers of the top regulatory filer. However, the SNL and CRSP data sets share ticker and CUSIP variables, allowing a direct match to the PERMCO. Similarly, we use the other SNL-provided RSSD ID variables to match to the top regulatory filer of the FR Y-9C. As a last layer of robustness, we rely on the PERMCO-RSSD ID link data set provided by the Federal Reserve Bank of New York to ensure proper identification of families.[15] We then sum any families with the same PERMCO as before, creating our final panel data set.

To make sure our algorithm works as intended and correctly captures important acquisitions, we do a variety of hand inspections using the raw SNL M&A database and the National Information Center (NIC) website.[16] For instance, because of its size and acquisition history, Bank of America offers a rich case study. We look at its history in detail, from NationsBank's buy of C&S/Sovran, Fleet's buy of Shawmut, BankAmerica's buy of Security Pacific, and NationsBank and BankAmerica's consolidation to the name we know today. Our database accurately covers all of these important acquisitions. Among other firms checked are Allco, BNY Mellon, Countrywide, Key, Regions, and Washington Mutual.

Although NIC is the natural choice as the information center of BHCs, two problems prevent NIC data from helping our understanding of this evolution when we compare SNL with NIC, particularly with respect to de novo entity creation. First, NIC focuses on the regulated banking industry, covering nonbank financial firms only insofar as they link to regulated entities. Therefore, unlike SNL, NIC lacks information on deal-level analysis at the broadest levels of the financial sector. We cannot see changes in the structure of nonbank financial firms unless they are already underneath the umbrella of a BHC. Further, we cannot find out how nonbank financial firms come under the control of a BHC, such as M&A as opposed to de novo creation. Second, NIC is extremely different from SNL in its scope of coverage; it is very detailed within the banking dimension but classifies many other financial subsidiaries as "domestic entity other," a catch-all type that includes some things we care about (asset management subsidiaries) and some things we do not (collateralized debt obligations, special-purpose vehicles, and the like). This group is extremely difficult to disentangle. Conversely, SNL focuses on specific entity types that are relevant to the asset securitization chain and is thus more useful for our purposes.

Note that the mapping from SNL's bank-type industry variable to FR Y-9C filers is not one to one. Of the 1,028 unique RSSD IDs in our family-level data set, about 85 percent are banks and 15 percent are thrifts. Wells Fargo achieves the highest bank consolidation in fourth-quarter 2008, totaling

[13] Note that in replacing the previous immediate parent, we also capture sales.

[14] In all subsidiaries, we include subsidiaries of subsidiaries, subsidiaries of subsidiaries of subsidiaries, and so on.

[15] If any of the identifier matches disagree, we use the link that appears most often. We have confirmed by hand that this reduces error more than throwing away data when links are ambiguous.

[16] For example, to check for possible conceptual errors in our primary algorithm, we go through a similar exercise as in our family-tree illustration with ABN AMRO.

361 banks. By the end of the sample, Regions Financial Corporation maintains the highest measure at 193.

Our final data set consists of 1,013 families spanning first-quarter 1988 to fourth-quarter 2012. This sample captures 22 percent of all FR Y-9C filers and 79 percent of all entities with a PERMCO-RSSD ID link. To give a picture of size, in fourth-quarter 2010, our sample totals 71 percent of the book value of equity from the FR Y-9C.

5. Analysis

As premised above, we operationalize bank complexity by measuring the extent to which a BHC expands its "horizontal" structure, acquiring entities operating in different industries of the financial sector. We must stress that our approach allows us to capture only *incremental* levels of complexity from acquisition dynamics. We cannot capture *organic* growth in complexity (de novo entity creations), nor entities acquired before the start of our sample period, nor the purpose of the acquisitions. That said, the quality checks on our constructed family-level data show that we capture a significant extent of the overall evolution in organizational structure of the largest BHCs.

5.1 Sector-Wide Dynamics

We begin by illustrating some of the characteristics of the original SNL Financial M&A database. As mentioned above, we partition the data into ten industry types within the financial sector.

Table 1 presents basic information about the acquisitions that take place over the sample period. The far-left column lists each of the ten industries within our data set. The "total unique" column presents the total number of unique entities across buyers and targets. The "unique buyers" ("unique targets") column presents the total number of unique buyers (targets).

The database allows us to identify 23,451 unique entities that appear at least once in acquisitions as buyers or targets over our sample period. Among industries, commercial banks account for about 34 percent of the unique entities, followed by insurance firms, thrifts, and specialty lenders. Of all these entity types, banks are by far the most involved in buying: 45 percent of unique buyers are banks, and 37 percent of banks act as buyers at least once in our sample. They are also the largest industry represented as unique targets, although to a smaller extent. Table 1 gives a flavor of the overall scope of the database and the related dynamics in acquisitions. However, it cannot offer direct insights into the process of horizontal organizational expansion; in referring to buyers and targets, the database does not indicate whether the underlying participants were from the same or from different industries.

Table 1
Unique Entities in Acquisitions Data Set

Industry	Total Unique	Unique Buyers	Unique Targets
Bank	7,893	2,904	5,843
Asset manager	1,648	374	1,306
Broker-dealer	1,387	361	1,070
Financial technology	1,989	426	1,621
Insurance broker	3,682	504	3,237
Insurance underwriter	2,193	793	1,514
Investment company	64	40	27
Real estate	229	87	150
Savings bank/thrift/mutual	2,352	676	1,927
Specialty lender	2,014	342	1,707
Total	23,451	6,507	18,402

Source: Authors' calculations, based on information in the SNL Financial Mergers and Acquisitions database.

Table 2 takes a different look at the same acquisition activity. It illustrates the extent to which each industry consolidates (same-type entity deals) or expands (different-type entity deals). Panel A displays the total number of acquisitions; panel B displays the total real value of acquisitions. We organize each panel as a two-way matrix. The rows show the industry of the buyer, while the columns show the industry of the target. Hence, the on-diagonal numbers represent same-industry consolidation, while the off-diagonal numbers represent cross-industry expansion.

We capture 19,532 acquisition events in our data set. As indicated by the total number of on-diagonal events (13,070), the financial sector overall experiences a substantial amount of same-industry consolidation. Banks account for almost half of these transactions. Likewise, banks also capture the lion's share of off-diagonal acquisition activity; their 3,742 acquisitions constitute about 60 percent of the 6,462 total off-diagonal acquisitions. For some industries, banks outperform same-industry entities in number of acquisitions. For example, banks acquire 519 asset managers, while asset-manager entities acquire only 459 other asset managers. Regardless of the target industry, the proportion of acquisitions by banks is high. For instance, banks are buyers in about 40 percent of all asset-manager acquisitions, 26 percent of all broker-dealer acquisitions, and 37 percent of all specialty-lender acquisitions.

