

Loan sales have little effect on bank risk

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Loan sales are becoming increasingly important as a strategic tool for banks. According to the July 1987 Senior Loan Officer Opinion Survey, over three-quarters of the respondent banks took steps in the past year to promote loans sales, and each of nine money center banks actively promoted loans sales in the past year. Such promotions allowed the respondents to increase the dollar amount outstanding of loans sold or participated nearly 50 percent since December 1985, to more than \$38 billion. The nine money center banks increased their loan sales by 71 percent since year-end 1985. These banks account for the bulk of loan sales outstanding.

Previous studies have identified a number of reasons for selling loans (Flannery, 1987; Greenbaum and Thakor, 1987; James, 1987; Pavel and Phillis, 1987; and Pennacchi, 1987). Banks may sell loans to avoid reserve requirements, capital requirements, and deposit insurance premiums. Banks may sell loans to facilitate gap management, alter their diversification, and fund new or existing loans.

All these reasons for loan sales have implications for bank risk. For example, if banks sell low-risk loans because regulatory taxes make such loans unprofitable, then the riskiness of banks' portfolios as well as the quality of loans sold would likely increase. If, however, banks sell loans to increase their level of diversification, then loan sales would be expected to lower bank risk.

This paper analyzes three reasons for loan sales—funding, diversification, and capital requirements—by empirically testing their relevance to and their implications for bank risk. That is, we test whether banks actually do sell loans for each of those three reasons, and whether selling loans, in each of the three cases, affects bank risk.

The data used in this paper are for 117 bank holding companies whose stock was actively traded on the New York Stock Exchange, American Stock Exchange, or Over the Counter and which filed *Reports of Condition and Reports of Income* and Y-9 reports during 1984 and 1985. An "actively traded stock" is defined as a stock that trades on average at

least three times per week. Balance sheet and income statement data are from the Board of Governors of the Federal Reserve System. Data for individual banks are grouped by holding company. Stock market data are from Interactive Data Services, Inc. Table 1 provides a description of the 117 bank holding companies according to the variables pertinent to this study.

Table 1
Description of sample of
117 bank holding companies

	Mean	Minimum	Maximum
1985			
Assets	\$11.12 bil.	\$573.56 mil.	\$160.56 bil.
Loan sales/assets	5.99%	0.40%	59.57%
(-----percent-----)			
1984			
Risk (w/OBS)	0.18	0	1.45
Risk (w/o OBS)	0.09	0	1.31
Loan index	0.08	0.02	0.18
Gap	0.12	-0.04	0.33
Primary capital	6.44	3.70	9.77
Net charge-offs	0.64	-0.38	2.33
Market-to-book ratio	1.01	0.40	2.71
Change 1984-85			
Risk (w/OBS)	44	0.01	773
Risk (w/o OBS)	105	0	1768
Loan index	1	-31	34
Gap	31	-295	362
Primary capital	6	-16	75
Market-to-book ratio	17	-54	135

Note: OBS = Off-balance-sheet items.

We use the measure of loan sales from Schedule L of the *Report of Condition* filed with the appropriate regulatory agency. Loan sales include "Loans originated by the reported bank that have been sold or participated to others . . ." Loan sales do not include portions of loans that have been retained by the reporting bank or loans sold with recourse or "with the reporting bank's endorsement or guarantee." Also excluded are one-to-four family mortgages and consumer installment loans, renewals or rollovers of loans previously

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Table 2
Funding: Loan sales and risk

(a)		
	Loan sales (percent)	T-statistic
<u>With OBS items</u>		
Riskiest BHCs in 1984 (n=30)	11.81	-3.1934***
Safest BHCs in 1984 (n=30)	3.20	
<u>Without OBS items</u>		
Riskiest BHCs in 1984 (n=30)	10.41	-2.3318**
Safest BHCs in 1984 (n=30)	4.05	
(b)		
	Change in risk (percent)	T-statistic
<u>With OBS items</u>		
Risky BHCs that sold the most loans in 1985 (n=15)	-58.05	-1.7722*
Risky BHCs that sold the least loans in 1985 (n=15)	-37.85	
<u>Without OBS items</u>		
Risky BHCs that sold the most loans in 1985 (n=15)	-27.09	-1.5488
Risky BHCs that sold the least loans in 1985 (n=15)	-62.56	

* Significant at the 10 percent level.

