



NEW YORK UNIVERSITY SALOMON CENTER

VOLUME 3 • NUMBER 5

FINANCIAL MARKETS, INSTITUTIONS & INSTRUMENTS

Recent Developments in Financial Economics:
Selected Surveys of the Literature

Blackwell Publishers • Cambridge, MA • Oxford, UK

Recent Evidence on Bank Mergers

BY DARIUS PALIA

Numerous studies have examined bank mergers that were completed during the late 1970s and 1980s. With federal deregulation of interstate banking a very real possibility, many more banks are likely to merge in the 1990s. Learning the lessons from history might help banks in dealing with the impending explosion of bank mergers. This paper reviews studies which examine bank mergers from two different approaches—one used heavily by bank merger practitioners and primarily using accounting data, and the other using stock price data. The evidence from these two approaches is compared and contrasted. A sample of traded banks is then examined for any relationship between these two approaches. We find a negative relationship between the bid premiums and the excess returns earned by the acquirer, when the acquiring bank has high levels of managerial ownership.

I. INTRODUCTION

The last fifteen years has been a remarkable period in the consolidation of the United States banking industry. The number of bank merger and acquisitions has grown considerably with a definite surge in bank mergers after 1981 (see Table 1). This growth in the number of bank mergers has been largely due to the changing economic and regulatory environment. With the reduction in the severity of strict antitrust guidelines enforcement and the gradual removal of geographical restrictions by individual states on bank expansion, bank mergers have been completed in a relatively conducive environment.

This environment is likely to be further deregulated in the near future. In fact, a recent House-Senate conference committee has paved the way for "true" national banking across interstate lines (see the Wall Street Journal, July 26, 1994, page A1). This bill is now ready for a Congressional vote and would allow full-scale banking across state lines beginning in June 1997. In response to this deregulatory atmosphere many banks are pondering the question: to acquire or to be acquired? In fact, Edward E. Crutchfield, chief executive officer of First Union Corporation, predicts that eight to ten institutions will account for fifty to eighty percent of the nation's banking business within the next three to five years. Susan Philips, a Federal Reserve Governor, agrees that "eighty percent is not out of the question." Given that a bank merger wave has begun among the existing 11,625 U.S. banks, understanding bank mergers and acquisitions is an important research issue.

This paper presents recent evidence that examines the motivations of merging banks. In answering this question, the literature has examined the prices offered by acquirer banks for the respective target bank. Underlying this research methodology is the implicit assumption that the price offered for a target bank reflects the motivations of the two merging banks. Accordingly, some studies have examined the bid premium offered for the target bank—defined as the ratio of the market

Table 1: Number of Bank Mergers 1975–1992

Year	Number of Mergers ^a	Year	Number of Mergers ^a
1975	137	1984	550
1976	135	1985	538
1977	138	1986	632
1978	144	1987	711
1979	179	1988	569
1980	194	1989	390
1981	361	1990	455
1982	428	1991	434
1983	430	1992(<i>preliminary</i>)	520

Source: Stephen Rhoades

NOTE:

^aThese mergers do not include failed or foreign banks.

price offered for the target bank, to the book value of equity in the target bank. An alternative approach is to examine the excess returns (over the market) earned by the acquirer on announcement of the merger. Such a method uses the stock market's reaction to the price offered as a measure of the value of the merger. We begin by discussing each of these two approaches and their respective advantages and disadvantages. The results of studies using these two approaches are then reviewed for common and contrasting findings. Finally, we examine a sample of large, traded banks to connect the two approaches, by testing for any relationship between the bid premiums and excess returns.

We observe that target banks earn significantly positive excess returns, whereas the evidence on acquirer banks is mixed. Further, the studies that examine the bid premiums generally analyze many more mergers and many more variables than the studies that examine excess returns. The growth rate of the target bank is not found to be of any significance. Importantly, the banking regulation in the target bank's state has a definite influence on the price offered. Generally, the more restrictive the state regulation, the higher the bid premiums (and lower the excess returns). In addition, there exists a manager-shareholder conflict in banks which significantly affects the value of a target bank. The relationship is non-monotonic in the percentage of shares owned by managers. The evidence on the profitability and capital-adequacy of the target bank is mixed, as is the evidence on the relative size of the two merging banks. Lastly, we find a negative relationship between the bid premiums and excess returns when the acquirer bank has high managerial ownership levels.

In Section II we give a brief historical overview of the regulation that is relevant to bank mergers. Section III explains the different merger motivations that have been proposed in the literature, and summarizes the results of the bid premium

and excess return studies. In Section IV we connect the two approaches by testing for any relationship between bid premiums and excess returns. Section V presents our conclusions.

II. BANK REGULATION

Due to banking's importance in all aspects of the economy, bank mergers are governed by a number of regulatory authorities. The major federal statutes that govern bank mergers are the Bank Holding Company Act (BHC Act), the Bank Merger Act and in a more general sense, Section 7 of the Clayton Act.

Under the Bank Merger Act of 1960 the three federal regulatory agencies, the Board of Governors of the Federal Reserve System (the Board), the Office of the Comptroller of the Currency (OCC), and the Federal Deposit Insurance Corporation (FDIC) are required to take into account the competitive effects of a proposed merger.¹ The agency to which a merger application should be submitted depends on the "resultant bank." If the resultant bank is a nonmember insured bank, the application needs to be made to the FDIC. If the resultant bank is a state member bank the application has to be made to the Board, and if it is a national or district bank the merger application should be made to the OCC. The Department of Justice may prevent consummation of the merger within 30 days of the approval from the relevant federal agency. After this 30-day period, the merger is immune from the Department of Justice and any other private party litigation. The one exception is if the charge is attempted monopolization under Section 2 of the Sherman Act or if the merger is to be reviewed as "de novo," i.e., the establishment of a newly chartered branch by the parent bank.

The BHC Act regulates companies that 1) own 25 percent or more of the stock of a bank; 2) control the election of the majority of the directors of a bank; or 3) the Board determines who exercise a controlling influence over a bank.² Further, the BHC Act rules that the proposed merger should be analyzed under the general principles of Section 7 of the Clayton Act and the Bank Merger Act. The BHC Act requires approval by the Federal Reserve Board of any action that causes a bank to become a subsidiary of a bank holding company. In the case where a bank holding company acquires more than five percent outstanding shares of any class of voting securities of a bank, Board approval is also required. Thus, we note that a bank has reasonable discretion as to which statutory agency should regulate the merger.³ Any of the three previously stated agencies could disapprove any proposed merger that would result in a significant increase in market concentration. In each case, the responsible agency takes into consideration the future prospect of the existing and proposed institution, and the convenience and needs of the community to be

¹Title 12 of U.S. Code Section 1828.

