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Fourth Quarter 2017

RESEARCH REPORT

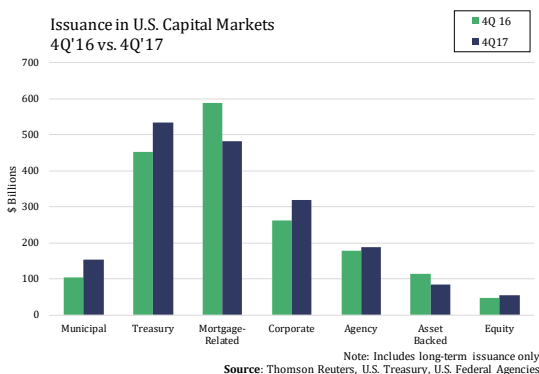
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CAPITAL MARKETS OVERVIEW



Issuance Highlights - Year-Over-Year⁽¹⁾

\$ Billions	2017:Q4	2016:Q4	% Change
Municipal	146.7	104.9	39.8%
Treasury	535.5	451.6	18.6%
Mortgage-Related	483.2	588.4	-17.9%
Corporate	319.2	264.6	20.6%
Federal Agency	187.6	178.9	4.9%
Asset-Backed	84.0	113.9	-26.3%
Equity	55.0	54.9	0.2%

Issuance Highlights - Quarter-Over-Quarter⁽¹⁾

\$ Billions	2017:Q4	2017:Q3	% Change
Municipal	146.7	91.5	60.3%
Treasury	535.5	463.9	15.4%
Mortgage-Related	483.2	492.3	-1.8%
Corporate	319.2	420.1	-24.0%
Federal Agency	187.6	187.6	0.0%
Asset-Backed	84.0	75.8	10.8%
Equity	55.0	52.3	5.2%

⁽¹⁾ Includes long-term issuance only

Total Capital Markets Issuance

Long-term securities issuance totaled \$1.81 trillion in 4Q'17, a 1.6 percent increase from \$1.78 trillion in 3Q'17 and a 3.6 percent increase year-over-year (y-o-y) from \$1.75 trillion. Issuance increased quarter-over-quarter (q-o-q) across all asset classes except mortgage-related, corporate, and agency; y-o-y, most asset classes increased in issuance except mortgage-related and asset-backed. For the full year 2017, long-term issuance totaled \$7.54 trillion, a slight decrease of 1.1 percent from \$7.62 trillion in 2016. The annual decrease was driven primarily by a decrease in mortgage-related and agency issuance.

Long-term public municipal issuance volume including private placements for 4Q'17 was \$146.7 billion, up 60.3 percent from \$91.5 billion in 3Q'17 and up 39.8 percent from \$104.9 billion in 4Q'16. Full year issuance was \$448.1 billion, an increase of 0.5 percent from \$445.8 billion in 2016.

The U.S. Treasury issued \$535.5 billion in coupons, Floating Rate Notes and Treasury Inflation Protected Securities in 4Q'17, up 15.4 percent from \$463.9 billion in the prior quarter and 18.6 percent above \$451.6 billion issued in 4Q'16. In full year 2017, Treasury issued \$2.22 trillion in Treasury coupons, FRNs and TIPS, up 2.5 percent from \$2.17 trillion in 2016.

Issuance of mortgage-related securities, including agency and non-agency passthroughs and collateralized mortgage obligations, totaled \$483.2 billion in the fourth quarter, a 1.8 percent decrease from 3Q'17 (\$492.3 billion) but a 17.9 percent decrease y-o-y (\$588.4 billion). For full year 2017, \$1.88 trillion of mortgage-related securities were issued, a decrease of 7.6 percent from \$2.04 trillion in 2016.

Corporate bond issuance totaled \$319.2 billion in 4Q'17, down 24 percent from \$420.1 billion issued in 3Q'17 but up 21.0 percent from 4Q'16's issuance of \$263.9 billion. Of 4Q'17 corporate bond issuance, investment grade issuance was \$250.4 billion (78.4 percent of total) while high yield issuance was \$68.8 billion (21.6 percent of total). For full year 2017, corporate bond issuance totaled \$1.63 trillion, up 6.9 percent from \$1.53 trillion in 2016.

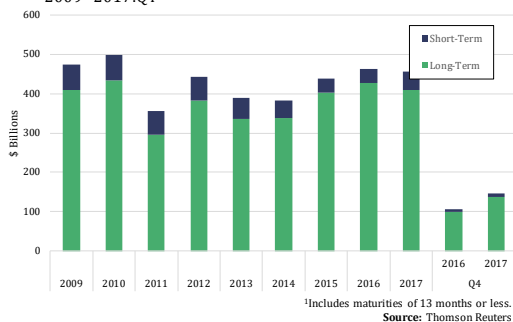
Long-term federal agency debt issuance was \$187.6 billion in the fourth quarter, which remain unchanged from \$187.6 billion in 3Q'17 but a 4.9 percent increase from \$178.9 billion issued in 4Q'16. For the full year, long-term agency issuance was \$710.0 billion, a decrease of 22.4 percent from \$915.5 billion in 2016.

Asset-backed securities issuance totaled \$84.0 billion in the fourth quarter, an increase of 10.8 percent q-o-q (\$75.8 billion) but a 26.2 percent decrease y-o-y (\$113.9 billion) in 4Q'16. For the full year, issuance totaled \$425.1 billion, an increase of 31.8 percent from the prior year.

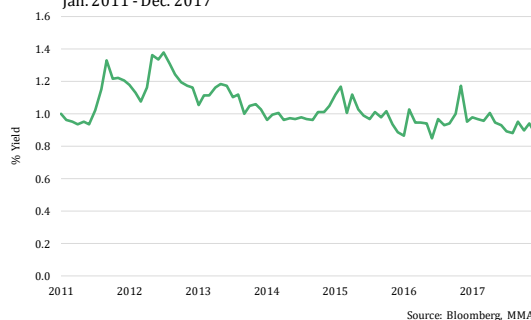
Equity underwriting increased by 5.2 percent to \$55.0 billion in the fourth quarter from \$52.3 billion in 3Q'17 and up 17.5 percent from \$46.8 billion issued in 4Q'16. Of the total, "true" initial public accounted for \$11.8 billion, up 152.6 percent from \$4.7 billion in 3Q'17 and up 168.1 percent from \$4.4 billion in 4Q'16. In full year 2017, \$36.3 billion was raised through 169 IPOs, up 103.4 percent from \$17.8 billion on 107 deals in 2016.

MUNICIPAL BOND MARKET

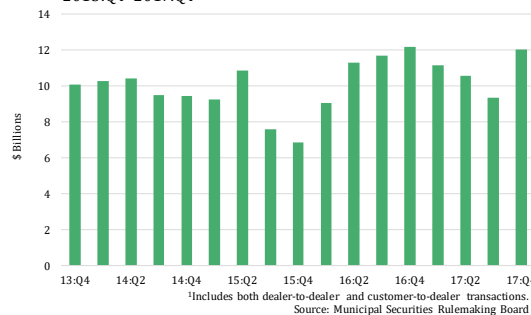
Short-¹ and Long-Term Municipal Issuance
2009 - 2017:Q4



Municipal GO AAA and 10-Yr Treasury Ratio
Jan. 2011 - Dec. 2017



Average Daily Trading Volume of Municipal Securities¹
2013:Q4 - 2017:Q4



According to Thomson Reuters, long-term public municipal issuance volume totaled \$136.5 billion in the fourth quarter of 2017, an increase of 60.9 percent from the prior quarter (\$84.8 billion) and an increase of 36.7 percent year-over-year (y-o-y) (\$99.9 billion). For the full year, municipal issuance totaled \$408.5 billion, a decline of 1.1 percent from 2016 but still the third highest annual volume on rec-ord. Including private placements (\$18.3 billion), long-term municipal issuance for 4Q'17 was \$154.8 billion, while full year totals were \$448.1 billion.

Tax-exempt issuance totaled \$120.9 billion in 4Q'17, an increase of 60.3 percent q-o-q and 33.2 percent y-o-y; for the full year, tax-exempt issuance was \$360.4 billion. Taxable issuance totaled \$11.5 billion in 4Q'17, an increase of 94.0 and 60.1 percent, respectively, q-o-q and y o y; for the full year, taxable issuance totaled \$34.2 billion. AMT issuance was \$5.4 billion in 4Q'17, an increase of 60.3 percent q-o-q and 33.2 percent y-o-y; for the full year, AMT volumes were \$15.4 billion.