** Significant at the 5 percent level.

*** Significant at the 1 percent level.

sold by the reporting bank provided that no new funds were advanced, and loans sold under repurchase agreements.

To answer the second question, do such sales affect bank riskiness, we use as a measure of risk the risk-based deposit insurance premium estimated by Ronn and Verma (1986). They apply the Black-Scholes option pricing model to calculate a "fair" per dollar deposit insurance premium that takes into consideration the FDIC's bail-out policy (see box).

Two risk-based insurance premiums were calculated for each bank holding company.

The first used only on-balance-sheet debt in the calculation; the second used both on-balance-sheet liabilities and contingent, or off-balance-sheet, liabilities because not all risks assumed by a bank appear on its books (see box). Results are presented using both measures of risk, and generally they are consistent.

Funding

Loan sales can be used as a funding device in several ways. A bank may sell loans in order to buy or originate other loans, or it might, in effect, underwrite loans, holding them only until they are sold. A bank that is riskier than the loan that it is originating might follow this strategy because if a bank has to issue risky debt and equity in order to book the loan, then the cost of funding the loan will exceed the rate that it can charge on the loan; i.e., the loan will be unprofitable. In order to originate this loan, the bank could sell the loan; that is, it could underwrite it. A bank might want to do this rather than not make the loan in order, for example, to maintain customer relations.

Originating and holding lower-risk loans might lower the overall riskiness of the bank, thus allowing it to fund these loans more cheaply. To whom, however, do the benefits of holding lower-risk loans accrue? James (1987) shows that if the benefits from holding a loan accrue to the depositors rather than to the shareholders that loan will not be booked; it may, however, be originated and then sold. This is especially true the riskier the bank and the safer the loan.¹

To see if funding is, in fact, an important reason for loan sales, we compared the 1985 ratio of loan sales to assets for the 30 riskiest bank holding companies in 1984 with the ratio for the 30 least risky bank holding companies. As shown in Table 2a, risky bank holding companies sell more loans than nonrisky ones. The riskiest bank holding companies in 1984 sold over 3 1/2 times the loans as a percent of assets in 1985 as the least risky bank holding companies. This difference is significant at the 1 percent level and suggests that funding is a motivation for loan sales.

But, if a bank uses loan sales as a cheaper source of funds, it will not (or should not) book loans that are less risky than itself. This implies that loan sales would not change the riskiness of the bank. So, we tested to see if "under-

Measures of risk

The measure of risk used in this paper is the risk-based deposit insurance premium estimated by Ronn and Verma (1986). They apply the Black-Scholes option pricing model to calculate a 'fair' per dollar deposit insurance premium that takes into consideration the FDIC's bail out policy.* This premium is a put option on the assets of the bank (Merton, 1977):

$$d = N(u + \sigma_s \sqrt{T}) - (V/B)N(y)$$

where

$$y = [\ln(B/V) - \sigma_s^2 T/2]/\sigma_s \sqrt{T}$$

$N(\cdot)$ is the cumulative density of a standard normal random variable

σ_s is the standard deviation of the rate of return on the BHC's assets

T is the time to expiration, i.e., the time until the next audit of the BHC (assumed to be 1)

V is the value of the BHC's assets adjusted for stock splits and dividends

B is the value of the BHC's debt

Two variables in the above equation are not empirically observable: V and σ_s .

They can, however, be solved for by representing the equity of a bank holding company as a call option on the assets of the firm with the same maturity as the debt and the striking price equal to the maturity value of the debt (Black and Scholes, 1973). The equity of the bank holding company, therefore, is

$$E = VN(x) - pBN(x - \sigma_t \sqrt{T})$$

where

$$x = [\ln(V/pB + \sigma_t^2 T/2)]/\sigma_t \sqrt{T}$$

and $\sigma_t = \sigma_s E/VN(x)$

p is the hypothetical limit, expressed as a percent of debt, beyond which net worth can erode before revival efforts by the FDIC would be too costly ($p = .97$)**

E is the equity value of the firm

σ_t is the standard deviation of the rate of return on the equity of the firm

Solving the above equations simultaneously yields values for the assets of the bank holding companies and the standard deviation of the rates of return on those assets.