This summary table suggests the significance of how much bank organizational structure has transformed over time. It also

Table 2

Entity Industries in Consolidation and Expansion

Panel A: Types in Acquisitions, by Number

	Target Industry										
Buyer Industry	Bank	Savings Bank/Thrift/ Mutual	Asset Manager	Broker-Dealer	Financial Technology	Insurance Broker	Insurance Underwriter	Investment Company	Real Estate	Specialty Lender	Total
Bank	6,076	1,305	519	292	164	759	38	3	1	653	9,810
Savings bank/ thrift/mutual	359	705	45	28	8	115	21	—	2	138	1,421
Asset manager	2	1	459	38	110	27	24	6	17	51	735
Broker-dealer	6	6	127	613	78	59	9	4	9	42	953
Financial technology	2	—	13	23	1,123	60	8	—	—	13	1,242
Insurance broker	4	1	31	12	35	1,762	18	—	—	6	1,869
Insurance underwriter	14	18	138	55	126	533	1,451	—	4	54	2,393
Investment company	2	1	19	4	4	4	2	11	4	42	93
Real estate	1	1	3	3	—	—	1	—	111	10	130
Specialty lender	19	21	10	26	20	11	5	3	2	769	886
Total	6,485	2,059	1,364	1,094	1,668	3,330	1,577	27	150	1,778	19,532

Panel B: Types in Acquisitions, by Value (Millions of U.S. Dollars)

	Target Industry										
Buyer Industry	Bank	Savings Bank/Thrift/ Mutual	Asset Manager	Broker-Dealer	Financial Technology	Insurance Broker	Insurance Underwriter	Investment Company	Real Estate	Specialty Lender	Total
Bank	1,405,983	203,243	43,512	173,952	18,083	3,297	16,783	1,127	333	276,048	2,142,361
Savings bank/ thrift/mutual	18,982	54,333	3,359	119	74	165	3,409	—	86	15,165	95,691
Asset manager	0	17	68,463	7,812	46,776	2,575	1,692	416	70,405	29,347	227,504
Broker-dealer	6,099	2,665	19,461	106,443	4,302	1,467	970	1,921	15,183	9,463	167,975
Financial technology	25	—	3,813	1,784	91,225	437	1,284	—	—	733	99,301
Insurance broker	10	11	41	41	5,346	21,359	244	—	—	1	27,054
Insurance underwriter	124,460	785	28,783	15,605	10,929	8,032	527,592	—	2,284	22,354	740,825
Investment company	0	19	654	18	6	129	5	2,657	4,669	4,120	12,276
Real estate	0	78	599	3	—-	—-	133	—	136,014	93	136,921
Specialty lender	110	848	1,904	2,006	1,884	62	1,824	393	416	73,561	83,008
Total	1,555,669	261,999	170,590	307,784	178,625	37,524	553,935	6,514	229,390	430,885	3,732,916

Source: Authors' calculations, based on data from SNL Financial.

hints at how the structure has changed with respect to entities in separate but related industries. Our conclusions are even more striking if we restrict our attention to the dollar value of these transactions (Table 2, panel B). Indeed, off-diagonal acquisitions performed by banks are more than 80 percent of the total value of all off-diagonal acquisitions.

Who are the top buyers over the period? How much are they buying? Tables 3 and 4 show the top fifty buyers by number and value of acquisitions, r espectively. The top entities by number of acquisitions are three of the now largest insurance brokers: Arthur J. Gallagher, Brown & Brown, and Hub International. As Table 3 shows, they acquired hundreds of entities, although almost exclusively consolidating within their own industry. Banks follow in the ranking, also displaying very large numbers of acquisitions but with a more balanced distribution between bank and nonbank targets. Many of the banks at the lower end of the list fell in the mass of acquisition activity after geographic deregulation. This consolidation may have set the stage for future expansion, as banks developed the scale and size necessary for later expansions in complexity.

Interestingly, banks dominate the ranking by value. Table 4 captures the most active firms over time, irrespective of when the activity took place and whether the entities are still in operation. This time-independence is the reason NationsBank is second on the list, despite its current incarnation as Bank of America. The artifacts of bank acquisition activity show a compounding and progressive industry buildup. For instance, although Bank of America is highly diverse today, it inherited the results of the earlier evolution of NationsBank and Merrill Lynch. Likewise, Citigroup inherited part of its diversity from the previous activity of Travelers Group. The same holds for Wells Fargo from Wachovia (originally First Union) and Norwest, and JPMorgan Chase from Bank One, Chase Manhattan, and Washington Mutual.

It is important to note that the phenomenon of horizontal expansion is not confined to a small handful of entities. As the tables show, below the top-ranked acquirers, we see a significant number of cross-industry acquisitions.

Next, we offer documentation on the dynamics of acquisitions. Chart 2 shows the composition of industries in four-year periods within our sample. Although the database shows mainly banks (and thrifts) as buyers in the late 1980s, variation in buyer type steadily increases over time. By the second half of the 1990s, all industry types perform acquisitions. Likewise, the variety in target types increases gradually over time, with nonbank targets already representing the large majority in the second half of the 1990s.

Chart 3 illustrates that the share of the dollar value of acquisitions reflects the gradual process of expansion in industry types, although the relative prevalence of each industry by value differs somewhat from prevalence by number. For instance, there is a relatively large number of insurance broker entities that are either buyers or targets of acquisitions, but they account for a much smaller share of the overall value. Conversely, there are relatively fewer insurance underwriters involved in acquisitions, but they account for a larger share.

Charts 4 and 5 combine the number of acquisitions within and across industries. While the process of same-industry consolidation is important in itself, for our purposes, we want to keep our focus on organizations expanding into other industries within the financial sector. To this end, it is useful to report the breakdown of acquisition activity (for buyers and targets), separating same-industry and cross-industry deals. Chart 4 shows that same-industry consolidation is quite diffusive across the various industries. Although banks dominated the activity during the geographic deregulation of the mid-1990s, there is sizable consolidation across the other industries as well, continuing into the present.

Chart 5 confirms and reinforces the message of the previous ones, which is that during our sample period the entire financial sector was reorganizing. Banks were buying nonbanks, but not to the exclusion of substantial cross-industry acquisitions of other entity types. Moreover, targets were not concentrated in any particular industry, suggesting that no particular industry-specific factors drove the development. Rather, it indicates a diffused transformation of the intermediation industry, with a progressive expansion of the organizational boundaries of intermediation firms.

5.2 Bank-Specific Dynamics

We shift our focus to banks themselves and follow their evolution. We start with a specific examination using the same deal data as above. Later in the paper, we present details of bank evolution at the family (or BHC) level.

Chart 6 goes into the specifics of the cross-industry evolution in bank organizational structure. Besides the extensive acquisition of thrifts in the early part of the period, the data denote how banks gradually expanded their footprint. Banks proceeded first by acquiring entities that were arguably closer to their traditional mode of operations—specialty lenders and asset managers, both specialized intermediaries that increased their roles once securitization-based intermediation became more prevalent. The expansion progressed naturally, with banks incorporating brokers and dealers later in the sample period. These entities rose in importance with the trading of a progressively increasing stockpile of securities created through asset securitization (Cetorelli and Peristiani 2012). Moreover, the process continued with the incorporation of insurance and financial technology firms, which offer payment-related services.

