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MARKET-BASED RISK IMPLICATIONS OF
SECTION 20 SUBSIDIARIES

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Abstract

This paper explores whether there was an economically significant differential in market-based risk between bank holding companies (BHCs) with Section 20 subsidiaries – subsidiaries that were authorized by the Federal Reserve to conduct bank-ineligible securities activities – and BHCs without such subsidiaries. Using market returns over a period of time in which BHCs expanded into securities activities, from 1985 through 1999, this study finds evidence that BHCs that participated in investment banking exhibited significantly lower total and unsystematic risk, suggesting that banks' participation in the securities business resulted in diversification gains. However, BHCs with Section 20 subsidiaries exhibited higher systematic risk.

JEL Classifications: G21, G24, G28

BANKS IN THE SECURITIES BUSINESS: MARKET-BASED RISK IMPLICATIONS OF SECTION 20 SUBSIDIARIES

1. Introduction

Historically, regulatory barriers and restrictions governing the operations of U.S. commercial banks often prohibited banks from expanding their operations into nonbank activities. Specifically, Section 20 of the Glass-Steagall Act of 1933 expressly prohibited banks from any affiliations with organizations engaged in the underwriting, sale, or distribution of stocks, bonds, debentures, notes, or other securities.[1] The regulation was driven by a concern about the possible increase in riskiness and negative effects on the overall safety and soundness of the banking system that may arise when BHCs engage in both commercial banking and investment banking activities.

In the last two decades, U.S. banking organizations have sought broader domestic securities underwriting powers. In 1987, the Federal Reserve (the Fed) authorized limited underwriting activity for previously prohibited securities. In 1989, the Fed allowed Section 20 subsidiaries of commercial bank holding companies to underwrite corporate debt and equity securities, with financial and informational firewalls between the BHC and its Section 20 subsidiary. But the general prohibition on domestic securities underwriting by U.S. banks remained in place until 1999, when the Gramm-Leach-Bliley Act (GLBA), also known as the Financial Services Modernization Act, was passed.

In the debate leading up to the passage of the Financial Services Modernization Act researchers analyzed various costs and benefits of universal banking, including the effect of a securities underwriter on the safety and soundness of a consolidated company. The existing empirical literature has provided mixed results. On the one hand, because securities activities are inherently riskier than traditional commercial banking activities (Boyd and Graham, 1986; Boyd, Graham, and Hewitt, 1993), expansion into this line of business may increase BHCs' risk. A BHC may become exposed to the losses of its

[1] The Banking Act of 1933, commonly referred to as the Glass-Steagall Act, 48 Stat. 162, is codified at various sections of Title 12 of the United States Code, as amended, 12 U.S.C. §§ 24 (Seventh). Section 20 of the act required member banks to eliminate any affiliations with organizations "engaged principally in the issue, flotation,

Section 20 underwriter, particularly if the firewalls that can insulate and protect it from risks of nonbank activities are not enforced.

On the positive side, there is a potential for product diversification and increased earnings from underwriting activities. A number of studies have analyzed the potential benefits of diversification by looking at the correlation between BHCs' subsidiaries returns. (Saunders and Cornett, 2003, provide a comprehensive literature review of these studies.) Wall and Eisenbeis (1984) found that over the period 1970-1980, the correlation between bank earnings and security broker/dealer earnings was negative, indicating potential gains from diversification. Kwan (1998) studied domestic BHCs with Section 20 subsidiaries from 1990 through 1997. He conducted an analysis of the return relationship between banking and securities activities, where securities affiliates were further separated into primary dealers (primary dealers of government securities) and nonprimary dealers. He reported that Section 20 subsidiaries typically posted more volatile accounting returns than commercial banking subsidiaries, although not necessarily higher returns.

The majority of the available empirical studies on the risks of securities underwriting activities estimated implied volatility of returns using simulation or hypothetical-merger methods that create synthetic universal banks composed of portfolios of commercial banks and securities and other nonbank entities (Wall and Eisenbeis, 1984; Boyd and Graham, 1986; Boyd and Graham, 1988; Boyd, Hanweck, and Hewitt, 1993; Allen and Jagtiani, 1996). Simulation studies are subject to aggregation bias resulting from using industry data. This paper uses a fundamentally different approach by evaluating the risk of banking organizations that actually engaged in securities activities. This approach allows me to examine the product mix effects within established, integrated production processes, rather than artificially combining earnings streams generated by unrelated financial entities.

