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## **The Effects of Marketing on Commercial Banks' Operating Businesses and Profitability: Evidence from U.S. Bank Holding Companies**

### **Abstract**

**Purpose** – This paper aims to explore the role that marketing plays in commercial bank management. Specifically, we examine the effects of marketing activities on banks' operating businesses, i.e., deposit, loan, and service businesses. Furthermore, we investigate the effect of marketing activities on bank profitability.

**Design/methodology/approach** – A series of hypotheses about the associations of marketing activities with banks' deposits, loans, services, and profitability are developed. The fixed-effects linear model with an AR(1) disturbance is applied on the panel dataset of FR Y-9C reports to test these hypotheses.

**Findings** – The results show that total loans and service proceeds are positively associated with marketing activities, which is measured by banks' advertising and marketing expenses. The effects of marketing activities on loan and service businesses are far-reaching to the second quarter in future. Moreover, the results reveal that profitability, measured as net income over total assets, increases with marketing activities.

**Managerial implications** – From the findings of this study, bank managers would learn the strengths and weaknesses of their marketing strategies and therefore better coordinate the marketing resources used in different areas of business. The study provides bank managers with a direction to examine the weaknesses in their marketing management.

**Originality/value** – An issue in bank marketing that has not been explored yet is whether and how marketing activities affect commercial banks' specific businesses, such as deposits, loans, and services, and how the improvements in the specific businesses further affect bank profitability. This study is the first one to address this fundamental issue in bank marketing. Furthermore, the study provides the supplementary evidence that marketing contributes to commercial banks' profitability.

**Keywords** Bank marketing, Bank businesses and profitability, Marketing-finance interface

**Paper type** Research paper

## **Introduction**

As the banking industry has become more competitive since the deregulation of financial institutions that started in 1980s, the U.S. commercial banks have reinforced their marketing strategies and practices to address higher market competition. In 2002, the U.S. bank holding companies (BHCs, thereafter) began to report their advertising and marketing expenses as required by the U.S. Federal Reserve System. In the following years, according to FR Y-9C reports, the total amount of this marketing expenditure by all BHCs has more than tripled from \$6.63 billion in 2002 to \$19.97 billion in 2018. Meanwhile, the portion of advertising and marketing expenses out of total revenue in an average BHC has been growing from 0.76% in 2002 to 1.06% in 2018. This marketing expenditure, expected to promote commercial banks' products and services, increase their cash flows, and build their brand equities, is viewed as an investment to maximize shareholder value. However, very little is known about how well marketing activities affect commercial banks' businesses and profitability. Until now, only a couple of papers (Hasan *et al.*, 2000; Mullineaux and Pyles, 2010; Acar and Temiz, 2017), which examine only the effect of marketing on accounting incomes, are found in the finance and marketing interface area.

On the other hand, the running of banking industry is different from that of other industries. Commercial banks, as financial intermediaries, transfer funds from ultimate savers to ultimate users. This function requires that banks hold financial assets for one kind of customers and invest those financial assets in the other kinds of customers to create more wealth. Generally, commercial banks engage in three kinds of businesses: taking deposits, making loans, and providing services related to movements of funds. Because of this, the marketing strategy of commercial banks might be different from that of firms manufacturing products and services, and the marketing activities in commercial banks might be carried out in somewhat different ways. Therefore, there should be much to be explored about commercial banks' marketing behaviors.

Our paper is intended to fill in the voids in this interdisciplinary area between finance and marketing. We aim at examining the role that marketing plays in the main banking businesses. Specifically, we delve into three operating businesses, i.e., deposits, loans, and banking services. Furthermore, we investigate whether and to what extent marketing activities affect banks' profitability. The answers to these questions would contribute to a comprehensive understanding of banking management and be useful to bank managers and bank shareholders.

We conduct our analysis using the panel data extracted from FR Y-9C reports, which U.S. bank holding companies file to the Federal Reserve on a quarterly basis. Since 2002, the BHCs are required to disclose their advertising and marketing expenses—the item BHCK0497—in the FR-Y9C filings. By the definition given by the Federal Reserve, the advertising and marketing expenses includes: (1) advertising, production, agency fees, and direct mail; (2) marketing research, including consultants; (3) public relations, including consultants, seminars, or customer magazines; (4) sales training by consultants; (5) public accountants' fees; (6) management services; (7) consulting fees for economic surveys; and (8) other special advisory services. Though this item does not include all kinds of marketing activities (for example, deposit promotions are reported in BHCK4326), we use it, in two transformations in this study, to measure the reporting bank's marketing activities in a quarter.

Using these measurements, we first examine the relationship between marketing and bank deposit, loan, and service businesses in reporting quarters. We find that the loans and service proceeds are positively associated with the advertising and marketing expenses. But we do not obtain the same relations with respect to the deposits. These results strongly suggest that marketing activities have positive impacts on banks' loan and service businesses.

Furthermore, we find that these relationships also exist between the advertising and marketing expenses two quarters back and the loans and service proceeds in the current quarter. These results indicate that marketing activities not only have a short-term effect (in the ongoing quarter), but also have a long-term effect (in the future quarters) on banks' loan and service businesses. To our knowledge, these results are the first evidence that marketing influences operating businesses in commercial banks.

Finally, we examine the effect of marketing on banks' profitability. We find that the net income increases with the advertising and marketing expenses. These results show that marketing plays an important part in bank profitability; it improves banks' financial performance and a larger investment in marketing would lead to a higher profitability.

Our regression designs control for unobserved time-invariant and time-varying factors that may result in endogeneity issues. Especially, we use instrumental variable regressions to confirm that the endogeneity would not bias our main results. Furthermore, our findings are robust to the selection bias test, to a change in the regression specifications, and to a different regression model.

In the following discussion, we first summarize the literature and develop hypotheses about the role of marketing in bank management. Then, we describe the data and methodology and present the empirical results. Finally, we briefly discuss the theoretical and managerial implications, limitation of the study, and planned future research to conclude the paper.

## **Literature and Hypotheses**

The interface between finance and marketing has attracted attention from both marketing and financial researchers. The subjects of most studies are the public firms in non-financial industries. Some studies focus on the impact of marketing on firms' value and stock return (Anderson *et al.*, 2004; Luo, 2008; Luo and Jong, 2012; Ryoo *et al.*, 2016 amongst others). Other studies extend to the relationships between marketing and other firm characteristics, exemplified by the following papers. Singh *et al.* (2005) find that firms with higher advertising expenditure have a lower cost of capital, while Nejadmalayeri *et al.* (2013) find that although advertising improves a firm's bond liquidity, it does not lower the firm's cost of debt. Grullon *et al.* (2004) show that firms with greater advertising expenditure have a larger base of investors and better stock liquidity. McAlister *et al.* (2007) estimate the effect of advertising and R&D expenditures on firm systematic risk.

