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**Working Paper**

## Investment opportunity set, product mix, and the relationship between bank CEO compensation and risk-taking

Working Paper, No. 2004-36

**Provided in Cooperation with:**

Federal Reserve Bank of Atlanta

*Suggested Citation:* Elijah Brewer, III; Hunter, William Curt; William E. Jackson, III (2004) : Investment opportunity set, product mix, and the relationship between bank CEO compensation and risk-taking, Working Paper, No. 2004-36, Federal Reserve Bank of Atlanta, Atlanta, GA

This Version is available at:

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Investment Opportunity Set, Product Mix,  
and the Relationship between Bank CEO  
Compensation and Risk-Taking

Elijah Brewer III, William Curt Hunter,  
and William E. Jackson III

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## Investment Opportunity Set, Product Mix, and the Relationship between Bank CEO Compensation and Risk-Taking

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**Abstract:** The product mix changes that have occurred in banking organizations during the 1990s provide a natural experiment for investigating how firms adjust their executive compensation contracts as their mix of businesses changes. Deregulation and new technology have eroded banking organizations' comparative advantages and have made it easier for nonbank competitors to enter banking organizations' lending and deposit-taking businesses. In response, banking organizations have shifted their sale mix toward noninterest income by engaging in municipal revenue bond underwriting, commercial paper underwriting, discount brokering, managing and advising open- and close-ended mutual funds, underwriting mortgage-backed securities, selling and underwriting various forms of insurance products, selling annuities, and other investment banking activities via Section 20 subsidiaries. These mix changes could affect firms' risk and the structure of CEO compensation. The authors find that as the average banking organization tilts its product mix toward fee-based activities and away from traditional activities, equity-based compensation increases. They also find that more risky banks have significantly higher levels of equity-based compensation, as do banks with more investment opportunities. But, more levered banks do not have higher levels of equity-based CEO compensation. Finally, the authors observe that equity-based compensation is more important after the Riegle-Neal Act of 1994.

JEL classification: G32; G34; G38; G21

Key words: corporate governance, executive compensation, product mix, risk-taking, bank holding companies

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The authors thank Beth Cooperman, James R. Marchand, seminar participants at the Federal Reserve Banks of Atlanta, Chicago, and Cleveland, and session participants at the 2003 FMA meetings for many helpful suggestions. The research assistance of Millard F. Southern III is greatly appreciated. The views expressed here are the authors' and not necessarily those of the Federal Reserve Bank of Atlanta or Chicago or of the Federal Reserve System. Any remaining errors are the authors' responsibility.

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## **1. Introduction**

During the 1980s and 1990s, banking organizations role as the main providers of credit has diminished (see Boyd and Gertler, 1994; Kaufman and Mote, 1994; Berger, Kashyap, and Scalise, 1995, Edwards and Mishkin, 1995; and Brewer, Minton, and Moser, 2000). Brewer, Minton, and Moser report that from year-end 1974 to year-end 1992, the proportion of business loans in bank portfolios decreased from 21 percent to 16 percent of total bank assets. Concurrently, banks' share of short-term business credit has declined substantially from 79 percent to 54 percent. Banking organizations have reacted to declining shares of credit by increasing the production and sale of fee-based financial services. Banking organizations have long earned noninterest income by offering "traditional" banking services such as checking, trust, and cash management. But the expansion into municipal revenue bond underwriting, commercial paper underwriting, discount brokerage, managing and advising open- and close-end mutual funds, underwriting mortgage-backed securities, selling and underwriting various forms of insurance products, selling annuities, and other investment banking activities via Section 20 subsidiaries has given banking organizations opportunities to earn noninterest income from "nontraditional" services. At the same time that banking organizations have expanded into fee-based financial activities, their use of equity-based compensation (i.e., stock options and restricted stock) to motivate executives has increased.

The opportunity to produce and sell an expanded menu of fee-based financial services has afforded banking organizations a greater degree of managerial discretion and incentive to use equity-based compensation. Smith and Watts (1992) argue that the degree of managerial discretion is inversely related to the degree of regulation. Product expansion increases the CEO's investment opportunity set and could make it difficult for shareholders to evaluate the executive's actions, thus exaggerating the information asymmetry problems between executives and shareholders. This point is underscored by the following quotation from a Standard & Poors' analyst regarding J.P. Morgan & Co.: "Over the last decade, the company's business mix has evolved, so that it has become increasingly reliant on...underwriting, advisory services, and trading. This profile has rendered earnings more volatile. The

expense base has also become quite high, so that earnings could be vulnerable to revenue declines” (*American Banker*, January 26, 1998).

In such an atmosphere of greater degree of uncertainty, there is no assurance that the self-interested behavior of CEOs will conform to that expected by shareholders. Equity-based compensation contracts that give the executive a share in the outcome of his actions could encourage executives to expend efforts to take actions that are expected by shareholders (Prendergast, 2002). To some extent the incentive to use equity-based compensation contracts increased in the 1990s with the relaxation of federal restrictions on banking organizations’ activities.

Cornett, Ors, and Tehranian (2002) find that the accounting- and market-based performance of banking organizations that established investment banking (Section 20) subsidiaries increased significantly more than banking organizations that did not have investment banking subsidiaries.<sup>1</sup> Thus, it appears that the alliances between commercial banking and investment banking as a result of Section 20 authorization have resulted in significant positive performance changes. It is possible that these changes could have altered the structure of CEO pay. Fields and Fraser (1999) provides evidence on whether banking organizations that have Section 20 subsidiaries have pay-performance compensation schemes that are like those used by investment banks. They find that pay-performance sensitivities for those banks once they begin securities underwriting are very similar to the sensitivities of non-Section 20 organizations.

In this article, we examine the relationship between the structure of CEO compensation and banking organizations’ financial characteristics from 1992 to 2000. In particular, we ask three questions: First, does equity-based compensation as a fraction of total compensation increase or decrease with risk, leverage, and growth opportunities? Second, does equity-based compensation as a fraction of total compensation increase with noninterest income of bank holding companies? And, third, does equity-

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<sup>1</sup> Section 20 refers to the sections of the Banking Act of 1933 (i.e., the Glass-Steagall Act) that restrict affiliation of banks and securities firms. Prior to the Financial Services Modernization Act of 1999, Section 20 affiliates were the vehicle used by banking organizations to engage in investment banking activities. Financial Services Modernization

based compensation as a fraction of total CEO compensation increase in the post-Reigle-Neal deregulatory environment? We find that as the average banking organization tilts its product mix toward fee-based activities and away from traditional activities, equity-based compensation increases. We also find that more risky banks have significantly higher levels of equity-based compensation, as do banks with more investment opportunities. But, more levered banks do not have higher levels of equity-based CEO compensation. Finally, we observe that equity-based compensation is more important after the Riegle-Neal Act of 1994.

The remainder of the paper is organized as follows. Section 2 provides some background on executive compensation. Section 3 presents our set of hypotheses and discusses the theoretical (and empirical) executive compensation literature that informs our hypotheses. Section 4 describes the data and methodology. Our empirical results are reported in section 5. And, section 6 summarizes the findings and offers conclusions.

