

Direct Bank Investment in Municipal Debt

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The period since 2004 has seen a significant increase in commercial bank investment in municipal debt, with bank holdings of municipal debt rising from 5.2% of the municipal market in 2004 to almost 10% of the market by the end of 2012. This paper places this increase into historical context. Although there has been some shuffling, in the cross section, the holdings of municipal debt 12 years ago are a remarkably strong predictor of holdings today. There is some evidence that municipal bond index returns have become correlated with bank stock returns.

INTRODUCTION

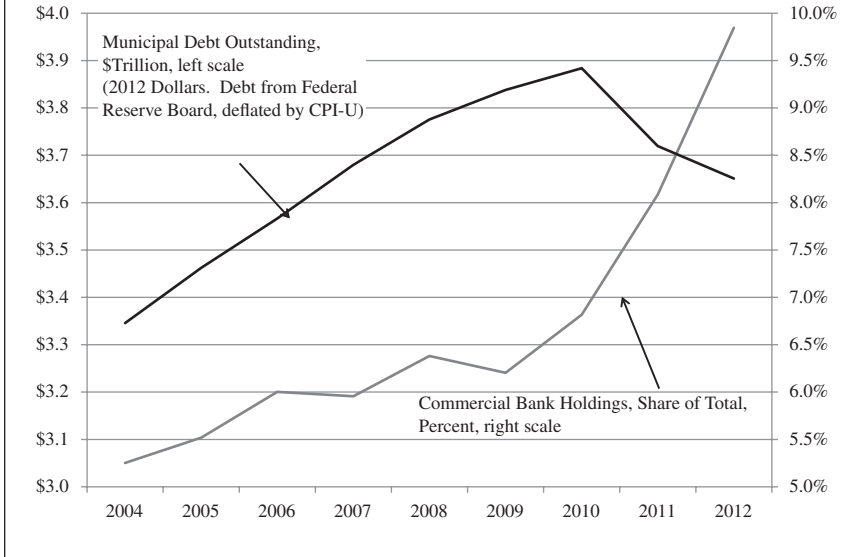
The nature of commercial bank involvement in the municipal capital market has changed dramatically since the financial crisis. Figure 1, which is based on data from the Federal Reserve Board’s Flow of Funds statistics, shows that direct commercial bank holdings of municipal loans and securities have been rising at a rapid pace—increasing from 5.25% in 2004 to 9.85% as of the end of 2012.¹ This increase has been the most dramatic increase in direct commercial investment in municipal debt since the Tax Reform Act of 1986.

Direct bank investment in municipal debt raises a number of policy issues. First, it raises a question about which investments are “securities” and which are not. The distinction is important because the Municipal Securities Rulemaking Board (MSRB) and the Securities and Exchange

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¹ In 2011, the Federal Reserve Board revised its methods for the calculation of municipal securities and loans. The revision extended back only to 2004, but not earlier.

Figure 1: Commercial Bank Holdings as Share of Total Municipal Debt Outstanding, 2004-2012



Commission (SEC) regulate securities markets, but they do not have the same regulatory tools when it comes to direct loans to municipalities. The line between a loan and a security is important because of the impact on regulation. As important as this distinction is, the line between loans and securities is not always clearly drawn.² As the MSRB said in a recent notice: “When banks make ‘loans’ to state and local governments . . . whether such ‘loans’ will be considered securities can be a difficult question.”³

The expansion of direct bank investment also raises important questions about municipal disclosure. A Moody’s report highlighted this issue:

One of the advantages of direct loans for municipal issuers is lower borrowing costs due to the absence of a need to prepare public offering documents for the borrowing. This advantage for the issuer can pose a disadvantage to investors in the issuer’s outstanding rated debt, as information on a privately placed loan may not be available until

² In this paper we will use the term “municipal debt” to describe both securities and non-security debt. We will use the term “loan” to refer to non-security debt, and “security” to refer to debt that is for legal purposes a security.

³ MSRB Notice 2011-52, “Potential Applicability of MSRB Rules to Certain ‘Direct Purchases’ and ‘Bank Loans,’” September 12, 2011. Accessed at <http://msrb.org/Rules-and-Interpretations/Regulatory-Notices/2011/2011-52.aspx>.

the subsequent financial statement or continuing disclosure filing is made available.⁴

Disclosure in the context of bond underwritings leads to public dissemination of information about issuers, and a shift in the direction of bank finance has caused concern about the already scrutinized quality and quantity of information available for bond investors in the municipal market.

A related concern is municipal liquidity. In particular, direct bank investment in municipal debt often comes with “acceleration” features that make the debt payable under certain scenarios, for example a ratings downgrade or the breach of a covenant.⁵ The increase in direct bank investment is following a reduction in municipal borrowing through variable rate demand obligations (VRDOs) and related bond types—bonds for which banks provide a liquidity backstop in the event that a periodic remarketing fails. Many market observers have noted that the liquidity concerns for municipalities are no greater in the direct-investment market than they were in the VRDO market. In fact, some argue that the tenor of direct bank investments has tended to be longer than liquidity agreements on average and that liquidity risk has therefore decreased. Nonetheless, the opaqueness of the direct investment market suggests that liquidity risks for particular issuers may only be apparent to bond market investors with a material lag.

The lack of disclosure that characterizes the direct municipal investment market can make it difficult for academic researchers to investigate this market. In some ways, this market is more difficult to investigate than the VRDO market that it has replaced, because market data sources provide consistent data on bank lines of credit (LOCs) for the VRDO bond market. In this paper, we turn the problem on its head. We look for evidence on direct bank investment in the municipal sector based on the banks’ regulatory filings, rather than municipalities’ filings. In particular, we use disaggregated bank-level data on direct investment in municipal debt from the Reports on Condition and Income for banks insured by the Federal Deposit Insurance Corporation (FDIC). These reports, commonly referred to as the “Call Report” data, provide quarterly snapshots of individual bank assets, liabilities, and earnings.

Using these data, as well as aggregated data from the Federal Reserve Board’s Flow of Funds reports, we address a number of questions about direct bank investments in municipal debt. We begin by characterizing the scale of the market. We show that commercial bank investments in

⁴ Moody’s Investors Service, Special Comment, “Direct Bank Loans Carry Credit Risks Similar to Variable Rate Demand Bonds for Public Finance Issuers,” September 15, 2011.

⁵ See Standard & Poor’s, ‘The Appeal of Alternative Financing Is Not Without Risk for Municipal Issuers,’ May 17, 2011.