²Title 12 US Code 3 1841.

³For a more detailed discussion of some strategies that could be effectively used, see Beatty et al. (1987).

served. Exactly what defines a banking product and its geographical market has been a continuing topic of debate.

A comprehensive and exact definition of a bank's product market has not been specifically stated in the law. However, different definitions of a bank's product market have evolved from various judicial decisions. In the Philadelphia National Bank⁴ case, the Supreme Court defined the relevant line of commerce as "the cluster of commercial banking services differentiating commercial banking as a unique line of business." Therefore, in applying the antitrust guidelines, only commercial banks should be considered. In the Connecticut National Bank⁵ case, the Supreme Court declined to include thrift institutions in its analysis but acknowledged that they may be included "when and if savings banks become significant participants in the marketing of bank services to commercial enterprises."

Geographic markets for commercial banks are generally considered to be local. In the Philadelphia National Bank case, the Supreme Court ruled that the relevant bank geographic market is the area wherein the bulk of the bank customers that are neither very large nor very small find it practical to do their business. In the Connecticut National Bank case, the Supreme Court rejected the State of Connecticut as the geographic market and ruled that the relevant geographic market would be a segmented group of bank office areas. The definition of geographic market is subjective and handled on a case by case basis.

After determining the appropriate product and geographic markets, antitrust guidelines dictate that regulators must examine the effect of the proposed merger on current competition. In the Phillipsburg National⁶ case, the Supreme Court stated that "a merger which produces a firm controlling an undue percentage of the relevant market, and results in a significant increase in the concentration of firms in that market, is so inherently likely to lessen competition substantially that it must be enjoined in the absence of evidence clearly showing that the merger is not likely to have such anticompetitive effects."

The reduction in the severity of enforcing strict antitrust guidelines and the encouraging attitude of bank regulators towards mergers, has made the bank merger environment very favorable. The Board initially appeared to be more conservative than the other regulatory bodies as manifested in its potential competition doctrine. In the Marine Bancorp⁷ case, the Supreme Court reserved judgment on the Board's application of the potential competition doctrine to "concentrated" markets wherein there was a potential reduction in competition and suggested that bank mergers can have pro-competitive effects by increasing competition in markets dominated by a few select institutions.

In June 1982, the Department of Justice released its Merger Guidelines (1982). According to the Guidelines, one has to compute the Herfindahl-Hirschman Index

⁴US v. Philadelphia National Bank, 374 U.S. 321, 359, 1963.

⁵US v. Connecticut National Bank, 418 U.S. 602, 1974.

⁶US v. Phillipsburg National Bank and Trust Co., 399 U.S. 350, 1970.

⁷US v. Marine Bancorp, 418 U.S. 602, 1974.

Table 2: Department of Justice Merger Guidelines (1982)

Post-merger Concentration	HHI	Post-merger change in HHI and likelihood of a challenged merger
Highly concentrated.	Greater than 1000	Greater than 100—likely to be challenged. 50 to 100 on a case by case basis. ^a Less than 50—unlikely to be challenged.
Moderately concentrated.	1000 to 1800	Greater than 100—likely to be challenged. Less than or equal to 50—unlikely to be challenged.
Unconcentrated.	Less than 1000	Any increase—unlikely to be challenged.

Source: US Department of Justice Merger Guidelines, 1982.

NOTE:

^aThe factors given consideration are terms of scale, nature of product, ease of entry, etc. In order that the law identify markets with individually dominant banks, a "lead firm" provision was introduced. According to this provision a merger is likely to be challenged if it is between the lead firm and a firm with a market share of one percent or more, provided that the lead firm has a market share of 35 percent or more, and is approximately twice the size of the second largest firm in the market.

(HHI), calculated by adding together the squares of the market shares of a market's participants. For example, if there are four firms in a market and their market shares are 45%, 25%, 20% and 10%, the HHI would be computed as follows: $(45)^2 + (25)^2 + (20)^2 + (10)^2 = 3150$. In evaluating the merger, the law considers both the level of post merger concentration and the increase in concentration resulting from the merger. See Table 2 above.

In late 1990 and 1991, the Department of Justice (the Department) challenged two bank mergers that had been approved by the Board. On December 26, 1990, the Department filed a suit to block the proposed acquisition of First Interstate of Hawaii by First Hawaiian.⁸ The Board had approved the merger subject to the divestiture of four branches and a financial services loan office. The Department required more branches to be divested and the abolishment of the First Interstate franchise. In March 1992, the Department filed suit to block another merger (the Society-Ameritrust merger) already approved by the Board. The Department settled the case by requiring that the acquiring bank divest about 30 more branches.

Subsequently, the Department issued the 1992 Horizontal Merger Guidelines (62, Antitrust and Trade Regulation Rep. (BNA) No. 1559 on April 2, 1992). Accordingly the Guidelines describe five steps that are required to determine whether

⁸United States v. First Hawaiian Inc. and First Interstate of Hawaii, Inc., 1991-1 Trade Cases (CCH) S. 69, 457 (D. Hawaii, May 29, 1991).

a proposed bank merger is likely to raise anticompetitive concerns. Step one involves product and geographic market definition, measurement, and concentration. "A market is defined as a product or group of products and a geographic area in which it is produced or sold such that a hypothetical profit-maximizing firm, . . . would impose a small but significant and nontransitory increase in price, assuming the terms of sale of all other products are held constant."⁹ Ordinarily the Department uses a five percent increase in price as the measure of small but significant and nontransitory increase in price, although this level is used as a methodological tool and not as a tolerance level for price increases. The geographic market is hence defined with respect to the product market and is largely done on a case by case basis. The Herfindahl-Hirschman Index (HHI) is calculated and a merger is likely to be challenged if there is an increase of over 200 points in a specific market to a level over 1,800. Step two examines the potential adverse competitive effects of mergers. These adverse competitive effects can generally fall under two categories, namely, coordinated actions (for example, where each bank can offer "cheaper" loan products if the other bank deviates from coordinated actions such as tying the terms of the loan to the prime rate or the borrower risk class), and unilateral effects (where the merged bank can raise loan rates without fearing that rival banks can lend to the affected customers). In step three, the Department examines banks currently providing the banking product as well as "uncommitted entrants," i.e., banks that would provide such services to affected customers without having to invest significantly in sunk costs. Step four examines whether the merger will result in a net gain in efficiency. In step five, regulators are more lenient in the previous four steps, after checking if the target bank is close to failing. However, it is important to note that the Department generally rectifies potential problems in most bank mergers by suggesting divestitures of branches, loan facilities, etc., so as to offset the competition that might be lost through the merger. Consequently, very few bank mergers do not get completed due to antitrust reasons.