Table 3

Top Fifty Buyers, by Number

			Value (Millions of U.S. Dollars)			Count		
Rank	Name	Industry	All	Consolidation	Expansion	All	Consolidation	Expansion
1	Arthur J. Gallagher & Co.	Insurance broker	3,314	3,249	65	249	245	4
2	Brown & Brown	Insurance broker	2,029	2,011	18	236	234	2
3	Hub International	Insurance broker	834	832	2	159	156	3
4	BB&T	Bank	19,989	15,291	4,697	142	23	119
5	Wells Fargo	Bank	50,566	48,577	1,989	138	34	104
6	Norwest	Bank	64,191	55,112	9,079	123	86	37
7	National Financial Partners Corporation	Insurance broker	739	731	8	95	62	33
8	Bank of New York	Bank	29,062	22,661	6,401	76	4	72
9	Regions Financial Corporation	Bank	27,951	26,154	1,797	74	50	24
10	Union Planters	Bank	9,564	7,672	1,893	69	53	16
11	First American Corporation	Insurance underwriter	5,738	171	5,566	66	4	62
12	U.S. Bancorp	Bank	12,146	5,151	6,995	64	17	47
13	First Union	Bank	72,837	61,532	11,305	64	29	35
14	Stewart Information Services	Insurance underwriter	40	40	0	63	4	59
15	Goldman Sachs	Broker-dealer	13,725	10,020	3,705	60	10	50
16	SouthTrust	Bank	2,450	1,539	910	60	46	14
17	Marsh & McLennan Companies	Insurance broker	6,757	6,635	122	58	49	9
18	Compass Bancshares	Bank	2,524	2,375	149	55	41	14
19	Bank One Corporation	Bank	70,781	56,069	14,712	55	36	19
20	Citigroup	Bank	100,742	2,530	98,212	54	2	52
21	Community First Bankshares	Bank	1,004	983	21	53	26	27
22	Hibernia Corporation	Bank	2,006	1,678	327	51	40	11
23	First American Corporation	Insurance underwriter	178	175	3	50	3	47
24	PNC Financial Services	Bank	34,106	28,577	5,529	47	17	30
25	KeyBank	Bank	12,518	9,648	2,870	46	20	26

Table 3 (continued)
Top Fifty Buyers, by Number

			Value (Millions of U.S. Dollars)			Count		
Rank	Name	Industry	All	Consolidation	Expansion	All	Consolidation	Expansion
26	USI Holdings Corporation	Insurance broker	546	527	19	45	43	2
27	Wachovia	Bank	67,562	23,837	43,726	45	11	34
28	Zions Bancorporation	Bank	5,591	5,463	129	45	35	10
29	First Banks	Bank	1,141	801	340	43	31	12
30	American International Group	Insurance underwriter	59,147	58,330	817	42	22	20
31	Colonial Bancgroup	Bank	2,970	2,348	622	42	31	11
32	SunGard	Financial technology	1,942	1,795	148	42	38	4
33	Fifth Third Bank	Bank	18,416	14,189	4,227	41	18	23
34	Synovus	Bank	2,503	1,994	509	41	29	12
35	Old National Bank	Bank	1,641	1,319	322	39	24	15
36	Aon plc	Insurance broker	8,359	3,297	5,063	39	31	8
37	JPMorgan Chase	Bank	85,253	75,001	10,251	38	2	36
38	Marshall & Ilsley	Bank	8,380	4,661	3,720	38	17	21
39	HCC Insurance Holdings	Insurance underwriter	1,339	811	528	37	10	27
40	Comerica	Bank	6,033	5,947	87	36	27	9
41	Fidelity National Financial	Insurance underwriter	6,857	2,145	4,712	36	8	28
42	FNB Corporation	Bank	2,135	1,883	252	36	17	19
43	Fiserv	Financial technology	6,533	5,992	541	35	28	7
44	Mercantile Bancorporation	Bank	7,078	4,910	2,169	35	23	12
45	National City Corporation	Bank	26,288	20,778	5,509	34	11	23
46	Hilb, Rogal & Hobbs Company	Insurance broker	380	380	0	34	33	1
47	LandAmerica Financial Group	Insurance underwriter	1,172	971	201	33	2	31
48	Commerce Bancshares	Bank	990	924	67	33	30	3
49	Willis Group	Insurance broker	1,920	1,888	32	33	32	1
50	Royal Bank of Canada	Bank	12,409	5,530	6,879	33	4	29

Source: Authors' calculations, based on data from SNL Financial.

Notes: Consolidation captures acquisitions in which the buyer and target have the same type. Expansion captures acquisitions in which the buyer and target have different types.

Table 4

Top Fifty Buyers, by Value

			Value (Millions of U.S. Dollars)			Count		
Rank	Name	Industry	All	Consolidation	Expansion	All	Consolidation	Expansion
1	Bank of America	Bank	187,572	87,208	100,364	16	3	13
2	NationsBank	Bank	138,702	135,166	3,535	23	12	11
3	Travelers Group	Insurance underwriter	137,466	5,892	131,573	8	1	7
4	Citigroup	Bank	100,742	2,530	98,212	54	2	52
5	JPMorgan Chase	Bank	85,253	75,001	10,251	38	2	36
6	First Union	Bank	72,837	61,532	11,305	64	29	35
7	Bank One Corporation	Bank	70,781	56,069	14,712	55	36	19
8	Wachovia	Bank	67,562	23,837	43,726	45	11	34
9	Capital One	Bank	66,804	22,434	44,370	12	2	10
10	Norwest	Bank	64,191	55,112	9,079	123	86	37
11	Blackstone Group	Asset manager	61,048	1,271	59,776	19	4	15
12	American International Group	Insurance underwriter	59,147	58,330	817	42	22	20
13	Chase Manhattan	Bank	58,120	45,275	12,845	26	4	22
14	Wells Fargo	Bank	50,566	48,577	1,989	138	34	104
15	Washington Mutual	Bank	50,347	320	50,027	27	4	23
16	Firstar Corporation	Bank	44,430	43,827	602	21	15	6
17	Fleet Financial Group	Bank	43,867	37,165	6,702	26	15	11
18	Berkshire Hathaway	Insurance underwriter	35,792	35,029	763	24	19	5
19	PNC Financial Services	Bank	34,106	28,577	5,529	47	17	30
20	HSBC	Bank	32,703	11,053	21,650	10	2	8
21	MetLife	Insurance underwriter	32,523	31,912	612	17	8	9
22	Toronto-Dominion Bank	Bank	29,866	14,567	15,299	21	5	16
23	Bank of New York	Bank	29,062	22,661	6,401	76	4	72
24	Kohlberg Kravis Roberts	Asset manager	29,002	0	29,002	6	0	6
25	Regions Financial Corporation	Bank	27,951	26,154	1,797	74	50	24

