CNMV
Comisión Nacional del Mercado de Valores

Financial Stability Note

No. 7 July 2018

Financial Stability Note
No. 7 July 2018

The Financial Stability Note is framed within the tasks that the CNMV carries out to monitor financial stability conditions in the areas it supervises. In particular, the Note assesses the stress level of domestic securities markets during the last quarter, identifies changes in the level of different financial risks and identifies the major sources of risk.

The CNMV distributes its reports and publications via the Internet at www.cnmv.es.

ISSN (digital edition): 25030-7827

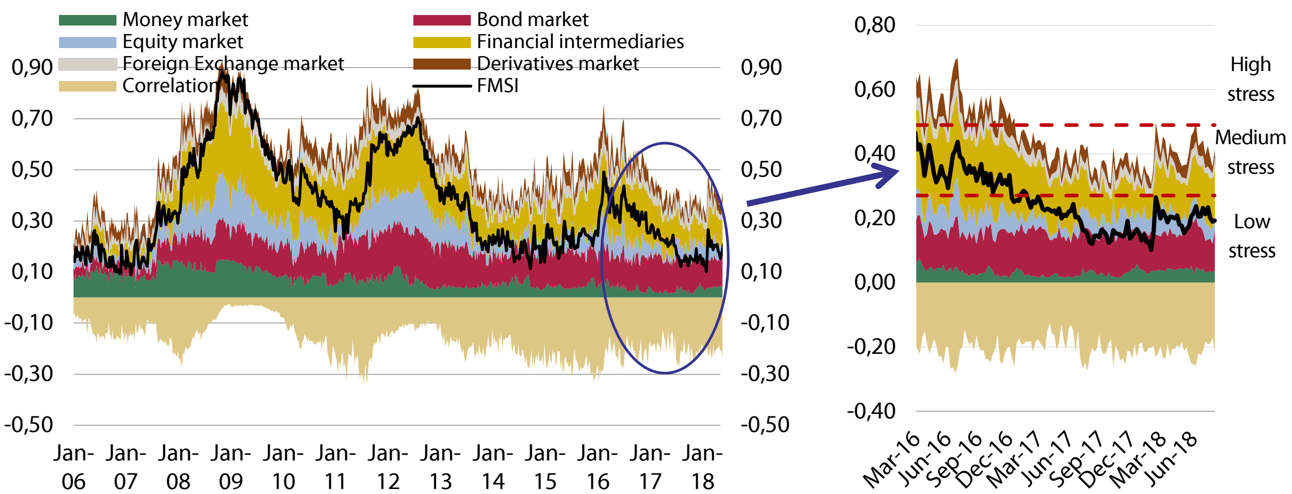
Layout: Comisión Nacional del Mercado de Valores

Summary

- ✓ Spanish financial market stress[1], which had fallen significantly following the upturn recorded in February, once again rose from May as a result of the political uncertainty in Italy and the fears of a possible trade war. In mid-July, the index stood at 0.24 and therefore, despite its recent increase, remained within the range consistent with a low stress level. By segment, the highest stress level was recorded in financial intermediaries (mostly banks), whose share prices have fallen more sharply than those of other sectors and whose bond spreads have widened. Stress in the bond segment worsened significantly at the end of May, coinciding with the worst moments of uncertainty in Italy, but then moderated in line with the fall in volatility in this market and in the risk premium.

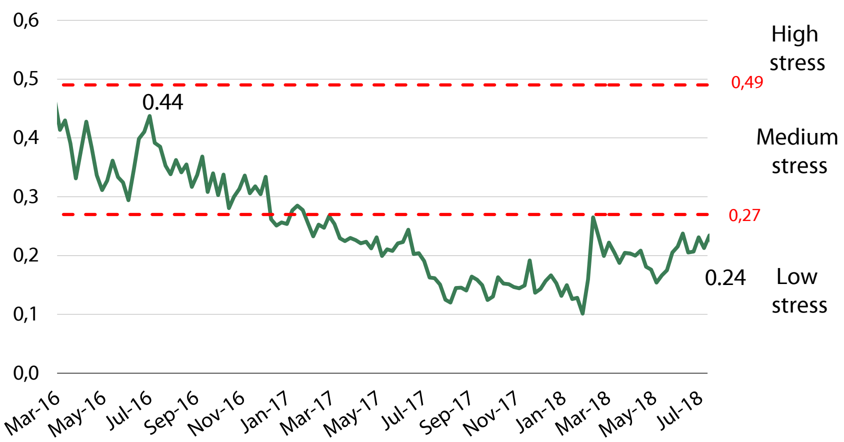
Spanish financial markets stress index

FIGURE 1



Source: CNMV.

