Chapter 1

Sovereign borrowing outlook for OECD countries

This chapter examines sovereign borrowing needs in OECD countries from 2007 to 2016. It first looks at the net and gross borrowing needs of OECD governments in the context of ongoing fiscal consolidation. It then considers recent trends in central government marketable debt in the OECD and general government debt ratios for selected OECD countries, as well as current interest rates and the possible medium to long-term effect of negative interest rates. Finally, the chapter examines the relationship between monetary policy and debt management decisions, the role of public institutions as investors in sovereign bonds and growing concerns about secondary market liquidity.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.
1. Introduction

This chapter examines net and gross sovereign borrowing in OECD countries for 2007 to 2016. It first looks at the net and gross borrowing needs of OECD governments in the context of fiscal developments. It then considers recent trends in central government marketable debt in the OECD area, central government debt ratios for groups of selected OECD countries and general government gross financial liabilities government debt ratios a group of selected major OECD countries. The chapter then discusses current interest rates and the challenges arising over the medium to long-term from negative interest rates. Finally, the chapter examines the relationship between monetary policy and debt management decisions and the role of public institutions as investors in sovereign bonds.

Key findings

- Sovereign borrowing needs in the OECD area as a whole have declined, owing to fiscal consolidation efforts. Net borrowing requirements have continued to decline from their peaks attained in 2008/9 and gross borrowing requirements from their peaks attained in 2012.

- Net borrowing continues to be positive however and sovereign debt levels, which had risen rapidly as a result of the policy response to the global financial crisis and the real activity deceleration associated with it, continue to be high by historical standards.

- Interest rates are low and they are even sometimes negative for high-credit-quality sovereigns. This borrowing environment facilitates the servicing of debt and influences the perceived need to reduce high public debt levels.

- Looking ahead, purchases of government bonds by central bank and other public authorities that have constituted such a considerable share of sovereign bond demand are likely to decline, even if the outlook in this regard differs across regions.

- Redemption profiles remain challenging over the next few years. Debt management offices have been reacting to these challenges among other things by making sovereign debt reimbursement requirements as light as possible over the short to medium term. As part of such efforts, redemption profiles were lengthened, thus limiting rollover risks. Such a strategy tends to involve higher debt-servicing costs over the short term, given that yield curves are upward sloping. At the same time, it makes debt-servicing costs more predictable, and this advantage is currently achieved at limited costs.

- A survey among debt management offices that are members of the OECD Working Party on Debt Management revealed concerns among debt management offices regarding sovereign bond secondary market liquidity, especially in the case of bonds that are not “on-the-run”. These concerns are valid, and more

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1 This chapter was prepared by Sebastian Schich, Senior Economist, OECD Financial Affairs Division, with research and statistical support from Romain Despalins, Statistician, OECD Financial Affairs Division, and Perla Ibarlucea Flores, Statistician, OECD Financial Affairs Division.
research is needed to more fully understand the implications of the evolving sovereign bond market structures for liquidity, trading and risk management practices, and market monitoring.

1.2 Net and gross borrowing needs of OECD governments decline with fiscal consolidation

Net borrowing needs of OECD governments have continued to decline, reflecting progress regarding fiscal consolidation. In fact, OECD Economic Outlook projections (OECD, 2015b) show an improvement in actual general government balances, from 5.1% of GDP in 2014 to an estimated 4.5% in 2015 and 4.2% in 2016. This situation is reflected in central government marketable net borrowing requirements that have declined and are estimated to continue to decline.

The net central government borrowing requirement for the region as a whole is projected to return in 2016 to a level similar to the one observed before the global financial crisis (Figure 1.1). The financial crisis, and the policy response to it, implied a drastically increased additional borrowing requirement in the years 2008 and 2009. From its peak of USD 3.3 trillion attained in 2009, net central government marketable borrowing requirement has fallen to an expected USD 1.2 trillion in 2015. Looking further ahead, the borrowing needs of OECD central governments combined are expected to decline further to USD 600 billion in 2016 (Table 1.1).

Expressed as a percentage of GDP rather than in absolute amounts, aggregate borrowing numbers for the OECD area as a whole hide considerable differences across selected OECD groupings, with the group of G7 countries being characterised by relatively higher marketable gross borrowing requirements as of GDP than other OECD countries (Figure 1.2). As foreshadowed in the 2014 edition of the OECD Sovereign Borrowing Outlook, gross borrowing needs of governments had peaked in 2012 (Table 1.1). The decline from 2012 to 2013 observed at the time of writing that edition has continued into 2015. The present chapter of this 2016 edition estimates that gross marketable borrowing requirements, calculated on the basis of budget deficits and redemptions of marketable debt, stands at USD 9.4 trillion in 2015, compared to USD 10.4 trillion two years earlier. It also projects gross marketable borrowing requirements to further decline to USD 8.8 trillion in 2016. The effect of the global financial crisis on these various measures is thus diminishing, although only very gradually.
1.3 Central government marketable debt in the OECD area may not have peaked yet

Net borrowing in the OECD area as a whole continues to be positive, however, and this observation is reflected in the continued growth of central government marketable debt. Figure 1.3 shows recent trends in central government marketable debt in the OECD area, based on data collected through a survey on central government marketable debt and borrowing by the OECD Working Party on Debt Management for the period from 2007 to 2016 (including OECD staff projections). The figure shows that a measure of aggregate central government marketable debt across the OECD area is estimated to rise slowly but steadily to exceed the equivalent of USD 40 trillion in 2016.

Such estimates of region-wide aggregates reflect the assumptions being made as to how to aggregate data in different national currencies to calculate area-wide aggregates. The estimates referred to above (and reported in previous editions of the OECD Sovereign Borrowing Outlook) are in fact based on the assumption of fixed exchange rates (as of 2009 values) to aggregate data across the different national currencies in the OECD area. This assumption facilitates the interpretation of developments in volumes over time and allows comparison of the volume data discussed in the present edition of the Sovereign Borrowing Outlook with those reported in previous editions.