INTERSTATE BANK MERGER REGULATION

Geographic restrictions on bank expansion particularly across state lines have long been part of the U.S. banking system. State banks could conduct business only in their home office cities and could branch outside if authorized by the state in which they were chartered. National banks who came under the supervision of the Federal Government were severely restricted to their home office cities. The Comptroller of the Currency subsequently urged legislation that would permit national banks to branch at least to the extent of the state chartered banks. This resulted in the McFadden Act of 1927 which stated that national banks can branch in any state within the geographical limits specified by that state. Fearful of unbridled expansion by national banks, a number of states enacted anti-branching

⁹The 1992 Horizontal Merger Guidelines (S. 1).

laws. Thus, the McFadden Act of 1927 defined banking markets as statewide by allowing national banks to branch within the geographical limits permitted to state chartered banks. However, many banks overcame these restrictions with the use of multi-bank holding companies. If a state did not allow a bank to open a branch, the bank could form a (multi-bank) holding company which acquired a bank across state lines. As a result of this loophole in the McFadden Act, some form of interstate banking was already being practiced. The Douglas Amendment to the Bank Holding Act of 1956 plugged this loophole by specifying that the Board could not approve an application by a bank holding company to acquire five percent of the voting shares of interest in all, or substantially all, of the aspects of any bank located outside of the holding company's home state.¹⁰ To avoid conflicts with states' rights, the Douglas Amendment allowed a bank holding company to acquire a bank located outside its home state provided the target bank's state specifically allowed it.

The state boundary restriction for bank expansion has changed considerably since 1980 with a number of states (49 out of 50 as of 1993) passing some type of interstate banking law, i.e., exploiting the "states' rights" loophole of the Douglas Amendment. In June 1985, interstate acquisition and mergers was fully legitimized when the Supreme Court ruled in *Northeast Bancorp v. Board of Governors*¹¹ that "State statutes . . . comply with the Douglas Amendment and they do not violate . . . clause(s) of the U.S. Constitution." According to this ruling, a state could say nothing and thus prevent entry by any out-of-state bank holding companies, or it could specifically allow out-of-state bank holding companies to acquire or establish in-state banks to the same extent as could in-state bank holding companies. Thus, every state had to explicitly make a choice with regard to its "de novo" entry and acquisition regulations. With this case, more states passed interstate banking laws. A number of states now belong to what is referred to as interstate regional pacts. For example, Kansas belongs to the regional market comprising of Arkansas, Colorado, Iowa, Missouri, Nebraska and Oklahoma. A few states have reciprocal relationships with their member states whereas some allow national entry or have a nationwide trigger date.

More recently, national banking took a large step forward at the federal legislative level (see *New York Times*, July 26, 1994, page D1). A conference committee report that allows for total interstate branching has passed both the House Ways and Means Committee and the Senate Banking and Finance Committee. In fact, many Senators and banking experts predict that the bill would pass before the Congressional session ends this autumn.¹² This bill provides for banks to branch

¹⁰Title 12 US Code S. 1842 (d).

¹¹105 S. Ct. 2545, 1985.

¹²This sentiment can be illustrated by the comments of Senator Dodd of Connecticut who states "They're not going to let this bill be derailed" and Karen Shaw, a banking company consultant: "One way or the other, sooner or later, this bill will be approved by both Houses" (*New York Times*, July 26, 1994, page D2).

in any state (except for states that explicitly disallow such legislation), permitting banks to establish national branch networks for the first time in U.S. banking history. This would allow someone who had an account with Citibank in New York to make a deposit at a Citibank office in Connecticut. Currently, Citibank has to create separate subsidiaries in each state and, importantly, cannot satisfy such a deposit transaction. Although, the Northeast and Western states have developed significantly with regard to interstate banking, the Southeast, particularly Florida, could experience significant changes since it practices regional reciprocal banking with strong limitations on outside banks entering its region.

III. BANK MERGER MOTIVATIONS

Several hypotheses have been proposed to explain why banks engage in merger activities. Like other investment decisions, the decision of a bank to acquire (or to be acquired by) another bank is primarily dependent on the price that one offers (or one accepts). The price offered for a target bank is the outcome of a negotiation process between the target bank and the acquirer bank.¹³ Per the usual investment principle of valuing a company, the market value of the company captures the net present value of future cash flows. Characteristics of the target bank that are valuable to the acquirer would consequently be related to the price offered.

Accordingly, we begin our examination of the price offered for the target bank. There are two approaches to examine the price offered for a target bank in the bank merger and acquisition literature. The first research approach uses as the dependent variable the size of the merger premium. The merger premium (or bid premium as it is sometimes referred to) is defined as the ratio of the price offered (the market value of equity) to the book value of equity. We call such an approach the *accounting approach*. The second research methodology uses stock price data and is usually called the *event study approach*. Under this approach, excess returns (or abnormal returns) over the market are calculated on announcement of the merger. The event study approach implicitly assumes that the stock price captures the stock market's expectation of whether the merger has been priced accurately. If the price paid for a given merger is estimated by the market to be too high, then the acquirer bank would earn negative excess returns over the market. Obviously, the two approaches examine the same issue of valuing a bank but from two different angles. If the price paid is high (i.e., the bid premium is high), the stock market would decrease the returns that the acquirer bank would earn, resulting in lower excess returns. The event study methodology, and the

¹³In the case of hostile takeovers the negotiation does not directly involve the managers of the target bank. In such cases, the acquirer bank offers a high premium to get the current shareholders of the target bank to sell their shares over the protest of their managers. However, hostile takeovers in banks are a much lower percentage of total bank acquisitions than the corresponding percentage in general corporations.

relationship between the bid premiums and excess returns, is explained in more detail in Section IV of this paper.