For further details on recent movements in this index and its components, see the CNMV's statistical series (market stress indices), available at http://www.cnmv.es/Portal/Publicaciones/SeriesWeb/Inicio.aspx?codrama=1295. For further information on the methodology of this index, see Cambón M.I. and Estévez, L. (2016) A Spanish Financial Market Stress Index (FMSI). Spanish Review of Financial Economics 14 (January (1)), 23-41 or CNMV Working Paper 60 (http://www.cnmv.es/portal/Publicaciones/monografias.aspx).



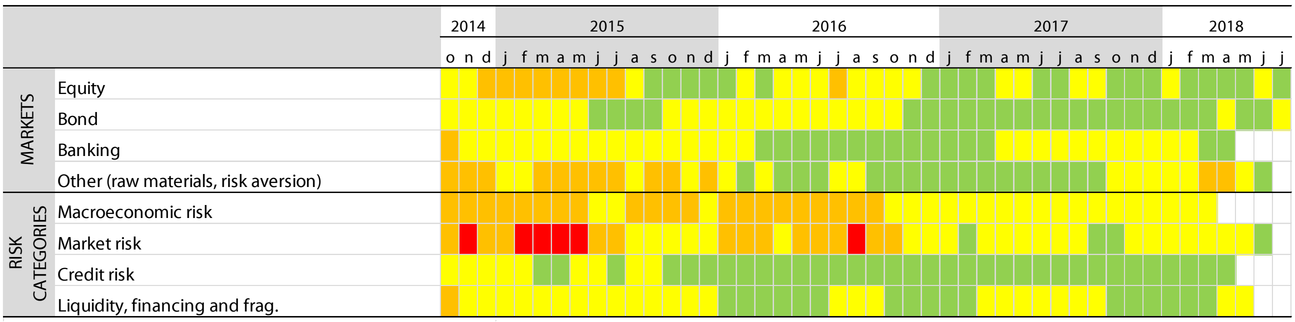
[1] The closing date of the note is 13 July, except for the information on the latest *World Economic Outlook* published by the IMF on 16 July.

- ✓ The macroeconomic performance of Spain remains positive. In the first quarter of the year, GDP grew by 3% year-on-year, only 0.1 percentage points below the previous rate and 0.4 percentage points above the growth recorded in the euro area. Job creation continued, albeit at a somewhat slower rate, while the level of inflation (year-on-year rate of 2.3% in June) mainly reflects the rise in oil prices. For the time being, fears of a trade war have not taken their toll on the growth expected by the IMF for this year (2.8%) or next year (2.2%), although they have introduced a downside risk on the core scenario used by the institution.

- ✓ Spanish financial markets, which had recorded a significant resurgence of volatility in February triggered by US markets, began the second quarter with price rises that were eventually reversed as a result of two new elements of uncertainty: the first related to the formation of the new government in Italy, and the second resulting from the fears of a trade war as a consequence of the policy of the new US administration. These factors did not lead to a sudden fall in prices, but they did hinder the gains that would be justified by the strength of economic activity and they have also triggered specific upturns in the sovereign risk premium. In contrast, the change in government that took place in Spain at the start of June did not have any noticeable effect on financial markets.

- ✓ The most significant risks looming over the financial system are related to market risk and to liquidity risk, mainly in fixed-income assets and, more generally, to the effects resulting from the shift in the monetary policy of advanced economies, which is at a more advanced stage in the US. In this regard, it is important to bear in mind that the adoption of restrictive global trade measures may lead to an additional increase in prices and introduce uncertainty with regard to expectations of movements in interest rates by central banks.

Heat map: summary by market and risk category FIGURE 2



Source: CNMV. See article in CNMV Quarterly Bulletin Quarter 1 2015. "Identification of vulnerabilities in the Spanish financial system: an application of heat maps". Data until 13 July.