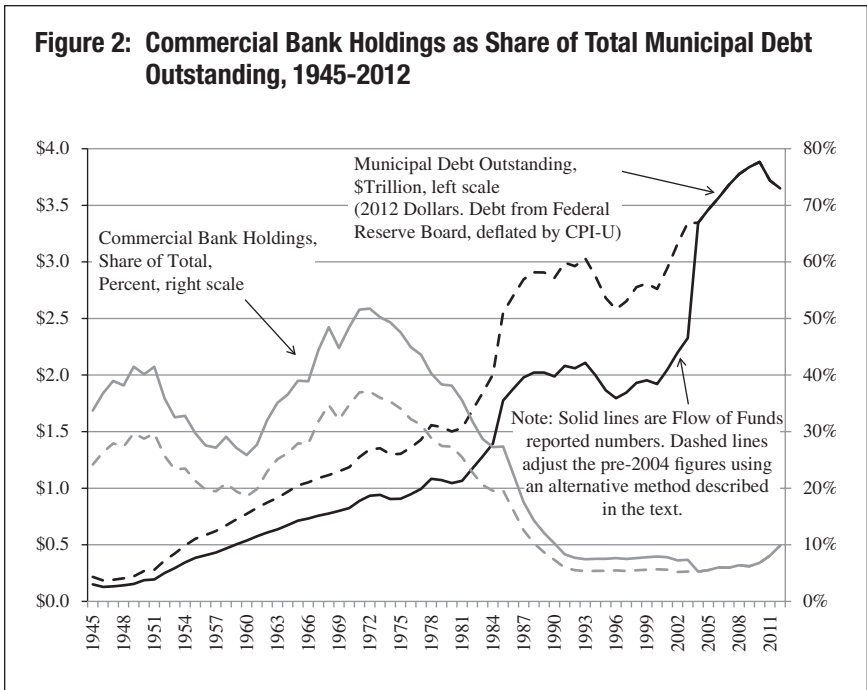
municipal debt amount to 10% of municipal debt at the end of 2012. At the same time, bank investments in municipal debt amounted to 2.69% of total bank assets in aggregate. For many large banks, the value of their municipal portfolios is larger than the value of their equity. Bank investment in municipal debt is less concentrated than their overall portfolios; the share of all bank assets held by the five largest banks was 46% in 2012, but the share of municipal debt held by the five banks with the largest municipal portfolios was only 37%.

Although the overall level of bank investment in municipal debt has increased recently, we show that bank by bank, the share of bank assets invested in municipal debt in 2000 has a high level of predictive power for banks' municipal asset shares in 2012. This suggests that, although there has been some shuffling of relative positions among banks, the increase in bank investment in municipal debt has reflected in large part a scaling up of the portfolio shares that banks had in 2000. The banks investing in municipal assets today are, on the whole, not novices at municipal investing. The scale of municipal investments has become large relative to bank equity—particularly in the tail of the distribution. A number of banks now have municipal portfolios that exceed the reported value of their equity, suggesting a high level of potential exposure to deterioration in municipal credit markets. In spite of this exposure, there is little evidence that the decline in municipal bond prices during June of 2013 has been reflected in bank equity prices.

BACKGROUND ON BANK DIRECT AND INDIRECT INVESTMENT IN MUNICIPAL DEBT

Until the 1982 Tax Equity and Fiscal Responsibility Act, commercial banks could deduct interest paid on borrowing used to finance portfolios of municipal debt. In this context, commercial banks were the dominant holders of municipal debt, with over 50% of the market. The 1982 and 1984 tax reforms restricted the commercial bank advantage, limiting them to deducting only 85%, and then 80%, of interest paid.⁶ The 1986 Tax Reform Act eliminated banks' ability to deduct interest paid to finance municipal bond portfolios. Figure 2 broadens the time scale of Figure 1, showing the recent uptick in the context of the massive historical fluctuation in direct bank holdings of municipal debt.

⁶ The 1982 Tax Equity and Fiscal Responsibility Act and the 1984 Deficit Reduction Act. See Peter Fortune, "The Municipal Bond Market, Part I: Politics, Taxes, and Yields," *New England Economic Review*, September/October 1991, and Richards Kibbe & Orbe LLP, Brian S. Fraser, and Paul J. Devlin, "Direct Bank Loans to Municipalities: What Are the Implications Under the Federal Securities Laws?" *Lexology.com*, June 8, 2012, accessed at: <http://www.lexology.com/library/detail.aspx?g=2f55d4b1-6ad9-4251-84c2-43-bf9e9ded59>.



As noted in the introduction, the Federal Reserve changed its methods for calculation of municipal debt in 2011.⁷ This adjustment to calculation methods was made back to 2004 but not before, meaning that municipal holding totals in the Flow of Funds accounts are not directly comparable between the pre-2004 and post-2004 periods. The change in methodology certainly contributed to the reported \$1 trillion increase in the municipal debt total, but the precise contribution of the change in methodology is not known. In this paper, when using Flow of Funds statistics straddling the 2003/2004 boundary, we take two approaches. The first approach, reflected in the solid lines in Figure 2, is to take the Federal Reserve numbers at face value. The second approach, reflected in dashed lines, is to assume that there was zero growth in municipal debt outstanding between 2003 and 2004. We calculate totals for periods prior to 2004 by using the Federal Reserve's (presumably accurate) reported growth rate in municipal debt

⁷ See page 2 of the 2011 Q3 Flow of Funds release, footnote 3. See also the June 4, 2013, note: "State and Local Debt: A Clarification," by Natalie Cohen of Wells Fargo. Cohen describes the Federal Reserve's change in calculation methods as being a response to research notes by George Friedlander of Citigroup and Daniel Berger of Thomson Reuters, who each pointed out significant discrepancies between the municipal debt totals reported by the Federal Reserve and those reported by Bloomberg, Mergent, and other private sector data providers. The Federal Reserve's new method uses data from Mergent.

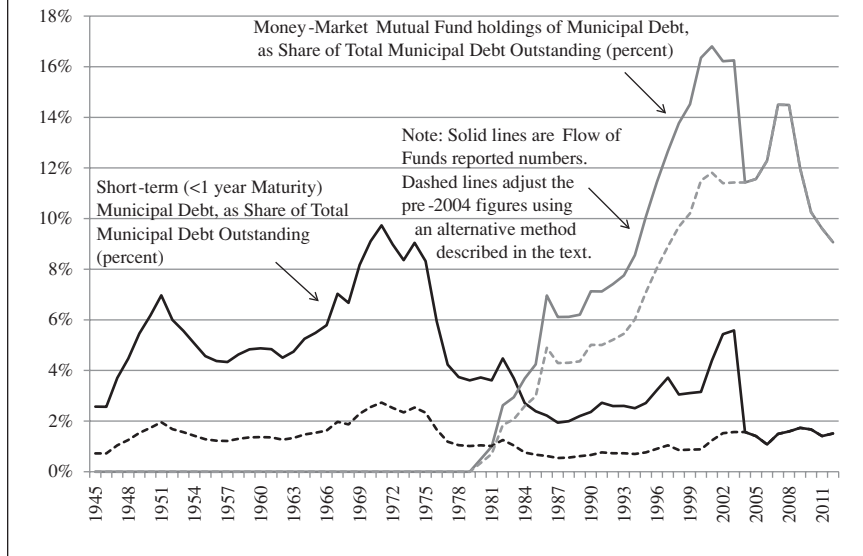
and projecting the growth rates backward from the 2003 totals to arrive at adjusted annual total figures. This alternative approach assumes that all of the reported increase in municipal debt between 2003 and 2004 was a consequence of the methodology change, and the true amount outstanding was unchanged. This alternative approach also assumes for periods prior to 2004, that although the Flow of Funds totals are not reliable, the year-over-year changes in these totals are reliable.

