

Changes in the Municipal Capital Markets since the Financial Crisis

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Abstract

The financial crisis of 2007-2009 and the policy changes that followed in its wake have impacted all financial markets in the United States including the municipal securities market. This paper aims to systematically analyze the changes in the structure, functioning, and regulation of the American municipal securities market. We also describe the impact and implications of a number of important events and policy changes that have impacted the municipal securities market during this period. The paper concludes with a discussion of potential future developments in the municipal market including tax reform possibilities, a significant new federal infrastructure investment initiative, the emerging market for social impact and green bonds, and the development of new analytical approaches and tools within the municipal securities market. Two themes run through the analysis. The first theme is the role that academic research has and can play in the functioning and regulation of the municipal market. The second theme considers how developments in technology and regulation – both past and prospective – may change the ways in which municipal capital markets operate.

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“Changes in the Municipal Capital Markets since the Financial Crisis” Description of Data Tables and Findings/Observations	
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Table 1. Municipal bond issuance, 2000-2016.	<ul style="list-style-type: none"> • Decline in municipal bond issuance from immediate pre-crisis and post crisis periods • Decline in average municipal bond size from immediate pre-crisis and post crisis periods
Table 2. Bond issuance by new/refunding/restructuring status, 2000-2016.	<ul style="list-style-type: none"> • Sizeable increase in refunding bonds as percentage of all new bond sales in post crisis period
Table 3. Monthly Long Term Municipal Bond Issuance, Build America Bonds, 2009 and 2010 (\$ in billions)	<ul style="list-style-type: none"> • BABs drove increase in overall issuance in 2009/2010 • BABs drove increase in taxable issuance in 2009/2010
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Table 6. Credit ratings of municipal bonds at time of issuance.	<ul style="list-style-type: none"> • Spike up in bonds sold without ratings right after crisis but has normalized to pre-crisis level • Rapid decline in bond insurance post-crisis • Declines in bonds sold with AAA rating as rated by S&P
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Table 15. Lead underwriter league tables, 2000-2016, based on dollar issuance amounts.	<ul style="list-style-type: none"> • Market concentration has grown in recent years at national level over 2000-2016 period • Market concentration static at state level
Table 16. Financial advisor league tables, 2000-2016, based on dollar issuance amounts.	<ul style="list-style-type: none"> • Market concentration has grown in recent years at national level over 2000-2016 period • Market concentration has declined at state level over 2000-2016 period
Table 17. Spread between offering price and average price at which bonds sold to customers in first 30 days post-issuance.	<ul style="list-style-type: none"> • Extent of underpricing dependent on bond size • Larger bonds had more underpricing during 2009-2010 but not in other periods
Table 18. Number of interdealer trades in first 30 days post-issuance.	<ul style="list-style-type: none"> • Significant spike in number of interdealer trades in 2008 and staying steady through 2016
Table 19. Market-adjusted price change days 0-30 comparing sets of issuers by number of trades in interdealer market	<ul style="list-style-type: none"> • Bonds with two or more interdealer trades associated with significant larger underpricing compared with bonds with 1 or fewer interdealer trades on a gross differential basis as well as after controlling for other factors • Differential spread pretty consistent throughout 2000-2016 period
Table 20. Market-adjusted price change days 0-30 comparing sets of issuers by competitive/negotiated	<ul style="list-style-type: none"> • Bonds sold via negotiated method associated with greater underpricing than bonds sold by competitive method on a gross differential basis as well as after controlling for other factors • Differential spread accelerated in post crisis period but has begun to normalize to pre-crisis levels
Table 21. Market-adjusted price change days 0-30 comparing sets of issuers by underwriter size.	<ul style="list-style-type: none"> • Bonds sold by larger underwriters associated with lower underpricing than bonds sold by smaller underwriters on a gross differential basis as well as after controlling for other factors • Differential spread pretty consistent throughout 2000-2016 period
Table 22. Market-adjusted price change days 0-30 comparing sets of issuers by financial advisor size.	<ul style="list-style-type: none"> • Bonds sold by larger financial advisors associated with lower underpricing than bonds sold by smaller financial advisors on a gross differential basis as well as after controlling for other factors • Differential spread pretty consistent throughout 2000-2016 period
Table 23. Market-adjusted price change days 0-30 comparing sets of issuers by bonds with high versus low explicit issuance costs	<ul style="list-style-type: none"> • Bonds sold with high explicit issuance costs associated with lower underpricing than bonds sold with low explicit issuance costs after controlling for other factors • Differential after controlling for other factors was higher in the immediate post crisis period but has normalized to pre-crisis levels in recent years
Table 24. Effective percent spread on secondary market municipal bond trades. Unweighted. Small (<1M par) trades.	<ul style="list-style-type: none"> • Spread on small trades have declined significantly over the time period with the exception of 2009-2010 blip • Spread on small trades still significantly higher than spread on large trades

Table 25. Effective percent spread on secondary market municipal bond trades. Unweighted. Large (>=1M par trades.)	<ul style="list-style-type: none">• Spread on large trades have increased steadily over the 2000-2016 period• Spread on large trades still significantly lower than spread on small trades
Table 26. Duration and structure of secondary market municipal bond trades.	<ul style="list-style-type: none">• Number of interdealer trades in secondary market has increased steadily and significantly over the 2000-2016 period
Table 27. Municipal bond defaults by type, 2000-2016.	<ul style="list-style-type: none">• Number and type of municipal bond defaults increased significantly during the financial crisis and in the immediate post-crisis period• The number of defaults in 2016 (165) represent a similar amount as in the immediate post-crisis period• On an absolute basis, the number of defaults still represent a tiny fraction of bonds outstanding in the municipal securities market

Table 1. Municipal bond issuance, 2000-2016.

Source of data is the Mergent Fixed Income database.

	Bond dollar amount (\$Billions par)	Issue count	Bond count	Average issue size (\$000 par)	Average bond size (\$000 par)	Note: % change in par issuance from 2000	Note: % change in par issuance from 2005
2016	470.1	15,075	158,551	31,183	2,965	135.6%	-1.7%
2015	446.1	14,782	151,431	30,176	2,946	123.6%	-6.7%
2014	375.3	13,309	124,556	28,196	3,013	88.1%	-21.5%
2013	388.6	13,853	127,209	28,048	3,054	94.7%	-18.8%
2012	467.2	16,615	155,728	28,118	3,000	134.2%	-2.3%
2011	394.3	14,034	121,930	28,093	3,233	97.6%	-17.6%
2010	547.3	17,670	149,531	30,972	3,660	174.3%	14.4%
2009	532.5	15,079	141,345	35,314	3,767	166.9%	11.3%
2008	525.8	14,537	116,529	36,169	4,512	163.5%	9.9%
2007	538.4	16,353	143,820	32,923	3,743	169.8%	12.6%
2006	461.4	16,444	150,560	28,057	3,064	131.2%	-3.5%
2005	478.2	16,819	176,709	28,434	2,706	139.7%	
2004	432.7	16,322	162,338	26,508	2,665	116.9%	
2003	435.9	16,246	178,176	26,829	2,446	118.5%	
2002	398.2	15,163	168,954	26,259	2,357	99.6%	
2001	303.4	13,629	153,089	22,263	1,982	52.1%	
2000	199.5	10,355	108,466	19,268	1,839		
>= 2011	2,541.4	87,668	839,405	28,989	3,028		
2008-2010	1,605.6	47,286	407,405	33,954	3,941		
<= 2007	3,247.6	121,331	1,242,112	26,767	2,615		
ALL YEARS	7,394.6	256,285	2,488,922	28,853	2,971		

Note: Issuance includes all bonds, except for a small number of instruments labeled by Mergent as derivative instruments.

Table 2. Bond issuance by new/refunding/restructuring status, 2000-2016.

Source of data is the Mergent Fixed Income database.

Period	Total Bond Count	Bond Dollar Amount (\$Billions)	Percentage of bonds identified by Mergent as new issuance		Percentage of bonds identified by Mergent as refunding bonds		Percentage of bonds identified by Mergent as "Other" - largely restructurings of variable-rate bonds	
			Weighed by par		Weighted by par		Weighted by par	
			Bond-weighted	value	Bond-weighted	value	Bond-weighted	value
2016	156,390	470	41.493	39.568	58.323	58.684	0.184	1.748
2015	149,027	446	42.498	40.157	57.229	56.175	0.273	3.668
2014	123,181	375	48.109	44.542	51.626	51.842	0.265	3.617
2013	124,827	389	47.184	51.048	52.393	44.509	0.423	4.443
2012	153,629	467	33.579	40.215	65.875	53.758	0.546	6.027
2011	120,501	394	45.484	48.030	53.679	42.293	0.837	9.677
2010	147,300	547	49.019	56.649	50.079	36.115	0.902	7.236
2009	138,253	533	56.713	60.530	42.208	33.274	1.079	6.196
2008	113,973	526	63.429	48.930	34.198	38.622	2.373	12.449
2007	140,794	538	62.503	59.753	36.945	35.805	0.553	4.442
2006	147,496	461	60.846	61.661	38.645	34.797	0.509	3.542
2005	174,619	478	52.427	52.362	47.138	43.444	0.435	4.194
2004	159,830	433	65.063	66.720	34.572	29.542	0.365	3.738
2003	174,955	436	56.652	59.691	42.979	36.471	0.369	3.838
2002	165,301	398	60.528	57.776	39.123	38.282	0.349	3.942
2001	149,208	303	66.231	61.097	33.487	36.801	0.281	2.102
2000	104,986	200	84.225	77.332	15.154	19.134	0.621	3.533
>=2011	856,962	2637	43.106	43.759	56.489	51.481	0.405	4.760
2008-2010	399,526	1606	55.792	55.408	42.825	35.994	1.383	8.598
<=2007	2,201,176	5631	64.245	60.591	35.281	36.679	0.473	2.729
All years	3,457,664	9873	58.029	55.252	41.409	40.521	0.562	4.226

Note. Other/unknown category is mostly refinancing floating-rate debt.

Table 3. Monthly Long Term Municipal Bond Issuance, Build America Bonds, 2009 and 2010 (\$ in billions)

Table based on SIFMA database and US Treasury Department data. Numbers may differ from those based on Mergent data.

	% of BABs					% of BABs					
	Build America Bonds	Total U.S. Municipal Bond Issuance	to Total Municipal Bond Issuance	BAB General Obligation Bonds	BAB Revenue Bonds	Build America Bonds	Total U.S. Municipal Bond Issuance	to Total Municipal Bond Issuance	BAB General Obligation Bonds	BAB Revenue Bonds	
Jan-09		23.2				Jan-10	7	32.7	21.55%	3.3	3.8
Feb-09		23.4				Feb-10	7.1	27.2	26.25%	3.5	3.7
Mar-09		38.9				Mar-10	12.6	44.4	28.41%	5.2	7.4
Apr-09	7.9	36.8	21.34%	5.5	2.4	Apr-10	6.5	27.4	23.82%	2.7	3.8
May-09	2.7	30.4	8.89%	0.6	2.1	May-10	9.3	38.3	24.22%	3.2	6.1
Jun-09	5	43.8	11.47%	1.3	3.8	Jun-10	9.4	34.7	26.98%	3.7	5.7
Jul-09	3.6	26.1	13.69%	1.1	2.5	Jul-10	6.4	29.1	22.15%	2.6	3.9
Aug-09	9.6	36.4	26.51%	4	5.6	Aug-10	5.4	29.2	18.41%	2.3	3.1
Sep-09	6.7	30	22.43%	3.1	3.7	Sep-10	9.4	35.5	26.52%	2.9	6.5
Oct-09	12.9	46.4	27.86%	6.2	6.7	Oct-10	12.6	45.6	27.65%	3.3	9.3
Nov-09	7.6	38.3	19.88%	3.1	4.5	Nov-10	16.1	45.2	35.60%	6.8	9.2
Dec-09	8.1	36.1	22.34%	3.8	4.3	Dec-10	15.4	40.9	37.65%	4.1	11.3
Total 2009	64.1	409.7	15.65%	28.7	35.5	Total 2010	117.3	430.1	27.27%	43.6	73.7

Note. SIFMA and Treasury counts of municipal bonds differ from counts in Mergent database.

Table 4. Annual State or Territory Municipal Bond Sales by Par Amount, 2000-2005.

Table based on Mergent database, years 2000 through 2009, in billions of dollars par amount.

