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of Banking and Commerce
Part 2: Risk and Return Using
Efficient Portfolio Analysis

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The Final Frontier: The Integration of Banking and Commerce Part 2: Risk and Return Using Efficient Portfolio Analysis

Alan K. Reichert, Larry D. Wall, and Hsin-Yu Liang*

In the first part (in the previous issue of *Economic Review*) of this two-part study, the authors identified a number of possible benefits from combining banking and commerce, including portfolio diversification, the creation of internal capital markets, and economies of scale and scope. This second part of the study analyzes the one source of possible gains—portfolio diversification—that can be estimated with existing data.

Using methodologies from previous studies, the authors combine ten financial and nonfinancial industries into hypothetical portfolios using industry-level profitability data calculated from corporate tax returns filed with the Internal Revenue Service between 1994 and 2004. The analysis demonstrates that pairwise combinations of banks with construction firms or with retail firms would have produced substantially higher returns on equity with less risk during the sample period. Efficient portfolios combining banks with several other industries showed even higher levels of returns relative to risk, although banks were not necessarily a dominant part of some combinations.

These findings suggest that portfolio diversification could be an important benefit from combining banks with some types of nonbank firms. The authors stress that bank management contemplating diversification into the commercial sector must be selective about which specific industries they choose, while corporate management interested in moving into banking might need to settle for somewhat lower returns to achieve a substantial reduction in risk.

JEL classification: G21, G34, G28

Key words: banking and commerce, portfolio diversification

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The Final Frontier: The Integration of Banking and Commerce

Part 2: Risk and Return Using Efficient Portfolio Analysis

Alan K. Reichert, Larry D. Wall, and Hsin-Yu Liang

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The limits on the affiliation of commercial banks with domestic nonbank firms have varied through time (see Haubrich and Santos 2003). Most of the barriers separating commercial banks from nonbank financial services were lifted by the Gramm-Leach-Bliley Act of 1999 (GLB Act). However, at present a firm providing nonfinancial services generally cannot acquire control of a commercial bank, nor can a commercial bank acquire a firm providing nonfinancial services. The biggest loophole to this restriction is through an industrial loan company (ILC). ILCs are a federally insured intermediary that may be owned by a commercial firm. Efforts by some firms to exploit this loophole, especially Wal-Mart's application during 2005 to own an ILC, sparked renewed interest in the merits of the current policies separating banking from commerce.¹

In a companion article, Wall, Reichert, and Liang (2008), we examine the likely outcome of eliminating the barrier between banking and commerce. That analysis is based on the view that the extent of the mixing of banking and commerce would depend largely on the gains obtained by the owners of the respective firms. The possible sources of gains from such combinations include portfolio diversification, the creation of internal capital markets, economies of scale, economies of scope, the potential to use the bank's control over the allocation of credit to help commercial affiliates, and the potential for commercial affiliates to benefit from the safety net provided to insured depositories. Offsetting these potential gains is the potential for diseconomies (higher costs) associated with running larger and more complex firms. That article also reviews a variety of types of suggestive evidence to evaluate the likely outcome of such deregulation. The conclusion is that some mixing of banking and commerce is inevitable but that a variety of types of historical experience suggests that combinations of large banks with large commercial operations are unlikely.

Ideally one would like to follow up with estimates of the gains of the various costs and benefits of different combinations. However, in many cases these costs and benefits can be observed only after the combinations are permitted. For example, whether combining a larger retail merchandise firm with a commercial bank provides gains for customers cannot be answered with hypothetical combinations.

One source of potential gains that can be analyzed using historical data is the gains from portfolio diversification. In this part of our two-part study, we create hypothetical combinations of industries during our sample period, assume that all the combinations would have been managed in exactly the same way, and then evaluate their risk and return characteristics. We know from the mathematics of portfolio diversification that such combinations should produce higher expected returns at the same risk or equivalently the same returns at lower risk than could be obtained by investing in either of the firms individually.² The data can provide us with estimates

of the size of the diversification gains and evidence on which combinations are likely to produce the largest gains.

In analyzing the portfolio gains from diversification between bank and nonfinancial firms, we are applying the same methods that were previously applied by Wall, Reichert, and Mohanty (1993) and Reichert and Wall (2000) to the analysis of combining bank and nonbank financial firms.

Our results demonstrate that some combinations of banking and nonfinancial services would have resulted in a higher return on equity (ROE) with less risk during our 1994–2004 sample period. In pairwise combinations with one other industry, combinations of banks with construction firms or with retail firms would have produced substantially higher ROE with less risk. Efficient portfolios that include combinations of banks with several other industries showed even higher levels of returns relative to risk, albeit banks were not necessarily a dominant part of some combinations. Finally, we look at a small sample of subindustries and find that banking and general merchandise retailing would have been a beneficial combination during the 1994–2004 period.

This article begins with a summary of the findings from our earlier studies focusing on the potential costs and benefits of integrating banking and commerce. We then consider important methodological issues such as alternative approaches to measuring industry and portfolio performance, the proper level of data aggregation, and the use of market or accounting data. Subsequent sections describe the data used in the analysis and the empirical results based upon both broad industry performance measures and more narrowly defined subindustry categories, various pairwise industry combinations, and efficient multisector portfolios. The conclusion notes that significant portfolio benefits generally exist either in the form of enhanced returns or lower risk or both.

Background

Reichert and Wall (2000) examine the potential gains from bank diversification into a variety of financial activities. Specifically, that study analyzes industry-level combinations of bank holding companies (BHCs) with traditional banking-related activities (mutual savings banks, savings and loans, and personal and business credit institutions) and with a set of nontraditional activities (security and commodity brokers and dealers, insurance agents and brokers, life insurance underwriters, regulated investment companies, and real estate subdividers and developers) during three separate periods: (1) pre-deregulation, 1974–80; (2) deregulation, 1981–89; and (3) post-deregulation, 1990–97. The data are industry-level, tax accounting–based return on assets (ROA) and return on equity (ROE) obtained from the Internal Revenue Service (IRS).