In Figure 2, as in other figures using the Flow of Funds data, the central conclusion of the exhibit is not affected by the treatment of the 2003/2004 data methodology change. According to either calculation method, the increase in the share of total municipal debt held by depository institutions is striking but has not yet brought the bank share near to the share that prevailed prior to the 1986 tax law change. The 1986 tax law change precipitated a massive shift, with banks significantly reducing their direct exposure to municipal debt.

But in the post-1986 period, banks continued to be involved in the municipal market, even though direct investment in municipal debt fell. The VRDO market was one particular channel for bank involvement. A VRDO is a long-term (for example, 30-year maturity) municipal security. It is sold with a variable coupon, with a remarketing manager running a periodic (e.g., every seven days) remarketing. At this remarketing, the remarketing manager sets a new coupon rate for the bond in order to match supply and demand for the bonds at a clearing price of par. The security also offers an unconditional put right to the investor. Combined with a letter or line of credit from a highly rated financial institution, this structure guarantees a purchaser for the VRDOs in the event that current holders en masse exercise their put right. The resulting security, though with a nominal long-term maturity, can be an eligible investment for money market mutual funds (often called 2a-7 funds, after the section of the Securities and Exchange Act that sets the parameters for this market).

Commercial banks providing liquidity backstops for VRDOs and related structures are involved in the municipal debt market but are only contingent holders of the actual debt. These institutions will come to own the debt in the event that a periodic remarketing “fails,” leaving the bank to perform under the liquidity agreement. Figure 3 shows a trace of the impact of this involvement. In particular, it shows two different series from the Federal Reserve’s Flow of Funds statistics. The solid black line shows the share of the municipal market that is accounted for by short-term (< 1 year maturity) instruments. The dashed black line shows the share of the municipal market that is accounted for by investments by money market mutual funds. The wedge between the two reflects the maturity transformation of VRDOs and related securities. Note that the implications of the figure are not affected by whether the Flow of Funds figures are used directly or modified according to the methods described above.

Figure 3: Short-Term Municipal Debt and Municipal Debt Held by Money-Market Mutual Funds, 1945-2012



The coming implementation of Basel III has had an impact on bank pricing for lines of credit and other contingent guarantees. In particular, Basel III will introduce minimum “Liquidity Coverage Ratios,” or LCRs; these coverage ratios are based not only on assets held on the balance sheet, but also on contingent commitments to provide liquidity such as those that backstop VRDOs.⁸ Many analysts have pointed to Basel III as a factor behind banks’ shift from off-balance-sheet to on-balance-sheet investment in municipal debt.⁹

Table 1 illustrates some of these changing dynamics. The table shows data from Mergent, for the period between 2000 and 2012, on the share of municipal debt (bond by value and by bond count), that is “bank-

⁸ See Bank for International Settlements, Basel Committee on Banking Supervision, “Basel III: The Liquidity Coverage Ratio and Liquidity Risk Monitoring Tools,” page 31.

⁹ See California Debt and Investment Advisory Commission, “New Frontiers in Public Finance: A Return to Direct Lending,” October 3, 2012. The report highlights reasons for resurgence of direct bank investment in municipal debt: “Issuer factors: Restructuring/conversion of existing variable rate transactions; elimination of bank downgrade risk; elimination of a ‘put risk’ due to credit or market events; elimination of trading risk volatility; ease of execution (reduced costs and limited public disclosure requirement). Bank factors: Lower-rated banks are able (to) participate as lender/investor; Basel III regulatory changes have encouraged Banks to pursue funded loans vs. contingent liabilities; Reduced opportunities for traditional lending.”

Table 1: Issuance of Bank-Qualified and Variable-Rate Debt, 2000-2012												
Year	Bond Count						Par Dollar Value (\$ Million)					
	New Issues			Share of New Issues			Total Par Value			New Issues		
	Total Bonds	Total	Bank-Qualified	Share of New Issues	Variable-Rate	Share of New Issues	Total Par Value	Total	Bank-Qualified	Share of New Issues	Variable-Rate	Share of New Issues
2000	104,892	88,507	40,631	45.9%	1,903	2.2%	\$209,612	\$162,362	\$10,798	6.7%	\$23,769	14.6%
2001	148,896	99,620	43,017	43.2%	1,715	1.7%	\$317,470	\$194,838	\$11,008	5.6%	\$20,468	10.5%
2002	165,133	100,743	40,841	40.5%	1,973	2.0%	\$410,526	\$244,098	\$10,273	4.2%	\$37,586	15.4%
2003	176,238	100,785	40,140	39.8%	2,063	2.0%	\$458,723	\$281,472	\$10,256	3.6%	\$32,007	11.4%
2004	159,863	107,213	40,824	38.1%	2,610	2.4%	\$450,561	\$307,570	\$12,943	4.2%	\$44,155	14.4%
2005	173,377	92,211	34,348	37.2%	3,093	3.4%	\$500,006	\$267,332	\$10,904	4.1%	\$49,509	18.5%
2006	147,183	92,563	34,385	37.1%	6,030	6.5%	\$509,824	\$335,441	\$13,642	4.1%	\$101,813	30.4%
2007	142,290	92,019	32,431	35.2%	7,858	8.5%	\$617,288	\$399,711	\$13,389	3.3%	\$126,365	31.6%
2008	113,851	75,688	30,095	39.8%	6,304	8.3%	\$562,248	\$317,261	\$13,581	4.3%	\$105,425	33.2%
2009	128,491	72,975	35,227	48.3%	1,499	2.1%	\$518,205	\$324,772	\$22,649	7.0%	\$36,143	11.1%
2010	144,833	72,559	32,145	44.3%	1,504	2.1%	\$528,905	\$330,489	\$20,649	6.2%	\$34,721	10.5%
2011	116,903	55,107	22,504	40.8%	1,529	2.8%	\$369,556	\$208,032	\$9,566	4.6%	\$36,458	17.5%
2012	151,219	51,236	22,286	43.5%	612	1.2%	\$440,943	\$194,610	\$9,415	4.8%	\$20,090	10.3%

Source: Mergent.

qualified” and that is identified by Mergent as being “variable-rate.” The “bank-qualified” identification is based on banks’ ability to hold debt and deduct part of interest payments for borrowing used to finance that debt. Bonds identified by Mergent as “bank-qualified” will not necessarily be held by banks, and banks are free to hold debt that is not “bank-qualified,” although banks face less favorable tax status than they do for debt that is considered “bank-qualified” by the IRS. The market identified by Mergent as “variable-rate” accounted for over 30% of the dollar value of new issuance from 2006 to 2008, but has since fallen dramatically.

