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Evolution and Heterogeneity among Larger Bank Holding Companies: 1994 to 2010

1. Introduction

Over the past two decades, there has been a transformation in the U.S. financial sector. Alongside the deregulation of this industry, financial intermediation has shifted from a bank-centered process to one where nonbanks play an increasing role. Given these changes, questions arise about how banks have adapted and to what degree their traditional roles in financial intermediation have changed (see Cetorelli, Mandel, and Mollineaux [2012]). In this article, I provide a general perspective on this broad question by documenting how banks have evolved in terms of income. I measure the amount by which banks have changed their income-generating strategies in response to the transformation of the U.S. financial sector. Further, I describe the heterogeneity in responses across banks to recent changes in the industry.

In this analysis, I focus on bank holding companies (BHCs) because, among banks, the BHC legal form of organization dominates over this period, especially for larger banks.[1] Comparing BHCs over the past two decades is difficult, however, because there has been rapid consolidation. This results in dramatic differences over time in the set of large BHCs (as measured by assets). To control for selection effects and better measure how BHCs have evolved over time, I create a sample related to the top fifty BHCs in 2006. (Section 2 describes how this sample is constructed.)

[1] Stiroh (2000) reports that by 1997, 83 percent of FDIC-insured assets were held by BHCs. He also details the organizational advantages of BHCs relative to independent banks.

For this sample of BHCs, I begin by using the standard measures of interest and noninterest income to infer the degree to which BHCs' income mix has changed. In 1994, near the beginning of the current transformation in the financial sector, these BHCs were fairly homogenous, earning the vast majority of their revenue from interest income. Over time, however, these BHCs pursued different income strategies, so that by 2006 there is a wide disparity in the relative importance of interest income. Some continue to earn the vast majority of their revenues from interest income, while for others interest income no longer accounts for most of their revenues. For this latter group, this shift in the mix of income suggests that these BHCs may have started earning income from new financial services, or at least changed the way they provide and charge for traditional banking services.

To better analyze BHCs' different income strategies, I turn to detailed income data available since 2001. With these data, I categorize income sources into three groups: traditional, securitization, and nontraditional. These categories are constructed so that income earned from new financial services would fall into either the securitization or nontraditional category. The securitization category captures income related to creating, servicing, or selling securitized assets, while the nontraditional category contains, roughly speaking, sources of income related to the capital markets.

Analyzing these three income categories, I find that there is a positive relationship between the relative importance of nontraditional income sources and asset size. Over the 2001-10 period, the largest BHCs earn a substantially larger share

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of their total income from the nontraditional category compared with their smaller peers. These results demonstrate that larger BHCs have been much more active in offering new financial services, and suggest that the transformation in the financial industry has influenced larger BHCs to a greater extent.

Building on the above result, I show that large BHCs also earn substantially larger shares of their interest and noninterest income from their noncommercial bank subsidiaries. Consequently, large BHCs seem to be organizing themselves differently from their smaller peers.[2] Consistent with this result, Avraham, Selvaggi, and Vickery (2012) report that the largest BHCs are substantially more complex organizations relative to their smaller peers.

Altogether, these results strongly suggest that overall changes in the financial sector have most heavily influenced the larger BHCs. From an income perspective, the smaller BHCs have not changed much over the past two decades. Their mix of income continues to rely heavily on traditional banking sources, and income is still mostly generated by the commercial bank subsidiary. The larger BHCs, in contrast, have undergone a significant change, resulting in a reliance on new sources of income and on income generated by the BHC's noncommercial bank subsidiaries.

2. Data

I use BHC data from Federal Reserve Y-9C regulatory filings covering the period 1994 to 2010.[3] The start date was chosen for two reasons. First, beginning the sample in the early 1990s allows me to observe a period of time when BHCs were still somewhat constrained by regulation and therefore fairly homogenous, providing a good reference point for any heterogeneity across BHCs that is later observed. Second, by 1994 the largest banks, the focus of this article, were organizing themselves as BHCs, as opposed to being stand-alone commercial banks (which are required to file different regulatory forms). From the Y-9C filings, I use mainly the income data as well as the information on organizational structure to track mergers over time.

Tracking mergers over time is crucial to the analysis in this study, because I intend to describe the evolution of the largest BHCs while controlling for selection effects. Because of the wave of mergers that occurred among BHCs over this period, the top fifty BHCs in 1994 look quite different from the top fifty in 2010 along many dimensions. Examples include the entry of several large, foreign-owned BHCs midway through the sample as well as Goldman Sachs and Morgan Stanley at the end of the sample.

To control for selection, I pick the top fifty BHCs in 2006 and construct a data set of bank holding companies that are linked to these specific BHCs through mergers. Consequently, in 2006 I have data on exactly fifty BHCs. In any previous year, more than fifty BHCs are in my sample because I include all the BHCs that merged into and became part of the top fifty in 2006. For example, if two BHCs merged in 2005 to become a top fifty BHC in 2006, then both BHCs would be in the sample in 2005. Similarly, in 2007 and later, there are fewer than fifty BHCs in the data because of continued mergers among these BHCs, in addition to exits.[4] I chose the top fifty BHCs in 2006 because this is the latest year before the recent financial crisis.