Sources of risk

Macroeconomic environment

- In the first quarter of 2018, the GDP of the Spanish economy continued to expand at a good rate, recording growth of 0.7% in quarter-on-quarter terms (the same as in the fourth quarter of 2017) and of 3% in year-on-year terms (3.1% in the fourth quarter of 2017). The external sector recorded a slight improvement, but the bulk of the growth in activity was driven by strong domestic demand. In this context, the number of people in employment continued to grow, although at a slightly lower rate than in previous quarters: 2.6% in the first quarter of the year compared with 2.9% in the three previous quarters, while the unemployment rate stabilised at a little over 16.5% of the active population. Inflation data showed an upturn in the annual rate to 2.3% in June, 0.3 percentage points up on May, exclusively as a result of the contribution of the index's most volatile components (energy, which reflects higher oil prices, and fresh food). In fact, the core inflation rate, discounting these two components, fell by 0.1 percentage points to 1%, a level around which it has been moving with few variations for over two years (see Figure 22).

- The latest data corresponding to the public accounts indicate that in the first four months of the year, the consolidated deficit of the public authorities, excluding local authorities, stood at 0.57% of GDP, 0.21 percentage points lower than in the same period of the previous year. The breakdown by tier of government shows that the State deficit (to May) fell by 0.17 pp to 1.19% of GDP, that of the regional governments fell by 0.1 pp to 0.2% of GDP and the surplus of the Social Security Funds remained at similar values to those of 2017 (0.19% of GDP in 2018 compared with 0.18% in 2017). Looking ahead, the new government has announced an upward revision of around 0.5 percentage points each year in the deficit targets for the period 2018-2021. Following this revision, the new path of budgetary stability has set the levels of deficit at 2.7%, 1.8%, 1.1% and 0.4% of GDP, respectively, in each one of these four years.

- The latest IMF forecasts for the Spanish economy published in mid-July are unchanged in relation to the April forecasts, with GDP expected to grow by 2.8% this year and by 2.2% in 2019 (2.2% and 1.9%, respectively, in the euro area). The European Commission estimates, released a few days before the IMF forecasts, show a similar pattern with expected growth of 2.8% this year (0.1 percentage points lower than in the April forecast) and of 2.4% (unchanged) in 2019. The most significant challenges from a macroeconomic point of view still relate to the need to reduce and stabilise the public deficit, the high level of leverage of some sectors of the economy and the progressive ageing of the population.

Low interest rate environment

- Interest rates remain at very low levels in the euro area and it seems unlikely that the ECB will raise them before the summer of next year. The first stage of the shift in the ECB's monetary policy is focused on ending the purchase programmes, in a similar manner as the Federal Reserve, which is at a much more advanced stage in changing its monetary policy stance[2]. Growth data in the euro area were somewhat weaker than expected in the first quarter of the year and the latest inflation figures place the annual rate at very close to 2%, mainly as a result of higher energy prices. The core rate (as in Spain) has fluctuated around 1% for several years. In this context, the factors that introduce a certain level of uncertainty with regard to central bank decisions in the short and medium term result either from a greater impact of higher oil prices on inflation (if there are significant indirect effects) or the impact of the increase in prices that may result from the restrictive global trade measures spreading.

- The prolongation of this environment of very low returns on many available investment products continues to have an impact on the decision-making of investors, who continue accepting higher-risk assets in order to obtain higher returns than those offered by traditional products, such as bank deposits. In this regard, the latest data from the Financial Accounts of the Spanish economy corresponding to the first quarter of the year reveal that households continued divesting from term deposits and debt securities[3] and used their funds to buy more liquid assets (cash and sight deposits) and investment funds. In the specific case of the investment fund industry, which has received substantial investments over recent years, the categories recording the highest levels of growth reveal investors' preference for higher-risk assets. For example, of the net inflow of almost 24 billion euros between March 2017 and March 2018, 15.1 billion euros corresponded to global funds and over 8 billion euros to equity funds (international or euro). In contrast, the more conservative categories[4] recorded total outflows of 11.3 billion euros (Figure 28).