Forming efficient portfolios using both ROA and ROE as measures of performance, Reichert and Wall conclude that during the earlier two periods, bank diversification into nontraditional financial services could have achieved both a dramatic increase in expected return and a significant reduction in risk. Expansion into life insurance underwriting and regulated investment companies would have been particularly beneficial. For example, during the 1974–80 period, a portfolio with 50 percent of its assets in a BHC and approximately 40 percent of its assets in life insurance underwriting and the remainder in selected other industries would have increased its expected ROA by a factor of four and reduced its risk by 60 percent. On the other hand, during the latter period (1990–97), the benefits to diversification would have been limited to an increase in expected earnings with little or no risk reduction (as measured by the volatility of ROA). For example, during the latter period the same increase in earnings could have been achieved with an investment of approximately 20 percent in security brokers and 10 percent in regulated investment companies. But in this case the level of

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1. In May 2007 Wal-Mart withdrew its application, citing the negative publicity surrounding its application and the slow regulatory decision-making process. More recently, the Federal Deposit Insurance Corporation (FDIC) allowed a commercial firm to continue owning an ILC, albeit under unusual circumstances. The FDIC order extended a waiver granted to a group of investors led by Cerberus Capital, a firm that manages private equity and hedge funds, to continue controlling GMAC Bank (an ILC based in Utah) for ten years subject to certain conditions. Cerberus purchased 51 percent of the bank from GMAC under a two-year waiver granted by the FDIC in 2006, according to Mildenberg (2008).
 2. These gains would be expected unless the returns to the two firms are perfectly positively correlated.

risk as measured by the coefficient of variation (the standard deviation of returns divided by the expected return) would have remained constant. The authors conclude that while some consistent trends are evident over the entire twenty-five year period, the precise mix of return-enhancing or risk-reducing diversification is likely to vary over time.

Wall, Reichert, and Liang (2008) also analyze a specific case study of the portfolio benefits of combining banking and commerce, that of Wal-Mart acquiring a bank. Over the 1994–2004 period, the major benefit of a substantial 30 percent investment in banking would have been a comparable 30 percent reduction in earnings variability, as measured by the standard deviation in Wal-Mart's return on equity (ROE). But this significant reduction in risk would have come at the expense of a 10 percent relative decline in average ROE for Wal-Mart over the same period.

Methodological issues

Policymakers would ideally like to know the actual performance results of the groups of bank and nonfinancial firms that would arise if existing restrictions on such groups were relaxed or eliminated. However, such results will not be available unless or until the restrictions are dropped. Attempts to simulate the effects must necessarily make some assumptions about the combinations and their likely future performance. As a convenience to readers, this section reviews the analysis of methodological issues provided by Wall, Reichert, and Mohanty (1993) and Reichert and Wall (2000).

The one area in which prior studies agreed in their methodology related to their assumptions about net synergies (the economies and diseconomies of scale and scope). Any assumptions about net synergies would necessarily be subjective given that full-service banks were not allowed to affiliate with certain types of financial services firms (and are currently not allowed to affiliate with commercial firms). Thus, prior portfolio diversification studies of bank and nonbank financial firms assumed that the net synergies are zero. As a consequence, the estimated gains from diversification may generally be taken as providing a lower bound on the gains from affiliation, assuming that banks and nonfinancial firms act rationally in avoiding mergers with negative net synergies. The remainder of this section looks at the methodological choices reflected in past studies that focus on combining bank and nonbank financial firms.

Measurement of portfolio performance. Most studies of the effect of portfolio diversification focus on one or two risk measures: the coefficient of variation of some return measure or the risk of failure calculated using accounting or market data. The coefficient of variation is a measure of the relative variability of returns and equals the standard deviation of returns divided by the expected return. Risk-of-failure models incorporate a firm's equity capital, its expected returns, and the standard deviation of returns to provide a measure of the likelihood that a firm will experience losses that exceed its capital. Risk of failure is a more direct measure of the primary regulatory concern: Would increased participation in nonbank activities make banks more or less likely to fail? However, implicit in the risk-of-failure measure is the assumption that the combined organization's capital structure would be the sum of its individual premerger capital structures, an assumption that may not be appropriate if regulators require higher postmerger capital levels. Further, calculation of the risk of failure requires data on premerger capital structures that may not be available from some data sources.

A further consideration in evaluating portfolio performance is the perspective of bank owners and managers. Most studies focus on risk issues because that is the regulators' concern. Bank owners and managers, however, actually undertake mergers on the basis of the effect of diversification on both the expected return and risk of the combined organization. Banks may engage in a risk-reducing merger if the reduction in their expected return is not too large, but they may also be willing to undertake higher risk if the increase in expected return is sufficiently large. Thus, a full analysis of the effect of diversification on risk and return should consider both the banks' and the regulators' perspectives.

Formation of portfolios. The various studies of bank mergers take three different approaches to forming the portfolios for analysis. Some studies limit their analysis to three or four statistics

based on industry averages, such as mean returns, standard deviations of returns, the coefficients of variation of returns, and the correlation of industry returns with banking returns. In certain studies ROE and ROA are both analyzed. Looking at industry statistics alone is not sufficient to determine the changes in risk that result from combining different industries into a single firm. For example, an industry might have a higher standard deviation of returns than banking, but the returns may be negatively correlated with banks' returns, reducing the standard deviation of the combined firm. Thus, it is not always clear whether the higher standard deviation of a particular firm from this

Policymakers would ideally like to know the actual performance results of the groups of bank and nonfinancial firms that would arise if existing restrictions on such groups were relaxed or eliminated.

industry, when combined with a banking firm, will increase the risk to the postmerger organization or whether its negative correlation with banking will lower risk.