Table 4 (continued)
Top Fifty Buyers, by Value

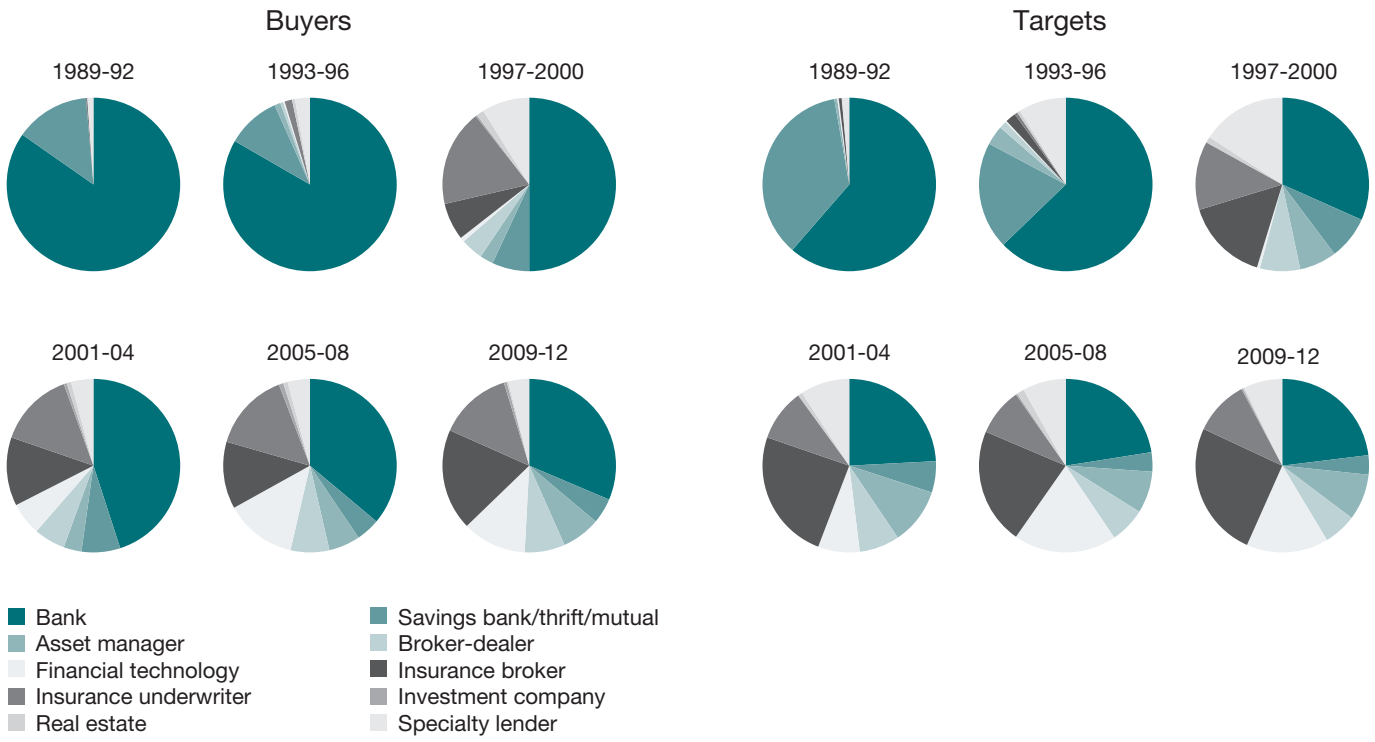
			Value (Millions of U.S. Dollars)			Count		
Rank	Name	Industry	All	Consolidation	Expansion	All	Consolidation	Expansion
26	BlackRock	Asset manager	26,847	26,847	0	9	7	2
27	Anthem Incorporated	Insurance underwriter	26,360	26,360	0	2	2	0
28	National City Corporation	Bank	26,288	20,778	5,509	34	11	23
29	St. Paul Companies	Insurance underwriter	25,074	24,063	1,012	12	7	5
30	SunTrust Banks	Bank	24,070	23,019	1,051	32	13	19
31	Chemical Bank	Bank	23,610	23,610	0	13	11	2
32	ING Group	Insurance underwriter	23,270	16,628	6,642	20	4	16
33	UBS	Bank	22,775	0	22,775	17	0	17
34	Morgan Stanley	Broker-dealer	21,216	0	21,216	21	1	20
35	Credit Suisse	Bank	20,110	0	20,110	13	0	13
36	BB&T	Bank	19,989	15,291	4,697	142	23	119
37	UnitedHealth Group	Insurance underwriter	18,476	17,897	579	23	16	7
38	Fifth Third Bank	Bank	18,416	14,189	4,227	41	18	23
39	Deutsche Bank	Bank	18,398	13,055	5,342	13	1	12
40	Aegon	Insurance underwriter	18,274	17,923	352	10	7	3
41	First Bank System	Bank	17,646	16,123	1,523	22	14	8
42	Swiss Re	Insurance underwriter	17,108	16,967	140	16	14	2
43	Merrill Lynch	Broker-dealer	16,182	4,761	11,422	25	17	8
44	Conseco	Insurance underwriter	15,583	4,253	11,331	16	7	9
45	Banco Bilbao Vizcaya Argentaria	Bank	15,499	15,499	0	9	7	2
46	Dean Witter Discover	Broker-dealer	15,390	15,390	0	2	2	0
47	Household International	Specialty lender	14,610	14,421	189	13	6	7
48	Monte dei Paschi di Siena	Bank	13,898	13,898	0	1	1	0
49	Equity Office	Real estate	13,813	13,813	0	3	3	0
50	Goldman Sachs	Broker-dealer	13,725	10,020	3,705	60	10	50

Source: Authors' calculations, based on data from SNL Financial.

Notes: Consolidation captures acquisitions in which the buyer and target have the same type. Expansion captures acquisitions in which the buyer and target have different types.

Chart 2

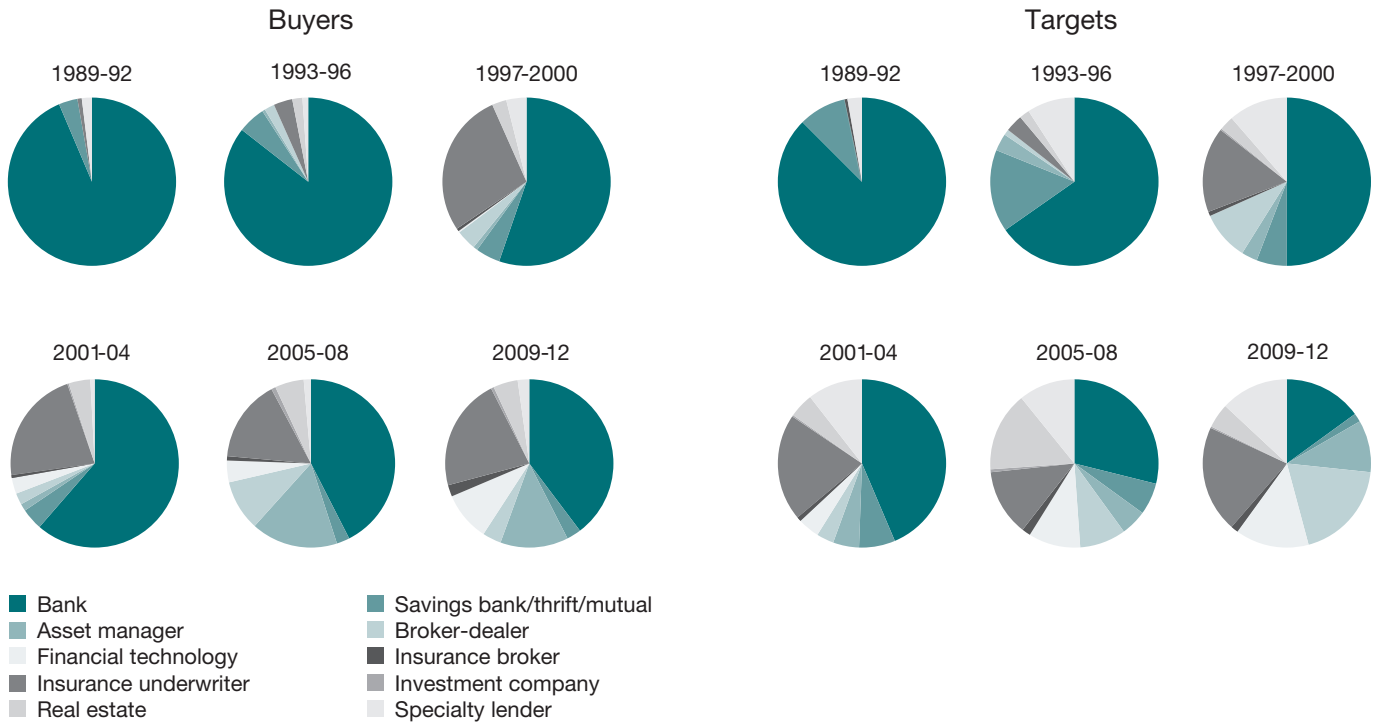
Types in All Acquisitions, by Number



Source: Authors' calculations, based on data from SNL Financial.