Unlike many previous studies that examine accounting-based measures of risk (Boyd, Hanweck, and Hewitt, 1993; Saunders and Walter, 1996; among others), this paper examines the market-based risk

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underwriting, public sale, or distribution at wholesale or retail or through syndicate participation of stock, bonds, debentures, notes, or other securities." (12 U.S.C. § 377).

of banking organizations that engaged in securities activities. One of the advantages of using market data is that they are less likely to be affected by the firm's choice of accounting methods. Furthermore, the market price of risk reflects the actual cost of capital faced by the firm (Allen and Jagtiani, 1999). Market-based measures of risk are used in the event studies by Bhargava and Fraser (1998), Cornett, Ors, and Tehranian (2002), and Akhigbe and Whyte (2004). These studies examine the market risk effects of various regulatory decisions pertaining to bank expansion into investment banking activities. The results are mixed. While Bhargava and Fraser (1998) and Akhigbe and Whyte (2004) find a significant increase in both total and unsystematic risk, Cornett, Ors, and Tehranian (2002) find no significant impact on bank risk.

The present study does not attempt to examine the effects of events that permitted BHCs to underwrite securities. Even some researchers who use an event study methodology to test the effect of regulatory changes note that such studies are prone to a number of biases arising from the difficulty of "identification of information arrival, partial anticipation of announcements, event clustering, and potential event-induced variance changes" (Bhargava and Fraser, 1998). Instead, this paper uses a longer time frame, 1985 through 1999, to examine whether there was an economically significant differential in market risk between BHCs with securities powers and those BHCs without such powers. I argue that the discrepancy in market risk between these groups of BHCs is likely to be more apparent in the long run. The choice of the time period is important, since it includes the period leading up to when the Fed allowed commercial bank holding companies to establish separate Section 20 securities affiliates (before 1987), to 1999, when passage of GLBA resulted in a significant reduction in the number of Section 20 reporters.[2] Securities underwriters that are subsidiaries of financial holding companies (FHC) are no longer required to file a separate report with the Fed.

[2] The Gramm-Leach-Bliley Act of 1999 allowed a qualified BHC to convert into a financial holding company and not file reports on its Section 20 subsidiaries. As a result, the number of securities subsidiaries filing Section 20 reports dwindled from 37 in 1999 to only five in 2001, and these companies were no longer representative of companies involved in securities activities.

While regulators are concerned about total risk, market participants consider systematic risk a more relevant measure of risk that can be used in the risk-adjusted cost of capital calculations. This study estimates total, systematic, and unsystematic risk using the capital asset pricing model (CAPM) for BHCs with and without Section 20 affiliates. This study illustrates that while systematic risk of all BHCs rose in the late 1980s and during the 1990s, BHCs that did not participate in Section 20 activities exhibited lower market risk compared to that of BHCs with Section 20 affiliates. However, the overall level of risk and unsystematic risk of BHCs with Section 20 activities declined during the 1990s. These results are an important extension of the findings of previous studies that argue that expanded bank powers, as permitted under the Financial Services Modernization Act, are likely to lower the total risk of the U.S. banking industry (Allen and Jagtiani, 1999). Because data used in this study are not for hypothetically merged universal banks, the results are more reliable and applicable.

The rest of the paper is organized as follows. Section 2 sets forth the hypotheses of this study and discusses the risk-return methodology of the CAPM. Section 3 discusses results of the CAPM estimation, and Section 4 concludes this study.

2. Hypotheses, methodology, and sample selection

2.1. Hypotheses

When the Fed allowed BHCs to establish separate underwriting Section 20 affiliates in 1987, it effectively reduced restrictions on permissible bank activities that existed since the passage of the Banking Act of 1933. Despite the regulatory precautions in the form of information and financial firewalls between the parent BHCs and their securities affiliates, this move allowed BHCs to select from a broader array of potential portfolio risks. On the one hand, the expanded investment opportunity profile can result in enhanced diversification, particularly if the return correlations between business lines are less than perfectly correlated (Wall and Eisenbeis, 1984; Kwast, 1989; Saunders and Walter, 1994; and Kwan, 1998). It is surmised that universal banks have some advantages over specialized banks because

they can develop a wider and a longer-term relationship with borrowers. This relationship allows the bank to collect more information about the firm's behavior with respect to various financial instruments and use this information more efficiently when extending credit to the firm (Petersen and Rajan, 1994). Besides having economies of scope in information gathering, universal banks may also benefit from the conventional technological economies of scope because they can spread the fixed costs over a wider set of products or they can use their existing branch networks and other delivery channels to distribute additional products at low marginal cost (Santos, 1998). Thus, we would expect BHCs with securities underwriting powers to exhibit lower risk than BHCs without such powers.