## **2. Background**

Chief executive officer (CEO) compensation has recently come under increased public and congressional scrutiny. The use of equity-based compensation (i.e., stock options and restricted stock) to motivate executives has been a major focus of this debate. The resulting concerns have led to demands for greater transparency in executive stock option programs and, possibly, to elimination of the programs altogether. Those calling for the elimination of stock options claim that they are a poor way to measure an executive's contribution to firm performance. This claim, however, is inconsistent with the empirical research literature on executive compensation. Murphy (1985) and Jensen and Murphy (1990) find a positive and statistically significant relationship between the level of pay and performance.<sup>2</sup>

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Act of 1999 allows banks, securities firms, and insurance companies to be owned by the same holding company without the limitation imposed by Section 20 of the Glass-Steagall Act.

<sup>2</sup> While they find a positive and statistically significant relationship between the pay of top-level executives and firm performance, Jensen and Murphy (1990) indicate that the sensitivity of pay per dollar change in shareholder wealth is small for an occupation in which incentive pay is expected to play an important role. The pay-performance sensitivity for CEOs varies by size of the firm. For CEOs in firms in the top half of their sample (ranked by market value), the pay-performance sensitivity is \$1.85 per \$1,000 change in shareholder wealth, while for CEOs in firms in the bottom half of their sample, the pay-performance sensitivity is \$8.05 per \$1,000.

Equity-based compensation contracts that give the executive a share in the outcome of her actions could encourage executives to expend efforts to take actions that are expected by shareholders (Prendergast, 2002). To some extent the incentive to use equity-based compensation contracts increased in the 1990s with the relaxation of restrictions on banks' activities.

As a result of a variety of court challenges in the 1970s and 1980s, banking organizations by 1990 were significant participants in municipal revenue bond underwriting, commercial paper underwriting, discount brokerage, managing and advising open- and close-end mutual funds, underwriting mortgage-backed securities, selling and underwriting various forms of insurance products, and selling annuities. Beginning in 1987, the Board of Governors of the Federal Reserve System began to permit banking organizations to form separately capitalized security subsidiaries to underwrite corporate debt and equity securities under the Section 20 provisions of the Banking Act of 1933 (i.e., the Glass-Steagall Act). However, these subsidiaries' revenue could not amount to more than 5 percent (increased later to 10 percent and then 25 percent) of the total revenue generated by the banking organization. The Financial Services Modernization Act of 1999 (Gramm-Leach-Bliley Act), extends this authority and allows banks, securities firms, and insurance companies to be owned by the same holding company. Product deregulation expands the investment opportunities for banking organizations. Concerns about the relationship between risk and performance produced Glass-Steagall. If these concerns are valid when commercial banking organizations have both banking and underwriting subsidiaries, we expect to see changes in performance and compensation that is tied to this performance. For example, Cornett, Ors, and Tehranian (2002) find that the accounting- and market-based performance of banking organizations that established Section 20 subsidiaries increased significantly more than banking organizations that did not have Section 20 subsidiaries. Thus, it appears that the initial alliances between commercial banking and investment banking have resulted in significant positive performance changes, and these changes could alter the optimal structure of CEO pay. Fields and Fraser (1999) provides evidence whether banking organizations that have Section 20 subsidiaries have pay-performance compensation schemes that are like those used by investment banks. They find that pay-performance sensitivities for those banks

once they begin securities underwriting are very similar to the sensitivities of non-Section 20 organizations.

The expansion of banking organizations' activities into investment banking and insurance presents opportunities to earn fee income from underwriting corporate debt and equity securities, selling and underwriting insurance products, as well as from originating and servicing loans separate from interest income earned by holding loans on the books.

The conventional wisdom among bankers, bank regulators, and bank analysts is that this growth in fee-based income has allowed banking organizations to diversify their income stream because fee-based earnings co-vary imperfectly with earnings from traditional banking products. Thus, combining banking activities with nonbanking activities such as securities, insurance, and real estate will reduce the riskiness of banking organizations. Academic studies tend to produce mixed results on the diversification effects of combining traditional banking and non-traditional banking activities.<sup>3</sup>

DeYoung and Roland (2001) find that commercial bank earnings grow more volatile as banks tilt their product mixes away from traditional intermediation activities and toward fee-based activities. They also find that the level of bank earnings increases as banks expand into fee-based activities. This suggests that there is a risk premium associated with these activities. Prendergast (2002) argues that increases in risk (or uncertainty) have could lead to a positive correlation between incentive compensation and risk. Prendergast (2002) suggests that uncertain environments result in relatively more delegation of responsibilities, and that this delegation of responsibilities in turn generates an environment in which incentive compensation is based relatively more on outputs. Thus, risk and incentive compensation are positively related.

Houston and James (1995) report no significant relationship between risk and incentive compensation. However, their data is from the 1980s. And, the banking industry today is far different from that of the 1980s.

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<sup>3</sup> See Brewer, Fortier, and Pavel (1988) for a review of some of this literature.



DeYoung and Roland (2001) provide three observations on why fee-based income may lead to more risky earning stream than income from traditional banking activities. First, banks can have qualitatively different relationships with fee-based customers than with their traditional interest-based customers. Revenue from a banking organization's traditional lending activities may actually be relatively stable over time, because switching costs and information costs make it costly for either borrowers or lenders to walk away from a lending relationship. In contrast, revenue from some fee-based activities may fluctuate more than interest-based activities, because banking organizations face high competitive rivalry, low information costs, and less stable demand in a number of these product markets (e.g., investment advice, mutual fund and insurance sales, data processing services). For example, fee-based income in the banking industry from mutual fund sales fell by about 50% in 1994, and commercial banking organizations' trading revenues fell by 39% during the second quarter of 1999. These short-run fluctuations in revenue would be unthinkable in the lending business where, even during an economic downturn, only a small percentage of loans stop making interest payments.

Second, banks use substantially different mixes of inputs to produce fee-based financial services and intermediation-based products. Once a bank has established a lending relationship, increasing the amount of credit actually extended to that customer requires the banking organization to increase only its variable costs (e.g., interest expense). In contrast, expanding the production of certain fee-based services can require the banking organization to hire additional fixed labor inputs, which can increase the organization's operating leverage. The key here is a high ratio of fixed-to-variable expenses (that is, high operating leverage) turns any given amount of revenue volatility into an even greater amount of earnings volatility.

Third, bank regulators do not require banking organizations to hold as much capital against fee-based activities as interest-based activities (see Spong, 1994, page 76), and banking organizations that take advantage of this can increase their returns to equity. For example, a Dean Witter Reynolds analyst concluded that Mellon Bank Corp. redeemed \$160 million of its preferred stock in the aftermath of purchasing securities giant Dreyfus Corp. because the combined firms "...don't need as much capital for

their fee-based business as they have for the spread business” (American Banker, December 21, 1994). Although most banking organizations will internally allocate some capital to these activities, the relative low level of capital relative to traditional interest-based activities suggests a higher degree of financial leverage—and thus higher earning volatility—for these lines of business, according to DeYoung and Roland (2001).