There are two streams of literature in the research of bank marketing. On one hand, there are many studies on marketing management in commercial banks. The topics vary from product, price, place to promotion strategies in the marketing mix. An attractive area regarding the product strategy is the innovation of financial services (Lassar *et al.*, 2005; Gounaris and Koritos, 2008; Mishra and Singh, 2015; Martovoy and Mention, 2016 amongst others). Accordingly, the studies on price strategy address the pricing of innovative financial services (Nejad and Estelami, 2012; Nejad and Kabadayi, 2016). Usually, these studies examine bank marketing from a perspective of marketing management. On the other hand, a few papers study the effect of marketing on banks' financial performance, usually measured by a variety of bank accounting incomes. To our knowledge, Hasan *et al.* (2000) is the first paper studying the impact of marketing activities in financial institutions; their results indicate that promotional expenditures have a strong positive impact on the profitability of non-interest business activities in thrift firms in the U.S. southeast region. Following the pioneer, two papers are noticeable. Mullineaux and Pyles (2010) investigate the effects of U.S. banks' marketing investments and find that the banks' profits and market shares increase significantly with increased spending on advertising and promotion. Using Turkish data,

Acar and Temiz (2017) find that a positive association between advertising expenses and financial performance extends over time. These papers examine bank marketing from a perspective of financial management.

There is a gap between these two streams. We have little knowledge about how, or in which way, these specific marketing strategies work to improve banks' profitability. Our paper is intended to narrow the gap in this interdisciplinary area. Rust *et al.* (2004) show a conceptual model that shows how marketing activities, viewed as an investment, are linked to returns on the investment. Marketing first improves customer perceptions through an improvement in a couple of drivers of customer equity. This then leads to increased customer attraction and retention, which increase customer lifetime value and customer equity. Finally, the increase in customer equity results in a return on marketing investment. This model presents a customer-centered concept for marketing practice. Commercial banks have three customer bases, i.e., depositors, borrowers, and service receivers; all the three bases are characteristically different from each other. A bank should develop its marketing strategies targeting at different customer bases. Following this reasoning, our first step to fill in the gap is to examine the effects of marketing on three bank fundamental businesses in which the customer base has unique characteristics. Theoretically, marketing strategies can be employed to attract deposits, market loans, and promote services that generate fee incomes. Thus, we expect that the marketing activities, measured by advertising and marketing expenses, are positively related to the amounts of these businesses in commercial banks.

Deposits provide funds for banks to issue loans. Given the macroeconomic environment, a bank's deposits would be affected by deposit interest rates, loan interest rate, bank risk profile, physical and cyber facilities, bank reputation, and customer satisfaction and loyalty. A marketing strategy can be used to coordinate these factors to optimize fund supplies when needed. For example, if there is a strong demand for loans, the bank can launch a promotional campaign to generate more deposits to meet the increasing demand for loans. Thus, our first hypothesis, the deposit hypothesis, is about the role of marketing in deposit business.

H1: the bank advertising and marketing expenses are positively associated with the bank total deposits.

Commercial banks issue loans to borrowers who need funds for investments or consumptions and make money through the difference between loan and deposit interest rates. In addition to the factors that affect deposits, a bank's policies of risk management would affect the

amount of loans. Banks would match the loans with the deposits in terms of dollar amounts and maturities to maximize the profits. In this process, marketing plays a role. For example, if a bank has plentiful funds from its deposits and other sources, then the bank would perform campaigns to advertise and promote its various loan products to customers. Therefore, our second hypothesis is the loan hypothesis.

H2: the bank advertising and marketing expenses are positively associated with the bank total loans.

Financial service has become an important banking business as the proceeds from service contribute a significant part to banks' profits. With the innovations in financial services (Nejad, 2016), the base of customers of bank services has been expanded. As customers can be reached not only in local communities but also on the Internet, promoting various services to current and potential customers becomes an indispensable part of banks' marketing plan. Therefore, we expect that marketing activities would attract more services and produce more fee revenues. Then, the service hypothesis is the third in our hypothesis series.

H3: the bank advertising and marketing expenses are positively associated with the bank total service proceeds.

On the top of the fundamental businesses, marketing management would be more comprehensive and far-reaching. Marketing strategies can be committed to generating the differentiation of goods and services from their competitors, engaging existing customers to keep their loyalty, creating brand awareness for new customers, and building brand equity for shareholders. All strategies in different banking areas and at different levels are expected to be coordinated to make commercial banks operating more efficiently and maximize their profits. Consequently, we propose the fourth hypothesis regarding the bank financial performance, i.e., the profitability hypothesis.

H4: the bank advertising and marketing expenses are positively associated with the bank net income.

Considering that marketing may have short- and long-term effects, we test these hypotheses in two timeframes. Specifically, we examine the effect of banks' marketing activities in current quarters as well as in future quarters. The test of these hypotheses in different horizons will help us better understand the role that marketing plays in commercial banks.

## **Data and Methodology**

### ***Sample***

U.S. bank holding companies file their consolidated financial statements to the Federal Reserve in the form of FR Y-9C on a quarterly basis. From the FR Y-9C dataset, we construct a sample of BHCs from 2002 to 2013 to test our hypotheses; 2002 is the first year when the data of advertising and marketing expenses are reported in FR Y-9C dataset, and 2013 is the latest year when the data of one control variable, the interest rates of certificate deposits, are available on the Federal Reserve website. The bank-quarter observations are screened from the dataset as follows. First, identifying U.S. institutions yields 806 BHCs with 20,270 observations. Second, excluding the BHCs with a missing or negative value of total equities reduces the sample to 19,200 observations for 747 BHCs. Next, by excluding the BHCs with a missing or negative value of advertising and marketing expenses, the sample narrows to 18,603 observations of 747 BHCs. Finally, our analysis is conducted on this sample.

### ***Variables***

Before we describe the models to test the hypotheses, we introduce the variables in the regressions. Using the advertising and marketing expenses reported by BHCs, we develop two forms of the independent variable to measure a bank's marketing activities. First,  $MKT/AT$ , calculated as the advertising and marketing expenses divided by the total assets, measures the level of marketing activities in the asset-scaled form. Second,  $LogMKT$ , called the log form of marketing activities, is the logarithm of the advertising and marketing expenses. The asset-scaled form ( $MKT/AT$ ) or the log form ( $LogMKT$ ) of marketing activities will be the independent variable of interest in regressions to explore the role of marketing in bank operating businesses and profitability.