On the other hand, risk may actually increase as banks expand into new activities. Research into the relationship between bank diversification and risk shows that better diversified banks may counterbalance their diversification advantage by pursuing riskier activities (Demsetz and Strahan, 1995a, b). Banks' decision to participate in these activities depends on their assessment of profitability of new activity mix. It also depends on their preferences regarding risk. The securities business is inherently more risky than traditional banking activities. Thus, given the increased scope of permissible activities, BHCs with Section 20 affiliates can exhibit higher risk than BHCs without Section 20 affiliates. The next section explores whether there exists an economically significant differential in market risk between these groups of BHCs using the CAPM methodology.

2.2. Methodology

Total risk is estimated using the variance of market-based returns, (σ_{RX}^2), for each BHC with and without Section 20 subsidiaries, and the results are compared based on the group variance comparison tests. Systematic risk is estimated using the capital asset pricing model (CAPM) developed by Sharpe (1964), Lintner (1965), and Black (1972). CAPM defines the systematic risk of a security in terms of market risk factor, beta, and quantifies the tradeoff between beta of a security and its expected return. This can be expressed as follows:

Equation 1

$$E[R_i] = R_f + \beta_{im}(E[R_m] - R_f)$$

and

$$\beta_{im} = \frac{Cov[R_{i,} R_m]}{Var[R_m]}$$

where R_m is the return on the market portfolio; R_f is the return on the risk-free asset; and β_{im} measures the risk of security i in the market portfolio relative to the risk of the market portfolio itself. The Sharpe-Lintner version can be expressed in terms of returns in excess of the risk-free rate. Let RX_i and RX_m represent excess return on the i^{th} asset and market, respectively. Then, because the risk-free rate is being treated as nonstochastic, we can rewrite the CAPM as:

Equation 2

$$E[RX_i] = \beta_{im} E[RX_m]$$

and

$$\beta_{im} = \frac{Cov[RX_{i,} RX_m])}{Var[RX_m]}$$

Implementation of the model requires three inputs: the stock's return, the risk-free return, and the market risk premium. The usual estimator of beta is the cross-section time-series estimator of the slope coefficient in the excess-return market model:

Equation 3

$$RX_{it} = \alpha_{im} + \beta_{1i} RX_{mt} + \varepsilon_{it},$$

where *i* denotes a security or an asset and *t* denotes time.

To measure systematic risk of BHCs with and without Section 20 affiliates, I extend the market model in Equation 3 by adding an interaction term between the dummy variable for Section 20 affiliates and RX_m (the return on the market portfolio in excess of the return on a risk-free asset). The model is written as:

Equation 4

$$RX_{it} = \alpha_{im} + \beta_{1i} RX_{mt} + \beta_{2i} Sec20 * RX_{mt} + \varepsilon_{it}$$

where Sec20 is the dummy variable for BHCs with Section 20 subsidiaries. β_1 captures the systematic risk of a BHC and reflects the comovement of its returns with the market portfolio returns. For a BHC with a Section 20 subsidiary, the marginal effect of market excess returns on the firm's excess returns is $\frac{\partial RX_{it}}{\partial RX_{mt}} = \beta_1 + \beta_2$. A positive coefficient β_2 would suggest that the sensitivity of BHCs' returns to the changes in market returns is higher in the presence of a Section 20 subsidiary.

For the systematic risk measure, I compute the *t*-statistic to test if beta coefficients are different from zero. I also test to see if they are different from one. This is important because market beta of a stock measures the degree to which the stock moves with the market. A beta of one indicates that the security has the same riskiness as the market, while a beta greater than one indicates that the price is more volatile than the market.

We obtain the measure for unsystematic risk by calculating the variance of the residuals, $\sigma^2(\hat{\varepsilon}_i)$, for each BHC in Equation 3 and compare the results for companies that engage in investment banking activities with those that do not. To check the robustness of all results, I conducted two additional tests. In the first, I limit the number of companies to those that reported continuously for 10 or more years. In the second, rather than comparing our sample of BHCs to the overall value-weighted market index from the Center for Research in Security Prices (CRSP), I compare it to the peer group in S&P Banks Composite Index.