Rank		2000		2001		2002		2003		2004		2005
1	CA	23.2	CA	30.0	NY	59.0	CA	73.1	CA	69.9	CA	70.2
2	NY	19.9	TX	25.8	CA	54.0	NY	45.6	NY	44.0	NY	51.9
3	TX	14.7	NY	24.5	TX	26.8	TX	32.0	TX	36.0	TX	43.0
4	FL	10.5	IL	14.3	IL	21.2	IL	24.5	NJ	18.2	FL	22.0
5	IL	10.1	FL	13.8	FL	19.4	FL	21.7	IL	16.2	NJ	20.9
6	MA	9.3	PA	13.8	PA	15.7	NJ	18.8	MN	15.7	PA	18.7
7	NJ	8.9	OH	10.8	MA	13.4	PA	15.8	MA	15.7	IL	18.3
8	PA	6.6	MI	10.3	NJ	11.4	MI	12.5	PA	15.2	MA	17.5
9	OH	5.3	MA	10.1	MI	9.5	MA	10.7	FL	14.2	MI	17.4
10	GA	5.3	NJ	10.0	OH	8.8	OH	10.4	OH	11.5	OH	12.9
11	MI	5.1	WA	9.0	WA	8.8	WA	8.4	MI	10.5	AZ	10.9
12	PR	4.8	VA	6.3	GA	8.6	VA	7.6	CO	9.3	VA	10.8
13	MN	4.6	PR	6.3	AZ	7.5	NC	7.6	IN	8.5	WA	10.4
14	CO	4.4	MO	6.3	WI	7.4	OR	7.1	WA	8.3	IN	9.9
15	WA	4.2	CO	6.1	MN	7.4	MD	7.0	GA	8.2	CO	9.1

Table 4 (continued). Annual State or Territory Municipal Bond Sales by Par Amount, 2006-2011.

Table based on Mergent database, years 2006 through 2011, in billions of dollars par amount.

Rank		2006		2007		2008		2009		2010		2011
1	CA	63.6	CA	98.3	CA	75.9	CA	96.0	CA	111.1	CA	59.6
2	NY	49.2	TX	59.5	TX	59.2	NY	54.8	NY	57.3	NY	58.5
3	TX	46.1	NY	50.7	NY	57.1	TX	42.9	TX	47.7	TX	36.6
4	FL	30.5	FL	32.9	FL	28.3	PA	23.6	IL	30.4	NA	21.1
5	IL	22.3	NA	26.3	NA	27.6	NJ	19.0	PA	23.8	NJ	18.2
6	PA	19.5	PA	23.3	IL	23.8	FL	18.2	FL	22.7	IL	14.7
7	NJ	16.8	IL	22.0	PA	22.4	IL	18.2	NJ	21.1	PA	14.5
8	OH	15.5	NJ	20.8	MA	19.8	OH	15.0	NA	18.6	FL	14.4
9	MI	15.2	OH	20.4	NJ	19.0	MA	13.6	OH	18.2	MA	13.4
10	MO	14.5	PR	19.0	OH	16.3	GA	12.6	MA	16.2	MI	10.6
11	MA	12.1	MA	16.8	PR	15.1	WA	11.5	WA	12.9	PR	10.1
12	TN	11.9	MI	12.9	MI	13.4	MI	10.9	MI	12.8	OH	9.2
13	IN	11.8	WA	12.0	IN	13.1	NC	10.9	GA	10.8	WA	9.2
14	CO	11.4	GA	11.2	GA	11.6	VA	10.6	PR	10.1	GA	8.2
15	WA	10.5	AZ	11.0	CO	11.6	IN	9.4	CO	9.5	CT	6.8

Table 4 (continued). Annual State or Territory Municipal Bond Sales by Par Amount, 2012-2016.

Table based on Mergent database, years 2012 through 2016, in billions of dollars par amount.

Rank	2012	2013	2014	2015	2016					
1	CA	66.7	CA	64.2	CA	54.7	CA	61.9	CA	68.2
2	NY	63.7	NY	51.1	TX	47.3	NY	52.6	NY	56.3
3	TX	50.8	TX	40.2	NY	46.2	TX	49.8	TX	53.3
4	NA	22.0	NJ	21.7	NJ	15.2	FL	20.5	PA	21.1
5	NJ	21.1	IL	13.7	IL	14.2	MD	20.2	IL	21.0
6	FL	19.5	FL	13.5	MA	13.5	PA	18.6	NJ	19.3
7	PA	18.5	OH	12.7	FL	13.5	NJ	16.3	FL	18.4
8	IL	18.5	PA	11.8	OH	12.1	IL	14.8	MA	17.4
9	WA	13.3	NA	11.3	PA	11.4	WA	14.4	MI	14.2
10	OH	13.3	MA	10.9	MI	10.4	MA	13.5	OH	12.6
11	MA	12.9	WA	8.7	NA	8.9	NA	13.4	NA	11.9
12	VA	11.8	IN	7.8	WA	8.7	MI	12.4	WI	10.9
13	MI	11.6	CT	7.1	CT	7.9	OH	9.9	WA	10.4
14	CO	9.6	VA	7.0	IN	7.5	CT	8.7	MN	9.7
15	GA	8.3	CO	7.0	MD	7.3	GA	8.2	CT	9.3

Table 5. Bond issuance, taxable and non-taxable, 2000-2016.

Data from Mergent.

Period	Bond Count	Size- weighted				Raw Bond Size	Size- weighted Maturity	Size- weighted Spread	Size- weighted		
		Bond Dollar	Raw Pct.	Bonds	Pct. Bonds				Raw Average	Average Maturity	Average Tax
		Amount	Taxable	Taxable	Taxable				Bond Size Tax	Taxable	Taxable
2016	158,551	470	13.0	14.5	3,455,573	14.318	1.065	2,940,968	13.833	0.504	
2015	151,431	446	13.1	13.9	3,176,456	14.797	1.144	2,965,538	13.333	0.484	
2014	124,556	375	13.5	14.5	3,305,205	14.520	0.786	3,006,376	13.406	0.320	
2013	127,209	389	16.9	18.0	3,326,095	14.486	0.806	3,069,514	13.763	0.286	
2012	155,728	467	15.7	16.0	3,093,531	15.312	0.889	3,031,192	13.097	0.307	
2011	121,930	394	14.7	15.3	3,397,465	13.872	1.397	3,249,995	13.381	0.484	
2010	149,531	547	23.7	35.0	5,501,417	20.186	1.695	3,162,275	13.350	0.503	
2009	141,345	533	18.4	23.2	4,943,544	20.456	1.678	3,610,747	14.118	0.641	
2008	116,529	526	14.3	16.5	5,218,834	19.570	1.047	4,509,801	17.042	0.348	
2007	143,820	538	14.5	19.6	5,125,705	21.004	0.677	3,601,496	17.495	0.236	
2006	150,560	461	14.2	21.6	4,689,862	22.719	0.680	2,865,743	16.807	0.176	
2005	176,709	478	11.1	15.9	3,931,155	20.544	0.627	2,589,713	15.656	0.155	
2004	162,338	433	10.8	14.8	3,701,212	20.104	0.606	2,586,420	14.271	0.168	
2003	178,176	436	13.3	18.3	3,426,344	21.515	0.620	2,347,891	15.167	0.206	
2002	168,954	398	11.5	15.4	3,214,016	22.624	0.678	2,303,766	16.549	0.206	
2001	153,089	303	10.3	16.7	3,302,273	21.847	0.576	1,887,985	16.645	0.294	
2000	108,466	200	12.9	21.0	3,087,729	22.898	0.756	1,724,072	17.522	0.226	
>=2011	839,405	2541	14.4	15.3	3,283,547	14.574	1.009	3,035,382	13.465	0.403	
2008-2010	407,405	1606	19.2	25.0	5,257,565	20.136	1.585	3,725,507	14.958	0.504	
<=2007	1,242,112	3248	12.3	17.8	3,865,239	21.592	0.649	2,500,248	16.170	0.203	
All years	2,488,922	7395	14.1	18.5	3,973,815	19.169	1.075	2,869,494	14.962	0.339	

Note. Spread calculated relative to issuance date-matched and maturity-matched AAA GO tax exempt bond yield, sourced from Bloomberg.

Table 6. Credit ratings of municipal bonds at time of issuance.

Data come from S&P and Mergent. S&P, which capture rating at time of issuance, end in 2013. Ratings for bonds issued after 2013 come

Period	Bond count	Dollar value (\$M)	Percent of issuance (by par value)								
			Rated by S&P	AAA S&P rating	AA rating by S&P	A rating by S&P	BBB and below		No ratings	One rating at issuance	
							at issuance	Insured at issuance			
2016	156,390	470.08	74.40	15.47	43.16	11.46	4.30	9.79	20.37	63.83	5.57
2015	149,031	446.07	74.02	15.77	41.53	13.03	3.69	10.78	22.53	62.71	5.84
2014	123,181	375.26	74.70	17.28	40.24	13.08	4.11	14.18	18.49	64.42	5.29
2013	124,827	388.55	72.31	12.33	39.01	17.35	3.62	16.80	18.58	62.14	3.29
2012	153,629	467.18	71.76	13.71	36.19	16.53	5.33	15.52	18.99	62.50	3.17
2011	120,502	394.25	67.21	13.29	35.05	15.14	3.74	18.28	16.71	60.11	4.15
2010	147,303	547.27	74.15	18.71	34.46	17.48	3.50	13.33	15.49	67.30	5.42
2009	138,253	532.51	73.72	19.65	34.46	17.26	2.36	14.38	16.08	66.98	8.01
2008	113,973	525.78	70.30	28.57	29.32	9.29	3.12	14.37	19.19	62.77	19.05
2007	140,794	538.39	68.63	39.33	16.63	6.56	6.11	14.53	17.08	64.72	38.08
2006	147,496	461.36	70.53	43.41	16.73	6.80	3.58	11.01	17.46	67.09	42.88
2005	174,620	478.23	72.85	48.42	16.83	5.20	2.40	11.10	14.55	72.43	51.01
2004	159,830	432.66	68.25	45.30	15.25	4.69	3.01	11.01	14.43	72.58	45.04
2003	174,955	435.87	73.50	43.50	20.53	5.81	3.66	10.26	10.65	75.55	45.72
2002	165,301	398.17	75.36	46.47	18.62	6.49	3.79	6.55	14.50	74.81	48.60
2001	149,208	303.43	78.00	47.88	20.32	6.62	3.20	6.68	14.45	75.37	46.84
2000	104,992	199.52	73.59	43.69	22.06	6.15	1.70	9.12	17.37	69.70	41.02
>=2011	856,967	2637.22	72.76	14.82	39.51	14.25	4.17	13.82	19.27	62.98	4.61
2008-2010	399,529	1605.56	72.74	22.25	32.78	14.73	2.99	14.02	16.90	65.71	10.74
<=2007	2,201,195	5630.51	70.99	41.17	18.77	7.74	3.32	16.95	18.95	60.41	42.41
All years	3,457,691	9873.29	71.75	31.06	26.59	10.61	3.49	15.64	18.70	61.96	27.16

Table 7. Bond issuance, bank-qualified and not bank-qualified.

Period	Size-weighted				Size-weighted			Size-weighted		
	Raw Pct.		Pct. Bonds	Raw	Average	Average	Raw	Average	Average	
	Bond Count	Bond Dollar Amount	Bonds Bank-Qualified	Bank-Qualified	Bond Size	Maturity	Spread	Bond Size	Maturity	Spread not
2016	158,551	470	37.759	5.449	431,261	9.393	0.412	4,582,388	14.164	0.593
2015	151,431	446	38.924	5.736	438,371	9.164	0.321	4,637,686	13.802	0.587
2014	124,556	375	42.049	6.230	449,671	8.825	0.243	4,943,022	13.883	0.395
2013	127,209	389	44.475	6.099	424,012	8.906	0.190	5,292,470	14.217	0.391
2012	155,728	467	45.221	6.155	412,257	8.657	0.271	5,226,731	13.765	0.401
2011	121,930	394	46.277	5.824	410,297	8.296	0.384	5,752,808	13.775	0.637
2010	149,531	547	53.454	8.628	595,855	8.701	0.449	7,347,147	16.408	0.969
2009	141,345	533	50.773	8.071	606,525	8.748	0.563	7,264,168	16.189	0.894
2008	116,529	526	40.467	3.856	436,303	9.014	0.181	7,488,573	17.798	0.457
2007	143,820	538	36.292	3.794	399,006	10.561	0.091	5,780,609	18.482	0.304
2006	150,560	461	37.574	4.810	401,272	10.467	0.111	4,763,812	18.466	0.262
2005	176,709	478	36.888	4.536	336,688	10.300	0.118	4,143,253	16.727	0.217
2004	162,338	433	39.165	4.682	323,836	9.569	0.177	4,239,587	15.407	0.219
2003	178,176	436	42.542	4.867	284,854	9.910	0.074	4,126,848	16.656	0.283
2002	168,954	398	40.966	4.695	275,352	10.168	0.121	3,895,460	17.844	0.266
2001	153,089	303	42.583	5.806	277,003	11.012	0.169	3,338,570	17.916	0.339
2000	108,466	200	45.064	6.403	268,870	12.069	0.207	3,248,932	19.101	0.311
>=2011	839,405	2541	42.245	5.902	426,902	8.879	0.304	5,021,747	13.933	0.505
2008-2010	407,405	1606	48.809	6.881	561,985	8.777	0.444	7,366,634	16.806	0.792
<=2007	1,242,112	3248	39.981	4.769	318,033	10.420	0.127	4,235,296	17.473	0.270
All years	2,488,922	7395	42.190	5.617	401,333	9.427	0.279	4,951,938	16.117	0.469

Table 8. Municipal debt ownership profile, from Federal Reserve's Financial Accounts of the United States.