Using varying foreign exchange rates instead to calculate area-wide aggregates, central government marketable debt is estimated to have peaked in 2013 at USD 35.6 trillion (Figure 1.3 Panel C). It is estimated to be equivalent to USD 33.9 trillion in 2016. Among other things, the differences in estimates depending on exchange rate assumptions (i.e. fixed versus flexible) reflect the depreciation of the Japanese Yen versus the USD. The depreciation in the bilateral exchange rate implies that Japanese central government marketable debt contributes less to area-wide aggregates expressed in USD.

Thus, metrics of marketable public debt in the OECD area suggest that it is high by historical standards for the period for which this data has been collected (that is, since 2007). That said, the reported numbers reflect the choice of exchange rate assumptions and, thus, absolute numbers expressed in any single currency should be interpreted with some caution.

Incidentally, the same caveat applies to the interpretation of aggregate data of gross borrowing in the area, which is discussed in section 1.2. Considering flexible rather than fixed exchange rates when aggregating central government marketable gross borrowing across OECD countries, estimates for 2014 are USD 9.2 trillion (Figure 1.4). This number compares with estimates of USD 10.1 trillion for 2014 when considering fixed exchange rates instead, as reported in Table 1.1 (and in previous editions of the OECD Sovereign Borrowing Outlook).
Figure 1.1. Fiscal and borrowing outlook in OECD countries for the period 2007-2016

Notes: GBR = gross borrowing requirement, NBR = net borrowing requirement. General government deficit is derived from the general government net lending as published in the OECD Economic Outlook No 98 for all OECD countries except for Chile, Mexico and Turkey for which the source is the IMF World Economic Outlook (October 2015). Figures are calculated based on data in national currencies using exchange rates as of 1st December 2009.

Source: 2015 Survey on central government marketable debt and borrowing by the OECD Working Party on Debt Management; OECD Economic Outlook No 98; IMF World Economic Outlook (October 2015) and OECD staff estimates.
Table 1.1. Central government marketable gross and net borrowing and marketable debt in the OECD area

(Trillion USD)

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<tr>
<td>Central government marketable GBR (with cash)</td>
<td>6.9</td>
<td>8.6</td>
<td>11.0</td>
<td>11.2</td>
<td>10.6</td>
<td>11.2</td>
<td>10.8</td>
<td>10.6</td>
<td>9.9</td>
<td>9.3</td>
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<tr>
<td>Central government marketable GBR (without cash)</td>
<td>6.4</td>
<td>8.1</td>
<td>10.6</td>
<td>10.7</td>
<td>10.1</td>
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<td>3.3</td>
<td>3.2</td>
<td>2.2</td>
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<td>1.8</td>
<td>1.4</td>
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<td>1.5</td>
<td>3.7</td>
<td>3.6</td>
<td>3.1</td>
<td>2.8</td>
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Notes: GBR = gross borrowing requirement, NBR = net borrowing requirement. General government deficit is derived from the general government net lending as published in the OECD Economic Outlook No 98 for all OECD countries except for Chile, Mexico and Turkey for which the source is the IMF World Economic Outlook (October 2015). “Cash” refers to short-term instruments in the money market such as outstanding commercial paper or instruments for liquidity management; these instruments are either excluded (“without cash”) or included (“with cash”). Figures are calculated based on data in national currencies using the exchange rates as of 1st December 2009.

Source: 2015 Survey on central government marketable debt and borrowing by the OECD Working Party on Debt Management; OECD Economic Outlook No 98; IMF World Economic Outlook (October 2015) and OECD staff estimates.

Figure 1.2. Central government marketable gross borrowing in OECD countries
(As a percentage of GDP)

Notes: Central government marketable GBR without cash. Values of marketable GBR and GDP have been aggregated by using fixed exchange rates, as of 1st December 2009, for all years. “Euro area - 15 members” includes the following OECD countries: Austria, Belgium, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Slovak Republic, Slovenia and Spain. “Other OECD” includes Australia, Chile, Czech Republic, Denmark, Hungary, Iceland, Israel, Korea, Mexico, New Zealand, Norway, Poland, Sweden, Switzerland and Turkey.

Source: 2015 Survey on central government marketable debt and borrowing by the OECD Working Party on Debt Management; OECD Economic Outlook No 98; and OECD staff estimates.
Figure 1.3. Central government marketable debt (without cash) in the OECD area
Panel A: USD trillion considering different exchange rate assumptions in aggregation of national currency values

Panel B: USD trillion using fixed exchange rates in aggregation of national currency values

Panel C: USD trillion using flexible exchange rates in aggregation of national currency values

Notes: Data aggregated using “fixed exchange rates” are calculated using exchange rates as of 1st December 2009. Data aggregated using “flexible exchange rates” are calculated using annual period average exchange rates. Euro area countries considered in this figure include Austria, Belgium, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Slovak Republic, Slovenia and Spain.

Figure 1.4. Central government marketable gross borrowing requirement (without cash) in the OECD area

Panel A: USD trillion considering different exchange rate assumptions in aggregation of national currency values

Panel B: USD trillion using fixed exchange rates in aggregation of national currency values

Panel C: USD trillion using flexible exchange rates in aggregation of national currency values

Notes: Data aggregated using “fixed exchange rates” are calculated using exchange rates as of 1st December 2009. Data aggregated using “flexible exchange rates” are calculated using annual period average exchange rates. Euro area countries considered in this figure include Austria, Belgium, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Slovak Republic, Slovenia and Spain.

1.4 Government debt ratios for selected OECD area groupings are close to historical peaks

The response of governments to the global financial crisis set the stage for a surge in fiscal deficits and growing actual as well as contingent government liabilities. Initially as a result of the effect of fiscal stimulus programmes on spending and then as a result of the negative growth dynamics on revenues and, more recently, as a result of efforts to support struggling real activity growth, government debt increased substantially. It increased not only in absolute but also in relative terms. Figure 1.5 shows that central government marketable debt in OECD countries, expressed here as a percentage of region-wide GDP, currently stands at levels that are well above those observed before the global financial crisis.