- The banking system continues to be affected by the low interest rate environment, which places downward pressure on its profitability. This is shown by the income statement data for the first quarter of the year as the income margin continued to fall over this period[5]. The most significant challenges faced by banks relate to the need to increase their efficiency (aggregate operating costs have remained relatively unchanged since 2013), address the competition from more technologically advanced entities and reduce the volume of non-performing assets. This last objective, in the case of Spain, is favoured by the buoyancy of the economy and the growth in the income of agents.

---

[2] The Federal Reserve raised its rates by 25 basis points in June to 1.75%-2%. This is the second increase in the year and the Fed has announced that it will make two additional rate hikes by the end of the year.
[3] The volume of divestments amounted to 5% of GDP in the four quarters up to the first quarter of 2018.
[4] Fixed-income funds, guaranteed equity funds, guaranteed fixed-income funds and passively-managed funds.
[5] 5.73 billion euros compared with 5.91 billion euros in the first quarter of 2017.

Sources of political uncertainty

- International risks include continued intensification of protectionist trade policies over the coming months. These restrictive measures started to be adopted in March, when the US administration imposed tariffs on aluminium and steel imports, although some countries, including EU members, were exempt. The protectionist shift was accentuated in June, when the United States ended these exemptions and announced new tariffs on 50 billion dollars of Chinese technology products.

- The adoption of these protectionist measures has not yet led to sharp falls in market prices as the taxed imports account for a low percentage of total trade flows. They are, however, preventing stronger price rises, particularly in those economies that are in a clearly expansive stage. In the medium and long term, the escalation of protectionism resulting from application of additional tariffs or reprisals by other countries may lead to many investment decisions being delayed or suspended and may, therefore, have significant negative consequences for global economic activity.

- In the context of the EU, one of the main political risks remains the progress of Brexit negotiations. In mid-July, the UK government published a document[6] detailing proposals on how the future relationship between the United Kingdom and the European Union might be defined. The final shape of this relationship will depend on the response of EU Member States to these proposals and on how the future rounds of negotiation progress. A scenario in which the transition period ends without an agreement may have negative economic consequences for both parties and might lead to the materialisation of operational risks relating to the continuity of financial contracts and access to market infrastructures.

- In the second quarter of the year, another source of risk to the EU financial environment was related to the political uncertainty in Italy. At the end of May, the possible formation of an Italian government that might pose a threat to financial stability in the euro area had a significant impact on international markets. Consequently, the Italian risk premium rose by 161 bp in May and ended the month at 283 bp, its highest level since 2013. There was also a certain contagion effect on the sovereign bond prices of other peripheral countries. Specifically, the Spanish risk premium rose by 62 bp over the same period to 134 bp.

- In Spain, there was a change in government at the start of June, following approval of a no-confidence motion. There is no evidence that this process has had a noticeable effect on financial markets.

[6] https://www.gov.uk/government/publications/the-future-relationship-between-the-united-kingdom-and-the-european-union

Risk categories

Market risk: green

- The performance of international equity markets this year has been marked by uncertainty relating to the negative consequences of a possible trade war and the (initiated or predicted) shift in the monetary policies of the major economies. In this context, US markets[7] have benefited from the positive impact of the tax reform[8] and performed positively in the year, with noteworthy gains in the NASDAQ technology sector index. However, there are increasing voices in the market warning that technology and Internet companies are overvalued. In Europe, where the activity data for the first quarter were somewhat weaker than expected, stock markets performed more unevenly[9]. Particularly noteworthy was the weakness of the German market, which suffered the potential impact that an increase in tariffs would have on manufacturing and exporting companies, as well as a downward revision in growth forecasts. The Italian market also performed weakly, reflecting political uncertainties following the formation of a new eurosceptic government.

- In Spanish equity markets, the Ibex 35, which had accumulated falls of over 4% in the first quarter due to the period of turbulence in the US market in February, barely recovered in the following months as the result of the uncertainties around the restrictive measures applied to world trade and the rise in oil prices. Hence, so far this year[10], the Ibex 35 has fallen by 3.1%, a slightly worse performance than that of other comparable European indices. The sector analysis reveals that the largest gains in the period corresponded to oil, consumer goods, pharmaceutical, industrial and commodities companies, as well as small-cap companies with gains linked to the economic cycle, which gained over 16%[11]. In contrast, the largest falls were for the financial sector, followed by the telecommunications and consumer services sectors. The performance of financial companies was affected by several factors including the delay in normalisation of interest rates by the ECB, losses relating to their exposure to Italian debt when significant concerns regarding that country emerged, more recently, the uncertainties relating to a possible change in the sector's tax regime.