Data on ownership composition from Federal Reserve's Financial Accounts of the US. These accounts were previously known as the "Flow of Funds" accounts. A change in the methodology for the calculation of the accounts makes pre-2004 data not comparable to post-2004 data. Direct household holdings are calculated as a residual, and include holdings by nonprofit businesses and by hedge funds.

Year	Total municipal debt (\$ Billions)	Share (percent) held by										Note: short- term munis as share of total	
		Direct house- hold		Dep- ository inst- itutions			Money market mutual funds and		Other mutual funds and		Rest of World		
		State and local	and credit unions	P&C insurers	Life insurers	funds	ETFs	GSEs	Dealers				
2016	3,837	43.66	1.15	0.44	14.49	8.82	4.67	4.23	19.38	0.15	0.55	2.47	0.79
2015	3,796	43.23	0.70	0.43	13.31	9.11	4.51	7.07	18.76	0.22	0.37	2.30	0.86
2014	3,781	44.80	0.67	0.42	12.11	8.98	4.35	7.46	18.30	0.29	0.50	2.13	1.03
2013	3,824	47.93	0.67	0.41	11.17	8.78	3.82	8.08	16.32	0.35	0.49	1.99	1.19
2012	3,892	46.86	0.74	0.38	9.55	8.67	3.86	8.67	18.30	0.44	0.68	1.84	1.44
2011	3,899	50.43	0.72	0.38	7.79	9.15	3.43	9.20	15.71	0.54	0.79	1.86	1.34
2010	3,945	52.57	0.75	0.38	6.52	9.08	2.82	9.83	14.58	0.63	1.01	1.82	1.60
2009	3,838	52.00	0.84	0.34	5.94	10.04	1.89	11.49	14.26	0.76	0.92	1.53	1.67
2008	3,661	52.46	0.85	0.32	6.13	10.46	1.29	13.93	11.26	0.85	1.06	1.39	1.53
2007	3,546	50.23	0.97	0.32	5.75	10.67	1.23	14.02	13.18	0.94	1.41	1.27	1.45
2006	3,283	51.54	1.03	0.30	5.83	10.40	1.16	11.95	14.09	1.10	1.55	1.05	1.04
2005	3,097	52.81	1.18	0.28	5.38	10.31	1.13	11.28	14.03	1.28	1.38	0.94	1.38
2004	2,873	52.93	1.26	0.29	5.16	9.69	1.14	11.23	14.74	1.55	1.11	0.90	1.54

Note: A change in the methodology used by the Federal Reserve Board to calculate municipal bond amounts outstanding in their aggregate

Financial Accounts makes pre-2004 data not comparable to post-2004 data.

2003	1,900	32.95	2.00	0.47	7.33	12.16	1.45	16.27	22.69	2.34	1.31	1.03	5.58
2002	1,763	34.55	2.01	0.28	7.23	10.88	1.21	16.23	23.52	2.23	1.19	0.65	5.43
2001	1,603	33.87	2.05	0.35	7.80	11.08	1.20	16.82	22.94	2.21	1.19	0.50	4.40
2000	1,481	32.98	2.32	0.37	7.92	12.43	1.31	16.37	23.02	1.97	0.76	0.54	3.15

Table 9. Household holdings of municipal bonds (direct and indirect), 1989-2013 Surveys of Consumer Finances

Tables based on 1989 through 2013 Surveys of Consumer Finances, conducted by Federal Reserve Board. Measure of financial assets used to group households includes all financial assets, including retirement accounts, but does not include municipal bonds. Municipal bond values in this table include both bonds held directly and bonds held indirectly through mutual funds. Reproduced from Bergstresser and Cohen (2015).

Panel A: Percent of households reporting positive holdings of municipal debt (direct and indirect)

Financial asset percentile	2013	2010	2007	2004	2001	1998	1995	1992	1989
0-50	0.1%	0.2%	0.3%	0.4%	0.5%	0.6%	0.2%	0.1%	0.1%
50-75	0.9%	0.7%	1.2%	2.3%	2.8%	3.8%	1.8%	2.2%	2.4%
75-90	2.6%	2.6%	3.5%	5.9%	8.9%	9.6%	7.5%	6.7%	7.0%
90-95	7.3%	14.6%	9.5%	12.5%	16.1%	12.9%	18.3%	19.4%	17.1%
95-99	21.4%	24.1%	23.1%	24.4%	27.4%	25.8%	31.3%	32.2%	35.9%
99-99.5	46.4%	38.4%	55.4%	47.3%	37.8%	41.1%	47.3%	47.0%	64.6%
99.5-100	46.6%	56.4%	58.0%	41.3%	51.9%	51.8%	55.0%	61.7%	55.2%
All households	2.4%	2.8%	2.9%	3.7%	4.6%	4.8%	4.4%	4.4%	4.6%

Panel B: Household holding of municipal debt (direct and indirect) as a share of total financial assets

Financial asset percentile	2013	2010	2007	2004	2001	1998	1995	1992	1989
0-50	0.6%	1.5%	0.8%	5.9%	0.6%	1.7%	1.7%	2.7%	0.4%
50-75	2.0%	1.5%	1.4%	0.5%	1.1%	2.4%	1.5%	4.3%	2.9%
75-90	0.6%	2.1%	2.2%	2.4%	3.5%	2.5%	1.8%	2.5%	5.2%
90-95	3.0%	2.7%	2.3%	2.5%	3.5%	5.1%	3.9%	7.0%	5.1%
95-99	4.8%	6.7%	6.4%	5.0%	5.0%	3.7%	5.9%	9.9%	9.7%
99-99.5	6.5%	7.5%	7.1%	9.3%	7.7%	5.7%	14.4%	10.4%	16.9%
99.5-100	6.7%	10.0%	9.4%	8.7%	7.0%	5.7%	8.8%	9.5%	7.7%
All households	4.5%	6.1%	5.8%	5.4%	5.0%	4.3%	6.3%	7.6%	7.9%

Table 10. Bond issuance, fixed and floating-rate, 2000-2016.

Data from Mergent.

Period	Bond count	amount (\$B)	Bond par	Raw pct.	Size-weighted	Average	Raw average	Size-weighted	Raw average	Size-weighted
			dollar	Bonds fixed-coupon	pct. Bonds fixed-coupon	bond size of fixed-coupon bonds	maturity of fixed-coupon bonds	maturity of fixed-coupon bonds	Average size of floating-rate bonds	maturity of floating-rate bonds
2016	158,551	470	98.8	95.6	2,894,636	9.5	13.7	19,057,515	15.7	18.6
2015	151,431	446	98.6	94.4	2,858,091	9.3	13.1	15,134,946	14.1	21.4
2014	124,556	375	98.7	92.3	2,844,585	9.1	12.9	20,040,113	14.5	21.5
2013	127,209	389	98.0	90.2	2,856,867	9.0	13.2	17,466,128	15.0	19.9
2012	155,728	467	98.2	89.1	2,758,538	8.7	12.4	18,991,542	16.1	21.8
2011	121,930	394	97.2	85.4	2,870,278	8.6	12.1	17,843,451	16.7	21.2
2010	149,531	547	97.4	88.7	3,369,781	8.9	14.7	19,000,012	15.1	23.9
2009	141,345	533	92.7	88.0	3,622,829	9.1	14.4	7,181,758	11.6	24.5
2008	116,529	526	95.0	71.6	3,457,876	9.7	14.6	29,486,486	18.6	24.7
2007	143,820	538	95.5	77.0	3,078,301	10.3	16.0	20,257,024	19.0	25.4
2006	150,560	461	96.0	76.9	2,500,932	10.3	15.7	18,766,631	18.9	25.9
2005	176,709	478	96.9	80.2	2,266,143	9.9	14.1	17,686,879	18.6	25.9
2004	162,338	433	96.9	80.1	2,237,791	9.6	12.6	17,433,219	19.2	25.5
2003	178,176	436	97.2	80.3	2,057,315	9.5	14.1	17,620,163	19.3	25.5
2002	168,954	398	96.3	79.7	1,990,396	9.6	15.3	13,703,540	19.0	25.9
2001	153,089	303	96.5	83.5	1,755,114	9.8	16.1	10,195,416	18.4	24.5
2000	108,466	200	95.3	78.5	1,561,186	10.2	16.7	9,196,870	19.0	25.9
>=2011	839,405	2541	98.3	91.3	2,846,173	9.1	12.9	18,030,169	15.5	20.9
2008-2010	407,405	1606	95.1	82.9	3,480,498	9.2	14.6	15,976,867	14.3	24.5
<=2007	1,242,112	3248	96.4	79.3	2,193,239	9.9	14.9	15,809,024	18.9	25.6
All years	2,488,922	7395	96.8	84.2	2,625,081	9.5	14.1	16,227,600	17.1	24.4

Table 11. Bond maturity/time to first call, 2000-2016.

Period	Bond				Raw	Weighted	Raw Average	Average	Weighted	Weighted	Weighted
	Dollar	Raw Average	Weighted	Percentage	Bonds	Percentage	Minimum	Minimum	Maturity	Share	Maturity
	Bond Count	Amount	Maturity	Maturity	Callable	Callable	(Maturity, 1st Call)	(Maturity, 1st Call)	(Less than 10 years)	Share	Maturity
2016	158,551	470	9.571	13.904	44.620	58.615	6.682	7.871	39.215	60.785	
2015	151,431	446	9.376	13.536	43.786	55.449	6.590	7.743	41.883	58.117	
2014	124,556	375	9.162	13.568	43.175	55.742	6.364	7.191	42.719	57.281	
2013	127,209	389	9.160	13.893	42.364	53.869	6.370	7.299	43.769	56.231	
2012	155,728	467	8.881	13.450	40.753	52.588	6.333	7.290	44.101	55.899	
2011	121,930	394	8.864	13.456	40.377	51.877	6.277	6.370	46.227	53.773	
2010	149,531	547	9.034	15.743	38.361	43.972	6.552	9.448	39.053	60.947	
2009	141,345	533	9.277	15.588	38.725	50.757	6.737	8.380	38.486	61.514	
2008	116,529	526	10.155	17.459	44.063	56.493	6.930	8.569	29.774	70.226	
2007	143,820	538	10.725	18.182	46.769	55.610	7.311	10.372	29.034	70.966	
2006	150,560	461	10.596	18.081	47.090	54.796	7.245	10.786	26.934	73.066	
2005	176,709	478	10.161	16.435	45.227	50.375	7.179	10.436	30.573	69.427	
2004	162,338	433	9.945	15.133	43.869	44.156	7.035	9.810	37.317	62.683	
2003	178,176	436	9.804	16.328	43.568	46.357	6.952	10.687	33.333	66.667	
2002	168,954	398	9.962	17.484	42.507	53.429	7.183	10.723	28.335	71.665	
2001	153,089	303	10.114	17.515	43.656	56.748	7.285	10.195	28.717	71.283	
2000	108,466	200	10.593	18.651	46.160	59.941	7.487	10.702	24.302	75.698	
>=2011	839,405	2541	9.182	13.635	42.580	54.756	6.447	7.321	42.883	57.117	
2008-2010	407,405	1606	9.439	16.254	40.118	50.323	6.725	8.806	35.827	64.173	
<=2007	1,242,112	3248	10.204	17.136	44.734	52.061	7.191	10.454	30.237	69.763	
all years	2,488,922	7395	9.734	15.741	43.252	52.610	6.864	9.020	35.797	64.203	

Table 12. Green Bond Issuance, 2000-2016.

Data come from Mergent. Identification of Green bonds based on Official Statements.