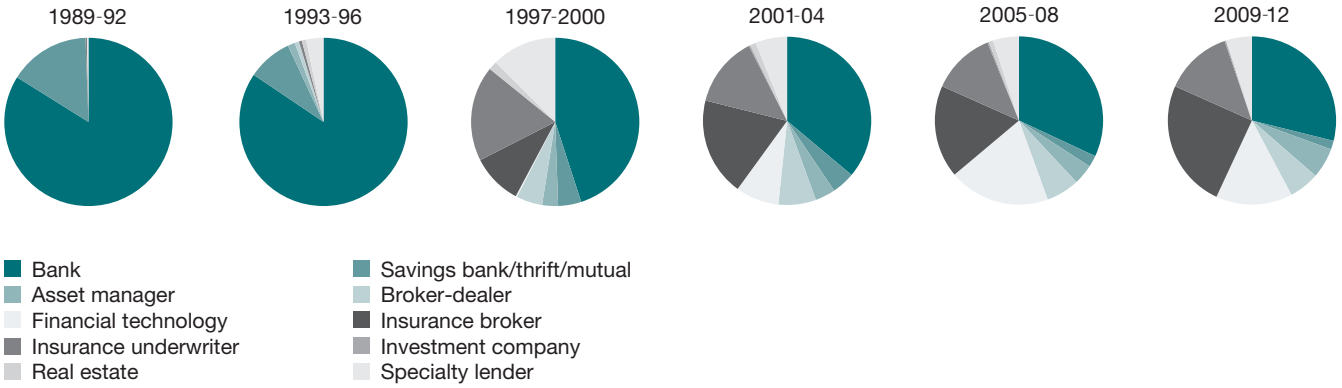
Chart 3

Types in All Acquisitions, by Value



Source: Authors' calculations, based on data from SNL Financial.

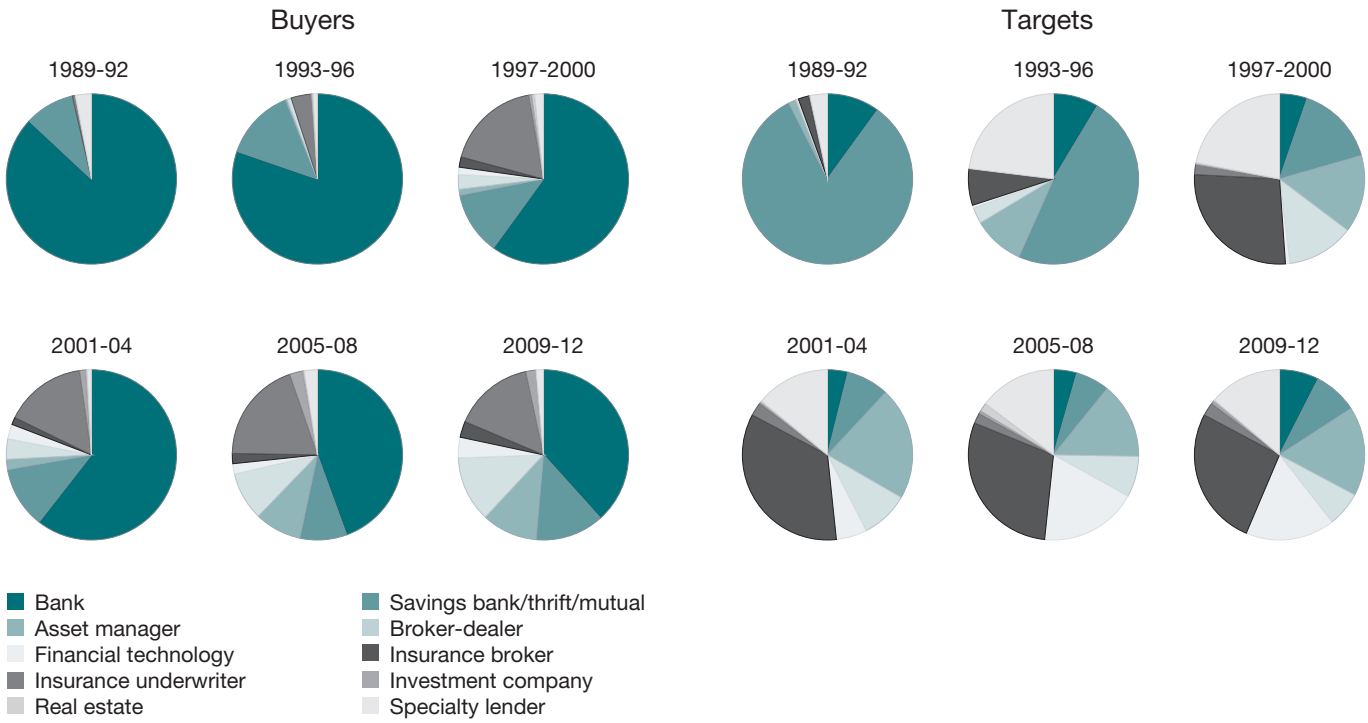
Chart 4
Types in Same-Industry Acquisitions, by Number



Source: Authors' calculations, based on data from SNL Financial.

Note: Same-industry acquisitions represent deals in which the buyer and target have the same type.

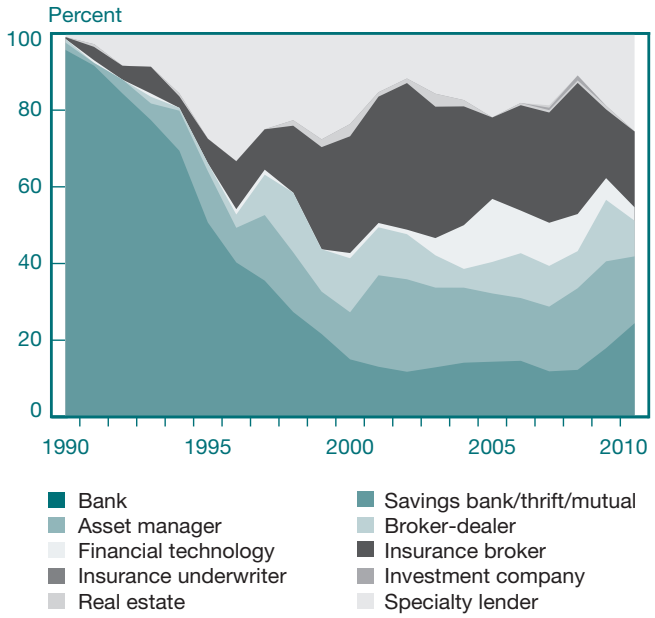
Chart 5
Types in Cross-Industry Acquisitions, by Number



Source: Authors' calculations, based on data from SNL Financial.