- The price-earnings ratio (P/E) of the Ibex 35 fell from 12.7 in the middle of April to 12.1[12] in July (its lowest level since 2013) due to the growth in corporate profits and, to a lesser extent, the fall in share prices (Figure 4). Reported aggregate short positions at the end of July rose to above 0.9% of total share capitalisation (Figure 3). As in recent

[7] Until 13 July, the US Dow Jones, S&P 500 and Nasdaq indices rose by 1.2%, 4.8% and 13.4%, respectively, in comparison with a rise of 1.5% in the MSCI World index.
[8] In force since 1 January 2018.
[9] The main European indices recorded both positive and negative performance, with the French Cac 30 and the Italian Mib 30 gaining 2.2% and 0.2%, respectively, while the German Dax 30 and the Eurostoxx 50 lost 2.9% and 1.4%, respectively.
[10] With figures to 13 July.
[11] These types of companies gained 8.9% and 31.4% in 2016 and 2017, respectively, compared with a fall of 2% and a gain a 7.4% in the Ibex 35 in the same periods.
[12] In the same period, the P/E ratio of the European Eurostoxx 50 and the US S&P 500 stock indices fell to 12.7 and 16.1, respectively, their lowest level since the end of the third quarter of 2016.

quarters, particularly large short positions were recorded in Día, Técnicas Reunidas and Neinor Homes, which were joined by OHL.

- The main market risk continues to be in fixed-income assets. The significance of this risk has already been revealed at particular times of uncertainty that led to significant changes in the prices of these assets as a result of changes in the spread demanded by the market. In Europe, despite the ECB maintaining an accommodative monetary policy[13], two opposing effects on debt prices took place in the second quarter. On the one hand, the uncertainties relating to the Italian government were partially transferred to the debt of other peripheral European economies, including the Spanish economy, which put upward pressure on their risk premiums. On the other hand, the fact that fixed-income assets are a safe haven against falling stock markets (more pronounced in the core European countries) meant that the initial increases in their risk premiums were significantly mitigated. As a whole, the yield on government bonds in the peripheral countries increased (between the 10 bp of Spain and the 76 bp of Italy), while that of the large economies fell (between 10 and 15 bp), with yields on bonds of terms of up to 5 years remaining negative or close to zero.

- Corporate bond yields remained close to their historical lows thanks to the extension, albeit reduced, of the purchase programme until December 2018, although there have been slight increases resulting from the rise in sovereign risk. Therefore, although there are no signs of imminent significant rises in interest rates, it is important not to underestimate the effects that a potential increase in rates associated with risk premium upturns could have on the most indebted agents and on those most exposed to fixed-income assets. Those effects would be especially significant in the case of riskier and illiquid complex assets. The volume of Spanish public debt acquired by the ECB stood at 247.25 billion euros[14] at the end of June.

Credit risk: green

- The risk premiums on Spanish corporate issuers rose slightly as from the end of March, although to a lesser extent than the sovereign risk premium, as a result of the rise of the latter and a variety of other causes. The average risk premium of financial institutions rose from 76 bp to 95 bp in mid-July (with a temporary high of 111bp in May) as a result of their exposure to government debt, especially Italian debt, and the delay in normalisation of the ECB's monetary policy, which makes it difficult to widen their margins. The average risk premiums of non-financial companies rose more moderately, from 62 bp to 70 bp, as the effects of the ECB's purchase programme have been practically exhausted (Figure 12). As discussed in a previous section in the note,

[13] The President of the ECB said in mid-June that rates will remain at 0% until at least the summer of 2019, having adopted a more patient and gradual approach to the speed of the rises. He also announced that debt purchases will be extended until December 2018, but that their monthly amount will fall as from October to 15 billion euros.
[14] Accounting for 28.4% of the balance of the long-term debt securities issued by the State.

the sovereign risk premium (measured as the spread between the yields on the ten-year bonds in Spain and Germany) rose temporarily in May, as a result of the contagion of political uncertainties in Italy, and reached a high of 134 bp. In mid-July, this figure fell below 100 bp once again (Figure 11).