By use of proceeds, general purpose led issuance totals in 4Q'17 (\$36.2 billion), followed by primary & secondary education (\$18.2 billion) and higher education (\$12.3 billion). For the full year, the rankings were still the same: general purpose (\$178.4 billion), primary & secondary education (\$126.2 billion), and higher education (\$70.4 billion). Refunding volumes rose slightly to comprise 47.0 percent of issuance in 4Q'17 from 43.4 percent in the prior quarter but declined from 47.4 percent from the fourth quarter of 2016. For the full year, refunding volumes comprised 43.3 percent of all issuance, down from 48.2 percent in 2016.

Yields, Inflows, and Total Return

Ratios of 10-year tax-exempt AAA GOs and similar-maturity Treasuries rose in the fourth quarter on a q-o-q basis, averaging 86 percent in 4Q'17 from 85.0 percent in 3Q'17. For the full year, the ratio was 89 percent.

According to the Investment Company Institute (ICI), fourth quarter net flow into long-term tax-exempt funds was positive, with \$2.1 billion of net inflow in 4Q'17 compared to \$8.8 billion of inflow from 3Q'17 and \$27.1 billion of outflow y-o-y.

According to Bank of America-Merrill Lynch indices, municipals gained 5.4 percent in the fourth quarter of 2017 and returned 5.7 percent for the full year. For the fourth quarter, the health, hospital and tobacco sectors outperformed among the individual municipal sectors (1.7 percent, 1.6 percent and 1.4 percent respectively)

while the state, leasing/rental, and pollution control sectors underperformed relative to other municipal sectors (0.2 percent, 0.3 percent and 0.3 percent total return, respectively). Build America Bonds (BABs) gained 2.0 percent in 4Q'17, underperforming tax-exempt bonds but outperforming similarly-rated corporate bonds (1.1 percent). For the full year, BABs returned 8.1 percent, outperforming both tax-exempts (5.7 percent) and similarly-rated corporates (5.4 percent).

Trading Activity and Bank Holdings

Trading activity rose q-o-q to \$12.0 billion daily in 4Q'17, a 28.8 percent increase from 3Q'17 (\$9.3 billion) but a 1.1 percent decline from 4Q'16 (\$12.1 billion). By number of trades, trading activity rose 6.1 percent on a q-o-q basis but fell 6.5 percent on a y-o-y basis. For the full year, trading activity averaged \$10.8 billion daily by dollar amount, down from \$11.1 billion daily in 2016.

Bank holdings of municipal loans rose in 3Q'17 from the prior quarter to \$183.4 billion (from \$180.3 billion) while holdings of bonds fell slightly to \$376.9 billion (from \$377.0 billion).

TREASURY MARKET

Gross Issuance of U.S. Treasury Securities

Total gross issuance of U.S. Treasury bills and coupons, including cash management bills (CMBs), Floating Rate Notes (FRNs) and Treasury Inflation-Protected Securities (TIPS), was \$2.26 trillion in 4Q'17, up 10.2 percent from \$2.05 trillion in 3Q'17 and a 7.8 percent increase from \$2.10 trillion in 4Q'16. Treasury net issuance, including CMBs, increased to \$270.1 billion in the fourth quarter, up from \$188.7 billion in the previous quarter and up from net issuance of \$254.9 billion in 4Q'16. Fourth quarter net issuance was slightly less than the U.S. Treasury's net issuance estimate of \$275.0 billion.¹ For full year 2017, U.S. Treasury gross issuance totaled \$8.79 trillion in bills and coupons (including CMBs, FRNs and TIPS), up 5.9 percent from \$8.30 trillion in 2016.

In 4Q'17, \$59.0 billion in CMBs were issued, a decrease from \$105.0 billion issued in 3Q'17 and an increase from 4Q'16 where there was no CMBs issuance. For full year 2017, \$327.0 billion of CMBs were issued.

The U.S. Treasury issued \$535.5 billion in coupons, FRNs and TIPS in 4Q'17, up 15.4 percent from \$463.9 billion in the prior quarter and up 18.6 percent from \$451.6 billion issued in 4Q'16. In full year 2017, Treasury issued \$2.22 trillion in Treasury coupons, FRNs and TIPS, up 2.5 percent from \$2.16 trillion in 2016.

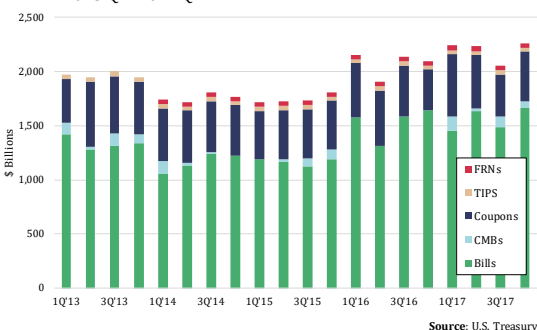
Excluding TIPS and FRNs, total gross issuance of Treasury marketable coupon securities was \$463.5 billion, up 21.4 percent from \$381.6 billion issued in 3Q'17 and 22.5 percent up from \$378.3 billion issued in 4Q'16. Net coupon issuance was \$116.2 billion in 4Q'17, a 10.9 percent increase from the \$104.8 billion in 3Q'17 and up 38.4 percent y-o-y. For full year 2017, Treasury gross coupon issuance, excluding FRNs and TIPS, totaled \$1.91 trillion, up 3.2 percent from \$1.85 trillion in 2016.

In 4Q'17, \$41.4 billion in FRNs were issued, down 2.7 percent from \$42.5 billion in 3Q'17 and down 1.3 percent from \$41.9 billion in 4Q'16.

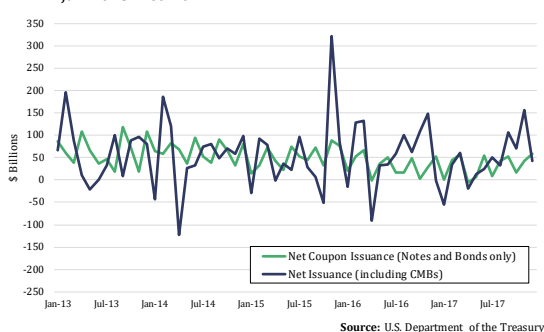
Trading Activity

The daily trading volume of Treasury securities by primary dealers averaged \$495.9 billion in 4Q'17, a 4.8 percent increase from \$473.2 billion in the previous quarter and a 10.3 percent decrease from \$552.9 billion traded daily in 4Q'16. For full year 2017, the average daily trading volume decreased to \$505.2 billion, down 2.7 percent from \$519.1 billion in 2016.

Quarterly Gross Issuance of U.S. Treasury Securities
2013:Q1 - 2017:Q4



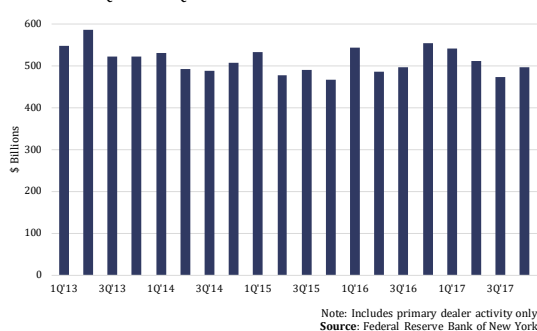
Net Issuances of U.S. Treasury Marketable Debt
Jan. 2013 - Dec. 2017



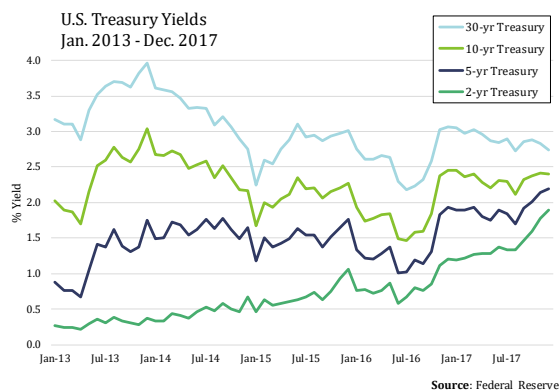
Gross Issuance of U.S. Treasury Marketable Coupon Securities
2008 - 2017



U.S. Treasury Securities Average Daily Trading Volume
2013:Q1 - 2017:Q4



¹ Treasury's October borrowing estimates can be found [here](#).



Treasury Yield Curve

In 4Q'17 U.S. Treasury yields increased for short-, medium-, and long-term securities. Two-year rates increased to 1.89 percent in 4Q'17, up from 1.47 percent end-September and from 1.20 percent end-December 2016. Five-year yields increased to 2.20 percent end-December, up from 1.92 percent in 3Q'17 and from 1.93 percent in 4Q'16. Ten-year yields increased to 2.40 percent end-December, up from 2.33 percent end-September and down from 2.45 percent in 4Q'16. Thirty-year yields ended 4Q'17 at 2.74 percent, down from 2.86 percent end-September and from 3.06 percent end-December 2016.