Period	Bonds issued	Par value issued (\$B)	Green bonds issued	Green bond par value issued (\$B)	Green bond par as share of total	Average green bond issue size (\$M)
2016	156,390	470	59	7.4	1.6%	124.600
2015	149,027	446	33	3.6	0.8%	109.800
2014	123,181	375	14	2.1	0.6%	151.500
2013	124,827	389	1	0.1	0.0%	100.000
2012	153,629	467	0	0.0	0.0%	
2011	120,501	394	0	0.0	0.0%	
2010	147,300	547	0	0.0	0.0%	
2009	138,253	533	0	0.0	0.0%	
2008	113,973	526	0	0.0	0.0%	
2007	140,794	538	0	0.0	0.0%	
2006	147,496	461	0	0.0	0.0%	
2005	174,619	478	0	0.0	0.0%	
2004	159,830	433	0	0.0	0.0%	
2003	174,955	436	0	0.0	0.0%	
2002	165,301	398	0	0.0	0.0%	
2001	149,208	303	0	0.0	0.0%	
2000	104,986	200	0	0.0	0.0%	

Table 13. TIFIA Projects

Table based on data from US Department of Transportation

Active Projects

Project Name	TIFIA		Primary Revenue Pledge	FY Closed
	Project Cost (\$M)	Assistance (\$M)		
35Express	1303	285	Toll Revenues	FY2017
Parallel Thimble Shoal Tunnel Project	1074	338.5	Toll Revenues	FY2017
Northgate Link Extension	1864	615.3	Sales Tax Revenues	FY2017
Westside Purple Line Extension, Section 2	2411	307	Sales Tax Revenues	FY2017
Monroe Expressway	800	166.5	Toll Revenues	FY2017
US-183S Bergstrom Expressway	859.6	282.2	Project Revenues	FY2016
US 301	635.9	211.2	Toll Revenues	FY2016
Chicago Transit Authority Rail Fleet Replacement Project	772.5	254.9	Farebox Revenues	FY2016
State Highway (SH) 288 Toll Lanes Project	1063.5	357	Toll Revenues	FY2016
I-93 Improvements Salem to Manchester Project	811.7	200	Revenues, State or Local Appropriations	FY2016
Purple Line Project	2650	874.6	Availability Payments	FY2016
East Link Extension	4031	1330	Tax Revenues	FY2015
CTA Blue Line Project	408.7	120	Farebox Revenues	FY2015
Wekiva Parkway	587.4	193.7	Toll Revenues	FY2015
Portsmouth Bypass	634.3	209	Availability Payments	FY2015
Ohio River Bridges East End Crossing	1319	162	State or Local Appropriations	FY2015
I-77 HOT Lanes Project	635.8	189	Toll Revenues	FY2015
CATS LYNX Blue Line Extension	1160	180	State or Local Appropriations	FY2015
Goethals Bridge Replacement	1436	474	Availability Payments	FY2014
Ohio River Bridges Downtown Crossing	1452	452	User Charges	FY2014
Northwest Corridor	834	275	User Charges	FY2014
New NY (Tappan Zee) Bridge Replacement	4979	1600	Project Revenues	FY2014

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Table 13. TIFIA Projects (continued)

Table based on data from US Department of Transportation

Active Projects (continued)

Project Name	TIFIA		Primary Revenue Pledge	FY Closed
	Project Cost (\$M)	Assistance (\$M)		
Grand Parkway Segments D–G	2913	841	Toll Revenues	FY2014
Regional Connector Transit Corridor	1399	160	Sales Tax Revenues	FY2014
U.S. 36 Managed Lane / Bus Rapid Transit Project: Phase 2 [25]	175	60	Toll Revenues	FY2014
CTA 95th Street Terminal Improvement	240	79	Farebox Revenues	FY2014
Westside Purple Line Extension, Section 1	2648	856	Sales Tax Revenues	FY2014
Gerald Desmond Bridge Replacement	1288	325	Port Revenues	FY2014
I-4 Ultimate Project	2877	949	Availability Payments	FY2014
Dulles Corridor Metrorail Project	5684	1876	or Local Appropriations, Toll Revenues	FY2014
SR 520 Floating Bridge	2736	300	User Charges	FY2013
I-95 HOV / Hot Lanes	923	300	User Charges	FY2013
Dallas Area Rapid Transit Project Orange Line Extension (I-3)	397	120	Sales Tax Revenues	FY2013
Riverwalk Expansion	419.5	99	or Fuel Tax Revenues, Project Revenues	FY2013
SR 91 Corridor Improvement	1279	421	User Charges	FY2013
Chicago O'Hare International Airport Consolidated Joint Use Facility	876	288	Facility Rents, User Charges	FY2013
North Tarrant Express (Segments 3A and 3B)	1637	531	User Charges	FY2013
Downtown / Midtown Tunnel	2089	422	User Charges	FY2012
Presidio Parkway [39]	852	150	Availability Payments	FY2012
Crenshaw / LAX Transit Corridor	1749	546	Sales Tax Revenues	FY2012
Eagle Project	2047	280	Tax Revenues	FY2012
President George Bush Turnpike Western Extension	1268	418	User Charges	FY2011

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Table 13. TIFIA Projects (continued)

Table based on data from US Department of Transportation

Active Projects (continued)

Project Name	TIFIA		Primary Revenue Pledge	FY Closed
	Project Cost (\$M)	Assistance (\$M)		
U.S. 36 Managed Lane / Bus Rapid Transit Project: Phase 1 [43]	307	54	Toll Revenues	FY2011
Port of Miami Tunnel	1073	341	Availability Payments	FY2010
North Tarrant Express Segments 1 and 2A	2047	650	User Charges	FY2010
Transbay Transit Center	1189	171	Real Estate Tax Increments	FY2010
IH 635 Managed Lanes	2615	850	User Charges	FY2010
I-595 Corridor Roadway Improvements	1834	603	Toll Revenues	FY2009
Triangle Expressway	1172	387	User Charges	FY2009
Capital Beltway High Occupancy Toll (HOT) Lanes	1938	589	User Charges	FY2008
SH 130 (Segments 5 and 6)	1328	430	User Charges	FY2007
Intercounty Connector	2569	516	User Charges	FY2007
Interlink	280	42	User Charges	FY2006
LA 1 Improvements	372	122	State or Local Appropriations	FY2005
South Bay Expressway [55]	658	140	User Charges	FY2003

Retired Projects

Project Name	Primary Revenue Pledge	FY Closed
35Express	Toll Revenues	FY2017
Parallel Thimble Shoal Tunnel Project	Toll Revenues	FY2017
Northgate Link Extension	Sales Tax Revenues	FY2017
Westside Purple Line Extension, Section 2	Sales Tax Revenues	FY2017
Monroe Expressway	Toll Revenues	FY2017
US-183S Bergstrom Expressway	Project Revenues	FY2016
US 301	Toll Revenues	FY2016
Chicago Transit Authority Rail Fleet Replacement Project	Farebox Revenues	FY2016
State Highway (SH) 288 Toll Lanes Project	Toll Revenues	FY2016
I-93 Improvements Salem to Manchester Project	200 Revenues, State or Local Appropriations	FY2016

Table 14. Annual Bond Sales by Sale Method

Table based on Mergent database, years 2005 through 2016, in dollars

Period	Par value identified by Mergent as being sold via competitive process		Par value identified by Mergent as being sold via negotiated process	
		% of Total		% of Total
2005	122,650,224,085	29.97%	286,661,143,512	70.03%
2006	97,835,093,033	22.62%	334,641,508,568	77.38%
2007	105,185,552,838	21.39%	386,657,929,691	78.61%
2008	80,380,584,910	17.89%	369,030,509,825	82.11%
2009	113,346,649,408	24.85%	342,761,470,992	75.15%
2010	269,155,607,154	52.38%	244,700,662,627	47.62%
2011	178,494,654,239	51.50%	168,065,816,469	48.50%
2012	221,992,259,617	51.25%	211,175,138,978	48.75%
2013	181,838,589,289	49.33%	186,785,359,352	50.67%
2014	183,737,055,684	51.21%	175,059,994,227	48.79%
2015	205,961,752,390	47.80%	224,948,726,845	52.20%
2016	228,853,285,731	49.43%	234,145,980,394	50.57%

Note: percent of total excludes private placements and remarketings

Table 15. Lead underwriter league tables, 2000-2016, based on dollar issuance amounts.

League tables calculated based on Mergent data, with some cleaning of underwriter identities by authors.

Underwriter name	2000-2016		2016		2015		2014		2013		2012	
	Overall rank	Market share (%)	Market Rank	Market share (%)								
CITIGROUP GLOBAL MARKETS INC	1	10.5%	2	11.5%	3	10.4%	3	9.3%	3	10.1%	3	11.2%
JP MORGAN SECURITIES INC	2	8.5%	3	10.6%	2	11.6%	2	14.0%	1	14.9%	1	15.8%
GOLDMAN SACHS & COMPANY	3	7.1%	9	3.6%	11	2.7%	8	3.7%	8	5.0%	5	5.3%
MORGAN STANLEY & COMPANY INC	4	6.4%	4	8.2%	4	7.6%	4	9.3%	4	6.1%	4	6.6%
BANK OF AMERICA MERRILL LYNCH	5	5.4%	1	15.4%	1	13.4%	1	14.5%	2	14.1%	2	13.3%
MERRILL LYNCH & COMPANY	6	5.2%										
UBS FINANCIAL SERVICES INC	7	3.7%	41	0.2%	31	0.3%	44	0.2%	50	0.2%	20	0.7%
LEHMAN BROTHERS	8	3.6%										
RBC CAPITAL MARKETS LLC	9	3.2%	6	5.1%	6	6.3%	6	5.3%	6	5.3%	7	5.2%
BEAR STEARNS & COMPANY	10	3.0%										
WELLS FARGO SECURITIES	11	2.2%	5	6.3%	7	5.8%	5	6.0%	5	5.3%	8	5.0%
BARCLAYS CAPITAL INC	12	2.2%	7	4.2%	8	5.0%	7	5.2%	7	5.0%	6	5.2%
BANC OF AMERICA SECURITIES	13	2.1%									212	0.0%
PIPER JAFFRAY & COMPANY	14	1.8%	10	3.6%	10	3.3%	10	3.1%	9	3.5%	9	2.6%
PAINEWEBBER INC	15	1.7%										
SALOMON SMITH BARNEY INC	16	1.5%										
MORGAN KEEGAN & COMPANY INC	17	1.4%									24	0.6%
STIFEL NICOLAUS & COMPANY INC	18	1.3%	8	3.9%	5	7.1%	11	2.8%	12	2.2%	13	1.9%
RAYMOND JAMES & ASSOCIATES INC	19	1.1%	11	3.6%	9	3.8%	9	3.5%	10	2.8%	11	2.1%
ROBERT W. BAIRD & COMPANY INC	20	1.1%	12	2.4%	12	2.1%	12	2.2%	11	2.3%	12	1.9%
Note: National underwriter Herfindahl index	0.0415		0.0709		0.0682		0.0729		0.0711		0.0738	
Note: average of underwriter Herfindahl indexes, calculated at state level												
Unweighted		0.0993		0.2066		0.2319		0.2129		0.2171		0.1939
Weighted by value of issuance in state		0.0579		0.1116		0.1317		0.1254		0.1258		0.1219

Note. The Herfindahl index is the sum of the squared market shares of the individual firms in a market. A monopolized market would have a Herfindahl index of 1; a market with 10 equal-sized competitors would have Herfindahl index of $10 \times (10\% \times 10\%) = 0.10$.

Table 15. Lead underwriter league tables, 2000-2016, based on dollar issuance amounts (continued)

League tables calculated based on Mergent data, with some cleaning of underwriter identities by authors.

Underwriter name	2011		2010		2009		2008		2007		2006	
	Rank	Market share (%)										
CITIGROUP GLOBAL MARKETS INC	3	10.5%	3	12.6%	3	12.1%	1	13.5%	1	13.4%	1	13.1%
JP MORGAN SECURITIES INC	1	16.4%	1	14.3%	1	13.1%	2	11.0%	7	6.0%	6	6.4%
GOLDMAN SACHS & COMPANY	6	6.4%	5	6.4%	4	9.5%	4	8.4%	6	6.0%	4	6.6%
MORGAN STANLEY & COMPANY INC	4	8.0%	4	9.6%	5	9.4%	5	7.7%	5	6.6%	8	5.4%
BANK OF AMERICA MERRILL LYNCH	2	10.9%	2	12.7%	2	12.6%			183	0.0%		
MERRILL LYNCH & COMPANY					26	0.5%	3	8.6%	2	9.7%	3	8.9%
UBS FINANCIAL SERVICES INC	31	0.4%	15	1.0%	15	0.9%	8	4.3%	3	7.8%	2	9.8%
LEHMAN BROTHERS							7	5.3%	4	7.0%	7	5.6%
RBC CAPITAL MARKETS LLC	8	4.8%	7	4.2%	7	3.9%	9	3.7%	10	2.9%	10	3.4%
BEAR STEARNS & COMPANY							13	1.4%	8	5.9%	9	3.9%
WELLS FARGO SECURITIES	5	6.8%	8	3.8%	8	2.9%	25	0.6%	38	0.3%	37	0.3%
BARCLAYS CAPITAL INC	7	5.0%	6	6.2%	6	6.5%	30	0.4%	137	0.0%		
BANC OF AMERICA SECURITIES					60	0.1%	6	7.2%	9	5.7%	5	6.5%
PIPER JAFFRAY & COMPANY	10	2.5%	10	2.0%	10	2.6%	12	1.9%	12	1.6%	13	1.7%
PAINEWEBBER INC												
SALOMON SMITH BARNEY INC												
MORGAN KEEGAN & COMPANY INC	9	2.7%	9	2.7%	9	2.6%	11	2.4%	11	2.6%	11	2.1%
STIFEL NICOLAUS & COMPANY INC	14	1.1%	14	1.1%	18	0.7%	34	0.4%	33	0.4%	20	0.7%
RAYMOND JAMES & ASSOCIATES INC	17	0.9%	26	0.5%	22	0.5%	33	0.4%	27	0.5%	34	0.4%
ROBERT W. BAIRD & COMPANY INC	12	1.5%	11	1.8%	11	1.4%	17	1.0%	30	0.5%	25	0.6%
Note: National underwriter Herfindahl index	0.0732		0.0758		0.0750		0.0650		0.0601		0.0585	
Note: average of underwriter Herfindahl indexes, calculated at state level												
Unweighted		0.1771		0.1775		0.1843		0.1868		0.2188		0.1869
Weighted by value of issuance in state		0.1301		0.1215		0.1263		0.1200		0.1084		0.1097

Note. The Herfindahl index is the sum of the squared market shares of the individual firms in a market. A monopolized market would have a Herfindahl index of 1; a market with 10 equal-sized competitors would have Herfindahl index of $10 \times (10\% \times 10\%) = 0.10$.