For each hypothesis, we have a different dependent variable. To test the deposit and loan hypotheses, we measure a bank's deposit and loan businesses with the amounts of total deposits and total loans, respectively. To test the service hypothesis, we measure the bank's service business with the total service fees charged by the bank. To test the profitability hypothesis, we measure the bank's financial performance with the net income. To be consistent with the measurement of marketing activities, the measurements of businesses and profitability are transformed into the asset-scaled form and the log form accordingly. For example, a bank's deposit business can be measured in the asset-scaled form ( $DEPO/AT$ ), i.e., total deposits over total assets, and the log form ( $LogDEPO$ ), i.e., the logarithm of total deposits.

In addition to marketing activities, the prospective factors affecting banks' operating businesses and financial performance are size, capital ratio, the cost of labors, the yield of loan, and the cost of deposit. The size of a bank ( $AT$ ) is measured by its book value of total assets (in millions), the logarithm of which is used in the regressions. The capital ratio ( $EQ/AT$ ) is defined as total equities over total assets. The cost of labors ( $WageRate$ ) is represented by the salaries and employee benefits divided by the number of full-time employees. We use the monthly Bank Prime Loan Rate from the website of Federal Reserve Bank of St. Louis to proxy for the interest yield of loan, and we use the monthly interest rate of 1-Month Certificate of Deposit, which is available until 2013 from the same source, to proxy for the interest cost of deposit. Because of the high multicollinearity between the two interest rates, we create a variable, *Spread*, defined as the prime interest rate minus the CD interest rate, to capture the combined effect of the loan yields and the deposit costs in regressions. In addition, *Spread* allows us to eliminate bias from unobserved factors, such as the macroeconomic environment, that change over time but are equal to banks in a specific quarter since it is an only time-varying covariate. The notations and detailed definitions of all variables involved in this study, including the variables used in the robustness tests, are listed in Appendix: Variable Definitions.

### ***Summary Statistics***

To reduce the effect of possibly spurious outliers, we winsorize the bank characteristic variables in the sample at the 0.5<sup>th</sup> and 99.5<sup>th</sup> percentiles. In Table I, we present the mean, standard deviation, minimum, 25<sup>th</sup> percentile, median, 75<sup>th</sup> percentile, and maximum of the variables after winsorizing. Panel A shows these statistics of the BHCs' business and profitability characteristics in magnitude. We find that the bank size, measured in total assets, has a mean (median) of \$25.14 (\$1.47) billion with a minimum value of \$189.04 million and a maximum value of \$1,463.69 billion. It is also revealed that a mean (median) bank spends \$6.6 million (\$0.16 million) in marketing activities, with the minimum and maximum advertising and marketing expenses being zero and \$504.45 million, respectively. In Panel B, we present the summary statistics of the BHCs' business and profitability characteristics in the asset-scaled form. Panel C is devoted to the BHCs' other characteristic variables that we use in the regressions. Generally, the data of these variables are distributed without extremely skewedness and extremely outliers, except that more than 25% but less than 50% of the observations, which are in fact 5,502 observations in the sample, have advertising and marketing expenses of zero.

(Insert Table I here)

### ***Correlation Matrix***

Before we proceed to perform multivariate analysis, we check the correlations between the independent variables in case of bias resulting from multicollinearity. Table II shows that the correlation coefficients are generally at the acceptable level for the purpose of regression, except for the correlation coefficient between *LogMKT* and *LogAT*, which has the value of 0.7165. Thus, when a regression includes both *LogMKT* and *LogAT*, multicollinearity problem might occur.

(Insert Table II here)

### ***Models***

To test H1, H2, H3, and H4, we estimate the following specifications.

$$DEP = \beta_0 + \beta_1 * MKTG + \varepsilon \quad (1)$$

$$DEP = \beta_0 + \beta_1 * MKTG + \beta_2 * LogAT + \beta_3 * EQ/AT + \beta_4 * WageRate + \beta_5 * Spread + \varepsilon \quad (2)$$

where *DEP* is the dependent variable measuring banks' businesses and profitability in the asset-scaled or log form, and *MKTG* is the primary independent variable measuring the banks' marketing activities, also in the asset-scaled or log form accordingly. For example, when we test the deposit hypothesis, *DEP* would be *DEPO/AT* and *LogDEPO*, respectively, and *MKTG* would be *MKT/AT* and *LogMKT* in the corresponding specifications. *LogAT*, *EQ/AT*, *WageRate* and *Spread* are independent variables controlling for bank size, capital ratio, the cost of labors, and the difference between loan yields and deposit costs, respectively.

When both *DEP* and *MKTG* are in asset-scaled forms, the coefficient of *MKTG* measures the marginal effect of the advertising and marketing expenses on a bank's businesses and profitability. Specifically, it represents the increase in the amount of a bank business, say the deposits, measured in percentages of its total assets, due to an increase in the advertising and marketing expenses by one percentage of its total assets. When *DEP* and *MKTG* are both in the log forms, the coefficient of *MKTG* measures the elasticity of a bank's businesses and profits to its marketing activities. The value of the coefficient indicates the percent change in the bank's businesses, say the deposits, from its current level when the advertising and marketing expenses increase by one percent from the current level. In this case, a positive coefficient of *LogMKT* would be managerially useful evidence supporting our hypotheses.

To test the long-term effect of marketing beyond the current quarter, we estimate the following specification.

$$DEP = \beta_0 + \beta_1 * MKTG + \beta_2 * MKTG(-2) + \beta_3 * LogAT + \beta_4 * EQ/AT + \beta_5 * WageRate + \beta_6 * Spread + \varepsilon \quad (3)$$

where  $MKTG(-2)$  is the measurement of marketing activities two quarters back from the reporting quarter. The coefficient of  $MKTG(-2)$  captures the effect of marketing activities that occur two quarters back on a bank's businesses and profitability in the current quarter.

The equation (1) performs the univariate analysis. Its objective is to ensure that any identified effect of marketing activities on banks' businesses and profitability is not driven by the presence of control variables that are potentially endogenously determined. The equation (2) and (3) perform the multivariate analysis, in which we include the additional explanatory variables regardless of whether they are potentially endogenous.

Noting that the correlation coefficient between  $LogMKT$  and  $LogAT$  is 0.7165, we should deal with the possibility of multicollinearity when both are included in Equation (2) and (3). We examine multicollinearity through the Variance Inflation Factor and Tolerance. By running OLS regression on the related specifications, we find that no Variance Inflation Factors are greater than three and no Tolerance values fall below 0.4. Even after including  $LogMKT(-2)$ , which is highly correlated with  $LogMKT$ , no Variance Inflation Factors are greater than ten and no Tolerance values fall below 0.1. Thus, multicollinearity would not be a big concern for our regression analysis.