Both the accounting and event study approaches have their individual advantages and disadvantages. The drawback to the accounting approach is that it primarily uses accounting data which is book-value based (and is therefore at historical costs) while ignoring market values. However, as many banks are not traded, this approach allows the researcher to examine a much larger sample of bank mergers, rather than just concentrating on the large mergers among publicly traded banks. Further, this approach is used extensively by bank merger practitioners. The event study approach has the advantage of using stock price data which presumably captures (via prices) all relevant information. Therefore, this approach captures the gains or losses earned by the acquirer bank. The disadvantage of the event study method is that it focuses only on the large traded banks, causing a sample selection bias. In addition, even among the traded banks, few are traded frequently, resulting in a thin trading problem. All of the event studies have had to modify their calculation of the relevant model, omit such banks from their sample, or do not make any correction (Scholes and Williams 1977) for nonsynchronous trading.

We begin by examining the excess returns earned by two merging banks. A summary of the different event studies is given in Table 3. Most of the studies have examined the excess returns earned by the acquirer bank. The studies that have also included the target bank have found strong evidence for positive excess returns. Depending on the size of the event window, these excess returns can vary from five to 25 percent. The evidence on the excess returns earned by acquirers is mixed. Many of the studies find negative excess returns with a few studies finding positive excess returns. Even in the positive excess returns cases, the excess returns earned is small. Consequently, the issue of whether the merger is a positive net present value project for the acquirer is still open to debate, with the evidence tilting towards the negative side.

Before we present the scientific evidence on the merger motivations that have been suggested in the bank mergers and acquisitions literature, a few caveats are in order. These caveats are listed below:

1) The set of independent variables differ considerably from one study to another. Some studies (such as Fraser and Kolari 1987) include target bank characteristics only, whereas other studies (such as Cheng et al. 1989) also include a number of acquiring bank characteristics. Obviously, including acquirer characteristics seems preferable but including such a large set of independent variables suffers from the issue of multicollinearity. Cheng et al. addressed this problem by using principal component analysis. We do not suggest that all studies do (or do not) suffer from multicollinearity, but including a number of regressors such as earnings growth, growth in assets, asset size, equity to assets, etc., invites the suspicion of multicollinearity. A quick check of the condition number (see Belsley et al. 1980) might be useful for each subset of regressors.

2) Some studies examine bank mergers completed during a short time period

Table 3: Summary of Event Studies

Study	Sample	Definition of Event ^a	Definition of Market ^b	Target's Excess Returns ^c	Acquirer's Excess Returns
Baradwaj, Dubofsky & Fraser (1991)	108 interstate (July 1981-87)	1	Nasdaq value weighted	N/A	negative
Baradwaj, Fraser & Furtado (1990)	23 hostile 30 non-hostile (1980-87)	1	OTC equally weighted	positive	negative
Cornett & De (1991a)	152 interstate 152 acquirers 37 targets (1982-86)	1, 4 5	equally weighted value weighted	positive	positive
Cornett & De (1991b)	132 interstate 132 acquirers 36 targets (1982-86)	1, 4 5	equally weighted value weighted	positive	positive
Cornett & Tehranian (1992)	30 mergers (1982-87)	10	equally weighted	positive	negative
Desai & Stover (1985)	18 BHCs (1976-82)	1, 2 3	equally weighted	N/A	positive
Dubofsky & Fraser (1989)	101 mergers (1973-83)	1	equally weighted value weighted	N/A	positive (before June '81) negative (after June '81)
Hannan & Wolken (1989)	43 acquirers 69 targets (1982-87)	1	Wilshire Index	positive	negative
Hawawini & Swary (1990)	78 acquirers 123 targets (1971-86)	1, 2	Nasdaq value weighted	positive	negative

Table 3: *Continued.*

Study	Sample	Definition of Event ^a	Definition of Market ^b	Target's Excess Returns ^c	Acquirer's Excess Returns
James & Weir (1987a)	60 mergers (1972-83)	1	equally weighted	N/A	positive
Kaen & Tehranian (1989)	33 New Hampshire mergers (June 1979-87)	1, 7 9	Nasdaq equally weighted bank index	N/A	zero
Lobue (1984)	37 BHCs (N/A)	3	OTC general market index & OTC banking index	N/A	positive
Neely (1987)	26 mergers (1979-85)	1, 5	Creates bank index from S&P	positive	negative
Palia (1994)	48 mergers (1984-87)	1	Nasdaq value weighted	N/A	negative
Sushka & Bendeck (1988)	41 mergers (1972-85)	2	Uses mean adjusted returns model	N/A	negative
Trifts & Scanlon (1987)	21 interstate 14 acquirers 17 targets (1982-85)	1	S&P 500 index	positive	negative
Wall & Gup (1989)	23 mergers (June 1981-83)	1	value weighted	N/A	negative

NOTE:

^aThe event dates among the various studies are coded (for easy presentation) as follows: 1 = Wall Street Journal announcement date; 2 = Federal Reserve Board approval date; 3 = acquisition completion date; 4 = Dow Jones News Wire announcement date; 5 = New York Times announcement date; 6 = American Banker announcement date; 7 = Cates MergerWatch announcement date; 8 = American Banker announcement date; 9 = Union Leader announcement date; 10 = Shearson Lehman Brothers's Bank Merger and Acquisition study announcement date.

^bWhenever the study specifies if Nasdaq stocks have been included in the market portfolio, we explicitly specify so. Otherwise, we present the market portfolio as an equally weighted and/or value weighted portfolio. Other market portfolios (such as the Standard and Poor's 500 Index, etc.) are also presented.

^cWe do not present the actual excess returns earned, because many studies provide results for a large number of differing event windows (which are not comparable). Accordingly, we present whether the excess returns were positive or negative. N/A stands for not available or not examined.

(example, Fraser and Kolari 1987 examine mergers completed in 1985) whereas other studies include bank mergers undertaken during a larger sample period (example, Rhoades 1987 examines mergers completed from 1973 to 1983).

3) Some studies examine bank mergers from a certain locational area only (example, Cheng et al. 1989 analyze mergers involving target banks headquartered in the Southeastern states of Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and the District of Columbia only), whereas other studies examine bank mergers undertaken throughout the United States (example, Palia 1993).

4) As explained earlier, the event study approach generally examines a much smaller subset of bank mergers by focusing only on banks that are publicly traded.