Despite the extensive research devoted to chief executive officers’ pay and performance, there are only a few studies addressing these issues in the banking industry. Banking is an industry in which regulation plays a major role, so moves to relax these regulations may have a significant impact on the relationship between CEO pay and performance. For example, Crawford, Ezzell, and Miles (1995) and Hubbard and Palia (1995) find that bank CEOs’ pay-performance sensitivity has increased significantly due to deregulation in the banking industry. Furthermore, Houston and James (1995) compare bank CEOs pay-performance with non-bank CEOs’ pay-performance. They find that bank CEOs have lower pay-performance sensitivity than non-bank CEOs. Barro and Barro (1990) find that bank CEOs’ pay-performance sensitivity diminishes with CEOs experience. All of these studies, however, use data from periods well before the deregulatory events considered in this study. This study adds to the growing literature on bank CEO compensation by testing whether fee-based financial service products are designed to promote greater risk-taking among banking organizations or whether they are designed to promote more stable earnings and less risk-taking than other products.

### **3. Testable hypotheses**

The theoretical literature suggests that the structure of CEO compensation should be a function of the firm risk, leverage, size, and growth opportunities (John and John, 1993; Aggarwal and Samwick, 1999; John, Saunders, and Senbet, 2000; Hermalin and Wallace, 2001; Prendergast, 2002). It is well known that because shareholders hold residual claims on earnings, their interests will often diverge from those of creditors of the firm. Shareholders will have incentives to purchase some projects with negative net present values if the increase in the shareholders’ option value from accepting these projects is sufficient enlarged. This is because shareholders keep all the gains if the investments are winners, and

they share the losses with creditors if the investments are losers. Because of this option-like payoff for shareholders, especially of highly levered firms, a CEO compensation structure that is relatively more equity-based may better serve to align the interest of the CEO with that of the firm's shareholders.

While shareholders have incentives to increase risk and leverage, there are offsetting costs that weigh against these incentives. Jensen and Meckling (1976) suggest that CEOs receive private benefits from control of the firm. Because a CEO has an undiversifiable stake in the firm that employs her human capital, she has an incentive to reduce risk in order to protect this stake (Jin, 2002). In addition, the firm's creditors (depositors) will require compensation for bearing increased risk and higher leverage in the form of a higher return on their funds, or restrict the amount of their investment, or both. Thus, the willingness of CEOs to invest in negative net present value (NPV) projects is held in check by their desire to protect their undiversified stake in the firm and the concern of creditors for the safety of their funds. This suggests that a CEO compensation structure that is relatively less equity-based can serve as a commitment device to hold in check the willingness of CEO to invest in negative NPV projects (John and Qian, 2003). This suggests that the creditors of firms with relatively low capital levels will tend to prefer CEO compensation structures that are relatively less equity-based.

However, if the creditors operate under the protection of a federal deposit insurance system, then one element of this restraint will be negated. Since depositors' funds are insured, depositors do not have any incentive to impose discipline on the use of their funds. The deposit insurer, as the guarantor of deposits, serves the role of creditor to the banking organization. So long as a greater premium is not charged for bearing risk, or covenants are not imposed to prevent excessive risk-taking, banking organizations will use deposits to engage in riskier activities than would otherwise be possible. Merton (1977) develops a framework for analyzing the cost of deposit insurance and evaluating the deposit insurer's liability. Buser, Chen, and Kane (1981) indicates that providing deposit insurance at less than its market value provides federally insured depository institutions with a subsidy. The subsidy is equal to the difference between the cost of deposits in the absence of deposit insurance and the cost of insured deposits including the deposit insurance assessment.

Many researchers, including Merton (1978), Kane (1985), and Brickley and James (1986), have indicated that a federally insured depository institution has, in addition to the tangible assets on the balance sheet, a valuable "intangible" asset in the form of access to underpriced, fixed-premium deposit insurance. The capitalized value of the subsidy is imbedded in the firm's common stock price. As long as the premium charged for insurance is less than the amount needed to compensate the deposit insurer for the exposure to risk, then expansion into riskier activities may enhance a banking organization common stock returns because risk-taking is subsidized. This behavior is referred to as the *Moral Hazard hypothesis* in Houston and James (1995) and the *FDIC hypothesis* in Crawford, Ezzell, and Miles (1995). The *Moral Hazard/FDIC hypothesis* predicts that CEOs of banking organizations with higher risk will receive a higher proportion of their overall compensation in the form of equity-based pay. This is because increased risk increases the value of the executive's equity position. On the other hand, this hypothesis predicts that executives of banking organizations with low risk will have a higher proportion of overall compensation in the form of cash-based pay. This is because such executives are like fixed-claimants. Thus, increased risk will increase their exposure to financial distress without an offsetting increase in expected benefits.

The effect of product deregulation on bank CEO's compensation structure depends on which activities are permitted, which activities banking organizations invest in, how these activities mix with other assets, and how the activities are managed. Allowing banking organizations to expand both geographically and into nontraditional financial products (e.g., investment banking activities) expands the efficient risk/return frontier available to firms. The expanded efficient risk/return frontier provides banking organizations' CEOs with more growth opportunities. Smith and Watts (1992) suggest that a CEO's actions are less readily observable if the firm has more growth opportunities. It is probably reasonable to assume that a firm's CEO knows more than shareholders and outside board members about the firm's projects and prospects. The greater is the investment opportunities that are available to CEOs the more difficult it will be to observe their investment choices. In such an atmosphere of asymmetry, there is no assurance that the self-interest behavior of the CEO will conform to that expected by

shareholders. To align the interest of the CEO with that of shareholders, the firm could tie managerial compensation to the effect of the CEO's action on firm value. Equity-based compensation contracts giving CEOs a share of the outcome of their actions encourage them to explore newer investment opportunities to increase the possibility of large payoffs (Prendergast, 2002). The conjecture that greater growth opportunities are correlated with relatively more equity-based compensation is referred to as the *contracting hypothesis* by Smith and Watts (1992).

The above arguments give rise to the following five hypotheses:

*H1:* Equity-based compensation as a fraction of total compensation (*EBC*) increases with performance. This hypothesis tests the contracting hypothesis of Smith and Watts (1992).

Empirical studies relate compensation to performance because of the incentive effects of pay on managerial actions (e.g., Jensen and Murphy, 1990; and Mehran, 1995).

*H2:* *EBC* increases (or decreases) with financial leverage. This provides a test of the Moral Hazard hypothesis. Increases in financial leverage can lead to lower *EBC* because it may prevent managers from taking poor projects.

*H3:* *EBC* increases (decreases) with risk. Like *H2*, this provides a test of the Moral Hazard Hypothesis. Holmstrom and Milgrom (1987) suggest that *EBC* for a risk-averse manager should be inversely correlated with firm risk.

*H4:* *EBC* is higher for banking organizations with relatively more noninterest income.