Table 15. Lead underwriter league tables, 2000-2016, based on dollar issuance amounts. (continued)

League tables calculated based on Mergent data, with some cleaning of underwriter identities by authors.

Underwriter name	2005		2004		2003		2002		2001		2000	
	Rank	Market share (%)										
CITIGROUP GLOBAL MARKETS INC	1	13.1%	1	13.1%	1	15.6%	1	14.1%	1	13.6%	1	13.3%
JP MORGAN SECURITIES INC	7	5.4%	8	5.0%	7	5.8%	6	6.4%	8	3.6%	7	4.2%
GOLDMAN SACHS & COMPANY	6	5.4%	4	6.9%	8	4.2%	4	6.7%	6	6.1%	4	8.3%
MORGAN STANLEY & COMPANY INC	4	6.4%	9	4.3%	6	6.2%	8	5.2%	4	6.7%	8	4.0%
BANK OF AMERICA MERRILL LYNCH												
MERRILL LYNCH & COMPANY	3	6.9%	5	6.9%	4	7.4%	3	7.0%	3	7.0%	3	8.8%
UBS FINANCIAL SERVICES INC	2	12.1%	2	10.9%	2	10.8%	2	11.3%	2	11.8%	17	1.2%
LEHMAN BROTHERS	5	6.4%	3	7.0%	5	6.9%	5	6.7%	7	5.0%	5	6.0%
RBC CAPITAL MARKETS LLC	10	3.9%	11	3.2%	10	2.5%	10	2.6%	31	0.5%	199	0.0%
BEAR STEARNS & COMPANY	8	5.3%	7	5.1%	3	8.4%	7	6.1%	5	6.3%	6	4.6%
WELLS FARGO SECURITIES	34	0.3%	33	0.4%	39	0.3%	45	0.2%	61	0.2%	51	0.2%
BARCLAYS CAPITAL INC												
BANC OF AMERICA SECURITIES	9	5.1%	6	5.5%	9	3.0%	9	4.0%	10	2.0%	9	2.2%
PIPER JAFFRAY & COMPANY	14	1.6%	10	3.9%	106	0.1%	135	0.0%	95	0.1%	84	0.1%
PAINEWEBBER INC											2	10.0%
SALOMON SMITH BARNEY INC												
MORGAN KEEGAN & COMPANY INC	11	2.2%	13	1.8%	13	1.5%	14	1.6%	13	1.6%	15	1.4%
STIFEL NICOLAUS & COMPANY INC	30	0.5%	28	0.4%	38	0.3%	29	0.4%	37	0.4%	80	0.1%
RAYMOND JAMES & ASSOCIATES INC	27	0.5%	18	0.7%	33	0.3%	42	0.2%	23	0.7%	71	0.1%
ROBERT W. BAIRD & COMPANY INC	26	0.5%	32	0.4%	29	0.4%	30	0.4%	29	0.5%	25	0.6%
Note: National underwriter Herfindahl index	0.0600		0.0581		0.0658		0.0610		0.0566		0.0551	
Note: average of underwriter Herfindahl indexes, calculated at state level												
Unweighted	0.1801		0.1943		0.2038		0.1798		0.2205		0.2017	
Weighted by value of issuance in state	0.1060		0.1359		0.1303		0.1183		0.1157		0.1168	

Note. The Herfindahl index is the sum of the squared market shares of the individual firms in a market. A monopolized market would have a Herfindahl index of 1; a market with 10 equal-sized competitors would have Herfindahl index of $10 \times (10\% \times 10\%) = 0.10$.

Table 16. Financial advisor league tables, 2000-2016, based on dollar issuance amounts.

League tables calculated based on Mergent data, with some cleaning of financial advisor identities by authors.

Financial advisor name	2000-2016		2016		2015		2014		2013		2012	
	Overall rank	Market share (%)	Rank	Market share (%)	Rank	Market share (%)	Rank	Market share (%)	Rank	Market share (%)	Rank	Market share (%)
PFM GROUP	1	15.5%	1	20.0%	1	19.6%	1	18.7%	1	17.2%	1	19.2%
PUBLIC RESOURCES ADVISORY GROUP	2	10.6%	2	10.9%	2	11.5%	3	10.9%	2	13.7%	3	9.6%
FIRST SOUTHWEST COMPANY	3	7.8%	28	0.6%	3	11.4%	2	11.3%	3	8.9%	2	9.6%
RBC CAPITAL MARKETS LLC	4	3.5%	6	2.1%	6	2.0%	10	1.7%	9	1.9%	9	1.7%
MONTAGUE DEROSE & ASSOCIATES LLC	5	3.1%	10	1.6%	8	1.6%	4	2.9%	4	4.0%	4	5.9%
LAMONT FINANCIAL SERVICES CORPORATION	6	2.2%	17	1.1%	10	1.4%	8	2.0%	5	3.5%	5	4.5%
KAUFMAN HALL & ASSOCIATES INC	7	1.7%	31	0.6%	43	0.4%	17	1.1%	11	1.4%	11	1.5%
PONDER & COMPANY	8	1.4%	5	2.1%	14	1.2%	19	1.0%	18	1.0%	10	1.6%
ACACIA FINANCIAL GROUP	9	1.3%	4	3.0%	5	2.5%	6	2.6%	7	2.8%	7	2.8%
KNN PUBLIC FINANCE	10	1.2%	7	2.0%	7	2.0%	9	2.0%	8	2.0%	12	1.4%
RAYMOND JAMES & ASSOCIATES INC	11	1.1%	19	1.0%	35	0.5%	38	0.4%	19	1.0%	19	0.8%
ROBERT W. BAIRD & COMPANY INC	12	1.0%	27	0.7%	15	1.1%	32	0.6%	31	0.5%	23	0.7%
PIPER JAFFRAY & COMPANY	13	1.0%	8	1.9%	4	3.0%	11	1.6%	17	1.1%	18	0.9%
SPRINGSTED INC	14	1.0%	21	0.9%	19	1.0%	24	0.8%	24	0.6%	13	1.3%
HILLTOP SECURITIES INC	15	1.0%	3	9.9%	188	0.0%						
GEORGE K BAUM & COMPANY	16	0.9%	29	0.6%	33	0.6%	5	2.6%	6	3.2%	6	3.4%
GOVERNMENT DEVELOPMENT BANK OF PUERTO RICO	17	0.9%					16	1.2%	66	0.2%	8	2.2%
SEATTLE-NORTHWEST SECURITIES CORPORATION	18	0.9%							25	0.6%	14	1.3%
FIELDMAN ROLAPP & ASSOCIATES	19	0.9%	15	1.3%	12	1.2%	18	1.0%	12	1.3%	28	0.6%
CAPITAL MARKETS	20	0.9%	13	1.3%	9	1.5%	13	1.3%	13	1.3%	15	1.2%
Note: National financial advisor Herfindahl index	0.0471		0.068		0.070		0.066		0.064		0.066	
Note: average of financial advisor Herfindahl indexes, calculated at state level												
Unweighted	0.2240		0.314		0.299		0.310		0.317		0.317	
Weighted by value of issuance in state	0.1480		0.205		0.214		0.211		0.209		0.234	

Note. The Herfindahl index is the sum of the squared market shares of the individual firms in a market. A monopolized market would have a Herfindahl index of 1; a market with 10 equal-sized competitors would have Herfindahl index of $10 \times (10\% \times 10\%) = 0.10$.

Table 16. Financial advisor league tables, 2000-2016, based on dollar issuance amounts (continued).

League tables calculated based on Mergent data, with some cleaning of financial advisor identities by authors.

Financial advisor name	2011		2010		2009		2008		2007		2006	
	Rank	Market share (%)										
PFM GROUP	1	16.9%	1	16.2%	1	14.6%	1	13.8%	1	12.6%	1	12.9%
PUBLIC RESOURCES ADVISORY GROUP	2	10.2%	2	9.8%	2	13.1%	3	8.2%	3	10.1%	2	8.2%
FIRST SOUTHWEST COMPANY	3	9.4%	3	9.1%	3	8.0%	2	8.2%	2	11.0%	3	7.9%
RBC CAPITAL MARKETS LLC	8	2.9%	6	2.7%	5	4.6%	4	7.4%	4	6.5%	4	5.7%
MONTAGUE DEROSE & ASSOCIATES LLC	4	6.1%	4	5.7%	4	5.2%	6	3.7%	61	0.3%	54	0.4%
LAMONT FINANCIAL SERVICES CORPORAT	7	3.0%	7	2.5%	9	1.5%	9	1.6%	9	1.5%	8	1.7%
KAUFMAN HALL & ASSOCIATES INC	17	0.9%	9	2.0%	6	3.5%	5	5.8%	6	2.5%	6	2.4%
PONDER & COMPANY	36	0.5%	12	1.4%	7	2.0%	7	3.3%	8	1.6%	11	1.4%
ACACIA FINANCIAL GROUP	18	0.8%	13	1.2%	15	1.0%	35	0.5%	32	0.6%	36	0.7%
KNN PUBLIC FINANCE	9	2.0%	22	0.8%	8	1.8%	11	1.4%	12	1.1%	375	0.0%
RAYMOND JAMES & ASSOCIATES INC	5	4.6%	5	2.9%	33	0.6%	19	0.9%	7	1.7%	5	2.6%
ROBERT W. BAIRD & COMPANY INC	12	1.3%	15	1.0%	13	1.1%	10	1.4%	17	1.0%	7	2.3%
PIPER JAFFRAY & COMPANY	21	0.7%	30	0.7%	32	0.6%	22	0.8%	22	0.8%	23	0.8%
SPRINGSTED INC	13	1.3%	24	0.8%	16	1.0%	25	0.7%	20	0.9%	13	1.2%
HILLTOP SECURITIES INC												
GEORGE K BAUM & COMPANY	58	0.3%	67	0.2%	43	0.4%	32	0.6%	45	0.4%	62	0.3%
GOVERNMENT DEVELOPMENT BANK OF												
PUERTO RICO	6	3.6%	8	2.2%	18	1.0%	18	1.0%	21	0.9%	37	0.6%
SEATTLE-NORTHWEST SECURITIES CORPO	16	1.0%	21	0.9%	10	1.1%	13	1.2%	10	1.4%	12	1.2%
FIELDMAN ROLAPP & ASSOCIATES	22	0.7%	41	0.5%	41	0.5%	47	0.4%	5	2.7%	35	0.7%
CAPITAL MARKETS	11	1.4%	19	0.9%	23	0.8%	30	0.6%	35	0.6%	25	0.8%
Note: National financial advisor Herfindahl index	0.0591		0.0533		0.0541		0.0471		0.0474		0.0384	
Note: average of financial advisor Herfindahl indexes, calculated at state level												
Unweighted	0.3611		0.3607		0.3228		0.2884		0.3229		0.3077	
Weighted by value of issuance in state	0.2578		0.2164		0.2214		0.1968		0.2037		0.2084	

Note. The Herfindahl index is the sum of the squared market shares of the individual firms in a market. A monopolized market would have a Herfindahl index of 1; a market with 10 equal-sized competitors would have Herfindahl index of $10 \times (10\% \times 10\%) = 0.10$.

Table 16. Financial advisor league tables, 2000-2016, based on dollar issuance amounts (continued).

League tables calculated based on Mergent data, with some cleaning of financial advisor identities by authors.