2.3. Sample Selection

The analysis is conducted using CRSP data for the 1985-1999 period as well as sub-periods to account for the intertemporal shifts in risk-taking behavior that occurred in the late 1980s and the early 1990s (partly because of government regulations and implementation of the Basel Accord).[3] I constructed a monthly

[3] The regulatory changes included the BIS capital standards of 1988 and Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991. The last introduced prompt corrective action, requiring mandatory

data set from January 1985 to December 1999, a total of 15 years, for all BHCs whose shares were traded on the NYSE, AMEX, or NASDAQ, based on the matching technique that uses the following criteria. First, because the majority of BHCs with Section 20 affiliates are among the largest 100 U.S. banks based on consolidated assets, matched BHCs were also picked from that peer group. I stratify firms by asset size to control for a potential differential in operating characteristics of BHCs and their balance-sheet composition.[4] Second, the matched-adjusted comparison group includes all BHCs that did not establish a Section 20 subsidiary prior to 1999. Starting the sample period in 1985 allows us to observe how beta coefficients evolved between the period prior to 1987 (when the BHCs were first allowed to underwrite bank-ineligible securities) and the period after 1987.

The BHCs are identified using the consolidated financial statements for BHCs (FR Y-9C reports) from the Federal Reserve. As a result of the matching, the sample consists of 52 bank holding companies: 22 BHCs without Section 20 affiliates and 30 with Section 20 affiliates; all have a record with CRSP.[5]

All monthly returns, value-weighted market indices, and three-month U.S. Treasury bill rates were obtained from the CRSP tapes and Haver.[6] The value-weighted market index serves as a proxy for

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interventions by regulators whenever a bank's capital falls. It also introduced risk-based deposit insurance premiums, limited the use of "too big to fail" bailouts by federal regulators for large banks, and extended federal regulation over foreign bank branches and agencies in the Foreign Bank Supervision and Enhancement Act (Saunders & Cornett, 2003).

[4] Researchers have documented significant differences in production technologies and outputs across banks of various sizes (for example, Kwan and Eisenbeis, 1995). In terms of balance-sheet composition, an examination of the composition of the BHCs' balance sheet revealed that compared with their peers, BHCs with Section 20 subsidiaries categorized a larger share of their assets as off-balance-sheet assets. Off-balance-sheet (OBS) activities may add to the bank's riskiness. However, research into OBS activities suggests that some OBS instruments, particularly those used to hedge on-balance-sheet risks – items such as interest swaps and foreign exchange forward contracts – work to reduce the overall risk (Saunders and Cornett, 2003). Furthermore, OBS activities may be associated with reduced risk because of what they may signal about the credit quality of the bank or its counterparties (Avery and Berger, 1988).

[5] CRSP and Compustat both use CUSIP and PERMNO as company identifiers, while Y-9C reports use RSSD identifiers. Thus, the bank's name is the only common identifier between BHC reports and CRSP. Matching by name is a rather difficult task. Matching based on CUSIP also proved arduous and not very reliable, because CUSIP numbers tend to change owing to various company transformations, such as mergers and acquisitions. CRSP has developed a unique permanent issue identification number, PERMNO, and a unique permanent company identification number, PERMCO. These enable researchers to track the issue over time. I used PERMNO and companies' names for a more accurate match. Some PERMNOs come from the study by Green, Lopez, and Wang (2003), which has a list of the top 50 BHCs in the U.S. with their holding company and PERMNO identifiers.

[6] Haver Analytics specializes in databases and software products for economic analysis and business decision-making (http://www.haver.com).

the market portfolio, and the U.S. Treasury bill rate proxies for the risk-free return. The value-weighted index contains returns (including dividends) on a value-weighted market portfolio.[7]

The U.S. Treasury bill rate (monthly averages of daily rates, where yields are expressed in percent per annum) were obtained from Haver. The rates were converted from the compounded annual to monthly rates using the geometric average return technique: $g_m = (1 + r_a)^{1/m} - 1$, where g_m = geometric average return applicable to each subset period, month; r_a= the cumulative return over the entire period; and m is the number of equal subset periods to average the return, and is equal to 12 months. The simple daily net return, R_t, on the bank's stocks between dates t-1 and t was defined as $R_t = \frac{P_t}{P_{t-1}} - 1$, where P_t is the stock price on the date of the trade t, and P_{t-1} is the price on the last date of the trade. All returns were converted to the monthly frequency.