Figure 1.5 also shows that, going forward, GDP projections taken from the November 2015 OECD Economic Outlook imply that estimates of central government debt in the OECD area (expressed as a share of GDP) are estimated to decline in 2015 and 2016. The figure also illustrates that there are considerable differences in levels across different groupings of OECD countries, with the group of G7 countries being characterised by the highest average estimates of central-government-debt-to-GDP ratios.

Figure 1.5. Central government marketable debt in OECD countries

Notes: Central government marketable debt without cash. Values of marketable debt and GDP have been aggregated by using fixed exchange rates, as of 1st December 2009, for all years. “Euro area - 15 members” includes the following OECD countries: Austria, Belgium, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Slovak Republic, Slovenia and Spain. “Other OECD” include Australia, Chile, Czech Republic, Denmark, Hungary, Iceland, Israel, Korea, Mexico, New Zealand, Norway, Poland, Sweden, Switzerland and Turkey.

Source: 2015 Survey on central government marketable debt and borrowing by the OECD Working Party on Debt Management; OECD Economic Outlook No 98; and OECD staff estimates.

A broader debt measure, general government as opposed to central government debt, is shown in Figure 1.6 for a sub-set of countries. The figure shows the development of general government gross financial liabilities expressed as a percentage of GDP for a
group of selected OECD countries (which, incidentally, include all G7 countries) from 1901-2016.\(^{10}\) It illustrates that average measures for this group are close to their historical peak attained subsequent to the Second World War (1941-45).\(^{11}\)

What is also remarkable is that the currently highest debt-to-GDP ratio of all countries included in the sample shown in Figure 1.6 is close to the two historical peaks attained after the First and the Second World War, respectively. Furthermore, the currently lowest debt-to-GDP ratio of all countries included is now well above the values observed during previous peaks (that is subsequent to the First and Second World War, respectively). This minimum is characterised by a trend increase over the last 50 years.

Taking the evidence from the various debt metrics together, public debt measures for this group of major OECD countries are currently high by historical standards. Servicing this debt is currently facilitated by low interest rates.

**Figure 1.6. Gross general government financial liabilities of selected advanced OECD countries**

(1901-2016, percentage of GDP)

![Diagram showing gross general government financial liabilities of selected advanced OECD countries](image)

Notes: The chart shows the evolution of several metrics (minimum, maximum, median, mean and GDP-weighted average) of general government gross financial liabilities expressed as a percentage of GDP for a selection of nine OECD countries (Australia, Canada, France, Germany, Italy, Japan, Spain, the United Kingdom and the United States). The grey area shows the range of minimum and maximum values all countries included. Recent data from OECD Economic Outlook No 98 and earlier data estimated by extrapolating the recent data applying the dynamics observed in the gross general government debts as reported in the IMF Historical Public Debt Database. The value for Germany for the year 1925 was dropped as its low value generated an unusual volatility of debt given the pattern for Germany around that period. The remaining gaps in the time series were imputed by fitting piecewise cubic splines. Individual countries’ time series may include methodological breaks. The GDP-weighted average ratio from 1954 to 2016 hinges on GDP values from IMF International Financial Statistics, converted in USD using annual exchange rates. GDP-weights before 1954 are identical to values in 1954.

Source: OECD Economic Outlook No. 98; IMF Historical Public Debt, International Financial Statistics and World Economic Outlook databases; and OECD staff calculations.
1.5 Interest rates are very low and sometimes even negative

Interest rates are low, by many different historical standards, both in nominal and in inflation-adjusted terms. They are low both at the short and the long end, and some rates are even negative.

The fact that interest rates are low (and some of them even negative) is the result of a variety of factors, some of which have been at play over decades. There is no consensus yet on the exact role of the various causes underlying the observed three-decade-long trend decline in interest rates, but a variety of explanations have been proposed. These include a reduction in overall global investment, perhaps related to demographic developments, and a “savings glut” in some parts of the world. Demographic developments and the role of baby boomer generations in raising the supply of savings are also often referred to in this context. Interest rates are the reflection of a variety of supply and demand factors and the interplay between them are still not very well understood.

What is clear however is that the declines in interest rates observed since the publication of the previous OECD Sovereign Borrowing Outlook in early 2014 are in fact a continuation of a trend that stretches over several decades (Figure 1.7). Whatever the fundamental factors driving this trend, and notwithstanding the operation of amplifying factors, the policy response to the effects of the global financial crisis, and especially unconventional monetary policies, have contributed to the downward pressures.

**Figure 1.7. Short-term interest rates in selected OECD countries**

![Chart showing short-term interest rates in selected OECD countries](chart.png)

Notes: Interest rates in percentages.
Source: OECD Economic Outlook No. 98.
In fact, several policy rates, that is interest rates at which private banks can borrow from or deposit at central banks, have been driven into negative territory. Bank deposit rates have followed in several cases. This observation is remarkable as prior to the recent episode, there was a perception among many economists and policy makers alike that nominal negative borrowing costs could not be imposed (e.g. in form of negative policy rates). The rationale for this view was that depositors would simply withdraw their money and hold cash, as long as storage costs are negligible. Recent developments cast doubt on the validity of this view, however, and/or suggest that storage costs for cash are not negligible in reality.

1.6 The medium to long-term effect of negative interest rates are not well understood yet

While so far, there have been no dramatic effects on cash demand and financial market functioning (for a recent overview see e.g. Jackson, 2015), which is reassuring, the medium- to long-run effects of negative nominal rates are not well understood yet. Concerns have been expressed that as a result of low interest rates further asset bubbles are nourished and that undesirable distributional effects are created.

Negative interest rates effectively mean that savers subsidise borrowers. Negative interest rates on sovereign bonds imply that investors compensate sovereign debtors for being able to hold their debt.