- The evolution of lending to non-financial sectors[15] of the economy reveals significant differences between households and companies. In May, outstanding household loans recorded the first positive annual growth since December 2010 (0.1%), thanks to the expansion in consumer credit (7.1%, its highest rate since 2008) and a slowdown in the fall in mortgage lending (-2.1%). In contrast, lending to non-financial companies recorded an annual fall of 1.7%, thus interrupting the slight recovery seen last year. Both SMEs and large corporations continue to take advantage of the improvement in economic activity to deleverage, although the latter continue to replace part of their bank lending by debt issues, which are mainly made abroad.

Liquidity, financing and fragmentation risk: green

- Fixed-income issues registered with the CNMV in the second quarter amounted to 11.11 billion euros, 58% down on the same period of 2017, with 40% of the total amount issued corresponding to short-term commercial paper. Debt issued by Spanish companies abroad grew by 9% in year-on-year terms to May (42.32 billion euros), with commercial paper once again particularly significant, accounting for 47% of the total. Especially noteworthy in equity markets was the flotation of Berkeley Energía on Spanish stock market by means of a listing procedure. Furthermore, several companies in different sectors plan to go public in the coming months.

- Equity market trading data for the second quarter indicate that, in daily terms, trading recovered slightly with regard to the figures from the first quarter (2.87 billion euros compared with 2.52 billion euros), but it continued to record falls in annual terms (Figure 17). Also noteworthy was the fall in relative importance of trading in Spanish securities on markets other than their original market from 38.6% of total trading[16] in the first quarter to 32.5% in the second quarter[17].

- With regard to the market transparency requirements resulting from the application of MiFID II/MIFIR, it should be noted that as of the reporting date of this note there were a total of 17 shares admitted to trading on Spanish markets that exceeded the trading thresholds established for the transparency waivers under this regulation[18]. On a

[15] Source: Economic indicators of the Bank of Spain.
[16] Subject to market or MTF rules (lit plus dark).
[17] In 2017 as a whole, this percentage stood at 31.7%.
[18] Article 4.1 of MiFIR regulates the waivers relating to orders at reference prices from another market. These waivers may be suspended temporarily if any of the double volume caps are exceeded.

temporary basis, these shares may not make use of the aforesaid waivers[19], which will therefore facilitate the price discovery process.

- The Ibex 35 liquidity index (assessed through the bid-ask spread) remained at satisfactory levels, improving slightly in recent months. The spread of the sovereign bond rose significantly in June, coinciding with the period of political uncertainty in Italy, but later declined notably (Figure 15).

- The spread between loans to euro area companies and Spanish companies once again fell for loans lower than 1 million euros, to stand in May at negative figures for the first time since 2008 (-1 bp), while the spread for loans of a higher amount recorded greater stability and stood at 37 bp (32 bp in the average over the last twelve months).

Contagion risk: yellow

- The correlation between the price of the Spanish sovereign bond and that of the sovereign bonds of core countries, which had risen significantly in April (to 0.79), fell drastically at the end of May and at mid-July stood at -0.03 (see Figure 31). The correlation between the price of Spanish public debt and that of other peripheral countries (excluding Greece) remained at high levels (although it fell slightly) and fluctuated at around 0.65 at the start of the second half of the year. This uneven performance is due to the negative impact of the political instability in Italy on the prices of the government bonds of peripheral countries and the safe haven role of the sovereign bonds of core countries (such as Germany and France) at times of uncertainty.

- As shown in Figure 32, the median value of the correlations between different types of Spanish assets rose slightly in the second quarter of the year and stood at 0.48 in mid-July, a similar figure to the average recorded over the last decade. The minimum and maximum values of the correlations rose slightly at the end of May, coinciding with the time that the political instability in Italy had its most significant impact on financial markets, as most assets moved in the same direction and recorded negative yields.