3. Results of the CAPM Estimation

Table 1 reports descriptive statistics. The average total assets for all BHCs in the sample is $66.4 billion. It is clear that BHCs with Section 20 subsidiaries are much larger, in terms of total assets, than BHCs without Section 20 subsidiaries (the mean total assets is $99.7 billion for the first group and $21 billion for BHCs without Section 20 subsidiaries). Researchers have suggested that production technologies and outputs tend to vary across banks of different sizes (Kwan and Eisenbeis, 1995). Therefore, I stratify the sample according to whether BHCs underwrite securities and whether BHCs are

[7] Theoretically, the market portfolio contains all assets, whereas most tests conducted by researchers use a value- or equal-weighted basket of stocks as a market proxy. This approximation may result in misleading conclusions on the CAPM hypothesis tests. This argument is known in the literature as the Roll's critique. Campbell, Lo, and MacKinlay (1997) suggest several approaches to consider if inferences are sensitive to the use of a proxy in place of the market portfolio. One approach is to use a number of broader proxies for the market portfolio, such as stock-based proxy, a stock- and bond-based proxy, or a stock-, bond-, and real-estate-based proxy. The results of this approach suggest that inferences are not sensitive to the error in the proxy when viewed as a measure of the market portfolio (Stambaugh, 1982). Another approach is to estimate an upper bound on the correlation between the market proxy return and the true market return. As long as the correlation is high (exceeding 0.70), the rejection of the CAPM with a market proxy would also imply the rejection of the CAPM with the true market portfolio (Kandel and Stambaugh, 1987; Shanken, 1987).

relatively large (had total assets of $10 billion during 1990-1999) or relatively small (had total assets of less than or equal to $10 billion).

Total risk is estimated using the variance of market-based returns, (σ^2_{RX}), for each BHC. Table 2 reports total risk for all BHCs, BHCs with and without Section 20 subsidiaries, and relatively large and small BHCs. Further, I divide the sample into two sub-samples: from 1985 through 1990 and from 1991 through 1999 to account for changes in regulatory environment between a strict separation of commercial and investment banking and the de facto erosion of the Glass-Steagall Act in 1987 when the Federal Reserve allowed BHCs to establish separate Section 20 securities affiliates as investment banks. The results in Table 2 show that total risk of BHCs with Section 20 subsidiaries is lower than that of BHCs without such subsidiaries. The same is true for relatively large BHCs in the sample. The table also shows that BHCs with securities subsidiaries (and relatively large BHCs) experienced a statistically significant decline in total risk between two sub-periods: pre-1990 and post-1990. These results are an important extension of the findings of Benston and Kaufman (1995), and Allen and Jagtiani (1999). Allen and Jagtiani (1999) argue that expanded bank powers, as permitted under the Gramm-Leach-Bliley Act, will likely lower the total risk of the U.S. banking industry. Owing to the fact that I do not create synthetic universal banks, but rather use the actual proprietary data for the Section 20 affiliates and their consolidated BHCs, and my data cover a more recent time period, the findings of this study are more applicable than those in previous studies.

Next, using Equation 4, I am interested in finding whether there is a potential reduction in the systematic risk resulting from allowing banks to engage in securities activities. Because systematic risk is of primary concern to well-diversified shareholders, a reduction in systematic risk would provide a rationale for expanding bank powers into nonbank activities. Table 3 reports the results. For all BHCs between 1985 and 1999, systematic risk measured by the beta coefficient c_1 was 1.06 and statistically different from zero. Furthermore, data are consistent with the hypothesis that c_1 is not significantly

different from one. A beta of one indicates that the security has the same price volatility (riskiness) as the market.

The coefficient on the interaction term, β_2, is positive and significant (at the 5 percent level), indicating that the marginal effect of market excess returns on BHCs' excess returns is higher in the presence of a Section 20 subsidiary. In other words, the market risk of BHCs that participated in securities underwriting was higher than that of BHCs that did not underwrite securities. Similar results emerge from the regressions performed on the stratified sample, based on BHCs' assets size. Relevant results appear in Table 3 and show that smaller BHCs, particularly those with securities underwriting powers, were exposed to higher market risk.