5) We do not examine studies that include mergers where the target bank has failed. In such cases, the price paid for the target bank is not an accurate reflection of the motivations of the two merging banks only, since it also includes the objectives of the FDIC. Comparing such mergers, with their potential subsidies from the FDIC, and the mergers between non-failed banks is inappropriate (see James and Weir 1987b, and Giliberto and Varaiya 1989, for an analysis of the gains or losses earned by bidders in transactions where the target bank has failed).

6) Among the papers using the event study approach, different definitions of the market portfolio have been used. For example, Lobue (1984) uses a two factor model (with the first factor defined as the Over the Counter general stock market index and the second factor defined as the Over the Counter banking stock index), whereas Cornett and Tehranian (1992) use an equally-weighted market index.

Therefore, one must be careful in interpreting and comparing the evidence from the different studies. It is possible that a common set of factors is generally related to the price offered for the target bank, but a consensus has yet to develop on the explicit definition of that set of factors. However, this said, many studies have included a more or less similar set of factors. Hence, we explain the different factors (hypotheses) that have been proposed in the literature.

PROFITABILITY

According to the profitability hypothesis, target banks that are highly profitable are valuable and therefore command a higher price. In addition, acquirer banks that are not so profitable are looking for higher profit opportunities and would therefore pay a high price. Accordingly, one would expect a positive relationship between a target bank's profitability and the merger premium. Two variables have generally been used to capture the target bank's profitability. They are the ratio of profits to assets (ROA) and the ratio of profits to book value of equity (ROE). The evidence on the target bank's profitability is mixed. Palia (1993) and Beatty et al. (1987) find a positive relationship between the target's profitability and the bid premium, whereas Cheng et al. (1989), Rhoades (1987), and Rogowski and Simonson (1989) do not find any significant relationship. Fraser and Kolari (1987)

also find a significant positive relationship but find it more pronounced in small banks, i.e., banks with assets of less than \$100 million. In the studies that include the acquirers' characteristics, Cheng et al. (1989) find a negative relationship between the bid premium and the acquirer's profitability, whereas Rhoades (1987) finds no significant relationship. Wall and Gup (1989) find a negative relationship between the excess returns earned by the acquirer and the target's profitability.

CAPITAL

Regulation requires banks to keep a minimum amount of capital as collateral against risk-taking activities. Under the deposit insurance contract that existed during the 1980s and early 1990s, the insurance premium paid by the bank was a flat rate (currently 22 cents per \$1000 of deposits). Merton (1977), Marcus and Shaked (1984), and Ronn and Verma (1986) show that debt guarantees (which disregard the financing and operating risks of the bank) imply a subsidy to the bank shareholders. This subsidy increases with an increase in the bank's leverage and the variability of its asset value. Thus, bank shareholders have a greater incentive to take on risk than when the deposit insurance is "actuarially fair." Consequently, regulators have imposed capital requirements to curb the risk-taking activities of banks.

Before the 1980s, banks were not required to meet any explicit capital requirements. Instead, regulators used "moral suasion" to induce banks to increase their capital. Formal capital requirements were legislated in 1981. From 1985, the minimum capital to asset ratio was required to be 5.5 percent for primary capital and six percent for total capital (where primary capital was equity, loan loss reserves, perpetual preferred stock and mandatory convertible debt, and total capital also included items such as subordinated debt and preferred stock with limited life). In early 1989, in accordance with the international Basle agreement, a new set of capital requirements was introduced by U.S. federal regulators—with deadlines of December 1990 set for partial compliance and December 1992 for full compliance.¹⁴ According to the new risk-based plan, assets with different risks are given different weights. Less risky assets, like cash and U.S. government securities, are given zero weight, whereas more risky assets, such as first mortgages, are given 50 percent weight. These risk-weighted assets are then used to calculate a bank's capital requirement. Specifically, core capital (and total capital) must equal at least four percent (and eight percent respectively) of the risk-adjusted assets.

The evidence whether the bid premium is positively related to the target bank's capital-to-asset ratio is mixed. Fraser and Kolari (1987), Palia (1993), and Beatty et al. (1987) find a negative relationship between the target's capital-to-asset ratio

¹⁴ Given that most of the studies does not include mergers completed after 1990 we do not provide a detailed explanation of the new risk-based capital plan. For more details see Keeton (1989).

and the bid premium, whereas Rhoades (1987) and Rogowski and Simonson (1989) do not find any significant relationship. Further, the percentage growth in equity for the acquirer bank had a positive but insignificant relationship to the bid premiums in Cheng et al. (1989). None of the event studies have included the target or acquirer bank's capital in their analysis.

GROWTH

It has been suggested by many merger specialists that banks that are growing fast are very valuable. Presumably, these growth-maximizing opportunities are more valuable to those acquirer banks who do not have such opportunities. Accordingly, one would expect a positive relationship between the target bank's growth rate and the bid premium, and a negative relationship between the acquirer bank's growth rate and the bid premium. All the studies that have examined the target growth rate (Palia 1993, Cheng et al. 1989, Rhoades 1987, and Rogowski and Simonson 1989) do not find any significant relationship between the target bank's growth rate and the bid premium. Cheng et al. (1989) find a significant negative relationship between the acquirer bank's growth rate and the bid premium, whereas Rhoades (1987) finds no significant relationship. Wall and Gup (1989) also find no significant relationship between the target's growth rate and the excess returns earned by the acquirer.

LOAN QUALITY

Many of the studies that examine the bid premiums have used different proxies to analyze the quality of the loan portfolio in a bank. Given that bank loans are still quoted at book value in the financial statements, the market value of the loan is typically inferred from chargeoffs to loans, provisions for non-performing loans, and the type of loans held (Treasury securities and shorter maturity loans being among the least risky, and commercial, real-estate, and longer maturity loans among the more risky). Many studies have used one or more of these variables to proxy for the quality of loans in the target bank. The evidence is mixed with respect to all three proxies of loan quality, with most studies finding at least one statistically significant proxy. For example, Cheng et al. (1989) find that the percentage of chargeoffs to total loans in a target bank is positively related to the bid premium, whereas Rogowski and Simonson (1987) find that loans-to-earning assets is positively related. In the case of acquirers, Cheng et al. (1989) find no significant relationship between the bid premium and the quality of the acquirer's loan portfolio. None of the event studies have examined the quality of the loan portfolio.

REGULATION

In Section II of this paper, we gave a brief description of the relevant regulation (both at the federal and state level) that affects bank mergers. Many studies have

SUMMARY

We observe from the above discussion that the evidence across various studies differs rather significantly. However, we list below a synopsis of certain trends of evidence that have developed from the different studies.