An alternative to using overall industry statistics is to combine industries in pairs, that is, BHCs and one nonbank industry at a time. This approach provides for simultaneously considering the effects of expected returns, the standard deviation of returns, and the correlation between returns (as well as the capital positions of the two firms, when

appropriate). Perhaps most importantly, this approach has the advantage of corresponding with actual bank behavior. Because firms typically engage in one merger at a time, the concern to banks and their regulators at any given time is the desirability of a particular pairwise combination.

The third alternative in examining portfolios is to analyze efficient portfolios of banks and several nonbank industries. As discussed previously, the term "efficient portfolio" refers to one whose combinations produce the greatest return for any given level of return variability (or, equivalently, the least return variability for any given return). These portfolios may contain firms operating in only two industries (or in some cases a single industry). However, as Litan (1985) found, some efficient portfolios are likely to contain multiple industries. Examining portfolios of unique service products is advantageous because it is the approach that banks should take from a portfolio risk and return perspective. Thus, basing public policy solely on the risk effects of pairwise mergers may impose significant social costs if it results in policies that prevent the formation of efficient portfolios of banks and nonbank firms.

Aggregation of the data. The various studies take two approaches to the aggregation of firm data into industry statistics. Some studies combine individual firms into a single industry before conducting any analysis, and others calculate the mean and variability of returns for individual firms (and across pairs of firms) and then aggregate the figures across all firms in the industry (or across the pairs of industries). The major disadvantage of the first approach is that individual firms enter into mergers with specific firms, not with broad industries. On the other hand, industry aggregate figures may be a better proxy for the expected future distribution if individual firms' deviation from the industry is largely the result of nonpersistent, idiosyncratic shocks.

An efficient portfolio is formed by looking at an individual entity's "assets" to determine the combinations that produce an efficient set of portfolios. These assets may be defined as entire industries or as individual firms within industries. Obviously, the number of separate assets for inclusion in an efficient portfolio will increase dramatically if individual firm returns are used rather than industry returns. In general, an increase in the number of assets is likely to increase the chances of identifying lower-risk portfolios. Thus, Boyd, Graham, and Hewitt (1993) argue that random chance favors the possibility that a risk-reducing portfolio will be found using individual firm data even if there is no real opportunity for diversification to reduce risk.

Use of market versus accounting data. Banks' and nonbank firms' returns may be measured using accounting or financial market data. The drawback to using accounting data is that they are not perfectly correlated with economic returns. Firms often try to smooth accounting data through time, producing reported returns that are deliberately low in good years and high in bad years. If firms across different industries have unequal ability to smooth their accounting earnings, then accounting-based risk measures may not provide accurate interindustry comparisons of risk. Using

accounting data has some appeal, however. First, market data are typically available only for the largest firms in an industry and are thus clearly more limited than accounting data. In addition, regulators rely heavily on accounting figures in their evaluation of banks' financial condition.

Studies that rely on accounting data use two sources of information: (1) accounting data from individual firms' public financial statements, prepared according to generally accepted accounting principles (GAAP), and (2) accounting data published by the IRS for all firms in an industry, prepared according to IRS accounting rules. Each data set has its advantages. GAAP rules are intended to fairly present a firm's performance over time whereas IRS rules also reflect a number of public policy decisions. For example, to encourage banks to hold state and local government obligations, IRS rules allowed banks to understate their income by excluding the interest from holding these obligations. Another advantage of using GAAP data is that they are available at the individual firm level, and IRS data are available only for an entire industry. On the other hand, IRS data reflect a broad cross-section of firms in an industry, while public financial statements are available only for the largest firms.

As the above discussion suggests, there appears to be no single "correct" methodology. Each approach has advantages and disadvantages. Thus, the diversification gains from combining activities are best examined in the context of studies using various types of methodologies.

Data

This article uses the same data source used by Wall, Reichert, and Mohanty (1993) and Reichert and Wall (2000) and follows these two studies in focusing on ROA and ROE as measures of annual industry profitability. The data on industry-level earnings and equity are obtained from the IRS corporate income tax returns for the period 1994–2004. To gain a comprehensive picture of industry performance for a given year, we calculate aggregate industry profits for the year as net income (total net income for corporations reporting positive earnings for the year) minus a deficit (total losses incurred by corporations reporting losses for the year).

In 1998, Standard Industrial Classification (SIC) codes were restructured into the North American Industrial Classification System (NAICS).³ To provide consistent industry series between the two periods, we followed the SIC-to-NAICS transition table provided on the U.S. Census Bureau's Web site. We used the following SICs that have a close NAICS match and a reasonably consistent trend in total assets between the two time periods: SIC1, agriculture, forestry, fishing, and hunting; SIC2, mining; SIC3, construction; SIC4, manufacturing; SIC5, transportation (excluding public utilities); SIC6, wholesale trade; SIC7, retail trade; SIC8, finance, insurance, and real estate (excluding BHCs); and BHCs.⁴

The NAICS includes a broad new category titled professional services. Therefore, our study groups SIC9, services, and NAICS, professional services, together to create a category called non-financial services (NFINS) that are very similar but not identical.⁵

Empirical results

This section presents empirical results based upon both broad industry performance measures and more narrowly defined subindustry categories, pairwise industry combinations, and efficient portfolios with up to ten possible sectors represented.