The table reports the total number of BHCs in the constructed data set for each year in the sample. The massive consolidation among BHCs is readily apparent—268 BHCs in 1994 had merged into 50 BHCs by 2006. This consolidation is almost completely responsible for the concentration in assets. In 1994, the 268 BHCs that are linked to the top 50 in 2006 control 58 percent of total assets held by BHCs that file Y-9C regulatory filings. In 2005, there are sixty-four BHCs linked to the top fifty, and they control 58 percent of total assets held by BHCs. Hence, while there has been growth in the value of assets held by BHCs over this period, this growth has been equally distributed between those in the sample and all those outside of it. In 2006, there is a large jump in the percentage of assets held in the BHC sample, but this is driven by a change in the rules that lowered the number of BHCs required to file Y-9C reports. Specifically, before March 2006 all BHCs with more than $150 million in assets were required to file Y-9C reports, while after March 2006 this asset threshold was raised to $500 million.

With this sample of BHCs, the analysis in this article focuses on income reported in the Y-9C regulatory filings. Typically, analysis of BHC income relies upon the structure inherent in the regulatory filings, and so focuses on measures such as interest income and noninterest income. While I discuss the evolution of these two aggregate income measures, I also highlight changes in income sources related to offerings of new financial services. The interest and noninterest income grouping does not allow for a clean measurement, because new financial services will show up in both categories. As such, I construct a different categorization of income sources,

[2] Clark et al. (2007) also highlight how the largest U.S. banks may be organizing themselves differently from other banks. They describe how retail banking has become an area of strategic focus for the largest U.S. banks, which are building large branch networks and investing in other retail banking infrastructure.

[3] For detailed information on the Y-9C filings, see http://www.federalreserve.gov/reportforms/ReportDetail.cfm?WhichFormId=FR_Y-9C.

[4] Some BHCs reclassified themselves and consequently were no longer considered BHCs. For example, Charles Schwab Corporation became a savings and loan holding company in 2007 and so exited the sample.

Statistics on the Constructed Bank Holding Company Data Set

	Summations over BHC Sample		Comparison of Sample to All BHCs	
Year	Total (Units)	Assets (Billions of Dollars)	Total (Percent)	Assets (Percent)
1994	268	2,673	20	58
1995	256	2,916	18	58
1996	238	3,139	17	59
1997	214	3,508	14	60
1998	170	4,406	11	62
1999	146	4,855	9	58
2000	127	5,405	7	57
2001	106	6,056	6	58
2002	91	6,413	4	57
2003	82	7,134	4	57
2004	69	8,546	3	56
2005	64	9,405	3	58
2006	50	10,646	5	86
2007	43	11,592	4	85
2008	40	11,780	4	85
2009	39	11,828	4	74
2010	38	11,818	4	73

Sources: Federal Reserve System, Form FR Y-9C regulatory filings; author's calculations.

Notes: The first pair of columns displays summations over the BHCs in the sample. The second pair of columns reports the ratio of the summations in the sample of BHCs over the comparable summations for all the BHCs that file FR Y-9C regulatory forms, as a percentage.

leveraging the increase in income source detail reported after 2000. For the 2001-10 period, I group income sources into three categories: traditional, securitization, and nontraditional. The main goal of this new categorization is to have income from new financial services fall into either the securitization or nontraditional category. By analyzing these two categories, then, I can estimate the relative importance of new financial services both overall and across BHCs.

The traditional category contains the classic sources of income that most banks have relied upon over time, such as interest and fee income on loans, service charges on deposit accounts, fees for providing payments services, and income from fiduciary activities. (See the appendix for a full mapping of income sources in the Y-9C filings to each of the income categories I construct.) These income sources capture services that BHCs have historically offered; hence, this category should not contain income derived from the newer financial services banks offered during the recent transformation of the banking sector.

The securitization category tries to capture income generated from banking activities related to the securitization of assets. In the past two decades, the creation, servicing, and sale of securitized assets have developed into an important part of banking.[5] Indeed, a well-known trend in banking is to substitute away from an originate-and-hold strategy for loans (particularly mortgages) to an originate-to-sell strategy. The first strategy involves holding loans on the balance sheet of BHCs. The second strategy uses financial market expertise to pool loans and create an asset-backed security that could be sold to investors. I include income from three sources in this category. The first two are fees earned from the securitization of loans and the servicing of financial assets held by others. The third source captures a BHC's net interest income from investing and holding mortgage-backed securities (MBS) on its balance sheet. I measure this third source of revenues as the interest and dividend income on MBS minus an approximation of the associated interest expense. The approximation is the fraction of interest and dividend income on MBS to total interest income, multiplied by total interest expense. Hence, I assume that interest expenses at a BHC are proportionately divided across all interest income activities.