Financial advisor name	2005		2004		2003		2002		2001		2000	
	Rank	Market share (%)										
PFM GROUP	1	14.3%	1	15.5%	1	13.7%	1	10.5%	1	14.1%	2	8.2%
PUBLIC RESOURCES ADVISORY GROUP	2	9.3%	2	11.8%	2	9.0%	2	9.8%	2	9.9%	1	12.0%
FIRST SOUTHWEST COMPANY	3	7.6%	3	6.3%	4	6.3%	4	6.4%	3	5.8%	3	6.2%
RBC CAPITAL MARKETS LLC	4	6.1%	4	4.2%	5	6.2%	6	3.8%	109	0.2%	106	0.1%
MONTAGUE DEROSE & ASSOCIATES LLC	13	1.3%	20	0.8%	3	8.3%	5	6.1%		81	0.2%	
LAMONT FINANCIAL SERVICES CORPORAT	5	2.8%	6	3.0%	8	1.7%	25	0.8%	4	4.2%	11	1.8%
KAUFMAN HALL & ASSOCIATES INC	7	2.1%	26	0.7%	10	1.4%	27	0.7%	50	0.4%	13	1.5%
PONDER & COMPANY	28	0.7%	31	0.7%	89	0.2%	26	0.7%	76	0.3%	34	0.7%
ACACIA FINANCIAL GROUP												
KNN PUBLIC FINANCE												
RAYMOND JAMES & ASSOCIATES INC			112	0.1%			119	0.1%	75	0.3%		
ROBERT W. BAIRD & COMPANY INC	6	2.2%	11	1.3%	7	2.1%	47	0.5%	101	0.2%	90	0.2%
PIPER JAFFRAY & COMPANY	26	0.7%	19	0.9%			348	0.0%	291	0.0%	241	0.0%
SPRINGSTED INC	10	1.5%	7	1.5%	11	1.1%	17	1.0%	20	1.0%	12	1.7%
HILLTOP SECURITIES INC												
GEORGE K BAUM & COMPANY	75	0.3%	59	0.3%	31	0.6%	45	0.5%	28	0.8%	39	0.6%
GOVERNMENT DEVELOPMENT BANK OF												
PUERTO RICO	56	0.4%	63	0.3%	17	0.9%	29	0.6%				
SEATTLE-NORTHWEST SECURITIES CORPO	11	1.4%	13	1.2%	24	0.7%	8	1.5%	5	2.3%	16	1.2%
FIELDMAN ROLAPP & ASSOCIATES	18	0.9%	41	0.5%	32	0.6%	55	0.4%	36	0.6%	40	0.6%
CAPITAL MARKETS	30	0.6%	16	1.1%	61	0.3%	86	0.2%				
Note: National financial advisor Herfindahl index	0.0436		0.0499		0.0458		0.0380		0.0403		0.0341	
Note: average of financial advisor Herfindahl indexes, calculated at state level												
Unweighted	0.3365		0.3260		0.3413		0.3397		0.4132		0.4301	
Weighted by value of issuance in state	0.2055		0.2165		0.2366		0.2350		0.2457		0.2569	

Note. The Herfindahl index is the sum of the squared market shares of the individual firms in a market. A monopolized market would have a Herfindahl index of 1; a market with 10 equal-sized competitors would have Herfindahl index of $10 \times (10\% \times 10\%) = 0.10$.

Table 17. Spread between offering price and average price at which bonds sold to customers in first 30 days post-issuance.

Data on bond characteristics from Mergent; MSRB data used for trade prices. Unit of analysis is the individual bond. Figures show the spread, in percent, between the offering price of the bond and the average price at which the bond is sold to customers in the secondary market on the day of the bond offering and the subsequent 30 days. For each bond, the average sale price is calculated as the weighted average of trades for that bond, weighted by par value traded on each trade. Trades weighted by trade size, and observations (except in the final column) weighted by bond par value.

Period	Count	Observations weighted by bond par value									Note: average unweighted spread	
		Average spread	Standard Dev.	Percentiles								
				5th	10th	25th	50th	75th	90th	95th		
2016	147,522	0.083	1.494	-0.487	-0.254	-0.032	0.001	0.228	0.759	1.265	0.194	
2015	141,166	0.126	0.927	-0.473	-0.242	-0.025	0.000	0.186	0.739	1.269	0.253	
2014	116,004	-0.037	0.946	-0.825	-0.404	-0.082	0.000	0.086	0.438	0.809	0.095	
2013	115,172	0.129	1.229	-0.338	-0.168	-0.015	0.000	0.166	0.684	1.312	0.261	
2012	139,761	0.056	0.985	-0.531	-0.221	-0.010	0.000	0.148	0.594	1.166	0.130	
2011	109,429	0.075	0.997	-0.762	-0.324	-0.047	0.000	0.109	0.697	1.298	0.127	
2010	133,443	0.281	2.407	-0.446	-0.152	-0.008	0.010	0.292	0.936	1.587	0.221	
2009	118,827	0.181	1.174	-0.522	-0.193	-0.014	0.003	0.259	0.908	1.512	0.188	
2008	96,786	0.062	2.276	-0.712	-0.267	-0.021	0.001	0.275	1.008	1.696	0.231	
2007	118,983	0.095	2.028	-0.633	-0.302	-0.014	0.000	0.126	0.634	1.187	0.228	
2006	122,469	0.065	0.981	-0.646	-0.311	-0.026	0.000	0.159	0.634	1.217	0.205	
2005	142,119	0.031	1.393	-1.416	-0.368	-0.020	0.000	0.230	0.961	1.483	0.222	
2004	122,108	-0.105	1.559	-1.870	-0.724	-0.066	0.000	0.182	0.706	1.291	0.157	
2003	125,189	-0.136	1.764	-2.273	-1.006	-0.087	0.000	0.292	0.808	1.367	0.184	
2002	103,946	0.052	1.148	-1.579	-0.662	-0.061	0.012	0.307	0.873	1.448	0.190	
2001	108,576	0.060	1.093	-1.166	-0.605	-0.086	0.000	0.248	0.783	1.262	0.157	
2000	73,872	0.013	0.920	-0.988	-0.512	-0.114	0.000	0.150	0.556	0.970	0.081	
1999	91,795	0.173	0.863	-0.498	-0.240	-0.002	0.010	0.269	0.789	1.304	0.144	
>=2011	769,054	0.074	1.130	-0.550	-0.264	-0.028	0.000	0.158	0.654	1.199	0.179	
2008-2010	349,056	0.187	2.016	-0.542	-0.194	-0.013	0.005	0.277	0.935	1.587	0.212	
<=2007	1,010,126	0.020	1.451	-1.257	-0.457	-0.041	0.000	0.215	0.773	1.341	0.181	
All years	2,128,236	0.076	1.475	-0.759	-0.308	-0.026	0.000	0.200	0.761	1.342	0.185	

Table 18. Number of interdealer trades in first 30 days post-issuance.

Data on bond characteristics from Mergent; MSRB data used for trade prices. Unit of analysis is the individual bond. Figures show

Period	Bonds issued	Average number of	Standard Deviation	Percentiles						
				5th	10th	25th	50th	75th	90th	95th
2016	150,712	4.164	16.557	0	0	0	1	2	9	18
2015	143,863	4.089	16.474	0	0	0	1	3	9	17
2014	118,250	3.320	11.980	0	0	0	1	3	8	14
2013	118,086	2.932	11.689	0	0	0	0	2	6	12
2012	144,393	3.394	17.944	0	0	0	1	2	7	14
2011	111,989	3.525	13.252	0	0	0	1	3	8	15
2010	136,295	3.793	16.969	0	0	0	1	3	9	16
2009	121,402	4.267	21.893	0	0	0	1	3	10	18
2008	98,715	4.025	14.515	0	0	0	1	3	10	18
2007	123,174	2.674	7.248	0	0	0	1	2	7	12
2006	127,975	2.755	7.272	0	0	0	1	3	7	12
2005	149,469	2.283	5.841	0	0	0	1	2	6	10
2004	130,317	2.445	7.492	0	0	0	1	2	6	10
2003	135,010	2.639	8.547	0	0	0	1	2	6	11
2002	112,643	2.580	8.628	0	0	0	1	2	6	10
2001	116,298	2.143	6.197	0	0	0	1	2	5	9
2000	80,257	1.921	4.728	0	0	0	1	2	5	8
1999	103,703	1.827	5.472	0	0	0	0	2	5	8
>=2011	787,304	3.607	15.111	0	0	0	1	2	8	15
2008-2010	356,412	4.019	18.214	0	0	0	1	3	9	17
<=2007	1,081,073	2.389	7.028	0	0	0	1	2	6	10
All years	2,224,789	3.081	12.587	0	0	0	1	2	7	13

Table 19. Market-adjusted price change days 0-30 comparing sets of issuers by number of trades in interdealer market

Data on bond characteristics from Mergent; MSRB data used for trade prices. Unit of analysis is the individual bond. Figures show the spread, in percent, between the offering price of the bond and the average price at which the bond is sold to customers in the secondary market on the day of the bond offering and the subsequent 30 days. For each bond, the average sale price is calculated as the weighted average of trades for that bond, weighted by par value traded on each trade.

Period	All Observations			1 or fewer interdealer trades			2 or More Interdealer Trades			Differential		With Covars	
	Count	Average	Std. Dev.	Count	Average	Std. Dev.	Count	Average	Std. Dev.	Coeff	p val	Coeff	p val
2016	147,693	0.194	0.847	98,806	0.050	0.658	48,887	0.485	1.081	0.434	0.000	0.398	0.000
2015	141,284	0.253	0.787	92,023	0.079	0.521	49,261	0.578	1.053	0.499	0.000	0.418	0.000
2014	116,074	0.095	0.704	75,821	0.010	0.494	40,253	0.254	0.965	0.243	0.000	0.235	0.000
2013	115,253	0.261	1.123	81,597	0.114	0.887	33,656	0.617	1.495	0.503	0.000	0.396	0.000
2012	139,929	0.130	1.012	95,645	0.002	0.916	44,284	0.408	1.144	0.406	0.000	0.386	0.000
2011	109,501	0.127	1.535	71,262	-0.005	1.435	38,239	0.374	1.679	0.379	0.000	0.340	0.000
2010	133,519	0.221	1.212	84,360	0.063	0.779	49,159	0.492	1.683	0.429	0.000	0.366	0.000
2009	118,891	0.188	1.039	73,376	0.034	0.778	45,515	0.436	1.319	0.403	0.000	0.369	0.000
2008	96,903	0.231	1.224	61,121	0.079	1.111	35,782	0.489	1.358	0.409	0.000	0.357	0.000
2007	119,381	0.228	1.648	78,193	0.085	1.804	41,188	0.499	1.257	0.415	0.000	0.382	0.000
2006	122,954	0.205	0.952	78,369	0.066	0.885	44,585	0.449	1.015	0.383	0.000	0.390	0.000
2005	142,374	0.222	1.424	93,325	0.062	0.976	49,049	0.527	1.982	0.465	0.000	0.508	0.000
2004	122,427	0.157	1.108	78,054	0.020	1.012	44,373	0.396	1.224	0.376	0.000	0.403	0.000
2003	125,740	0.184	1.054	78,985	0.060	0.913	46,755	0.393	1.230	0.333	0.000	0.323	0.000
2002	104,456	0.190	0.973	66,397	0.080	0.945	38,059	0.383	0.991	0.303	0.000	0.256	0.000
2001	108,963	0.157	0.960	71,646	0.062	0.770	37,317	0.340	1.226	0.278	0.000	0.251	0.000
2000	74,197	0.081	1.184	49,261	0.039	1.332	24,936	0.165	0.809	0.126	0.000	0.191	0.000
1999	92,386	0.144	1.079	65,483	0.077	0.999	26,903	0.308	1.238	0.231	0.000	0.173	0.000
>= 2011	769,734	0.179	1.020	515,154	0.043	0.857	254,580	0.454	1.244	0.411	0.000	0.355	0.000
2008-2010	349,313	0.212	1.160	218,857	0.058	0.884	130,456	0.472	1.477	0.414	0.000	0.367	0.000
<= 2007	1,013,962	0.181	1.187	660,533	0.062	1.105	353,429	0.402	1.299	0.340	0.000	0.320	0.000
All years	2,133,009	0.185	1.125	1,394,544	0.054	0.986	738,465	0.432	1.314	0.378	0.000	0.341	0.000

Table 20. Market-adjusted price change days 0-30 comparing sets of issuers by competitive/negotiated

Data on bond characteristics from Mergent; MSRB data used for trade prices. Unit of analysis is the individual bond. Figures show the spread, in percent, between the offering price of the bond and the average price at which the bond is sold to customers in the secondary market on the day of the bond offering and the subsequent 30 days. For each bond, the average sale price is calculated as the weighted average of trades for that bond, weighted by par value traded on each trade.