WHAT IS THE DIFFERENCE BETWEEN A LOAN AND A SECURITY?

The rise of direct bank investment in municipal debt is highlighting the challenge of identifying whether a given debt issue is a “loan” or a “security.” The MSRB has highlighted the importance—and the potentially fuzzy nature—of the line that separates loans from securities.¹⁰ As the MSRB has noted, the distinction between a loan and a security is important because private placements of municipal securities—including private placements with commercial banks—are subject to MSRB rules and federal securities laws. For example, a financial advisor who gives a municipality advice in the context of placement of debt that is viewed as a security would come under MSRB and SEC rules. The same advisor, providing advice on a transaction where a bank makes a loan to a municipality, may not be subject to MSRB and SEC regulation. The legal distinction between a non-security and a security is established by the U.S. Supreme Court case *Reves v. Ernst & Young, Inc.*¹¹ The guiding principal, as described by the MSRB, is that “a note is presumed to be a security . . . unless it is of a type specifically identified as a non-security.”¹²

¹⁰ Municipal Securities Rulemaking Board Notice 2011-52, “Potential Applicability of MSRB Rules to Certain ‘Direct Purchases’ and ‘Bank Loans,’” September 12, 2011. The MSRB notice highlights a number of rules that “might apply to a broker-dealer placing a bank financing that is a municipal security”: Rule A-13 (requiring broker-dealers to pay assessments on underwritings and placements of municipal securities), Rule G-3 (requiring broker-dealers to pass qualifying examinations), Rule G-14 (requiring broker-dealers to report purchases and sales of municipal securities), Rule G-17 (imposing a duty of fair dealing), Rule G-34 (requiring broker-dealers to obtain CUSIP identifiers), and Rule G-37 (political contributions).

¹¹ 494 U.S. 56 (1990). See <http://supreme.justia.com/cases/federal/us/494/56/>.

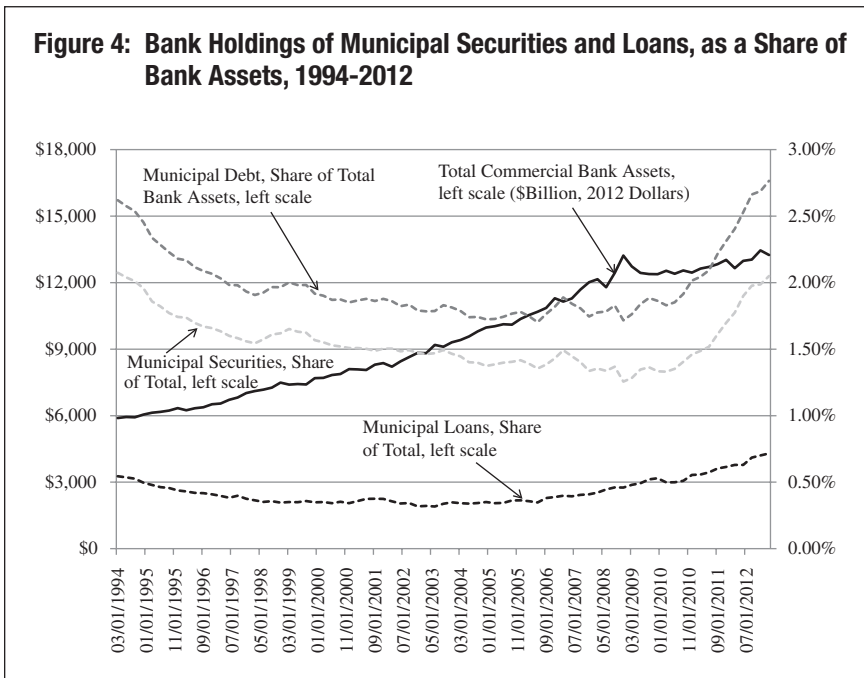
¹² From the text of the decision: “The fundamental purpose undergirding the Securities Acts is ‘to eliminate serious abuses in a largely unregulated securities market.’ In defining the scope of the market that it wished to regulate, Congress painted with a broad brush. . . it enacted a definition of ‘security’ sufficiently broad to encompass virtually any instrument that might be sold as an investment.”

In this paper, we are able to identify loans and securities, at least to the extent that banks' Call Report data identify holdings as being loans or securities (+ leases). Figure 4 shows the breakdown between loans and securities during the recent period. Loans to municipalities represented 0.7% of bank assets at the end of 2012, while securities were above 2% of bank assets.

MORE DETAIL ON DATA FROM THE CALL REPORTS

The core analysis of this paper is based on a comprehensive sample of commercial banks. Commercial banks are required to file quarterly reports of condition (the "Call Reports") with the FDIC. These reports detail bank investment portfolios and income in a way that allows us to follow individual bank investment in municipal securities. The appendix details data and variable construction.

The previously mentioned Figure 4 shows aggregate municipal debt holdings at commercial banks, as a share of total bank assets, back to 1994. The solid line also shows commercial bank total assets, measured in constant 2012 dollars (using the consumer price index for urban consumers [CPI-U] as the deflator series). Bank holdings of municipal debt represented 2.62% of their assets as of March 1994, and it declined rapidly over the next 10 years to a minimum of 1.7%, achieved in 2006. Since that minimum, bank holdings have risen to 2.69%, or over \$368 billion.



Figures 5 and 6 show that commercial bank holdings of municipal debt are much more evenly distributed than overall bank assets. Figure 5 shows holdings of the top five commercial banks as a share of total commercial bank assets. The top five share of overall assets has risen from under 10% to over 46% since 1994, a remarkable increase in the concentration of the banking sector. Municipal assets held by the top five banks have risen from 7% of the total to 36% of the total. Figure 6 shows a different measure of concentration, the “Herfindahl Index,” which is the sum of the squared portfolio shares of the institutions investing in a particular asset. The Herfindahl Index shows a similar pattern, with much more dispersion in bank holdings of municipal assets than in their overall portfolios. In short, although the market share of the largest banks has risen across the board, this pattern has been less pronounced in municipal debt, and the debt (relative to other assets) is disproportionately held by the smaller banks. The Herfindahl Index shows a pattern around the time of the financial crisis, with dispersion in bank holdings of municipal debt actually increasing significantly since 2006, before increasing again since 2011.