[19] See the CNMV communications of 8 March, 11 April, 9 May and 8 June, adopting ESMA's resolutions: http://www.cnmv.es/portal/AlDia/Informacion-Sector.aspx

Market risk: green

Figure 3: Short selling

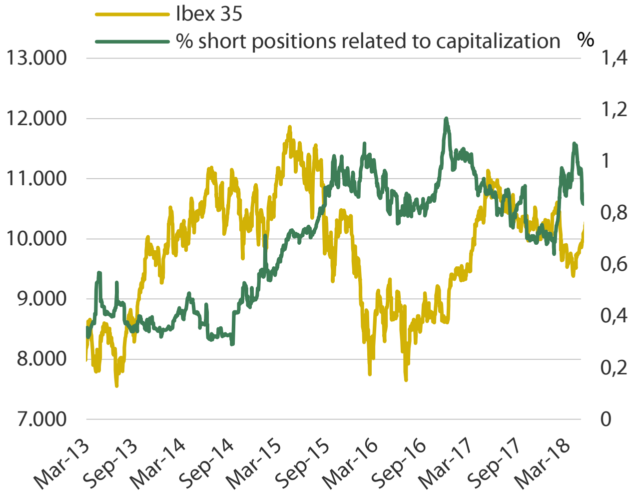


Figure 4: Price-earnings ratio (P/E)

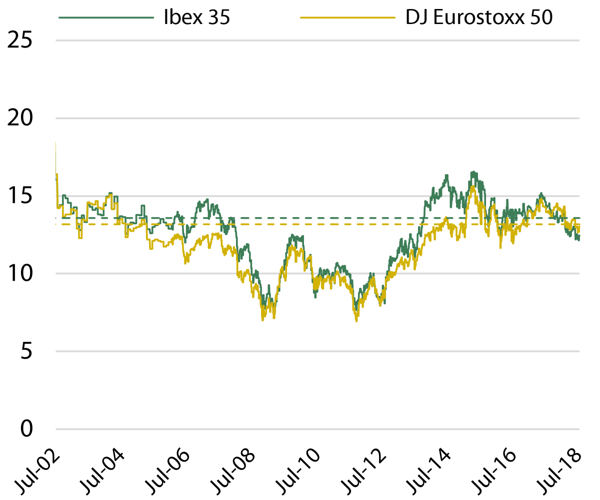


Figure 5: Short-term interest rates (3m)

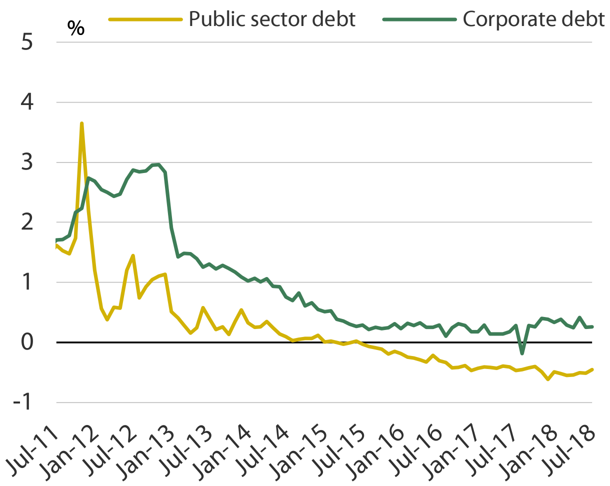


Figure 6: Long-term interest rates (10y)

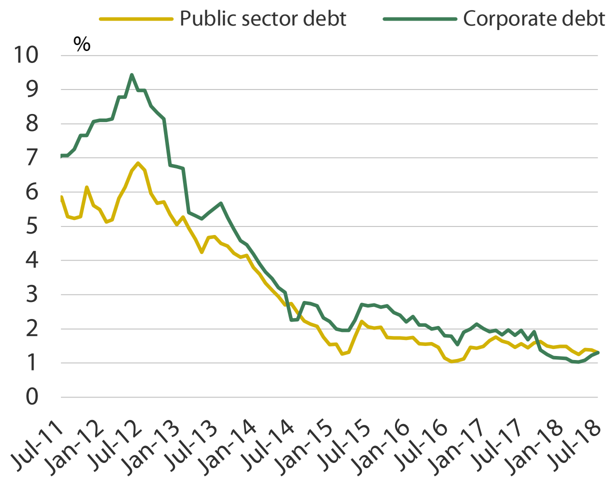
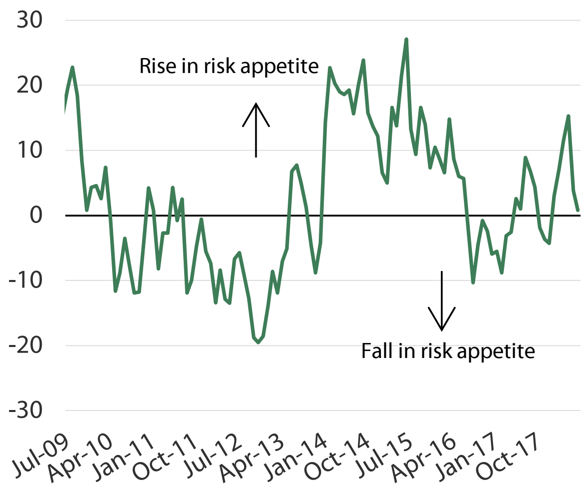