We estimate the equations using a fixed-effects linear model with an AR(1) disturbance to control for serial autocorrelation over our sample period. For the purpose of robustness, we redo the multivariate analysis with an OLS model, in which the quarter dummies are included and the robust standard errors are clustered at the BHC level.

## Results

The layout of a table that presents the results estimating businesses and profitability is designed as follows. Column (1) and (2) present the results of Equation (1), Column (3) and (4) the results of Equation (2), and Column (5) and (6) the results of Equation (3). In Column (1), (3) and (5), the  $MKTG$  and the  $DEP$  are in asset-scaled forms, and in Column (2), (4) and (6), the  $MKTG$  and the  $DEP$  are in log forms. Our discussion focuses on the results of the independent variables of interest,  $MKT/AT$ ,  $MKT/AT(-2)$ ,  $LogMKT$ , and  $LogMKT(-2)$ . For the control variables, we only briefly interpret the results in Column (3), since the results of the controls in Column (5)

are very similar. Theoretically, the coefficients of the control variables in Column (4) and (6) measure the percent change in a bank output from its current level when control variables change by one unit. Compared with the coefficients of the control variables in Column (3) and (5), which measure the marginal effects of the control variables on bank operating businesses and financial performance, the coefficients of the controls in Column (4) and (6) are less indicative and therefore not addressed in our discussion.

### ***Test of Deposit Hypothesis***

Table III presents the results of estimation of the BHCs' deposit business. The deposit hypothesis predicts that marketing has a positive impact on banks' deposit business. If it is true, the coefficients of *MKT/AT* and *LogMKT* would be positive and significant. However, the results in Table III are mixed; only the coefficients of *LogMKT* in Column (4) and (6) are positive at 5% or 10% level. In addition, the coefficients of *MKT/AT(-2)* and *LogMKT(-2)* in Column (5) and (6) are not significant. In conclusion, the evidence is not sufficient to support the deposit hypothesis. A couple of explanations arise. First, the marketing activities measured by the advertising and marketing expenses, which do not include deposit promotions as we note in the introduction, would not capture the effect of the deposit promotions. Second, the objective of the BHCs' marketing strategy to promote banking businesses does not include attracting deposits and no expenses are spent on promoting and marketing deposits. Third, the BHCs have engaged in some advertisements and promotions to appeal to depositors, but for some reasons, these activities are not effective.

### **(Insert Table III here)**

Even though the control variables affecting deposits are not our focus in this paper, we would like to briefly discuss the related results in Column (3) since few papers have studied the determinants of a bank's deposit business. It is not surprising that the coefficient of *LogAT* is positive and significant; it indicates that large banks would have more deposit liabilities. Since deposits are thought to be a cheap and stable financing of bank assets relative to other sources of funds, a bank with less equity capital would attract more deposits to balance its risk and vice versus. Thus, we expect that the coefficient of *EQ/AT* is negative, and indeed it is at 1% significance level. The existing literature maintains that the small spread between loan yields and deposit costs is indicative of an efficient financial system and that the spread is negatively related to economic growth (Agapova and McNulty, 2016). This point of view explains why the estimated

coefficient of *Spread* is positive. When the economy is slowing down, accompanying by a larger spread, market participants tend to save more money to avoid risk. Finally, the wage rate may have no effect on the deposit business, since the coefficient of *WageRate* is statistically insignificant and economically small.

### ***Test of Loan Hypothesis***

In Table IV, we present the results of testing the loan hypothesis, which predicts that marketing has a positive impact on banks' loan business. In fact, the estimated coefficients of *MKT/AT* and *LogMKT* in all columns are significantly positive. The effect is economically large. The coefficient of *MKT/AT* in Column (3) shows that an increase in the advertising and marketing expenses by two bps of the total assets (one standard deviation of *MKT/AT*) would result in an increase in the loans by six and half bps of the total assets. Furthermore, the significantly positive coefficients of *MKT/AT(-2)* and *LogMKT(-2)* in Column (5) and (6) indicate that the marketing activities also have an long-term impact to promote banks' loan business in the following quarters.

### **(Insert Table IV here)**

As far as the control variables are concerned, the results in Column (3) of Table IV help us understand the determinants of bank lending activities. As expected, the coefficient of *LogAT* is significantly positive in that larger banks would issue more loans. A bank's capital can be viewed as a collateral that shareholders pledge against the risk in business. As the capital ratio rises, the bank's capacity to issue risky loans increases. Consistent with this notion which is supported by the existing findings (Gambacorta and Mistrulli, 2004; Karmakar and Mok, 2015; Kim and Sohn, 2017), the coefficient of *EQ/AT* is positive at 1% significance level. The same notion that the spread between loan yields and deposit costs is negatively related to economic growth applies to the result that *Spread* is negatively associated with banks' loans; a booming economy with a smaller spread would have more loans demanded and issued. Finally, we cannot explain the sign of the coefficient of *WageRate*. Nevertheless, its significance is only at 10% level.

### ***Test of Service Hypothesis***

To test the service hypothesis, we estimate the BHCs' service business and display the results in Table V. Consistent with the service hypothesis, the coefficients of *MKT/AT* in all Column (1), (3) and (5) are positive at 1% significance level. The results from Column (2), (4) and (6), though significant at 5% or 10% levels, also support the service hypothesis. The effect is economically large. If a BHC increases its advertising and marketing expenses by two bps of the total assets (one

standard deviation of  $MKT/AT$ ), the proceeds from its banking services would increase by approximately one basic point of its total assets. In addition, the estimated coefficients of  $MKT/AT(-2)$  and  $LogMKT(-2)$  in Column (5) and (6) are significantly positive, indicating that the effect of marketing activities on banks' service business is beyond into the second quarter in future. In a word, the evidence regarding  $MKT/AT$  and  $LogMKT$  strongly supports the hypothesis that marketing promotes banks' service business.

**(Insert Table V here)**

The results about the control variables in Column (3) fill in the void that little literature studies the determinants of banking service. The estimated coefficient of  $LogAT$  shows that the service proceeds per dollar of total assets significantly decreases as the bank size increases. This result indicates an important property of service—decreasing returns to scale; the large organizations are often affected by rigidities, inertia, and bureaucracy, which may decrease their service efficiency. The estimated coefficient of  $EQ/AT$  shows that the capital ratio is positive associated with a bank's service business, and the explanation of this result is open to further study. It is understandable that the spread between loan yields and deposit costs has no effect on a bank's services. Finally, the coefficient of  $WageRate$  is positive and significant, implying that labors play a significant role in bank service business, even though the e-business has been increasing.

