

Government Bond Data Report

European market data update

Q1: 2017



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Highlights and Market Environment

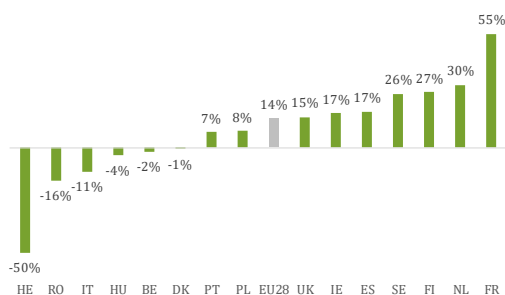
This report provides a comprehensive data source with updated statistics of the Government bond¹ primary and secondary markets in Europe (EU28).

Among the main findings of this report are:

- **Average daily trading volumes** of European government bonds increased in most jurisdictions during 1Q17, although with significant differences across countries. For EU countries on aggregate, average trading volumes increased 14% QoQ in 1Q17 (or 16% YoY— the largest annual increase since 3Q14).
- **European Government bond gross issuance** totalled €684 bn in 1Q17, a decrease of 3.9% from the volume originated in 1Q16 (€712 bn).
- **Average bid-cover ratios** (demand/amount allocated)² was 2.07 in 1Q17, a decrease when compared to 2.26 in 4Q16 and 2.08 in 1Q16.
- **One EU country had its long-term credit rating upgraded** during the quarter (Cyprus). There were no credit rating downgrades during the quarter.

“Average daily trading volumes increased 14% during 1Q17 compared with 4Q16, with higher trading activity in FR, NL, FI, SE, ES, IE, UK, PL and PT”

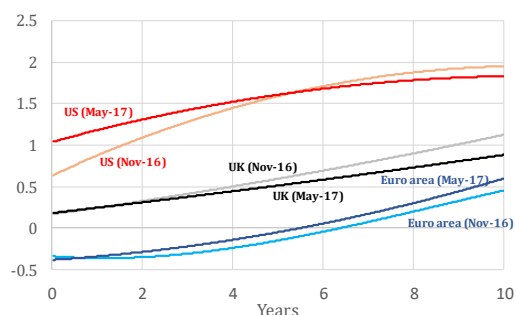
Quarterly change in Government Bond average trading volumes (1Q17 vs 4Q16) Selected European jurisdictions



Source: AFME with information from European DMOs and other agency sources and Trax, a MarketAxess subsidiary. See section 5 for details on aggregation basis and sources. *Europe total is sourced from TRAX Facts as the quarterly variation of average daily volumes of government and sovereign bonds.

	2013	2014	2015	2016	1Q17
Issuance (€ bn)	2805.7	2728.0	2605.6	2538.0	684.5
Outstandings (€ tn)	8.9	9.3	9.7	9.6	9.8
Bid-cover ratio	2.18	2.29	2.22	2.16	2.07
Average daily turnover (% YoY change)	-	-	-8.4%	-7.2%	16.1%

US, Euro area and UK overnight index swap curve (%)



Source: Reuters Eikon

Highlights

Bond turnover and repricing of sovereign bond markets

Average daily trading volumes of EU sovereign bonds increased 14% during 1Q17 compared with 4Q16, with higher trading activity in FR, NL, FI, SE, ES, IE, UK, PL and PT. Likewise, EU average turnover ratio increased by 7% in 1Q17 against the previous quarter.

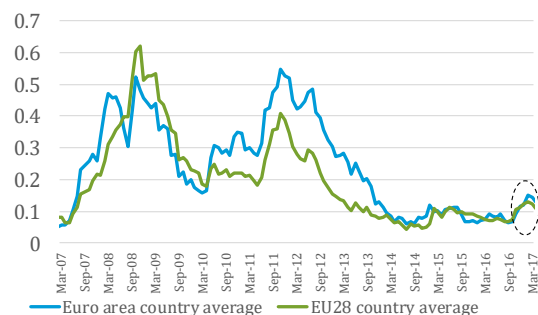
The quarterly increase was driven by several factors, including (i) recent changes of the European macro outlook; (ii) temporary political uncertainty in some European countries; and (iii) financial market developments in the US.

Changes in the macro outlook: Higher-than-expected inflation outcomes and growing optimism on economic activity have decreased the probability of deflation in the euro area. 1Y-ahead market-implied inflation expectations have risen in the euro area from 0.8% in Nov-16 to 1.16% in May-17.

¹ Fixed income securities issued by central governments. The report includes Bonds and Treasury Bills and excludes agencies and Central Bank origination.

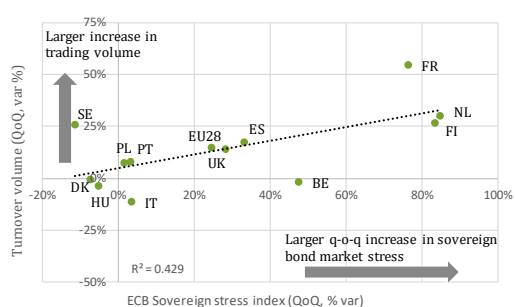
² Weighted average (by issuance volume) of bid-cover ratios in the United Kingdom, Spain, France, Italy, Germany, Belgium, Sweden, Netherlands, Denmark and Austria.

ECB index: stress in European sovereign bond markets



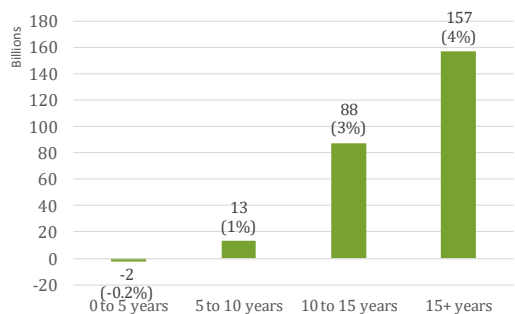
Source: ECB and AFME

Quarterly change in turnover volume and ECB sovereign bond stress index



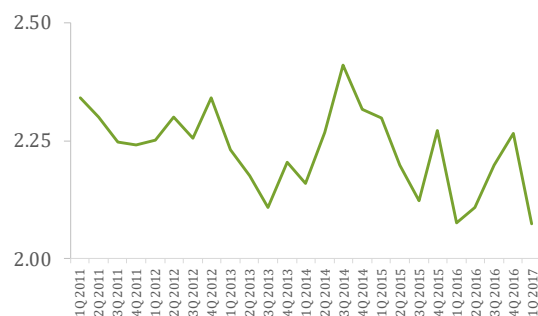
Source: DMOs, ECB and AFME

Change in outstanding EU sovereign bonds by tenor (1Q17-2Q16; % change in brackets)



Source: Reuters Eikon

Average bid-cover ratio of European government bonds and bills



Source: AFME and Thomson Reuters Eikon. Weighted average of UK, DE, FR, ES, IT, BE, SE, NL, DK, and AT bonds and bills.

The overnight index swap curve, as indicator of market-implied expectations of central banks' policy rates, steepened in the euro area, accumulating an 11bps increase in 10Y yields between Nov-16 and May-17 and 52bps since Aug-16.

Financial market developments in the US also had spillover effects on European bond markets during the quarter, particularly the optimism on economic growth and its implications on the future trajectory of US monetary policy and global yields.

Economic policy uncertainty also influenced sovereign bond market trading. Risk premia rose in western European countries that held general elections during the quarter (FR and NL), although the increase was short-lived and reversed in the last part of the quarter. In France, for example, 5Y CDS rose by c40bps with a full reversal to pre-election levels at the end of the quarter.

Market repricing supported bond trading increase

The quarterly market and political events were mirrored by an increase in the ECB sovereign bond market stress index³. This index aggregates liquidity, risk and market volatility conditions of the sovereign bond market for countries in Europe (see chart on top left panel).

The increase in sovereign bond market stress was uneven across countries. In France, one of the countries most affected by the political and market events of the quarter, sovereign stress index rose by 77% QoQ which was mirrored by an increase of 54% in bond trading. In the Netherlands, sovereign stress index stood in 1Q17 80% above the 4Q16 value and an increase in bond trading of 30% QoQ. See chart on left panel.

Maturity profile has shifted towards long tenors

The maturity profile of EU sovereigns has continued to shift towards long-term debt securities. Over the last year, outstanding government bond debt with tenors of 15 years or above has increased by 4%, compared with an increase of 1% in bonds with 5-10 years of maturity and a decrease of 0.2% bonds with maturities below 5 years. See chart on left panel.

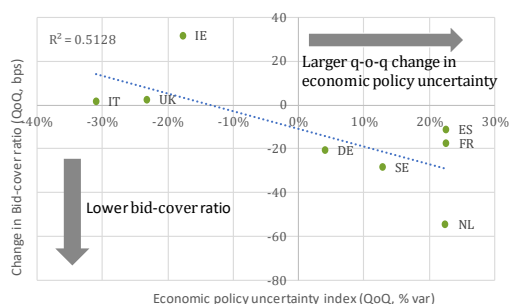
Lower bid-cover ratios

Of the instruments issued during the quarter through auctions, average bid-cover ratios decreased by 19bps in 1Q17 against 4Q16. Lower bid-cover ratios in 1Q17 were observed for all three classes of tenors (<1 year, 1-10 years and >10 years), whereas for auctions of less than €1bn saw a modest increase and for auctions of €1-3bn and greater than €3bn decreased by c25 bps.

³ The index is constructed as composite indicator of market volatility, bid-ask spreads, yield spreads and cross-asset correlations.

The quarterly variation in bid-cover ratios was, in part, driven by changes in policy uncertainty for some European countries. In the Netherlands, for example, bid-cover ratios declined above 20bps over the quarter in tandem with a 20% QoQ increase in the index of economic policy uncertainty (as measured by Baker, Bloom and Davis). In Ireland, economic policy uncertainty declined by c20% QoQ which was mirrored by a 30bps increase in bid-cover ratios during the quarter.

