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**Bank Capital Structure, Regulatory Capital, and
Securities Innovations**

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Abstract: Although financial instruments that, in effect, permit corporations to treat preferred stock dividends as tax-deductible interest have been used by nonfinancial corporations since late 1993, bank holding companies (BHCs) did not issue these trust-preferred securities (TPS) until 1996, when the Federal Reserve qualified them as Tier-1 capital. We delineate and test hypotheses with 1) analyses of the stock-market reaction to the Fed's ruling and to TPS filings and 2) comparisons of BHCs that issued TPS with those that did not. We conclude that regulatory capital requirements, tax savings, and uninsured sources of funds can have significant positive effects on BHCs' demand for capital; growth and investment opportunities have an inconclusive effect; and transaction costs have a negative effect. Our results are not consistent with the moral-hazard hypothesis.

JEL classification: E5, G2, L1, L5

Key words: bank capital structure, bank holding companies, regulatory capital, securities innovations, Tier-1 capital, trust-preferred securities

Bank Capital Structure, Regulatory Capital, and Securities Innovations

> *It must be perpetual but it doesn't have to be forever. It has to feel like equity but look — to tax authorities — like debt. Defining banks' core capital is one of the thorniest issues facing bank regulators.*
>
> *Anthony Currie*
> *Euromoney [1998]*

On October 21, 1996, a ruling by the Federal Reserve pruned some thorns from the prickly issue of defining banks' core capital. As a result, bank holding companies (BHCs) were presented with a cost-effective way to raise regulatory capital in the form of a debt-equity hybrid called trust-preferred securities (TPS).[1] These instruments, issued by a special-purpose financing vehicle established as a trust subsidiary of a BHC, are attractive because they generate both tax-deductible interest payments and qualify as Tier-1 (core) regulatory capital, following an October 21, 1996 ruling by the Federal Reserve.[2] Although TPS and other similar hybrids have existed since late 1993, after the Fed's ruling BHCs issued, through 1999, $31 billion of these securities across 162 filings for an average issue size of $188 million (Table 1). Prior to this ruling, no BHC had announced a TPS filing.

These facts raise a number of questions about securities' innovations (such as TPS), bank capital structure, and regulatory capital. For example, although all BHCs would benefit from the tax advantages of using TPS rather than conventional common or preferred equity, why did BHCs wait until after the Fed's ruling? Moreover, given that virtually all BHCs currently fulfill their minimum regulatory capital requirements, why do only some BHCs use TPS to increase their regulatory capital? What characteristics distinguish issuers from nonissuers and early adopters from later issuers? Do the Modigliani and Miller (M&M) propositions apply to banks? Miller [1995] is unsure. These questions capture some of the

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[1]To qualify as Tier-1 capital, TPS plus outstanding preferred stock cannot be greater than 25 percent of Tier-1 capital before deduction of goodwill and other intangible assetes; amounts in excess are counted as Tier-2 capital.

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issues we investigate. They, in turn, are grounded in the departures from strict M&M assumptions dealing with taxes, agency costs, and government guarantees for bank deposits.

We provide answers to these questions by proposing and testing five, not mutually exclusive, hypotheses. We expect a positive market reaction to BHCs' issuance of TPS for the first three, and a negative market reaction for the other two. The first hypothesis is that BHCs' stockholders benefit from the tax-saving attributes of TPS and that this would be reflected in an increase in share prices. The second hypothesis focuses on the costs of financial distress, which arise from both financial markets and bank regulators. Because TPS permit BHCs to increase their regulatory Tier-1 capital at an after-tax cost close to that of long-term debt, TPS issues would enhance stockholder wealth if this action reduced BHCs' costs of financial distress. A third, and complementary, hypothesis stresses the role of growth opportunities which increased, in large measure, as a result of the removal of restrictions on interstate branching and the anticipated repeal of laws restricting BHCs from acquiring securities and insurance firms. "Moral hazard" is a fourth, and competing, hypothesis. It posits that stockholders benefit from BHCs taking advantage of underpriced federal deposit insurance by holding relatively low levels of capital and (possibly) taking substantial operating and investment risks. This hypothesis predicts that BHCs either would not increase their equity capital by issuing TPS or, if they did, that share prices would decline, particularly for undercapitalized BHCs. The fifth (and also competing) hypothesis focuses on transactions costs. If the costs of issuing and servicing capital-increasing TPS exceed the perceived benefits, some BHCs would not issue these securities, despite their other advantages.

We test these hypotheses first by investigating market and regulatory reaction to the TPS securities' innovation. Event-study results show that TPS issuers, in particular the early adopters, experienced significant positive abnormal returns following the Federal Reserve's October 21, 1996 ruling that it would accept TPS as Tier-1 capital. BHCs that issued TPS also experienced significant positive two-day abnormal returns on their filing dates. These results show that the net effect of TPS filings are wealth enhancing for stockholders and, thus, do not support the predictions of the moral-hazard hypothesis. To our knowledge, this is also the first study to document a statistically significant positive price response to equity security offerings by publicly traded BHCs.

Because TPS would appear to offer considerable advantages to banks, we examine why only some have taken advantage of this opportunity. In the year before TPS were sold, univariate tests reveal that issuers, compared to nonissuers, are far larger and appear to be more financially sophisticated, fund fewer loans per dollar of assets, pay a higher percentage of their net income in taxes, have relatively more preferred stock to exchange, have a greater risk of insolvency, and have a riskier funding structure. Of greatest importance, issuers have relatively less total equity and Tier-1 capital. Growth opportunities do not appear to distinguish issuers from nonissuers. Although these differences between issuers and nonissuers hold for both 1996 and 1997, they are more pronounced in 1996. Multivariate probit models confirm the univariate findings (with the exception that growth opportunities appear to be important) and show that issuers and nonissuers come from distinct groups. Finally, we use conditional event-study methods to examine the variables associated with abnormal returns experienced by TPS issuers. These results confirm our previous findings: stock prices of relatively poorly capitalized BHCs that use TPS to increase their Tier-1 capital experience the greatest positive market reaction. We conclude that the improved capital position of BHCs allows them to lower their capital costs in the markets for uninsured sources of funds.

The paper proceeds in six sections. Section I discusses the role of government guarantees and regulatory capital in bank capital structure. Section II explains how TPS deals are structured, reviews non-bank corporate issuance of similar debt-equity hybrid securities, and describes BHCs' issuance of TPS. Section III presents our hypotheses, while section IV discusses our sample of BHCs and methodology. Section V analyzes our empirical findings. The last section summarizes, concludes, and draws managerial and regulatory implications.

I. The Role of Government Guarantees and Regulatory Capital in Bank Capital Structure

An important question in corporation finance is: Does capital structure matter? When asked if the M&M proposition on the irrelevancy of the ratio of debt to equity applies to banks, Miller [1995] answered: "Yes and no." On the affirmative, Miller says that it's hard to see anything about bank deposits being so special as to rule out the application of the M&M proposition to banks. Bank deposits are very short term, because they can be withdrawn on demand, but commercial paper has a similar maturity. Further, some bank deposits, such as certificates of deposit, have longer maturities.

However, the market for bank capital is not left to its own devices, which is Miller's crucial caveat and his reason why M&M propositions might not apply to banks. What makes banks special is not the securities they issue, but the government guarantees that protect those securities.[3] The government, in turn, imposes capital requirements on banks as a means of protecting its interests. Banks fund themselves with deposits (FDIC-insured and uninsured), nondeposit debt (e.g., federal funds and repurchase agreements), long-term debt capital (e.g., subordinated notes and debentures), and equity capital. Herein lies the distinguishing feature of banks' capital structure – deposits, rather than equity and long-term debt, are banks' major sources of funds. Equity and long-term debt, however, play a critical role in determining a bank's capital adequacy and, hence, its safety and soundness and conformity with government regulations.

Structural changes have affected the market for bank capital and changed the market's perception of the role of government guarantees. The S&L and banking crises of the 1980s and early 1990s resulted in a more stringent regulatory environment and greater risk to uninsured depositors. The Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA, 1989) and Federal Deposit Insurance Corporation Improvement Act (FDICIA, 1991) redefined the market's sensitivity to bank-specific risks. In particular, FDICIA requires regulators to take "prompt corrective action" when an insured depository becomes financially distressed, as measured by its ratio of regulatory capital to risk-adjusted assets, and severely limits the FDIC's coverage to deposit accounts of $100,000 or less. Previously, depositors with larger accounts often suffered no losses when the FDIC arranged for a bank to be purchased with all deposits assumed by the acquiring bank. Even then, Flannery and Sorescu [1996] examine the yields on banks' subordinated debentures over the period 1983-1991 and conclude that conjectural government guarantees and bank-specific risks were reflected in the prices of these securities.[4] Their findings suggest a rational response to changes in government policy toward absorbing private losses in the event of a bank failure.

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[3]Buser, Chen, and Kane [1981] show how underpriced deposit insurance enhances the value of an insured bank's equity. Black, Miller, and Posner [1978] analyze bank capital requirements and M&M propositions. They contend that capital requirements may represent an inexpensive way for the government to regulate banks.

[4] Flannery [1998] summarizes the empirical literature on market discipline and concludes that such monitoring "… could reasonably provide a greater proportion of corporate governance services for large, traded U.S. financial firms" (p. 273).