***Test of Profitability Hypothesis***

The profitability hypothesis predicts that marketing, by working on and coordinating banking businesses in different areas, ultimately improves banks' financial performance. We use the net income per dollar of total assets, traditionally called ROA, to measure banks' financial performance and estimate its determinants to test the profitability hypothesis. In Table VI, the coefficients of  $MKT/AT$  in all Column (1), (3) and (5) show that the marketing activities have a significantly positive effect on the banks' financial performance. The coefficients of  $LogMKT$  in Column (2), (4) and (6), positive at varying significance levels, are further supporting evidence. The effect is significant not only statistically but also economically. The coefficient of  $MKT/AT$  in Column (3) shows that an increase in the advertising and marketing expenses by two bps of the total assets (one standard deviation of  $MKT/AT$ ) is associated with an increase in the net income by more than one basic point of the total assets. A more straightforward interpretation is that an increase in the advertising and marketing expenses by \$1 would generate 52 cents in net income. Finally, the estimated coefficient of  $MKT/AT(-2)$  in Column (5) is positive but not significant, and

the estimated coefficient of  $LogMKT(-2)$  in Column (6) is positive at 1% significance level. Thus, the long-term effect of marketing on banks' profitability is open to further evidence.

**(Insert Table VI here)**

The results about the control variables in Column (3) are fundamentally consistent with the extant literature. Like its counterpart in the test of the service hypothesis, the coefficient of  $LogAT$  is negative and significant, showing that the net income per dollar of total assets decreases as a bank becomes large. This property of decreasing return to scale can be interpreted by large institutions' rigidities, inertia, and bureaucracy (Capraru and Ihnatov, 2014; Menicucci and Paolucci, 2016). The positive and significant relationship between  $EQ/AT$  and  $NI/AT$  suggests that banks with a high capital ratio have a strong cushion against financial stress, and such an advantage can be translated into a gain in profitability beyond the losses associated with a low leverage, say, a loss in tax shield and/or an increase in agency cost. It is straightforward that the profitability is positively associated with the spread between loan yields and deposit cost, evidenced by the estimated coefficient of  $Spread$ . Finally, the coefficient of  $WageRate$  is negative and significant, which is consistent with our expectation.

### ***Endogeneity of Marketing Activities***

Our results are subject to the criticism that some unobserved, omitted factors may affect both banks' marketing activities and their operating and financial outcomes. Especially, a bank that is more profitable might spend more on marketing. Thus, the endogeneity would bias the results. Our fixed-effects model with the time-varying variable,  $Spread$ , have controlled for unobserved time-invariant and time-varying factors that may drive the results. Now, we further address the endogeneity concerns with instrumental variable regressions.

We focus on the endogeneity issue in testing for the service and profitability hypotheses. Table VII shows the results of the IV regressions using the fixed-effects model with AR(1) disturbance. Beginning with the service hypothesis, we instrument for banks' marketing activities using the quarterly spread between loan yields and deposit costs. Column (3) and (5) in Table V show that  $Spread$  is not associated with  $FEE/AT$ . This relation between  $Spread$  and  $FEE/AT$  is economically reasonable. Furthermore, we find that  $Spread$  is negatively associated with  $MKT/AT$ , evidenced by the coefficient of  $Spread$  in the first-stage regression shown in Column (1), Table VII. This makes sense because banks would spend more on marketing activities to take advantage of the economic growth that is accompanied with a smaller spread between loan yields and deposit

costs. Therefore, *Spread* is a proper instrument. The result from the second-stage regressions confirms that a bank's marketing activities significantly affect its service business. In Column (2), the coefficient of the predicted *MKT/AT* from the first-stage regression is significantly positive, indicating that marketing activities really have a causative effect on banks' service proceeds.

**(Insert Table VII here)**

As far as the endogeneity issue in the profitability hypothesis is concerned, we use the results above to make an inference. The service proceeds are an important source to banks' net income. In Column (3), we perform the following regression.

$$NI/AT = \beta_0 + \beta_1 * FEE/AT + \beta_2 * LogAT + \beta_3 * EQ/AT + \beta_4 * WageRate + \beta_5 * LoanRate + \beta_6 * DepoRate + \varepsilon \quad (4)$$

where *FEE/AT* is the predicted value obtained in Column (2), *LoanRate* is total interest incomes over total loans, and *DepoRate* is total interest expenses over total deposits. Because the coefficient of the predicted *FEE/AT* is significantly positive, we conclude that the service business contributes to banks' profitability. Since the results show that marketing activities really increase banks' service proceeds, we infer that marketing activities would in turn improve banks' financial performance.

After addressing the potential issue of endogeneity using different approaches, we conclude that even though the possibility of the endogeneity is not excluded completely, marketing activities have a significant impact on banks' service business and profitability.

### **Methodological Limitations and Robustness Tests**

The effectiveness of our analysis is limited by some issues in data structure, data availability, and methodology to control for the macroeconomic environment. We conduct robustness tests to address these methodological limitations. The results of these robustness tests, not presented in the paper to save space, are available upon request in a supplementary package.

#### ***Limitation of data structure***

Table II shows that 5,502 observations, accounting for 29.58% of the sample, have a zero value of advertising and marketing expenses. Because of this data structure, our findings might be subject to the sample selection bias. We address this problem with the Heckman correction test. Beginning with the selection equation, we estimate a probit model as follows.

$$Classifier = \beta_0 + \beta_1 * LogAT + \beta_2 * EQ/AT + \beta_3 * WageRate + \beta_4 * LoanRate + \beta_5 * DepoRate + \beta_6 * Public + \varepsilon \quad (5)$$

where *Classifier* is defined as one if an observation has a positive value of advertising and marketing expenses or zero otherwise, and *Public* is defined as one if a bank is a publicly traded company or zero otherwise. Then we repeat Table III to Table VI, including in our regressions the inverse Mills' ratio estimated from the selection equation. Except for the effects of *MKT/AT(-2)* and *LogMKT(-2)*, our main results do not change qualitatively after controlling for the selection bias.

### ***Limitation of data availability***

In our reported analysis, we use the variable, *Spread*, to capture the combined effect of a bank's loan yields and deposit costs. Because we cannot get the data of individual banks' loan rates and deposit rates in a specific quarter, *Spread* is a reasonable variable to proxy for the difference between the banks' loan yields and deposit costs. We maintain that the advantage of this proxy is that it also captures the effect of the macroeconomic environment in each quarter in that *Spread* is constant across banks but varies from quarter to quarter. However, the disadvantage is that it loses the effect of the variation in loan yields and deposit costs across banks. To address this limitation, we develop two bank-specific variables, *LoanRate*, defined as total interest income over total loans, and *DepoRate*, defined as total interest expense over total deposits, and include them in the regressions to replace *Spread*. This method has its own drawbacks though; they do not accurately measure the bank's ongoing loan yields and deposit costs in a quarter since these rates were determined when the loans or deposits occurred. Nevertheless, we use these two variables in place of *Spread* for the purpose of robustness analysis. In general, our results are robust to this change in specifications.