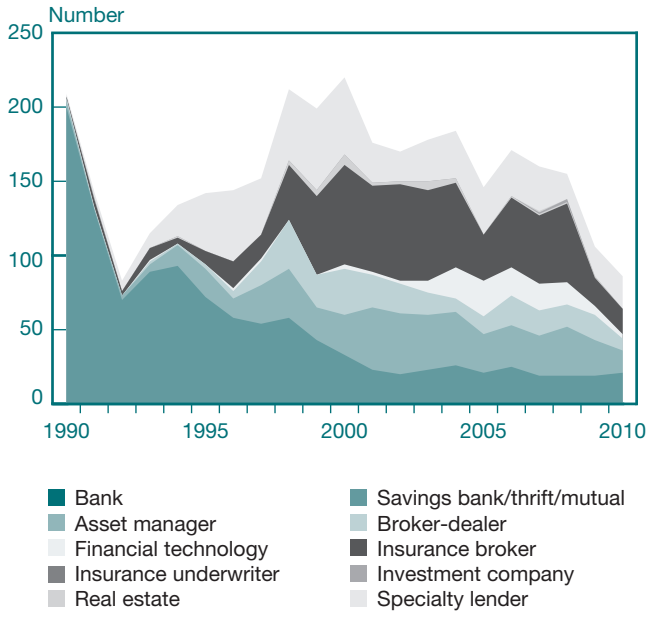
Note: Cross-industry acquisitions represent deals in which the buyer and target have different types.

Chart 6
Nonbank Targets of Bank Buyers (Share)



Source: Authors' calculations, based on data from SNL Financial.
Note: Vertical cross-sections illustrate the average share of targets by type in a given quarter.

Chart 7
Nonbank Targets of Bank Buyers (Number)



Source: Authors' calculations, based on data from SNL Financial.
Note: Vertical cross-sections illustrate the average number of targets by type in a given quarter.

Chart 7 instead displays the number, not the share, of acquisition types through time. It shows that the process of expansion remained active throughout the period, perhaps slowing down only in the post-crisis years.

5.3 Evolution in Bank Families, or Organizational Changes in BHCs

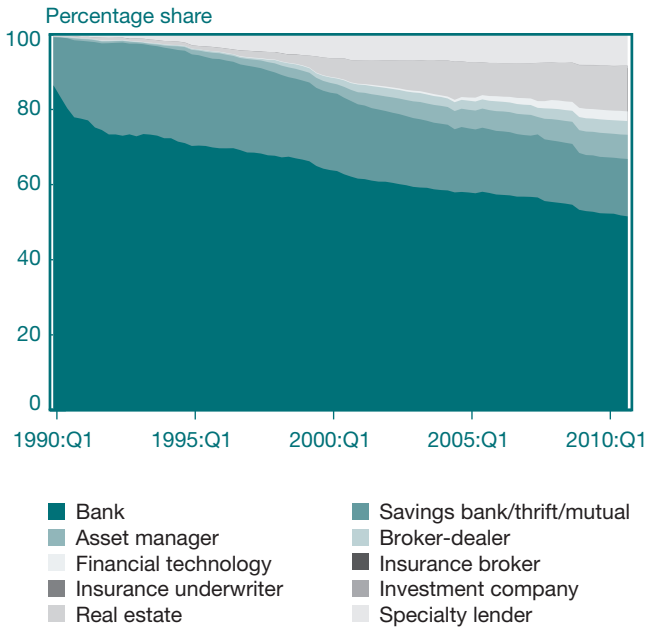
The entity-level analysis in the previous subsection already hints at the evolution in complexity of U.S. banking firms. However, maintaining the focus on individual entities actually understates the extent to which bank organizational boundaries really expanded. Entity-level analysis misses the process of merging, changes in names, and branching into multiple levels of affiliation. As a result, entity, rather than family, analysis leaves us blind to the actual size and composition of entity families. For example, in Table 4, Bank of America and NationsBank are the first- and second-highest ranked entities by acquisition value. However, these entities are truly the same; most of NationsBank's history folded into Bank of America upon creation. Within this new entity are many entities acquired along the way, perhaps representing a diversified portfolio or a focused industry giant. To track complexity accurately through time, we need a picture of the same entity's organization before and after the deal.

As explained in section 4, our methodology allows us to combine and track overall complexity, as captured by the amount and type of performed acquisitions (and sales). This buildup takes place within the walls of a banking family, defined by aggregating the information of individual entities under a common highest-holder identifier.

What does the typical BHC family look like? How does its structure evolve over time? Chart 8 addresses these questions by depicting the evolution of organizational profiles in our sample. The typical BHC changed appreciably over time. A BHC family was identified by having mostly commercial bank and thrift subsidiaries in the early 1990s. However, the organizational boundaries expanded significantly starting in the mid-1990s, as BHCs began adding an increasing number of nonbank subsidiaries.

The process that we are able to pick up through the data on acquisition matches well the data on total assets of BHCs, depicted earlier in Chart 1, which shows the increasing

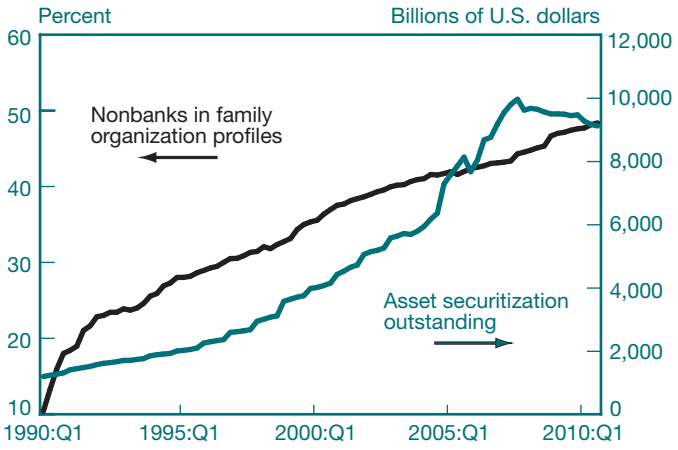
Chart 8
Organizational Evolution



Source: Authors' calculations, based on data from SNL Financial.

Note: Vertical cross-sections illustrate the average share of types within a bank family in a given quarter.

Chart 9
Nonbanks and Securitization



Sources: Authors' calculations, based on data from SNL Financial; Securities Industry and Financial Markets Association.

Notes: The black line illustrates the share (by count) of nonbanks in family organizational profiles. The green line illustrates asset securitization outstanding in billions of U.S. dollars.

contribution of nonbank subsidiaries to the total assets of their organizations. This evolution in BHCs' organizational footprint also coincides closely with the concurrent evolution in asset-securitization activity. Chart 9 shows the time series of the ratio of nonbank subsidiaries to total subsidiaries of all the BHCs in our sample, together with the time series of total asset securitization outstanding. As the chart suggests, the organizational expansion of BHCs tracks quite closely the rise in securitization activity observed from the mid-1990s up to the financial crisis.

Table 5 shows snapshots of family complexity taken in a given year, capturing the number of both bank and nonbank entities amassed through the acquisition channel by the top fifty BHC families (ranked by total assets) up to that year. BHCs in the early 1990s were relatively simple in organizational structure. Among the top ten in 1990, only BankAmerica Corporation, back then a holding company headquartered in San Francisco, California, had performed ten nonbank acquisitions, and Security Pacific Corporation had performed seven. Among the remaining top fifty, Bank One and Barnett had performed five nonbank acquisitions each. Five years later, the picture was already quite different. The number of acquisitions was much higher, both within and across industries. Some families from 1990 had disappeared from the subsequent list as surviving ones absorbed them (BankAmerica, for instance, acquired Security Pacific).