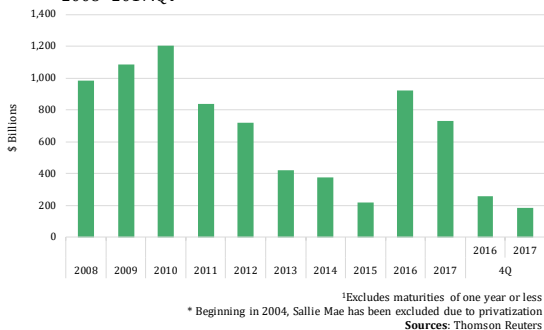
FOMC Meeting Summary

During its December 13th, 2017 meeting, the Federal Reserve's Federal Open Market Committee decided to raise the target range for the federal funds rate to 1.00-1.50 percent.² The FOMC also confirmed that its stance of monetary policy remains accommodative, thereby supporting strong labor market conditions and a sustained return to two percent inflation.

² [Statement from the FOMC Meeting](#), December 13th, 2017.

FEDERAL AGENCY DEBT MARKET

Long-Term Federal Agency Debt Issuance
2008 - 2017:Q4



Federal agency long-term (LTD) issuance was \$207.9 billion in the fourth quarter, a 10.9 percent increase from \$187.6 billion in 3Q'17 and an 8.4 percent increase from \$191.9 billion issued in 4Q'16. For the full year 2017, federal agency LTD issuance totaled \$730.3 billion, a 20.7 percent decrease y-o-y from \$921.4 billion.

Fannie Mae's 4Q'17 gross debt issuance, both short term debt (STD) and LTD, totaled \$219.7 billion, a 9.5 percent increase from \$200.7 billion in 3Q'17 and a 49.8 percent increase from \$146.7 billion in 4Q'16. STD issuance decreased to \$194.1 billion in 4Q'17 compared with \$196.7 billion in 3Q'17 while LTD issuance increased to \$25.6 billion in 4Q'17 from \$4.0 billion in 3Q'17. Fannie Mae had \$33.4 billion STD outstanding and \$244.1 billion LTD outstanding at the end of 4Q'17, unchanged from the previous quarter's STD outstanding but down from \$258.9 billion LTD outstanding in 3Q'17.

Freddie Mac's gross debt issuance totaled \$110.6 billion in 4Q'17, an increase of 3.8 percent from \$106.5 billion in 3Q'17 but a decrease of 3.7 percent from \$114.8 billion in 4Q'16. As of 4Q'17, Freddie Mac had \$73.1 billion STD and \$243.5 billion LTD outstanding, in comparison with \$69.6 billion STD and \$251.6 billion LTD in the prior quarter.

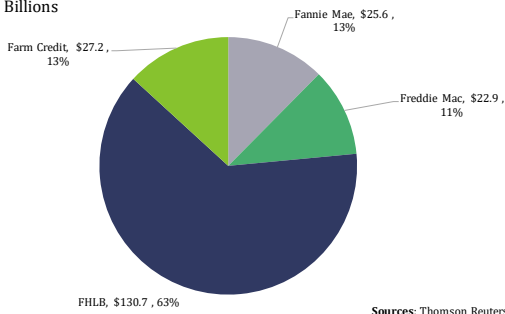
The 12 Federal Home Loan Banks (FHLB) issued \$130.7 billion in LTD in the fourth quarter, a decrease of 9.1 percent from \$143.7 billion in 3Q'17 but an increase of 4.5 percent from \$125.1 billion in 4Q'16. In 4Q'17, \$1,676.7 billion of STD was issued, up 6.1 percent from \$1,580.8 billion issued in 3Q'17 and up 266.4 percent from \$457.6 billion in 4Q'16. Total FHLB LTD outstanding was \$642.2 billion at the end of December, up from \$620.5 billion outstanding in 3Q'17. Discount notes outstanding decreased to \$392.0 billion in 4Q'17 from \$407.9 billion in 3Q'17.

Total Farm Credit System gross debt issuance for 4Q'17 totaled \$78.7 billion, up 24.4 percent from the previous quarter's \$63.3 billion but down 17.1 percent y-o-y. Total debt outstanding at the end of the fourth quarter was \$265.4 billion, of which \$25.6 billion was short-term and \$239.8 billion was long-term compared to \$25.5 billion short-term and \$232.5 billion long-term in the prior quarter.

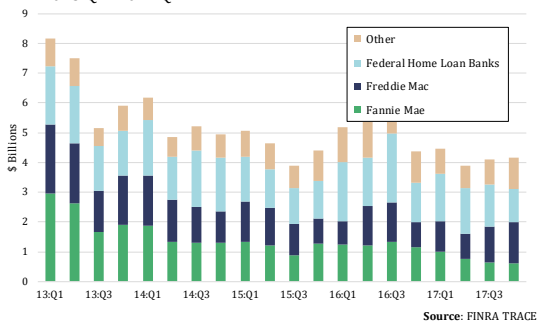
Trading Activity

Average daily trading volume of agency securities in the fourth quarter was \$4.2 billion, up 1.5 percent from \$4.1 billion traded in 3Q'17 but down 5.0 percent from \$4.4 billion traded in 4Q'16. Growth was primarily driven by Freddie Mac agency securities trading dollar volume increasing 12.7 percent q-o-q while Fannie Mae and FHLB security trading dollar volume decreased 4.0 percent and 19.5 percent q-o-q, respectively.

Long-Term Federal Agency Debt Issuance by Agency
2017:Q4
\$ Billions

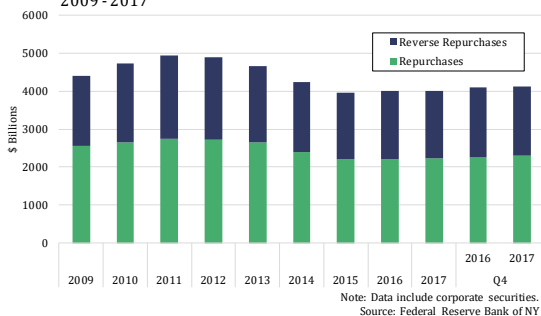


Federal Agency Securities Average Daily Trading Volume
2013:Q1 - 2017:Q4

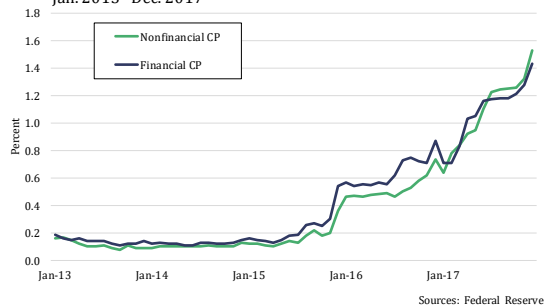


FUNDING AND MONEY MARKET INSTRUMENTS

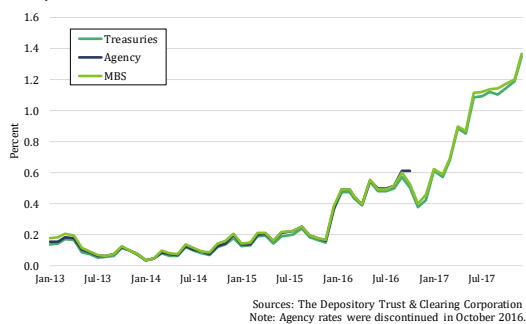
Financing by U.S. Government Securities Dealers
Average Daily Amount Outstanding
2009 - 2017



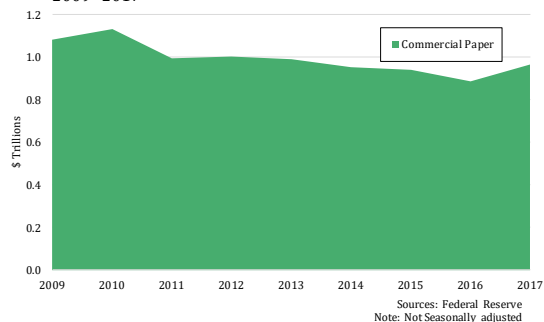
Financial & Nonfinancial Commercial Paper 3-Month Interest Rates
Jan. 2013 - Dec. 2017



DTCC GCF Repo Index™
Jan. 2013 - Dec. 2017



Outstanding Commercial Paper
2009 - 2017



Total Repurchase Activity

The average daily amount of total repurchase (repo) and reverse repo agreement contracts outstanding was \$4.13 trillion in 4Q'17, an increase of 3.3 percent from 3Q'17's \$4.00 trillion and an increase of 1.1 percent y-o-y. For the full year, the average daily amount of total repo and reverse agreements was \$4.01 trillion.

Average daily outstanding repo transactions totaled \$2.31 trillion in 4Q'17, an increase of 3.4 percent q-o-q and an increase of 2.8 percent y-o-y. Reverse repo transactions in 4Q'17 averaged \$1.82 trillion daily outstanding, an increase of 3.08 percent and a decline of 1.1 percent q-o-q and y-o-y, respectively.