Quarterly change in bid-cover ratio and policy uncertainty index



Source: Reuters and Baker, Bloom and Davis

“Long-term credit ratings were reaffirmed for the large majority of EU countries”

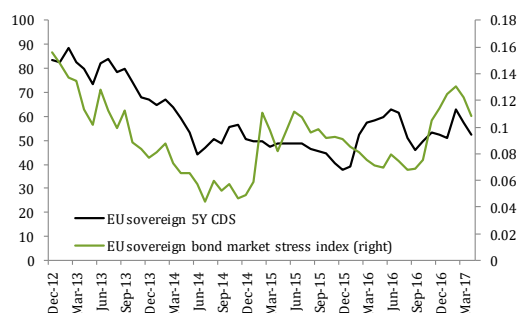
Credit quality

Long-term credit ratings were reaffirmed for the large majority of EU countries. One EU country (Cyprus) had its long-term credit rating upgraded during the quarter, driven by stronger-than-expected economic growth and continued fiscal progress. There were no downgrades during 1Q17, although IT was downgraded by one notch by one credit rating agency in the first part of 2Q17.

Average CDS of EU countries increased only slightly during the quarter, with a median of 56.9 bps in 1Q17 against 50.9 bps in 4Q16. The temporary increase in 5Y CDS in France during the election period and the average increase in IT 5Y CDS of c20bps QoQ were partly offset by the **improved market sentiment towards Portugal’s fiscal outlook.**

In March 2017, Portugal reported its lowest fiscal deficit in more than 40 years at 2.1% of GDP for 2016. The deficit was also below the target set by EU authorities at 2.5% of GDP. The fiscal improvement was welcomed by markets with a decline of c100 bps in the Portuguese 5Y CDS during the first five months of the year. See chart 6.6 of the report.

ECB sovereign stress index and 5Y EU CDS



Source: ECB and Reuters. 5Y EU CDS estimated as the median 5Y CDS of UK, PT, IT, IE, FR, ES, DE, BE, HE, RO, PL, DK, FI, HU, SE, and NL

Major upcoming regulatory, legislative and policy initiatives

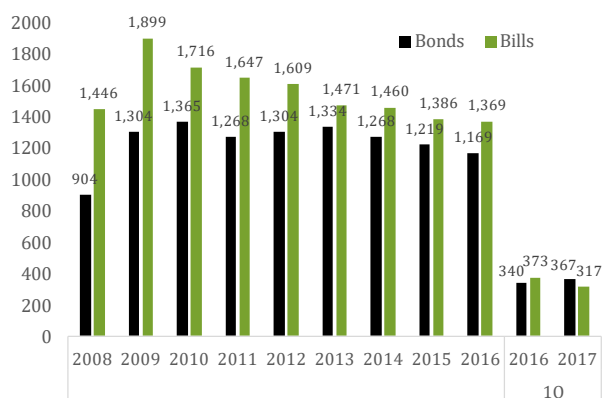
There several regulatory initiatives that are currently being considered at the European and national level with expected impact on the fixed income markets. Some of the key initiatives currently being developed are:

- MiFID II/R
- Market Abuse Directive/Regulation (MAD/MAR)
- Basel III
- CSDR
- Prospectus Regulation

AFME and its members are actively contributing on all of these and other initiatives.

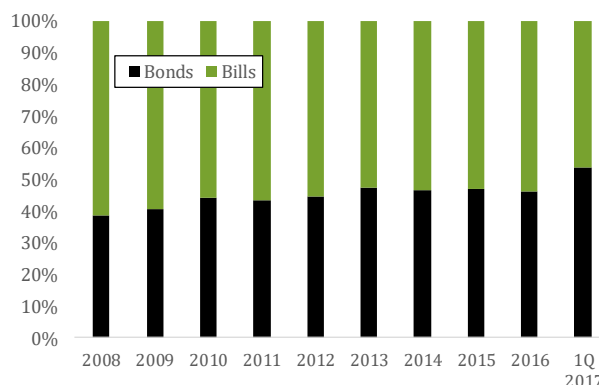
1 Issuance

1.1 Government Bonds and Treasury Bills issuance (EUR bn)



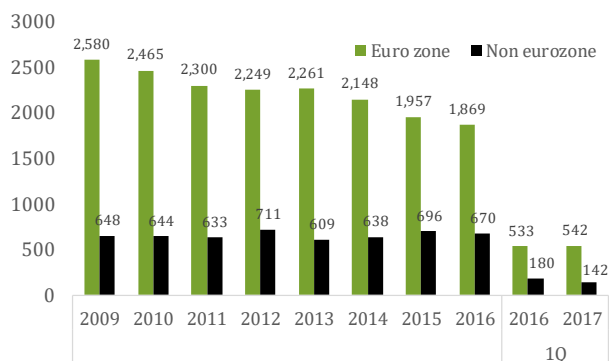
Source: ECB and National Debt Management Offices

1.2 Government Bonds and Treasury Bills issuance (%)



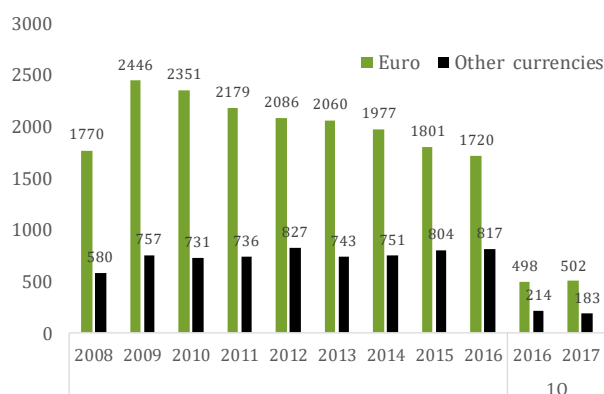
Source: ECB and National Debt Management Offices

1.3 Issuance by region (EUR bn)



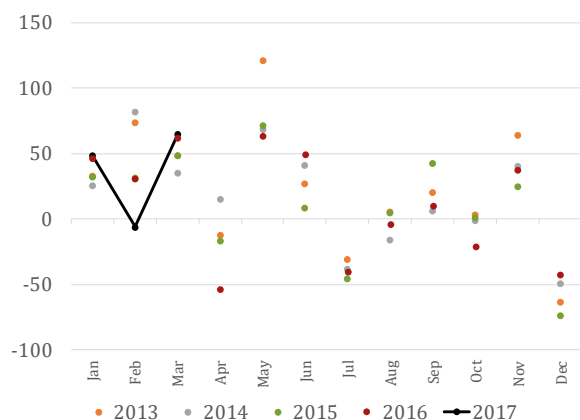
Source: ECB and National Debt Management Offices

1.4 Issuance by currency (EUR bn)



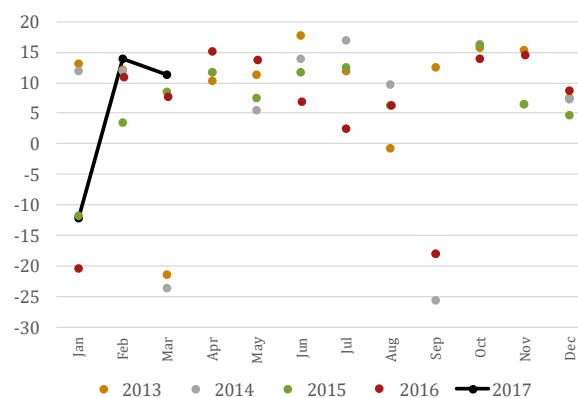
Source: ECB and National Debt Management Offices

1.5 Euro area net sovereign debt issuance (EUR bn)



Source: ECB

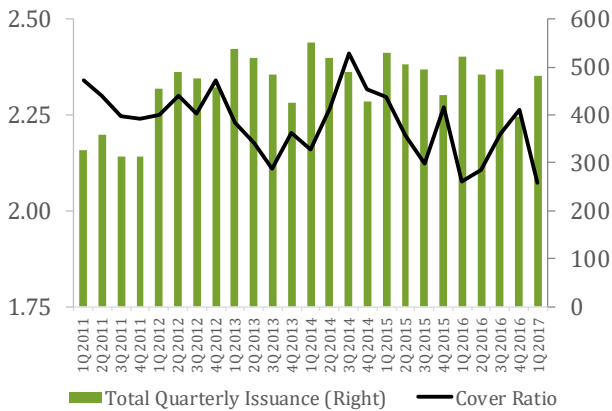
1.6 UK Gilts net issuance (GBP bn)



Source: UK Debt Management Office

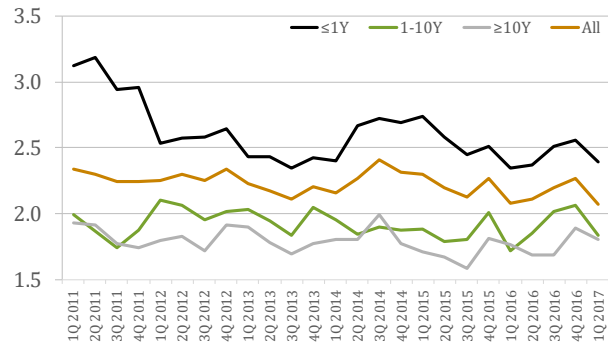
2 Recent auctions and primary dealers

2.1 Average bid-cover ratios and issued volumes in selected jurisdictions (EUR bn)



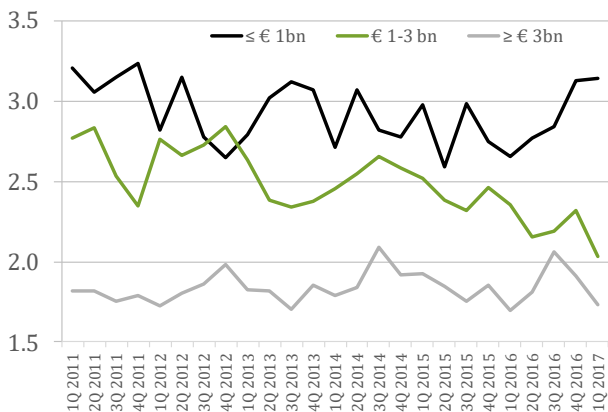
Source: Thomson Reuters Eikon. Weighted average of UK, DE, FR, ES, IT, BE, SE, NL, DK, and AT bonds and bills