I view the securitization and traditional categories as substitutes. Income related to securitization is focused on process—how a BHC manages its assets—as opposed to product. In both the originate-and-hold and originate-to-sell examples, the BHC is providing the same service—loans to customers. But under the first strategy, the BHC employs the "traditional" technology of holding and managing the loans on its balance sheet, while under the second it transforms the loans into a security. Under the first strategy, the resulting earned income will be classified as traditional, while under the second strategy the income will fall into the securitization category.

The nontraditional category captures income from, loosely speaking, capital market activities. I argue that most of the new financial services that BHCs began to offer in the past two decades were mainly related to capital market services. The five income sources in this category are net interest income from trading assets, trading revenues, venture capital revenues, investment banking, and insurance income. Net interest income is computed as interest income from trading assets minus an approximation of the interest expense associated with this activity. Once again, this approximation is the fraction of interest income from trading assets divided by total interest income, all multiplied by total interest expense.

[5] Cetorelli and Peristiani (2012) describe in detail the role of securitization within the banking industry.

3. Evolution and Heterogeneity among BHCs

This section analyzes how the largest BHCs, from an income perspective, have evolved over time. I begin by examining changes in BHCs using the typical measures employed in the literature—for example, interest and noninterest income. I then complement this analysis by using the three income categories described in Section 2. In particular, I emphasize that the largest BHCs have a mix of income sources significantly different from that of other BHCs. Finally, I present evidence that the largest BHCs are organized quite differently from other ones.

3.1 An Analysis of BHC Income Using Standard Measures

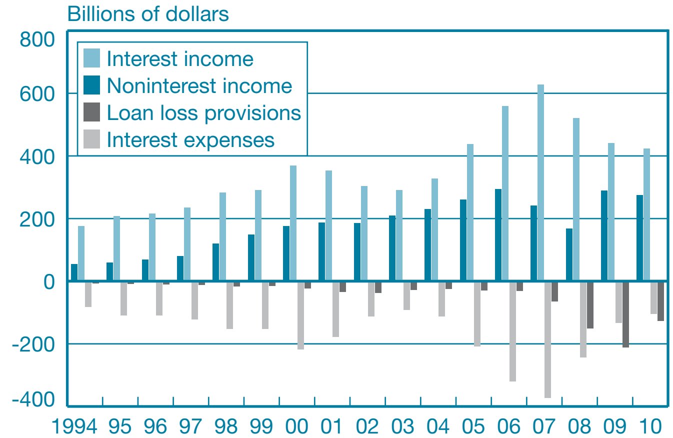
I start by focusing on a commonly used measure of BHC income: operating revenue and its components. Operating revenue is equal to interest income minus interest expense plus noninterest income minus loan loss provisions. The first two variables are also called net interest income and together they roughly capture the income BHCs earn on the spread between the interest rate they earn from lending versus the interest rate they pay from borrowing. Noninterest income covers a wide variety of revenue sources, but is typically considered revenues the bank earns from providing fee-based services. Since 1994, noninterest income generated by BHCs has steadily increased, except for a dip during the financial crisis (Chart 1).[6] In addition, noninterest income has grown as a share of operating revenue, reaching 59 percent in 2010. This change in the mix of income has been presented as a shift away from banking services based on interest income and toward a fee-based operating model of banking (see, for example, DeYoung and Rice [2004]).

There is, however, a lot of heterogeneity among the largest BHCs with respect to this greater reliance on noninterest income. Chart 2 plots the joint distribution of the log of assets and the ratio of noninterest income to operating revenue for BHCs in 1994 and 2006. There are two interesting patterns revealed. First, the rightward shift from circle to triangle markers illustrates the massive consolidation that occurred among BHCs between 1994 and 2006. This is visually reinforced by the contrast in the number of data points; there were 268 BHCs in 1994 that through mergers became 50 in

[6]Stiroh and Rumble (2006) analyze BHCs' shift toward noninterest income. They find that the gains from having a more diversified mix of income are more than offset by the costs associated with the volatility of noninterest income.

Chart 1

Evolution of the Components of Operating Revenue

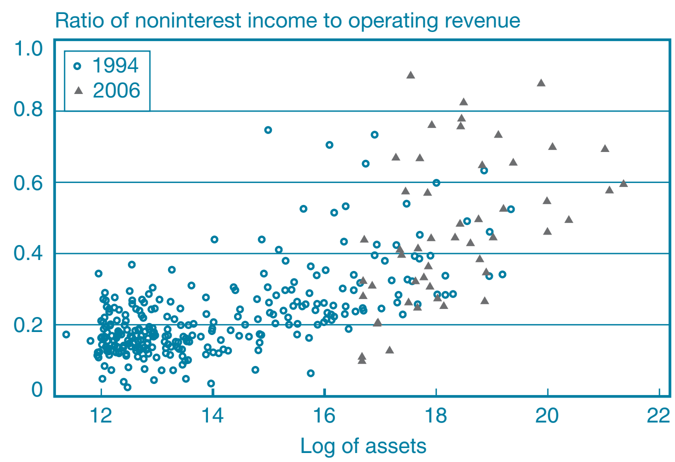


Sources: Federal Reserve System, Form FR Y-9C regulatory filings; author's calculations.