Figure 7 shows the experience of individual financial institutions, focusing on the six largest institutions, ranked by municipal bond holdings as of 2012. For this graph, in cases of merger, predecessor organizations are rolled in together with the survivor. For example, the 1994 figures for JPMorgan

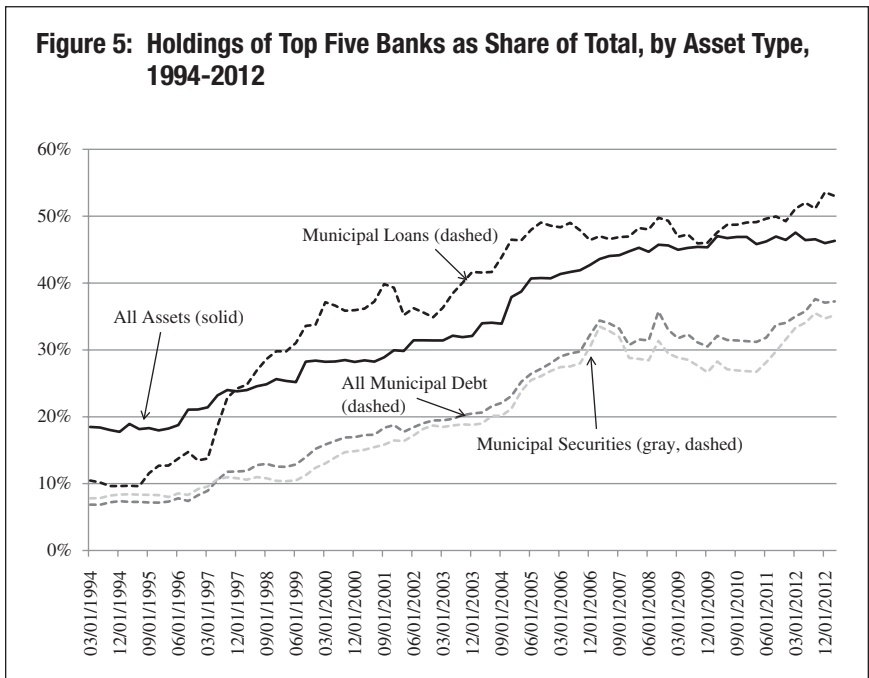


Figure 6: Herfindahl Indexes, Bank Assets, by Asset Type, 1994-2012

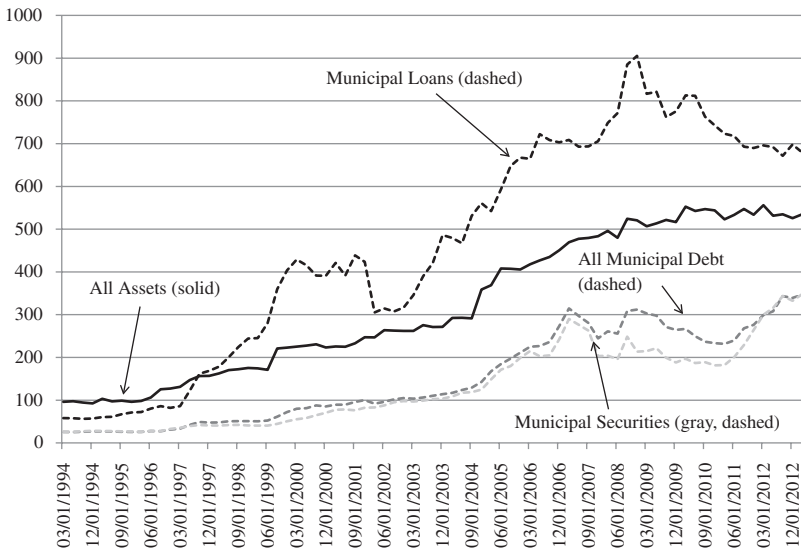
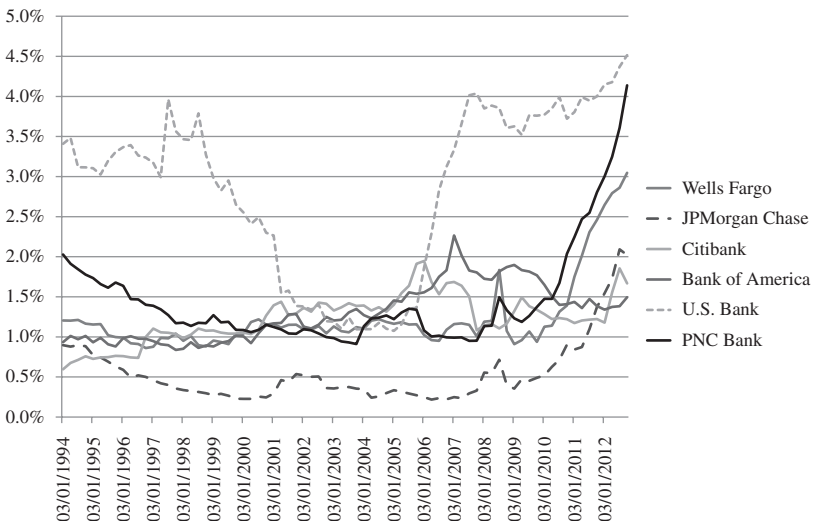


Figure 7: Municipal Debt as a Share of Total Bank Assets, Selected Banks, 1994-2012



Chase include all of the predecessor institutions that were merged to form JPMorgan Chase. PNC Bank, JPMorgan, and Wells Fargo follow a very similar pattern, with a major uptick in holdings during 2008, which is then rapidly liquidated. In the case of JPMorgan, municipal holdings as a share of total assets jump from 0.30% at September 2007 to 0.72% at September 2008, an increase of \$9 billion. PNC Bank municipal holdings also spike from 0.95% of assets to 1.49% of assets during the same period. Each of these institutions, after unwinding that rapid spike, then resumed increasing municipal holdings during 2009, each at a somewhat slower but more sustained pace. Citibank and Bank of America follow a very different pattern. All of these banks increased their municipal assets leading up to the financial crisis and have since trimmed their portfolios. Although the two institutions had (among the six) the highest municipal weights in 2005, their municipal weights are the lowest today.

LARGE SAMPLE CROSS-SECTIONAL EVIDENCE

The analysis in this section describes in more detail the municipal security holdings of major commercial banks. Table 2 shows the 50 banks with the largest municipal portfolios in December 2012. These banks are ranked by the size of the portfolio; the largest two portfolios are Wells Fargo Bank, NA (with \$38.56 billion in municipal debt) and JPMorgan Chase Bank, NA (with \$38.34 billion). The figure shows municipal holdings both by assets and by bank equity. Among the banks whose municipal portfolios exceed their reported equity are Frost Bank, with \$3.43 billion in municipal debt, and First Security Bank, whose \$2.20 billion in municipal debt is more than half of its portfolio of assets. There are also some differences across banks in the mix of assets that they are reporting to the FDIC as securities versus loans. The \$21.9 billion municipal portfolio of Citibank is almost all reported as securities, while more than 58% of the portfolio of U.S. Bank is loans.