GCF Repo Rates

DTCC general collateral finance (GCF) repo rates increased again for Treasuries and MBS in 4Q'17 on a q-o-q basis and y-o-y basis: the average repo rate for Treasuries (30-year and less) rose to 122.4 basis points (bps) from 3Q'17's average rate of 110.6 bps and 4Q'16's average of 43.5 bps. The average MBS repo rate rose to 124.3 bps from 113.4 bps in the previous quarter and 46.0 bps in 4Q'16.

Financial and Nonfinancial 3-Month Commercial Paper Interest Rates

Interest rates for nonfinancial commercial paper (CP) rose to 153 bps end-December 2017 from 125 bps end-September 2017 and from 74 bps end-December 2016. Financial CP increased to 143 bps end-December 2017 from 118 bps end-September 2017 and also rose from 87 bps end-December 2016.

Total Money Market Instruments Outstanding

Preliminary outstanding volume of commercial paper stood at \$965.9 billion at the end of the fourth quarter, down 1.7 percent from the prior quarter's \$982.4 billion and an increase of 9.2 percent y-o-y.

MORTGAGE-RELATED SECURITIES

Mortgage-Related Issuance

Issuance of mortgage-related securities, including agency and non-agency passthroughs and collateralized mortgage obligations (CMOs), totaled \$514.3 billion in the fourth quarter, a 2.4 percent increase from 3Q'17 (\$502.2 billion) and a 12.9 percent decline y-o-y (\$590.3 billion). The increase was due to slight increases in both non-agency and agency MBS issuance volumes, although the agency share of issuance decreased to 88.0 percent from 89.5 percent. For the full year, the market issued \$1.93 trillion in mortgage-related securities, down by 5.6 percent from \$2.04 trillion in 2016.

Agency Issuance

Agency mortgage-related issuance totaled \$452.8 billion in 4Q'17, an increase of 0.7 percent q-o-q (\$449.7 billion) but a decline of 16.3 percent from 4Q'16 (\$541.0 billion). For the full year, agency issuance was \$1.71 trillion, a decrease of 9.0 percent from \$1.88 trillion 2016.

According to Freddie Mac, average conventional 30-year mortgage rates rose in the fourth quarter to 3.92 percent, up 2 basis points from 3.90 percent in the prior quarter.

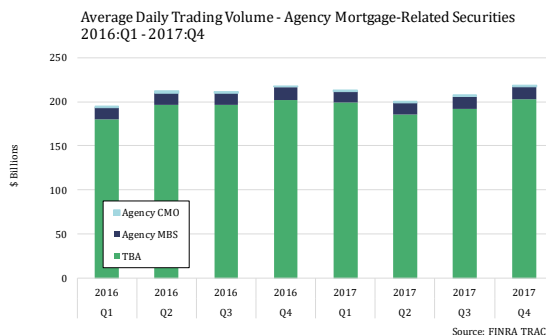
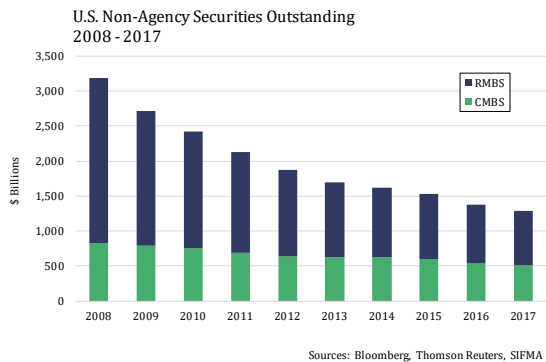
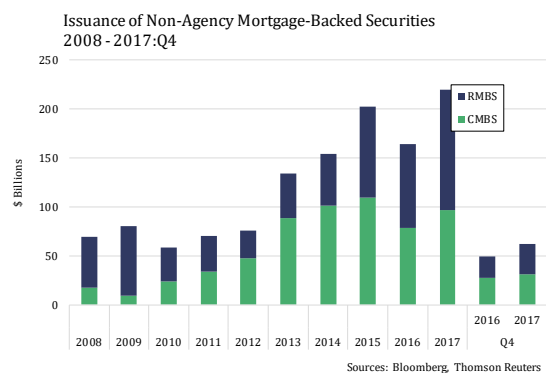
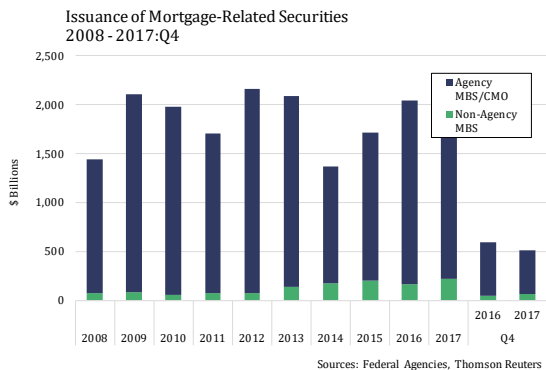
Non-Agency Issuance

Non-agency issuance totaled \$61.6 billion in 4Q'17, increase of 17.2 percent from 3Q'17 (\$52.5 billion) and increase of 24.9 percent y-o-y (\$49.3 billion). Non-agency residential mortgage-backed securities (RMBS) issuance was \$30.8 billion (up 24.8 percent q-o-q and 41.1 percent y-o-y, while commercial mortgage backed securities (CMBS) issuance was \$30.7 billion (up 10.5 percent q-o-q and 11.9 percent y-o-y). For the full year, non-agency issuance was \$219.9 billion, an increase of 34.1 percent from 2016, largely due to the increase in residential mortgage-backed securities (RMBS) issuance, particularly in the new issue nonprime and legacy scratch & dent sectors.

Trading Activity

Daily trading volumes for mortgage-related securities rose in the fourth quarter, with increases in both agency and non-agency trading volumes. Average daily trading volume of agency mortgage-related securities, including passthroughs, CMOs and TBAs, was \$218.9 billion in 4Q'17, an increase of 5.7 percent from 3Q'17 and a slight increase 0.2 percent y-o-y. Average daily trading volumes of non-agency securities rose to \$2.7 billion daily in 4Q'17, an increase of 22.1 percent q-o-q and up 6.6 percent y-o-y.

For the full year, mortgage-related securities trading volume was \$211.6 billion, a slight increase of 0.3 percent from 220.8 in 2016.



ASSET-BACKED SECURITIES

Asset-Backed Securities Issuance

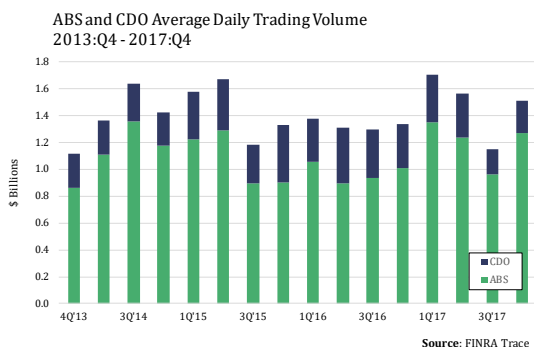
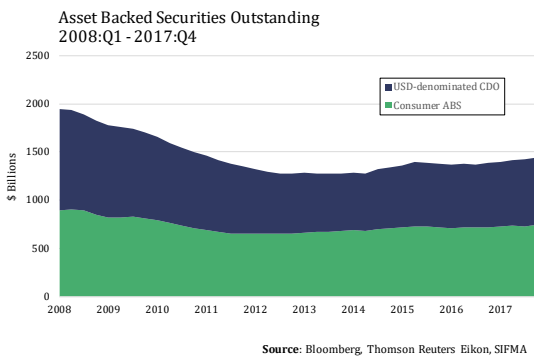
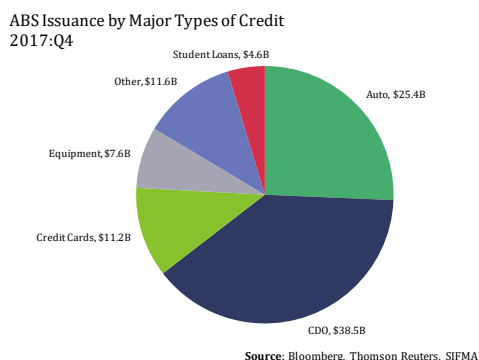
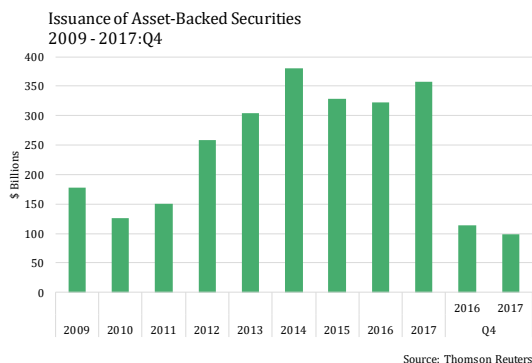
Asset-backed securities (ABS) issuance totaled \$99.1 billion in the fourth quarter, an increase of 30.5 percent q-o-q but a decrease of 13.0 percent y-o-y. Both the CDO and auto sectors led issuance totals for the fourth quarter with \$38.5 billion (38.9 percent of total issuance) and \$25.4 billion (25.7 percent of total issuance) issued, respectively. For the full year, issuance totaled \$357.0 billion, up 10.7 percent from the previous year's \$322.5 billion.