Notes: Operating revenue is equal to interest income minus interest expense plus noninterest income minus loan loss provisions. The sample is all bank holding companies linked to the top fifty BHCs in 2006.

Chart 2

Heterogeneity in the Importance of Noninterest Income across Bank Holding Companies



Sources: Federal Reserve System, Form FR Y-9C regulatory filings; author's calculations.

Note: There are 268 BHCs plotted in 1994 and 50 BHCs plotted in 2006.

2006. Second, in 2006 BHCs look more diverse. In 1994, for a strong majority of BHCs the ratio of noninterest income to operating revenue was less than 0.4. For the most part, then, BHCs in 1994 relied on interest income as the main source of operating revenue. In contrast, the BHCs in 2006 are much more evenly spread between the high and low ratios of noninterest income to operating revenue. The recent evolution in banking, then, has produced greater variety among BHCs, as institutions have pursued different strategies with respect to their reliance on noninterest income.

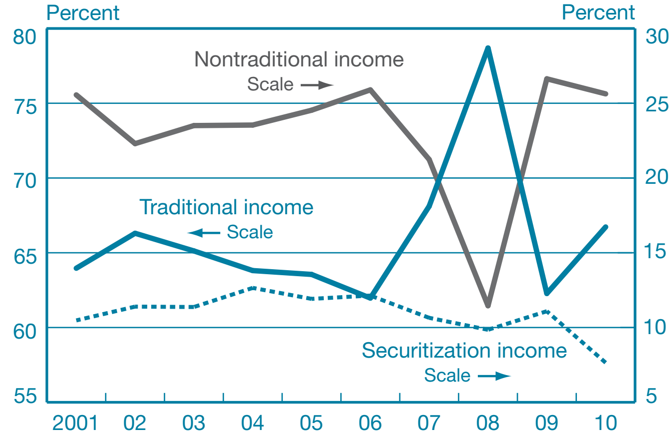
3.2 An Analysis of BHC Income Using New Measures

To better understand what is driving the heterogeneity in BHCs' sources of income, I turn to the detailed income numbers reported in regulatory filings from 2001 onward. I look for evidence that increased variety across BHCs is related to the larger changes occurring in the financial sector. An important trend in the sector has been the ability of banks to offer a number of new financial products to customers.[7] Using the detailed income data, I intend to measure if income earned from new financial services is a substantial amount and to what degree it impacts BHCs' mix of income sources. To this end, I use the disaggregated data to construct three categories of income: traditional, securitization, and nontraditional (as described in Section 2). These categories are constructed so that new financial services show up in the securitization or nontraditional category.

I first look at aggregate measures of traditional, securitization, and nontraditional income from 2001 to 2010 to see if overall trends inform us about the impact of new financial services on BHCs' mix of income. If new financial services are an important source of total BHC income, then we would expect to see upward trends in securitization's and nontraditional's shares of total income. Chart 3 presents these shares: the percentage contribution of each income category to total income over the sample period. Leading up to the crisis, the share of each income category to total income is roughly constant, with traditional income accounting for the majority of total BHC income. During the crisis, nontraditional income's share of total income fell dramatically, with a corresponding rise in traditional income's share. Post-crisis, however, nontraditional income has bounced back and contributes to total income at the same level observed in 2006. Securitization income started to fall with the advent of the crisis and has not yet recovered. Its share of total income dropped to about 7 percent of total income by 2010, its lowest level over the sample period. The financial crisis, then, appears to have had a lasting dampening effect on securitization income, in contrast to what we observed with nontraditional income.

[7]Before passage of the Gramm-Leach-Bliley Act of 1999, BHCs were restricted from owning both commercial and investment banks and were limited to providing services closely related to banking. Afterward, BHCs were able to own both commercial and investment banks and offer customers a wide variety of financial services.

Chart 3
Evolution of Traditional, Securitization, and Nontraditional Income



Sources: Federal Reserve System, Form FR Y-9C regulatory filings; author's calculations.