Although Figure 7 documented some changes in banks' position in the municipal holdings "league table," deeper investigation suggests a surprising degree of persistence in bank investment in municipal debt. Table 3 reports the result of this exercise. In the entire sample of FDIC-insured banks, we explore empirically the determinants of municipal holdings (as a share of bank assets) in 2012. Column (1) fits an OLS regression of municipal assets (as a share of total assets) on lagged (to 2008) bank capitalization, the interest yield earned on the banks' municipal portfolios, the lagged municipal bond share, and the lagged bank size (in logs). Columns (2), (3), and (4) fit the same specification, with the independent variables calculated based on 2007, 2006, and 2000 figures, respectively. Columns (5) through (8) follow the same pattern, but instead of using the

Name	Municipal Debt	As Share of Total Assets	As Share of Total Equity	Securities	Loans	Total Bank Assets	Total Equity
WELLS FARGO BANK, NATIONAL ASSOCIATION	38.56	3.05%	28.85%	32.38	6.19	1266.13	133.66
JPMORGAN CHASE BANK, NATIONAL ASSOCIATION	38.34	2.02%	26.25%	26.66	11.68	1896.77	146.02
BANK OF AMERICA, NATIONAL ASSOCIATION	22.02	1.49%	12.41%	6.84	15.18	1474.08	177.46
CITIBANK, N.A.	21.90	1.67%	14.85%	20.93	0.97	1313.40	147.51
U.S. BANK NATIONAL ASSOCIATION	15.58	4.51%	40.86%	6.45	9.13	345.09	38.13
PNC BANK, NATIONAL ASSOCIATION	12.21	4.14%	33.66%	2.97	9.24	295.03	36.27
STATE STREET BANK AND TRUST COMPANY	7.64	3.49%	38.82%	7.63	0.01	218.66	19.68
BANK OF NEW YORK MELLON, THE	6.21	2.20%	31.49%	6.13	0.07	282.44	19.70
BRANCH BANKING AND TRUST COMPANY	6.04	3.39%	33.12%	2.34	3.70	178.03	18.22
TD BANK, N.A.	5.10	2.50%	18.22%	0.00	5.10	203.99	27.98
COMPASS BANK	4.12	5.96%	37.75%	1.50	2.62	69.08	10.91
FROST BANK	3.43	14.79%	142.85%	3.30	0.12	23.19	2.40
SUNTRUST BANK	3.35	1.98%	15.78%	0.26	3.10	169.08	21.25

FIRST REPUBLIC BANK	3.30	9.61%	97.23%	2.59	0.71	34.39	3.40
BMO HARRIS BANK NATIONAL ASSOCIATION	2.39	2.51%	16.80%	1.95	0.45	95.26	14.25
FIRST SECURITY BANK	2.20	51.10%	413.57%	2.20	0.00	4.31	0.53
SOVEREIGN BANK, NATIONAL ASSOCIATION	2.07	2.50%	16.15%	2.06	0.01	83.08	12.85
UMB BANK, NATIONAL ASSOCIATION	2.07	14.06%	194.41%	2.02	0.05	14.69	1.06
CAPITAL ONE, NATIONAL ASSOCIATION	2.02	0.81%	5.51%	0.09	1.93	250.96	36.64
COMMERCE BANK	1.96	8.91%	98.87%	1.63	0.33	22.02	1.98
MB FINANCIAL BANK, NATIONAL ASSOCIATION	1.39	14.56%	103.26%	0.96	0.43	9.55	1.35
FIRSTBANK	1.34	10.46%	130.37%	1.22	0.13	12.84	1.03
KEYBANK NATIONAL ASSOCIATION	1.26	1.45%	13.79%	0.05	1.21	87.04	9.15
GLACIER BANK	1.25	16.27%	130.88%	1.21	0.04	7.68	0.95
WELLS FARGO BANK NORTHWEST, NATIONAL ASSOCIATION	1.11	6.58%	66.43%	1.11	0.00	16.82	1.67
ASSOCIATED BANK, NATIONAL ASSOCIATION	1.07	4.62%	35.43%	0.84	0.23	23.26	3.03
FIRST NIAGARA BANK, NATIONAL ASSOCIATION	1.02	2.78%	19.82%	0.61	0.42	36.88	5.17
WESTAMERICA BANK	1.01	20.56%	189.08%	0.90	0.11	4.91	0.53
BOF, NATIONAL ASSOCIATION	1.01	3.60%	42.71%	0.50	0.50	27.93	2.36

(Continued)

Table 2: Bank-Reported Municipal Loan and Securities Portfolios, December 31, 2012 (50 Banks with Largest portfolios of Municipal Investments) (Continued)

Name	Municipal Debt	As Share of Total Assets	As Share of Total Equity	Securities	Loans	Total Bank Assets	Total Equity
REGIONS BANK	0.99	0.83%	6.02%	0.00	0.99	120.42	16.51
OLD NATIONAL BANK	0.98	10.48%	93.01%	0.75	0.24	9.39	1.06
FIRST FINANCIAL BANK, NATIONAL ASSOCIATION	0.94	20.97%	205.07%	0.83	0.11	4.47	0.46
BANCO SANTANDER PUERTO RICO	0.87	12.08%	110.21%	0.00	0.87	7.20	0.79
FIFTH THIRD BANK	0.83	0.70%	5.60%	0.51	0.32	119.44	14.92
SUSQUEHANNA BANK	0.83	4.63%	30.53%	0.44	0.40	17.97	2.73
BANCO POPULAR DE PUERTO RICO	0.80	2.92%	28.29%	0.15	0.64	27.20	2.81
BANK OF HAWAII	0.78	5.68%	80.03%	0.78	0.00	13.77	0.98
SOUTHSIDE BANK	0.77	23.76%	250.83%	0.55	0.22	3.23	0.31
NATIONAL PENN BANK	0.74	8.90%	66.11%	0.70	0.05	8.35	1.12
CITY NATIONAL BANK	0.74	2.63%	30.83%	0.71	0.04	28.26	2.41
COMMUNITY BANK, NATIONAL ASSOCIATION	0.74	9.88%	78.93%	0.73	0.01	7.47	0.94

FARMERS AND MERCHANTS BANK OF LONG BEACH	0.73	14.58%	101.43%	0.73	0.00	4.99	0.72
FIRSTMERIT BANK, N.A.	0.71	4.74%	51.31%	0.54	0.17	14.90	1.38
TRUSTMARK NATIONAL BANK	0.69	7.14%	53.03%	0.25	0.44	9.72	1.31
BROADWAY NATIONAL BANK	0.68	24.04%	200.53%	0.55	0.13	2.81	0.34
FIRST MIDWEST BANK	0.67	8.43%	64.71%	0.55	0.12	7.98	1.04
ZIONS FIRST NATIONAL BANK	0.66	3.67%	36.55%	0.47	0.19	17.93	1.80
BANK OF THE WEST	0.65	1.03%	5.62%	0.60	0.05	63.34	11.64
WESBANCO BANK, INC.	0.65	10.69%	82.15%	0.60	0.05	6.07	0.79
CITIZENS BUSINESS BANK	0.63	9.84%	77.32%	0.63	0.00	6.36	0.81
Source: Reports of Income and Condition (Call Reports) for December 31, 2012.							