The amount of sovereign debt affected by this situation is substantial. According to BIS (2015) estimates, between December 2014 and end-May 2015, about USD 2 trillion in global long-term sovereign debt traded at negative yields on average. While rates of Treasury bonds continue to be positive and bills with shorter remaining maturities to hover close to zero in the United States, at least part of the maturity spectrum of the debt of several European sovereigns paid negative interest rates at the beginning of December 2015 (Figure 1.8). In fact, yields on the debt of some highly rated sovereigns can be negative out to more than ten years, depending on the issuer.

This interest rate environment has distributional consequences. In particular, given that governments and non-financial corporations have much larger interest-bearing liabilities than interest-earning assets, these sectors tend to benefit from ultra-low or negative interest rates. Looking at the change in net government debt interest payments, Figure 1.9 shows that many OECD countries are estimated to have benefitted from a further decline in net government debt interest payments as of GDP since the publication of the OECD Sovereign Borrowing Outlook 2014. Others however have not. In many cases, this situation reflects that government net debt increased, while interest rates declined.

By contrast, long-term investors such as pension funds and life insurance companies, many of which with fixed nominal payment obligations, hold more interest-bearing assets than liabilities. As a result, these entities tend to suffer from lower net interest incomes in an environment of ultra-low interest rates. While some wealth effects occurred on their fixed-income portfolios as a result of declining rates over recent years, these benefits have to be seen against the background of rising measured liabilities, as lower rates to discount future payment obligations imply higher values of discounted present values of such promises. These developments have increased the already existing pressures, resulting especially from demographic developments, that a large number of financial institutions that accumulate retirement savings are facing, and it might induce them to engage in a search for yield.
Figure 1.8. Government benchmark interest rates in selected OECD countries

Notes: Interest rates in percentages. Cut-off date is end of December 2015. The charts show the evolution of several metrics (minimum, maximum, 25th percentile, 75th percentile, median) of 3-year, 5-year and 10-year benchmark government bond yields in a group of selected OECD countries. The group includes Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Netherlands, New Zealand, Norway (5-year and 10-year yields only), Poland, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States. The grey area shows the range of minimum and maximum values among all the included countries.

Source: OECD staff calculations based on Thomson Reuters Datastream.
1.7 Interest rate expectations diverge considerably across regions

Exceptional as the current episode of low interest rates appears by historical standards, predictions of a reversal to the “normal” have so far repeatedly been proved wrong. As a result, the longer the situation of historically low rates lasts, the more observers come to believe that this situation might be the “new normal”. That said, going forward, central expectations are for the situation to change and for interest rates to rise again, although expected developments differ noticeably across major regions.

For example, in the euro area, market expectations are consistent with further monetary policy easing over the short term, either through additional efforts to lower short-term policy rates or long-term rates through expanded quantitative easing. Against the background of downside risks stemming especially from global growth and trade, the ECB announced that it will re-examine its monetary policy measures and use further instruments if necessary to bring inflation back to target, which is to maintain price stability and keep inflation below but close to 2% over the medium.

By contrast, in the United States, where policy rates have been lifted again for the first time in ten years in December 2015, interest rate expectations are clearly pointing upwards. There is, however, considerable uncertainty about the pace of adjustment. This uncertainty seems to have been trending up during 2015, as reflected in a relatively
1.8 Many debt managers are lengthening maturity profiles

The OECD Sovereign Borrowing Outlook 2014 drew attention to the observation that many issuers faced fairly high borrowing needs and challenging redemption profiles at least until 2017. The observation is still valid. While gross and net borrowing needs have somewhat decreased since the publication of the 2014 edition, redemption profiles continue to be challenging, with more than a third of total outstanding long-term debt and close to 45% of total debt in 2015 estimated to be coming due over the three years from 2015 to 2018 (Figure 1.10).

This situation places a premium on management of debt maturities to control rollover risk. The responses of debt management offices to this situation and the choices made as part of their funding strategy in primary and secondary markets are discussed in more detail in the remaining chapters of this Sovereign Borrowing Outlook. The remainder of this section singles out for special attention some observations regarding developments in the maturity structure of issuance and outstanding debt.

In describing the maturity structure of debt and communicating about roll-over risks, debt management offices often refer to traditional and conceptually straightforward sovereign debt metrics such as the average or weighted-average maturity of debt outstanding. With an average maturity of four years, the total debt is rolled over once every four years. If the average debt maturity was increased from four to five years, only 20% instead of 25% of debt would mature each year and would thus have to be refunded, assuming net borrowing requirements equal to zero.

A lengthening of the maturity structure of government debt can be a cost-minimising response to a highly uncertain future issuance environment. On the one hand, extending the average maturity of debt implies that roll-over risk is reduced. On the other, as yield curves are typically upward-sloping, such strategies involve higher measured debt-servicing costs over the short term. Currently, the term premium seems to have become smaller than it used to be in the past. Thus, the trade-off between expected higher cost associated with a longer duration and reduced roll-over risk is changing, with the result that it becomes relatively cheaper to limit roll-over risk. Longer durations imply that borrowing costs become more predictable over time and this advantage might be achieved currently at more limited costs than in the past.

elevated two-year swaption volatility. While short end rates volatility had been trending higher, long-end rates volatility had been trending lower during the course of the year 2015. This situation is consistent with the view that there is considerable uncertainty about the pace of United States (short-term) policy rate adjustment, while there is less uncertainty about long-term rates; the view that the latter will remain at modest levels for some time might have become more firmly entrenched.
In fact, the maturity structure of gross issuance of central government marketable debt has evolved over recent years and is characterized by a trend increase in the issuance of long-term as opposed to short-term debt instruments in the area as a whole (Figure 1.11). As a result of this trend in issuance, the structure of outstanding debt is also changing. While the response to the financial crisis involved a sharp increase in the share of short-term central government marketable debt of almost 4% to around 18% from 2008 to 2009, this share is estimated to have substantially fallen again. It is estimated to be below 10% of total outstanding central government marketable debt in the OECD area as a whole in 2015, thus well below the levels observed between 2007 and 2009 (Figure 1.12).
This change in the structure of outstanding debt is consistent with a lengthening of the maturity of debt and, in fact, the average maturity of outstanding marketable central government debt in selected OECD countries has continued to increase over recent years. It is estimated to be close to eight years in 2015, compared to just above seven years in 2013 (Figure 1.13). In 2007, this measure stood at 6.5 years. Thus, judged by this simple standard metrics of the structure of outstanding central government debt, debt managers have brought about an easing in redemption profiles, limiting roll-over risk.