The findings were robust to two additional variations. The first test limited the number of companies to those that reported continuously for 10 years or longer. As a result, the number of companies decreased from 52 (30 BHCs with Section 20 subsidiaries and 22 BHCs without) to 28 BHCs: 18 BHCs with Section 20 subsidiaries and 10 without.[8] Results of these tests appear in Table 5. For the second robustness check, I ran analogous estimations using S&P's Banks Composite Index to compare our sample of banks to a market index of their peer firms (see Table 6).[9] Both tests conclude that market risk of BHCs with Section 20 subsidiaries is higher than market risk of BHCs without such subsidiaries. These results are consistent with conclusions in Allen and Jagtiani (1999) that suggest that expanding bank powers into securities and insurance activities is likely to lower the overall risk of the U.S. banking industry but increase banks' systematic (nondiversifiable) risk.

The analysis of sub-periods – before 1990 and post 1990 – is presented in Table 3 and Table 5. These results suggest that, on average, all banks took on more risk relative to the market after 1990. The secular increase in bank market risk exposure during this period is consistent with a risk-enhancing response to the decline in bank charter values proposed by Keeley (1990). Greatly liberalized regulation

[8] This, potentially, can cause the survivorship bias that arises when lack of data leads certain subsets of stocks to be excluded from the analysis (see Campbell, Lo, and MacKinlay, 1997).

[9] Source: Bloomberg, value-weighted S&P Banks Composite Index, ticker: SPBNKC or S&P 500 Bank Index, for 1990-1999. The year 1990 is used as a starting point to limit the noise caused by the annual index rebalancing.

in terms of barriers to entry for nonbank competition and geographic expansion – due to interstate branching and deposit interest rate deregulation – had eroded the charter value of banks, possibly reducing banks' incentives to act prudently with regard to risk taking. Other studies document an increase in banks' risk taking following the introduction of the 1988 Basel Accord. The study by Allen and Jagtiani (1996) finds that compared to other financial intermediaries, including insurance companies, securities firms, and mutual funds, banks were taking on more market risk following the introduction of new risk-based capital requirements. Their study suggests that new requirements may have altered the optimal levels of risk that banks took and, hence, their estimates of the market beta.

In Table 3 and Table 5, coefficients on the interaction term between the dummy variable and market excess returns prior to 1990 and post 1991 are both significantly different from zero. These results are consistent with the earlier findings of higher market risk exposure at BHCs with securities underwriting subsidiaries. Systematic risk is priced in the market and is of primary interest to a well-diversified investor. These findings suggest that investors should require a higher return on BHCs involved in securities activities.

Table 7 reports the results for unsystematic risk, measured by the variance of residuals in the CAPM regressions (Equation 3). Unsystematic risk, also referred to as the residual or company-specific risk, can be eliminated through diversification. Overall, BHCs experienced a statistically significant increase in unsystematic risk between the two sub-periods: before 1990 and after 1990. The table shows that while BHCs with Section 20 subsidiaries experienced a significant decline in unsystematic risk, BHCs without these subsidiaries and relatively smaller BHCs experienced an increase in unsystematic risk between the two sub-periods. These results parallel those reported for total risk and confirm the initial finding that BHCs that expanded into securities activities experienced a decline in risk. These changes in the total risk are of primary concern to regulators because it is more directly linked to the risk of failure. The decline in unsystematic risk at the BHCs that expanded into securities activities is consistent with the notion of diversification gains found in earlier studies (Boyd and Graham, 1986; Kwast, 1989; Bhargava and Fraser, 1998, among others). Conversely, the increase in total and unsystematic risk of non-Section

20 BHCs may reflect market concern regarding their ability to expand into newly allowed nonbank activities.

4. Conclusions

This paper estimates and compares total market-based risk, systematic risk, and unsystematic risk measures for BHCs with and without securities underwriting subsidiaries (Section 20 subsidiaries) in the late 1980s and during 1990s. During this period, the Federal Reserve made several decisions that first eased and later repealed restrictions on banks' affiliating with securities firms contained in the Glass-Steagall Act of 1933. On the whole, I find evidence of significantly lower total risk and unsystematic risk for BHCs that expanded into investment banking activities, suggesting that these activities provided diversification benefits. In contrast, I find evidence that these BHCs were exposed to higher systematic risk. Furthermore, results of the analysis suggest that total risk of all BHCs rose in the late 1980s and during the 1990s, regardless of whether they participated in securities underwriting.

