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Bank Trading, Capital, and Profitability

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Abstract

Some banks generate significant income from trading activities. In this paper, we analyze a panel of US banks and find that the effect of trading on bank profitability depends on each bank's capital ratio. Trading enhances profitability for banks with high capital ratios, but reduces profitability for banks with low capital ratios. Our findings provide empirical support for theories in which trading can divert capital away from relationship lending and undermine bank profitability.

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1. Introduction

Some banks generate significant income from trading activities (e.g., Boot and Ratnovski, 2016; King, Massoud, and Song, 2016; Falato, Iercosan, and Zikes, 2019). In 2017, for example, there were 109 US banks with assets greater than $10 billion. These banks collectively earned $25 billion of trading income, which accounted for 12% of their total noninterest income[3].

Given the importance of trading in modern banking, a question naturally arises: How does trading affect overall bank profitability? To answer this question, we follow King, Massoud, and Song (2016) and measure trading as the ratio of trading assets to total assets. Analyzing a panel of US banks over the period 2010:Q1 to 2017:Q4, we find that the effect of trading on bank profitability depends on each bank's capital ratio. The effect is positive for banks with high capital ratios, but

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[3] The numbers are obtained from the Statistics on Depository Institutions Report of the Federal Deposit Insurance Corporation.

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negative for banks with low capital ratios.

Our findings are consistent with Boot and Ratnovski (2016) who develop a model to analyze the interaction between trading and relationship banking. They show that, while trading can generate profits, it can also divert capital away from relationship banking. Their analysis suggests that the effect of trading on bank profitability depends on each bank's capital ratio. Our findings provide empirical support for their model.

Our paper is most closely related to King, Massoud, and Song (2016) who analyze the effects of trading on bank performance and stock returns. Using a sample of publicly-listed banks, they find that trading increases bank risk but reduces profitability and stock returns. Our paper is also related to Falato, Iercosan, and Zikes (2019) who examine the effect of trading on bank risk. Our paper focuses on the effect of trading on bank profitability, and we find that the effect varies with each bank's capital ratio.

2. Data

We obtain quarterly financial statement data for bank holding companies (hereafter, banks) from the Federal Reserve's Y-9C database[4]. Our sample period begins in the first quarter of 2010 as we are interested in examining the effect of trading on bank profitability in normal times[5]. The sample period ends in the fourth quarter of 2017. We restrict our sample to banks with assets greater than $1 billion as small banks usually do not engage in trading (Falato, Iercosan, and Zikes, 2019).

To measure profitability, we use both return on assets (ROA) and return on equity (ROE). ROA is the annualized ratio of net income to total assets, and ROE is the annualized ratio of net income to total equity capital.

We measure trading as the ratio of trading assets to total assets (King, Massoud, and Song, 2016). According to the Federal Reserve[6], trading assets include securities and other assets acquired "principally for the purpose of selling in the near term or otherwise with the intent to resell in order to profit from short-term price movements."

We include several control variables that are known to influence bank profitability. First, we control for size, measured as the natural logarithm of total assets. Large banks can benefit from economies of scale. Small banks, however, can benefit from greater flexibility and develop stronger relationships with their customers.

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[4] A bank holding company owns or controls one or more commercial banks. Our analysis uses data for bank holding companies rather than individual banks because the effect of trading on profitability likely depends on each bank's capital ratio (Boot and Ratnovski, 2016), and bank holding companies establish internal capital markets to allocate capital among their subsidiaries (e.g., Houston, James, and Marcus, 1997; Houston and James, 1998; Campello, 2002). Therefore, we measure variables at the holding company level.

[5] Abbassi et al. (2016) analyze the trading activities of German banks. They find that banks with trading expertise increase their investments in securities during a crisis to profit from trading opportunities.

[6] https://www.federalreserve.gov/data/mdrm.htm

Therefore, the relation between bank size and profitability is ambiguous.

Second, we control for capital, measured as the ratio of total equity capital to total assets. Banks with higher capital ratios are less likely to go bankrupt and thus have lower costs of funding. Therefore, we expect a positive relation between capital and profitability.

Third, we control for cost-to-income ratio, measured as the ratio of noninterest expense to total operating income. This ratio is a proxy for operational efficiency, with higher values indicating lower efficiency. We expect a negative relation between cost-to-income ratio and profitability.

Finally, we control for the ratio of provision for loan and lease losses to total operating income. Because provision reduces net income, we expect a negative relation between provision and profitability.

Our final sample consists of 17,217 bank-quarter observations on 845 banks. We winsorize all the variables except size at the 1% and 99% levels to ensure that our results are not driven by outliers.

Table 1 presents summary statistics for the variables. The mean ROA is 0.8%, and the mean ROE is 7.5%. Trading has a mean of 0.4%, which is similar to the value reported in King, Massoud, and Song (2016). The ratio's standard deviation of 1.9% reveals considerable variation in trading among banks. The average bank in our sample has a capital ratio of 10.7%.

Table 1: Summary statistics

	Mean	**Std. dev.**	**Minimum**	**Maximum**	**N**
ROA	0.008	0.010	-0.040	0.052	17,217
ROE	0.075	0.118	-0.711	0.392	17,217
Trading	0.004	0.019	0.000	0.149	17,217
Size	22.023	1.417	20.723	28.578	17,217
Capital	0.107	0.038	0.021	0.299	17,217
Cost-to-income	0.609	0.145	0.276	1.166	17,217
Provision	0.062	0.119	-0.093	0.801	17,217

Notes: ROA is the annualized ratio of net income to total assets. ROE is the annualized ratio of net income to total equity capital. Trading is the ratio of trading assets to total assets. Size is the natural logarithm of total assets. Capital is the ratio of total equity capital to total assets. Cost-to-income is the ratio of noninterest expense to total operating income. Provision is the ratio of provision for loan and lease losses to total operating income.