3. One major difficulty is that not all firms follow the new classification standard, additional industry categories have been established, and certain subindustry categories have been moved to other broad industry categories. This restructuring requires that the post-1997 data categories be recombined to approximate the prior SIC categories, especially for service industries, where much of the recent economic growth has taken place.

4. The transition table may be found at www.census2010.gov/epcd/www/naicstab.htm.

5. NFINS from 1994–97 include advertising, nursing and personal care facilities, hospitals, legal services, educational services, architectural and engineering services, accounting, auditing, bookkeeping services, and communication services. NFINS from 1998–2002 include legal services; accounting, tax preparation, bookkeeping, and payroll services; architectural, engineering, and related services; advertising and related services; educational services; hospitals, nursing, and residential care facilities; and broadcasting and telecommunications.

Table 1
Total assets by industry (\$millions)

	1994	1995	1996	1997	1998	1999
Agriculture, forestry, fishing and hunting	79,893	86,299	94,140	91,984	96,300	102,896
Mining	239,728	268,690	299,106	324,295	344,843	358,375
Construction	249,094	265,813	284,595	314,551	415,680	463,073
Manufacturing	4,525,456	4,941,073	5,425,185	5,966,306	6,407,879	6,812,198
Transportation	327,509	351,906	380,195	440,175	460,300	495,262
Wholesale trade	901,102	959,562	1,055,079	928,403	950,645	1,029,714
Retail trade	891,406	957,374	958,658	1,017,099	1,130,947	1,240,644
Nonbank financial services	9,606,699	10,944,706	12,359,191	15,106,776	17,801,261	20,379,626
Bank holding companies	4,288,595	4,732,581	5,000,862	5,798,844	5,788,736	5,578,680
Nonfinancial services	802,112	834,477	962,093	1,018,837	1,311,428	1,697,701
	2000	2001	2002	2003	2004	
Agriculture, forestry, fishing and hunting	105,715	104,902	105,501	111,326	118,719	
Mining	410,748	448,910	449,430	421,276	478,699	
Construction	504,720	525,704	540,503	566,393	613,627	
Manufacturing	7,830,526	8,100,073	8,202,170	8,827,565	9,283,378	
Transportation	531,565	531,566	536,270	558,279	569,991	
Wholesale trade	1,142,234	1,138,791	1,190,676	1,186,288	1,596,267	
Retail trade	1,304,474	1,317,523	1,385,650	1,438,794	1,542,330	
Nonbank financial services	21,375,063	21,642,820	22,475,694	24,895,724	27,698,463	
Bank holding companies	7,538,275	8,990,222	9,361,061	9,748,695	12,059,408	
Nonfinancial services	2,209,769	2,283,206	2,047,387	1,797,537	1,778,181	

Source: IRS: SOL Tax Stats—Corporate Data by Sector or Industry: Returns of Active Corporation, General (selected years, 1994–2004)

Broad industry analysis. Table 1 indicates total assets for reporting firms in each industry from 1994 to 2004. Based on the 2004 data, the three largest industries in total assets are nonbank financial services (\$27.7 trillion), BHCs (\$12.1 trillion), and manufacturing (\$9.3 trillion). While the analysis was conducted on both industry ROE and ROA, this article focuses on profitability measured by ROE because it provides some control for the wide differences in financial leverage across industries and is thus the better measure for cross-industry comparisons.⁶ Thus, the primary empirical results presented in this article use ROE as the measure of industry performance.⁷

Table 2 indicates the mean, the standard deviation, and the coefficient of variation over the eleven-year period for ROE for each of the ten industry categories. The coefficient of variation (CV) is a measure of relative risk compared to the standard deviation (STD), which is a measure of absolute risk. When analyzing asset returns, we calculate the CV by dividing the STD of returns by the expected return; the CV is a particularly useful measure of risk when comparing assets with widely different expected returns.

In addition, each industry is ranked from high to low ROE for comparison purposes. For example, the construction industry had the highest average ROE for the data period and hence was ranked number one, while BHCs had the fifth-lowest ROE. A reverse ranking order was assigned for the two risk measures, STD and CV, since a lower level of risk is presumably more desirable.

Using the STD of ROE as our measure of industry risk, we find that the three least risky industries during the sample period were nonbank financial services, retail, and BHCs, while the three most risky

6. For example, an ROA of 2 percent would provide a 20 percent ROE if the firm had \$1 of equity for every \$10 of assets.

However, that same ROA would provide only a 4 percent ROE if the firm had \$1 of equity for every \$2 of assets.

7. See Wall, Reichert, and Liang (2007) for similar analysis using ROA as the profitability measure.

Table 2
Industry returns and correlation with bank holding companies

	ROE (%)		ROE (%)		ROE CV		Correlation	
	Mean	Rank	STD	Rank	%	Rank	with BHCs	Rank
Agriculture, forestry, fishing and hunting	4.161	8	2.738	6	65.8	8	0.527	5
Mining	3.885	9	2.495	5	64.2	7	0.126	3
Construction	20.363	1	3.247	7	15.9	3	-0.555	1
Manufacturing	10.228	4	3.912	8	38.2	6	0.78	8
Transportation	5.022	7	5.682	10	113.1	10	0.673	6
Wholesale trade	12.041	3	1.745	4	14.5	2	0.482	4
Retail trade	13.223	2	1.653	2	12.5	1	-0.165	2
Nonbank financial services	3.773	10	0.789	1	20.9	5	0.733	7
Bank holding companies	8.138	5	1.605	3	19.7	4	1	10
Nonfinancial services	5.175	6	5.623	9	108.7	9	0.865	9

Source: IRS: SOL Tax Stats—Corporate Data by Sector or Industry: Returns of Active Corporation, General (selected years, 1994–2004); authors' calculations

industries were transportation, nonfinancial services, and manufacturing. However, since average returns vary widely, the CV may be the most representative measure for risk. Ranked by CV as a relative measure of stand-alone risk, the three least risky industries were retail trade, wholesale trade, and construction, while the three most risky were transportation, nonfinancial services, and agriculture/forestry/fishing/hunting.