2.2 Average bid-cover ratios by tenor (years) of issued instrument



Source: Thomson Reuters Eikon. Weighted average of UK, DE, FR, ES, IT, BE, SE, NL, DK, and AT bonds and bills

2.3 Average bid-cover ratios by size of issued instruments



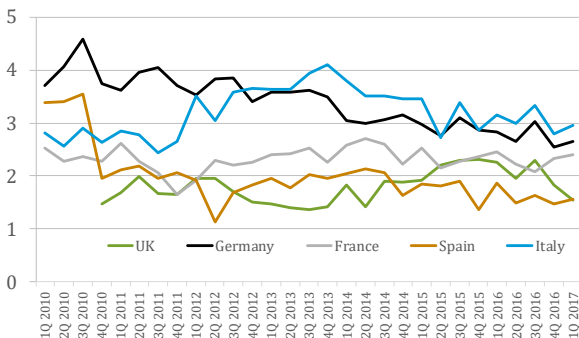
Source: Thomson Reuters Eikon. Weighted average of UK, DE, FR, ES, IT, BE, SE, NL, DK, and AT bonds and bills

2.4 Average auction size in selected European jurisdictions (EUR bn)



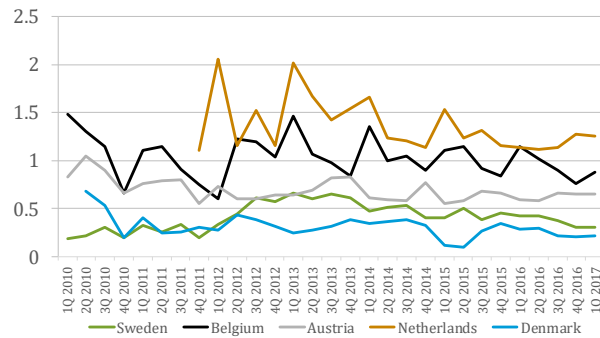
Source: Thomson Reuters Eikon. Weighted average of UK, DE, FR, ES, IT, BE, SE, NL, DK, and AT bonds and bills. Polynomial trendline in grey.