The regulatory environment has continued to evolve since 1991. The National Depositor Preference Act of 1993, for example, gives priority to the FDIC and to depositors at domestic offices over all other creditors. As a result, noncollateralized, nondeposit sources of funds are now explicitly inferior to the claims of the deposit-insurance fund. In addition, FDICIA severely restricts the Fed and the FDIC from bailing out uninsured depositors, and provides for specified regulatory actions and the prompt intervention and resolution of capital-deficient banks, where the governing capital ratios are defined by the banking authorities.

The Basel Accord, adopted in 1992 by U.S. bank regulators, defines regulatory capital for internationally active banks and has been adopted by the Federal Reserve for BHCs. It mandates two kinds of regulatory capital: Tier-1 (core capital) and Tier-2 (supplementary capital), the sum of which is total regulatory capital. Tier-1 capital consists of equity and related surpluses – common stockholders' total equity (book value), noncumulative perpetual preferred stock, and cumulative preferred stock (to a maximum of 25 percent) – plus minority interests in the equity capital accounts of consolidated subsidiaries, less goodwill and other intangible assets. The minimum Tier-1 requirement is four percent of risk-weighted on-balance-sheet assets plus off-balance-sheet activities, where the risk weights are somewhat arbitrarily defined and applied to four categories of assets. Tier-2 capital, which is limited to 100 percent of Tier-1 capital, consists of all other types of preferred stock and any related surplus, and (subject to some additional limits) subordinated notes and debentures and allowance for loan and lease losses. To be considered well capitalized, the Federal Reserve's Regulation Y specifies that BHCs must have Tier-1 capital equal to at least six percent of risk-weighted assets under the Basel Accord, and total regulatory capital equal to at least ten percent under FDICIA.

Taken as a package, these changes have reduced the expected value of the federal safety net to BHCs by providing for a speedy resolution of their insolvent bank subsidiaries and by shifting more of the losses of failure to uninsured creditors. Accordingly, the costs of financial distress now play a more important role in the supply and demand for bank funds, especially regulatory capital. In this new environment, banks should want to demonstrate to both the marketplace and their regulators that they are strongly capitalized.

A recent innovation in the form of trust-preferred securities (TPS) has effectively shifted out the supply curve for Tier-1 capital by providing bankers with a cost-effective way of raising regulatory capital. These instruments are attractive because they generate tax-deductible interest payments and qualify as Tier-1 capital. However, Stein [1998] notes that not all banks will benefit to the same extent from cheaper Tier-1 capital. Citing the empirical results of Kashyap and Stein [2000], Stein argues that smaller banks do not generally access uninsured sources of funds. The fixed transactions costs on small issues of securities, which makes them too expensive to issue, is a major reason for this scarce demand. On the other hand, large banks often have substantial uninsured sources of funds, such as foreign deposits, in their capital structures. If the market for uninsured funds responds in a rational way to bank-specific risks, we can hypothesize that larger banks, and banks that rely on uninsured funding, are more likely to issue TPS, improve their Tier-1 capital ratios, and thereby lower their cost of acquiring uninsured deposits.

From a polic y perspective, the Basel capital requirements have been severely criticized and are now under review by the Basel Committee.[5] Bankers mainly object to higher mandated capital because of the high cost of issuing equity capital. The evidence is overwhelming. Calomiris and Himmelberg [1999] find that over the years 1995 through 1999 the cost of issuing capital by BHCs with over $10 billion in assets averaged 3.46 percent, compared to 1.53 percent for the present value of repeated offerings of subordinated debt that is rolled over at maturity. Houston, James, and Marcus [1997] report underwriting fees for 278 publicly traded BHCs issuing securities from 1982 to 1989 of 4.49% for common stock, 2.69% for preferred, and 1.35% for subordinated notes.[6] Further, equity capital entails additional costs, which reflect the need to resolve asymmetric-information problems (as described in Myers and Majluf [1984]). Consequently, common share value tends to decrease significantly when new equity is issued. For example, Slovin, Sushka, and Poloncheck [1992] find that money-center BHCs experience a two-day abnormal return of -2.89% when they issue common equity. Houston, James, and

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[5] For a review of and citations to much of the criticism, both of the present and proposed Basel capital requirements, see Shadow Financial Regulatory Committee [2000]. Jones [2000] describes how banks engage in "regulatory capital arbitrage" by reallocating their asset portfolios.

[6] Benston and Kaufman (1988) suggest that subordinated debentures counted fully as regulatory capital. The extent to which BHCs (and banks) might voluntarily increase their regulatory capital, if allowed to use subordinated debentures as Tier-1 capital, can be inferred from the empirical findings in this study of BHCs' use of TPS, a similar, but more expensive, financial instrument.

Marcus [1997] find a significant abnormal return of -1.29% for their sampled BHCs' common stock issues and insignificant abnormal returns for preferred stock and subordinated note issues. Wall and Peterson [1991] find a similar one-day market response in their study of BHCs' security issues during 1982-1986: -1.43% for common stock, and insignificant abnormal returns for other security issues.

Keeley [1989] examines 24 equity-capital issues by banks during the 1975-1986 period and finds that issues by banks with lower capital ratios produce a significantly more negative return than issues by banks with higher capital ratios. One explanation Keeley provides for this result is that poorly-capitalized banks that are forced to issue equity in an effort to diminish the risk exposure of the deposit-insurance fund would experience larger negative returns because the issuance would diminish the value of the deposit-insurance guarantee.

Cornett and Tehranian [1994] study securities issues by banks between June 1983 and December 1989 and report significantly negative two-day abnormal returns of -1.56% for common-stock offerings by well-capitalized banks and insignificant negative abnormal returns of -0.64% for common stock offerings by poorly-capitalized banks. They also report insignificant returns for other securities issues. Cornett and Tehranian, who compare their results to four major non-banking studies, conclude: "Common stock and convertible debt offerings have generally been found to produce negative and statistically significant price reactions, while preferred stock and straight debt offerings have generally been found to produce no statistically significant stock price reactions" (p. 100).

These findings strongly suggest that securities issues by BHCs do not increase share prices, yet we find a significant positive market reaction to TPS filings. What is so different about TPS issues? Our evidence points to tax savings and reductions in the costs of financial distress as major reasons for the favorable reaction.

II. The Evolution and Issuance of TPS

A. *The Structure of a TPS Deal and Terms of Issuance*

Figure 1 shows the structure for a typical TPS deal. The process begins with the BHC creating a special-purpose vehicle (SPV) as a trust subsidiary. The SPV is structured as a statutory business trust formed under the laws of the State of Delaware, which is taxed as a partnership, wherein net income flows through as interest income to the holders of the TPS. Hence, unlike traditional preferred stock

dividends, corporations do not benefit from the dividends-received deduction. The parent BHC buys all the SPV's total pro forma common equity, which is nominal. The SPV's main function is to issue the desired amount of TPS to investors. The SPV, in turn, lends the proceeds of the offering to the parent BHC in the form of junior-subordinated, deferrable-interest debentures under economic terms similar to the TPS. This loan (or loans in the case of multiple issues) is the sole asset of the SPV. To count as regulatory capital, the Federal Reserve requires that, if the BHC encounters financial distress, the SPV must have the option to defer dividend distributions for at least 20 consecutive quarters.[7] The BHC treats the TPS shares as minority interest, which is included in Tier-1 capital.[8]

Although TPS has no stated maturity, it does have a mandatory-redemption feature. Using the longest feasible maturity (as is required by the Federal Reserve), the effective life is typically 30 years. In public retail offerings, the securities usually are callable at par after five years, while for private institutional offerings (the 144A market) they tend to be callable after 10 years at par plus a declining premium. According to Ryan, Beck & Co., the all-in costs of issuance favor public retail offerings, as they have lower expenses compared to 144A transactions. Although credit ratings are not required on TPS, they have been more common on institutional offerings than retail ones.

B. Nonbank Corporate Issuance of Debt-Equity Hybrid Securities

On October 27, 1993, Texaco issued the first debt-equity hybrid security known variously, since then, as monthly-income preferred stock (MIPS), quarterly-income preferred stock (QUIPS), and trust-preferred stock (TPS), among other names.[9] By the end of 1999, almost 300 nonfinancial corporations issued roughly $65 billion of these securities.[10] Irvine and Rosenfeld [2000] study a sample of 185 of these firms and find that 22 percent of them used part or all of the proceeds to retire outstanding preferred stock, showing that an important motivation for selling these securities was tax-driven.

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[7]In effect, dividend distributions can be deferred indefinitely if the SPV makes just one payment before twenty missed quarters have been accrued.

[8] Kalser [1997] notes that TPS outstanding is not delineated in Call Reports but it is included in the line item "minority interest in consolidated subsidiaries".

[9]Since the banking industry, as reflected by the American Banker, seems to prefer the term "trust preferred securities" we use TPS to describe the securities analyzed in this paper. On the street, TPS also are know as "capital securities" and Euromoney refers to them as "preference shares." Akselrad and Bernstein [1994], Kalser [1997], Khana and McConnell [1998], Padgett [1998], and Sinkey [1998] describe various aspects of these securities' innovations.

[10]Goldman Sachs, MIPS/QUIPS Market Update, January 26, 2000.