### ***Limitation of the model to control for the macroeconomic environment***

The relationship between the marketing activities and the banks' operating and financial outcomes might be affected by omitted variable bias due to factors related to the macroeconomic environment that changes over time. Even though we include in our regressions the time invariant variable, *Spread*, the common practice is to use quarter dummies to control for the macroeconomic environment. To address this concern regarding the model, we estimate an OLS model which includes the time fixed effect and clusters the robust standard errors at the BHC level. This model, as an alternative method to deal with panel data, eliminates the omitted variable bias caused by excluding unobservable variables which change over time but are constant across banks. The

results of this test show that the effects of marketing activities on banks' operating businesses and profitability are qualitatively robust.

## **Discussion**

### ***Theoretical implications***

Marketing behavior of commercial banks is an area where financial and marketing researchers have been exploring. Usually, marketing researchers focus on the specific marketing strategies and managements in banks, while financial researchers study how marketing affects banks' financial performance. We are wondering if and how the effects of marketing strategies and managements are transmitted to banks' financial performance. This study is intended to fill in this gap in the interface between finance and marketing. In the paper, we measure commercial banks' marketing activities with their advertising and marketing expenses and examine the effects of marketing on bank operating businesses and financial performance. We find that the advertising and marketing expenses are positively associated with the total loans and total service proceeds. This evidence implicates that marketing has promoted banks' loan and service businesses. Furthermore, our results show that marketing has a positive impact on bank profitability, measured as net income over total assets, i.e., commonly used ROA. This U.S. evidence is consistent with Turkish evidence provided by Acar and Temiz (2017). By examining the endogeneity issue, we find evidence that one channel for marketing to improve profitability is through service business. The present results have built a good start to bridge marketing strategies and bank profitability.

### ***Managerial implications***

Not only does this study has its theoretical relevance, also it provides valuable information for bank managers and investors. First, our results show that the effect of marketing activities varies from business to business. From this finding, bank managers would learn the strengths and weaknesses of their marketing strategies and therefore better coordinate the marketing resources used in different areas of business. For example, we do not have evidence that marketing has a positive effect on deposit business, which implicates that the deposit business might be a weak area for marketing management and deserves more attention of bank managers. Second, we provide three explanations why there is no evidence supporting the deposit hypothesis. These explanations provide bank managers with a direction to examine their deposit marketing strategies. The solution based on a thorough examination would help bank managers develop more pertinent marketing strategies to improve their deposit business. Third, we also examine the effect of

marketing activities on stock performance of commercial banks. However, we do not find a positive relationship between advertising and marketing expenses and banks' buy and hold returns adjusted by the market in the reporting quarters. The inconsistency between this finding and the finding about the profitability shows that bank marketing is effective in improving profitability but not in improving stock performance. It indicates that bank managers might focus more on customer relations than on investor relations. Bank marketing might not be so pertinent to investors that they do not perceive and respond to marketing strategies. As the investors' degree of familiarity with a firm may affect its cost of capital and consequently its value (Grullon *et al.*, 2004), bank managers should develop marketing strategies that are pertinent not only to their customers but also to their investors. Finally, our results also benefit investors in commercial banks. Since marketing activities are a predictor of banks' financial performance, investors can use the information of bank marketing to pick stocks; banks with better predicted profitability would, in general, lead to better performance on the stock market.

### ***Limitations and future studies***

Besides the methodological limitations that we have addressed, the present study leaves much to be desired in its contribution to the theory and practice. First, this study is the first step to examine the transmission mechanism from marketing to bank profitability. We begin with bank's three fundamental operating businesses and expect to explore in more detail in future. For example, in the next study, we plan to examine what kinds of marketing strategies a bank would use in different banking businesses. Second, even though we have the solid evidence that marketing has a positive effect on bank profitability, our results, not presented in the paper, do not show the same effect on bank stock performance. This inconsistency is interesting and deserves further study. A firm's management decisions affect its stock performance in two ways. One is that investors would immediately perceive the effect of decisions on the profitability and then the stock price would respond right away. The other way is that investor would not perceive the effect of management decisions directly until the expected effect on the profitability shows up. Thus, it would take a while for the stock price to respond. In this case, it is difficult to make sure that it is the marketing decisions rather than others that contribute to the stock performance. Because of this, there has not been papers studying the effect of marketing on banks' stock behaviors, such as the stock performance, riskiness, and liquidity. We are planning to address this issue in future studies. Third, though the study sheds light on the role of marketing in commercial banks' operating businesses

and profitability, its implication about a specific marketing strategy is limited. It is up to bank managers to assess the effectiveness and efficiency of a specific marketing strategy, and it is up to them to develop and implement effective and efficient marketing strategies to improve banks' operations and profitability.

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## Tables

**Table I**  
**Summary Statistics of BHCs' Characteristic Variables**

Variable	N	Min	Quartile 25	Median	Quartile 75	Max	Mean	Std Dev
<u>Panel A: the BHCs' assets, marketing expenses, operating businesses, and profits (in million \$)</u>								
<i>AT</i>	18603	189.04	738.52	1466.14	4365.38	1463685.49	25137.46	138714.62
<i>MKT</i>	18603	0.00	0.00	0.16	0.58	504.45	6.60	45.84
<i>Deposits</i>	18603	140.71	565.72	1119.34	3186.94	771761.00	12849.47	68392.75
<i>Loans</i>	18603	106.43	485.64	981.87	2801.89	674209.00	11677.90	61280.94
<i>Fees</i>	18603	0.00	0.607	1.74	6.32	5619	92.17	544.33
<i>NI</i>	18603	-225.53	0.95	2.67	9.33	3172.00	54.14	298.19
<i>MKT</i>	18603	0.00	0.00	0.16	0.58	504.45	6.60	45.84
<u>Panel B: the BHCs' marketing expenses, operating businesses, and profitability in asset-scaled forms</u>								
<i>DEPO/AT</i>	18603	0.0435	0.7059	0.7753	0.8239	0.9118	0.7498	0.1221
<i>LOAN/AT</i>	18603	0.0484	0.6033	0.6847	0.7532	0.9129	0.6641	0.1388
<i>FEE/AT</i>	18603	0.0000	0.0007	0.0012	0.0019	0.0192	0.0016	0.0020
<i>NI/AT</i>	18603	-0.0294	0.0012	0.0022	0.0030	0.0187	0.0016	0.0041
<i>MKT/AT</i>	18603	0.0000	0.0000	0.0001	0.0002	0.0022	0.0002	0.0002
<u>Panel C: the other BHCs' characteristic variables</u>								
<i>EQ/AT</i>	18603	0.0276	0.0778	0.0919	0.1086	0.3850	0.0968	0.0354
<i>WageRate</i>	18603	8.2584	13.0976	15.6038	19.1825	58.0895	17.1142	6.6206
<i>LoanRate</i>	18589	0.0109	0.0164	0.0190	0.0219	0.0858	0.0203	0.0082
<i>DepoRate</i>	18593	0.0005	0.0031	0.0055	0.0081	0.0419	0.0061	0.0046

Note: This table presents summary statistics of the BHCs' characteristic variables in our sample. The definitions of the variables are shown in the Appendix.