1. Target banks earn significantly positive excess returns, whereas the evidence on acquirer banks is mixed.
2. The accounting studies generally examine a much broader set of variables than the event studies.
3. The growth rate of the target bank is not of any significance.
4. The banking regulation in the target bank's state has a definite influence on the price offered. Generally, the more restrictive the state regulation the higher the bid premiums (and lower the excess returns).
5. There exists a manager-shareholder conflict in banks which significantly affects the value of a target bank in a merger. The relationship is non-monotonic in the percentage of shares owned by managers.
6. The higher the quality of the loan portfolio in the target bank the higher the bid premium.
7. The evidence on the profitability and capital-adequacy of the target bank is mixed, as is the evidence on the relative size of the two merging banks.

IV. THE RELATIONSHIP BETWEEN BID PREMIUMS AND EXCESS RETURNS

In Section III, we explained the different studies that use the two approaches to examine the motivations of merging banks. The accounting approach examines the bid premiums, defined as the ratio of the price offered (the market value of equity) to the book value of equity. The event study approach uses stock price data and calculates the excess returns (or abnormal returns) over the market on announcement of the merger. This section of the paper attempts to connect these two approaches (namely, the accounting approach and the event study approach) by examining the relationship between the bid premiums and excess returns. If the price paid for a given target bank is estimated by the market to be high, then the acquirer bank should earn negative excess returns. Accordingly, one would expect mergers that involve high bid premiums to have acquirers that have lower excess returns.¹⁵ We test this hypothesis below.

¹⁵Strictly speaking, one should also examine the target bank's excess returns, since high bid premiums increase the excess returns earned by the target.

DATA DESCRIPTION

The list of all bank mergers for the period 1984 to 1987 was obtained from Cates Consulting Analysts' *MergerWatch* reports. Cates Consulting Analysts list all mergers where the target bank is of an asset size of \$25 million or greater and the acquirer bank is of an asset size of \$100 million or greater. The required financial data for the above stated companies were extracted from Moody's *Bank and Finance Manual* and Cates' *BancCompare* and *MergerWatch* reports. The data for the percentage of stock owned by managers was obtained from the proxy statements filed with the SEC, whereas the bid premiums were obtained from *MergerWatch*. The final sample consists of 48 acquirer banks which satisfy the following criteria:

- (i) Stock return data for each acquirer bank is available from the daily returns file of the Center for Research in Security Prices (CRSP).
- (ii) Acquirer banks have managerial ownership data available.
- (iii) Mergers with failed target banks are not included in the sample given that regulators often subsidize these transactions.
- (iv) No acquirer bank was allowed to be in the sample more than once. A few acquirers such as BancOne in Ohio have been extremely active in the merger market. Consequently, if no adjustments were made, their managerial ownership levels would heavily weight our sample and could dominate our results. Accordingly, we allow each acquirer bank to appear once in the sample.

The announcement date of the merger was obtained from the Wall Street Journal Index. We use the value-weighted market portfolio (including dividend) obtained from CRSP as the relevant market index.

EMPIRICAL TESTS

We describe below the event study methodology that is generally used (Palia 1994). The return generating process for stock i during time t is given by

$$R_{it} = \alpha_i + \beta_i R_{mt} + e_{it},$$

where R_{it} = return for stock i at time t , R_{mt} = return on the market (as proxied by the CRSP value-weighted market index) at time t , α_i = OLS estimate of the intercept of the market model regression, and β_i = OLS estimate of the slope coefficient of the market model regression.

The above equation is estimated for the 100 days before the event window, namely, $[-105, -6]$, by regressing R_{it} on R_{mt} and obtaining the OLS estimates α_i and β_i . We sum over the prediction errors so as to average out the nonsystematic

factors not related to the merger announcement:

$$\bar{A}_t = 1/N \sum_{i=1}^N A_{it} \text{ where } A_{it} = R_{it} - \alpha_i - \beta_i R_{mt}.$$

The 11-day cumulative abnormal return $CAR[-5, +5]$ for the event window is

$$CAR[-5, +5] = \sum_{t=-5}^{+5} \bar{A}_t.$$

The standardized prediction error is given by

$$SPE_{it} = A_{it}/S_{it},$$

where

$$S_{it} = \left[s_i^2 \left[1 + 1/100 + \frac{(R_{mt} - \bar{R}_{mt})^2}{\sum_{t=-105}^{-6} (R_{mt} - \bar{R}_{mt})^2} \right] \right]^{1/2},$$

and the residual variance $s_i^2 = 1/98 \sum_{t=-105}^{-6} A_{it}^2$.

The test statistic for the 11-day cumulative return is unit-normal and is

$$Z = \bar{W}_i \sqrt{N}, \text{ where } \bar{W}_i = \frac{1}{N} \sum_{i=1}^N W_i \text{ and } W_i = \sum_{t=-5}^{+5} SPE_{it} \frac{1}{\sqrt{11}}.$$

The results of the event study are given in Palia (1994), which we report in Table 4 of this paper. The average 11-day abnormal return is -1.50% with an associated z -statistic of -2.40 . These results indicate that acquirer banks experience small but statistically significant decreases in share value upon announcement of a merger. These results of Palia (1994) are consistent with that of Wall and Gup (1988), Dubofsky and Fraser (1989), and Sushka and Bendeck (1988), who find negative abnormal returns for successful acquirers. Although Palia (1994) initially appears to contradict James and Wier (1987), further analysis suggests that it is not so, because the two studies examine bank mergers that occurred in two different time periods. James and Wier examine a sample of acquirers from 1973 to 1983 while Palia studies acquirers from 1984 to 1987. Note that Dubofsky and Fraser (1989) find a structural shift in abnormal returns near mid-1981, due to two court decisions¹⁶ that occurred in mid-1981. These decisions restricted the Board of Governors of the Federal Reserve System from imposing more stringent competitive requirements in the case of bank mergers than those requirements specified in the antitrust laws. Consequently, Dubofsky and Fraser find that prior to mid-1981,

¹⁶The two cases are *Mercantile Texas Corporation v. Board of Governors*, 638, F.2d 1255, Fifth District Court of Appeals, 1981, and *Republic of Texas Corporation v. Board of Governors*, 649, F.2d 1026, Fifth District Court of Appeals, 1981.