C. BHC Issuance of TPS

BHCs did not issue TPS until after October 21, 1996, when issues increased dramatically, apparently for three reasons. First, before October 21, 1996, the banking authorities did not allow TPS to count as Tier-1 capital. Second, relatively few BHCs could obtain the pure tax advantage arising from an exchange of TPS for taxable-preferred stock because they have relatively little capital represented by preferred stock. For example, at year-end 1995, of the 1,252 BHCs that reported to the Fed, only 182 (14.6%) had any preferred stock outstanding. Overall, taxable preferred stock represented only 1.79 percent of total BHC equity capital. Third, BHCs' investment bankers were urging their clients to issue TPS before the end of the calendar year, citing uncertainty regarding the continued tax-advantaged status of TPS. This urging may have been motivated by the additional fee income provided by these issues. As Dutt notes, investment bankers earned more than $200 million in fees in less than four months of underwriting TPS issues.[11]

Following the Federal Reserve's October 21, 1996 ruling, BHCs have been major issuers of TPS. As Table 1 shows, between October 1996 and December 1997, BHCs issued $25.0 billion of TPS, compared to $65 billion in similar issues raised by nonfinancial corporations over five years. Although most of the TPS issues have been sold by large publicly traded BHCs, smaller BHCs, banks, and thrifts also have used this instrument. In addition to the issues presented in Table 1, during 1997 and 1998, community banks and thrifts sold 72 public retail issues and 37 private issues.[12] Gross proceeds on these retail issues ranged from $5 million to $75 million. We do not analyze these issues for two reasons. First, few of these institutions have publicly traded stock. Second, to ensure a homogeneous sample, we study only commercial-bank holding companies.

III. Hypotheses

We examine whether issuing TPS enhanced stockholder wealth, why some BHCs issued and others did not issue TPS, and why, among the issuers, some issued early and some later. We propose and

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[11]Dutt [1997], who reports that the Treasury indicated it would try to have the tax law changed, quotes Susan Lester, the CFO of First Bank Systems, the first BHC to sell TPS, as saying: "Most banks are trying to do as much as possible. We had a concern, as did everyone, that the opportunity would end with tax law changes" (p. 12). Our personal conversations with managers of Wachovia Corp. confirm the reports of pressure from investment bankers to issue TPS.

[12]We thank Christopher Gastelu of Ryan, Beck & Co. for supplying us with descriptions of trust-preferred securities and information on their sale by small banks and thrifts.

test two sets of competing hypotheses. One set includes (A) tax savings, (B) reductions in the costs of financial distress, and (C) growth opportunities, all of which predict an increase in stockholder wealth. The second set includes (D) moral-hazard behavior and (E) transactions costs, conditions that are inconsistent with the M&M hypothesis. These latter two hypotheses predict that at least some BHCs will not issue TPS, and that the stockholders of those that do are likely to suffer wealth losses.

A. *Tax Savings*

Since trust-preferred securities have a tax advantage over common equity and ordinary preferred stock, but not over debt capital, the pure-tax play is to use TPS to redeem equity, either common or preferred. Although this tax-savings event should enhance stockholder wealth, we note that until the Fed ruled that TPS would count as Tier-1 capital, no BHCs had issued these securities. TPS also can be issued as a source of additional capital to be used for general-corporate purposes. For our sample of 65 first-time issuers of TPS, we identify 11 BHCs as using the proceeds to redeem equity and 54 BHCs as indicating use for general-corporate purposes.

B. Reduction in the Costs of Financial Distress

The costs of bank financial distress take two basic forms: increased regulatory interference and increased costs of funds (capital). Bank regulators who believe that inadequately capitalized banks pose a threat to the deposit-insurance safety net can impose on BHCs a range of increasingly costly actions. These include more frequent and intrusive on-site examinations, classification as a "problem bank," cease-and-desist orders, removal of officers, and removal of deposit insurance. Under FDICIA (1991), the increasing severity of the measures relates directly to a BHC's regulatory capital-to-asset ratio. The imposition of these actions not only is costly to the BHC's stockholders, but also imposes costs on officers' time and is likely to severely damage reputation capital.

BHCs with inadequate capital also will be perceived by the market as being riskier, and hence will incur higher costs of funds provided by holders of uninsured obligations. Two factors are particularly important. One is FDICIA, effective after 1991, which imposed conditions making it more unlikely that

uninsured creditors would be bailed out.[13] Indeed, Benston and Kaufman [1997] find that, through 1995, the FDIC increasingly imposed losses at closed banks on uninsured creditors. The other is the National Depositor Preference Act of 1993, which gives priority to the FDIC and depositors over all other creditors.[14] Foreign deposits, however, are not given a preference. These FDIC-uninsured and disfavored creditors are likely to demand higher yields from BHCs they perceive to be risky.

We hypothesize that the market recognizes the advantages of issuing TPS by BHCs with relatively less regulatory capital and with more uninsured sources of funds. For these banks, TPS represents an addition to existing equity which, in turn, leads to a corresponding reduction in the costs of financial distress. If this hypothesis is correct, these banks will tend to be issuers of TPS and, when issue filings are announced, this action will have a positive effect on common share value. For banks with adequate capital, they could also receive a positive market response because of a substitution effect, whereby a current TPS issue results in a reduced amount of future issues of common equity.

C. *Growth Opportunities*

The climate for BHCs growth opportunities during the mid-to-late 1990s presented a prescient atmosphere. The removal of geographic and product restrictions on BHCs and banks became not a question of *if* they would be removed, but *when*. Indeed, the staged removal of nationwide restrictions on interstate branching began in 1994 with the passage of the Riegle-Neal Interstate Banking and Branching Efficiency Act. The Financial Modernization or Graham-Leach-Bliley Act was enacted in 1999. Although its passage occurred beyond our test period, it was an anticipated event. In fact, the expected repeal of laws restricting or prohibiting BHCs from acquiring or merging with securities and insurance firms had been hotly debated and widely expected for several years. The mega-merger of Citicorp and Travelers Group in 1998 to form Citigroup played a major role in forcing lawmakers to act. In addition, financial innovations such as new contracting technologies, had expanded banks' investment opportunities. On balance, BHCs should have expected an enhanced expansion as well as greater investment opportunities

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[13] Flannery and Sorescu (1996) find that spreads on subordinated debentures issued by banks or BHCs over equivalent-maturity treasuries were significantly higher for banks whose financial statements indicated greater risks and that had higher liability-to-market-value-equity ratios, particulary in 1989-91.

[14] According to the FDIC's 1993 *Annual Report* (p. 51), the law specifies that the assets of a failed institution be distributed in the following order: (1) to cover the administrative expenses of the receiver for the insured depository, (2) to pay the claims of domestic depositors, (3) to pay the claims of general creditors, (4) to pay the claims of subordinated creditors, and (5) to pay the claims of stockholders.

during our sample period. Accordingly, we hypothesize that BHCs with greater growth opportunities would be more likely to issue TPS and, when the issue filings are announced, their stock prices will increase.

D. Moral-Hazard Hypothesis

Mayers and Smith [1982] refer to moral hazard as any self-interested and voluntary response to an insurance contract by an insured party.[15] In banking, such behavior can take the form of excessive risk-taking by bank mangers, in response to deposit insurance which, at the margin, is underpriced. Excessive risk taking occurs when banks take risks with substantial variances of possible outcomes, such that there is a significant probability that the cost of negative outcomes will be borne by the FDIC. Merton [1977, 1978] shows the isomorphic correspondence between deposit insurance as a guarantee and a common-stock put option, and he analyzes the cost of deposit insurance when surveillance costs exist, respectively. As banks approach insolvency, managers acting to benefit stockholders have increasing incentives to "bet the bank": if they don't win, they can "put" the assets to the FDIC. As Keeley [1990] shows formally, "increasing capital, holding constant deposits, reduces the value of the deposit-insurance option" (p. 1187). Indeed, Kane [1989], among others, identifies a substantial portion of the losses incurred by savings-and-loan associations (and imposed on taxpayers when the Federal Savings and Loan Insurance Corporation (FSLIC) was rendered bankrupt) as due to moral hazard. Such concerns about the negative moral-hazard consequences of low capital combined with underpriced government-provided deposit insurance are in large measure responsible for the minimum capital requirements of FDICIA (1991). In addition, FDICIA provides that the banking authorities can forbid undercapitalized banks from offering performance-incentive compensation plans (e.g., bonuses and stock options) to senior bank officers, because the Congress feared that this would give bank CEOs incentives to take excessive risks.

The moral-hazard hypothesis predicts that BHCs, particularly those that are undercapitalized, would not increase their capital by issuing TPS. These capital securities would be available to absorb

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[15] The term "moral hazard" was used first by Arrow (1963) in the context of medical insurance. He points out that an optimal insurance contract cannot be constructed because knowledge is incomplete. Moral hazard results from the inability of the contracting parties to state and observe all contingencies. Pauly (1968) points out that "moral hazard" should not be viewed as equivalent to "moral perfidy," but as rational behavior when a lower-than-market price is charged for a product. The term has been applied to depository institutions on the assumption that the FDIC imposes a lower-than-market marginal price for deposit insurance. Benston (1995) reviews the theory and evidence on moral hazard .

losses that otherwise might be imposed on the FDIC and uninsured depositors and other fund providers. Consequently, holders of TPS should require an interest rate sufficient to compensate them for the bankruptcy risk, a cost which stockholders would bear. In effect, the value of the stockholders' deposit-insurance put options would be reduced or eliminated. Nevertheless, some BHC managers, those who want to protect their positions and reputations, might seek to reduce the costs of regulatory discipline by issuing TPS to increase their regulatory capital, even though this might reduce stockholders' wealth. In this case, the moral-hazard hypothesis predicts that the stock prices of BHCs that issued TPS, especially undercapitalized BHCs, will decline when the issue filings are announced.