The BHC organizational profiles only increase in complexity as time goes by, with very large numbers of entities wrapped under common ownership and control. Moreover, the lists show that the process takes place across institutions, and it is not a phenomenon confined to just the largest entities.

Another way to capture the sector-wide transformation is to look at time-series metrics of BHC structures. Chart 10, for instance, displays the average number of commercial banks acquired and kept within a family in a given year. This number, not surprisingly, steadily increases, again reflecting the process of geographic deregulation and consequent consolidation.

The number of nonbank acquisitions in Chart 9 could still fail to show true expansion across industries. For instance, BHCs could have performed many acquisitions concentrated in just one nonbank industry. In order to capture the extent of broad horizontal expansion, we calculate a Herfindahl-Hirschman Index (HHI) of industrial concentration. This index is 1 if the BHC has only commercial banks and smaller than 1 if the BHC acquires nonbank subsidiaries. Furthermore, it progressively decreases as the acquisition profile among the ten industries becomes more "diverse." In the same chart, we report the average HHI of BHC families over time. The steady downward trend shows a push toward broad expansion in organizational boundaries.

Table 5

Top Fifty Families by Size and Time, 1990-2000

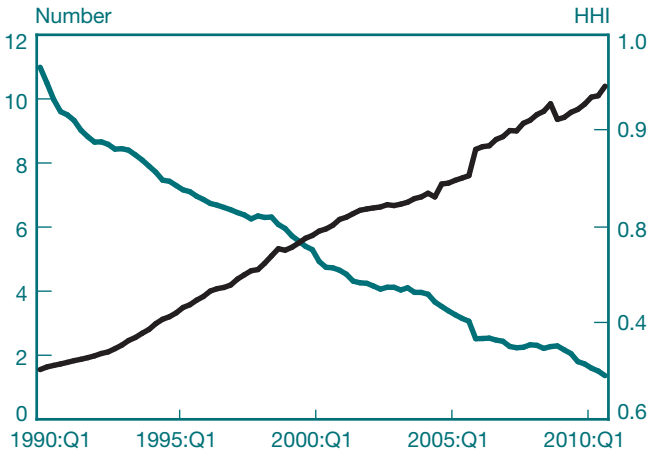
	1990			1995			2000		
Rank	Name	Banks	Nonbanks	Name	Banks	Nonbanks	Name	Banks	Nonbanks
1	Citi	6	1	Citi	5	2	Citigroup	1	37
2	BankAmerica	3	10	BankAmerica	16	28	JPMorgan Chase	17	25
3	Chase Manhattan	1	0	NationsBank	17	3	Bank of America	104	77
4	J. P. Morgan	1	0	J. P. Morgan	1	1	Wells Fargo	194	80
5	Security Pacific Corporation	10	7	Chemical Banking	18	7	Bank One	74	20
6	Chemical Banking	18	2	First Chicago NBD	1	0	First Union	73	77
7	NCNB	5	0	Bankers Trust New York	1	0	FleetBoston Financial	45	47
8	Bankers Trust New York	1	0	First Union	22	25	SunTrust Banks	11	23
9	Manufacturers Hanover	1	0	Banc One	60	13	U. S. Bancorp	77	53
10	C&S/Sovran	1	0	Fleet Financial Group	25	21	Key	26	20
11	First Interstate Bancorp	7	0	PNC Bancorp	14	10	Firstar	0	1
12	First Chicago	3	0	Norwest	65	18	Bank of New York Company	5	32
13	PNC Financial	4	0	Key	26	12	PNC Financial Services Group	14	16
14	Bank of New York Company	3	0	First Interstate Bancorp	23	4	State Street	1	8
15	Banc One	16	5	Bank of New York Company	5	1	BB&T	55	89
16	First Union	15	1	National City	12	6	Mellon Financial	20	19
17	SunTrust Banks	1	0	Bank of Boston	11	9	Fifth Third Bancorp	27	39
18	Bank of Boston	2	1	SunTrust Banks	6	2	SouthTrust	47	12
19	Fleet/Norstar Financial	4	1	Barnett Banks	7	9	Regions Financial Corporation	83	28
20	Barnett Banks	4	5	Mellon Bancorp	5	8	Comerica	25	9
21	Norwest	10	2	Comerica	24	10	Summit Bancorp	6	7
22	First Fidelity Bancorp	2	1	First Bank System	27	10	AmSouth Bancorp	33	17
23	Mellon Bancorp	2	0	Boatmen's Bancshares	29	7	MBNA	0	3
24	Continental Bank	3	0	CoreStates Financial	6	5	Charles Schwab	3	14
25	NBD Bancorp	1	0	State Street Boston	1	2	Northern Trust	6	6
26	Society	2	0	First of America Bank	7	11	Union Planters Corporation	78	33
27	National City	2	1	SouthTrust	28	6	Charter One Financial	4	15
28	Shawmut National	3	3	Southern National	6	31	M&T Bank	14	18
29	CoreStates Financial	2	0	Huntington Bancshares	20	8	Huntington Bancshares	33	11
30	Midlantic	4	0	Northern Trust	4	3	Popular	14	5
31	Bank of New England	1	0	Firstar	1	1	Old Kent Financial	14	12
32	Key	8	1	Crestar Financial Corporation	4	16	Zions Bancorp	35	9
33	First Bank System	8	3	AmSouth Bancorp	10	8	Compass Bancshares	45	4
34	Boatmen's Bancshares	2	1	Fifth Third Bancorp	9	7	First Tennessee National	10	15
35	First of America Bank	5	3	Mercantile Banc	16	9	Banknorth Group	25	16
36	Comerica	13	4	UJB Financial	3	4	Hibernia	44	12
37	UJB Financial	2	0	BanPonce	4	2	National Commerce	18	25
38	Manufacturers National	5	1	Meridian Bancorp	9	4	GreenPoint Financial	0	6
39	Meridian Bancorp	2	1	GreenPoint Financial	0	3	Provident Financial	4	12
40	Crestar Financial Corporation	2	2	Integra Financial	2	3	North Fork Bancorp	5	15
41	Huntington Bancshares	4	1	Regions Financial	11	8	Pacific Century Financial	8	2
42	Northern Trust	1	1	MBNA	0	1	Associated Banc-Corp	14	1
43	State Street Boston	1	0	Bancorp Hawaii	3	2	Colonial BancGroup	26	11
44	Signet Banking	1	0	First Security	14	4	People's Mutual Holdings	2	5
45	Ameritrust	1	1	First Tennessee National	12	10	Centura Banks	18	17
46	Michigan National	4	1	BayBanks	5	2	TCF Financial Corporation	2	8
47	Bancorp Hawaii	3	1	Old Kent Financial	4	3	Commerce Bancshares	28	5
48	Valley National	1	0	First Empire State	3	4	First Citizens Bancshares	6	15
49	Dominion Bancshares	1	0	Union Planters Corporation	33	7	FirstMerit	3	9
50	BayBanks	2	0	Signet Banking	3	2	BOK Financial Corporation	13	2