Comparison of risk measures

	Rank among top 10		Rank among 117		Risk measure	
	w/OBS	w/o OBS	w/OBS	w/o OBS	w/OBS	w/o OBS
					(percent)	
Chicorp	5	4	11	12	0.61	0.24
Chase Manhattan Corp.	2	2	3	6	1.22	0.42
Manufacturers Hanover	1	1	1	3	1.45	0.71
J.P. Morgan & Co.	10	10	41	51	0.10	0.02
Chemical NY Corp.	4	5	9	17	0.82	0.17
Security Pacific Corp.	8	6	17	21	0.38	0.13
Bankers Trust NY Corp.	7	7	13	29	0.47	0.08
First Chicago Corp.	3	3	4	9	1.17	0.32
Mellon Bank Corp.	6	8	12	42	0.51	0.04
Wells Fargo & Co.	9	9	26	46	0.23	0.03

We calculated two insurance premiums for each bank holding company. The first uses only on-balance-sheet debt in the calculation; the second used both on- and off-balance-sheet debt because not all risks assumed by a bank appear on its books. Standby letters of credit, commercial letters of credit, and loan commitments are included in the second premium calculation as debt and are, therefore, included in the estimate of the market value of assets. These three off-balance-sheet items were included because they are close substitutes for a combination of a bank loan and a deposit with the same maturity (Benveniste and Berger, 1986).†

As shown in the Table above, whether or not off-balance-sheet items are included in the calculation of premiums does not produce very different rankings of the 10 largest bank holding companies in our sample, but it does produce different rankings among all 117 banking firms. Also, the addition of off-balance-sheet items to debt in the calculation of premi-

ums increases premiums for all banking firms, but not proportionately. For example, Mellon Bank Corp.'s premium with off-balance-sheet items taken into consideration is more than 15 times higher than without them, while Manufacturers Hanover's premium with off-balance-sheet items is only two times higher than with them. Nevertheless, for this study, both premium calculations produced similar and consistent results.

*Ronn and Verma point out that the FDIC does not liquidate a bank as soon as it observes that its net worth is negative. Rather the FDIC tries to 'revive' the bank. They assume, however, that some hypothetical limit of erosion of value exists such that revival becomes too costly.

**Ronn and Verma show that a p of .97 yields an aggregate deposit premium weighted average of about 1/12 percent, the flat rate premium. They also show that the rank order of bank holding companies according to deposit insurance premium varies little with p .

†Standby letters of credit differ from commercial letters of credit and loans commitments in that credit is normally expected to be extended under the latter two off-balance-sheet items.

writing" loans alters bank risk by comparing the change in risk for banks that were risky and sold a high proportions of loans with banks that were risky and sold a low proportion of loans. A "risky" banking firm is one whose risk measure is above the median. As shown in Table 2b, risky bank holding companies with the highest loan sales in 1985 actually reduced their risk over the 1984-85 period. Risky bank holding companies with the lowest loan sales also decreased their risk. But the difference is statistically significant at only the 10 percent level and even then only when the measure of risk that includes off-balance-sheet items is used. Otherwise, the difference is not significant. Funding as a reason for selling loans, therefore, seems to have some utility but a strategy of using loan sales as a funding device seems to have little if any impact on bank risk.

Diversification

Diversification has been identified as another reason for loan sales (Pavel and Phillis

1987). A bank might sell loans in order to buy or originate other loans for its portfolio, thus altering its diversification. Pavel and Phillis show that greater diversification is one of the primary motivations for loans sales and that banks that sold loans increased their level of diversification.