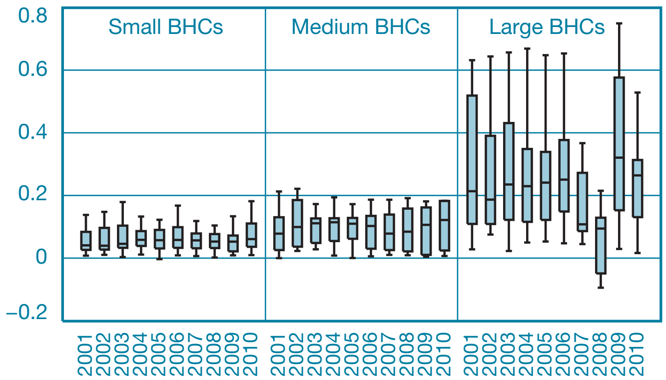
Unfortunately, these aggregate dynamics do not inform us about the impact of new financial services. The constant trends may indicate that the introduction of new financial services had little impact on BHCs' mix of income. However, BHCs may have already begun offering new financial services before 2001, in which case their income mix may have already adjusted. We may, however, be able to learn something by using the disaggregated data and analyzing the heterogeneity across BHCs over this period. Before the banking sector started its transformation and before the deregulation in the 1990s, BHCs were constrained to be fairly homogenous in their mix of income. For 2001 onward, then, we can interpret differences across BHCs in their reliance on securitization and nontraditional income as a function of differences in BHCs' willingness to introduce new financial services and to develop these new sources of income.

A main result from this approach is a positive relationship between size (as measured by assets) and reliance on nontraditional income sources. To illustrate this heterogeneity, I group BHCs into three categories based on asset size. I label "large" those BHCs that are linked to the top ten BHCs in 2006. "Medium" are those BHCs linked to the bank holding companies whose asset size ranks from eleven to twenty in 2006 and "small" are the remaining BHCs. As a point of reference, the median asset sizes in 2006 across these three groups of BHCs were \$505 billion, \$147 billion, and \$43 billion, respectively.

Charts 4-6 illustrate the income heterogeneity across BHCs. They present "box-and-whisker" plots of the ratios of nontraditional, traditional, and securitization income to total

Chart 4

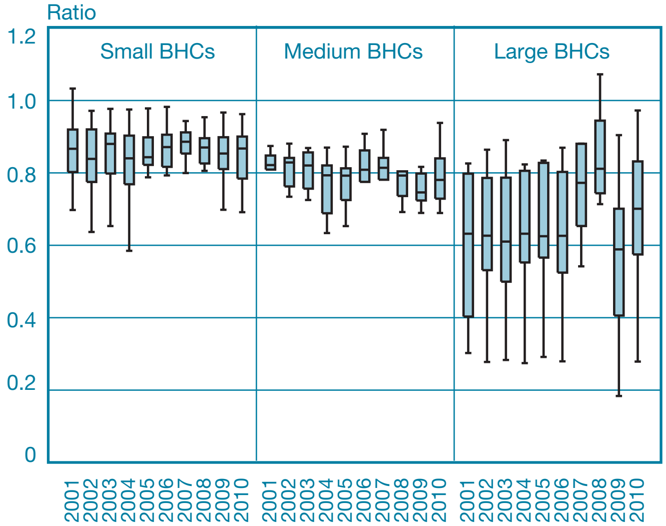
Ratio of Nontraditional to Total Income



Sources: Federal Reserve System, Form FR Y-9C regulatory filings; author's calculations.

Chart 5

Ratio of Traditional to Total Income

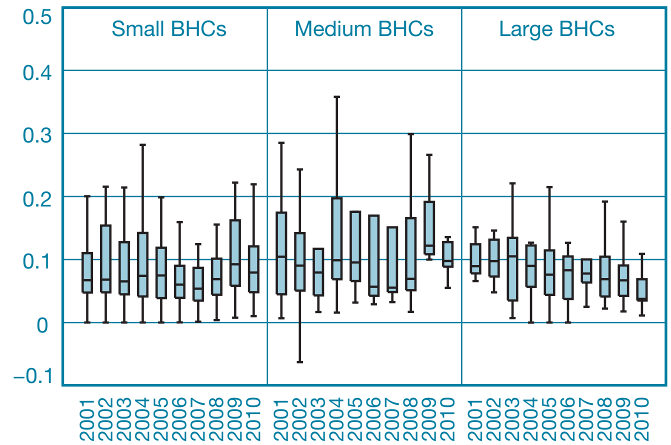


Sources: Federal Reserve System, Form FR Y-9C regulatory filings; author's calculations.

income for each group of BHCs from 2001 to 2010.[8] For large BHCs, nontraditional income accounts for a significantly larger portion of total revenues. From 2001 to 2010, the median

Chart 6

Ratio of Securitization to Total Income



Sources: Federal Reserve System, Form FR Y-9C regulatory filings; author's calculations.

ratio of nontraditional to total revenues was 0.05 and 0.11 for small and medium BHCs, respectively. In contrast, the median ratio was 0.21 for large BHCs. These stark differences across BHC groupings are mirrored in Chart 5, which plots the ratio of traditional to total income. Except for 2008, when the financial crisis was in full swing, the median ratio for large BHCs was significantly below those for small and medium BHCs. Surprisingly, all three types of BHCs rely on securitization to the same degree (Chart 6).