In the next two sections, we develop a methodology and test these hypotheses.

## **4. Methodology and data**

### **A. Methodology**

To develop a test of the above hypotheses regarding the impact of banking firm's financial characteristics on *EBC*, we specify the following regression model, similar to Houston and James (1995):

$$EBC_{j,t} = a_0 + a_1 PERFORMANCE_{j,t-1} + a_2 LEVERAGE_{j,t-1} + a_3 RISK_{j,t-1} + a_4 SIZE_{j,t-1} + e_{j,t} \quad (1)$$

where  $PERFORMANCE_{j,t-1}$  is a measure of a banking organization's market- or accounting-based performance and is captured by two variables: the market value of equity divided by the book value of equity and net income divided by total assets;  $LEVERAGE_{j,t-1}$  is a measure of a banking organization's leverage and is captured by two variables: one minus the book value of equity divided by the book value of total assets and total deposits divided by total assets;  $RISK_{j,t-1}$  is the variance of daily stock return within a year;  $SIZE_{j,t-1}$  is the value of total assets divided by 1000; and  $e_{j,t}$  is an error term.<sup>4</sup>

In the above specification a positive  $a_1$  implies that *EBC* increases with growth opportunities; a positive  $a_2$  that *EBC* increases with financial leverage; a positive (negative)  $a_3$  that *EBC* increases (decreases) with risk; and a positive  $a_4$  that *EBC* increases with the size of the banking firm.

### *Risk Hypothesis*

Regulation in banking has traditionally focused on controlling risk-taking by imposing minimum capital requirements and by limiting banks' asset and liability choices. However, the FDIC Improvement Act of 1991 (FDICIA) expanded regulatory oversight and included the compensation policies toward senior management. Houston and James (1995) suggest that FDICIA was in response to a direct recognition by regulators that compensation contracts in banking be structured to provide CEOs with excessive risk-taking incentives to exploit the provision of fixed-rate deposit insurance. And John, Saunders, and Senbet (2000) develop a model in which executive compensation contracts serve to mitigate the moral hazard problem inherent in bank regulation. Implicitly, they suggest that optimal bank executive compensation contracts may be a substitute for regulation.

Nonetheless, the sign of the relationship between risk and incentive compensation as yet is still hotly debated in the literature. For example, in most agency models, such as Aggarwal and Samwick

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<sup>4</sup> Most previous work on executive compensation has generally used one of two functional forms to estimate the relationship between compensation and firm size (Murphy, 1998, has a discussion of the different approaches). The first approach is to regress the dollar value of compensation on the dollar value of firm size. The second approach is

(1999), the outcome is a negative relationship between risk and incentive compensation. However, Prendergast (2002) argues that risk (or uncertainty) has another impact on incentive compensation that may lead to a positive correlation between incentive compensation and risk. Prendergast (2002) suggests that uncertain environments result in relatively more delegation of responsibilities, and that this delegation of responsibilities in turn generates an environment in which incentive compensation is based relatively more on outputs. Thus, uncertainty and incentive pay are positively related.

In the only other empirical study of incentive based bank CEO compensation that includes a control variable for risk, Houston and James (1995) report no significant relationship between risk and incentive compensation. However, their data is from the 1980s. And, the banking industry today is far different from that of the 1980s.

Based on the conflicting theoretical evidence, we have no priors about the sign of our risk measure.

### *The product deregulation hypothesis*

To investigate the impact of product deregulation on *EBC*, our specification includes a measure of the fee-based activities of banking organizations. We capture these activities by isolating traditional noninterest revenue and nontraditional noninterest revenue. Traditional noninterest revenue is income from fiduciary activities plus service charges on deposit accounts. Nontraditional sources of noninterest revenue are all other noninterest revenue (e.g., income from Section 20 activity).

Permitting banking organizations to engage in municipal revenue bond underwriting, commercial paper underwriting, discount brokerage, managing and advising open- and close-end mutual funds, underwriting mortgage-backed securities, selling annuities, and other investment banking expands their efficient risk/return frontier. The expanded efficient risk/return frontier provides banking

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to regress the log of compensation on the log of size. Murphy says that there is no theoretical reason to prefer one approach to the other.

organizations' CEOs with more growth opportunities. Thus, one may interpret the coefficient on nontraditional noninterest revenue as capturing how past expansion into municipal revenue bond underwriting, commercial paper underwriting, discount brokerage, managing and advising open- and close-end mutual funds, underwriting mortgage-backed securities, selling annuities, and other investment banking activities are reflected in CEO compensation structure.

To account for each of the above factors, an expanded model is used. We write the expanded model as an equation (2):

$$EBC_{j,t} = \mathbf{a}_0 + \mathbf{a}_1 PERFORMANCE_{j,t-1} + \mathbf{a}_2 LEVERAGE_{j,t-1} + \mathbf{a}_3 RISK_{j,t-1} + \mathbf{a}_4 SIZE_{j,t-1} + \mathbf{a}_5 NONRADNOINT_{j,t-1} + \mathbf{a}_6 TRADNOINT_{j,t-1} + \mathbf{a}_7 SECT20_{j,t-1} + \mathbf{a}_8 DEREGET + \mathbf{e}_{j,t} \quad (2)$$

$NONRADNOINT_{j,t-1}$  is nontraditional sources of noninterest revenue (e.g., income from Section 20 activity);  $TRADNOINT_{j,t-1}$  is traditional sources of noninterest revenue (e.g., fees from deposit services);  $SECT20_{j,t-1}$  is a Section 20 binary variable that is equal to one for the banking organizations with Section 20 subsidiaries, zero otherwise; and  $DEREG_t$  is a Reigle-Neal binary variable that is equal to one after 1996, zero otherwise.<sup>5</sup> The Section 20 binary variable captures the presence of banking organizations with Section 20 subsidiaries. This variable is likely correlated with firm size. Thus,  $NONRADNOINT_{j,t-1}$  provides a test of the importance of all forms of nontraditional sources of noninterest revenue on the structure of CEO compensation.

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<sup>5</sup> We include the Reigle-Neal binary variable in the specification to control for the impact of changes in the competitive environment on CEO compensation structure. The Reigle-Neal Interstate Banking and Branching Efficiency Act of 1994 allows banks to branch interstate by consolidating existing out-of-state bank subsidiaries or by acquiring banks or individual branches through mergers and acquisitions. Prior to the Reigle-Neal Act, federal and state laws prevented banks from expanding across state lines (with some exceptions). One exception was that a banking organization could conduct interstate banking operations through "nonbank banks"—those that do not meet the definition of a bank. Banks are commonly defined as institutions that both accept demand deposits and make commercial loans. The Reigle-Neal Act allows bank holding companies to acquire banks in any state, effective September 29, 1995, and allows mergers between banks located in different states beginning June 1, 1997. Unless states individually opt out of this branching authority or choose to adopt an earlier starting date. The deregulation associated with the Reigle-Neal Act served to increase the trend of interstate acquisitions and statewide branch banking. This created a more competitive environment by allowing banks to enter new markets and challenge incumbent banks. Stiroh and Strahan (2003) document that this type of deregulation of banking markets allowed high performing banks to increase their market share at a much faster pace after the deregulation. Thus, these competitive reallocation effects will transfer assets to better performers after deregulation, this could be reflected in the structure of CEO compensation.