Our analysis of 117 bank holding companies confirms these findings. Using the same measure of diversification as Pavel and Phillis $(L_1 + \dots + L_{10})/1000$ where L_i is the loan to asset ratio for loan type i), we found that bank holding companies that were the least diversified in 1984 sold more than twice the loans (as a percent of assets) in 1985 as bank holding companies that were the most diversified in 1984 (Table 3a). Also, bank holding companies that increased their diversification over the 1984-85 period sold, on average, loans equal to 7.4 percent of assets, while the bank holding companies that decreased their diversification over the same period sold loans equal to 4.8 percent of assets. This difference is statistically significant at the 10 percent level.

Table 3
Diversification: Loan sales and risk

(a)		
	Loan sales (percent)	T-statistic
Diversified BHCs in 1984 (n=30)	3.74	-2.0073**
Nondiversified BHCs in 1984 (n=30)	8.14	
Increased diversification (n=53)	7.43	1.6842*
Decreased diversification (n=64)	4.80	
(b)		
	Change in risk (percent)	T-statistic
<u>With OBS items</u>		
Increased diversification (n=53)	35.40	.4503*
Decreased diversification (n=64)	51.53	
<u>Without OBS items</u>		
Increased diversification (n=53)	78.09	.7815
Decreased diversification (n=64)	126.42	
(c)		
	Change in risk (percent)	T-statistic
<u>With OBS items</u>		
Increased diversification/ sold most loans (n=15)	-40.24	1.3899
Increased diversification/ sold least loans (n=15)	46.23	
<u>Without OBS items</u>		
Increased diversification/ sold most loans (n=15)	-41.45	1.5008
Increased diversification/ sold least loans (n=15)	73.84	

* Significant at the 10 percent level.

** Significant at the 5 percent level.

But does the use of loans sales to increase diversification decrease the riskiness of banks?

Using our calculation for risk, we tested to see, first, if bank holding companies that increased their diversification the most reduced their risk or increased it at a slower rate than bank holding companies that decreased their diversification the most. Second, we tested to see if bank holding companies that increased their level of diversification and had the most loans sales became less risky than bank holding companies that increased their level of diversification and had the least loan sales. As shown in Table 3b, the bank holding companies that diversified the most increased their riskiness at a slower rate than the bank holding companies that decreased their level of diversification the most. The difference, however, is not statistically significant.

Similarly, as shown in Table 3c, the bank holding companies that were diversifiers and heavy sellers reduced their risk by over 40 percent, but the diversifiers that sold few loans increased their risk by more than 40 percent. This difference is not statistically significant at the 10 percent level.

So, diversification appears to be an important reason for selling loans. Banks seem to be using loans to increase their level of diversification by altering the types of loans that they hold. But, bank holding companies that use loans sales to increase their diversification do not significantly change their riskiness any more than bank holding companies that use some other means to achieve diversification.

Diversification via loan type does not significantly change risk. However, diversification according to maturity, industry, and geography may reduce risk, and loan sales can be used to achieve such diversification. But, the data compiled for this article do not shed any light on the effect of these kinds of diversification.

Regulatory taxes

Regulatory taxes, especially capital requirements, are the most often cited motivation for loan sales (Flannery, 1987; Greenbaum and Thakor, 1987; Pavel and Phillis, 1987; and Pennacchi, 1987). Supposedly, banks sell low-risk loans because they cannot afford to fund them. Deposit insurance premiums, foregone interest on reserve requirements, and capital requirements in excess of what banks would hold in the absence of regulation make such loans unprofitable. The cost of these regulatory

Table 4
Primary capital: Loan sales and risk

(a)		
	<u>Loan sales</u> (percent)	<u>T-statistic</u>
BHCs with the highest primary capital ratio in 1984 (n=30)	6.97	2.3245**
BHCs with the lowest primary capital ratios in 1984 (n=30)	3.68	
Increased primary capital ratio (n=98)	6.51	-1.4948
Decreased primary capital ratio (n=19)	3.35	
(b)		
	<u>Change in risk</u> (percent)	<u>T-statistic</u>
<u>With OBS items</u>		
Increased primary capital/sold more loans (n=15)	-41.25	1.5961
Increased primary capital/sold least loans (n=15)	42.35	
<u>Without OBS items</u>		
Increased primary capital/sold most loans (n=15)	-36.89	1.6734
Increased primary capital/sold least loans (n=15)	91.34	

** Significant at the 5 percent level

taxes has been estimated to be as low as 29 basis points (Benveniste and Berger, 1987b) and as high as 52 basis points (Baer and Pavel, 1988).