2.5 Average auction size in selected jurisdictions (EUR bn)



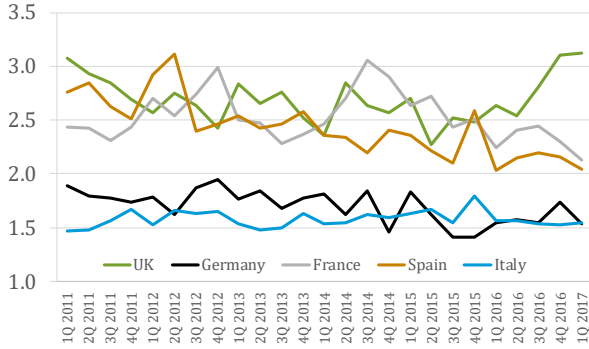
Source: Thomson Reuters Eikon

2.6 Average auction size in selected jurisdictions (EUR bn)



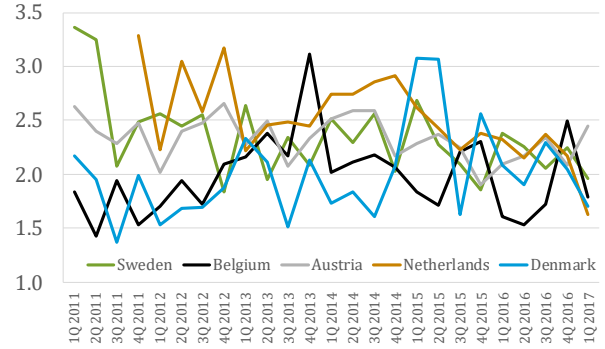
Source: Thomson Reuters Eikon

2.7 Average bid-cover ratios by jurisdictions



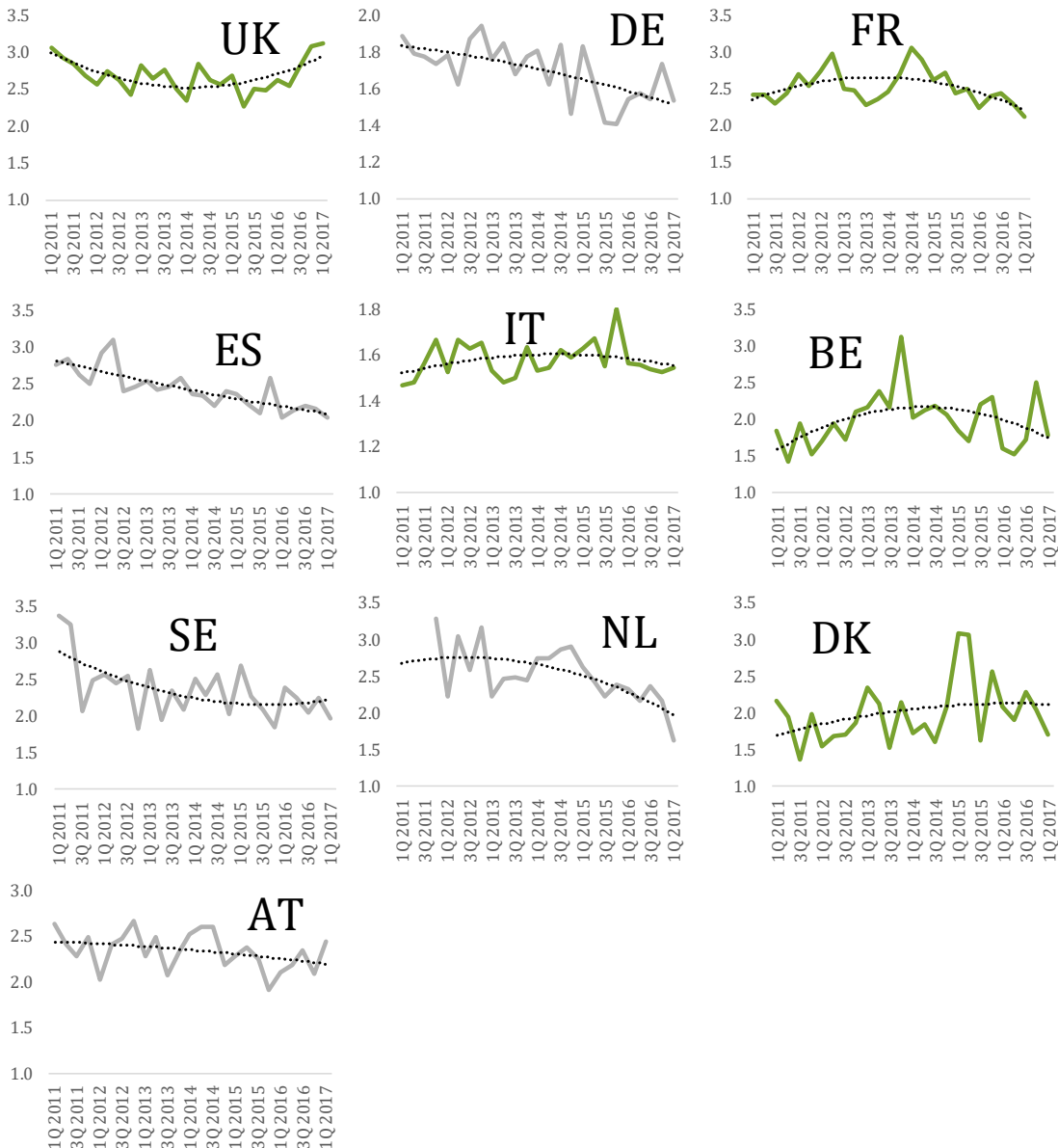
Source: Thomson Reuters Eikon

2.8 Average bid-cover ratios by jurisdictions



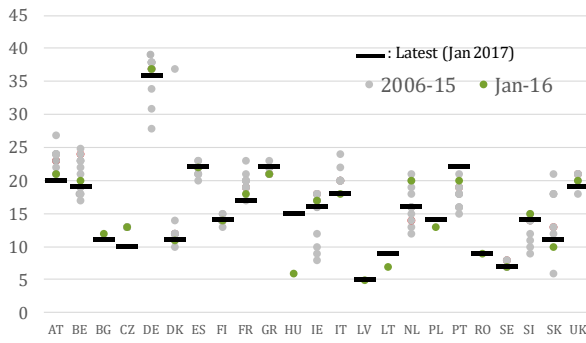
Source: Thomson Reuters Eikon

2.9 Average bid-cover ratios in selected jurisdictions: 2011-17



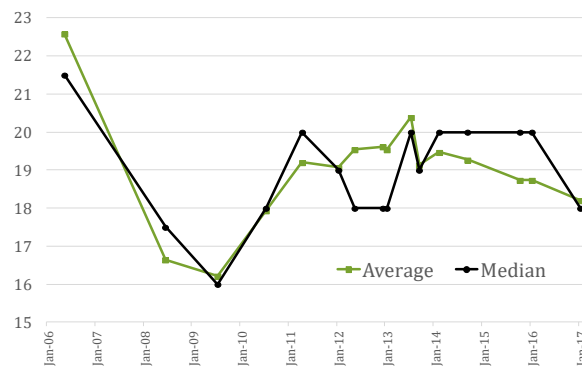
Source: Thomson Reuters Eikon

2.10 Number of primary dealers relative to historic number



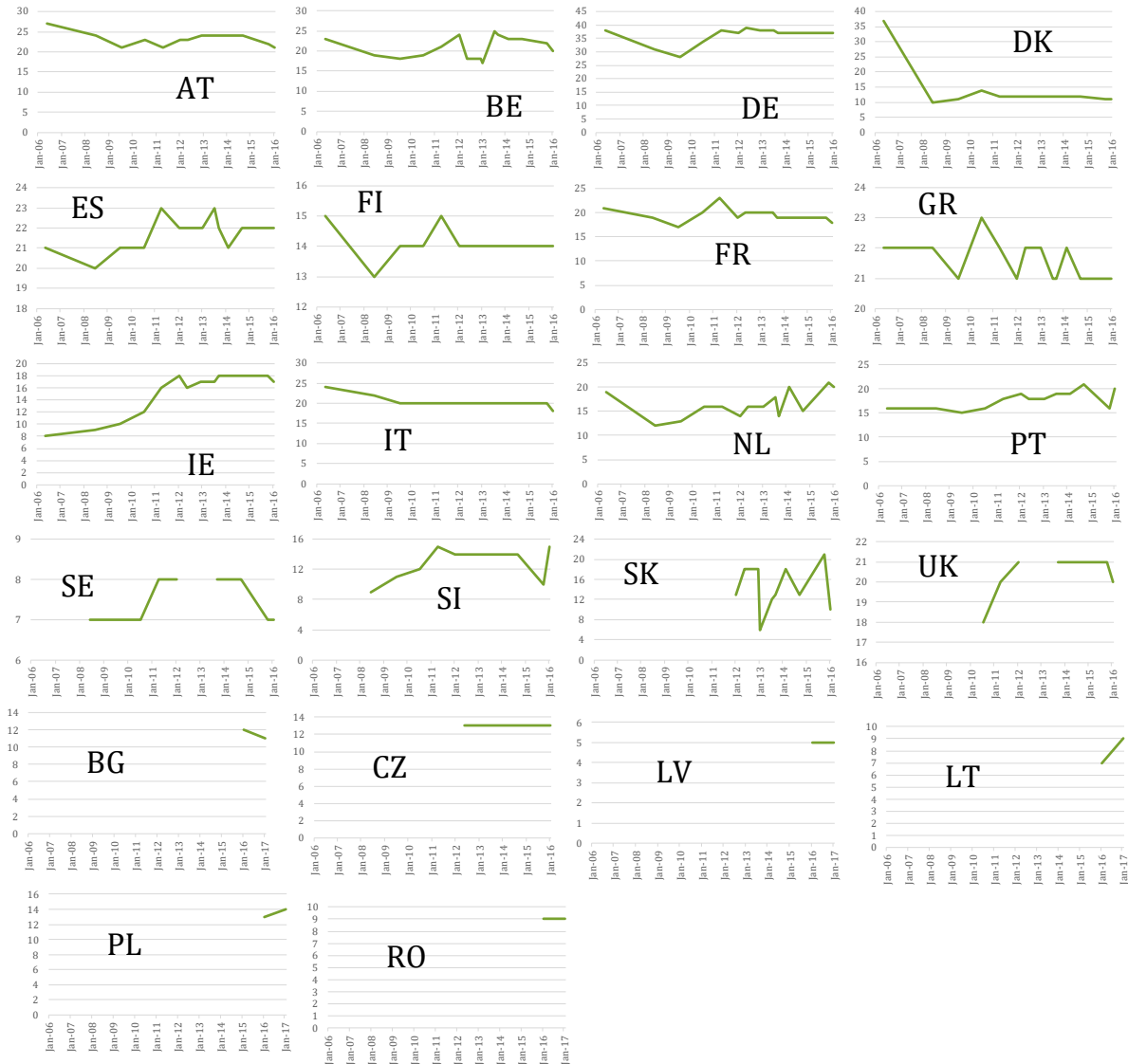
Source: AFME Primary Dealers Handbooks and national DMOs

2.11 Average and median number of primary dealers in selected EU countries



Source: AFME Primary Dealers Handbooks and national DMOs. Average and medians of AT, BE, DE, DK, ES, FI, FR, GR, IE, IT, NL, PT, SE, SI and UK

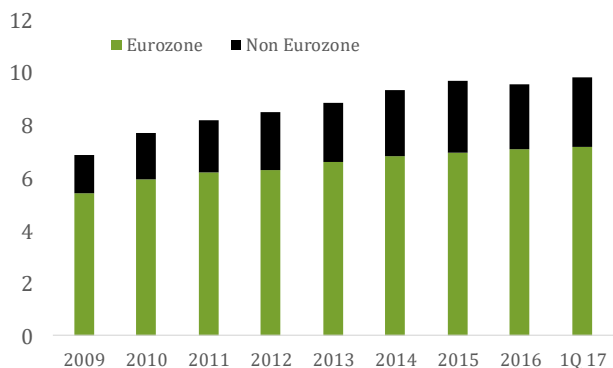
2.12 Number of primary dealers in Europe by jurisdiction: 2006-17



Source: AFME Primary Dealers Handbooks and national DMOs

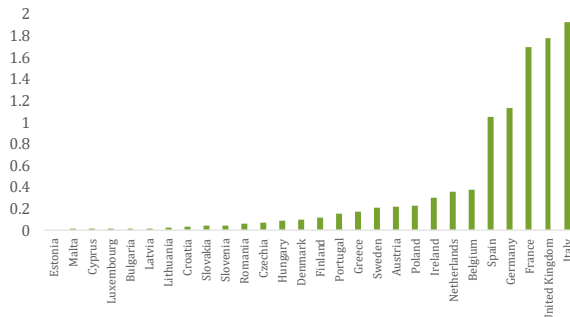
3 Outstanding

3.1 Outstanding debt securities issued by Central Governments (Nominal, EUR tn)



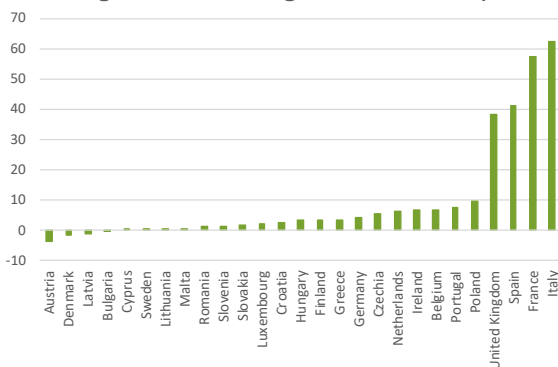
Source: ECB and Thomson Reuters Eikon

3.2 European government bonds outstanding by country (EUR tn)



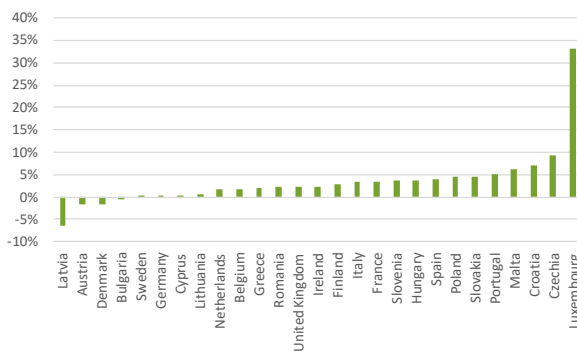
Source: Thomson Reuters Eikon

3.3 Change in outstandings 4Q16 to 1Q17 (EUR bn)



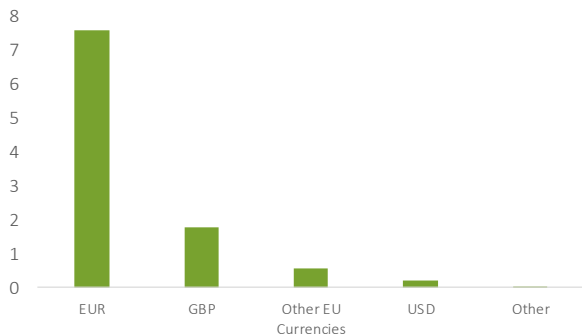
Source: Thomson Reuters Eikon

3.4 % Change in outstandings from 4Q16 to 1Q17



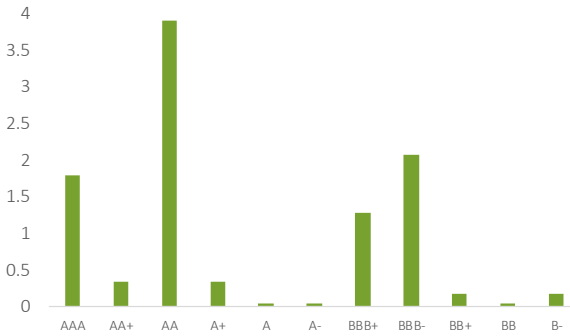
Source: Thomson Reuters Eikon and Standard and Poor's

3.5 European government bonds outstanding by currency (EUR tn)



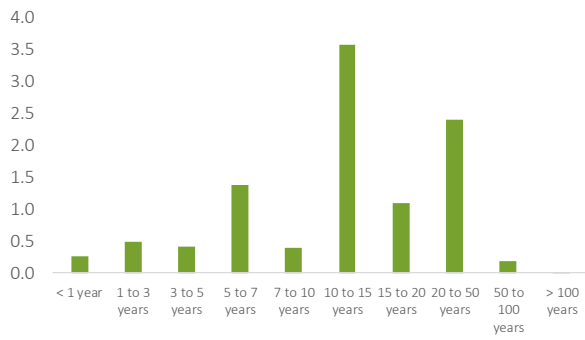
Source: Thomson Reuters Eikon

3.6 European government bonds outstanding by current rating of issuer (EUR tn)



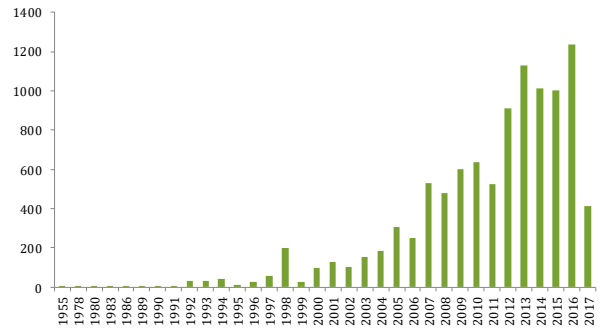
Source: Thomson Reuters Eikon and Standard and Poor's