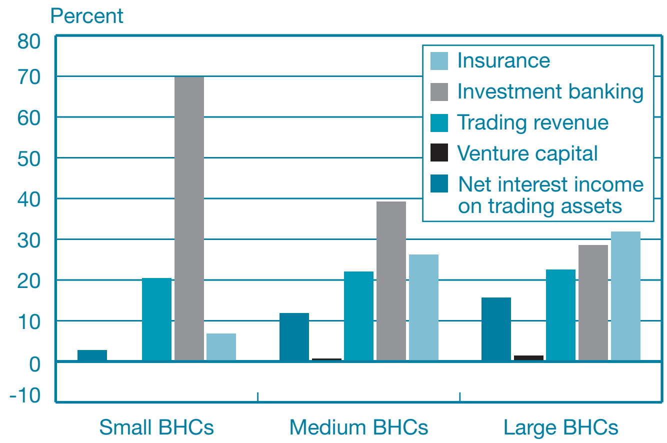
I argue that the significant heterogeneity between large BHCs and the remaining BHCs indicates that new financial services have had a substantial and uneven impact. The result suggests that the largest BHCs have most aggressively built up new sources of income. Small BHCs, in contrast, continue to rely mainly on the same sources of income available to them historically. Overall, then, this finding suggests that large BHCs have been impacted by the larger transformations within the financial sector to a much greater extent than their smaller counterparts.

Another interesting feature of Charts 4-6 is the greater diversity of income shares within large BHCs compared with shares within medium and small BHCs. As illustrated in Chart 4, the 75th percentile of large BHCs earn in the neighborhood of four-tenths of total income from nontraditional sources (of course, 2008 is a significant exception). In contrast, small and medium BHCs are more homogenous, as evidenced by the narrower range between the 25th and 75th percentiles (the length of the "box" portion of the "box-and-whiskers" plots). This result supports the idea that large BHCs are experimenting with and developing new financial services with varying degrees of success, while small

[8]The "box-and-whisker" format is a convenient way to characterize a distribution. The "box" portion comprises the 25th, 50th, and 75th percentiles. Consequently, the box contains half of the observations in a category, and the length of the box provides a measure of the dispersion (heterogeneity) among them. The "whiskers" plot upper and lower adjacent values, defined hereafter. Let x represent the variable of interest. Define x_i as the ith ordered value of x, so that (x_{25}, x_{75}) represent the 25th and 75th percentiles, respectively. Let $U = x_{75} + \frac{3}{2}(x_{75} - x_{25})$. The upper adjacent value is defined as x_i, such that $x_i <= U$ and $x_i+1 > U$. The lower adjacent value is defined similarly.

Chart 7

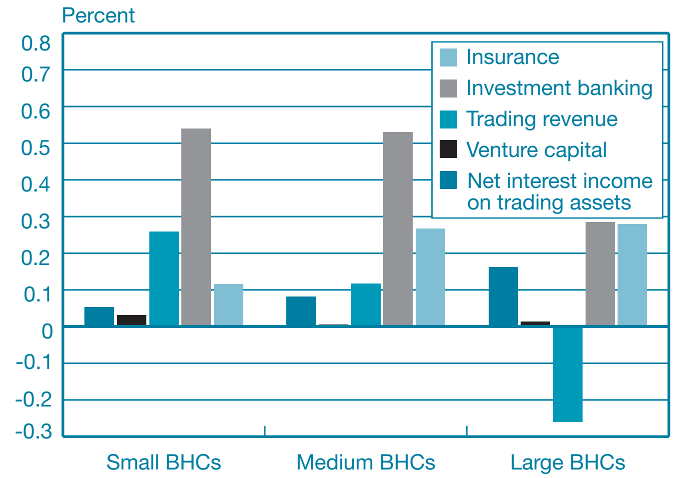
Components of Nontraditional Income, 2001-06



Sources: Federal Reserve System, Form FR Y-9C regulatory filings; author's calculations.

Chart 8

Components of Nontraditional Income, 2007-08



Sources: Federal Reserve System, Form FR Y-9C regulatory filings; author's calculations.

and medium BHCs continue to earn income from the same traditional services.

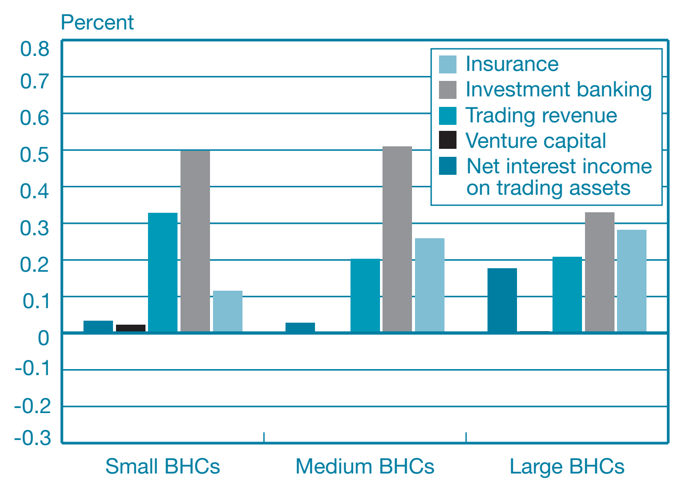
To better understand the differences in nontraditional income across BHC groupings, I turn to the disaggregated data. Recall that nontraditional income comes from five sources: net interest income from trading assets, venture capital revenues, investment banking, insurance income, and trading revenues. Because the recent financial crisis had a large impact on these income sources, I analyze the periods 2001-06, 2007-08, and 2009-10 separately.