Although there appear to be observable differences in the systematic risk for BHCs with and without Section 20 affiliates, the conclusions must be tempered with two important qualifications. First, the characteristics of BHCs that participate in securities underwriting differ markedly from those BHCs that do not. BHCs that participate in securities activities are much larger (in terms of both total assets and total equity) than BHCs without Section 20 subsidiaries. Hence, it is hard to find a good matching sample, which may contribute to the differential impact on market return sensitivity. Second, the differences in the systematic risk of BHCs with and without Section 20 affiliates may also reflect a market in disequilibrium that is adjusting to the effects of expanding scope and scale of permissible activities during the 1990s. Longer term studies may be needed to determine whether the findings of this paper persist as securities underwriting subsidiaries become more established. Such studies are necessary to ensure that the safety and soundness of the financial system are not compromised by an expanded array of activities in which banks participate.

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Table 1 Descriptive Statistics

	Average Total Assets, $ Bil. (Standard Deviation)	Average Total Equity, $ Bil. (Standard Deviation)
All BHCs (n=52)	66.4	4.4
	(104)	(6.8)
BHCs with Section 20 subs (n=30)	99.7	6.6
	(127)	(8.3)
BHCs without Section 20 subs (n=22)	21.0	1.5
	(10.3)	(0.62)
Large BHCs (n=30)	84.5	5.7
	(131)	(8.5)
Small BHCs (n=22)	41.7	2.7
	(36.7)	(2.6)

This table shows the mean of total asset and total equity of BHCs, separated by whether they participate in Section 20 activities, and whether they are relatively large (have total assets greater than $10 billion) or relatively small (have total assets less than or equal to $10 billion). Accounting data are averaged over the period from 1990 through 1999. Standard deviations are reported in parentheses.

Table 2 Total Risk of BHCs (1985-1999)

	Whole Sample	Pre-1990	Post-1990
All BHCs (n=52)	0.0082*	0.0089*~	0.0078~ *
	(0.011)	(0.012)	(0.009)
BHCs with Section 20 subs (n=30)	**0.007***	**0.0074*~**	**0.0071*~**
	(0.002)	(0.002)	(0.002)
BHCs without Section 20 subs (n=22)	**0.0099***	**0.011*~**	**0.009*~**
	(0.017)	(0.019)	(0.02)
Large BHCs (n=30)	**0.007***	**0.007*~**	**0.007*~**
	(0.002)	(0.001)	(0.002)
Small BHCs (n=22)	**0.011***	**0.012*~**	**0.01*~**
	(0.017)	(0.021)	(0.016)

This table shows total risk as measured by the variance of market-based returns, ($\sigma^2_{RX_i}$), for each BHC, separated by whether they participate in Section 20 activities, and whether they are relatively large (have total assets greater than $10 billion) or small (have total assets less than or equal to $10 billion). Panel data are for 52 BHCs (22 without Section 20 affiliates and 30 with Section 20 affiliates).

*significantly different from zero at the 0.05 level.~ values before 1990 (1985-1990) and post 1990 (1991-1999) are significantly different from each other at the 0.05 level. Standard deviations are in parenthesis. Values in bold are different from each other (by size and by participation in Section 20 activities) according to the F-statistic.

Table 3 Systematic Risk (1985-1999)

($RX_{it} = \alpha_i + \beta_{1i} RX_{mt} + \beta_{2i} Sec20 * RX_{mt} + \varepsilon_{it}$, where RX_{it} are excess returns over the U.S. Treasury bill rate for asset *i* at time *t*; RX_{mt} is the t-period market portfolio excess return, β_{1i} is a measure of systematic risk)

	Whole Sample	Pre-1990	Post-1990
Intercept	0.001	-0.006*	0.006*
	(0.001)	(0.001)	(0.001)
β_1	1.06*~	1.026*~	1.10*
	(0.03)	(0.04)	(0.05)
β_2	0.13*	0.154*	0.129*
	(0.04)	(0.048)	(0.067)
N obs.	8144	3565	4579
Overall R^2	0.291	0.372	0.222

*significantly different from zero at the 0.05 level. ~ the beta coefficient is not significantly different from 1 at the 0.05 level. Standard errors are in parenthesis. Panel regressions for the largest 100 domestic BHCs in at least one year from 1985 through 1999. For a Section 20 firm, the marginal effect of market excess returns on the firm's excess returns is $\frac{\partial RX_{it}}{\partial RX_{mt}} = \beta_1 + \beta_2$. Positive β_2 suggests that the security's price is more volatile in the presence of a Section 20 subsidiary.