3.7 Maturity wall of European government bonds outstanding (EUR tn)



Source: Thomson Reuters Eikon

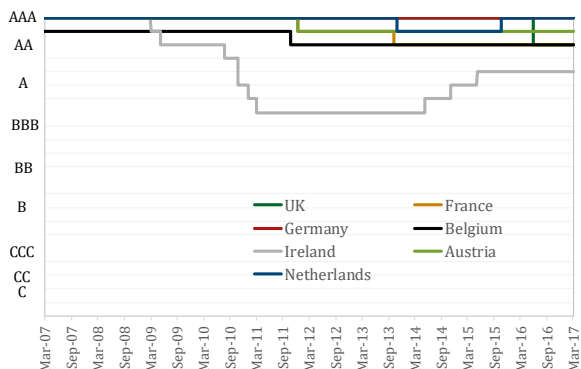
3.8 European government bonds outstanding by year of issuance (EUR bn)



Source: Thomson Reuters Eikon

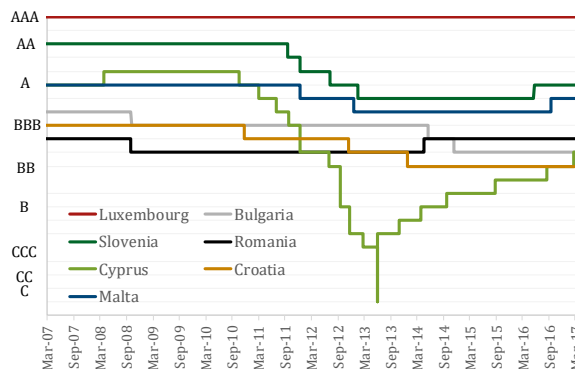
4 Credit quality

4.1 Long-term foreign currency credit rating (Central and Northern Europe)



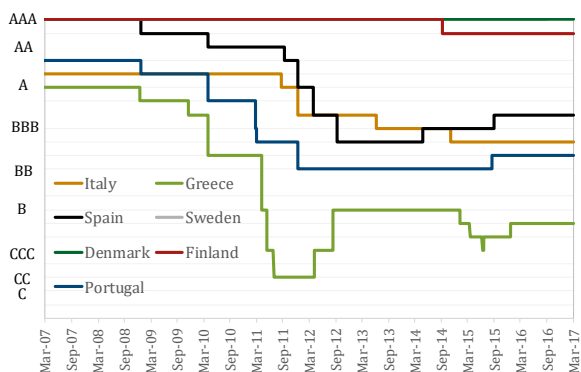
Source: Thomson Reuters Eikon with data of Standard and Poor's

4.2 Long-term foreign currency credit rating (Nordics and Southern Europe)



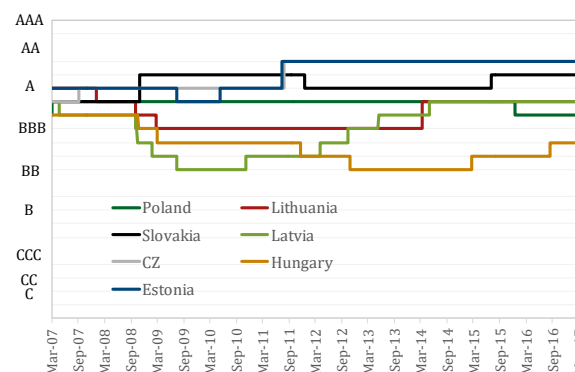
Source: Thomson Reuters Eikon with data of Standard and Poor's

4.3 Long-term foreign currency credit rating (Visegrad 4 and Baltic states)



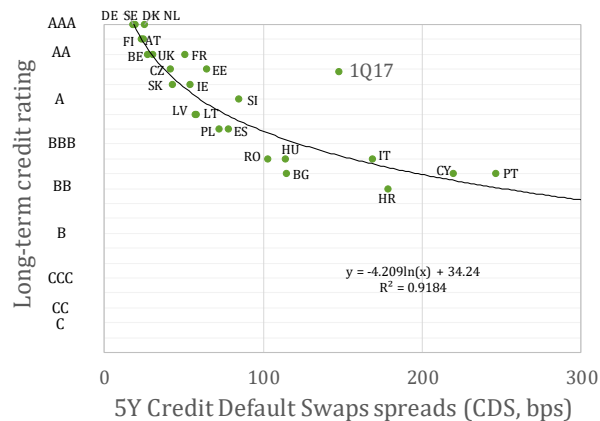
Source: Thomson Reuters Eikon with data of Standard and Poor's

4.4 Long-term foreign currency credit rating (Balkans, CY, MT and LU)



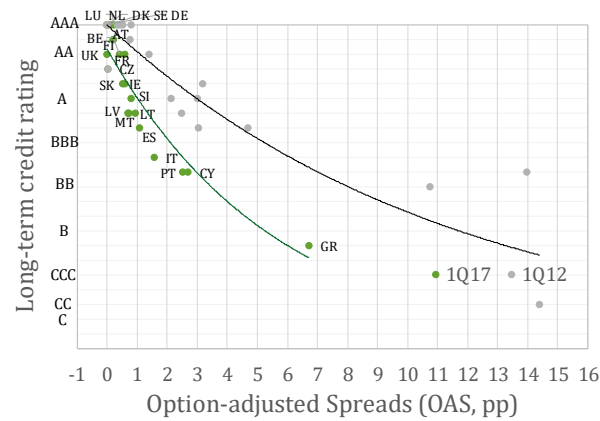
Source: Thomson Reuters Eikon with data of Standard and Poor's

4.5 Long-term foreign currency credit rating and 5Y Credit Default Swaps (CDS)



Source: Deutsche Bank and Standard and Poor's

4.6 Long-term foreign currency credit rating and option-adjusted spreads (OAS)



Source: Barclays and Standard and Poor's

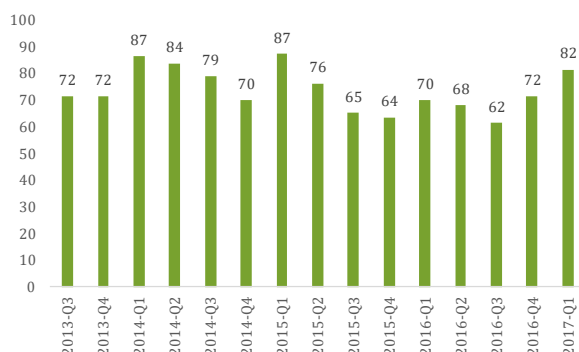
4.7 European rating actions on long-term foreign currency ratings (2017 YtD)

Issuer	Rating action	Date	Rated by	Rationale
Cyprus	Upgrade to BB+ (stable) from BB	Mar-17	S&P	Stronger-than-expected economic growth and fiscal progress
Italy	Downgrade to BBB (stable) from BBB+	Apr-17	Fitch	Track record of fiscal slippage, weak growth, and failure to bring down gov. debt. Political risk and banking sector weakness

Source: Fitch, Moody's, S&P

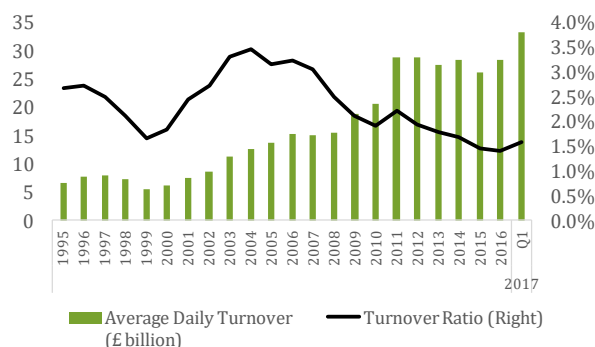
5 Secondary market trading volumes and turnover ratios⁴