When evaluating the possibility of combining BHCs with alternative commercial and industrial sectors, one must consider the correlations between returns in addition to stand-alone risk. The last two columns in Table 2 indicate the correlation of each industry's ROE with the corresponding return for BHCs. Industries with larger negative correlations with BHC returns are ranked higher because these industries would reduce aggregate portfolio risk more when combined with BHCs. The construction industry has the largest negative correlation with BHCs for ROE (-0.555) while retail (-0.165) has the second-largest negative correlation. On the other hand, the correlations between BHCs and nonfinancial services and manufacturing is positive and quite large (0.865 and 0.780, respectively), suggesting limited potential diversification benefits.

Pairwise industry combinations. The following discussion examines how a BHC might logically begin to diversify into the commercial sector or how a commercial firm might begin to diversify into the banking sector. Table 3 shows the results of combining BHCs in varying portions with each of the industries discussed above. The table indicates the mean, STD, and CV associated with various combinations of BHCs and each of the alternative industries using ROE as the measure of industry performance.

Assume that a representative BHC desires to increase its ROE by approximately 50 percent (that is, from the industry average over the sample period of 8.1 percent to around 12 percent) and measures risk using the STD. The BHC could achieve this goal by one of the following alternative strategies: (1) investing slightly more than 25 percent of its assets in the construction industry with a substantial reduction in risk or (2) investing 75 percent in retail, again with a significant reduction in risk. Note that the desired increase in ROE of 50 percent could not be obtained by any degree of BHC investment in the remaining sectors. On the other hand, if the goal is a dramatic reduction in relative risk as measured by the CV, a 25 percent investment in either the construction or retail sectors would reduce risk by approximately 54 percent and 35 percent, respectively.

Efficient frontier analysis. Table 4 provides the results of an efficient frontier analysis of the ten broad industry categories. The analysis employs the mean-variance Markowitz model (1952), which considers both the expected and standard deviation of industry returns and the pairwise correlations among returns. The efficient frontier indicates the combination of industry sectors that

Table 3
Pairwise combinations of BHCs with other industries

	Percent in commercial sector						
	0	10	25	50	75	90	100
Agriculture, forestry, fishing, and hunting							
Mean ROE (%)	8.14	7.74	7.14	6.15	5.16	4.56	4.16
STD ROE (%)	1.61	1.61	1.67	1.92	2.29	2.55	2.74
CV (%)	19.73	20.75	23.37	31.19	44.45	56.01	65.83
Mining							
Mean ROE (%)	8.14	7.71	7.07	6.01	4.95	4.31	3.89
STD ROE (%)	1.61	1.50	1.42	1.57	1.96	2.27	2.49
CV (%)	19.73	19.41	20.13	26.05	39.66	52.69	64.21
Construction							
Mean ROE (%)	8.14	9.36	11.19	14.25	17.31	19.14	20.36
STD ROE (%)	1.61	1.29	1.01	1.35	2.24	2.84	3.25
CV (%)	19.73	13.82	9.04	9.50	12.92	14.81	15.94
Manufacturing							
Mean ROE (%)	8.14	8.35	8.66	9.18	9.70	10.02	10.23
STD ROE (%)	1.61	1.77	2.06	2.63	3.26	3.65	3.91
CV (%)	19.73	21.18	23.79	28.65	33.56	36.41	38.25
Transportation							
Mean ROE (%)	8.14	7.83	7.36	6.58	5.80	5.33	5.02
STD ROE (%)	1.61	1.88	2.40	3.43	4.54	5.22	5.68
CV (%)	19.73	23.96	32.64	52.17	78.29	97.93	113.15
Wholesale trade							
Mean ROE (%)	8.14	8.53	9.11	10.09	11.07	11.65	12.04
STD ROE (%)	1.61	1.54	1.47	1.44	1.54	1.65	1.75
CV (%)	19.73	18.02	16.08	14.30	13.95	14.20	14.50
Retail trade							
Mean ROE (%)	8.14	8.65	9.41	10.68	11.95	12.71	13.22
STD ROE (%)	1.61	1.43	1.21	1.05	1.24	1.47	1.65
CV (%)	19.73	16.51	12.83	9.86	10.37	11.56	12.50
Nonbank financial services							
Mean ROE (%)	8.14	7.70	7.05	5.95	4.86	4.21	3.77
STD ROE (%)	1.61	1.50	1.36	1.12	0.93	0.84	0.79
CV (%)	19.73	19.53	19.24	18.89	19.08	19.86	20.94
Nonfinancial services							
Mean ROE (%)	8.14	7.84	7.40	6.66	5.92	5.47	5.18
STD ROE (%)	1.61	1.95	2.52	3.53	4.57	5.20	5.62
CV (%)	19.73	24.90	34.09	53.02	77.23	95.04	108.64

Source: IRS: SOL Tax Stats—Corporate Data by Sector or Industry: Returns of Active Corporation, General (selected years, 1994–2004); authors' calculations

either maximizes the expected return on the portfolio for a given level of risk (that is, portfolio standard deviation) or, alternatively, minimizes the level of risk for a given expected return. As one moves along the efficient frontier, the proportion of each asset (industry) in the portfolio generally changes.