This interpretation should be treated with some caution for at least three reasons. First, the numbers refer to metrics of redemption profiles that abstract from the total levels of outstanding debt, which are currently high, as discussed in the first sections of this chapter.

Second, the numbers shown in Figure 1.13 are based on consistent definitions when collecting time-series data for each individual country, but the concepts are not strictly comparable across countries given that the type of liabilities and borrowing instruments included are not the same across border. Moreover, the data might refer to “physical debt” only, while excluding the effects of swaps. Interest rate swaps are, however, standard instruments used by some debt management offices to modify the effective duration of outstanding debt. Most recently, for example, a strategy adopted by at least one debt management office consists of extending the duration of debt in small steps by limiting the use of swaps, which are being used to effectively lower the duration of debt given the duration of outstanding government bonds.

Third, using average debt maturity as a metric to describe redemption profiles has well-known limits. Against the background of this observation, debt management offices
are developing and monitoring a host of other indicators to assess roll-over risks as well as to communicate debt management strategies. Some metrics are based on surveys of primary dealers and investors and others involve fairly complex methods, involving stochastic simulations. As a gauge of roll-over risk, average debt maturity is deficient in capturing a variety of issues such as the frequency of required or planned market access and potential redemption cliffs, i.e. situations where redemptions are not smoothly distributed over time. More generally, just like any average measure, average-debt-to-maturity does not provide information about the distribution of redemptions over time of existing sovereign debt portfolios.

Some of the more recent sovereign debt metrics use stochastic simulations to describe the issuance strategy (i.e. issuance size and distribution over different maturities, etc.) as a function of the projected economic and financial markets environment (projected interest rates and budget deficits, etc.). To what extent such alternative metrics should be used in the communication with potential investors, so as to add quantitative references to qualitative announcements, is one of the many issues currently being discussed among debt management offices. Discussions within the OECD Working Party on Debt Management suggest that a consensus has yet to be reached regarding the pros and cons of using more sophisticated and perhaps more difficult-to-explain metrics as part of public communication in an effort to further enhance transparency of debt management strategies. In any case, such more sophisticated debt metrics allow debt managers to place a sharp focus on limiting tail outcomes by using quantitative tools that capture the likelihood of their occurrence under different borrowing strategy choices. Avoiding such risks is crucial, as debt managers have a natural inclination to prepare for the worst. The fulfilment of their mandates typically does benefit more from avoiding downside risks than exploiting upside risks.

Figure 1.12. Maturity structure of central government marketable debt for OECD area

Figure 1.13. Average term-to-maturity of outstanding marketable debt in selected OECD countries

Notes: Average term-to-maturity in years (e.g. 0.5 years correspond to 6 months) of outstanding marketable debt. Data are collected from debt management office and national authorities’ websites. Data are not strictly comparable across countries. The average term-to-maturity of outstanding debt might include government holdings (e.g. Norway, the United Kingdom), might include short-term debt (e.g. Denmark, United Kingdom) or exclude it (e.g. Ireland), include the effect of swaps (e.g. for France and Norway) or exclude that effect. The weighted average was calculated based on the data of all countries for which the average term to maturity was available for 2007, 2013, and 2015. The values of central government marketable debt (without cash) in 2007, 2013 and 2015, expressed in USD values using the December 2009 exchange rates, were used as weights in constructing the average. Figures for 2015 refer to the latest, publicly available, information. Cut-off date is 11 December 2015.

Source: Surveys on central government marketable debt and borrowing by the OECD Working Party on Debt Management; debt management offices and national authority’s websites and OECD staff calculations.

1.9 Other aspects of funding strategies in terms of types of instruments

The funding strategy of debt management offices is guided primarily by considerations regarding the costs and risks of the management of debt. The mandates of debt managers typically have a clear microeconomic focus, involving attempts to keep sovereign debt markets liquid and limit refunding risks, etc., while references to macroeconomic objectives in formal mandates are rare and/or formulated in terms of ensuring broad consistency with macroeconomic policy objectives. Nonetheless, debt management does not operate in a vacuum, and funding strategy choices take this observation into account.

The funding strategy entails decisions on how gross borrowing needs are funded using instruments with different maturities and other features. Table 1.2 reflects the choices made regarding the funding structure in terms of types of instruments and maturity. The relative importance of issuance of short-term instruments was relatively high in 2008 and 2007, but has lessened since then. Currently, around 55% of funding of gross borrowing needs is covered by long-term instruments, dominated by fixed rate,
local currency bonds. The issuance of index-linked bonds is estimated to have increased to above pre-crisis levels, and remain at those more elevated levels during the projection period. Variable-rate debt has increased noticeably. Also, somewhat more foreign-currency debt was issued in 2014 and 2014, and this funding pattern is estimated to broadly remain at that slightly more elevated level. More details of funding patterns are provided in the chapters on challenges in primary and secondary markets of this Outlook.