5.1 EU28: Average daily trading volumes on Trax (Government & Sovereign bonds, EURbn)⁵



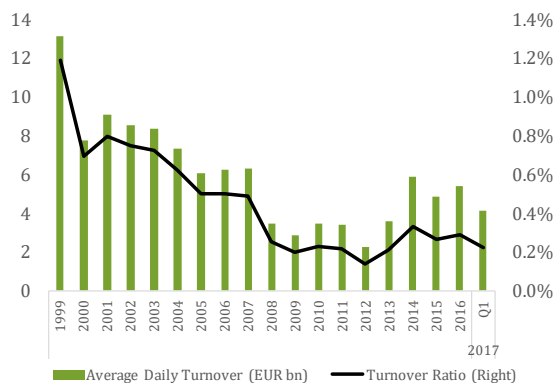
Source: Trax, a MarketAxess subsidiary

5.2 United Kingdom: Average daily trading volume (bonds only) and turnover ratio⁶



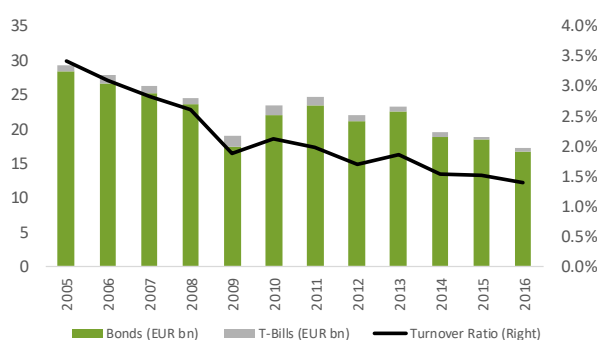
Source: UK Debt Management Office

5.3 Italy: Average daily trading volume (bonds and bills) and turnover ratio. Electronic trading⁷



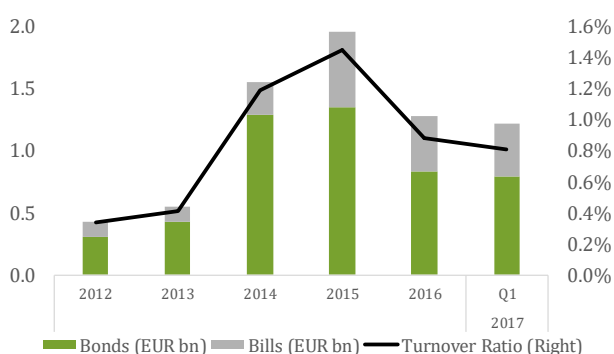
Source: Italian Dipartimento del Tesoro

5.4 Germany: Average daily trading volume (aggregated bonds and bills) and turnover ratio⁸



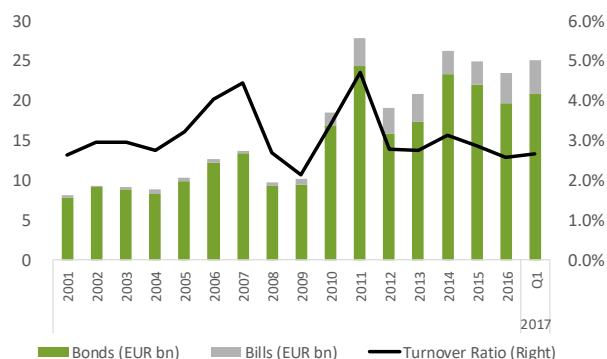
Source: Deutsche Finanzagentur and ECB

5.5 Portugal: Average daily trading volume and turnover ratio⁹



Source: Agência de Gestão da Tesouraria e da Dívida Pública – IGCP and ECB

5.6 Spain: Average daily trading volume and turnover ratio¹⁰



Source: Tesoro Público de España

⁴ Turnover ratios are calculated as the average daily trading volume relative to total outstandings. Cash trading only (excludes repo and derivatives transactions). Given the differences in the aggregation basis across jurisdictions, the data is not fully comparable between countries.

⁵ Secondary Market Volumes (please note this is restricted to 2013-Q3 onwards as split not available prior to this date). Volumes are calculated by converting the individual traded securities to EUR using the prevailing exchange rate on the date of each trade. ADV calculated by dividing the total converted volume by the number of UK trading days for quarter. Government & Sovereign bond volumes for EU28 member states as per the AFME methodology.

⁶ Turnover data reported to the DMO by the Gilt-edged Market Makers (primary dealers).

⁷ Turnover on electronic interdealer regulated market.

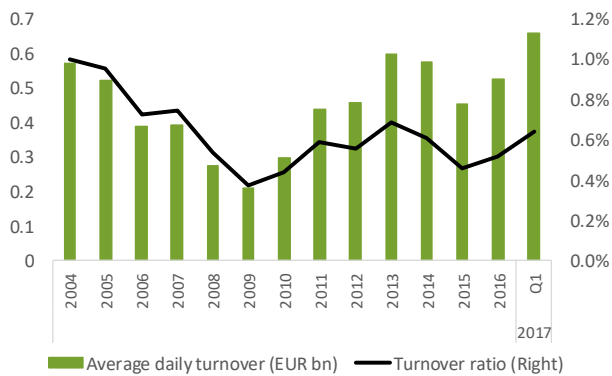
⁸ Turnover of both electronic and OTC trading. The traded volume is aggregated for a representative part of the members of the Bund Issues Auction Group with trades with all counterparties. Bubills, Schaetze, Bobls, Bunds and inflation-linked securities. Capital and coupon strips as well as US-dollar bonds are excluded.

⁹ Turnover of electronic and OTC trading reported on MTS-Portugal, BrokerTec and eSpeed.

¹⁰ Turnover is total outright transactions. Includes Treasury Bills, non-stripped Government Bonds and stripped Government Bonds. The Spanish DMO was contacted to describe in more detail the aggregation basis of the Spanish turnover figures.

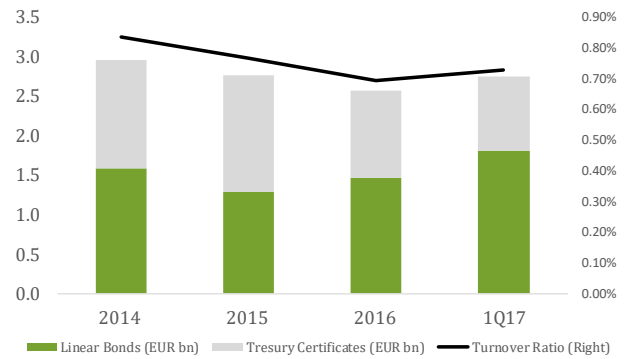
Secondary market trading volumes and turnover ratios

5.7 Finland: Average daily trading volume (aggregated bonds and bills) and turnover ratio¹¹



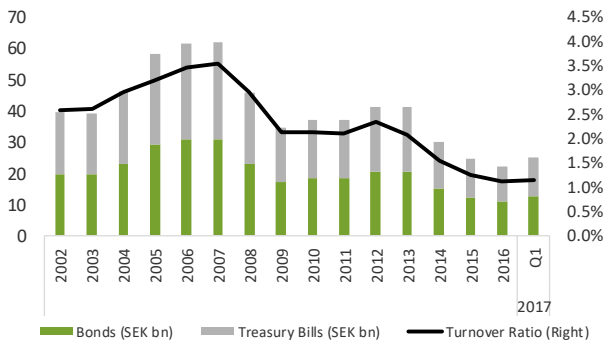
Source: Finland Valtiokonttori and ECB

5.8 Belgium: Average daily trading volume and turnover ratio¹²



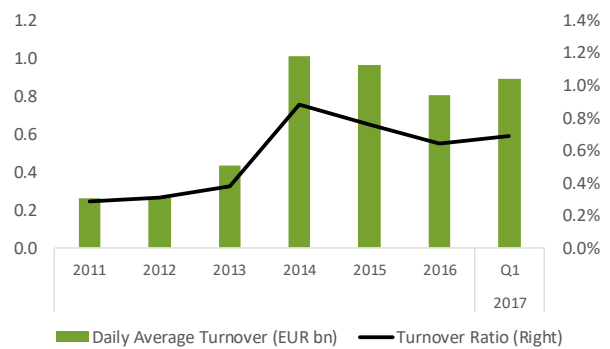
Source: Belgian Debt Agency and ECB

5.9 Sweden: Average daily trading volume and turnover ratio¹³



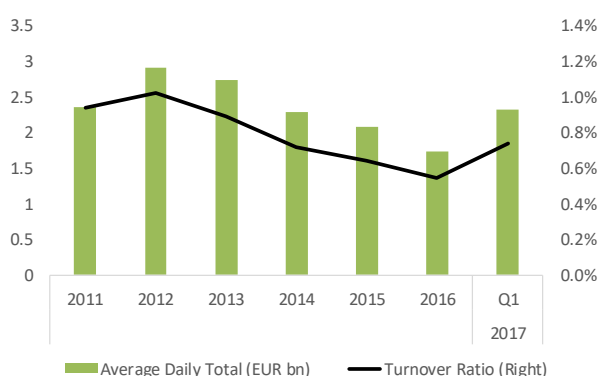
Source: Swedish National Debt Office (Riksgälden) and ECB

5.10 Ireland: Average daily trading volume (aggregated bonds and bills) and turnover ratio¹⁴



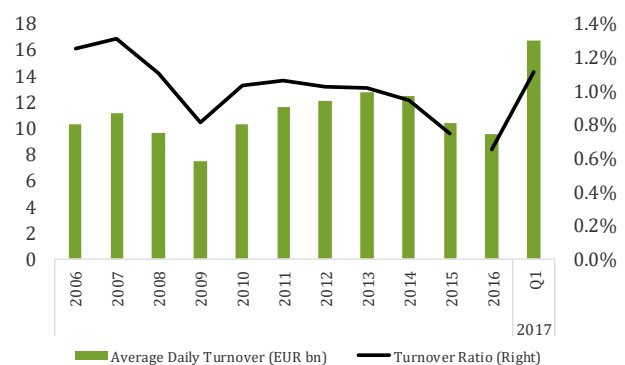
Source: Irish Stock Exchange and ECB

5.11 Netherlands: Average daily trading volume (bonds only) and turnover ratio¹⁵



Source: Ministerie van Financiën

5.12 France: Average daily trading volume (bonds only) and turnover ratio¹⁶



Source: Agence France Trésor and ECB

¹¹ Turnover of customer trades, MTS Finland and Euro MTS.

¹² Turnover is total outright transactions.

¹³ Turnover is total outright transactions.

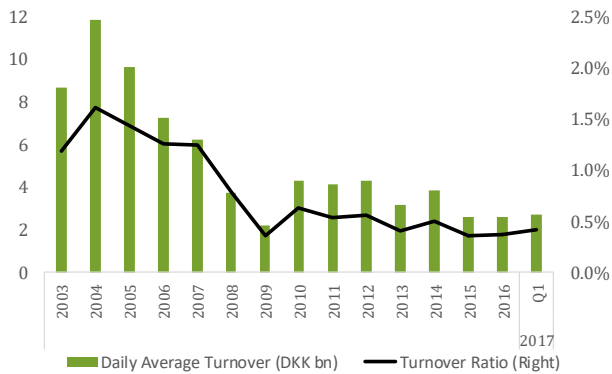
¹⁴ Turnover on Irish Stock Exchange.

¹⁵ Turnover is customer and interdealer trading. Total outright transactions, including electronic and OTC trading.

¹⁶ Turnover of voice and electronic trading (not including PSPP transactions or trading without an SVT). Q2 is the average of the first two months of the quarter.