Period	All Observations			Competitive sales			Negotiated sales			Differential		With Covars	
	Count	Average	Std. Dev.	Count	Average	Std. Dev.	Count	Average	Std. Dev.	Coeff	p val	Coeff	p val
2016	146,731	0.195	0.849	91061	0.160	0.803	55670	0.251	0.915	0.091	0.000	0.057	0.000
2015	140,539	0.253	0.788	88143	0.204	0.779	52396	0.337	0.796	0.133	0.000	0.084	0.000
2014	115,624	0.095	0.700	73905	0.039	0.716	41719	0.195	0.660	0.155	0.000	0.125	0.000
2013	114,703	0.263	1.119	72735	0.200	0.740	41968	0.372	1.567	0.172	0.000	0.120	0.000
2012	139,499	0.131	1.012	86118	0.070	0.954	53381	0.228	1.093	0.158	0.000	0.034	0.371
2011	109,282	0.127	1.536	72063	0.053	1.093	37219	0.269	2.141	0.216	0.000	0.127	0.000
2010	133,006	0.221	1.206	87411	0.151	0.794	45595	0.356	1.734	0.205	0.000	0.155	0.000
2009	117,281	0.189	1.042	51134	0.056	0.748	66147	0.292	1.212	0.235	0.000	0.193	0.000
2008	96,381	0.231	1.222	40676	0.144	0.762	55705	0.294	1.467	0.150	0.000	0.098	0.000
2007	118,378	0.227	1.555	46035	0.192	1.976	72343	0.249	1.214	0.057	0.083	0.009	0.724
2006	122,217	0.206	0.951	46854	0.119	0.681	75363	0.260	1.082	0.141	0.000	0.072	0.000
2005	135,972	0.222	1.127	53041	0.165	0.946	82931	0.259	1.228	0.094	0.000	0.024	0.214
2004	57,925	0.154	1.031	31427	0.117	0.832	26498	0.197	1.225	0.080	0.000	0.036	0.060
2003	19,834	0.238	1.182	11931	0.222	1.224	7903	0.262	1.116	0.040	0.309	0.025	0.584
2002	29,142	0.221	0.963	18547	0.196	0.944	10595	0.264	0.995	0.068	0.011	0.053	0.091
2001	18,291	0.231	0.872	11671	0.217	0.849	6620	0.254	0.911	0.037	0.210	-0.010	0.727
2000	9,197	0.055	0.794	5449	0.058	0.691	3748	0.050	0.923	-0.007	0.839	-0.005	0.898
1999	12,373	0.231	1.329	7159	0.218	1.600	5214	0.248	0.822	0.030	0.400	-0.014	0.750
>= 2011	766,378	0.179	1.020	484025	0.124	0.858	282353	0.275	1.243	0.151	0.000	0.106	0.000
2008-2010	346,668	0.213	1.158	179221	0.122	0.775	167447	0.310	1.454	0.188	0.000	0.134	0.000
<= 2007	523,486	0.210	1.180	232191	0.162	1.201	291295	0.248	1.161	0.086	0.000	0.062	0.000
All years	1,636,532	0.196	1.103	895437	0.133	0.945	741095	0.272	1.264	0.139	0.000	0.093	0.000

Table 21. Market-adjusted price change days 0-30 comparing sets of issuers by underwriter size.

Data on bond characteristics from Mergent; MSRB data used for trade prices. Unit of analysis is the individual bond. Figures show the spread, in percent, between the offering price of the bond and the average price at which the bond is sold to customers in the secondary market on the day of the bond offering and the subsequent 30 days. For each bond, the average sale price is calculated as the weighted average of trades for that bond, weighted by par value traded on each trade.

Period	All Observations			Small underwriter			Large underwriter			Differential		With Covars	
	Count	Average	Std. Dev.	Count	Average	Std. Dev.	Count	Average	Std. Dev.	Coeff	p val	Coeff	p val
2016	147,550	0.194	0.847	50026	0.207	0.818	97524	0.188	0.862	-0.019	0.071	-0.020	0.072
2015	141,198	0.253	0.787	47867	0.251	0.773	93331	0.254	0.795	0.003	0.744	-0.025	0.010
2014	116,014	0.095	0.702	42128	0.119	0.694	73886	0.082	0.706	-0.037	0.000	-0.029	0.002
2013	115,194	0.261	1.123	44221	0.253	0.794	70973	0.267	1.287	0.014	0.470	-0.017	0.391
2012	139,856	0.130	1.012	55690	0.158	1.044	84166	0.112	0.989	-0.046	0.000	-0.033	0.037
2011	109,469	0.127	1.533	41758	0.146	0.886	67711	0.114	1.820	-0.032	0.088	-0.052	0.019
2010	133,376	0.221	1.212	49943	0.262	1.516	83433	0.197	0.986	-0.065	0.000	-0.082	0.000
2009	118,716	0.188	1.039	42093	0.199	1.066	76623	0.182	1.024	-0.018	0.169	-0.034	0.010
2008	96,856	0.231	1.220	40550	0.242	0.930	56306	0.223	1.392	-0.020	0.197	-0.063	0.000
2007	119,369	0.228	1.648	46474	0.225	1.011	72895	0.230	1.948	0.005	0.839	-0.025	0.254
2006	122,787	0.205	0.952	49406	0.202	0.814	73381	0.207	1.035	0.005	0.698	-0.012	0.448
2005	141,448	0.222	1.427	59106	0.224	1.017	82342	0.221	1.660	-0.003	0.860	0.005	0.816
2004	108,936	0.153	1.119	45062	0.195	1.189	63874	0.124	1.066	-0.071	0.000	-0.085	0.000
2003	124,304	0.184	1.051	59308	0.221	1.018	64996	0.149	1.078	-0.072	0.000	-0.096	0.000
2002	103,595	0.190	0.974	47148	0.194	0.960	56447	0.188	0.985	-0.006	0.675	-0.045	0.003
2001	108,299	0.157	0.962	58793	0.172	1.098	49506	0.139	0.769	-0.032	0.001	-0.063	0.000
2000	73,705	0.083	1.176	41550	0.083	1.409	32155	0.083	0.777	0.000	0.988	0.035	0.016
1999	90,835	0.144	1.080	54710	0.142	1.167	36125	0.148	0.934	0.006	0.669	-0.026	0.082
>= 2011	769,281	0.179	1.019	281690	0.190	0.852	487591	0.173	1.105	-0.017	0.002	-0.031	0.000
2008-201	348,948	0.213	1.159	132586	0.236	1.222	216362	0.198	1.118	-0.038	0.000	-0.058	0.000
<= 2007	994,361	0.181	1.190	462164	0.187	1.081	532197	0.176	1.276	-0.011	0.047	-0.036	0.000
All years	2,112,590	0.185	1.125	876440	0.195	1.037	1236150	0.178	1.184	-0.017	0.000	-0.032	0.000

Table 22. Market-adjusted price change days 0-30 comparing sets of issuers by financial advisor size.

Data on bond characteristics from Mergent; MSRB data used for trade prices. Unit of analysis is the individual bond. Figures show the spread, in percent, between the offering price of the bond and the average price at which the bond is sold to customers in the secondary market on the day of the bond offering and the subsequent 30 days. For each bond, the average sale price is calculated as the weighted average of trades for that bond, weighted by par value traded on each trade.

Period	All Observations			Small advisor			Large advisor			Differential		With Covars	
	Count	Average	Std. Dev.	Count	Average	Std. Dev.	Count	Average	Std. Dev.	Coeff	p val	Coeff	p val
2016	114,038	0.186	0.872	53071	0.220	0.857	60967	0.156	0.883	-0.064	0.000	-0.043	0.000
2015	108,515	0.249	0.808	50222	0.294	0.845	58293	0.211	0.773	-0.082	0.000	-0.053	0.000
2014	85,665	0.075	0.712	38247	0.106	0.738	47418	0.050	0.689	-0.055	0.000	-0.041	0.000
2013	81,470	0.245	1.236	36803	0.296	1.650	44667	0.203	0.735	-0.093	0.005	-0.073	0.017
2012	94,490	0.096	0.999	42201	0.127	0.930	52289	0.072	1.051	-0.055	0.000	-0.021	0.141
2011	71,718	0.092	1.787	31724	0.168	2.497	39994	0.032	0.878	-0.136	0.000	-0.069	0.000
2010	90,282	0.194	1.186	41701	0.242	1.534	48581	0.154	0.769	-0.089	0.000	-0.054	0.000
2009	79,780	0.151	0.873	36063	0.212	1.000	43717	0.101	0.749	-0.111	0.000	-0.069	0.000
2008	63,518	0.222	0.901	28110	0.262	0.983	35408	0.191	0.829	-0.071	0.000	-0.044	0.006
2007	76,696	0.238	1.772	36935	0.287	2.431	39761	0.192	0.750	-0.095	0.020	-0.088	0.041
2006	79,872	0.193	0.749	38346	0.197	0.792	41526	0.189	0.707	-0.009	0.464	0.008	0.478
2005	86,555	0.201	1.025	42051	0.231	0.980	44504	0.172	1.065	-0.059	0.000	-0.039	0.017
2004	52,792	0.125	1.005	26081	0.153	0.966	26711	0.098	1.042	-0.055	0.005	-0.050	0.016
2003	48,757	0.182	1.020	25141	0.224	1.058	23616	0.138	0.975	-0.086	0.000	-0.058	0.012
2002	39,415	0.182	0.880	22896	0.196	0.900	16519	0.163	0.849	-0.033	0.085	-0.006	0.767
2001	27,162	0.167	0.927	16875	0.178	0.854	10287	0.148	1.034	-0.031	0.137	-0.016	0.455
2000	21,232	0.044	1.034	12387	0.057	1.025	8845	0.024	1.046	-0.033	0.165	-0.037	0.125
1999	23,665	0.156	1.222	14595	0.185	1.212	9070	0.109	1.237	-0.076	0.001	-0.048	0.034
>= 2011	555,896	0.163	1.083	252268	0.206	1.308	303628	0.126	0.850	-0.080	0.000	-0.057	0.000
2008-2010	233,580	0.187	1.013	105874	0.237	1.235	127706	0.146	0.780	-0.091	0.000	-0.062	0.000
<= 2007	456,341	0.182	1.140	235393	0.206	1.306	220948	0.156	0.932	-0.050	0.000	-0.029	0.001
All years	1,245,817	0.174	1.092	593535	0.212	1.294	652282	0.140	0.866	-0.072	0.000	-0.049	0.000

Table 23. Market-adjusted price change days 0-30 comparing sets of issuers by bonds with high versus low explicit issuance costs

Data on bond characteristics from Mergent; MSRB data used for trade prices. Data on explicit issuance costs from the Texas Bond Review Board. Unit of analysis is the individual bond. Figures show the spread, in percent, between the offering price of the bond and the average price at which the bond is sold to customers in the secondary market on the day of the bond offering and the subsequent 30 days. For each bond, the average sale price is calculated as the weighted average of trades for that bond, weighted by par value traded on each trade.

Period	All Observations			Low Explicit Costs			High Explicit Costs			Differential		With Covars	
	Count	Average	Std. Dev.	Count	Average	Std. Dev.	Count	Average	Std. Dev.	Coeff	p val	Coeff	p val
2016	13,068	0.206	0.825	7649	0.157	0.815	5419	0.276	0.834	0.119	0.001	0.023	0.536
2015	19,701	0.302	0.927	13805	0.281	0.931	5896	0.351	0.917	0.070	0.039	-0.090	0.021
2014	15,382	0.148	0.866	10981	0.141	0.852	4401	0.165	0.899	0.025	0.502	-0.152	0.000
2013	13,591	0.302	0.817	9355	0.306	0.822	4236	0.291	0.808	-0.015	0.649	-0.132	0.001
2012	15,298	0.074	1.605	10489	0.141	1.695	4809	-0.072	1.378	-0.213	0.000	-0.434	0.000
2011	12,254	0.121	0.916	8644	0.156	0.905	3610	0.039	0.939	-0.117	0.005	-0.196	0.000
2010	14,565	0.198	0.982	10127	0.210	0.961	4438	0.168	1.027	-0.042	0.333	-0.170	0.000
2009	11,220	0.174	0.856	7743	0.215	0.766	3477	0.083	1.022	-0.132	0.005	-0.170	0.010
2008	10,093	0.298	1.003	7233	0.342	1.028	2860	0.188	0.927	-0.154	0.002	-0.160	0.003
2007	12,626	0.265	0.844	9240	0.261	0.862	3386	0.275	0.793	0.014	0.710	0.023	0.572
2006	11,958	0.279	0.906	7985	0.290	0.894	3973	0.256	0.931	-0.033	0.414	-0.097	0.025
2005	13,111	0.208	1.056	8421	0.219	1.044	4690	0.189	1.076	-0.030	0.504	-0.110	0.021
2004	10,331	0.115	1.103	6478	0.137	1.050	3853	0.079	1.187	-0.058	0.251	-0.096	0.057
2003	8,663	0.189	1.277	5090	0.251	1.413	3573	0.102	1.047	-0.149	0.034	-0.204	0.004
2002	7,964	0.209	0.862	4339	0.275	0.689	3625	0.130	1.027	-0.145	0.001	-0.245	0.000
2001	8,126	0.199	1.108	4098	0.223	0.986	4028	0.175	1.220	-0.048	0.224	-0.130	0.003
2000	7,449	0.008	1.433	4023	0.028	1.738	3426	-0.016	0.957	-0.044	0.322	-0.150	0.017
1999	2,561	0.061	1.479	1466	0.015	1.466	1095	0.122	1.494	0.107	0.248	0.039	0.710
>= 2011	89,294	0.198	1.041	60923	0.202	1.063	28371	0.188	0.993	-0.015	0.400	-0.099	0.000
2008-2010	35,878	0.219	0.952	25103	0.250	0.928	10775	0.146	1.001	-0.104	0.000	-0.148	0.000
<= 2007	82,789	0.190	1.085	51140	0.214	1.096	31649	0.150	1.066	-0.064	0.000	-0.080	0.000
All years	207,961	0.198	1.044	137166	0.216	1.052	70795	0.165	1.028	-0.051	0.000	-0.075	0.000

Table 24. Effective percent spread on secondary market municipal bond trades. Unweighted. Small (<1M par) trades.