**Table II**  
**Correlation Matrix**

	<i>MKT/AT</i>	<i>LogMKT</i>	<i>LogAT</i>	<i>EQ/AT</i>	<i>WageRate</i>	<i>Spread</i>
<i>MKT/AT</i>	1	0.4272	0.1063	0.3595	0.1869	0.0021
<i>LogMKT</i>	0.4272	1	0.7165	0.1397	0.2184	0.0060
<i>LogAT</i>	0.1063	0.7165	1	0.0579	0.3025	0.0072
<i>EQ/AT</i>	0.3595	0.1397	0.0579	1	0.1804	0.0665
<i>WageRate</i>	0.1869	0.2184	0.3025	0.1804	1	0.0687
<i>Spread</i>	0.0021	0.0060	0.0072	0.0665	0.0687	1

Note: This table presents the Pearson correlation coefficients between the key independent variables in the regressions. The definitions of the variables are presented in the Appendix.

**Table III**  
**Estimation of BHCs' Deposit Business**

VARIABLES	(1) <i>DEPO/AT</i>	(2) <i>LogDEPO</i>	(3) <i>DEPO/AT</i>	(4) <i>LogDEPO</i>	(5) <i>DEPO/AT</i>	(6) <i>LogDEPO</i>
<i>MKT/AT</i>	-1.4160 (-1.61)		0.0079 (0.01)		-1.2432 (-1.08)	
<i>LogMKT</i>		0.0010 (0.39)		0.0036** (2.07)		0.0025* (1.79)
<i>MKT/AT(-2)</i>					-0.0392 (-0.05)	
<i>LogMKT(-2)</i>						0.0007 (0.55)
<i>LogAT</i>			0.0646*** (45.95)	0.9601*** (332.25)	0.0644*** (43.75)	0.9461*** (360.62)
<i>EQ/AT</i>			-0.2971*** (-15.20)	-0.6025*** (-11.73)	-0.2865*** (-13.78)	-0.0357 (-0.84)
<i>WageRate</i>			-0.0001 (-1.54)	-0.0004*** (-4.02)	-0.0000 (-0.31)	-0.0000 (-0.46)
<i>Spread</i>			0.0166*** (16.83)	0.0204*** (7.54)	0.0163*** (16.43)	0.0190*** (9.11)
Constant	0.7664*** (4,148.13)	7.9733*** (11,647.48)	0.2333*** (162.69)	-0.0040 (-0.84)	0.2329*** (147.89)	0.0578*** (15.66)
R-squared	0.0896	0.4953	0.1448	0.9432	0.1494	0.9482
Obs.	17,856	17,856	17,856	17,856	16,387	16,387
N of BHCs	740	740	740	740	710	710

Note: This table presents the results of estimating the BHCs' deposit business from the fixed effects model with AR(1) disturbance. The variable definitions are provided in the Appendix. The *t*-statistics are presented in the parentheses below the coefficients. The signs of \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

**Table IV**  
**Estimation of BHCs' Loan Business**

VARIABLES	(1) <i>LOAN/AT</i>	(2) <i>LogLOAN</i>	(3) <i>LOAN/AT</i>	(4) <i>LogLOAN</i>	(5) <i>LOAN/AT</i>	(6) <i>LogLOAN</i>
<i>MKT/AT</i>	3.9990*** (4.71)		3.2627*** (3.91)		4.9899*** (4.29)	
<i>LogMKT</i>		0.0055*** (3.19)		0.0031*** (2.61)		0.0030** (2.42)
<i>MKT/AT(-2)</i>					2.7701*** (3.40)	
<i>LogMKT(-2)</i>						0.0037*** (3.13)
<i>LogAT</i>			0.0051*** (2.62)	0.8583*** (254.64)	0.0015 (0.72)	0.8616*** (251.86)
<i>EQ/AT</i>			0.3489*** (16.66)	1.0348*** (27.16)	0.2831*** (13.08)	0.9274*** (23.71)
<i>WageRate</i>			0.0001* (1.92)	0.0001 (1.16)	0.0001* (1.78)	-0.0001 (-0.60)
<i>Spread</i>			-0.0062*** (-6.06)	-0.0118*** (-6.26)	-0.0066*** (-6.53)	-0.0118*** (-6.42)
Constant	0.6747*** (3,663.80)	8.2479*** (17,003.89)	0.6169*** (493.73)	0.6080*** (257.20)	0.6544*** (508.52)	0.6041*** (244.54)
R-squared	0.0170	0.4970	0.1082	0.9281	0.0695	0.9356
Obs.	17,856	17,856	17,856	17,856	16,387	16,387
N of BHCs	740	740	740	740	710	710

Note: This table presents the results of estimating the BHCs' loan business from the fixed effects model with AR(1) disturbance. The variable definitions are provided in the Appendix. The t-statistics are presented in the parentheses below the coefficients. The signs of \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

**Table V**  
**Estimation of BHCs' Service Business**

VARIABLES	(1) <i>FEE/AT</i>	(2) <i>LogFEE</i>	(3) <i>FEE/AT</i>	(4) <i>LogFee</i>	(5) <i>FEE/AT</i>	(6) <i>LogFEE</i>
<i>MKT/AT</i>	0.6011*** (11.01)		0.4736*** (8.61)		0.7406*** (10.10)	
<i>LogMKT</i>		0.0085* (1.80)		0.0081* (1.75)		0.0112** (2.33)
<i>MKT/AT(-2)</i>					0.0935* (1.82)	
<i>LogMKT(-2)</i>						0.0187*** (4.11)
<i>LogAT</i>			-0.0002** (-2.04)	0.2127*** (28.80)	-0.0004*** (-3.51)	0.2195*** (30.16)
<i>EQ/AT</i>			0.0063*** (4.63)	0.5451*** (4.03)	0.0080*** (5.89)	0.6801*** (4.89)
<i>WageRate</i>			0.0000*** (13.21)	0.0053*** (17.56)	0.0000*** (4.36)	0.0013*** (3.42)
<i>Spread</i>			-0.0001 (-1.04)	-0.0481*** (-6.71)	-0.0001 (-0.86)	-0.0389*** (-5.52)
Constant	0.0018*** (152.42)	1.6352*** (1,247.41)	0.0027*** (30.89)	-0.0595*** (-4.77)	0.0046*** (54.94)	-0.0596*** (-4.24)
R-squared	0.1928	0.5182	0.2281	0.8560	0.1177	0.8692
Obs.	17,856	17,815	17,856	17,815	16,387	16,354
N of BHCs	740	740	740	740	710	710