Table 4 Systematic Risk by Asset Size (1985-1999)

($RX_{it} = \alpha_i + \beta_{1i} RX_{mt} + \varepsilon_{it}$, where RX_{it} are excess returns over the U.S. Treasury bill rate for asset *i* at time *t*; RX_{mt} is the t-period market portfolio excess return, β_{1i} is a measure of systematic risk)

	Small Banks	Large Banks
BHCs with Section 20 subs	1.30*	1.178*
	(0.06)	(0.042)
BHCs without Section 20 subs	1.13*~	1.025*~
	(0.079)	(0.035)

*significantly different from zero at the 0.05 level, based on the t-test.~ the value is not significantly different from 1. Standard errors are in parentheses. This table reports systematic risk for BHCs based on assets size. The t-statistic tests whether systematic risk is significantly different from zero. I also test if systematic risk is different from one, particularly if it is greater than one, which would suggest that asset prices are more volatile than the market. Relatively large banks have total assets greater than $10 billion and relatively small banks have total assets less than or equal to $10 billion.

Table 5 Results of the CAPM Estimation for Continuous Reporters

($RX_{it} = \alpha_i + \beta_{1i} RX_{mt} + \beta_{2i} Sec20 * RX_{mt} + \varepsilon_{it}$, where RX_{it} are excess returns for N assets, *i* denotes assets and *t* denotes time, RX_{mt} is the t-period market portfolio excess return, and Sec20 is a dummy for whether a BHC had a Section 20 subsidiary)

	Whole Sample	Pre-1990	Post-1990
Intercept	0.0013	-0.003*	0.0042
	(0.0009)	(0.0015)	(0.001)
c_1	0.9395*†	0.8946*	0.9814*†
	(0.035)	(0.048)	(0.050)
c_2	0.2102*	0.222*	0.1947*
	(0.04)	(0.059)	(0.062)
N	5016	1990	3026
Adj R^2	0.3411	0.3988	0.2899
F-statistic	1299.01	660.8	618.5

*significant at the 0.05 level

† not significantly different from 1 (at the 0.05 significance level)

Panel data for 28 BHCs (10 without Section 20 affiliates and 18 with Section 20 affiliates) that were among the largest 100 BHCs, ranked by assets, in each year between 1985 and 1999, and were traded on NYSE, AMEX, or NASDAQ. All returns are calculated in excess of the three-month Treasury bill rate from Haver.

Table 6 Results of the CAPM Estimation Using Bank Stock Index

($RX_{it} = \alpha_i + \beta_{1i} RX_{bxi,t} + \beta_{2i} Sec20 * RX_{bxi,t} + \varepsilon_{it}$, where RX_{it} is the excess return on asset i for time t, $RX_{bxi,t}$ is the t-period bank composite index portfolio's excess returns, and Sec20 is a dummy for whether a BHC had a Section 20 subsidiary)

	Post-1990
Intercept	0.006*
	(0.001)
c_1	0.80*
	(0.02)
c_2	0.21*
	(0.04)
N	3362
Adj R^2	0.50

*significant at the 0.05 level. The year 1990 is used as a starting point to limit the noise caused by the annual index rebalancing.

Table 7 Results of the CAPM Estimation: Unsystematic Risk

($RX_{it} = \alpha_i + \beta_{1i} RX_{mt} + \varepsilon_{it}$, where RX_{it} are excess returns for N assets, *i* denotes assets and *t* denotes time, RX_{mt} is the t-period market portfolio's excess return, Var(ε_i) is a measure of unsystematic risk)

	Whole Sample	Pre-1990	Post-1990
All banks (n=52)	0.0058	0.0053~	0.0061~
BHCs with Sec20 (n=30)	**0.0046**	0.0046~	0.0044~
BHCs without Sec20 (n=22)	**0.0079**	0.0063~	0.009~
Large Banks (n=30)	**0.0001**	0.000~	0.0004~
Small Banks (n=22)	**0.0098**	0.008~	0.010~

~ values for the period before 1990 and after 1990 are significantly different from each other at the 0.01 level. In column 1, values in bold (in rows 2 and 3, and in rows 4 and 5) are significantly different from each other. See notes to Table 2.