From 2001 to 2006, there is a wide difference across the three BHC types in their reliance on specific income sources (Chart 7). As a group, small BHCs received over 60 percent of their nontraditional income from investment banking. In contrast, medium and large BHCs relied upon trading revenue, investment banking, and insurance income to a roughly equally extent. Further, net interest income from trading assets is substantially higher for medium and large BHCs relative to small ones.

From 2007 on, there is a shift such that small and medium BHCs now look similar. Both types of BHCs rely on investment banking to generate half of their nontraditional income (Charts 8 and 9). Large BHCs, meanwhile, look significantly different. Unlike the other two types, large BHCs incurred massive losses in trading revenue during the financial crisis. Furthermore, they rely equally on investment banking and insurance to generate more than half of their nontraditional income, and they rely on net interest income on trading assets to a larger extent.

Chart 9

Components of Nontraditional Income, 2009-10



Sources: Federal Reserve System, Form FR Y-9C regulatory filings; author's calculations.

In summary, by analyzing the disaggregated data, I find that large BHCs have developed significantly different income sources relative to medium and small ones. While their smaller peers continue to rely on traditional income sources that have been available to BHCs historically, large BHCs have offered new financial services and have so developed new sources of income. The changes occurring in the financial sector, then, seem to have impacted large BHCs the most.

3.3 The Importance of Noncommercial Bank Subsidiaries in BHCs

The above analysis has focused on income sources of BHCs, regardless of where in the BHC entity the income was earned. Historically, the commercial bank subsidiary of a bank holding company has been dominant, earning the vast majority of a BHC's income. But a well-known feature of the current evolution in banking is the rising importance of noncommercial bank entities (see Boyd and Gertler [1994]). BHCs have the organizational flexibility to incorporate noncommercial bank subsidiaries, and so in this section I measure the importance of these subsidiaries in terms of income.[9] The main result is that large BHCs rely on commercial bank subsidiaries for income to a much lesser extent than do smaller BHCs. This finding reinforces the previous result that long-run changes in the financial industry have had a significant, but differential, impact on BHCs.

To measure how much BHCs rely on their commercial bank subsidiaries for income, I compute the fraction of interest and noninterest income earned by the commercial bank subsidiaries within a BHC compared with the BHC's total interest and noninterest income.[10] Charts 10 and 11 plot the median value of each fraction in each year of the sample by type of BHC.

Despite the rising importance of noncommercial bank entities in the financial sector, small BHCs continue to almost exclusively rely on their commercial bank subsidiaries for interest income (Chart 10). The same is true for medium BHCs, except for 2005 and 2006. In contrast, large BHCs dramatically decreased the share of interest income earned from their commercial bank subsidiaries. From 2005 to 2009, noncommercial bank subsidiaries in large BHCs accounted for roughly one-quarter of total BHC interest income.

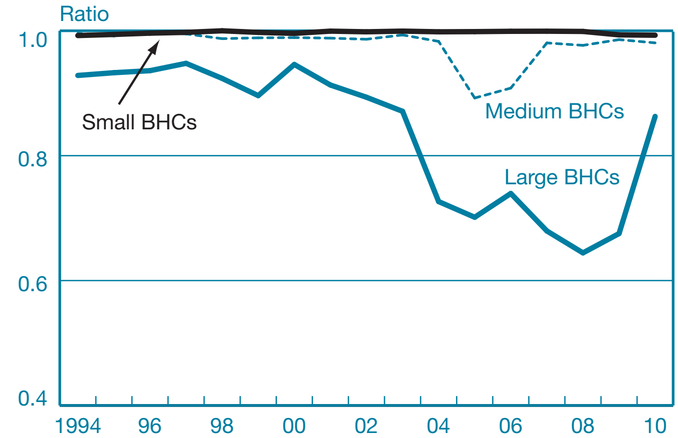
A similar story holds for noninterest income (Chart 11). In this case, small and medium BHCs have slightly decreased the role of commercial bank subsidiaries in generating income over time. But this is nowhere near the extent seen for large BHCs, where commercial bank subsidiaries have gone from producing almost all BHC noninterest income in the late 1990s to only about 60 percent in 2009 and 2010.

[9]Boyd and Graham (1986) also consider the significance of nonbank subsidiaries to BHCs. Rather than focus on income, they empirically examine whether nonbank subsidiaries increase a BHC's risk of failure. They find no evidence that increased involvement in nonbank business systemically changes a BHC's risk of failure.