On a q-o-q basis, all major types of credit experienced increases in issuance volumes in the fourth quarter, with the largest increase of 65.7 percent in the equipment sector. Credit cards, USD-denominated CDOs, "other" asset categories, student loans, and autos experienced q-o-q increases of 48.8 percent, 41.5 percent, 27.4, 19.5 and 8.1 percent, respectively. For the full year, issuance volumes increased for all major types of credit except student loans. The largest increase for the full year was in credit cards (63.8 percent) followed by equipment (48.0 percent), auto (10.9 percent), and USD-denominated CDOs (9.0 percent), while student loans decreased by 7.1 percent.

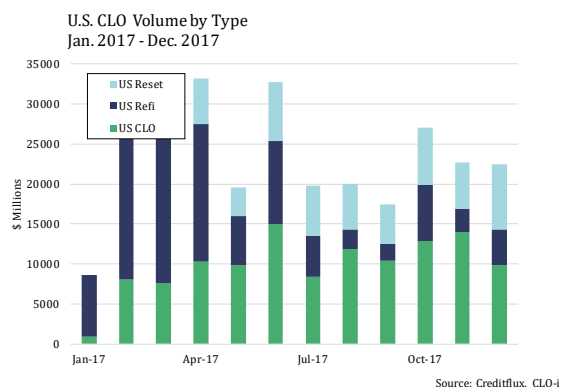
Outstanding volumes ended the fourth quarter at \$1.4 trillion, an increase of 1.8 percent q-o-q and 4.3 percent y-o-y. Credit cards, USD-denominated CDOs, auto, equipment, and esoteric ABS experienced increases in outstanding volume by 0.6 percent, 1.4 percent, 2.4 percent, 4.9 percent, and 5.8 percent respectively. Student loans experienced the only decrease in volume by 1.0 percent. Notable subcategories to see q-o-q growth were: floorplan auto (8.8 percent), equipment leases (13.1 percent), large ticket transportation (5.9 percent), cell phone contracts (27.5 percent), PACE (18.6 percent) and solar (55.9 percent).

Trading Activity

Daily average trading activity in ABS and CDOs increased in 4Q'17 to \$1.51 billion, an increase of 31.1 percent from \$1.15 billion in 3Q'17, and an increase of 12.9 percent from 4Q'16. Trading activity increased in both ABS and CDO markets, 31.8 percent and 27.4 percent q-o-q respectively.



U.S. COLLATERALIZED LOAN OBLIGATIONS³



	2017 CLO Risk Retention Structures (# of Deals)				
	Horizontal	Vertical	Dual	L-shape	Unknown
US new CLOs	101	83	67	2	2
US reset CLOs	23	79	10	7	6
MM new CLOs	19	1	14	0	6
MM reset CLOs	7	1	4	0	1
EUR new CLOs	19	29	26	0	3
EUR reset CLOs	17	15	4	0	1
EUR refi CLOs	15	19	3	0	1

Source: Creditflux, CLO-i

Who predicted \$145bn of issuance?

2017 was the first year in which US risk retention was enforced, causing issuers to hold onto at least 5 percent of their deals. By the end of the year, 135 managers had priced CLOs, contributing to \$339 billion of issuance globally across new issues, resets and refinancings.

Last January, the market got off to a cautious start with new issue CLO generation heavily outweighed by resets and refis. But gradually, CLO managers became more self-confident; at the start of 2017, triple A CLOs in regular five-year reinvestment deals were pricing in Europe at 93 basis points over Euribor (floored at zero), and in the US at 145 bps over Libor. By the end of the year, spreads had reached their tightest levels since the financial crisis: European triple As were pricing at Euribor plus 72 bps (a 21 bps fall over 12 months), while US seniors were pricing at 108 bps (a 37 bps fall).

Spread tightening was not exclusive to CLOs. According to a 2017 ABS round-up by Debtwire, Creditflux's sister publication, "many asset classes ended the year at their pre-crisis level." Dutch RMBS and German auto ABS were the two markets that rallied the most during the course of last year.

Spreads are tighter in European RMBS and US CMBS when comparing to CLOs from the same regions. However, CLO issuance tops that of mortgage-backed deals. There was \$104.8 billion of new issue US CLO launches last year when considering deals backed by broadly syndicated corporate loans.

US managers have had a couple of years to prepare for risk retention and many firms entered 2017 armed with MOAs (majority owned affiliates), CMOAs (capitalised majority-owned affiliates and CMVs (capitalised manager vehicles). They put these vehicles to work, favouring horizontal compliance (retaining CLO equity) over vertical strips (retaining 5 percent of each tranche of a securitisation). 101 US CLOs were compliant by means of a horizontal risk retention stake, while 83 deals went the way of vertical strips.

Across the year, there was a rise in managers choosing dual compliance. Across the US and Europe, 67 deals from the 2017 vintage are classified as both US and European risk retention-compliant.

Europe has had a four-year head start in the risk retention space. For 2017 new issue deals, vertical compliance was a slightly more popular choice for European managers, whereas for resets and refinancings the choice was fairly balanced between horizontal and vertical.

Our data shows that 23 new issue European CLOs priced last year using an originator structure. Originators require managers to purchase loan assets for their own account before then securitizing these assets into a CLO. Twenty five new issue 2017 European CLOs used sponsors; these are Mifid-regulated entities, and therefore have to be registered in the EU.

When volumes escalate and spreads plummet, innovation is very nearly always the next item on the agenda. There was plenty of that in 2017, such as GoldenTree Loan Management's multi-arranger CLO programme and RBC's move to transform CLO vertical strips into bonds.

Another area around which managers and equity investors strategised was duration. The boom in CLO refis and resets, along with the copious amounts of CLO paper that trades in the secondary market these days, has resulted in the development of a term curve for CLOs.

Carlyle broke new ground when it produced a US CLO with a six-year reinvestment period and the followed with shortly after with another six-year reinvestment deal. No other CLO manager dared venture beyond the five-year mark. The Carlyle CLOs were pricing just a handful of basis points wide

³ The author of the CLO section is Tanvi Gupta, Creditflux. For any questions, please contact Tanvi Gupta at tanvi.gupta@acuris.com.

of market tights, which meant that the manager did not have to pay very much for another year of reinvestment capability, a particularly valuable tool for a manager in the event of a downturn in the loan market.

As 2017 wore on, the CLO term curve steepened at the front end, which made pricing shorter dated CLOs more valuable. A steeper curve meant that managers could obtain drastically cheaper financing by giving up a year or two of reinvestment flexibility.

It may be too early to gauge how the 2017 generation of CLOs performs, but there are signs that loan market conditions are not as favourable as they once were and managers are beginning to reach for higher-yielding assets.

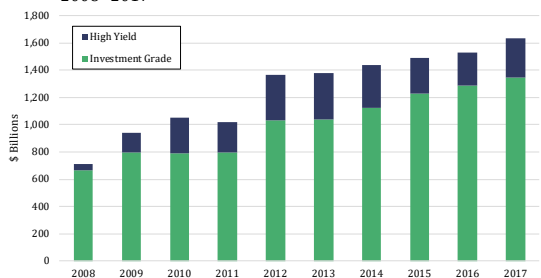
Looking at the first trustee reports of new issue US deals, we found that warf levels climbed during the course of the year from around 2,700 to 2,850. At the same time weighted average loan spreads fell from 385bp to 370bp.

In Europe, loan spreads fell from an average of 400 bps at the start of 2017 to 365 bps by the end of the year. At the same time, collateral quality improved, with weighted average rating factor (WARF) levels going from 2,700 to 2,645.

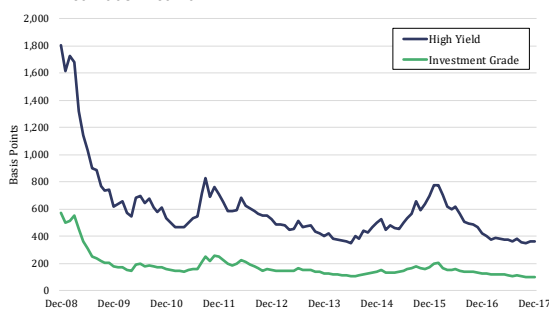
A lot has changed over 12 months. CBAM was the most productive CLO manager in the U.S., pricing \$5.1 billion of new issue paper last year, but established forces remain dominant in CLOs. Citi was once again the most active arranger globally, while PGIM was the most prolific European CLO manager last year, dishing out €1.9 billion of CLOs.