Table 4: Acquiring Bank's Excess Returns

Panel A. Daily Abnormal or Excess Returns				
Day	Mean	t-Statistic	Median	% of Abnormal Returns Positive
-5	-0.0023	-0.171	-0.0046	29.2
-4	0.0005	0.041	0.0011	54.2
-3	-0.0021	-0.151	-0.0004	47.9
-2	-0.0008	-0.096	-0.0016	41.7
-1	-0.0087	-1.644	-0.0065	31.3
0	-0.0025	-1.481	-0.0027	39.6
+1	0.0026	0.192	0.0008	52.1
+2	-0.0014	-0.101	-0.0034	35.4
+3	0.0020	0.151	0.0011	54.2
+4	-0.0028	-1.205	-0.0018	35.4
+5	0.0002	0.013	-0.0022	58.3

Panel B. Cumulative Abnormal Returns [CAR]			
	Mean	z-Statistic	% of Abnormal Returns Positive
CAR [-5, +5]	-0.015	-2.402 ^a	33.3
Standard deviation		0.075	
Median		-0.016	

Source: Palia (1994).

NOTE:

^aIndicates significance at the 5% level.

acquirers earned positive abnormal returns and after mid-1981, acquirers earned negative abnormal returns. As most of James and Wier's sample is before mid-1981, and Palia's entire sample is after mid-1981, their results are consistent with each other and with those of Dubofsky and Fraser, and James and Wier.

Having obtained each acquirer bank's excess returns, we turn our attention to examining the relationship between these excess returns and the bid premiums. Consistent with the studies described in Section II, we use the price-to-book ratio as the bid premium. Hence, we regress these bid premiums on the excess returns earned by the acquirer. We use two specifications—one that includes the relative size of the two merging banks and one that excludes the relative size of the two merging banks. The results of this estimation are given in Panel A of Table 5. Column 1 suggests that the bid premiums are negatively related to the excess returns. However, we were surprised to find that this relationship is not statistically significant (with t -statistics of -0.849 and -1.048 , respectively). We then split

Table 5: OLS Regression of Bid Premiums on Excess Returns

Panel A: Coefficient of the Bid Premiums (and <i>t</i> -statistics)				
	less than median managerial ownership level of 3.185%	greater than median managerial ownership level of 3.185%	<i>t</i> -statistic for differences between (2) and (3)	
Specification	(1)	(2)	(3)	
without relative size	-0.015 (-0.849)	-0.0053 (-0.218)	-0.033 (-1.433)	49.82 ^a
with relative size	-0.018 (-1.048)	-0.0055 (-0.240)	-0.032 (-1.533)	8.62 ^a
Panel B: Average Relative Size in the Two Sub-Samples				
	less than median managerial ownership level of 3.185%	greater than median managerial ownership level of 3.185%		
average relative size	0.301	0.150		

NOTE:

^aIndicates significance at the 1% level.

the sample into two sub-samples. We calculate the median percentage of stock owned by the managers of the acquirer bank prior to the acquisition; which we find to be 3.185 percent. Accordingly, the first sub-sample includes only acquirer banks with managerial ownership levels that are less than 3.185 percent, whereas the second sub-sample includes acquirer banks with managerial ownership levels that are greater than 3.185 percent. Column 2 suggests that acquirers with less than the median ownership level do not have any significant relationship between the excess returns and the bid premiums. More interestingly, among acquirers with managerial ownership levels greater than the median level, excess returns and bid premiums are negatively related (with *p*-values of .15 and .12, respectively). Further, a *t*-test for differences in the bid premium regression coefficients is very significant. These results suggest that at higher managerial ownership levels, considerable overpayment is undertaken by the managers of acquirer banks. These managers are enjoying their private benefits of control at the higher levels of ownership, and consequently offer high bid premiums resulting in lower excess returns (see Grossman and Hart 1982, and Harris and Raviv 1988, and DeAngelo and DeAngelo 1985, for the importance of benefits of control). In Panel B, we

observe that mergers where the managers of the acquirer bank have less than the median ownership level have an average relative size which is almost twice the average relative size of mergers where the managers have ownership levels greater than the median ownership level. This shows that managerial ownership and relative size are inversely correlated. Our results hold whether we include or exclude relative size, making them robust.

V. CONCLUSIONS

The pace of bank mergers and acquisitions is likely to accelerate with the impending deregulation in federal interstate banking legislation. This paper presents evidence on the different motivations affecting bank mergers. Specifically, target banks seem to benefit substantially from mergers whereas the evidence on acquirer banks is mixed. In addition, regulation in the target bank's state, and the manager-shareholder conflict have a definite influence on bank mergers. Although we have made some generalizations when comparing the different studies, their conclusions have to be contrasted with several caveats in mind (such as the differing definitions of the market portfolio, a different set of regressors, etc.). It would be beneficial for future studies to include *all* of the merger motivations and then conduct a stepwise regression in order to determine the relative importance of each one. The final set of factors should be checked for multicollinearity (a condition number would suffice). Further, many off-balance sheet items should be included in the analysis, especially with the growth of derivatives and trading activities in many of the large banks. A comparison between the traded banks and the nontraded banks might be illuminating. We leave these issues for future research to address.

VI. REFERENCES

- Baradwaj, B., D. Dubofsky, and D. Fraser. 1991. "Bidder Returns in Interstate and Intrastate Bank Acquisitions." *Journal of Financial Services Research* 5:261-73.
- Baradwaj, B., D. Fraser, and E. Furtado. 1990. "Hostile Bank Takeover Offers: Analysis and Implications." *Journal of Banking and Finance* 14:1229-42.
- Beatty, R., A. Santomero, and M. Smirlock. 1987. "Bank Merger Premiums: Analysis and Evidence." Solomon Brothers Center for the Study of Financial Institutions *Monograph Series in Finance and Economics*.
- Belsley, D., E. Kuh, and R. Welsch. 1980. *Regression Diagnostics*. New York: John Wiley and Sons, Inc.
- Cheng, D., B. Gup, and L. Wall. 1989. "Financial Determinants of Bank Takeovers." *Journal of Money, Credit, and Banking* 21:524-36.
- Cornett, M. and S. De. 1991(a). "Common Stock Returns in Corporate Takeover Bids: Evidence from Interstate Bank Mergers." *Journal of Banking and Finance* 15:273-95.
- Cornett, M. and S. De. 1991(b). "Medium of Payment in Corporate Acquisitions: Evidence from Interstate Bank Mergers." *Journal of Money, Credit, and Banking* 23:767-76.