E. Transaction Costs

For some BHCs, the additional transaction costs associated with TPS could offset some or all of the expected benefits. Because corporate investors in TPS do not obtain the 70-percent dividend exclusion available to them from traditional equity issues, BHCs that had conventional preferred stock to replace, which were few, would have to pay somewhat higher yields on TPS. Nevertheless, a net after-tax advantage in yield to the issuer still would exist. Most BHCs interested only in the tax advantages of TPS, therefore, would have to redeem common stock. However, we see relatively few such transactions, because bank managers apparently consider this change to be too costly, in part because the replacement of common with preferred stock might increase stockholders' costs of financial distress.

Another potentially important cost is the higher fee charged by underwriters relative to conventional preferred-stock issues, which could absorb a portion of the issuer's tax benefit. For example, Houston, James, and Marcus [1997, Table 9] find that underwriters' average fees were 2.69 percent for conventional preferred stock, while Irvine and Rosenfeld [2000] document an average fee of 3.15 percent for MIPS.

Additionally, the managers of smaller BHCs might find that the opportunity cost of learning about and evaluating TPS issues exceeds the tax benefits that might be obtained from their use. This outcome would be inconsistent with the M&M hypothesis. Kashyap and Stein [2000] examine a similar situation. They analyze the extent to which banks issue CDs following Federal Reserve open-market reductions in demand deposits. They say: "In an M&M world, banks are indifferent at the margin between issuing transactions deposits and large CDs, so shocks to the former do not affect their lending decisions" (p.

408). They find that smaller banks, in particular, tend not to issue large CDs. In sum, these transaction costs are likely to be greater for BHCs for which the primary (perhaps, sole) benefit is tax savings and for smaller BHCs, for which learning costs are likely to be greater.

F. Summary of Hypotheses

To recap, the tax-savings, costs-of-financial-distress, and growth-opportunities hypotheses have the same predictions of positive stockholder wealth enhancement to a TPS filing. Moral-hazard behavior and transaction costs suggest that BHCs would not issue TPS, and those that do will experience a negative stock-price reaction. These hypotheses also can be distinguished by the association between changes in stockholder wealth (stock prices) and specified attributes of the BHCs. Those with greater tax savings opportunities should have greater positive stock-price changes if hypothesis A obtains. Those that are less-well capitalized or that have greater amounts of FDIC-uninsured sources of funds should have greater positive changes if hypothesis B obtains. The price changes should be greatest for BHCs with more growth opportunities if hypothesis C obtains. In contrast, stock-prices changes should be negative for less-well-capitalized BHCs if the moral-hazard hypothesis obtains. BHCs that are undercapitalized and those that can expect smaller tax benefits and for which the cost of issuing TPS are greater should not issue these securities (hypothesis E). We additionally test these hypotheses by relating the attributes of BHCs – such as tax advantages, FDIC-uninsured funding, growth opportunities, capital, and size – to their issuance of TPS and stock-price changes when the filings are announced.

IV. Sample BHCs and Methodology

Our initial sample consists of all publicly traded BHCs that had data on CRSP and reported to the Federal Reserve at the beginning and end of both 1995 and 1996, of which there were 229 in 1996 and 256 in 1997.[16] We determined those that issued TPS from three sources: Goldman, Sachs and Co., Chase Manhattan Bank, and Keefe, Bruyette and Woods. We gathered data on the SEC filing date, issue size, and use of proceeds directly from the prospectuses on the SEC's EDGAR database. If the prospectus

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[16] The number of publicly traded BHCs in our samples is similar to the numbers reported in other studies. The *American Banker* (June 30, 2000, p. 23) lists 223 bank stocks. Houston, James, and Marcus [1997] found 287 BHCs that were in existence at least two years over 1982-1989. Our numbers differ between years because some BHCs merged or were acquired and the others went public and then were reported on CRSP. Demsetz and Strahan [1997] examine between 81 (in 1993) and 134 (in 1986) publicly traded BHCs over the period 1980-1993.

could not be found on EDGAR, we obtained information from Security Data Corporation's database of preferred offerings. When a bank filed multiple TPS issues, we include only the initial filing. [17]

Table 1 shows that from 1996 through 1999 BHCs filed $31 billion in TPS with an average issue size of $188 million. Over this period, 162 issues were filed by 110 BHCs, of which 74 were first-time issuers. Of these, seven were omitted either because we could not locate them on CRSPs file or they did not have complete data on the Federal Reserve Y-9 BHC database. Since only two publicly traded BHCs had their initial filing after 1997, we excluded these observations. Our final issuer sample contains the 65 BHCs with initial filings that occurred before 1998, 25 in 1996 and 40 in 1997. We find that 22 of the 25 filings in 1996 took place in the months of November and December, with 14 occurring in December. Thereafter, no month accounted for more than six initial filings. We compare this sample of 65 BHCs with the 204 BHC nonissuers in 1996 and the 216 nonissuers in 1997.

We use event-study methodology (described below in Section V) to test the hypotheses related to stockholder-wealth enhancement. We compute the abnormal change in the BHC issuers' stock-price returns (both early (1996) and late (1997) filers) over selected intervals beginning on October 21, 1996 (Day 0), when the Federal Reserve ruled that this security could be included in Tier-1 capital, and compare these with the abnormal returns of BHCs that subsequently did not issue TPS. We then compute two-day abnormal returns of TPS issuers over the days that these securities were initially filed with the SEC. We also examine whether the use of proceeds, namely substitution of TPS for existing Tier-1 capital, affects the magnitude of the BHCs' abnormal returns.

We next structure and examine the hypotheses presented above that might explain why publicly traded BHCs did and did not issue TPS. We test these hypotheses with univariate and multivariate-probit comparisons of the BHCs that did and did not issue TPS in 1996 and 1997. We conduct additional tests, adjusted for sample-selection bias arising from the voluntary choice to issue, by regressing the two-day abnormal returns, when TPS filings were announced, on the variables hypothesized to explain why BHCs sold these obligations.

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[17] Following Bhagat, Marr, and Thompson [1985], we consider shelf offerings registered under Rule 415 equivalent to ordinary offerings.

V. Empirical Findings

We present our empirical findings in three parts. The first subsection describes our event-study results. The second subsection identifies the distinguishing characteristics of TPS issuers versus nonissuers. The findings from this analysis are then used in the third subsection to explain the magnitudes of the issuers' abnormal returns.

A. Event-Study Results

We compute abnormal returns using the CRSP Excess Returns Tape, which ranks stocks in the CRSP daily file according to the magnitude of their market-model betas. We calculate daily abnormal returns for each stock by subtracting the average daily return recorded by that stock in its beta decile from its daily raw return, and cumulate abnormal returns (CARs) over the relevant periods.

Panel A of Table 2 reports the cumulative abnormal return for the full sample of 269 BHCs and the two subsamples of TPS issuers (n = 65) and nonissuers (n=204) over one-, five- and ten-day intervals beginning October 21, 1996 (Day 0) through November 1, 1996 (Day +9).[18] We include five-day and ten-day intervals to account for post-event drift in the abnormal returns caused by related events. Specifically, the first press coverage of the Federal Reserve's ruling did not appear until October 24 in The American Banker, a daily trade publication. On October 30, the same publication ran a front-page story on TPS, in which a trader from Morgan Stanley, referring to the Fed's ruling, was quoted as saying: "In my mind this is the most significant announcement to effect banking institutions that I can remember."[19] For all BHCs, the one-day CAR is 0.48 percent, statistically significant at the 0.10, two-tail level.[20] However, over longer intervals, as the importance of the event was publicized, the results become stronger. The five-day CAR is 0.86 percent, statistically significant at the 0.07 level; over the ten-day interval it is 1.89 percent, statistically significant at the 0.01 level. An examination of the Day 0 abnormal

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[18] For non-clustered event dates, abnormal returns are typically computed over a two-day interval (day 0 and day +1), because it is unclear whether each of the initial announcements occurred before or after the market closed on the event date. Since the Federal Reserve's October 21 announcement represents a date which is common to all BHCs and occurred before the market closed on that date, we consider Day 0 to be the appropriate event date.

[19] To insure that no other confounding events had taken place during this period, we examined both the American Banker and the Wall Street Journal from October 21 through November 4. We did not find any unusual news reports that would have been likely to affect the stock returns of BHCs other than the usual positive or negative economic news that would affect all publicly traded firms.

[20] Brown and Warner [1985] note that standard cross-sectional standard errors are innacurate when abnormal returns are calculated over a single date for stocks in the same industry. Accordingly, the t-statistics in our tests are calculated with time-series standard deviations estimated over 200 trading days prior to October 21, 1996 (see Campbell, Lo, and McKinley [1997]).

return for the subsample of issuers and nonissuers finds them to be virtually identical in magnitude: 0.47 percent for issuers versus 0.48 percent for nonissuers, although neither value is statistically significant at the 0.10 level. Over five days, the issuers' CAR is 1.31 percent (significant at the 0.01 level) compared to 0.71 percent (p-value 0.13) for nonissuers. Over the ten-day window, issuers continue to record stronger results with a CAR of 2.69 percent compared to 1.66 percent for nonissuers (both significant at the 0.01 level).