Percent spread on secondary market municipal bond transactions. Trades identified by a sequence with a bond purchase from a customer, followed by sales to customers of the same bond in the same amounts, potentially with inter-dealer trades between the purchase and sale. Spread is the spread between the average price at which the bonds are purchased and the average price at which they are sold back to customers. Distribution of spreads is calculated on an unweighted basis; transactions (once identified) are weighted equally regardless of size. Small trades only .

Period	Average			Percentiles						Amount Traded	
	Count	spread	Std. Dev.	5th	10th	25th	50th	75th	90th		
2016	1,156,383	1.105	1.389	0.000	0.039	0.199	0.762	1.837	2.746	3.189	85,037
2015	1,193,706	1.262	1.459	0.000	0.048	0.230	0.920	2.066	2.856	3.375	83,803
2014	1,227,903	1.467	1.574	0.000	0.061	0.291	1.169	2.363	3.155	3.736	84,709
2013	1,506,013	1.524	1.593	0.000	0.097	0.389	1.276	2.404	3.258	3.810	100,127
2012	1,302,727	1.631	1.590	0.001	0.100	0.451	1.448	2.505	3.332	3.928	92,814
2011	1,383,318	1.907	1.788	0.046	0.171	0.624	1.725	2.828	3.765	4.486	97,113
2010	1,317,519	1.895	1.773	0.033	0.180	0.686	1.739	2.803	3.728	4.425	94,651
2009	1,178,970	2.069	2.098	0.039	0.209	0.766	1.784	2.921	4.035	4.986	88,977
2008	1,135,815	1.736	2.100	0.000	0.000	0.490	1.371	2.529	3.671	4.604	95,406
2007	1,132,309	1.345	1.392	0.000	0.000	0.285	1.054	2.095	3.032	3.643	95,495
2006	1,068,725	1.436	1.553	0.000	0.000	0.310	1.176	2.249	3.139	3.786	87,777
2005	944,185	1.630	1.796	0.000	0.000	0.463	1.446	2.487	3.387	4.019	74,192
2004	924,287	1.930	2.359	0.000	0.000	0.674	1.817	2.849	3.763	4.477	68,059
2003	923,973	2.016	2.488	0.000	0.078	0.779	1.896	2.913	3.856	4.615	67,786
2002	845,482	2.092	2.691	0.000	0.143	0.885	1.924	2.958	3.957	4.727	59,834
2001	838,545	2.068	2.790	0.000	0.196	0.848	1.862	2.937	3.998	4.766	58,083
2000	927,653	2.256	2.389	0.000	0.277	0.986	2.016	3.144	4.320	5.160	58,766
>= 2011	7,770,050	1.498	1.598	0.000	0.083	0.348	1.211	2.376	3.228	3.84	543,603
2008-2010	3,632,304	1.902	1.991	0.000	0.141	0.637	1.628	2.769	3.822	4.661	279,035
<= 2007	7,605,159	1.820	2.218	0.000	0.000	0.573	1.605	2.69	3.685	4.418	569,991
All years	19,007,513	1.704	1.949	0.000	0.075	0.470	1.464	2.565	3.528	4.239	1,392,629

Table 25. Effective percent spread on secondary market municipal bond trades. Unweighted. Large (>=1M par) trades.

Percent spread on secondary market municipal bond transactions. Trades identified by a sequence with a bond purchase from a customer, followed by sales to customers of the same bond in the same amounts, potentially with inter-dealer trades between the purchase and sale. Spread is the spread between the average price at which the bonds are purchased and the average price at which they are sold back to customers. Distribution of spreads is calculated on an unweighted basis; transactions (once identified) are weighted equally regardless of size. Large trades only.

Period	Average			Percentiles						Amount Traded	
	Count	spread	Std. Dev	5th	10th	25th	50th	75th	90th		
2016	64,130	0.148	0.609	-0.104	0.000	0.000	0.016	0.158	0.566	1.062	379,473
2015	52,132	0.189	0.607	-0.168	-0.014	0.000	0.029	0.217	0.712	1.201	252,398
2014	53,797	0.228	0.780	-0.103	-0.001	0.000	0.024	0.230	0.785	1.366	291,654
2013	62,697	0.163	0.743	-0.168	0.000	0.000	0.025	0.205	0.699	1.250	356,196
2012	57,958	0.212	0.864	-0.133	0.000	0.000	0.005	0.193	0.847	1.426	340,406
2011	66,318	0.253	0.887	-0.006	0.000	0.000	0.005	0.220	0.852	1.450	399,898
2010	70,413	0.175	0.892	0.000	0.000	0.000	0.000	0.139	0.625	1.207	475,142
2009	65,541	0.218	0.964	0.000	0.000	0.000	0.000	0.189	0.717	1.318	408,017
2008	96,235	0.138	1.445	0.000	0.000	0.000	0.000	0.102	0.503	1.000	637,491
2007	122,134	0.061	0.887	-0.006	0.000	0.000	0.000	0.016	0.206	0.480	897,502
2006	107,242	0.068	0.547	-0.005	0.000	0.000	0.000	0.024	0.240	0.533	765,639
2005	85,552	0.081	0.793	-0.008	0.000	0.000	0.000	0.046	0.300	0.618	566,363
2004	88,153	0.073	0.805	-0.006	-0.001	0.000	0.000	0.012	0.268	0.639	554,256
2003	83,991	0.104	0.974	-0.005	-0.002	0.000	0.000	0.045	0.399	0.866	483,047
2002	78,482	0.132	0.907	-0.006	-0.003	0.000	0.000	0.062	0.453	0.911	414,387
2001	73,922	0.128	1.227	-0.011	-0.002	0.000	0.000	0.079	0.475	0.904	351,763
2000	74,755	0.161	1.012	-0.006	-0.002	0.000	0.000	0.092	0.467	0.885	375,511
>= 2011	357,032	0.198	0.760	-0.105	0.000	0.000	0.016	0.201	0.738	1.299	2,020,025
2008-2010	232,189	0.172	1.170	0.000	0.000	0.000	0.000	0.135	0.599	1.160	1,520,649
<= 2007	714,231	0.096	0.895	-0.006	-0.001	0.000	0.000	0.042	0.328	0.708	4,408,469
All years	1,303,452	0.138	0.918	-0.012	0.000	0.000	0.000	0.099	0.486	0.973	7,949,143

Table 26. Duration and structure of secondary market municipal bond trades.

Structure of realized municipal bond transactions in which purchase from customer and sale back to a customer or customers can be identified. Realized trade may also involve interdealer trades.

Period	Full trade count	Trade time to completion (days)				Average number of individual trades in transaction					
		Average	25th ptile	50th ptile	75th ptile	Total Trades where time < median			Trades where time >= median		
						All trades	median	Purchases	Inter-dealer trades	Sale to customer count	
2016	1,220,513	5.27	0.01	0.82	4.89	3.81	2.90	4.72	1.09	1.32	1.39
2015	1,245,838	5.28	0.02	0.85	4.96	3.76	2.86	4.67	1.09	1.27	1.39
2014	1,281,700	4.86	0.02	0.85	4.81	3.66	2.81	4.51	1.09	1.15	1.41
2013	1,568,710	4.00	0.02	0.84	3.88	3.57	2.78	4.36	1.10	1.05	1.42
2012	1,360,685	5.09	0.04	0.95	4.98	3.71	2.89	4.53	1.10	1.16	1.45
2011	1,449,636	4.47	0.04	0.93	4.83	3.65	2.85	4.44	1.09	1.00	1.55
2010	1,387,932	4.58	0.05	0.94	4.85	3.62	2.86	4.38	1.09	0.95	1.58
2009	1,244,511	4.12	0.05	0.93	4.05	3.64	2.88	4.39	1.09	0.92	1.64
2008	1,232,050	4.29	0.04	0.94	4.69	3.59	2.87	4.31	1.10	0.93	1.57
2007	1,254,443	4.70	0.03	0.95	4.94	3.36	2.68	4.04	1.10	0.81	1.45
2006	1,175,967	4.74	0.03	0.95	4.96	3.31	2.64	3.99	1.10	0.76	1.46
2005	1,029,737	4.92	0.04	0.97	5.05	3.11	2.50	3.72	1.10	0.51	1.50
2004	1,012,440	4.27	0.04	0.92	4.19	3.06	2.47	3.66	1.10	0.45	1.52
2003	1,007,964	4.10	0.04	0.90	4.00	3.07	2.48	3.66	1.10	0.43	1.55
2002	923,964	3.95	0.04	0.90	3.96	3.05	2.43	3.68	1.09	0.39	1.58
2001	912,467	4.83	0.05	0.97	4.98	2.98	2.39	3.57	1.09	0.37	1.52
2000	1,002,408	5.03	0.07	1.04	5.78	2.99	2.39	3.60	1.09	0.38	1.52
>= 2011	8,127,082	4.79	0.02	0.88	4.80	3.69	2.84	4.53	1.10	1.15	1.44
2008-2010	3,864,493	4.34	0.05	0.94	4.70	3.62	2.87	4.36	1.09	0.93	1.59
<= 2007	8,319,390	4.58	0.04	0.95	4.89	3.13	2.51	3.75	1.10	0.53	1.51
All years	20,310,965	4.62	0.03	0.92	4.83	3.45	2.72	4.17	1.10	0.85	1.50

Table 27. Municipal bond defaults by type, 2000-2016.

Data come from Mergent Fixed Income Database

Year	Unscheduled			Missed Interest Payment	Principal or Redemption Payment	Tender or Put Payment	Missed Replenish LOC or Reserve Fund	Failure to Replenish			Covenant violation	Other	Total	
	Draw on Credit		Failure of guarantor					Missed Interest Payment		Tender or Put Payment				
	Bankrupt Leasor	Enhancement or Reserve	Missed Interest Payment	Principal or Redemption Payment	Tender or Put Payment	Missed Replenish LOC or Reserve Fund	Missed Interest Payment	Principal or Redemption Payment	Tender or Put Payment	Failure to Replenish	Covenant violation			
2016	9	37	1	93	14	0	1	9	1	1	9	1	165	
2015	0	9	0	29	6	1	1	21	1	1	21	1	68	
2014	4	51	0	68	11	0	0	45	0	0	45	0	179	
2013	1	35	0	75	10	0	1	28	1	1	28	0	150	
2012	2	41	0	55	18	0	2	59	2	2	59	2	179	
2011	25	35	0	51	6	0	20	28	0	20	28	0	165	
2010	1	22	2	71	10	0	1	36	1	1	36	0	143	
2009	8	18	0	95	8	0	8	42	0	8	42	0	179	
2008	3	8	2	23	1	0	0	11	0	0	11	0	48	
2007	5	1	9	2	0	0	0	11	0	0	11	0	28	
2006	2	2	1	13	1	0	0	8	0	0	8	0	27	
2005	5	0	2	16	1	0	0	7	0	0	7	1	32	
2004	7	0	0	18	1	0	0	9	0	0	9	29	64	
2003	7	3	1	25	1	0	1	8	0	1	8	0	46	
2002	8	3	1	13	1	0	0	8	0	0	8	0	34	
2001	2	3	0	12	1	0	0	6	0	0	6	1	25	
2000	8	5	1	9	0	0	0	4	0	0	4	0	27	
Total	97	273	20	668	90	1	35	340	35	35	340	35	1559	