An area to watch out for in 2018 is middle market CLOs. The field of managers is expanding here, with Medley Management and THL Credit Partners expected to securitize mid market loan pools into CLOs this year. These deals still price meaningfully wide of CLOs backed by broadly syndicated loans, mainly because of the illiquidity of the underlying small and mid-cap loans.

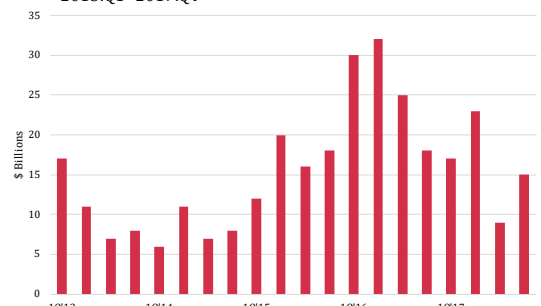
CORPORATE BOND MARKET

Corporate Bond Issuance
2008-2017

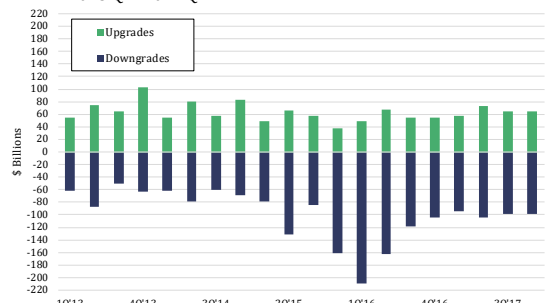
Note: Includes all nonconvertible debt, MTNs Yankee bonds, and TLGP debt, but excludes all issues with maturities of one year or less, CDs, and federal agency debt
Source: Thomson Reuters

Corporate Option Adjusted Spreads to U.S. Treasury
Dec. 2008 - Dec. 2017

Source: Bank of America Merrill Lynch

Corporate Bond Defaults
2013:Q1 - 2017:Q4

Source: S&P Global Ratings

Corporate Bond Rating Actions
2013:Q1 - 2017:Q4

Source: S&P Global Ratings

Corporate Bond Issuance

Corporate bond issuance totaled \$319.2 billion in 4Q'17, down 24.0 percent from \$420.1 billion issued in 3Q'17 but up 20.6 percent from 4Q'16's issuance of \$264.6 billion. More than a third of the bonds issued in the fourth quarter were for indebtedness reduction (34.8 percent of total issuance), followed by general corporate purposes (31.0 percent), and future acquisitions (12.2 percent). For the full year, issuance totaled \$1.63 trillion, up 6.9 percent from \$1.53 trillion in 2016.

Investment grade (IG) bond issuance decreased to \$250.4 billion in 4Q'17, down 30.3 percent from \$359.0 billion in the previous quarter but up 16.3 percent from \$215.3 billion in 4Q'16. The top three industries accounted for over half of 4Q'17 IG issuance: financial companies remained the leading IG debt issuance sector accounting for more than a third (\$94.9 billion) of all IG issuance, followed by the energy and power sector with 15.0 percent (\$37.7 billion) and the high technology sector with 9.2 percent (\$22.9 billion). For the full year, IG bond issuance totaled \$1.35 trillion, up 4.6 percent from \$1.29 trillion in 2016.

Issuance of high yield (HY) bonds increased to \$68.8 billion in 4Q'17, 12.6 percent above the 3Q'17's total of \$61.1 billion and up 39.4 percent from \$49.4 billion issued in 4Q'16. The following three sectors made up over half of total HY issuance in the fourth quarter: energy and power (23.7 percent, \$16.3 billion), industrials (13.7 percent, \$9.4 billion), and financials (13.3 percent, \$9.1 billion). For the full year, HY issuance increased to \$284.9 billion, up 18.9 percent from \$239.6 billion in 2016.

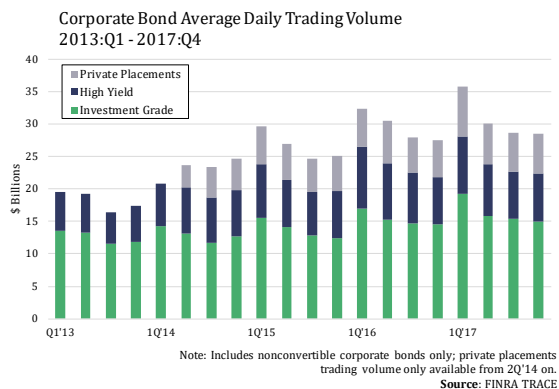
Bond Spreads and U.S. Default Rate

According to Bank of America-Merrill Lynch, option adjusted spreads for IG bonds tightened while spreads for HY bonds widened in the fourth quarter of 2017. Spreads of IG bond stood at 99 bps at the end of 4Q'17, down 8 bps from 107 bps at end-September 2017 and down 31 bps from 130 bps at the end of December 2016. HY bond spreads widened q-o-q, ending 4Q'17 at 363 bps, 7 bps above 356 bps in 3Q'17 but down 59 bps from 422 bps at the end of December 2016.

S&P's Global Fixed Income Research reported the number of U.S. defaulted issuers increased to 15 issuers in the fourth quarter of 2017 from 9 defaults in 3Q'17 and down from 18 in 4Q'16. For the full year, U.S. defaults fell to 64 from 105 defaults in 2016. The U.S. trailing 12-month speculative-grade corporate default rate decreased to 3.0 percent end-December 2017, down from 3.1 percent end-September 2017 and down from 5.0 percent end-September 2016. The U.S. speculative-grade corporate default rate is expected to fall further to 2.70 percent by September 2018.⁴

In 4Q'17, S&P Ratings Services downgraded 103 and upgraded only 55 U.S. issuers, a ratio of downgrades to upgrades of 1.9. This was an increase from the previous quarter when there were 99 downgrades versus 65 upgrades (downgrade/upgrade ratio of 1.5). For the full year, downgrades outpaced upgrades 402 to 249 with a downgrade/upgrade ratio of 1.6, lower than the previous year's ratio of 2.6 with 595 downgrades and 225 upgrades.

⁴ Standard & Poor's Rating Services, [The U.S. Speculative-Grade Corporate Default Rate](#), August 14, 2017.



Trading Activity

According to the FINRA TRACE data, average daily trading volume of non-convertible corporate bonds was \$28.5 billion in 4Q'17, down 0.5 percent from \$28.6 billion in 3Q'17 but up 3.3 percent y-o-y. Only slight changes in volume were observed across all corporate bond segments in the third quarter. Investment grade corporate bonds average daily trading volume decreased to \$15.0 billion in 4Q'17, down 2.2 percent from \$15.3 billion in the previous quarter but up 2.8 percent from \$14.6 in 4Q'16. High yield corporate bonds average daily trading volume was \$7.4 billion in 4Q'17, unchanged from \$7.4 billion in the previous quarter but a 3.8 percent increase from \$7.2 billion in 4Q'16. Private placements' average daily trading volume increased to \$6.0 billion in 4Q'17, up by 1.9 percent from \$5.9 billion in 3Q'17 and up 3.9 percent from \$5.8 billion in 4Q'16.

EQUITY AND OTHER MARKETS

The U.S. stock market posted a strong fourth quarter for 2017 with all three major stock indices reaching their record highs in December. The S&P 500 closed 4Q'17 at 2,673.61, a 6.1 percent increase from the prior quarter and a 19.4 percent increase y-o-y and recorded an all-time high 2,690.16 on December 18, 2017. The NASDAQ Composite Index closed 4Q'17 at 6,903.39, a 6.3 percent increase q-o-q and a 28.2 percent increase y-o-y, also reaching its record high of 6,994.76 on December 18, 2017. The Dow Jones Industrial Average (DJIA) ended 4Q'17 at 24,719.22, a 10.3 percent gain q-o-q and a 25.1 percent gain y-o-y and recorded its all-time high of 24,837.51 on December 28, 2017.