When we divide the BHCs between the 1996 ("early") filers and the 1997 ("late") filers, an interesting picture emerges.[21] For 1996 filers, the Day 0 CAR is 0.91 percent (significant at the .06 level) compared to just 0.18 percent (p-value 0.55) for 1997 filers. Over five- and ten-day intervals, the 1996 filers CARs are 1.93 percent and 3.52 percent, respectively, and both are statistically significant at the 0.01 level. The corresponding CARs for the 1997 filers are 0.94 percent and 2.12 percent, significant at the 0.07 and 0.01 levels. These results suggest that the market could recognize BHCs that were more likely to issue this security early rather than later, and later rather than not at all, and rewarded their shareholders accordingly. However, the fact that nonissuers also record a significantly (0.01 level) positive CAR of 1.66 percent suggests that the market expected the Fed's ruling to benefit all BHCs in general.

Panel B of Table 2 reports the CARs of BHCs that eventually issued TPS. We examine a two-day period, where Day 0 is the date that the bank filed a TPS issue with the SEC. Because we have no way of knowing whether the issue was filed before or after the market closed on that day, we include Day +1 in our abnormal-return measure. For the sample of 65 issuers, the two-day CAR is 0.94 percent, statistically significant at the .01 level.[22] In contrast, Houston, James, and Marcus [1995, Table 9] document an (possibly one-day) insignificant abnormal return of just -0.08 percent for 65 issues of conventional preferred stock over 1982-1989. Wall and Peterson [1991] find an announcement-day abnormal return of -0.04 percent for 14 issues of conventional preferred stock by BHCs over 1982-1986; for 40 issues of mandatory convertible bonds, they report an insignificant abnormal return of 0.20 percent. The latter

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[21] Because the number of filings peaked during December 1996 (n = 14 filings) with no month recording more than six filings thereafter (see Section IV), we consider December 31, 1996 as the cutoff date between early and late filers. The 1996 (early) issuers include include most of the largest BHCs, such as Citicorp, Chase Manhatten, JP Morgan, Bankers Trust, Bank of America, Wells Fargo, Mellon, Wachovia, First Union, and Barnett.

[22] The sample's abnormal return on Day –1 is 0.12 and not statistically significant at conventional levels.

result is interesting because, under the old primary-secondary scheme of classifying regulatory capital, mandatory convertible debt is the closest observed security to TPS that has been tested. On balance, the results in Panels A and B provide preliminary evidence that issuing TPS results in benefits that more than offset any existing moral-hazard costs as well as the higher yields and other transaction costs associated with TPS.

Panel C of Table 2 reports the CARs based on the issuers' use of proceeds. From our detailed examination of TPS filings, news reports, and annual 10-K reports, none of the 65 BHCs intended to use TPS proceeds to retire debt and only 11 explicitly used the proceeds to retire equity (common or preferred stock or both); the remainder used the proceeds for general-corporate purposes. For the subsample of 11 BHCs, the two-day $(0, +1)$ CAR is 0.19 percent, not statistically significant (t-statistic = 0.39). In contrast, the other 54 firms record a CAR of 1.07 percent, statistically significant at the .01 level. Additionally, the CARs of the two subsamples differ statistically (p-value = .06). For the subsample of 11 firms, the retirement of outstanding equity meant that the size of the issuers' Tier-1 capital base remains essentially unchanged while, for the other group, there is both a tax-savings effect as well as an increase, at least temporarily, in Tier-1 capital. These results suggest that the Tier-1 effect rather than the tax effect is driving the market's significant positive response to the TPS filing. However, the lower taxes associated with TPS may also play an important role because a BHC issuing TPS is able to achieve a higher equity base at an after-tax cost similar to debt. Furthermore, since the higher equity base positions the BHC to take advantage of future growth opportunities, we cannot, at this stage, rule out the positive market response as a reaction to a signal about growth opportunities.

B. Why Did Some BHCs Issue TPS while Other BHCs Did Not?

To understand why some BHCs did and did not issue TPS, we compare the means of selected balance-sheet and income-expense data of issuers with those of nonissuers. We use balance-sheet data as of the year-end prior to issuance and income-expense data for that prior year. We obtained the data from consolidated Y-9 financial statements, which, in most cases, are dominated by the BHCs' commercial-bank subsidiaries. We assume that these data provide valid proxies for the conditions that the BHCs expect to face following their decisions either to issue or not to issue TPS and, hence, predict those decisions.

We examine six sources of motivations for BHCs to issue TPS: (1) size, to account for the effects of scale and transactions costs, and as a measure of financial sophistication (four proxies); (2) taxation savings (two proxies); (3) risk that might be reduced with additional capital (three proxies); (4) funding structure, because the cost of uninsured deposits and borrowings might be reduced with additional capital (three proxies); (5) growth and investment opportunities to use the funds (four proxies); and (6) regulatory capital structure (three proxies). We make comparisons for each year 1996 and 1997, both to examine differences between early and later issuers and as a replication of the findings. The figures presented are averages of the various groups' numbers.

B.1 Univariate Results

(1) <u>Size</u>. Table 3 shows that the 25 BHCs in 1996 and the 40 in 1997 that issued TPS are much larger than the 204 and 216 BHCs that did not issue TPS in those same years. For example, the 1996 issuers' total assets average $66.0 billion versus $3.3 billion for the nonissuers. Net loans and leases and the market value of common equity are similarly much larger. Furthermore, the 1996 issuers are much larger than the 1997 issuers (total assets of $66.0 billion versus $11.7 billion). Also of interest is the BHCs' holding of derivatives, which may be viewed as an indicator of their financial sophistication. The 1996 TPS issuers had substantial amounts of derivatives (notional amount of $14.5 billion). In contrast, TPS nonissuers held almost no derivatives, while the 1997 issuers had just $0.8 billion (not significantly different from the nonissuers' derivative holdings). It is clear that the larger and more financially sophisticated BHCs took early advantage of this new capital security.

(2) <u>Taxation</u>. The possibility of taxation savings, as measured by the percentage of taxes paid on net income before taxes, is significantly higher for both the 1996 and 1997 issuers compared to the nonissuers, although the mean differences are small.[23] The 1996 issuers also had more conventional taxable-preferred stock as a percentage of total assets (0.5% vs. 0.2%), and both groups had more than the nonissuers, which had only 0.10 percent. Thus, the univariate analysis indicates that taxes played a significant, though not overwhelmingly important, role in BHCs' decisions to issue TPS.

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[23]We adjusted the 1995 tax rate for Riggs Bank Holding Company to its expected (future) value, because it paid almost no taxes in 1995 and very low taxes in 1996 due to a tax write-off of losses taken in 1994. Including the unadjusted data does not alter the regression results reported.

(3) <u>Risk</u>. Three variables that relate to the BHCs' loans and insolvency risk capture this dimension.[24] Loans and leases are considered to be the riskiest of most banks' assets. The percentages of loans and leases to assets show that early issuers made fewer loans per dollar of assets, although the difference is not significant at conventional levels (p-value = 0.19). We proxy loan quality with the ratio of the loan-loss allowance to total gross loans. Banks that take on more loan underwriting risk should hold higher allowances. This ratio is significantly higher for 1996 issuers, but not for the 1997 issuers.

To capture insolvency risk, we employ a safety index suggested by Hannan and Hanweck [1988]. This index is a comprehensive measure that collapses three pieces of information into a single number. The numerator is the sum of a BHCs' expected return on assets (ROA) and its ratio of total equity to total assets. The denominator is the standard deviation of the BHCs' ROA over the previous five years. The higher a BHCs' risk index is, the safer it is, and vice versa.[25] The 1996 issuing BHCs had a risk index of 58.6 at the beginning of the year, compared to 78.8 for nonissuers, significant with 0.01 probability. Among 1997 issuers, the difference narrows, as the indices are to 69.4 and 77.9, and is not statistically significant. It seems, then, that only the early TPS issuers tended, ex ante, to pose greater risk to investors.

(4) <u>Funding Structure</u>. BHCs' deposit structure appears to be related to their reasons for issuing TPS. Since the FDIC protects depositors with accounts of $100,000 or less, banks have little reason to increase their capital to attract or hold these depositors. Uninsured domestic demand deposits (over $100,000) are not reported in the Federal Reserve Y-9 data; however, these deposits are at little risk of loss, because demand depositors can remove their funds almost instantaneously should they fear that the bank might become insolvent. Holders of uninsured time deposits, though, are likely to demand greater explicit or intrinsic interest payments from banks that hold relatively less capital. Furthermore, foreign depositors are at greater risk of loss than domestic depositors, as the Depositor Protection Act gives domestic deposits preference over uninsured foreign deposits. We measure this motivation to issue TPS

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[24]Demsetz and Straham [1997] report significant negative relationships between firm-specific risk (measured as the residual of a regression of the variance of weekly stock returns on the market index) and BHC size (log of assets), log [(book value of equity capital/assets)^2] (and other balance sheet variables) over the period 1987-1993. Thus, it appears that our size and capital variables also measure firm-specific risk as indicated by the variance of stock-price returns.

[25]Bank risk indices vary over time with credit and business cycles. For example, using data from the *Federal Reserve Bulletin* (June 1994, p. 501), we calculate that the 90 banks ranked 11 to 100 by total assets for the years 1987 through 1991 had an average risk index of 19.1 in 1991 (when 124 banks failed) compared to 79 in 1996 (when only five banks failed).

with three variables as percentages of total assets: foreign deposits, uninsured (over $100,000) time deposits, and other borrowed funds.