Table 5 (continued)
Top Fifty Families by Size and Time, 2005-10

	2005			2010		
Bank	Name	Banks	Nonbanks	Name	Banks	Nonbanks
1	Citigroup	6	59	Bank of America	117	166
2	Bank of America	114	113	JPMorgan Chase	81	97
3	JPMorgan Chase	75	65	Citigroup	5	108
4	Wachovia	138	117	Wells Fargo	305	244
5	Wells Fargo	211	119	Goldman Sachs	0	89
6	MetLife	1	9	Morgan Stanley	0	25
7	U.S. Bancorp	116	83	MetLife	1	22
8	SunTrust Banks	12	34	U. S. Bancorp	126	96
9	Countrywide Financial Corporation	1	4	PNC Financial Services Group	69	117
10	National City	31	54	Bank of New York Mellon	6	98
11	BB&T	105	161	Capital One Financial Corporation	54	41
12	Fifth Third Bancorp	47	53	SunTrust Banks	25	41
13	Bank of New York Company	5	59	State Street	2	26
14	State Street	1	15	BB&T	112	190
15	Key	28	27	American Express Company	0	12
16	PNC Financial Services Group	21	26	Regions Financial Corporation	191	163
17	Capital One Financial Corporation	45	22	Fifth Third Bancorp	55	69
18	Regions Financial Corporation	158	70	Key	30	31
19	MBNA	0	6	Northern Trust	6	11
20	North Fork Bancorp	8	17	M&T Bank	27	34
21	Comerica	23	10	Discover Financial	0	3
22	Northern Trust	6	9	Comerica	23	10
23	AmSouth Bancorp	30	75	Huntington Bancshares	51	34
24	Popular	15	9	CIT Group	0	21
25	Charles Schwab	3	19	Zions Bancorp	55	17
26	Zions Bancorp	50	17	Marshall & Ilsley	32	34
27	Mellon Financial	23	36	New York Community	5	12
28	Commerce Bancorp	4	14	Popular	18	10
29	First Horizon National	9	28	Synovus Financial Corporation	29	15
30	Huntington Bancshares	34	13	First Horizon National	9	29
31	Compass Bancshares	45	14	BOK Financial Corporation	20	2
32	Synovus Financial Corporation	27	14	Associated Banc-Corp	25	7
33	New York Community	2	7	First Niagara Financial	8	34
34	Associated Banc-Corp	24	7	First Citizens Bancshares	14	16
35	Colonial BancGroup	31	13	East West Bancorp	10	3
36	First Bancorp	7	6	TCF Financial Corporation	2	11
37	Webster Financial	24	30	Webster Financial	21	32
38	Doral Financial	1	1	Cullen/Frost Bankers	19	12
39	Mercantile Bancshares	16	10	SVB Financial Group	2	4
40	BOK Financial Corporation	18	2	Fulton Financial	26	13
41	W Holding Company	2	1	First Bancorp	9	8
42	Sky Financial Group	12	17	Valley National Bancorp	16	14
43	First Citizens	9	16	FirstMerit	4	11
44	South Financial Group	25	15	Wintrust Financial Corporation	10	10
45	Commerce Bancshares	28	6	Susquehanna Bancshares	16	27
46	TCF Financial Corporation	2	10	BankSouth	29	18
47	Valley NBC	9	12	Bank of Hawaii	8	2
48	Fulton Financial	22	11	PrivateBancorp	5	2
49	Investors Financial	1	3	UMB Financial Corporation	19	14
50	Cullen/Frost Bankers	15	8	Franklin Resources	0	13

Source: Authors' calculations, based on data from SNL Financial; Federal Reserve System, Form FR Y-9C, Schedule HC.

Chart 10
Concentration and Diversification



Source: Authors' calculations, based on data from SNL Financial.

Notes: The black line illustrates the average number of banks acquired and kept within a family in a given year. The green line represents the average Herfindahl-Hirschman Index (HHI) calculated across the ten types of bank families. For each family, HHI is defined as $\sum_{(i=1)}^{10}\left(\frac{n_i}{N}\right)^2$ where n_i represents the count of subsidiaries of type i and N represents the total count of subsidiaries.

6. Conclusion

Three key observations can summarize the evolution in the structure of financial firms. First, bank holding companies have become less bank-centric by expanding the types of their subsidiaries. Second, this phenomenon was very widespread, as financial firms other than bank holding companies also expanded their scope. Finally, bank holding companies expanded by adding more banks to their firms in the early- and mid-1990s. As we noted earlier, there are several hypotheses that might be consistent with those observations. First, it seems that the geographic deregulation of banking in the United States led to significant changes in the structure of banking markets (while not covered in our paper, this phenomenon has been studied extensively) and bank holding companies. This expansion and consolidation positioned bank holding companies to take advantage of later regulatory changes to increase their complexity. Second, and along these lines, GLB may have also allowed bank holding companies to expand into activities from which they were previously excluded, such as brokering and dealing.

While deregulation or firms' attempts to evade existing regulation may have allowed firms to evolve in the ways we describe, these rationales unlikely explain fully the evolution. The acquisitions we see in the data are among firms still in the regulated sector, and many of these firms organize themselves as bank holding companies, which the Federal Reserve supervises at the consolidated level.

Instead, some other changes in financial intermediation seem to be required to explain such widespread and profound shifts in the industry. Here again, there are several possible candidates. For instance, it may be that the more geographically expansive nature of business enterprises gave rise to an increased demand for cross-border banking, both within the United States and overseas. That could have provided an impetus for the early wave of bank acquisition we see in our sample. An alternative hypothesis is that specialized firms, whose contributions to finance are to add value along a chain of financial engineering that operates externally to any particular firm, are now more efficient than generalist firms, which build an integrated value chain internally.

This hypothesis could be supplemented to account for the acquisitions of specialist firms by increasingly large BHC conglomerates. For example, information and credit frictions may be more difficult to overcome for isolated specialist firms but more manageable with help from internal capital markets in larger firms. Our results are consistent with this move toward a model of finance more oriented toward securitization. The hypothesis itself may be dependent on the long-term and ongoing revolutions in information technology and communications that have allowed more quantification of financial information and have improved the ability to communicate and manage that information. In that sense, for banking firms to stay viable in a changing industry, complexity is a necessary adaptation.

The changes documented in this paper refine our understanding of bank complexity across a number of dimensions. First, they highlight the expanded scope and complexity of individual firms. Second, they suggest that the industrial organization of finance is changing profoundly: Market interactions among more numerous and more specialized firms have displaced the earlier organization of generalized firms, which engaged in most stages of finance by using internal resources. Third, bank holding companies have become increasingly less bank-centric, increasing the importance of consolidated supervision by the cooperative effort of a larger set of functional regulators. Given these findings, design of informed regulation of complex banking organizations presents a key challenge going forward.

The financial crisis of 2007-09 raises concerns about the very existence of supersized institutions. Why does society need incredibly large and complex banking institutions when they are a potential cause of systemic disruption? Possible "subsidies" from explicit or perceived government guarantees may distort incentives in failure resolution. Size and complexity

may also lead to complicated and ineffective monitoring, such as duplication of rules or regulation that is too strict (or too weak).

Our documentation of the evolving structure of banks offers potential insights for the evaluation of policy solutions to these bank complexity problems. For instance, blunt fixes such as reinstating GLB might artificially impose breakups, fragmenting the intermediation industry and trading large and complex holding companies for shadow entities outside the scope of oversight. If complex conglomerate structures are the result of an adaptation to technological and financial advances, then tractable policies such as enhanced capital requirements, effective resolution plans, and stress tests may reduce systemic risk while retaining intermediation synergies, such as reducing informational frictions across links in the intermediation chain.[17]

[17] For a discussion of this policy trade-off, see Federal Reserve Bank of New York President Bill Dudley's speech: "Global Financial Stability—The Road Ahead," February 26, 2014. Available at http://www.bis.org/review/r140226b.htm.

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