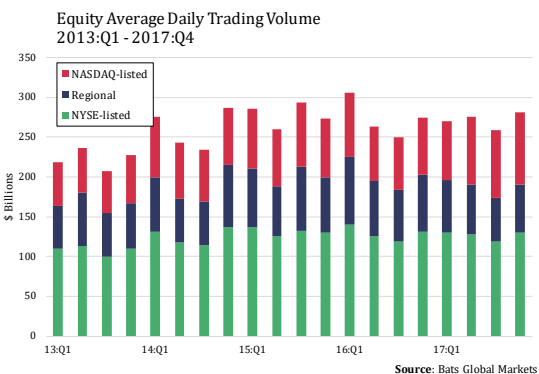
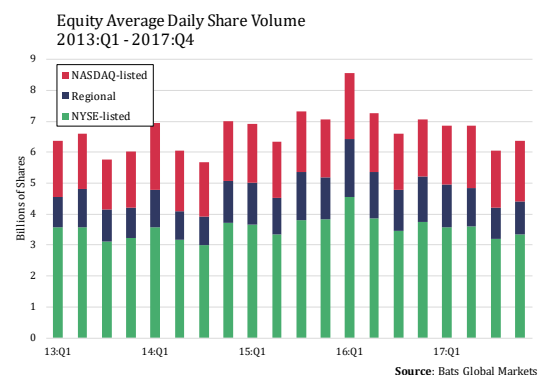
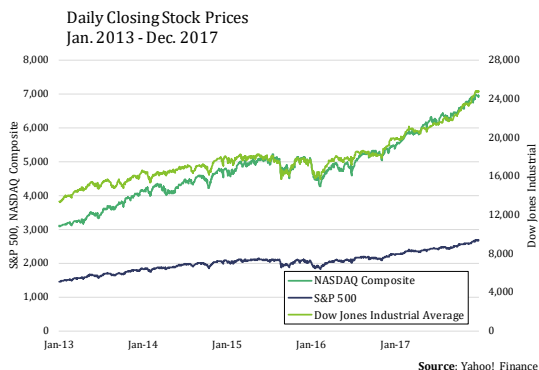
Equity Average Daily Share and Dollar Volume

Equity average daily share volume was 6.4 billion shares in 4Q'17, an increase of 5.0 percent from 6.1 billion shares in 3Q'17 but a 9.9 percent decrease from 7.1 billion in 4Q'16. The largest quarterly increase was observed in NASDAQ-listed stocks, where average daily share volume increased by 5.6 percent in 4Q'17. Average daily share volume of stocks listed on regional exchanges and NYSE-listed stocks also increased by 5.3 percent and 4.6 percent q-o-q, respectively.

Equity average daily dollar volume increased by 8.8 percent to \$281.0 billion in 4Q'17 from \$258.3 billion in 3Q'17 and was up 2.4 percent from \$274.3 billion in 4Q'16. The largest quarterly increase in dollar volume was observed in regional-listed stocks (up 10.7 percent), followed by NYSE-listed (up 8.9 percent) and NASDAQ-listed (up 7.4 percent).

NYSE Short Interest

The number of shares sold short on the NYSE averaged 16.24 billion in 4Q'17, down 2.4 percent from 16.64 billion during the previous quarter but up 1.5 percent from 16.00 billion in 4Q'16. NYSE short interest was 4.1 percent above the five-year average of 15.60 billion. Out of approximately 6,100 issues, a short position was shown in 4,882 issues at the end of 4Q'17 and 3,916 issues showed a short position of 5,000 shares or more.⁵



⁵ [NYSE, NYSE Arca and NYSE MKT Short Interest Reports](#), January 10, 2018.

Equity Underwriting Volume

Equity underwriting increased by 5.2 percent to \$55.0 billion in the fourth quarter from \$52.3 billion in 3Q'17 and was up 17.6 percent from \$46.8 billion issued in 4Q'16. Equity underwriting volume in 4Q'17 was 14.6 percent below the five-year average of \$64.4 billion. For the full year, equity underwriting totaled \$221.1 billion, up 11.9 percent from the previous year's \$197.6 billion.

IPO Volume

“True” initial public offerings (IPOs), which exclude closed-end mutual funds, increased to \$11.8 billion on 60 deals in 4Q'17. IPO dollar volumes increased by 152.6 percent from \$4.7 billion on 35 deals in 3Q'17 and was up 168.1 percent from \$4.4 billion on 29 deals in 4Q'16. The top three sectors in IPO issuance in 4Q'17 by dollar volume were: high technology (\$3.9 billion on 17 deals), healthcare (\$1.4 billion on 14 deals) and financials (\$1.3 billion on 10 deals), which together accounted for slightly more than half of the quarter's total volume. For the full year, IPO volumes were \$36.3 billion, up 103.4 percent from \$17.8 billion in 2016.

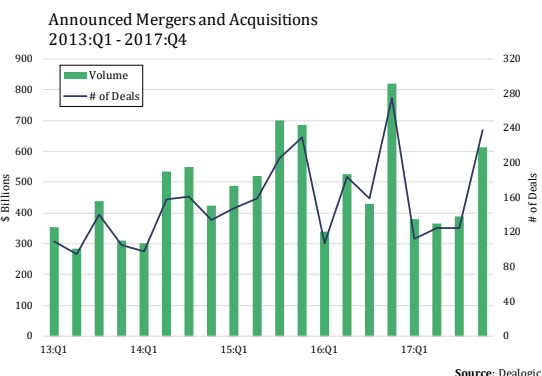
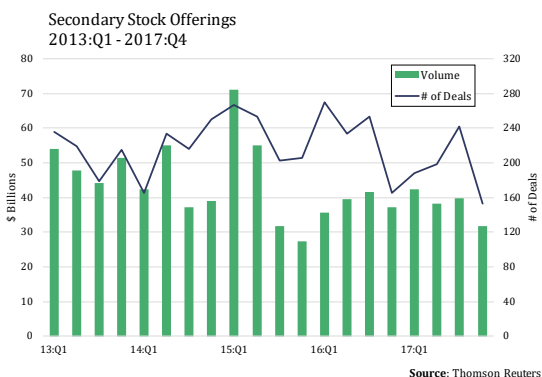
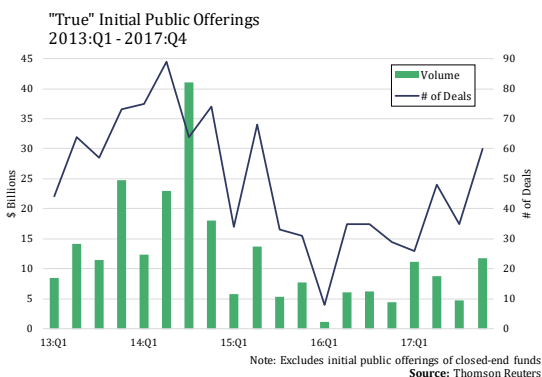
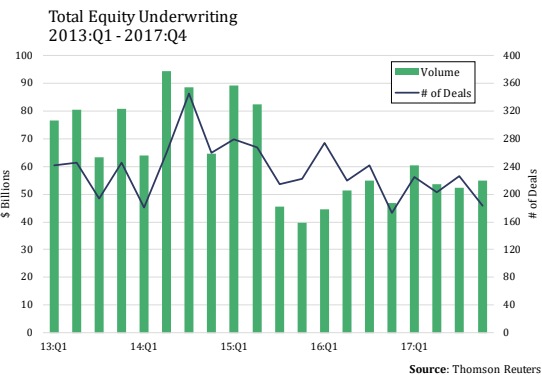
Secondary Offerings

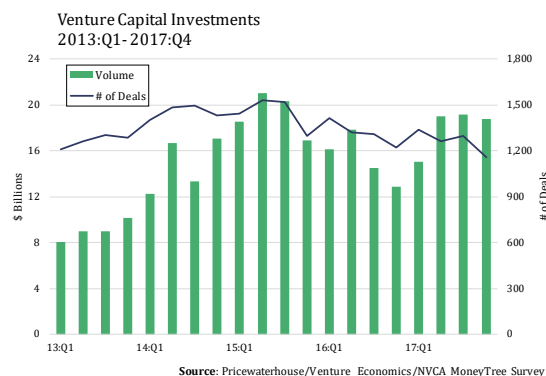
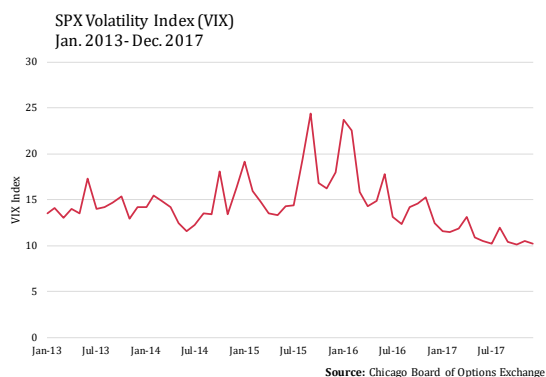
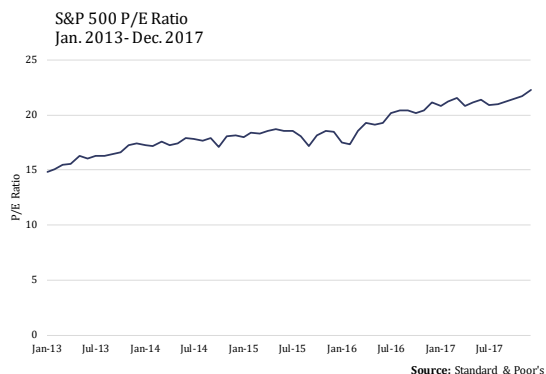
Secondary market issuance decreased to \$31.8 billion on 208 deals in 4Q'17, a decrease of 20.1 percent from \$39.8 billion on 165 deals in 3Q'17 and a decrease of 14.4 percent from \$37.2 billion on 225 deals in 4Q'16. For the full year, \$152.1 billion was issued through secondary offerings, a decrease of 1.1 percent from \$153.9 billion in 2016.