A bank must hold a certain amount of capital against all of its assets. Currently, this is a flat assessment with no regard for risk. In a perfect market, i.e., in a world with no taxation, information costs, or transactions costs, any combination of debt and equity should be as good as any other (Modigliani and Miller, 1958). But the world is not perfect. Therefore, a firm's capital structure does matter. Returns to equity holders are taxable, whereas returns to debt holders are treated as an expense and therefore tax-deductible. This means that equity is a more expensive funding source than debt, and forcing banks to hold more capital than would be demanded of an unregulated

intermediary drives up the cost of funding a loan through a bank.

Pavel and Phillis found regulatory taxes to be important determinants in loan sales, and capital requirements to have one of the largest impacts on whether or not a bank sells loans. Their study, however, is inconclusive as to the quality of the loans that banks sell, although they argue that regulatory taxes make low-risk loans unprofitable and that loan sales are an attempt by banks to compete with commercial paper—debt instruments of investment-grade borrowers. Greenbaum and Thakor argue that, theoretically, in a world with assymmetric information, capital requirements and reserve requirements would induce banks to fund the poorest quality loans with deposits and could induce banks to sell the highest quality loans.

We first test to see if capital requirements are an important force behind loan sales by comparing the loan sales of bank holding companies with high primary capital ratios and those with low capital ratios. As Table 4a shows, the proportion of loan sales to assets differ significantly between the two groups; however, contrary to Pavel and Phillis, we found that the bank holding companies with the highest primary capital ratios sold more loans than bank holding companies with the lowest ratios. This, however, may be the result of banking firms with high capital ratios achieving those ratios through loan sales in a previous period.

To see if banks do in fact use loan sales to increase primary capital ratios, the loan sales of banking firms that increased their primary capital over the 1984–85 period were compared with those of bank holding companies that decreased their capital. As shown in Table 4a, bank holding companies that increased their primary capital ratios over the 1984–85 period sold more loans as a percent of assets in 1985 than did bank holding companies that decreased their primary capital. This difference, however, is not statistically significant at the 10 percent level. Loan sales, therefore, do not seem to be used by banks to increase their primary capital.

If, however, bank holding companies sold loans to increase their primary capital and if they did so by selling the low-risk loans, then the riskiness of these bank holding companies would be expected to increase. As shown in Table 4b, bank holding companies that in-

Table 5
Market-to-book value: Loan sales and risk

(a)		
	<u>Loan sales</u> (percent)	<u>T-statistic</u>
BHCs with below average capital and above average net charge-offs	8.39	1.3636
BHCs with above average capital and below average net charge-offs	4.91	
(b)		
	<u>Loan sales</u> (percent)	<u>T-statistic</u>
BHCs with the highest market-to-book values in 1984 (n=30)	6.55	-0.1523
BHCs with the lowest market-to-book values in 1984 (n=30)	6.18	
Decreased market-to-book value (n=21)	9.56	-2.1597**
Increased market-to-book value (n=96)	5.22	
(c)		
	<u>Change in risk</u> (percent)	<u>T-statistic</u>
<u>With OBS items</u>		
Decreased market-to-book value/risk in 1984 (n=24)	2.49	0.7267
Decreased market-to-book value/risk in 1985 (n=21)	3.18	
<u>Without OBS items</u>		
Decreased market-to-book value/risk in 1984 (n=21)	1.53	0.3253
Decreased market-to-book value/risk in 1984 (n=21)	1.78	

** Significant at the 5 percent level.

creased their primary capital ratios and who sold the most loans decreased their riskiness, while bank holding companies that increased their primary capital and sold the least loans increased their riskiness. This difference again is not statistically significant. We conclude that, even if bank holding companies use loan sales to increase their primary capital ratios, they do not alter their riskiness any more than bank holding companies that increase their primary capital ratios through some other means.