Table 1.2. Funding strategy based on marketable gross borrowing needs in OECD area

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<td>45.9</td>
<td>44.3</td>
<td>45.0</td>
<td>44.8</td>
<td>43.4</td>
<td>41.4</td>
<td>42.9</td>
<td>41.5</td>
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<td>44.7</td>
<td>54.1</td>
<td>55.7</td>
<td>55.0</td>
<td>55.2</td>
<td>56.6</td>
<td>58.6</td>
<td>57.1</td>
<td>58.5</td>
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<tr>
<td>Fixed rate</td>
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<td>40.0</td>
<td>50.1</td>
<td>51.4</td>
<td>50.4</td>
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<td>51.6</td>
<td>50.3</td>
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<td>1.8</td>
<td>2.3</td>
<td>3.0</td>
<td>3.2</td>
<td>3.7</td>
<td>4.1</td>
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</tr>
<tr>
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<td>1.0</td>
<td>1.0</td>
<td>0.9</td>
<td>0.7</td>
<td>0.3</td>
<td>0.9</td>
<td>2.4</td>
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</tr>
<tr>
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<td>1.1</td>
<td>0.9</td>
<td>0.7</td>
<td>0.7</td>
<td>0.6</td>
<td>0.5</td>
<td>0.5</td>
</tr>
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<td>Of which:</td>
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</tr>
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<td>53.4</td>
<td>55.3</td>
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<td>55.3</td>
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<td>56.5</td>
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<tr>
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<td>0.7</td>
<td>0.5</td>
<td>0.6</td>
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</tbody>
</table>


1.10 Monetary policy and debt management decisions influence each other

As has been noted, as a response to the global financial crisis and deteriorating real activity outlook, central banks in the major advanced economies lowered policy rates to close to zero, or even below, and several of them also implemented policy measures considered unconventional, including outright purchases of large amounts of long-term bonds. Such measures were aimed at affecting real activity through several channels, including through the portfolio balance channel, whereby purchases of longer-term securities lower the long end of the yield curve and lead investors to buy assets with even greater duration or higher credit risk. Examples of quantitative easing strategies that have had a direct impact on sovereign debt markets include the Federal Reserve’s Large-Scale Asset Purchase (LSAP) Programme introduced in 2008, the Maturity Extension Programme (MEP) of 2011 and the ECB’s Outright Monetary Transactions (OMT) Programme. More recently, in January 2015, the ECB announced the asset purchase programme (APP), which has the objective to provide additional monetary policy stimulus in face of increasing deflation risks and to ease borrowing conditions of households and firms. Many of these policies led to a massive expansion of the balance sheets of central banks (Figure 1.9).

There is considerable scope for consultation between central banks and sovereign debt managers, especially as their respective mandates imply that they operate in the same markets. That said, parts of the mandates of central banks and debt managers are at odds, which is why perfect collaboration is not feasible and perhaps not even desirable. The observation that potential tensions could arise justifies however close communication. In fact, central banks and debt managers are operating in the same markets and, thus, effective two-way exchange of information between the government debt issuers and the central bank is important, not least to avoid the impression on the part
of other market participants that their respective strategies are at odds and could create additional frictions.

Debt management aims at matching government borrowing needs at the lowest costs while maintaining risk at acceptable levels. Achieving this mandate can involve shortening or lengthening the maturity structure of government debt. If the maturity structure of the debt is shortened, the debt instruments represent more liquidity for their holders, which likely influences spending. By contrast, if the maturity structure is lengthened, the effects on spending plans will be in the opposite direction. When central banks implemented quantitative easing measures over recent years with the aim of lowering long-term sovereign bond rates and encouraging additional risk-taking, public debt management strategies that involved extended average maturity of debt to lock in low long-term rates tended to counteract the desired long-term-rate reduction effects. For example, according to Meaning and Zhu (2012), the US Treasury’s extension of average maturity of outstanding debt, by around twelve months between 2009 and 2011 pushed 10-year benchmark bond rates up by several tens of basis points. The authors conclude that while unconventional monetary policy was effective in lowering long-term government bond yields, the impact of bond purchases on the 10-year bond yield would have been greater had the Treasury not expanded the relative supply of Treasuries at the long end, thus increasing the average maturity of outstanding Treasury debt. Debt management offices are aware of these potential tensions and address them by adopting transparent and predictable issuance strategies.

Similarly, transparency and communication on the part of the central bank is important to ensure that an unwinding of unconventional policy measures and government bond sales by central banks are not disruptive for markets. Central banks are aware of the implications for sovereign debt markets of an exit from quantitative easing and do in fact communicate to the public their intentions so as to limit uncertainty. For example, the Bank of England Monetary Policy Council (MPC), which decided to give preference to adjusting policy through using the Bank Rate rather than the stock of assets purchased, announced that it expects to continue to reinvest maturing assets until the Bank Rate has reached a level from which it can again be cut materially (Bank of England, 2015). Moreover, the MPC suggests “any reduction in the stock of purchased assets will be conducted in an orderly manner over a period of time so as not to disrupt the gilt market. So, while any reduction will be solely a decision for the MPC based on meeting its objectives, the Bank will liaise with the Debt Management Office when implementing any change in its asset purchase programme.” Similarly, as part of the press conference related to the December Federal Open Market Committee meeting in December 2015, the Fed Chair emphasized that tapering reinvestment will be delayed until after policy rate normalization is “well under way.” This communication is consistent with a desire to return to an interest rate level from which rates could be cut again in the case of a negative shock before starting to run down the central bank balance sheet.

1.11 The role of public institutions as investors in sovereign bonds has risen

The role of public sector institutions, including but not limited to central banks, as investors in sovereign bonds has increased during the last decade. The quantitative easing programs have been reflected in a marked increase in the significance of central banks as sovereign bond investors over recent years, while the substantial accumulation of foreign exchange reserves especially of many emerging markets for more than a decade has
implied a more gradual increase in public sector holdings of sovereign debt. Other public sector institutions such as sovereign wealth funds have also taken on greater significance as investors. The various types of public sector investors, including central banks and sovereign wealth funds, that have increased their demand for high-quality sovereign debt issues do not form a homogeneous group, although there are some common issues that their increased participation as investors raises.

One issue that the increased participation of public institutions as investors raises is that to the extent that they are large, holdings of sovereign bonds might become more concentrated. This situation in turn could have adverse effects on bond market volatility, as even relatively small reallocations and portfolio adjustments on the part of such large investors could have significant price implications. For example, the role of foreign central banks matters in the case of the market for US government debt. Towards the end of 2015, some of the latter were selling US Treasuries, which could have had noticeable price implications had these sales not been more than offset by foreign private buyers. In fact, in this specific case, a decline in official holdings put upward pressure on rates, but the interest from private investors, presumably motivated by the stronger real activity outlook in the United States compared to some other regions, seem to have capped secondary market yield increases.