- Cornett, M. and H. Tehranian. 1992. "Changes in Corporate Performance Associated with Bank Acquisitions." *Journal of Financial Economics* 31:211-34.
- DeAngelo, H. and L. DeAngelo. 1985. "Managerial Ownership of Voting Rights: A Study of Public Corporations With Dual Classes of Stock." *Journal of Financial Economics* 14:33-69.
- Desai, A. and R. Stover. 1985. "Bank holding Company Acquisitions, Stockholder Returns, and Regulatory Uncertainty." *Journal of Financial Research* 8:145-56.
- Dubofsky, D. and D. Fraser. 1989. "Regulatory Change and the Market for Bank Control." Pp. 121-39 in *Bank Mergers: Current Issues and Perspectives*, ed. B. Gup. Boston: Kluwer Academic.
- Fraser, D. and J. Kolari. 1987. "Determinants of Small Bank Acquisition Premiums." in *Conference on Bank Structure and Competition* Federal Reserve Bank of Chicago: 393-405.
- Giliberto, M. and N. Varaiya. 1989. "The Winner's Curse and Bidder Competition in Acquisitions: Evidence from Failed Bank Auctions." *Journal of Finance* 44:59-76.
- Grossman, S. and O. Hart. 1982. "Corporate Financial Structure and Managerial Incentives." Pp. 107-40 in *The Economics of Information and Uncertainty*, ed. J. McCall. Chicago: University of Chicago Press.
- Hannan, T. and J. Wolken. 1989. "Returns to Bidders and Targets in the Acquisition Process: Evidence from the Banking Industry." *Journal of Financial Services Research* 3:5-16.
- Hansen, R. 1987. "A Theory of Medium of Exchange in Mergers and Acquisitions." *Journal of Business* 60:75-96.
- Harris, M. and A. Raviv. 1988. "Corporate Control Contests and Capital Structure." *Journal of Financial Economics* 20:55-86.
- Hawawini, G. and I. Swary. 1990. *Mergers and Acquisitions in the U.S. Banking Industry*. New York: North-Holland.
- James, C. and P. Wier. 1987(a). "Returns to Acquirers and Competition in the Acquisition Market: The Case of Banking." *Journal of Political Economy* 95:355-70.
- James, C. and P. Wier. 1987(b). "An Analysis of FDIC Failed Bank Auctions." *Journal of Monetary Economics* 20:141-53.
- Jensen, M. and W. Meckling. 1976. "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure." *Journal of Financial Economics* 3:305-60.
- Kaen, F. and H. Tehranian. 1989. "New Hampshire Bank Mergers: The Returns to Acquiring Bank Shareholders." Pp. 141-55 in *Bank Mergers: Current Issues and Perspectives*, ed. B. Gup. Boston: Kluwer Academic.
- Keeton, W. 1989. "The New Risk-Based Capital Plan for Commercial Banks." Federal Reserve Bank of Kansas City *Economic Review*: 40-60.
- Lobue, M. 1984. "Categorical Bank Acquisitions." *Journal of Bank Research* 14:274-282.
- Marcus, A. and I. Shaked. 1984. "The Valuation of FDIC Deposit Insurance Using Option Pricing Estimates." *Journal of Money, Credit, and Banking* 16:446-60.
- Merton, R. 1977. "Analytic Derivation of the Cost of Deposit Insurance and Loan Guarantees." *Journal of Banking and Finance* 1:3-11.
- Mørck, R., A. Shleifer, and R. Vishny. 1988. "Management Ownership and Market Valuation." *Journal of Financial Economics* 20:293-315.

- Myers, S. and N. Majluf. 1984. "Corporate Financing and Investment Decisions when Firms Have Information that Investors do not Have." *Journal of Financial Economics* 13:187-221.
- Neely, W. 1987. "Banking Acquisitions: Acquirer and Target Shareholder Returns." *Financial Management* 16:66-73.
- Palia, D. 1994. "The Agency Conflict in Bank Mergers." Working Paper, Columbia University.
- Palia, D. 1993. "The Managerial, Regulatory, and Financial Determinants of Bank Merger Premiums." *Journal of Industrial Economics* 41:91-102.
- Rhoades, S. 1987. "Determinants of Premiums Paid in Bank Acquisitions." *Atlanta Economics Journal* 15:20-30.
- Rogowski, R. and D. Simonson. 1989. "Bank Merger Premiums and Interstate Bidding." Pp. 87-104 in *Bank Mergers: Current Issues and Perspectives*, ed. B. Gup. Boston: Kluwer Academic.
- Ronn, E. and A. Verma. 1986. "Pricing Risk Adjusted Deposit Insurance: An Option Based Model." *Journal of Finance* 41:871-96.
- Scholes, M. and J. Williams. 1977. "Estimating Betas from Nonsynchronous Data." *Journal of Financial Economics* 5:309-337.
- Stulz, R. 1988. "Managerial Control of Voting Rights: Financing Policies and the Market for Corporate Control." *Journal of Financial Economics* 20:25-54.
- Sushka, M. and Y. Bendeck. 1988. "Bank Acquisitions and Shareholder Wealth." *Journal of Banking and Finance* 12:551-62.
- Trifts, J. and K. Scanlon. 1987. "Interstate Bank Mergers: The Early Evidence." *Journal of Bank Research* 10:305-11.
- Wall, L. and B. Gup. 1989. "Market Valuation Effects of Bank Acquisitions." Pp. 107-120 in *Bank Mergers: Current Issues and Perspectives*, ed. B. Gup. Boston: Kluwer Academic.

VII. NOTES ON CONTRIBUTORS/ACKNOWLEDGMENTS

Darius Palia is an Assistant Professor in Finance and Economics at Columbia University's Graduate School of Business. He earned his Ph.D. in Finance from the Stern School of Business. His thesis "The Agency Conflict in Bank Mergers" was awarded the New York University Salomon Center Ph.D. Award for demonstrated excellence through research in finance, financial economics, or international finance. His research interests lie in the fields of banking, corporate finance, and applied econometrics. His current research examines compensation contracts, deposit insurance and principal-agent models.

The author acknowledges helpful discussions on the topics of this paper with Dean Amel, Carlene Palia, Stephen Rhoades, and Anthony Saunders.