The figure on page 10 illustrates the efficient frontier using ROE as the measure of industry return, providing the average risk/return configuration over the sample period for BHCs alone (with no diversification) and for the minimum risk portfolio. As the figure shows, BHCs by themselves

Table 4
Efficient risk and return portfolios

ROE analysis	Portfolios						
	A	B	C	D	E	F	G
Mean ROE (%)	7.0	9.0	11.0	13.0	15.0	17.0	19.0
STD ROE (%)	0.56	0.63	0.77	0.97	1.29	1.88	2.66
CV (%)	8.1	6.9	7.0	7.4	8.6	11.0	14.0
Industry	Portfolio allocation (%)						
Agriculture, forestry, fishing and hunting	4.16	2.84	1.66	0.21	0	0	0
Mining	5.01	3.26	1.70	0	0	0	0
Construction	2.96	7.58	11.71	16.07	30.28	54.33	81.12
Manufacturing	2.04	2.83	3.53	4.21	1.82	0	0
Transportation	0.97	0.76	0.57	0.32	0	0	0
Wholesale trade	10.25	16.36	21.82	27.32	26.25	8.13	0
Retail trade	11.41	19.79	27.26	34.91	41.67	37.53	18.88
Nonbank financial services	50.11	31.94	15.75	0	0	0	0
Bank holding companies	12.11	13.85	15.40	16.59	0	0	0
Nonfinancial services	0.99	0.79	0.61	0.38	0	0	0

Source: IRS: SOL Tax Stats—Corporate Data by Sector or Industry: Returns of Active Corporation, General (selected years, 1994–2004); authors' calculations

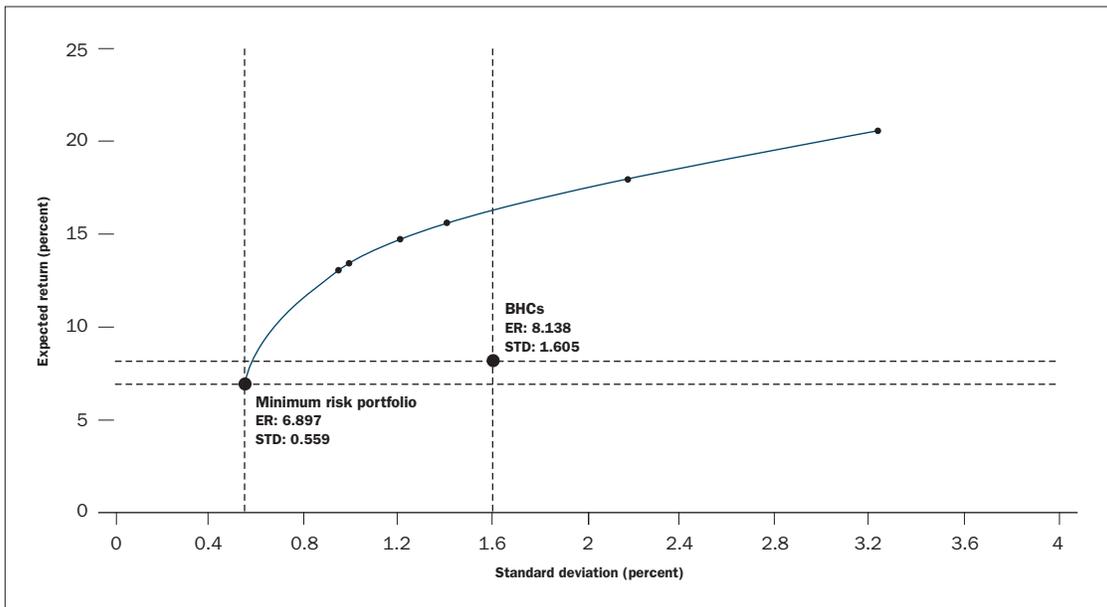
fall substantially below the efficient frontier, suggesting that substantial benefits from diversification are possible.

Table 4 presents the results of seven alternative portfolios, labeled A through G, that were created by increasing the expected ROE from 7 percent to 19 percent in 2 percent increments (row one). The STD and CV associated with each expected return are provided in rows two and three, respectively. Thus, the first two rows define the mean-variance efficient frontier. The next section of the table provides the efficient industry allocations associated with each of the seven portfolios along the efficient frontier. The CV is provided as an alternative measure of relative risk. As indicated in Table 2, the mean ROE and standard deviation for BHCs alone (with no diversification) are approximately 8.14 percent and 1.61 percent, respectively. For example, the industry allocations under column C indicate the proportion of each industry that should be included in an efficient portfolio to achieve an expected ROE of 11 percent, a 35 percent improvement over the actual average ROE over the sample period. Thus, either a portfolio of industries or a holding company with 15.4 percent of its total assets invested in BHCs, 15.8 percent in nonbank financial services, 27.3 percent in retail, 21.8 percent in wholesale, and 11.7 percent in construction, plus a small percentage in the other five remaining industries, would generate an expected ROE of 11.0 percent, a portfolio standard deviation of 0.77 percent, and a coefficient of variation (CV) of 7.0 percent.

As the portfolio return increases, its STD of returns also increases, while the CV declines at first and then increases. The share of the portfolio devoted to BHCs increases from 12.1 percent for portfolio A to 16.6 percent for portfolio D and then drops to zero for the last three portfolios. The share devoted to nonbank financial services decreases from 50.1 percent for portfolio A to 15.7 percent in portfolio C and then drops to zero for the remaining portfolios. The drop in assets devoted to BHCs and financial services is offset by increases in the share of the portfolio devoted to construction and retail.⁸ The only other industry that had a significant share was wholesale trade, which achieved a maximum allocation of 27.3 percent in portfolio D.

8. These are also the two industries that did the best in the pairwise combinations with banks. While this result is not entirely surprising, it is also not inevitable.