Figure 1.14. Total balance sheets of selected central banks

![Graph showing total balance sheets of selected central banks](image_url)

Note: Cutoff date is end of December 2015.
Source: Thomson Reuters Datastream.

Another issue is related to market liquidity. Many of the public institutions that have assumed a greater role as investors in sovereign bonds apply buy-and-hold strategies, implying that the increased participation of such investors might in principle decrease bond market liquidity. Against the background of the potential issue of such a situation, international best-practise guidelines for debt managers recommend having a diversified
1.12 The issue of liquidity and liquidity risk has come into sharp focus

The issue of bond market liquidity and liquidity risk has come into a sharp spotlight, among other things reflecting recent experiences with episodes of exceptional high volatility in specific market segments, including in those for securities that are traditionally characterised by high liquidity. One type of concern regarding market liquidity is related to the question of what happens when interest rates might rise by more than factored into current prices.

Many asset prices including those for corporate bonds in emerging markets rose significantly over the past five years or so; they were supported by low interest rates, but remain vulnerable to sharper-than-expected increases in interest rates. The effects on these and other asset prices could be magnified by sudden disappearances in market liquidity (BoE, 2015b).

Concerns are not limited to markets for emerging and advanced economies corporate bond markets. In fact, secondary bond market liquidity is a concern across different types of markets, and sovereign bond markets are no exception.

The issue of liquidity or the lack of it is an especially important issue in the case of government bond markets, given their crucial economic function. These markets serve to fund the governments’ borrowing needs and support the conduct of monetary policy. Government bonds are used as collateral in various transactions conducted bilaterally and through clearing houses and exchanges. They are a global reserve asset and their prices are used by market participants to price other assets and manage interest-rate risk. As a result of these various functions of government bonds, liquidity in the markets in these assets is of great importance.

Debt managers have expressed concerns about secondary market liquidity and liquidity risk in securities markets including sovereign bond markets. Some observers have argued that market making has become more costly as a result of financial regulatory reform, although such a direct link has been difficult to prove (CGFS, 2015). Other observers point to a host of other potential determinants of liquidity, including market participants’ risk appetites and changing technologies.

Measuring liquidity is not straightforward and there is no single measure of market liquidity capturing the various dimensions of this concept. And whether pre-crisis levels are a good reference is questionable. In any case, the issue is not so much liquidity per se but liquidity risk, that is, the risk that liquidity suddenly disappears. The factors behind the evolution of liquidity and especially liquidity risk are not yet well understood, however, and more research is needed.

Liquidity and liquidity risk in any market segment are influenced by the constraints facing and the behaviour of various actors active on the demand or supply side of a specific market segment. Debt management offices are addressing the issue of liquidity risk among other things by stepping up their efforts to monitor liquidity indicators, and they also put in place several measures to better evaluate and motivate dealer
performance in market-making, as well as adapted their own issuance strategies. The latter has involved buying back illiquid lines, strengthening existing benchmark lines and increasing transparency through a variety of measures. More detail is provided in the subsequent chapters that discuss developments in primary and secondary market liquidity and liquidity risks based on a survey among debt management offices that are members of the OECD Working Party on Debt Management.

Debt management offices express considerable concern regarding secondary sovereign bond market liquidity, especially in the case of bonds that are not “on-the-run”. These concerns are valid, although it is useful to recall that there is no wide-spread agreement on how to measure market liquidity. This situation reflects not only the observation that market liquidity has many dimensions; that is, a market is considered liquid when sizeable quantities can be negotiated quickly and at a price close to the market price. It also reflects the observation that the various dimensions, e.g. size and speed, are not equally valuable in all situations, that is whether market conditions are normal or stressed.

While most traditional and many more modern liquidity indicators do not clearly signal a decline in liquidity during normal times, the incidence of episodes where liquidity suddenly dries up in stress situations without any clear economic justifications might have become more numerous, including especially in the case of benchmark securities that are otherwise regarded as being highly liquid (Powell, 2015). As concerns about secondary market liquidity are valid, more research is needed to more fully understand the implications of the evolving sovereign bond market structures and the effect of structural changes and regulation for liquidity, trading and risk management practises, and market monitoring.

**Notes**

1. The cut-off date for data collected through the Survey on central government marketable debt and borrowing by the OECD Working Party on Debt Management is mid-November 2015 and the cut-off date for other data considered in this chapter is 31 December 2015.

2. See Table 1.4 of OECD Economic Outlook, Volume 2015, Issue 2.

3. This assessment is based on estimates of OECD aggregates using the assumption of exchange rates that are fixed as of 1 December 2009 when converting national values to USD equivalents. Accounting for exchange rate developments (annual period-average exchange rates, with rates kept constant after cut-off date 1 December 2015), estimates of net central government marketable borrowing requirements for 2016 are USD 500 billion (rather than USD 600 billion, as reported above).

4. The OECD *Sovereign Borrowing Outlook* 2014 expected combined gross borrowing needs of OECD countries to fall from USD 11 trillion in 2012 to USD 10.8 trillion in 2013 and further to USD 10.6 trillion in 2014, again based on the assumption of fixed exchange rates in the aggregation process. Using that same assumption and recent information, central government gross borrowing requirements for 2012 to 2014 were
USD 10.7, 10.4, and 10.1 trillion, respectively, and are estimated to further decline to USD 9.4 trillion in 2015 and USD 8.8 trillion in 2016.

5. Redemptions include those of long-term and short-term debt. As regards the latter, the method for calculating gross short-term borrowing needs suggested in Annex B.6 of the *Sovereign Borrowing Outlook* 2014 is followed here.

6. Using flexible rather than fixed exchange rate assumptions to obtain area-wide data from national data, the estimated decline would be from USD 9.7 trillion in 2013 to USD 8.0 in 2015. As in the case of net borrowing requirements, the difference in estimates of gross borrowing requirements as a result of the choice of exchange rate assumption owes much to the observed depreciation of the Japanese Yen versus the USD over recent years. Using more up-to-date exchange rate assumptions imply a lower ‘weight’ in OECD aggregates of Japanese borrowing metrics.