The use of equity-based compensation increased during the sample period. To incorporate this dynamic effect, we estimated pooled cross-sectional time series regression equations.

## **B. Data**

The data used in this paper are for 100 banking organizations whose compensation data was found in Standard & Poor's Compustat ExecuComp database. These compensation data are based on each banks' publicly filed proxy statements. The data include measures of short-term compensation, such as base pay and annual bonus; and measures of long-term compensation, such as long-term incentive plans, restricted stock, and the value of options granted (using an approximation of the Black-Scholes option pricing method). Accounting data used in this study was obtained from bank holding company (*BHC*) *Y9* reports. The Center for Research in Security Prices (CSRP) database provides the stock market data. Our sample contains 621 firm-year observations. Equity-based compensation is measured as the value of option grants plus the value of restricted stock grants divided by the sum of salary, bonus, the value of option grants, and the value of restricted stock grants.

To obtain our measures of *RISK*, we use daily stock market data. For each year in the sample period, estimates of the variance of each banking organization's equity returns are made using data covering the twelve-month period ending with the last month of the year. Financial leverage (*LEVERAGE*) is estimated as one minus the ratio of book market value of capital to total assets. We also use the ratio of total deposits to total assets as a measure of financial leverage because several of the components in the first measure of leverage are included in the regulatory definition of total capital. *PERFORMANCE* is captured by two measures: the ratio of market to book value of the firm's equity, and *ROA*, computed as the ratio of net income to total assets. *SIZE* is total assets divided by 1000. Thus, the coefficient  $a_4$  captures how a million dollars change in total assets influences *EBC*.<sup>6</sup> *TRADNOINT* is income from fiduciary activities plus fees from deposit services divided by total revenue. *NONTRADNOINT* is all other noninterest income divided by total revenue.

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<sup>6</sup> We also included an asset growth variable in the empirical specifications. In none of the regression equations was this variable statistically significant. Thus, we do not report those results.

Table 1 provides a list of banking organizations authorized by the Board of Governors of the Federal Reserve System to engage in securities underwriting, the year such securities underwriting may be conducted through a Section 20 subsidiary, and the average asset over the sample period. The average size ranges between \$4 and \$337 billion over the 1992-2000 period.

CEOs are paid in many different ways. For some CEOs, salary accounts for only a small part of their compensation. Managers may also receive performance-related bonuses, restricted shares, and stock options. We want to test the relationship between managerial compensation, deregulation and Section 20 activity. We also want to distinguish between cash- and equity-based compensation, since the incentives for a manager to increase firm value depend on whether pay is related to such value creation. Following others such as Hubbard and Palia (1995), we break compensation into two parts: cash-based (salary plus bonus) and equity-based (value of newly granted restricted shares granted and stock options).

Table 2 shows that over the 1992-2000 period real average cash-based compensation ranges between \$1.2 to \$2 billion (reported in 1982-84 dollars) for banking organizations with Section 20 subsidiaries and between \$580,000 and \$708,000 for other organizations. Cash-based compensation represents between 25% and 63% of total new compensation for banking organizations with Section 20 subsidiaries and between 34% and 66% for other organizations. Compensation varies widely across banking organizations and time, which is not surprising since most of our banking organizations grew significantly over the sample period. Even after normalizing compensation for asset size, there is still a wide variation. For banking organizations with Section 20 subsidiaries, total compensation ranges from \$0.0564 to \$0.1366 per thousand dollars of assets, while cash compensation ranges from \$0.0353 to \$0.0434 per thousand dollars of assets. For other banking organizations, total compensation ranges from \$0.1284 to \$0.2689 per thousand dollars of assets, while cash compensation ranges from \$0.0848 to \$0.1094 per thousand dollars of assets.

Figure 1 presents additional information on how the compensation structure has changed over the 1992 and 2000 sample period. Equity-based compensation as percent of direct compensation is reported for both banking organizations with Section 20 subsidiaries and those without Section 20 subsidiaries.

Three findings are worth noting. First, equity-based compensations as a percent of direct compensation (*EBC*) is increasing over the years: in 1992, *EBC* was 30%; that percentage was about 53% by 2000. Banking organizations with Section 20 subsidiaries tend to have on average higher *EBC* than other firms. In fact, over our sample period, average equity-based compensation as a percent of direct compensation was 49% for Section 20 banking organizations and 37% for non-Section 20 firms. Third, in the period after 1994, it appears that *EBC* at non-Section 20 firms is increasing at a slightly faster rate than that at Section 20 banking organizations. For example, *EBC* of Section 20 banking organizations average 55.72 percent over the 1995-2000 period, about 15.15 percent more than over the 1992-1994 period; *EBC* of non-Section 20 banking organizations average 41.97 percent over the 1995-200 period, about 17.02 more than over the 1992-1994 period. Thus, it appears that non-Section 20 firms are increasing the use of equity-based compensation at a faster rate than Section 20 firms.

## 5. Empirical results

We estimate equation (2) to examine the correlation between equity-based compensation and characteristics of banking organizations. Table 3 reports the summary statistics for the variables used in our regression specifications. Table 4 presents the results of these pooled cross-sectional time series regression using annual data from 1992 to 2000. Regression (1) of table 4 uses the market-to-book value ratio as the performance measure and the ratio of total deposit to total asset as the leverage measure to examine the correlates between equity-based compensation and the firm's financial characteristics (excluding firm size). Regression (2) of table 4 includes firm size in the specification reported in (1).

The results in columns (1) and (2) are consistent with the results of prior research. Like Houston and James (1995), we find that *EBC* is significantly and positively correlated to the market-to-book value ratio. This result is consistent with the hypothesis that banking organizations with greater investment opportunities are more likely to rely on equity-based incentives. We also find a negative but insignificant correlation between leverage and *EBC*. The positive coefficient on the risk variable (measured by the variance of stock returns) suggests that equity-based incentives increase with the level of risk taking. The Section 20 binary variable is positive and statistically significant in column (1) regression, suggesting that

banking organizations' with Section 20 subsidiaries, on average, have higher *EBC*. But when size is included (Regression (2)), the Section 20 binary variable is not significant at conventional levels. *EBC* is positively and significantly correlated with a banking organization's size.

Column (3) reports the results using the ratio of total deposits to total asset as the leverage measure. Like the variable one minus the ratio of book market value of capital to total assets, this ratio is not significantly correlated with *EBC*.

Column (4) reports the results using return on assets as the performance measure and the variable one minus the ratio of book market value of capital to total assets as the leverage variable. Return on assets is positively correlated with *EBC*, but it is insignificant at the conventional levels. The leverage measure is also insignificant at the conventional levels. Column (5) uses the ratio of total deposits to total asset as the leverage measure. Again, this variable is not significantly correlated with *EBC*.