Announced M&A Volume

Announced U.S. mergers and acquisitions (M&A) volume stood at \$614.8 billion in 4Q'17, a 57.8 percent increase from the previous quarter's \$389.6 billion but a 25.0 percent decrease from \$820.2 billion in 4Q'16. M&A volume was 30.0 percent above the five year quarterly average of \$473.1 billion. For the full year, announced M&A volume totaled \$1.75 trillion, a decrease of 17.3 percent from \$2.12 trillion in 2016.

According to data from Dealogic, the amount of “U.S. Inbound” M&A (money invested in U.S. companies by those outside the U.S. through M&A) rose to \$84.6 billion in 4Q'17, up 61.9 percent from \$52.3 billion in the previous quarter and down 48.3 percent from \$163.9 billion in 4Q'16. The dollar amount U.S. companies invested in other countries through M&A (“US Outbound”) fell in 4Q'17 to \$24.7 billion, down 50.7 percent from \$50.1 billion in 3Q'17 and down 83.2 percent from \$147.0 billion invested in 4Q'16.





S&P P/E Ratio

The S&P 500's P/E ratio averaged 21.8 in 4Q'17, up 3.7 percent from the previous quarter's 21.0 and up 6.0 percent from 20.6 in 4Q'16. The S&P P/E ratio stood 17.5 percent above the 5-year average of 18.6 but 23.1 percent below the high of 28.4 in 1Q'00.⁶ For the full year, the S&P 500's P/E ratio averaged 21.3, up 9.3 percent from 19.5 in 2016.

CBOE VIX Index

The Chicago Board Options Exchange Volatility Index (VIX) decreased to an average of 10.3 in the fourth quarter from an average of 10.9 in 3Q'17 and down 26.9 percent from 14.1 in 4Q'16. The quarter started with the index declining to a low of 9.14 in early November before spiking to 13.3 mid-November; the VIX ended 4Q'17 at 11.04. The spread between high and low values for the VIX was 3.99 in 4Q'17, narrower than 6.68 in 3Q'17 and much narrower than the 11.24 spread in 4Q'16. For the full year, the VIX averaged 11.1, down 30.1 percent from 15.9 in 2016.

Venture Capital Volume

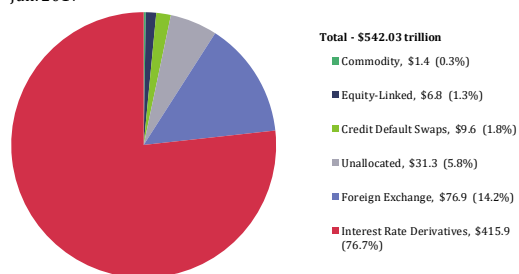
Venture capitalists invested \$18.7 billion in 1,158 deals in the fourth quarter of 2017, according to the MoneyTree™ Report from PricewaterhouseCoopers LLP (PwC) and the National Venture Capital Association (NVCA), based on data provided by Thomson Reuters. Quarterly venture capital (VC) investment activity decreased by 2.3 percent in dollar terms and decreased by 10.9 percent in the number of deals compared to 3Q'17 when \$19.2 billion was invested in 1,299 deals. The internet sector continued to receive the highest level of funding of all industries with \$6.5 billion in 4Q'17, down 15.9 percent from \$7.7 billion in 3Q'17 but up 22.0 percent y-o-y. The healthcare sector received second largest amount of funding with \$4.0 billion (up 20.2 percent q-o-q) followed by the mobile & telecommunications sector with \$3.8 billion (up from \$1.6 billion in 3Q'17).⁷ For the full year, venture capitalists invested \$71.9 billion in 5,052 deals, an increase of 17.2 percent from \$61.4 billion on 5,268 deals in 2016.

⁶ SIFMA records start in January 2000.

⁷ [US MoneyTree Report Press Release](#), 4Q 2017.

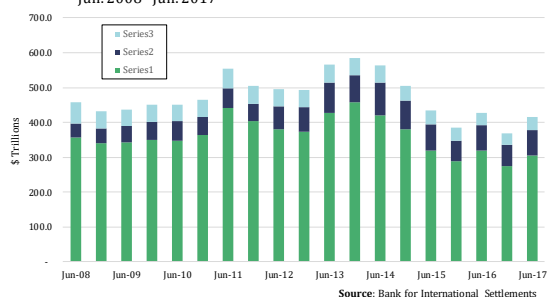
GLOBAL OTC DERIVATIVES

Gross Notional Amounts Outstanding: Global OTC Derivatives
Jun. 2017



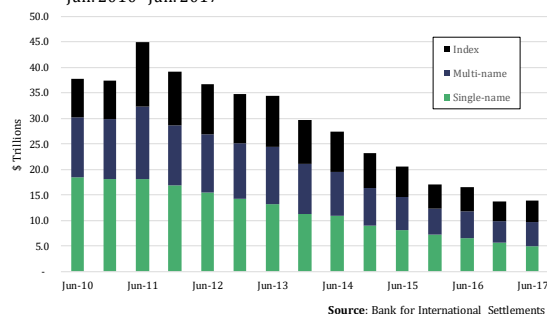
Source: Bank for International Settlements

Gross Notional Amounts Outstanding: Interest Rate Derivatives
Jun. 2008 - Jun. 2017



Source: Bank for International Settlements

Gross Notional Amounts Outstanding: Credit Default Swaps
Jun. 2010 - Jun. 2017



Source: Bank for International Settlements

Global OTC Derivatives Market

According to the most recent Bank of International Settlements (BIS) Semi-annual Over-the-Counter (OTC) Derivatives Markets Statistics Report (“BIS Report”)⁸, the gross notional amount outstanding of OTC derivatives totaled \$542.4 trillion as of end-June 2017 (up 12.4 percent from end-December 2016). All product classes saw increases from end-December 2016, except credit default swaps (CDS), which were down 2.2 percent to \$9.6 trillion. Interest rate derivatives (“IRD”) (up 12.9 percent to \$415.9 trillion), unallocated transactions (up 12.4 percent to \$31.3 trillion), foreign exchange (up 12.2 percent to \$77.0 trillion) and equity-linked derivatives (up 11.3 percent to \$6.8 trillion) saw the largest increases from end-December 2016. Commodity derivatives experienced the smallest increase from the end-December 2016, up 3.8 percent to \$1.4 trillion.

The gross market value of OTC derivatives decreased to \$13.0 trillion as of end-June 2017, down 13.3 percent – its lowest level since 2007 according to BIS data.⁹ Gross credit exposure of outstanding OTC derivatives decreased 15.2 percent to \$2.8 trillion during the same period.

Interest Rate Derivatives

According to the BIS Report, IRD accounted for the majority of the gross notional amount outstanding for the OTC derivatives market, at \$416.0 trillion as of end-June 2017, representing 77.1 percent of the global market (largely static from end-December 2016). Interest rate swaps (IRS) (accounting for 74.0 percent of the total IRD market as of end-June 2017) totaled \$306.1 trillion, up 11.3 percent from end-December 2016 (but down 4.0 percent y-o-y). Forward Rate Agreements (FRAs) also saw increases (up 20.0 percent from end-December 2016, but down 2.0 percent y-o-y). Options increased 15.0 percent from end-December 2016 and 6.5 percent y-o-y.

Credit Default Swaps

According to the BIS Report, CDS accounted for 2.1 percent of the gross notional amount outstanding of the global OTC derivatives market, at \$9.6 trillion as of end-June 2017 (down 2.2 percent from end-December 2016). This decline was largely due to decreases in single-name CDS, which totaled \$5.0 trillion as of end-June 2017 (down 9.7 percent from end-December 2016 and 23.4 percent y-o-y). Multi-name CDS totaled \$4.6 trillion as of end-June 2017, up 7.6 percent from end-December 2016 (but down 11.2 percent y-o-y). Index CDS totaled \$4.2 trillion as of end-June 2017 (up 10.1 percent from end-December 2016 (but down 12.6 percent y-o-y).

⁸ Based on data from most recent report released, available at: <http://www.bis.org/statistics/derstats.htm>.

⁹ Available at: https://www.bis.org/publ/otc_hy1711.htm.

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