7. Reflecting the effect of the observed Yen-versus-USD depreciation, forward-looking assessments depend to some extent on the choice of exchange rate assumption when aggregating national date. The *OECD Sovereign Borrowing Outlook* has traditionally relied on the assumption of exchange rates fixed as of 2009. If one considers flexible exchange rates, debt would be estimated to decline from 2014 to 2015 and then to rise from 2015 to 2016, although not exceeding in 2016 the level attained in 2014.

8. The global financial crisis placed a sharp spotlight not only on levels of actual public debt but also on the issue of contingent sovereign liabilities, especially those stemming from banking sector liabilities. In fact, the global financial crisis that initially started out as a crisis involving private financial intermediaries evolved into a sovereign debt crisis with the focal point in Europe, among other things as a result of adverse feedback loops operating between sovereign and banking sector debt in some economies. A variety of fiscal and regulatory measures were invoked to break that adverse feedback loop. Among these, the strengthening of banking sector regulation and of capital and liquidity buffers in that sector have been successful in limiting undesirable adverse feedback loops. Banks' capital and liquidity buffers are being strengthened, while the burden of potential failure resolution needs is shifted from the taxpayer to bank creditors. As a result, implicit contingent liabilities stemming from efforts to avoid or deal with banking sector failures have declined (Cariboni et. al., 2016; Blix-Grimaldi et. al., 2016; Arslanalp and Liao, 2015). Admittedly, public authorities have not yet settled on the best way of measuring such liabilities (Schich and Aydin, 2014), but the observation that the results of several different approaches point in a similar direction is reassuring.

9. Some caution is required in interpreting these ratios as both numerator and denominator for these two years are based on estimates/projections.

10. Note that this reference is to general as opposed to central government debt, unlike the preceding discussion. An excellent overview of different government debt indicators is provided by Bloch and Fall (2015).

11. These measures are constructed by combining a time series for general government gross financial liabilities as a percentage of GDP from the OECD and the IMF. To facilitate updating most recent estimates, the general approach taken was to consider OECD data for the recent history and going back in time as far as appeared reasonable and then to extrapolate the data by applying the changes observed in the IMF data (which goes further back in time). As there are some level differences between OECD and IMF data (with the former tending to exceed the latter), the estimates of the peaks attained subsequent to World War II using the method...
underlying the data shown in the figure are higher than what IMF data would have suggested.

12. Domanski, Shin and Sushkoportfolio (2015) analyse how adjustments by long-term investors aimed at containing duration mismatches have acted as an amplification mechanism in the process of interest rate compression.

13. Similarly, the household sector has more interest-bearing assets than interest-bearing liabilities, which is why that sector’s net interest income tends to be adversely affected by a low-interest-rate environment. At the same time, households benefit from capital gains on fixed-income asset holdings, although such holdings are not equally distributed within the household sector. A recent study, focusing directly on the effects of unconventional monetary policy measures in Japan, argues that increases in financial asset prices while the overall real economy was stagnant has disproportionally benefitted higher-income households, which tend to hold greater amounts of financial assets than low-income households. See Saiki and Frost (2014).


15. This assessment is consistent with forward interest rates, although the situation differs noticeably across regions. There are some observations that suggest that some of the savings supply factors are evolving (Bean et.al., 2015). For example, aggregate savings propensities should fall back as the bulge of high-saving middle-aged households moves through into retirement and start to dissave; this process has already begun. Also, the net flow of Chinese savings into global financial markets has already started to ebb.

16. A swaption is an option granting its owner the right (but not the obligation) to enter into an underlying swap, often (as is the case here) referring to interest rate swaps. In such a transaction, typically, two counterparties agree to exchange a stream of cash flows over some specified period of time, with one counterparty receiving a fixed payment stream and paying the other party a stream of floating cash flows tied to the three-month Libor rate. A swap can be interpreted as trading a fixed rate coupon bond for a floating rate note.

17. Also, to the extent that the signalling via asset purchases of the commitment to further stimulus going forward is credible, a lower expected path of short-term rates will result, with reduced long-term rates and compressed risk premia due to the reduction in uncertainty.

18. Unlike the Large-Scale Asset Purchase Programme, the Maturity Extension Programme aims at extending the average maturity of the Treasury securities held by the Federal Reserve, while holding the overall size of the central bank’s balance sheet constant. Empirical analyses of the effects of the various programmes suggest that the effects on assets targeted were generally found to be significant, although declining over time and often with limited spillovers to other market segments. In the UK, however, there is evidence that scarcity effects on the targeted maturities of gilts have spilled over to other asset classes of similar maturity; see McLaren et al. (2014).
References


Annex 1.A1

Methods and sources

Regional aggregates

- Total OECD area denotes the following 34 countries: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

- The G7 includes seven countries: Canada, France, Germany, Italy, Japan, United Kingdom and the United States.

- The OECD euro area includes 15 countries: Austria, Belgium, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Slovak Republic, Slovenia and Spain.

- The Other OECD group includes fifteen countries: Australia, Chile, Czech Republic, Denmark, Hungary, Iceland, Israel, Korea, Mexico, New Zealand, Norway, Poland, Sweden, Switzerland and Turkey.

Calculations, definitions and data sources

- Gross borrowing requirements (GBR) as a percentage of GDP is calculated using nominal GDP data from the OECD Economic Outlook 98, November 2015.

- To facilitate comparisons with previous Outlooks, figures are converted into US dollars using exchange rates from 1 December 2009, unless indicated otherwise. Where figures are converted into US dollars using flexible exchange rates, the main text refers to that approach explicitly. Source: Thompson Reuters Datastream.

- All figures refer to calendar years.

- Aggregate figures for gross borrowing requirements (GBR), net borrowing requirements (NBR), central government marketable debt, redemptions, and debt maturing are compiled from the answers to the Borrowing Survey. The Secretariat inserted its own estimates/ projections in cases of missing information for 2015 and/or 2016, using publicly available official information on redemptions and central government budget balances.