Overall, the Reigle-Neal indicator variable is positive, consistent with the increased use of equity-based incentives after the passage of Interstate Banking and Branching Efficiency Act in 1994. This is consistent with the findings of Kole and Lehn (1999) who study the impact of deregulation on the airline industry.

The variable capturing product mix changes, nontraditional noninterest revenue divided by total revenue, is positive and statistically significantly correlated with *EBC*, suggesting that CEOs of banking organizations with higher than average nontraditional noninterest revenue (e.g., from activities of Section 20 subsidiaries as well as other nontraditional activities), on average, have significantly more equity-based compensation. Cornett, Ors, and Tehranian (2002) find that a banking organization's performance following the establishment of Section 20 subsidiaries improved relative to a control group of banking organizations that did not establish Section 20 subsidiaries. As indicated in figure 2, banking organization with Section 20 subsidiaries tend to have relatively more revenue from nontraditional noninterest sources. Since Section 20 activities generate nontraditional noninterest revenue, our results are consistent with the conjecture that CEOs of Section 20 banking organizations captured some of these gains in the form of higher equity-based compensation relative to CEOs of non-Section 20 firms.

## 6. Conclusion

One of the fundamental components of corporate governance is a well-designed CEO compensation package. However, very little attention has been paid to how executive compensation structures adjust to major public policy induced changes in firms operating environments.

This paper examines CEO equity-based compensation in the banking industry using 1992-2000 data. This time period captures perhaps the most significant deregulation that has ever occurred in the banking industry (Calomiris, 2000). Additionally, the use of equity-based compensation (i.e., stock options and restricted shares) to motivate executives has recently come under increased public and congressional scrutiny. The resulting concerns have led to demands for greater transparency in executive stock option programs and, possibly, to elimination of the programs altogether because they are claimed to be a poor way to measure an executive's contribution to firm performance. Over the nine-year period that we examine a number of regulatory changes have afforded banking organizations a greater degree of managerial discretion and incentive to use equity-based compensation. Deregulation increases the CEO's investment opportunity set and could make it difficult for shareholders to evaluate the executive's actions, thus exaggerating the information asymmetry problems between executives and shareholders. In such an atmosphere of greater degree of managerial discretion, there is no assurance that the self-interested behavior of CEOs will conform to that expected by shareholders (Prendergast, 2000). In addition, beginning in 1987, the Board of Governors of the Federal Reserve System began to permit banking organizations to form separately capitalized security subsidiaries to underwrite corporate debt and equity securities under the Section 20 provisions of the Glass-Steagall Act. This deregulation expands the investment opportunities for banking organizations. In this paper, we document a positive correlation between the nontraditional noninterest sources of revenue, including revenue from Section 20 activity, and the use of equity-based compensation. This positive association is consistent with Smith and Watts (1992) conjecture that greater investment opportunities are correlated with relatively more equity-based compensation to align the interest of CEOs and shareholders. We also document a higher percentage of equity-based compensation in the period after the passage of the Reigle-Neal Interstate Banking and

Branching Efficiency Act of 1994. Thus, banking organizations appear to respond to geographical deregulation by providing relatively more equity-based incentives to better align CEOs' incentives with those of shareholders. This is consistent with the theoretical argument of Prendergast (2002) and the empirical findings of Kole and Lehn (1999).

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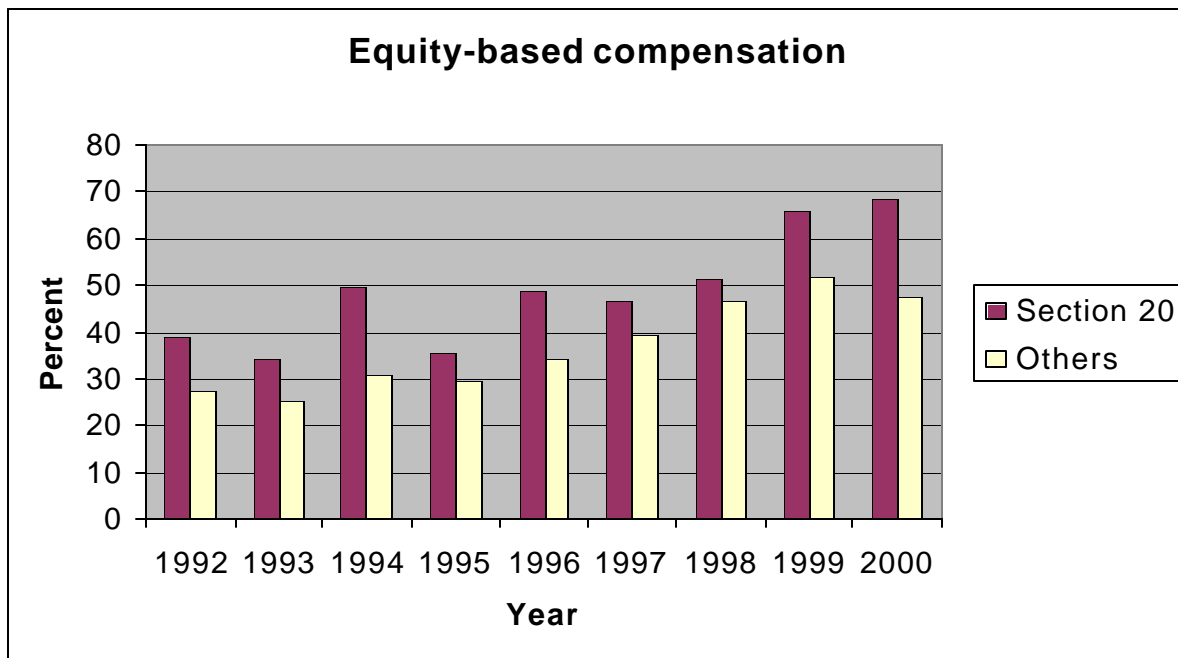
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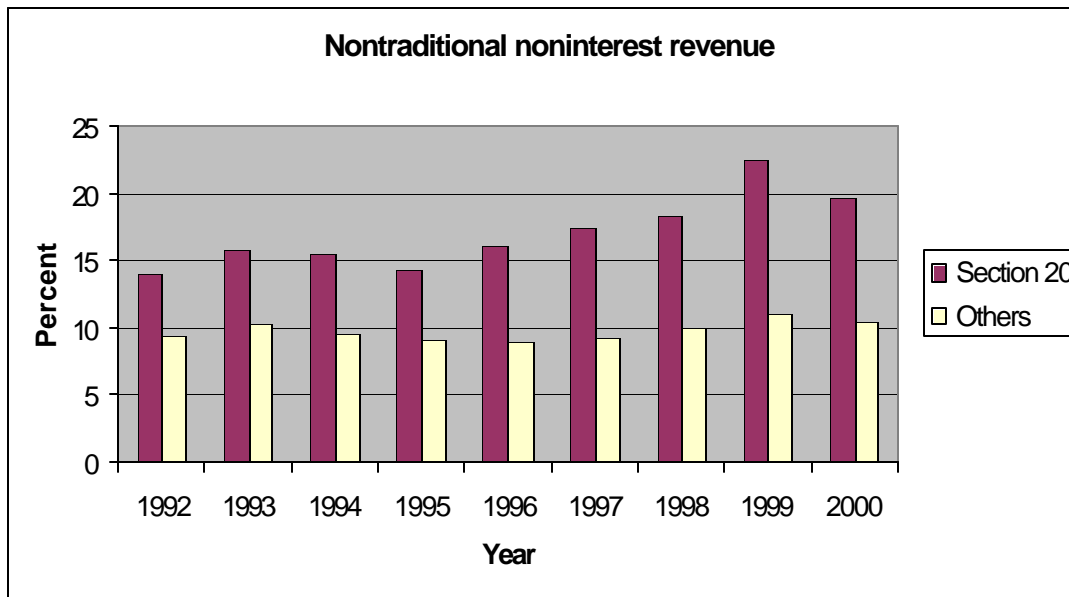
**Figure 1**  
**The distribution of equity-based compensation as a percent of direct compensation by year**