Each of the variables indicates highly significant differences between TPS issuers and nonissuers for both years. TPS issuers have relatively more foreign deposits, particularly among the early (1996) issuers: 8.2 percent vs. 0.2 percent of total assets among the nonissuers. The 1997 issuers have a much lower percentage of foreign deposits (2.3%), although it still is significantly greater than the nonissuers (0.2%). Uninsured time deposits as a percentage of total assets is significantly greater for the early issuers than for the nonissuers, but not so for the later issuers (p-value = 0.13). Compared to the nonissuers, the issuers' other borrowed funds also are a significantly higher percentages of total assets. These numbers are consistent with the hypothesis that Tier-1 capital is attractive when uninsured and less-protected depositors are more important to BHCs.

(5) <u>Growth and Investment Opportunities</u>. We measure growth by the average annual growth rate of total assets over the three years prior to the TPS issue. Since this proxy includes the effect on asset increases of mergers and acquisitions, it is an imperfect measure, except to the extent that it predicts the desire of BHCs to expand capital to finance additional acquisitions. Compared to nonissuers, this number is somewhat higher (although not significantly so) for 1997 issuers but not so for 1996 issuers.

Investment opportunity is measured with three variables: market/book value of common equity, return on assets (ROA), and return on book equity (ROE), all measured as of the beginning of each year. Although the market-to-book ratios are slightly higher for issuers in both years, they are not significantly different. The ROAs between the two groups for both years are not significantly different from zero. However, the issuers' ROEs in both years are significantly higher than the nonissuers' ROEs, 15.2 percent versus 11.9 percent in 1996, and 13.5 percent versus 12.2 percent in 1997. Since the higher ROE for issuers are not accounted for by a higher ROA, the differences trace to a greater use of leverage by issuers rather than greater profitability per dollar of assets. On balance, these results do not support the hypothesis that BHCs with greater growth and investment opportunities are more likely to sell TPS.

(6) <u>Regulatory Capital Structure</u>. We find that the regulatory-capital structure of issuers and nonissuers is significantly different. First, per dollar of total assets, issuers have significantly less total equity, which is the leverage factor driving the higher ROE. Second, relative to risk-weighted assets,

issuers have significantly less Tier-1 capital (the major component of regulatory capital), but significantly more Tier-2 capital. On balance, these findings suggest that issuers have reason to restructure their capital to increase their Tier-1 capital ratios without incurring the higher cost of equity. TPS provides these BHCs with the opportunity to do just that.

To recap, our univariate findings reveal significant differences between issuers and nonissuers across both years. These differences, however, are more pronounced for the 1996 issuers. The common findings across both years show that, in the year before selling TPS, issuing BHCs were much larger institutions; had higher tax rates and relatively more preferred stock that could be replaced with tax-advantaged TPS; had relatively more FDIC-uninsured foreign deposits, time deposits, and borrowed funds; had higher ROE (due to greater leverage rather than greater profitability per dollar of assets); and had lower capital-to-asset and Tier-1 ratios, but higher Tier-2 ratios. The 1996 issuers compared to 1997 issuers were larger, had relatively more preferred stock, relatively more foreign deposits and borrowed funds, and lower equity and Tier-1 capital ratios, but higher Tier-2 capital ratios.

B.2 Multivariate Analyses

Since univariate tests ignore the interaction among variables, we estimate a multivariate probit model to determine the differences between issuers and nonissuers and to examine the influence of the variables as a set rather than individually. Because there are a small number of issuers in each year, we combine the data for both years. To adjust for differences between the years, we include a dummy variable, D97, which equals 1 for observations in 1997 and 0 for observations in 1996. We use the natural logarithm of total assets (ln total assets) to represent size. The other three size variables – loans and leases, market value of common equity, and total derivatives – are not reported because they are highly correlated with total assets (Pearson correlation coefficient are 0.94, 0.94, and 0.77). An interactive term, the product of D97 and ln total assets, also is included to account for the effect of a shift in the diffusion of innovation (described below) related to the size of early and later issuers. We include all the other variables presented in Table 3, with two exceptions. We exclude ROE because it is driven primarily by leverage (total equity/total assets). Tier-2 capital to risk-weighted assets is omitted because total equity/total assets already measures it.

Table 4 presents the results for three alternative probit models in which the dependent variable is defined as Issuers = 1 and Nonissuers = 0. Model 1 includes all of the variables. Model 2 excludes ln total assets and ln total assets * D97, because BHC size is highly related to several of the other independent variables. Model 3 uses Tier-1 capital to risk-weighted assets in place of total equity to total assets.

For all three models, D97 is positive and highly significant (probability that the coefficient equals zero is less than 0.01), which reflects the greater number of issuers in 1997. Ln total assets also is positive and highly significant, consistent with our univariate analysis. The interaction of this variable with D97 is significantly negative, indicating that in 1997 there was a smaller positive relationship between size and the probability of issuance. These findings are consistent with the notion of financial innovation as a diffusion process that starts with larger and more financially sophisticated firms and trickles down to other firms.[26]

Three other variables have coefficients that are statistically significant at the 0.05 level or better in all three models: preferred stock/total assets and asset growth each have positive coefficients, and total equity/total assets or Tier-1 capital/risk-weighted assets have significantly negative coefficients. Foreign deposits/total assets has significantly negative coefficients in models 2 and 3, for which total assets is omitted. The coefficient of loans and leases/total assets is negative, but is significant only in model 3, while taxes paid/net income before taxes and ROA are positive and significant in model 2.

Although the multivariate and univariate analyses are generally consistent, one exception stands out. The asset-growth and ROA proxies for BHCs' investment opportunities play a more important role when interaction among the variables is permitted. The probability of a BHC issuing TPS appears positively related to its size and investment opportunities, extent of funding with foreign deposits, and relative capital shortfall as measured by total equity or Tier-1 risk-adjusted capital ratios.

C. What Explains the TPS-Issuing BHCs' Cumulative Two-Day Abnormal Returns?

Next, we seek to explain the magnitude of the two-day CARs when the TPS filings were "announced" by the 65 BHCs reported in Panel B of Table 2. We employ the variables used for the multivariate-probit analysis that excludes ln Total assets and D97 (reported in models 2 and 3 of Table 4) with one substitution and one addition. We replace preferred stock/total assets with a more precise and

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[26]Kane [1983] describes innovation as a diffusion process.

inclusive measure, Retire, a dummy variable that equals 1 if a BHC retired existing tier-1 capital (common or preferred stock or both). Following the argument put forth by Cornett and Tehranian [1994], we include a new variable, offer size/total assets, where offer size is defined as the dollar amount in the TPS offering prospectus.[27] Cornett and Tehranian (1994) find that offer size/total assets is negatively related to abnormal returns surrounding banks' common-stock issues and insignificantly positively related to abnormal returns surrounding other issues, primarily subordinated debt.

We present four models. One set includes all of the variables and the other includes only variables that are statistically significant in the multivariate-probit analysis presented in Table 4. For each of these two sets, we include either total equity to total assets or Tier-1 capital to risk-adjusted assets. These data are censored in the sense that we can observe the independent variables for all potential issuers, but the dependent variable only for those BHCs who actually issued TPS. Further, since all of the independent variables in the multivariate analysis are in the markets' information set prior to the date of issue, we have already demonstrated that the identity of the BHCs that do choose to file is predictable. In this case, standard OLS cross-sectional estimation is, at best, less powerful than conditional event-study methods (Prabhala [1997], Eckbo, Maksimovic and Williams [1990]). Instead of OLS, we estimate a conditional event study using Heckman's [1979] two-step method, which is appropriate for both the censored data and the voluntary nature of the issue decision. To determine statistical significance, we follow Greene [1991] who provides a consistent estimate of the standard errors for the second stage OLS estimates.

Table 5 presents the results. For both of the all-variables models, the relative capital variables and ROA are statistically significant. The coefficients of the relative capital variables are all negative (i.e., the lower the relative amount of capital, the greater the CAR), showing that the market rewards BHCs that increase their capital ratios. Although the coefficients of ROA are significantly positive, the coefficients of market/book value of common equity (which should indicate growth opportunities) are insignificantly negative (as they are in the multivariate probit analysis presented in Table 4). The coefficient on Retire is significantly negative. This suggests that the positive abnormal returns are driven by more than just the tax shield provided by TPS. Removal of variables that are not statistically significant in the multivariate

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[27] Since several filings were shelf offerings, where the total amount filed was significantly larger than the initial offering size, this variable was alternatively defined as the amount of the initial offering with similar results.

analysis of differences between the issuers and nonissuers improves the adjusted R-squares, but does not change the conclusions drawn from the all-variables models.

The moral-hazard hypothesis predicts negative abnormal returns for BHCs that increased their capital with TPS issues and lower (more negative) abnormal returns for BHCs with relative less capital. Table 2 reports positive abnormal returns to issuers, which is inconsistent with the hypothesis. As reported in Table 5, the coefficients on equity capital/total assets and Tier-1 capital/risk-weighted assets are significantly negative. These results are not consistent with those expected if the moral-hazard hypothesis was valid.

VI. Conclusions and Policy Implications

No BHCs issued TPS until after the Federal Reserve permitted them to include this security in their regulatory Tier-1 capital. From this evidence alone, it appears that the M&M propositions on the irrelevance of leverage do not apply to banks. The importance of regulatory requirements for banks is shown by our event-study findings, which show that early (1996) issuers of TPS record significantly positive cumulative abnormal returns over selected intervals, beginning when the Federal Reserve first announced it would accept TPS for Tier-1 capital. Further, the sample of 65 BHCs that subsequently filed a TPS issue with the SEC records significantly positive abnormal returns over a two-day period when TPS filings are announced. These results can be attributed primarily to those BHCs that used the issue proceeds to increase Tier-1 capital, as opposed to those that use TPS as a substitute for existing Tier-1 capital.