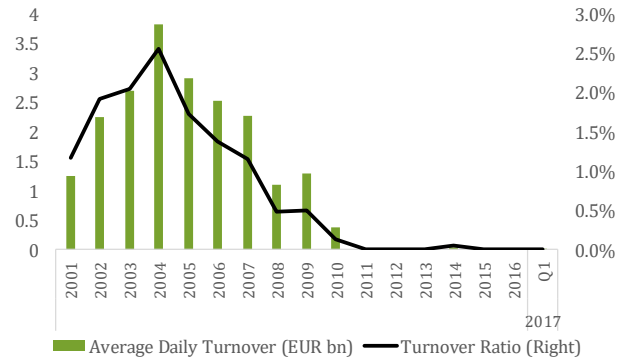
Secondary market trading volumes and turnover ratios

5.13 Denmark: Average daily trading volume (bonds and bills) and turnover ratio¹⁷



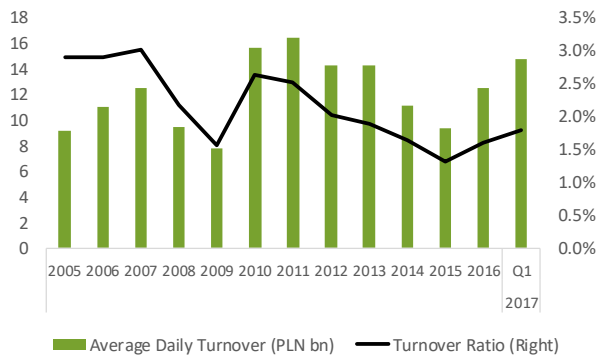
Source: Danmarks Nationalbank

5.14 Greece: Average daily trading volume (bonds only) and turnover ratio¹⁸



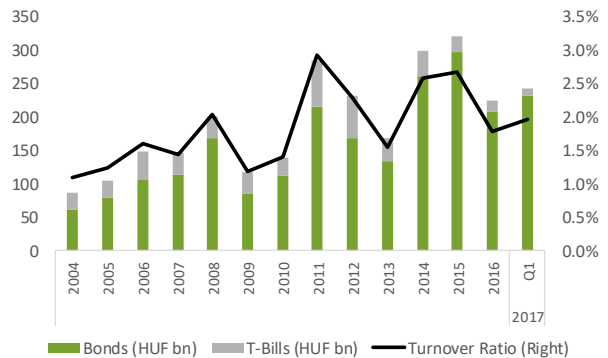
Source: Bank of Greece and ECB

5.15 Poland: Average daily trading volume (bonds only) and turnover ratio¹⁹



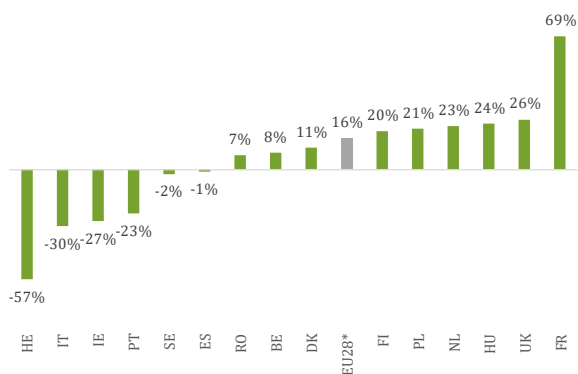
Source: National Depository for Securities (KDPW), WSE

5.16 Hungary: Average daily trading volume and turnover ratio²⁰



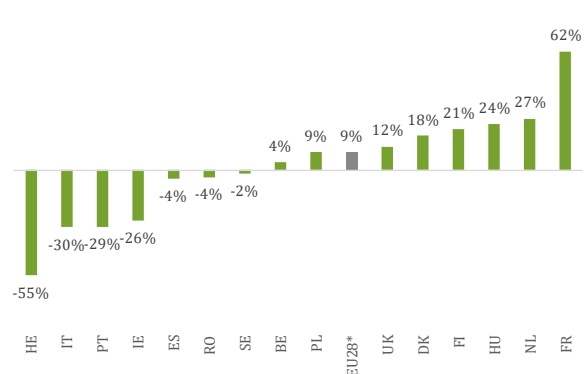
Source: ÁKK

5.17 Annual change in average daily turnover volumes of EU government bonds: 1Q16 to 1Q17



Source: AFME with information from European DMOs and other agency sources. See section 5 for details on aggregation basis and sources. *Europe total is sourced from TRAX Facts as the quarterly variation of average daily volumes of government and sovereign bonds.

5.18 Annual change in turnover ratio of EU government bonds: 2015 to 2016



Source: AFME with information from European DMOs and other agency sources. See section 5 for details on aggregation basis and sources. *Europe total is sourced from TRAX Facts as the quarterly variation of average daily volumes of government and sovereign bonds

¹⁷ Turnover of MTS, TradeWeb, Bondvision and trades reported to Nasdaq OMX (including voice trading).

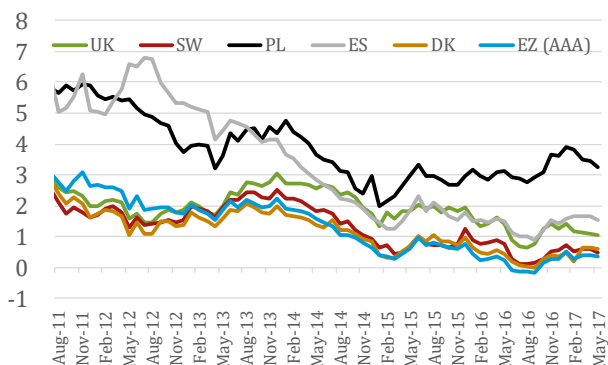
¹⁸ Turnover on Electronic Secondary Securities Market (HDAT).

¹⁹ Turnover is total outright transactions. Data from KDPW are presented according to the date of the settlement, while data from WSE are presented according to the date of conclusion of a transaction.

²⁰ Turnover does not include Premium Bonds, Bonus Bonds or Euro Bonds.

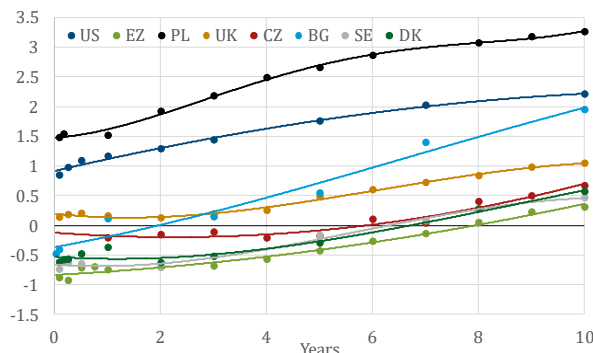
6 Valuations

6.1 Selected European 10Y spot yields



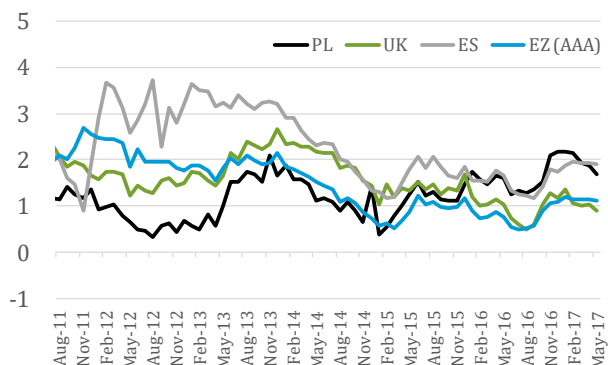
Source: ECB and Thomson Reuters Eikon

6.2 Sovereign spot yield curve of selected jurisdictions: 31 May 2017



Source: Thomson Reuters Eikon

6.3 Slope: 1Y10Y spread



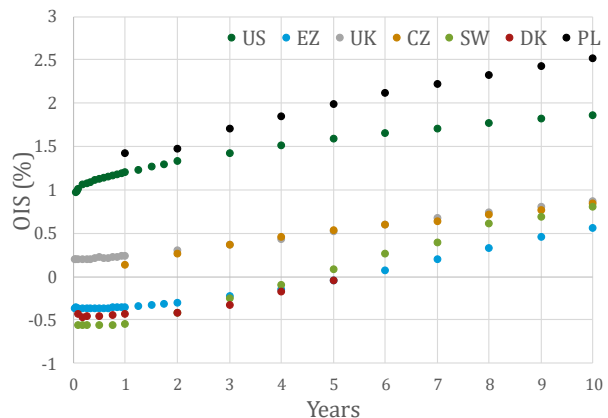
Source: ECB and Thomson Reuters Eikon

6.4 Market-implied inflation expectations (EuroZone)



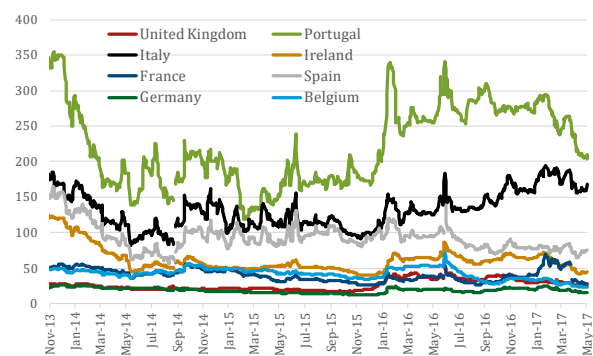
Source: Thomson Reuters Eikon

6.5 Overnight index swap (OIS) yield curve: 31 May 2017



Source: Thomson Reuters Eikon

6.6 5Y Sovereign Credit Default Swap (CDS, bps)



Source: Thomson Reuters Eikon

Summary of the Methodologies Adopted for this Report

1. Issuance

1.1. – 1.4. Government bond issuance by type, region and currency

The charts aggregate central government gross debt issuance volumes originated by EU28 member states. It excludes debt issued by government agencies and Central Banks.