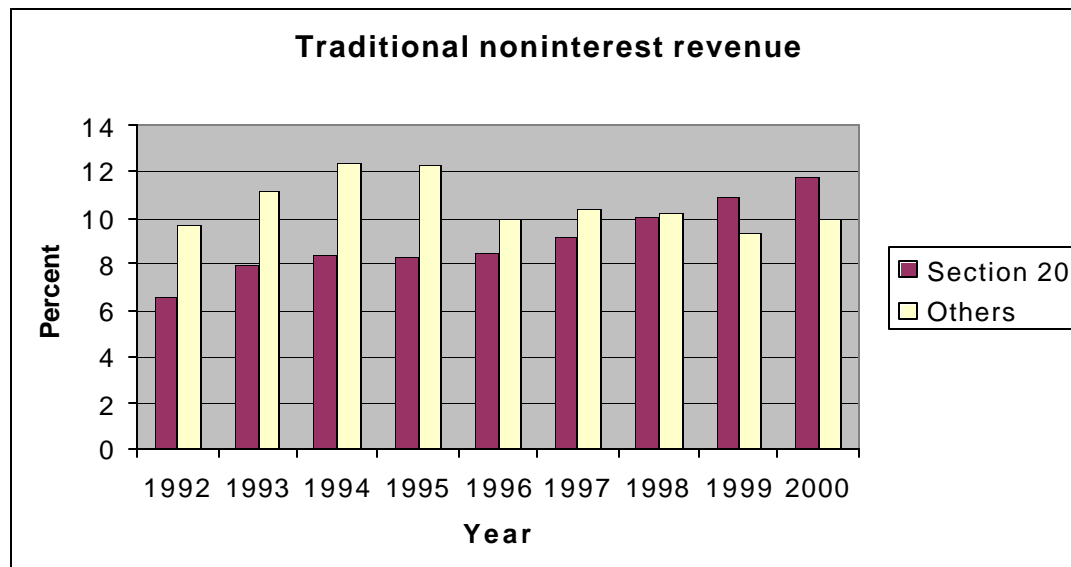
**Figure 2**  
**The distribution of noninterest revenue by year**

Traditional noninterest revenue is income from fiduciary activities plus service charges on deposit accounts. Nontraditional noninterest revenue is all other noninterest revenue.

**A. Nontraditional noninterest revenue**



**B. Traditional noninterest revenue**



**Table 1**  
**Bank holding companies with Section 20 subsidiaries**

	Initial Order	Average total assets (billion of dollars)
Bankers Trust New York Corporation	4/87	108
Citicorp	4/87	254
J.P. Morgan & Company	4/87	198
Chase Manhattan Corporation	5/87	438
Chemical New York Corporation	5/87	161
PNC Financial Corporation	7/87	71
First Interstate Bancorp	10/87	53
Bank of Boston Corporation	8/88	53
First Chicago Corporation	8/88	56
Fleet/Norstar Financial Group	10/88	97
Huntington Bancshares Incorporated	11/88	24
Barnett Banks, Inc.	1/89	40
NationsBank Corporation	5/89	159
Southtrust Corporation	7/89	62
First Union Corporation	7/89	149
Norwest	12/89	121
Banc One Corporation	7/90	149
Dauphin Deposit Corporation	6/91	5
Synovus Financial Corporation	9/91	10
BankAmerica Corporation	3/92	229
National City Corporation	2/94	70
SunTrust Banks Inc.	8/94	62
First of America Bank Corporation	10/94	23
Mellon Financial Corporation	4/95	47
Bank of New York Co Inc.	6/96	69
KeyCorp	2/96	81
Corestates Financial Corporation	8/97	33
BB&T Corporation	9/97	46

**Table 2 Deregulation and CEO compensation**

This table reports means for various components of CEO compensation for banking organizations with Section 20 subsidiaries. All data are from ExecuComp. The p-value reports the significance of the difference between the two sample means. All dollar values are in thousands; and converted to 1982-84 dollars using the Consumer Price Index for All urban Consumer (CPI-U). Total cash compensation is the sum of salary and bonus. Total equity-based compensation is the sum of the value of stock options granted and stock shares granted. Total compensation is the sum of total cash compensation and total-equity based compensation. The percentage of equity-based compensation (EBC) is total equity-based compensation divided by total compensation.

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Cash Compensation									
Section 20	1,221.63	1,655.34	1,363.28	1,379.91	1,685.10	2,025.98	1,729.28	1,919.58	2,005.21
Others	580.33	610.54	595.70	665.97	637.69	675.90	696.69	707.92	696.08
<i>P-value</i>	<i>0.0000</i>	<i>0.0010</i>	<i>0.0000</i>	<i>0.0008</i>	<i>0.0011</i>	<i>0.0003</i>	<i>0.0014</i>	<i>0.0019</i>	<i>0.0297</i>
Equity-based Compensation									
Section 20	993.56	1,120.08	1,860.83	809.42	1,715.90	2,546.85	2,326.85	4,187.67	6,046.35
Others	395.58	309.13	434.42	412.95	668.52	732.50	1,273.59	1,395.12	1,160.96
<i>P-value</i>	<i>0.0148</i>	<i>0.0259</i>	<i>0.0016</i>	<i>0.0097</i>	<i>0.0077</i>	<i>0.0117</i>	<i>0.0322</i>	<i>0.0149</i>	<i>0.0384</i>
Total Compensation									
Section 20	2,215.19	2,775.41	3,224.12	2,189.34	3,401.99	4,572.75	4,055.50	6,107.25	8,051.56
Others	975.91	919.67	1,030.11	1,078.92	1,306.21	1,408.48	1,970.28	2,103.04	1,857.04
<i>P-value</i>	<i>0.0013</i>	<i>0.0011</i>	<i>0.0002</i>	<i>0.0004</i>	<i>0.0003</i>	<i>0.0004</i>	<i>0.0029</i>	<i>0.0049</i>	<i>0.0177</i>
Compensation per thousand dollars of total assets									
Cash									
Section 20	0.0372	0.0434	0.0397	0.0353	0.0358	0.0401	0.0381	0.0389	0.0383
Others	0.0904	0.0966	0.0924	0.1058	0.1094	0.1090	0.0962	0.0919	0.0848
<i>P-value</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0002</i>	<i>0.0062</i>
Equity-based									
Section 20	0.0224	0.0222	0.0375	0.0211	0.0361	0.0517	0.0547	0.0859	0.0982
Others	0.0374	0.0437	0.0528	0.0641	0.1019	0.1100	0.1727	0.1449	0.1153
<i>P-value</i>	<i>0.0373</i>	<i>0.0301</i>	<i>0.1928</i>	<i>0.0053</i>	<i>0.0434</i>	<i>0.0443</i>	<i>0.0453</i>	<i>0.1987</i>	<i>0.6934</i>