3. Results

To understand the effect of trading on bank profitability, we estimate a regression in which the dependent variable is profitability. The explanatory variables include trading, its interaction term with capital, and other variables. Specifically, we estimate the following regression:

$$Profitability_{i,t} = \beta_0 + \beta_1 \cdot Profitability_{i,t-1} + \beta_2 \cdot Trading_{i,t} + \beta_3 \cdot Trading_{i,t} \cdot Capital_{i,t} + \beta_4 \cdot Capital_{i,t} + \beta_5 \cdot Size_{i,t} + \beta_6 \cdot Cost\text{-}to\text{-}income_{i,t} + \beta_7 \cdot Provision_{i,t} + \mu_i + \theta_t + \varepsilon_{i,t}$$

We include the lagged dependent variable as an explanatory variable because previous studies find that bank profits tend to persist over time (e.g., Berger et al., 2000; Goddard et al., 2011). We also include bank fixed effects μ_i and quarter fixed effects θ_t in the regression. $\varepsilon_{i,t}$ is the error term.

We estimate the regression using the two-step system Generalized Method of Moments (GMM) estimator developed in Arellano and Bover (1995) and Blundell and Bond (1998), and treat all bank-specific variables as endogenous. We use only lags two through four of the endogenous variables as instruments to avoid the risks of instrument proliferation (Roodman, 2009). To check the suitability of the system GMM estimator, we report two diagnostic tests. First, we report the Arellano-Bond test for serial correlation in the first-differenced errors. Second, we report the Hansen test for over-identifying restrictions.

Table 2 presents the GMM regression results. The dependent variable is ROA in regression (1), and ROE and regression (2). As shown, the coefficient on the lagged dependent variable is positive and significant in both regressions. This result indicates the persistence of bank profits and validates our specification of a dynamic model.

The coefficient on trading is negative and significant, yet the coefficient on the interaction term between trading and capital is positive and significant. These results suggest that the effect of trading on profitability depends on each bank's capital ratio. When the capital ratio is high, trading enhances profitability. When the capital ratio is low, however, trading reduces profitability.

The coefficients on the control variables are generally consistent with our expectations. Capital is positively associated with ROA. Size does not enter the regression significantly, suggesting that an increase in size has both benefits and costs for banks. Both the cost-to-income ratio and the provision ratio are negatively associated with profitability.

The diagnostic tests support the suitability of the system GMM estimator, as the Arellano-Bond test indicates that there is no second-order serial correlation in the first-differenced errors, and the Hansen test indicates that the instruments are valid.

Table 2: The effect of trading on bank profitability

	(1) ROA	(2) ROE
Lagged dependent variable	0.071***	0.199***
	(0.014)	(0.036)
Trading	-0.096**	-1.153**
	(0.041)	(0.569)
Trading x Capital	0.914***	8.226**
	(0.294)	(3.723)
Capital	0.061***	-0.046
	(0.010)	(0.142)
Size	-0.000	-0.002
	(0.000)	(0.003)
Cost-to-income	-0.037***	-0.291***
	(0.003)	(0.043)
Provision	-0.042***	-0.457***
	(0.002)	(0.071)
Constant	0.030***	0.294***
	(0.006)	(0.075)
Number of observations	16,296	16,296
Number of groups	815	815
Number of instruments	725	725
AR(2) test (*p*-value)	0.507	0.212
Hansen test (*p*-value)	0.118	0.138

Notes: This table presents the two-step system GMM regression results. Robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

4. Conclusion

Theory suggests that trading can generate profits, but it can also reduce a bank's capacity to engage in relationship lending. Consistent with theory, we find that the effect of trading on bank profitability depends on each bank's capital ratio. Trading enhances profitability when capital ratio is high, but reduces profitability when capital ratio is low. Our findings suggest that banks with low capital ratios need to reduce trading activities.

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References

[1] Abbassi, P., Iyer, R., Peydró, J.L., & Tous, F. (2016). Securities trading by banks and credit supply: Micro-evidence from the crisis. Journal of Financial Economics, 121(3), 569-594.

[2] Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. Journal of Econometrics, 68(1), 29-51.

[3] Berger, A., Bonime, S., Covitz, D., & Hancock, D. (2000). Why are bank profits so persistent? The roles of product market competition, informational opacity, and regional/macroeconomic shocks. Journal of Banking and Finance, 24(7), 1203-1235.

[4] Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics, 87(1), 115-143.

[5] Boot, A., & Ratnovski, L. (2016). Banking and trading. Review of Finance, 20(6), 2219-2246.

[6] Campello, M. (2002). Internal capital markets in financial conglomerates: Evidence from small bank responses to monetary policy. Journal of Finance, 57(6), 2773-2805.

[7] Falato, A., Iercosan, D., & Zikes, F. (2019). Banks as regulated traders. Finance and Economics Discussion Series 2019-005, Board of Governors of the Federal Reserve System.

[8] Goddard, J., Liu, H., Molyneux, P., & Wilson, J. (2011). The persistence of bank profit. Journal of Banking and Finance, 35(11), 2881-2890.

[9] Houston, J., & James, C. (1998). Do bank internal capital markets promote lending? Journal of Banking and Finance, 22(6-8), 899-918.

[10] Houston, J., James, C., & Marcus, D. (1997). Capital market frictions and the role of internal capital markets in banking. Journal of Financial Economics, 46(2), 135-164.

[11] King, M., Massoud, N., & Song, K. (2016). Who benefits from bank trading activity: Shareholders or employees? Working Paper, Western University.

[12] Roodman, D. (2009). A note on the theme of too many instruments. Oxford Bulletin of Economics and Statistics, 71(1), 135-158.