Issuance data of Eurozone member states are sourced from the European Central Bank (ECB) “Debt securities issued by euro area residents by original maturity; currency and sector of the issuer” report with “Central Government” as the basis of aggregation. The data are available in: <https://www.ecb.europa.eu/stats/money/securities/debt/html/index.en.html>

Issuance volumes of non-Eurozone member states are sourced from national Debt Management Offices (DMO), Central Banks and Ministries of Finance depending on data availability. More specifically:

UK Debt Management Office:
http://www.dmo.gov.uk/index.aspx?page=Gilts/Net_Issuance_Data

Sweden Riksgalden:
<https://www.riksdagen.se/en/For-investors/Government-securities/Auction-results/>

Poland Finanse:
<http://www.finanse.mf.gov.pl/uk/public-debt/t-bills-and-t-bonds/transactions-database>

Hungary ÁKK:
<http://www.akk.hu/en/page/statistics>

Denmark National Banken:
<http://www.nationalbanken.dk/en/governmentdebt/auctionsandissuance/Pages/Auction-results---government-bonds.aspx>

Czech Republic CNB:
https://www.cnb.cz/en/financial_markets/treasury_securities_market/government_bonds/

Croatia Ministry of Finance:
<http://www.mfin.hr/en/public-debt>

Bulgaria Ministry of Finance:
<http://www.minfin.bg/en/page/70>

Data are aggregated in Euros by converting the original values of non-Euro volumes using the relevant daily currency pair exchange rate as published by the ECB. Data available in

<https://www.ecb.europa.eu/stats/exchange/eurofxref/html/index.en.html>

For Charts 1.1 and 1.2, “Bills” refer to central government debt securities issued with a tenor of 1 year or less, while “Bonds” relate to central government debt securities issued with a tenor of above 1 year.

1.5. – 1.6. Net sovereign debt issuance

Net issuance relates to gross issuance volumes originated by central governments net of redemptions during the relevant period. As in 1.1-1.4, the data excludes debt securities issued by agencies and other related general government securities.

For Eurozone member states, data are sourced from the ECB’s “Debt securities issued by euro area residents by original maturity; currency and sector of the issuer” report with “Central Government” as the basis of aggregation.

For UK net issuance, data are sourced from the UK Debt Management Office according to the “Monthly Gross and Net Issuance report” available in: http://www.dmo.gov.uk/index.aspx?page=Gilts/Net_Issuance_Data

2. Auctions and Primary Dealers

2.1. – 2.7. Bid-cover ratios

Bid-cover ratios data is sourced from Thomson Reuters Eikon for 10 jurisdictions (selected based on overall outstanding debt size and auction data quality). Where the data is not in Euros, it is converted using the relevant exchange rate from the ECB as in 1.1-1.4.

2.8.- 2.10. European Primary Dealers

The number of European primary dealers are sourced from AFME’s Primary Dealers handbooks as published for the relevant period, and from AFME’s regularly updated Primary Dealers list for the counterparty type definitions under the Harmonised Reporting Format (or “HRF table”).

In Belgium, the list also aggregates “Recognised Dealers” in the total number of Primary Dealers.

In Germany, members of the “Bund Issues Auction Group” are aggregated. Technically, there are no primary dealers but banks which are members of the auction group.

In the Netherlands, the list also aggregates “Single Market Specialists” in the total number of Primary Dealers.

3. Outstanding

3.1. Outstanding debt securities issued by central governments

2009-2015 outstanding volumes are sourced from the ECB “Debt securities outstanding (Securities other than shares, excluding financial derivatives). 1Q16 and 2Q16 outstanding volumes are sourced from Thomson Reuters Eikon (see section 3.2-3.6 for the methodology and aggregation basis).

3.2. – 3.8. European Government bonds outstanding

The charts display outstanding central government gross debt volumes originated by EU28 member states. It excludes debt issued by government agencies and Central Banks.

The data is sourced from Thomson Reuters Eikon and is required to have a maturity date, issue date and issue amount in order to be included. The data was sourced with issue amounts in US Dollars and so was converted to Euros using the relevant exchange rate from the ECB as in 1.1–1.4.

The credit ratings used in 3.6 are the long term foreign currency issuer credit ratings and are sourced from Standard and Poor’s as reported by Thomson Reuters Eikon at the end of the relevant quarter.

4. Credit Quality

4.1. – 4.4 Credit ratings in selected European jurisdictions

Charts 4.1-4.4 aggregate the long-term credit rating in foreign currency of EU 28 member states as rated by Standard and Poor’s. Data were retrieved from Thomson Reuters Eikon but primarily sourced from Standard and Poor’s.

4.5.-4.6. Relationship between S&P long-term credit ratings and CDS and OAS

Chart 4.3 illustrates the relationship between S&P long-term credit ratings in foreign currency as described in charts 4.1-4.2, with sovereign Credit Defaults Swap rates.

Credit ratings are sourced from Standard and Poor’s as reported by Thomson Reuters Eikon as of the end of the relevant quarter.

CDS data are sourced from Deutsche Bank’s web-based platform “Sovereign default probabilities online” available in: [https://www.dbresearch.com/servlet/reweb2.ReWEB?rwnode=DBR_INTERNET_EN-PROD\\$NAVIGATION&rwobj=CDS.calias&rwsite=DBR_INTERNET_EN-PROD](https://www.dbresearch.com/servlet/reweb2.ReWEB?rwnode=DBR_INTERNET_EN-PROD$NAVIGATION&rwobj=CDS.calias&rwsite=DBR_INTERNET_EN-PROD)

For purposes of comparability, the CDS spreads assume a recovery rate of 40% across all jurisdictions.

Chart 4.4 illustrates the relationship between S&P long-term credit ratings in foreign currency and Option-Adjusted spreads (OAS). OAS are sourced from Barclays Capital.

4.7. European rating actions

Rating actions on long-term foreign currency ratings of EU28 member states as rated by Standard and Poor’s, Fitch and Moody’s. Changes to credit outlooks are not aggregated.

The column “rationale” is a summary of the main drivers behind the respective rating actions as per the agencies’ press releases and detailed ratings reports.

5. Trading volumes and turnover ratio

5.1. – 5.18 Trading volumes and turnover ratio

The charts display secondary market daily average trading volumes and turnover ratios for the selected jurisdictions. The turnover ratio is equal to the daily average trading volume divided by the total outstanding debt volume for the country at the time of the trading.

Trading volumes are sourced from Trax, a MarketAxess subsidiary, national Debt Management Offices (DMO), Central Banks and Ministries of Finance depending on data availability.

Trax data includes Government & Sovereign bond volumes for EU28 member states as per the AFME methodology. The volumes are calculated by converting the individual traded securities to EUR using the prevailing exchange rate on the date of each trade. ADV calculated by dividing the total converted volume by the number of UK trading days for quarter. Secondary Market Volumes (please note this is restricted to 2013-Q3 onwards as split not available prior to this date).

Publicly available sources are:

UK Debt Management Office:

<http://www.dmo.gov.uk/index.aspx?page=Gilts/Turnover>

Belgian Debt Agency:

http://www.debtagency.be/en_products_olo_volume.htm

Italian Dipartimento del Tesoro:

http://www.dt.tesoro.it/en/debito_publico/dati_statistici/bollettino_trimestrale/

Deutsche Finanzagentur:

<http://www.deutsche-finanzagentur.de/en/institutional-investors/secondary-market/>

Portugese Agência de Gestão da Tesouraria e da Dívida Pública – IGCP:

<http://www.igcp.pt/gca/?id=89>

Tesoro Público de España:

<http://www.tesoro.es/en/deuda-publica/estad%C3%ADsticas-mensuales>

Finland Valtiokonttor:

http://www.treasuryfinland.fi/en-US/Statistics/Funding/Secondary_market

Bank of Greece:

<http://www.bankofgreece.gr/Pages/en/Markets/HDAT/statistics.aspx>

Irish Stock Exchange:

<http://www.ise.ie/Market-Data-Announcements/Statistical-Reports/>

Polish Finance:

<http://www.finanse.mf.gov.pl/en/web/wp/public-debt/secondary-market/secondary-market-statistics>

Hungarian ÁKK:

<http://www.akk.hu/en/page/statistics>

6. Valuations

6.1. Selected European 10Y benchmark yields

The chart aggregates the end-of-month sovereign 10Y benchmark yield rates in selected European jurisdictions (United Kingdom, Sweden, Poland, Spain, Denmark and the Euro zone benchmark). The Euro zone yield rate is sourced from the ECB and relates to the AAA-rated benchmark sovereign interest rate for a 10-year tenor. The yields for the other jurisdictions are sourced from Thomson Reuters Eikon.

6.2. Sovereign spot yield curve

Spot yield curve for jurisdictions for the 1 to 10 years maturities as of the selected period. All data points are sourced from Thomson Reuters Eikon.

6.3. Slope of the sovereign debt yield

The chart aggregates the difference between 1 year and 10-year spot rates in the selected jurisdictions. The slope of the Euro zone curve is sourced from the ECB and relates to the slope of AAA-rated benchmark sovereign yields. The slopes of the

other jurisdictions are sourced from Thomson Reuters Eikon.

6.4. Implied inflation expectations in the Euro zone

The chart aggregates the historic market-implied HICP inflation expectation of the Euro zone for 1 and 5 years ahead. Specifically, EUIL1YF1Y=R and EUIL5YF5Y=R contracts retrieved from Thomson Reuters Eikon.

6.5. Overnight index swap (OIS) yield curve

The chart aggregates the OIS yield curve in the respective jurisdictions, illustrating the market-implied expectations of future changes in the central banks' policy rates. All data points are sourced from Thomson Reuters Eikon and retrieved during the disclosed day.

6.6. 5Y Sovereign Credit Default Swap

The chart aggregates historic 5Y CDS spreads for selected jurisdictions. For purposes of comparability, the CDS spreads assume a recovery rate of 40% across all jurisdictions. Data are sourced from Deutsche Bank's web-based platform "Sovereign default probabilities online".

Annex

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