From the univariate tests, we find that issuers compared to nonissuers are larger, have higher tax rates and relatively more preferred stock, more uninsured deposits and borrowed funds, and relatively less total equity. Although these differences between issuers and nonissuers hold for both early (1996) and late (1997) issuers, they are more pronounced for the early issuers. Early issuers are larger and appear to be more financially sophisticated than late issuers and nonissuers (as reflected by their greater use of ordinary preferred, derivatives, and foreign deposits). Multivariate probit models generally confirm the univariate findings and show that issuers and nonissuers come from distinct groups.

The stockholders of BHCs generally benefited from the TPS issues, and those with relatively lower capital ratios benefited even more. This is a unique result, since TPS is the only security that

provides clear benefits to BHC's stockholders. The positive share price reaction occurs even though almost all BHCs held more than the regulatory minimum amount of capital (relative to assets). A regulatory emphasis on Tier-1 capital appears to have given BHCs incentives to exceed the minimum required ratio. Market forces, as evidenced by the effect of uninsured sources of funds on BHCs' desired capital ratios, also encourage BHCs to hold relatively more capital. When the tax disadvantage of equity capital is removed, BHCs that can achieve greater tax benefits, have relatively lower capital, and are funded with more uninsured funds, are more likely than other BHCs to increase their capital by selling TPS. Furthermore, the stock market appears to view this increase as beneficial.

Our findings are consistent with the tax-savings and costs-of-financial-distress hypotheses. Regarding the growth-and-investment-opportunities hypothesis, the results are inconclusive. Our results are not consistent with moral-hazard hypothesis. The transaction-costs hypothesis appears to explain why some BHCs did not issue TPS or were late issuers, even though they could have achieved tax savings from substituting these instruments for common or preferred stock. Thus, both regulatory and market considerations appear to be determinants of BHCs' capital structure. When a lower-cost capital instrument (TPS) becomes available and is accepted by the banking authorities as qualifying capital, many (particularly larger) BHCs willingly increase their capital. Nevertheless, an even greater number of (particularly smaller) BHCs have not used this instrument, apparently because its potential benefits are offset by its costs.

One policy implication that can be derived from our study is that Tier-1 capital should include subordinated debentures as well as TPS. Subordinated debentures have the same tax-avoidance properties as TPS, with the additional advantage of being less costly to underwrite. Allowing banks, as well as BHCs, to use both securities to meet their capital requirements would lower BHCs' cost of capital and reduce the risk of bank failures to the FDIC and taxpayers. The results of this study suggest that both bankers and investors also would benefit from this regulatory change. However, since our findings may not hold for the thousands of community banks in the U.S., which have a paucity of unprotected creditors, an area for future research is the determinants of the capital structure and cost of capital for community banks.

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Figure 1. The Typical Structure of a Trust-Preferred Transaction and How TPS Counts at Tier-1 Capital

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┌─────────────────────────────────────────────┐
│                                              │
│         Bank Holding Company (BHC)           │
│                                              │
│       (BHC owns common stock of SPV)         │
│                                              │
└─────────────────────────────────────────────┘
```

Ý TPS Proceeds (TPS shares treated as minority **ß Subordinated Debt** with same coupon and terms as

interest by BHC and counted as Tier-1 capital   TPS, interest payments made with BHC's before tax

dollars, and booked as intercompany debt that is

eliminated upon consolidation