[10]The income earned by commercial banks is reported in the Consolidated Reports of Condition and Income (the "Call Reports"). Further, these filings provide information that allows me to link the commercial bank to its BHC. For detailed information on the Call Reports, see http://www.fdic.gov/regulations/resources/call/.

Chart 10

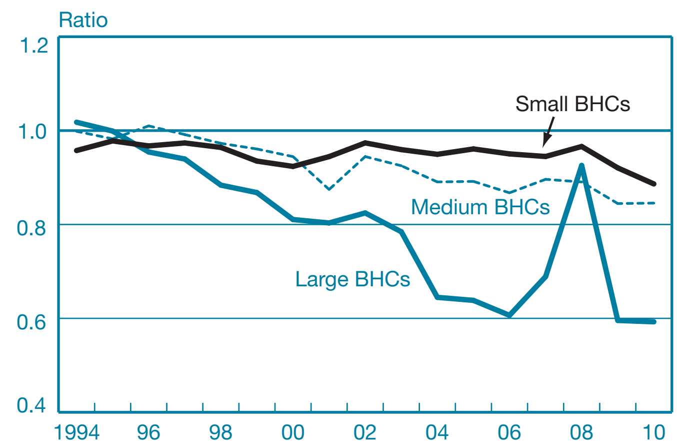
Ratio of Bank to Bank Holding Company Interest Income by BHC Type



Sources: Federal Reserve System, Form FR Y-9C and call report regulatory filings; author's calculations.

Chart 11

Ratio of Bank to Bank Holding Company Noninterest Income by BHC Type



Sources: Federal Reserve System, Form FR Y-9C and call report regulatory filings; author's calculations.

These findings demonstrate a variety of approaches across BHCs in their strategies to earn income. For large BHCs—and only for large BHCs—noncommercial bank subsidiaries play a substantial role in generating income. These results are consistent with those of Avraham, Selvaggi, and Vickery (2012), who report that the complexity of a BHC's structure increases with size. Furthermore, these results reinforce the earlier claims that the transformation of the financial sector has impacted large BHCs to a much larger extent than medium or small ones.

4. Conclusion

This article uses detailed income data from the Federal Reserve Y-9C regulatory filings to describe the evolution of BHCs' income mix from 1994 to 2010. I find that bank holding companies have become more diverse over time, as large BHCs have developed new sources of income by offering new financial services. Furthermore, large BHCs have developed income sources outside of their commercial bank subsidiaries to a much larger extent than their smaller counterparts. I argue that these results demonstrate that the transformation of the financial sector over the past two decades has had a substantial and uneven impact on BHCs. Specifically, it is the large BHCs that have been most affected, at least as measured by income.

Appendix: Income Sources

This appendix lists the income sources reported in the Federal Reserve Y-9C regulatory filings that are attributable to the three income categories used in the article. This mapping works only for those filings from 2001 and thereafter. Before 2001, reporting on income sources lacked sufficient detail to make this categorization possible.

For interest and dividend income on mortgage-backed securities (in the securitization category) and interest income from trading assets (in the nontraditional category), I compute an associated interest expense in order to arrive at a net interest measure. For interest income from trading assets, the interest expense term is equal to the fraction of interest income from trading assets to total interest income, multiplied by total interest expense. Similarly, for interest and dividend income on mortgage-backed securities, the interest expense term is equal to the fraction of interest and dividend income on mortgage-backed securities to total interest income, multiplied by total interest expense. These approximations are driven by the assumption that interest expenses at a bank holding company are divided proportionately across all interest income activities. The remaining portion of interest expense is assigned to the traditional category.

1. Traditional income sources:
   - (a) Interest and fee income on loans
   - (b) Income from lease financing receivables
   - (c) Interest income on balances due from depository institutions
   - (d) Interest and dividend income on securities (except for mortgage-backed securities)
   - (e) Interest income from federal funds sold and securities purchased under agreements to resell
   - (f) Other interest income
   - (g) Income from fiduciary activities
   - (h) Service charges on deposit accounts in domestic offices
   - (i) Net gains (losses) on sales of loans and leases
   - (j) Net gains (losses) on sales of other real estate owned
   - (k) Net gains (losses) on sales of other assets (excluding securities)
   - (l) Realized gains (losses) on held-to-maturity securities
   - (m) Realized gains (losses) on available-for-sale securities
   - (n) Interest expense (excluding the amounts assigned to securitization and nontraditional income categories)

2. Securitization income sources:
   - (a) Net servicing fees
   - (b) Net securitization income
   - (c) Interest and dividend income on mortgage-backed securities minus associated interest expense

3. Nontraditional income sources:
   - (a) Trading revenue
   - (b) Investment banking, advisory, brokerage, and underwriting fees and commissions
   - (c) Venture capital revenue
   - (d) Insurance commissions and fees
   - (e) Interest income from trading assets minus associated interest expense

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