Flannery (1987) identifies another link between capital requirements and loan sales. Flannery argues that bank regulators force banks to write down bad loans while appreciating assets must be carried at book value. This produces an underestimate of the bank equity that is "truly available to absorb future losses." The only way for banks to correct this understatement is to realize the capital gain on assets that have appreciated by selling such loans. Flannery's theory implies that banks with low capital ratios and high net charge-offs ought to sell more loans than those with high capital ratios and low net charge-offs. It also implies that banks with high market-to-book equity values would sell more loans than banks with low market-to-book values in order to bring market values in line with book values.

As shown in Tables 5a and 5b, this theory is not fully supported by empirical evidence. Bank holding companies with below average capital and above average net charge-offs in 1984 sold a higher proportion of loans than banking firms with above average capital and below average net charge-offs; however, the difference in loans sales between the two groups is not statistically significant.

Similarly, the bank holding companies with the highest market-to-book values in 1984 sold only slightly more loans than did bank holding companies with the lowest market-to-book values, but again the difference is not significant.

Bank holding companies with decreasing market-to-book values however, did sell almost twice the loans as a percent of assets as banking firms with increasing market-to-book values. Furthermore, this was apparently achieved by increasing primary capital faster than market equity: bank holding companies that decreased their market-to-book values increased their primary capital at an average rate of 28 percent, while increasing the market value of equity 2 percent.

A strategy of selling appreciated assets in order to bring book capital in line with market capital, however, does not seem to affect bank risk (see Table 5c). Because only 21 bank holding companies decreased their market-to-book ratios, we could not meaningfully compare banking firms that sold a high proportion of loans with those that sold a low proportion. Therefore, we simply tested to see if the riskiness of bank holding companies that de-

Table 6
Loan sales: Overall implications for risk

(a)		
	Change in risk <i>(percent)</i>	T-statistic
<u>With OBS Items</u>		
BHCs that sold the most loans in 1985 (n=30)	23.77	0.6747
BHCs that sold the least loans in 1985 (n=30)	60.47	
<u>Without OBS items</u>		
BHCs that sold the most loans in 1985 (n=15)	59.24	0.6801
BHCs that sold the least loans in 1985 (n=15)	109.96	

creased their market-to-book ratios increased significantly. As shown in Table 5c, their riskiness did increase, but not significantly.

Summary and conclusions

Loan sales by banks are on the increase. Several reasons for loan sales have been suggested. This study looks at three: funding, diversification, and capital requirements. It is not likely that all banks sell loans for only one reason, and all banks cannot be expected to sell loans for the same reasons; therefore, it is probable that loan sales could reduce the riskiness of one bank, increase it at another, and have no impact on risk at yet another bank. But our research shows that, on average,

loan sales have little impact on bank risk. As shown in Table 6, banking firms that sold the highest proportion of loans in 1985 increased their risk at a slower pace than banks that sold the lowest proportion of loans in 1985. But this difference is not statistically significant.

While this study by no means analyzes all the reasons for selling loans, the results presented here indicate that loans sales do not affect bank risk in any significant manner. Regulation, and capital requirements in particular, does not seem to play as large a role in loan sales as previous research indicated. One explanation is that loans made unprofitable by regulatory taxes, such as capital requirements, are probably sold immediately and, therefore, have no impact on a bank's portfolio. Funding, diversification, and regulation all seem to be factors motivating loan sales, but the use of loan sales to increase diversification or avoid regulation does not significantly affect bank risk any more than other means to achieve these ends.

¹ Benveniste and Berger (1987), along with James, show that if the benefits from holding a loan accrue to the depositors then a standby letter of credit may be issued in its stead.

² The loan categories from Schedule C of the Report of Condition were used: one-to-four family mortgages, other loans secured by real estate, loans to depository institutions, agricultural loans, commercial and industrial loans, acceptances, loans to individuals, loans to foreign governments, obligations of states and political subdivisions, and other loans.

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