```
┌─────────────────────────────────────────────┐
│                                              │
│    Special-Purpose Vehicle (SPV) Issues TPS  │
│                                              │
│      (structured as a non-taxpaying entity)  │
│                                              │
└─────────────────────────────────────────────┘
```

Ý TPS Proceeds (Cash)   **ß Trust-Preferred Securities** with dividends funded by interest received on

subordinated note

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┌─────────────────────────────────────────────┐
│                                              │
│              Investors in TPS                │
│                                              │
└─────────────────────────────────────────────┘
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Notes: The holding company creates a special-purpose vehicle or SPV as a trust subsidiary. The BHC buys a nominal amount (3-4%) of the SPV's total pro forma common equity. The SPV's main function is to issue the desired amount of trust preferred securities to investors. The SPV then lends the proceeds of the offering to the BHC in the form of "junior subordinated deferrable interest debentures" under economic terms similar to the trust preferred. This loan (or loans in the case of multiple issues) is the sole asset of the SPV. Although the structure shown is typical, it is not the only one possible.

Sources: Adapted from "Executive Summary", Ryan, Beck & Co. [no date] and Kalser [1997], Chart 1, p. 20.

Table 1. Number and Dollar Volume of Trust Preferred Issues, 1996-1999

This table shows BHC issues of Trust Preferred Securities from 1996 through 1999. The Issues column shows the total number of TPS issues for BHCs in each year. The BHCs column represents the number of individual BHCs that issued TPS in each year. The First-Time Issuers column shows the number of BHCs in each year issuing TPS for the first time. The final column lists the number of first-time issuers for which we were able to obtain all necessary data.

Year	Dollar Volume ($millions)	Average Size Issue ($millions)	Issuers (number)	BHCs (number)	First-Time Issuers	Complete Data
1996	13,765	250	52	35	29	25
1997	11,252	191	59	49	43	40
1998	3528	152	28	15	1	1
1999	2468	107	23	11	1	1
Total/Average	31,031	188	162	110	74	67

Source: Goldman, Sachs & Co., Institutional Capital Securities Issuance by U.S. Banks as of January 26, 2000.

Table 2. Cumulative Abnormal Returns (CARs)

Panel A presents the mean cumulative abnormal returns (CARs) for banks that issue TPS (n = 65) and a control group of nonissuers (n = 204) over one-, five- and ten-day intervals beginning October 21, 1996, the date that the Federal Reserve ruled that TPS can be classified as Tier-1 capital. Because cross-sectional standard errors would be inaccurate due to cross-sectional correlation around this date, t-statistics are calculated using the time-series standard deviation of each groups' average daily abnormal return, calculated over 200 trading days prior to October 21,1996. Panel B presents mean CARs for TPS issuers. The CARs in Panel B are computed over the filing date, event date 0, and the subsequent day, event day +1. Panel C subdivides the issuers into those issuers who added TPS to their existing Tier 1 capital, General Purpose issuers, and those issuers that replaced other Tier-1 capital, Redeem Equity (with the TPS issue). In Panels B and C, the t-statistics are calculated from cross-sectional standard errors. All abnormal returns are calculated using the CRSP Excess Returns Tape.

Panel A. CARs Beginning October 21, 1996 (Day 0)

	N	October 21 (Day 0)	t	Five Days (Day 0, +4)	t	Ten Days (Day 0, +9)	t
All BHCs	269	0.48%	1.60	0.86%	1.82*	1.89%	2.84***
Issuers	65	0.47%	1.32	1.31%	2.25***	2.69%	3.27***
1996	25	0.91%	1.97*	1.93%	2.61***	3.52%	3.36***
1997	40	0.18%	0.55	0.94%	1.82*	2.12%	2.89***
Nonissuers	204	0.48%	1.58	0.71%	1.50	1.66%	2.50***

Panel B. CARs Over Issuing Bank's Filing Date (Day 0)

Year of Filing	N	Two-Days (Day 0, +1)	t	Abnormal Returns > 0	Sign Test P-value
1996-1997	65	0.94%	4.12***	46	0.01
1996 only	25	0.87%	3.20***	18	0.04
1997 only	40	0.97%	2.97***	28	0.01

Panel C. CARs based on Use of Proceeds Over Issuing BHCs Announcement of Filing Date (Date 0)

Use of Proceeds	N	Two-Days (Day 0, +1)	t	Abnormal Returns > 0	Sign Test P-value
General Corporate	54	1.07%	4.33***	39	0.01
Redeem Equity	11	0.19%	0.39	7	0.55

* statistically significant at the 0.10 level
** statistically significant at the 0.05 level
***statistically significant at the 0.01 level

Note: For clarity we do not report sign test results in Panel A. We note that the medians and sign-tests are consistent with the t-tests reported in Panel A. For example, the 65 issuers' day-0 abnormal returns have a median of 0.48, almost exactly equal to the mean.

Table 3. Univariate Comparison of Issuers and Nonissuers: 1996-1997

This table compares the financial characteristics of BHC issuers with those of nonissuers. 1996 and 1997 issuers include all BHCs that issued their first TPS in calendar 1996 or 1997. 1996 and 1997 nonissuers include all nonissuers that met the sample criteria – existing Fed Y-9 data and CRSP data in 1996 and 1997. Financial characteristics are calculated using data from year-end numbers prior to the year of issue, except for asset growth, which is calculated over a three-year period prior to the issue year. Except for the market value of equity, which is from CRSP, the data are from the BHC Report of Condition and Report of Income (Y9) computer tapes supplied by the Federal Reserve Bank of Atlanta. The risk/safety index is the sum of ROA and the ratio of capital/assets divided by the standard deviation of ROA over five years. The higher the index is, the safer the BHC is. Means and the probability that differences in means are equal to zero, calculated assuming unequal variances, are reported in the first line for each variable. Standard deviations and **t-statistics**, where appropriate, are reported in square brackets in the second line.

	1996			1997		
	Issuers	Non-issuers	Probability different	Issuers	Non-issuers	Probability different
Number of Observations	25	204		40	216	
Size ($billions)						
Total assets	66.0	3.3	0.00	11.7	3.5	0.01
	[73.5]	[8.2]	**[4.3]**	[20.4]	[8.9]	**[2.5]**
Loans and leases	34.8	2.2	0.00	6.9	2.3	0.03
	[42.7]	[5.7]	**[3.8]**	[12.9]	[6.2]	**[2.2]**
Market value of common equity	7.2	0.5	0.00	2.2	0.6	0.01
	[7.4]	[1.3]	**[4.6]**	[3.7]	[1.7]	**[2.7]**
Total derivatives (notional value)	14.5	0.0	0.03	0.8	0.0	0.27
	[30.5]	[0.0]	**[2.4]**	[4.6]	[0.0]	**[1.1]**
Taxation (%)						
Taxes paid / net income before taxes	34.5	31.7	0.01	34.4	31.8	0.00
	[454]	[7.6]	**[2.6]**	[4.5]	[7.6]	**[3.0]**
Preferred stock / total assets	0.5	0.1	0.00	0.2	0.1	0.10
	[0.5]	[0.4]	**[3.3]**	[0.6]	[0.3]	**[1.7]**
Risk (%)						
Loans and leases / total assets	58.5	63.2	0.19	62.5	64.4	0.34
	[17.3]	[9.3]	**[1.3]**	[11.9]	[9.3]	**[0.9]**
Loan loss allowance / gross loans	2.2	1.6	0.01	1.6	1.5	0.41
	[1.0]	[0.6]	**[3.0]**	[0.4]	[0.5]	**[0.8]**
Insolvency risk - risk/safety index	58.6	78.8	0.01	69.4	77.9	0.24
	[33.4]	[48.1]	**[2.7]**	[40.2]	[48.1]	**[1.1]**

Table 3 (continued)

	1996			1997		
	Issuers	Non-issuers	Probability different	Issuers	Non-issuers	Probability Different
Funding structure (%):						
Foreign deposits /	8.2	0.2	0.00	2.3	0.2	0.05
total assets	[12.0]	[1.0]	**[3.3]**	[6.7]	[0.7]	**[2.0]**
Uninsured time deposits /	19.0	15.8	0.04	17.9	15.7	0.13
total assets	[6.9]	[7.0]	**[2.2]**	[8.8]	[6.7]	**[1.5]**
Borrowed funds /	13.0	5.2	0.00	7.9	5.8	0.05
total assets	[7.4]	[5.7]	**[5.1]**	[6.1]	[6.2]	**[2.0]**
Growth and Investment Opportunities						
Asset growth over	16.5	17.0	0.20	24.0	16.9	0.03
three years (%)	[10.3]	[13.3]	**[0.9]**	[18.5]	[12.8]	**[2.3]**
Market / book value of	1.7	1.6	0.38	2.0	1.8	0.18
Common equity	[0.4]	[0.5]	**[0.9]**	[0.8]	[0.6]	**[1.4]**
Return on assets	1.2	1.1	0.19	1.1	1.1	0.37
ROA (%)	[0.4]	[0.3]	**[1.3]**	[0.4]	[0.4]	**[0.9]**
Return on book equity	15.2	11.9	0.00	13.5	12.2	0.09
ROE (%)	[3.8]	[3.1]	**[4.2]**	[3.7]	[6.0]	**[1.7]**
Regulatory Capital structure (%)						
Equity capital /	7.8	9.4	0.00	8.1	9.2	0.00
total assets	[1.3]	[2.2]	**[5.3]**	[1.2]	[1.8]	**[5.1]**
Tier-1 capital / risk-	9.7	13.6	0.00	11.0	13.2	0.00
Weighted assets	[2.1]	[4.8]	**[7.1]**	[2.3]	[3.6]	**[5.0]**
Tier-2 capital / risk-	3.8	1.4	0.00	2.1	1.4	0.00
Weighted assets	[2.0]	[1.6]	**[5.9]**	[1.4]	[0.7]	**[3.1]**

Table 4. Multivariate Analysis of TPS Issuers and Nonissuers, 1996-1997.

Multivariate probit analysis of variables associated with BHCs' Issuing (=1) or Not Issuing (=0) TPS in 1996 and 1997. For each variable, the associated coefficient is presented in the first line and p-values for a test of coefficients equal to zero is presented in the second line. Model Concordance is the percentage of outcomes correctly predicted by the model.

	All Variables [1]	Excluding ln TA, and ln TA * D97 [2]	Tier 1 Capital rather than Total Equity [3]
Number of Observations			
Issuers = 1	65	65	65
Nonissuers = 0 (note 1)	420	420	412
Total	485	485	477
Issuers / total	13%	13%	14%
Independent Variables			
Intercept	-0.81	-0.71	0.20
	(.47)	(.50)	(.86)
D97 (1997 = 1, 1996 = 0)	1.15***	0.54***	0.56***
	(.00)	(.01)	(.00)
ln Total assets ($billions)	0.51***		
	(.00)		
ln total assets * D97	-0.38***		
	(.00)		
Taxes paid / net income	0.03*	0.04**	0.03*
before taxes (%)	(.09)	(.03)	(.08)
Preferred stock /			0.28*
total assets (%)	(.03)	(.01)	(.08)
Loans and leases /	-0.01	-0.01	-0.03**
total assets (%)	(.19)	(.47)	(.02)
Loan loss allowance /	0.03	0.11	0.14
gross loans (%)	(.85)	(.45)	(.36)
Insolvency risk -	-0.003	0.08	0.01
risk/safety index	(.89)	(.71)	(.95)
Foreign deposits /	0.06	0.17***	0.13***
total assets (%)	(.14)	(.00)	(.01)
Uninsured time deposits /	-0.02	-0.03	-0.02
total assets (%)	(.38)	(.14)	(.24)
Borrowed funds /	0.02	0.02	0.02*
total assets	(.32)	(.14)	(.09)

Table 4 Continued

Market / book value of common equity	-0.08 (.71)	0.01 (.94)	0.01 (.98)
Asset growth (%)	1.47*** (0.01)	1.24** (0.03)	1.05** (0.05)
Return on assets (ROA) (%)	0.63* (.08)	0.75** (.03)	0.48 (.12)
Equity capital / total assets (%)	-0.29*** (.01)	-0.37*** (.00)	
Tier 1 capital / risk-weighted assets (%)			-0.18*** (.00)
Model Concordance	88.6%	85.3%	85.3%
Chi-Squared p-value for model	.0001	.0001	.0001

Note 1: Tier-1 capital was not reported for 8 nonissuers in 1996; hence they are excluded

* statistically significant at the 0.10 level
** statistically significant at the 0.05 level
***statistically significant at the 0.01 level

Table 5. Determinants of BHCs' TPS Issue Abnormal Returns 1996-1997

This table presents Heckman second-stage OLS estimates of the determinants of BHCs' two-day (0, +1) cumulative abnormal returns, where Day 0 is the filing date of a BHC's first TPS issue. Coefficients and t-statistics are presented for each variable. The continuous independent variables are calculated at the end of the calendar year prior to the announcement of TPS issue. Retire is a dummy variable that takes on a value of 1 for the 11 BHCs (16.9%) that retire existing Tier-1 capital in the year following the TPS issue. Lambda is the coefficient on the inverse Mills ratio in the Heckman specification. Models 3 and 4 include only the variables that are statistically significant in the financial-statement analysis presented in Table 3.

	[1]	[2]	[3]	[4]
Dependent Variable mean (%)	0.940	0.940	0.940	0.940
Independent Variables				
Intercept	4.39	5.74*	3.33*	1.90
	(1.44)	(1.75)	(1.68)	(0.91)
Taxes paid / net income	0.04	-0.003	0.05	0.01
before taxes (%)	(0.79)	(-0.06)	(1.02)	(0.24)
Retire tier-1 capital = 1	-1.11**	-1.25**	-1.09*	-1.20**
otherwise = 0	(-2.01)	(-2.16)	(-1.95)	(-2.02)
Loans and leases /	0.003	-0.03		
total assets (%)	(0.16)	(-1.37)		
Loan loss allowance /	0.03	-0.06		
gross loans (%)	(0.08)	(-0.15)		
Insolvency risk -	-0.001	-0.003		
risk/safety index	(-0.03)	(-0.50)		
Foreign deposits /	-0.04	-0.03	-0.04	-0.02
total assets (%)	(-1.14)	(-0.94)	(-1.37)	(-0.66)
Uninsured time deposits /	0.03	0.05		
total assets (%)	(0.61)	(-0.98)		
Borrowed funds /	-0.02	-0.04		
total assets	(-0.72)	(-0.96)		
Asset growth (%)	-1.47	-1.74	-0.91	-0.93
	(-0.86)	(-0.95)	(-0.66)	(-0.63)
Market / book value of	-0.37	-0.25		
common equity	(-0.86)	(-0.49)		

Table 5 Continued

Return on assets (ROA) (%)	2.56***	1.46*	0.19***	0.92
	(2.93)	(1.78)	(3.06)	(1.59)
Equity capital / total assets (%)	-0.78***		-0.68***	
	(-3.72)		(3.82)	
Tier 1 capital / risk-weighted assets (%)		-0.31**		-0.18*
		(-2.29)		(1.69)
Offer size / total assets (%)	0.17	0.13		
	(1.00)	(0.65)		
Lambda	-0.54	-0.22	-0.18	-0.08
	(-1.00)	(0.37)	(-0.41)	(-0.15)
Adjusted R-square	7.7%	-1.4%	14.7%	3.2%

* statistically significant at the 0.10 level
** statistically significant at the 0.05 level
***statistically significant at the 0.01 level