OLS empirical specification, fit a Tobit model, which accounts for the fact that municipal bond portfolio shares are censored at (i.e., cannot go below) zero. The most consistent result is that lagged muni assets explain a significant part of the current holdings. Although the largest banks described in Figure 7 had seen a reversal in muni holdings, this does not characterize the larger cross-section of the data. The banks that have the largest municipal portfolios today are the same banks that had large portfolios in 2008 or 2000.

Table 4 shows the observations that represent significant prediction “errors” based on the empirical model of Figure 7. This figure highlights the unusual circumstances of JPMorgan and Citibank. Although the empirical fit of the model in the cross section is quite high, it does a poor job of fitting the behavior of these institutions. The model predicts that JPMorgan would allocate 0% to municipal debt in 2012, \$31 billion less than their actual allocation. The model predicts that Citibank would allocate 3.21% of its portfolio to municipal bonds, which is \$22 billion more than the bank’s actual allocation.

Table 5 shows some evidence on the correlation between municipal market returns and bank stock returns during the 2010–2012 period. There is some evidence that during the period since 2010, there has been a correlation between daily returns to bank stocks and the daily estimated return to the 1-year AAA-rated municipal bond index.¹³ The dependent variable in all but one column of Table 5 is the daily return to the S&P 500 bank stock subindex. The third column uses disaggregated bank stock return data, using the sample of banks from Table 4. Independent variables include the S&P 500 index return and measures of returns to 1-year and 10-year swaps and Treasuries, as well as a measure of the return of Aaa-rated and Baa-rated corporate bonds. The model in column (1) does not include a muni market measure. Only the coefficient on the S&P 500 market index is statistically significant, and this coefficient estimate suggests that banks have had a S&P 500 market loading of somewhat higher than one during 2010–2012.

Model (2) includes measures of the municipal market return, based on the Bloomberg municipal AAA GO curve. The return is constructed using the daily change in the one-year point on this yield curve; because the specification already includes the change in Treasury yields at that maturity, the results can be interpreted as reflecting aggregate bank exposure to tightening and widening of AAA municipal spreads.

¹³ This series comes from Bloomberg. The daily return series is based on the daily change in the reported AAA-rated 1-year GO index yield.

Table 3: Determinants of June 2012 Bank Municipal Portfolio Shares

Dependent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged Bank Capital/Lagged Total Assets	0.026* (0.016)	-0.011 (0.017)	-0.046*** (0.018)	-0.052* (0.029)	0.015 (0.017)	-0.029 (0.018)	-0.065*** (0.019)	-0.072** (0.031)
Lagged Muni Interest/Lagged Muni Assets	-0.02 (0.035)	0.036 (0.051)	0.015 (0.014)	-0.010 (0.119)	-0.014 (0.036)	0.047 (0.054)	0.015 (0.014)	0.001 (0.124)
Lagged Muni Assets/Lagged Total Assets	1.109*** (0.016)	1.026*** (0.017)	0.096*** (0.018)	0.779*** (0.023)	1.133*** (0.016)	1.054*** (0.018)	0.099*** (0.018)	0.819*** (0.024)
Lagged Log Bank Size (Assets)	-0.007*** (0.001)	-0.008*** (0.001)	-0.008*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)	-0.008*** (0.001)	-0.008*** (0.001)	-0.006*** (0.001)
Constant	0.104*** (0.008)	0.128*** (0.009)	0.134*** (0.009)	0.126*** (0.013)	0.104*** (0.008)	0.127*** (0.009)	0.133*** (0.009)	0.113*** (0.014)
Date of independent variables	June 2008	June 2007	June 2006	June 2000	June 2008	June 2007	June 2006	June 2000
Model	OLS	OLS	OLS	OLS	Tobit	Tobit	Tobit	Tobit
N	5,051	5,007	4,959	4,688	5,051	5,007	4,959	4,688
R2	0.5225	0.4406	0.4019	0.2172				

Note: Sample includes commercial banks in Call Report/FFIEC databases. With respect to bank mergers, figures for earlier periods are calculated based on aggregate totals for all predecessor institutions.

Table 4: Notable Observations: Model-Predicted and Actual Municipal Debt Holdings						
Name	Muni Assets	Total Assets	Actual Muni Share (June 2012)	Model-Predicted Muni Share (June 2012)	Residual (%)	Residual (\$)
<i>Observations for which June 2012 municipal debt holdings are higher than predicted by model</i>						
JPMORGAN CHASE BANK, NATIONAL ASSOCIATION	31,300,000	1,810,000,000	1.73%	0.00%	1.73%	31,300,000
WELLS FARGO BANK, NATIONAL ASSOCIATION	33,000,000	1,180,000,000	2.79%	1.12%	1.67%	19,700,000
U.S. BANK NATIONAL ASSOCIATION	14,300,000	343,000,000	4.18%	1.92%	2.26%	7,754,344
BANK OF NEW YORK MELLON, THE	5,686,000	259,000,000	2.19%	0.08%	2.11%	5,474,403
BRANCH BANKING AND TRUST COMPANY	6,107,131	174,000,000	3.52%	0.70%	2.82%	4,896,209
STATE STREET BANK AND TRUST COMPANY	7,393,515	197,000,000	3.75%	1.40%	2.35%	4,636,863
FROST BANK	2,407,894	20,900,000	11.51%	2.26%	9.24%	1,934,314
COMPASS BANK	3,707,916	66,000,000	5.62%	2.81%	2.81%	1,853,055
CAPITAL ONE, NATIONAL ASSOCIATION	1,693,290	158,000,000	1.07%	0.00%	1.07%	1,693,290
FIRST SECURITY BANK	2,095,804	4,207,680	49.81%	13.21%	36.60%	1,540,053
<i>Observations for which 2012 municipal debt holdings are higher than predicted by model</i>						
FIRSTBANK	1,366,948	12,000,000	11.34%	17.76%	-6.42%	(773,101)
MANUFACTURERS AND TRADERS TRUST COMPANY	577,138	79,800,000	0.72%	1.86%	-1.13%	(905,346)
RABOBANK, NATIONAL ASSOCIATION	53,000	11,800,000	0.45%	9.35%	-8.90%	(1,053,212)
GOLDMAN SACHS BANK USA	18,000	115,000,000	0.02%	1.95%	-1.93%	(2,214,952)
NORTHERN TRUST COMPANY, THE	563,559	94,200,000	0.60%	3.35%	-2.75%	(2,594,294)
FIRST NIAGARA BANK, NATIONAL ASSOCIATION	972,208	35,100,000	2.77%	10.26%	-7.49%	(2,626,237)
TD BANK, N.A.	4,232,702	196,000,000	2.16%	3.78%	-1.62%	(3,168,727)
HSBC BANK USA, NATIONAL ASSOCIATION	349,323	194,000,000	0.18%	4.30%	-4.12%	(7,986,155)
BANK OF AMERICA, NATIONAL ASSOCIATION	19,900,000	1,450,000,000	1.37%	2.42%	-1.05%	(15,100,000)
CITIBANK, N.A.	20,900,000	1,350,000,000	1.55%	3.21%	-1.66%	(22,400,000)