**Table 3 Deregulation and CEO compensation, continuation**

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total									
Section 20	0.0596	0.0655	0.0772	0.0564	0.0729	0.0918	0.0929	0.1248	0.1366
Others	0.1284	0.1403	0.1452	0.1699	0.2113	0.2190	0.2689	0.2368	0.2002
<i>P-value</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0002</i>	<i>0.0000</i>	<i>0.0003</i>	<i>0.0004</i>	<i>0.0063</i>	<i>0.0484</i>	<i>0.0305</i>
% <i>EBC</i>									
Section 20	38.70	34.26	49.79	35.61	48.58	46.58	51.30	66.02	68.32
Others	27.18	25.07	30.81	29.63	34.08	39.44	46.65	51.72	47.13
P-value	0.0109	0.0553	0.0001	0.2218	0.0068	0.2499	0.4761	0.0073	0.0025

**Table 3**  
**Summary statistics, selected accounting and market variables, 1992-2000**

	Mean	Median	Standard deviation
Equity- based compensation	39.0006	38.1637	24.0766
Market-to-book value	2.0178	1.7319	1.4944
Net income divided by total assets)	1.0874	1.1398	0.4893
(One minus book capital divided by total assets)	92.2346	92.3582	1.4944
Deposit-to-total assets	72.9102	74.7226	11.0508
Standard deviation of stock returns	0.3307	0.2560	0.2808
Traditional noninterest revenue divided by total operating income	11.0754	9.3556	6.7235
Nontraditional noninterest revenue divided by total operating income	10.1985	8.2561	7.9325
Total assets	\$41.4 billion	\$17.6 billion	\$66.0 billion

**Table 4**  
**Correlates between CEO's equity-based compensation and firm financial characteristics**

This table reports the regression results of correlating EBC and banking organization's financial characteristics using the following equation:

$$EBC_{j,t} = a_0 + a_1 PERFORMANCE_{j,t-1} + a_2 LEVERAGE_{j,t-1} + a_3 RISK_{j,t-1} + a_4 SIZE_{j,t-1} + a_5 NONTRADNOINT_{j,t-1} + a_6 TRADNOINT_{j,t-1} + a_7 SECT20_{j,t-1} + a_8 DEREG_t + e_{j,t}$$

The dependent variable is the percentage of EBC for CEOs. The percentage of equity-based compensation (EBC) is total equity-based compensation divided by total compensation.  $PERFORMANCE_{j,t-1}$  is captured by two variables: the market value of equity divided by the book value of equity and net income divided by total assets.  $LEVERAGE_{j,t-1}$  is captured by two variables: one minus the book value of equity divided by the book value of total assets and total deposits divided by total assets.  $RISK_{j,t-1}$  is the variance of daily stock return within a year;  $SIZE_{j,t-1}$  is the natural logarithm of total assets divided by 1000;  $TRADNOINT_{j,t-1}$  is noninterest revenue from fiduciary activities plus service charges on deposit accounts divided by operating income;  $NONTRADNOINT_{j,t-1}$  is noninterest revenue are all other noninterest revenue (e.g., municipal revenue bond underwriting, commercial paper underwriting, discount brokerage, managing and advising open- and close-end mutual funds, underwriting mortgage-backed securities, selling and underwriting various forms of insurance products, selling annuities, and other investment banking activities via Section 20 subsidiaries);  $DEREG_t$  is a Reigle-Neal binary variable that is equal to one after 1996, zero otherwise;  $SECT20_{j,t-1}$  is a Section 20 binary variable that is equal to one for the banking organizations with Section 20 subsidiaries, zero otherwise, and  $e_{j,t}$  is an error term. Number of firm-year observations is 621. Numbers in parentheses below the coefficient estimates are t-statistics. The t-statistics are starred if the regression coefficients are significantly different from zero at the 10 (\*), 5(\*\*), and 1 (\*\*\*) percent level.

	(1)	(2)	(3)	(4)	(5)
<i>Performance measures</i>					
Market-to-Book	2.3762 (1.99)**	2.9832 (2.45)**	2.8635 (2.42)**		
Net income-to-Total Assets				1.3374 (0.53)	1.9380 (0.85)
<i>Leverage measures</i>					
Deposit-to-Total Assets			0.1594 (1.56)		0.1613 (1.57)
(One minus Book capital divided by total assets)	-0.1793 (-0.29)	-0.7243 (-1.16)		-0.6228 (-0.89)	
Risk	8.4486 (2.48)**	10.7405 (3.16)**	9.3544 (2.82)**	11.8320 (3.04)**	11.0970 (2.83)**



**Table 4**  
**Correlates between CEO's equity-based compensation and firm financial characteristics, Cont'd**

	(1)	(2)	(3)	(4)	(5)
Size		4.6517 (4.52) <sup>***</sup>	5.0556 (4.65) <sup>***</sup>	4.4289 (4.30) <sup>***</sup>	4.9082 (4.50) <sup>***</sup>
Nontraditional noninterest revenue divided by total revenue	0.6676 (4.39) <sup>***</sup>	0.4211 (2.64) <sup>***</sup>	0.4803 (2.94) <sup>***</sup>	0.4909 (3.08) <sup>***</sup>	0.5412 (3.31) <sup>***</sup>
Traditional noninterest revenue divided by total revenue	-0.1057 (-0.84)	-0.1454 (-1.17)	-0.1531 (-1.24)	-0.0905 (-0.35)	-0.0487 (-0.35)
Section 20 binary	6.7199 (2.98) <sup>***</sup>	0.3249 (0.12)	0.4235 (0.16)	0.2824 (0.11)	0.3546 (0.13)
Reigle-Neal binary	12.3341 (5.51) <sup>***</sup>	10.6480 (4.77) <sup>***</sup>	11.6905 (5.23) <sup>***</sup>	13.6155 (7.27) <sup>***</sup>	14.4135 (7.64) <sup>***</sup>
Asset growth	0.9665 (0.22)	2.0715 (0.48)	2.0406 (0.48)	4.1213 (0.97)	3.9324 (0.93)
Adjusted R-square	0.1837	0.2092	0.2106	0.2017	0.2039