Figure
The Efficient Frontier



Thus, nonbank financial services and BHCs combined are a large fraction (62.2 percent) of the lowest-risk portfolio (portfolio A), but the proportion of both falls to zero for higher-risk, higher-return portfolios. The rapid decline in the percentage of nonbank financial services is particularly dramatic. Construction, wholesale, and retail all show generally increasing shares as risk and return increase. The biggest difference is that the portion going to construction increases uniformly, with its share ending at slightly over 81 percent in the highest-return portfolio, while the portions going to wholesale and retail decline for these high-return portfolios. The remaining industries play only a small role (generally 1 percent to 5 percent) in the lower-risk portfolios and no role at all in the higher-return portfolios.

Subindustry analysis. The previous industry sectors are quite broad and merely suggest sectors that might make good candidates for diversification. The NAICS subindustry categories may provide more information on the types of mergers that are likely to occur. However, we did not use the entire set of NAICs for two reasons: (1) Matching the more recent NAICS subindustry classifications with the older SIC classifications in effect during the early part of our sample period is problematic; (2) an increase in the number of subindustries also increases the probability that some pairings will show large gains by random chance. Thus, this section focuses on a few, more narrowly defined commercial sectors for which we could obtain a consistent time series.

Our first two sectors were selected based on an overview of historical experience with loopholes in the barriers to banking and commerce discussed in Wall, Reichert, and Liang (2008). The first sector, real estate operators and lessors, was selected in part because real estate-related activities were popular when affiliation was permitted via one-bank holding companies (OBHCs). The second sector, motor vehicle manufacturing, was selected because of that industry’s interest in ILCs, demonstrated by BMW’s and Volkswagen’s ownership of ILCs. A third sector, general merchandise retailing, was selected because of the controversy generated by Wal-Mart’s efforts to acquire an ILC and because another larger retailer, Target, recently acquired an ILC. The fourth sector, hotels and lodging, was selected because of Bank of America’s approval to own a hotel managed by Ritz-Carlton Hotel and PNC’s involvement with a hotel.⁹ Finally, given the General Electric Company’s

9. Rothacker (2006) discusses the approval. Links to the Office of the Comptroller of the Currency’s interpretative letters 1044 and 1045 of December 5, 2005, granting approval may be found at www.occ.gov/interp/dec05/intdec05.htm.

Table 5
Total assets by industry subcategory (\$million)

	1994	1995	1996	1997	1998	1999
Bank holding companies	4,288,595	4,732,581	5,000,862	5,798,844	5,788,736	5,578,680
Motor vehicle manufacturing	453,847	497,809	673,796	764,242	937,152	919,228
Machinery manufacturing	161,655	176,263	188,686	226,350	312,462	348,020
Real estate operators/lessors	155,321	160,099	167,609	184,907	205,761	222,770
General merchandise retail sales	270,011	284,677	223,944	233,522	259,372	278,868
Hotels/lodging	78,207	90,949	107,542	126,057	131,041	172,823
	2000	2001	2002	2003	2004	
Bank holding companies	7,538,275	8,990,222	9,361,061	9,748,695	12,059,408	
Motor vehicle manufacturing	1,092,865	1,160,184	1,218,943	1,323,069	1,345,186	
Machinery manufacturing	380,363	430,937	429,094	446,611	461,581	
Real estate operators/lessors	243,660	247,920	249,557	262,656	281,391	
General merchandise retail sales	272,453	288,536	307,922	288,624	270,042	
Hotels/lodging	186,618	199,650	188,908	190,231	204,099	

Source: IRS: SOL Tax Stats—Corporate Data by Sector or Industry: Returns of Active Corporation, General (selected years, 1994–2004)

longstanding investment in nonbank financial services and its wide range of commercial and industrial equipment products, the last subsector we include in the pairwise combination with banking is the machinery manufacturing sector.

Table 5 indicates the total level of assets for BHCs and the following five commercial industries: (1) motor vehicle manufacturing, (2) machinery manufacturing, (3) real estate operators and lessors, (4) general merchandise retail sales, and (5) hotels and lodging facilities. BHCs clearly dominate the group, with motor vehicle manufacturing being the next-largest group, and hotels and lodging representing the smallest subcategory.

Table 6 presents the descriptive statistics for each subcategory over the 1994–2004 sample period. The subcategories with the largest ROE are general merchandise retail sales and machinery manufacturing, while machinery and motor vehicle manufacturing have the two largest STDs. In terms of the CV, the two industries with the lowest degree of relative risk are BHCs and general merchandise retail sales. In terms of correlation with BHCs, real estate operators and lessors and general merchandise retail stores reported the largest negative correlation coefficients (–0.76 and –0.61, respectively).

Table 7 shows the results of a pairwise analysis of these five subcategories with BHCs. As before, we assume that BHCs desire to increase their ROE by approximately 50 percent (from 8.1 percent to 12.0 percent). They can achieve this goal by investing approximately 50 percent of their assets in the general merchandise retail sector with no change in the STD of portfolio returns. Alternatively, both the absolute and relative measures of risk could be reduced by approximately 40–50 percent with only a 25 percent investment in the general merchandise retail sector. (In this case, expected ROE increases by only 20 percent.) Thus, on a pairwise basis among the subindustries selected for analysis, only the general merchandise retail sector appears to offer BHCs an opportunity to increase expected return (ROE) while reducing risk (STD or CV).

To substantiate and refine the efficient portfolio results presented in Table 4, we conducted a similar portfolio analysis on the five commercial subsectors discussed above. For brevity the results are not presented in table form but are briefly summarized as follows: Using ROE as the measure of performance, a 50 percent increase in expected ROE would have been accomplished with a portfolio structured to include 38 percent BHCs, 51 percent general merchandise retail sales, and 11 percent machinery manufacturing.