Table 5: Determinants of S&P Bank Index Returns, 2012 and 2000-2006

Dependent variable is daily percent return to S&P bank index. Empirical model fits this daily return by the independent variables listed. Treasury and swap returns based on change in yield on constant-maturity Treasury index and constant-maturity swap rate, reported by Federal Reserve Board. Return to Lehman/Barclays Aggregate based on daily return to Vanguard mutual fund tracking that index.

Sample	2010-2012	2010-2012	2010-2012	2010-2012	2010-2012	2010-2012	2010-2012	2010-2012	2010-2012	2010-2012	2000-2012
Dependent Variable	S&P Bank Index Daily Return	S&P Bank Index Daily Return	Bank-Level Data; Daily Return	S&P Bank Index Daily Return	S&P Bank Index Daily Return	S&P Bank Index Daily Return	S&P Bank Index Daily Return	S&P Bank Index Daily Return	S&P Bank Index Daily Return	S&P Bank Index Daily Return	S&P Bank Index Daily Return
S&P 500 index return	1.370*** (0.039)	1.376*** (0.039)	1.266*** (0.015)	1.378*** (0.039)	1.371*** (0.039)	1.370*** (0.039)	1.370*** (0.039)	1.370*** (0.039)	1.370*** (0.039)	1.370*** (0.039)	1.400*** (0.024)
Return to 1-year Treasury	0.888 (3.002)	0.886 (2.994)	4.785*** (1.137)	0.757 (2.997)	0.84 (3.005)	0.88 (3.005)	0.882 (3.006)	0.851 (3.004)	0.851 (3.004)	0.851 (3.004)	1.729* (0.920)
Return to 10-year Treasury	0.007 (0.241)	0.029 (0.240)	0.044 (0.091)	0 (0.241)	0.006 (0.241)	0.01 (0.243)	0.009 (0.243)	-0.004 (0.242)	-0.004 (0.242)	-0.004 (0.242)	-0.016 (0.182)
Return to 1-year swap	1.621 (2.176)	1.665 (2.170)	2.090*** (0.825)	1.527 (2.172)	1.645 (2.178)	1.613 (2.178)	1.623 (2.177)	1.653 (2.177)	1.653 (2.177)	1.653 (2.177)	-2.094** (0.862)
Return to 10-year swap	0.021 (0.199)	-0.002 (0.199)	-0.097 (0.075)	0.023 (0.199)	0.024 (0.199)	0.021 (0.199)	0.021 (0.199)	0.024 (0.199)	0.024 (0.199)	0.024 (0.199)	0.447*** (0.138)
Return to Corp AAA	0.074 (0.217)	0.093 (0.217)	-0.108 (0.082)	0.072 (0.217)	0.076 (0.217)	0.072 (0.218)	0.073 (0.218)	0.082 (0.218)	0.082 (0.218)	0.082 (0.218)	0.445** (0.183)

(Continued)

Table 5: Determinants of S&P Bank Index Returns, 2012 and 2000-2006 (Continued)

Return to Corp BBB	-0.165 (0.259)	-0.168 (0.259)	0.089 (0.098)	-0.149 (0.259)	-0.168 (0.260)	-0.167 (0.260)	-0.166 (0.260)	-0.163 (0.260)	-1.011*** (0.203)
Return to 1-year AAA GO Muni index		5.923** (2.581)	6.734*** (0.980)						2.681** (1.171)
Return to 1-year A GO Muni index				3.684* (1.896)					
Return to 1-year BBB GO Muni index					-0.724 (1.538)				
Return to 10-year AAA GO Muni index						-0.019 (0.158)			
Return to 10-year A GO Muni index							-0.012 (0.172)		
Return to 10-year BBB GO Muni index								0.095 (0.164)	
Constant	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
N	754	754	33,650	754	754	754	754	754	3,269
R2	0.7448	0.7466	0.2801	0.7461	0.7449	0.7448	0.7448	0.7449	0.5502

The coefficient estimate using the AAA GO index is large, and the estimate is significant at the 5% confidence level. This high loading could reflect a number of factors. First, it could reflect direct exposure of bank equity to municipal market performance through the impact on their portfolios. The large magnitude of the coefficient suggests that other factors may also be at play. For example, if tightening and widening AAA municipal spreads reflect economic activity that is correlated with bank equity performance, then the coefficient may reflect joint causation by this underlying factor. But it is important to note that this regression already includes controls for changes in the overall stock market, as well as Treasury, swaps, and aggregate bond markets, so this would need to be a chain of causation not captured by these controls. Another factor at work may be reverse causation—if 1-year municipal yields are being driven in part by the SIFMA Municipal Swap Index, reflecting yields on 7-day VRDOs with AA bank LOC support, then changes in bank credit quality may be driving the change in municipal yields, rather than the other way around. Given the importance of the name of the LOC support bank to VRDO trading performance, this is very plausible.

The remaining columns use different measures of municipal market returns as the dependent variable. These measures include returns based on the A-rated GO index, the BBB-rated GO index, and returns based on the 10-year point on the yield curve. Across all of the specifications, the AAA-1-year muni index appears to have the strongest correlation with the performance of the bank stock index during the 2010–2012 period.

CONCLUSION

Particularly since the financial crisis and the ensuing expiration of significant amounts of bank liquidity agreements supporting VRDOs, bank direct investment in municipal debt has increased significantly as a percentage of total municipal debt outstanding. The increase brings to the fore important questions of disclosure, liquidity, regulation, and transparency for players in the municipal market; importantly, the question of what qualifies as a “loan” versus a “security” is not wholly resolved.

To provide historical context to this increase and instead of relying on disparate municipal disclosures, we use Call Report data from the FDIC and Federal Reserve Flow of Funds data filed by commercial banks to analyze this activity. With a few notable exceptions, we find that a strong predictor of bank 2012 municipal holdings is, in fact, prior year holdings; the direct-investment players are in general not new to municipal assets. We also find an emerging correlation between bank equity returns and short-term municipal market returns.



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