Note: This table presents the results of estimating the BHCs' service business from the fixed effects model with AR(1) disturbance. The variable definitions are provided in the Appendix. The t-statistics are presented in the parentheses below the coefficients. The signs of \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

**Table VI**  
**Estimation of BHCs' Net Income**

VARIABLES	(1) <i>NI/AT</i>	(2) <i>LogNI</i>	(3) <i>NI/AT</i>	(4) <i>LogNI</i>	(5) <i>NI/AT</i>	(6) <i>LogNI</i>
<i>MKT/AT</i>	0.6977*** (2.91)		0.5226** (2.26)		0.7483*** (2.82)	
<i>LogMKT</i>		0.0642*** (4.94)		0.0081* (1.75)		0.0314** (2.24)
<i>MKT/AT(-2)</i>					0.1211 (0.49)	
<i>LogMKT(-2)</i>						0.0348*** (2.59)
<i>LogAT</i>			-0.0024*** (-19.32)	0.2127*** (28.80)	-0.0027*** (-19.50)	0.0262** (2.22)
<i>EQ/AT</i>			0.0852*** (34.98)	0.5451*** (4.03)	0.0972*** (35.87)	2.9600*** (7.74)
<i>WageRate</i>			-0.0000*** (-4.96)	0.0053*** (17.56)	-0.0001*** (-5.28)	0.0042*** (3.38)
<i>Spread</i>			0.0030*** (17.40)	-0.0481*** (-6.71)	0.0029*** (16.22)	0.1486*** (6.85)
Constant	0.0014*** (31.32)	1.8890*** (423.75)	0.0037*** (5.66)	-0.0595*** (-4.77)	0.0057*** (7.50)	0.8846*** (27.20)
R-squared	0.0656	0.4905	0.0792	0.8560	0.0726	0.3407
Obs.	17,856	16,305	17,856	17,815	16,387	14,901
N of BHCs	740	737	740	740	710	703

Note: This table presents the results of estimating the BHCs' net income from the fixed effects model with AR(1) disturbance. The variable definitions are provided in the Appendix. The *t*-statistics are presented in the parentheses below the coefficients. The signs of \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

**Table VII**  
**Instrumental Variable Regressions**

	(1)	(2)	(3)
VARIABLES	2SLS 1st-Stage <i>MKT/AT</i>	2SLS 2nd-Stage <i>FEE/AT</i>	<i>NI/AT</i>
$\widehat{FEE/AT}$			1.2361*** (2.88)
$\widehat{MKT/AT}$		6.6935** (2.49)	
<i>Spread</i>	-0.0000*** (-3.59)		
<i>Log(AT)</i>	-0.0000* (-1.93)	-0.0003*** (-2.62)	-0.0018*** (-13.75)
<i>EQ/AT</i>	0.0005*** (4.49)	0.0032* (1.70)	0.0866*** (22.50)
<i>WageRate</i>	0.0000*** (11.36)	0.0000 (1.28)	-0.0001*** (-4.79)
<i>LoanRate</i>			0.0101*** (4.50)
<i>DepoRate</i>			0.0036 (0.46)
Constant	0.0002*** (12.41)	0.0025*** (28.84)	0.0059*** (7.28)
Obs.	17,856	17,856	17,841
R-squared	0.0958	0.0830	0.0569
N of BHCs	740	740	738

Note: The table presents the instrumental variable regression results on the effect of the marketing activities on banks' service business. Column (1) and (2) show the results using the fixed-effects model with an AR(1) disturbance, and Column (3) to (4) show the results using the OLS model in which the robust standard errors are clustered at the BHC level. In the first-stage regressions, the dependent variable is *MKT/AT*, and in the second-stage regressions, the dependent variable is *FEE/AT*. The instrument for *MKT/AT* is *Spread*. The variable definitions are provided in the Appendix. The *t*-statistics are presented in the parentheses below the coefficients. The signs of \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

## Appendix

### Appendix: Variable Definitions

Variable	Definition
<b>Panel A: Dependent Variables</b>	
<i>DEPO/AT</i>	Deposits = (BHCB2210+BHCB3187+BHCB2389+BHCB6648+BHCB2604
<i>LogDEPO</i>	+BHOD3189+BHOD3187+BHOD2389+BHOD6648+BHOD2604 +BHFN6631+BHFN6636); Assets Total ( <i>AT</i> ) = BHCK2170. <i>DEPO/AT</i> = Deposits/Assets Total. <i>LogDEPO</i> = log(Deposits+1).
<i>LOAN/AT</i>	Loans = BHCK2122.
<i>LogLOAN</i>	<i>LOAN/AT</i> = Loans/Assets Total. <i>LogLOAN</i> = log(Loans+1).
<i>FEE/AT</i>	Fees = (BHCK4070+BHCK4483+BHCKC886+BHCKC888+BHCKC887
<i>LogFEE</i>	+BHCKC386+BHCKC387+BHCKB492). <i>FEE/AT</i> = Fees/Assets Total. <i>LogFEE</i> = log(Fees+1).
<i>NI/AT</i>	Net Income ( <i>NI</i> ) = BHCKB492.
<i>LogNI</i>	<i>NI/AT</i> = Net Income/Assets Total. <i>LogNI</i> = log(NI+1).
<b>Panel B: Independent Variables</b>	
<i>MKT/AT</i>	Advertising and Marketing Expenses ( <i>MKT</i> ) = BHCK0497.
<i>LogMKT</i>	<i>MKT/AT</i> = Advertising and Marketing Expenses/Assets Total. <i>LogMKT</i> = log(MKT+1).
<i>AT and LogAT</i>	Assets Total ( <i>AT</i> ) = BHCK2170, <i>LogAT</i> = log(AT+1).
<i>EQ/AT</i>	Capital Ratio = Equity Capital (BHCK3210)/Assets Total (BHCK2170).
<i>WageRate</i>	= Salaries and Employee Benefits (BHCK4135)/ Number of Full-time Employees (BHCK4150).
<i>Spread</i>	<i>Spread</i> = the average monthly prime interest rate over the FR Y-9C report quarter minus the counterpart of the CD interest rate.
<i>LoanRate</i>	<i>LoanRate</i> = Interest Income (BHCK4107)/Loans.
<i>DepoRate</i>	<i>DepoRate</i> = Interest Expense (BHCK4073)/Deposits.