Table 6
Industry subcategory returns and correlation with bank holding companies

	ROE (%)		ROE (%)		ROE CV		Correlation	
	Mean	Rank	STD	Rank	%	Rank	with BHCs	Rank
Machinery manufacturing	11.48	2	7.48	6	65.13	5	0.688	5
Motor vehicle manufacturing	6.25	4	5.65	5	90.38	6	0.561	4
General merchandise retail sales	15.01	1	3.95	4	26.31	2	-0.607	2
Real estate operators/lessors	4.79	5	2.67	3	55.66	3	-0.758	1
Hotels/lodging	4.52	6	2.61	2	57.81	4	0.523	3
Bank holding companies	8.14	3	1.61	1	19.72	1	1	6

Source: IRS: SOL Tax Stats—Corporate Data by Sector or Industry: Returns of Active Corporation, General (selected years, 1994–2004); authors' calculations

Table 7
Pairwise combination of BHCs with other industry subcategories

	Percent in commercial sector						
	0	10	25	50	75	90	100
Machinery manufacturing							
Mean ROE (%)	8.14	8.47	8.97	9.81	10.65	11.15	11.49
STD ROE (%)	1.61	2.03	2.84	4.33	5.90	6.85	7.48
CV (%)	19.73	24.01	31.62	44.16	55.35	61.38	65.13
Motor vehicle manufacturing							
Mean ROE (%)	8.14	7.95	7.66	7.19	6.72	6.44	6.25
STD ROE (%)	1.61	1.82	2.31	3.34	4.47	5.17	5.65
CV (%)	19.73	22.94	30.19	46.46	66.58	80.40	90.41
General merchandise retail sales							
Mean ROE (%)	8.14	8.82	9.85	11.57	13.29	14.32	15.01
STD ROE (%)	1.61	1.25	0.99	1.62	2.74	3.46	3.95
CV (%)	19.73	14.11	10.05	13.97	20.58	24.14	26.30
Real estate operators/lessors							
Mean ROE (%)	8.14	7.80	7.30	6.46	5.62	5.12	4.79
STD ROE (%)	1.61	1.25	0.82	0.89	1.71	2.28	2.66
CV (%)	19.73	16.08	11.27	13.81	30.47	44.49	55.66
Hotels/lodging							
Mean ROE (%)	8.14	7.78	7.23	6.33	5.42	4.88	4.52
STD ROE (%)	1.61	1.60	1.64	1.86	2.19	2.44	2.61
CV (%)	19.73	20.54	22.71	29.33	40.46	49.93	57.77

Source: IRS: SOL Tax Stats—Corporate Data by Sector or Industry: Returns of Active Corporation, General (selected years, 1994–2004); authors' calculations

Conclusions

This study analyzes the potential diversification benefits of allowing affiliation between BHCs and nonfinancial firms. More specifically, the article examines the potential increase in return (and/or reduction in risk) from combining various industries into efficient portfolios. The analysis finds potential gains to the banking and commercial sectors from removing the barriers to their combination.

The analysis of potential gains from combining industries into portfolios uses industry-level profitability data calculated from corporate income tax returns filed with the IRS between 1994 and 2004. The primary analysis uses data compiled for ten financial and nonfinancial industries. Pairwise combinations of BHCs with other industries identified the potential for a 50 percent increase

in ROE with a significant reduction in risk through an investment of 25 percent in construction and an investment of 75 percent in retail. Combinations of BHCs on a pairwise basis with the six other industries either could not produce a 50 percent increase in ROE or could do so only with a substantial increase in risk.

When efficient portfolios were formed using all ten industries at the same time, the potential for higher returns at the same level of risk was even greater. For example, a BHC's historical average ROE of approximately 8 percent could be increased to 11 percent (Table 4, portfolio C) with no increase in risk by investing in a portfolio with 15.4 percent of its assets in banking and the remaining shares invested in the following sectors: nonbank financial services (15.8 percent), retail (27.3 percent), wholesale (21.8 percent), and construction (11.7 percent). When using ROE as the measure of performance, nonbank financial services dominate low-risk and low-return portfolios. However, as risk and return increase, an increasing share of the portfolio was invested in the construction, wholesale, and retail sectors.

The study also examines the potential for expansion into a number of subindustry categories: namely, machinery and motor vehicle manufacturing, general merchandising at the retail level, real estate operators and lessors, and hotel and lodging. The results indicate that over the sample period a 50 percent gain in ROE on a pairwise basis would have been achieved from combining BHCs with a 50 percent investment in general merchandising retailing (such as Wal-Mart) with no increase in absolute risk (standard deviation).¹⁰

As a final caveat, these results are necessarily the result of hypothetical combinations of industries over our historical sample time period. Another time period could have generated different results. If affiliation between these industries were permitted, actual results could be better if significant economies of scale and scope were achieved, but the results could also be worse if the combinations caused significant diseconomies of scale and scope. Nevertheless, as discussed in Wall, Reichert, and Liang (2008), the revealed preferences or actual banking/commerce combinations associated with the historical exploitation of loopholes in the barriers separating banking and commerce suggest that the economies of scale and scope, combined with the portfolio diversification benefits, would likely dominate any diseconomies for certain combinations. It should be emphasized that the portfolio gains documented here are relegated to a few sectors such as construction, retail, and wholesale. Thus, bank management contemplating diversification into the commercial sector must be selective about what specific industries they choose, while corporate management interested in moving into banking might need to settle for somewhat lower returns to achieve a substantial reduction in risk.

10. As mentioned before, extending the pairwise analysis to the firm level by analyzing various combinations of Wal-Mart and commercial banking suggests that the major portfolio benefit to Wal-Mart would be a substantial reduction in risk but at the cost of a lower expected return.

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