Figure 7: Oil price

Figure 8: Risk appetite (State Street)



Credit risk: green

Figure 9: Financing of non-financial sector

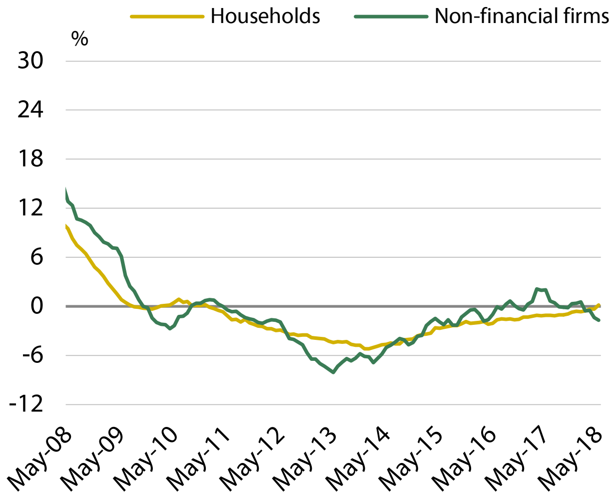


Figure 10: NPL rate and unemployment rate

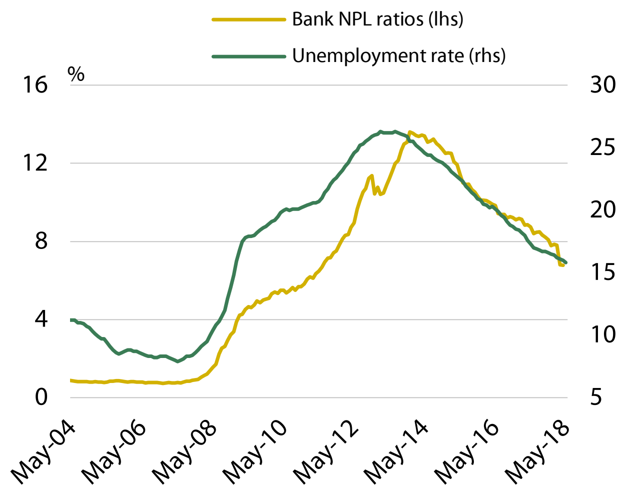


Figure 11: 10-year government debt risk premium (spread with Germany).

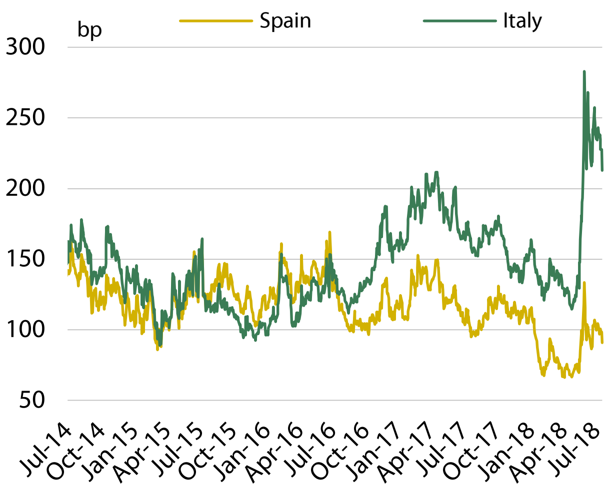


Figure 12: Private debt risk premium (5-year CDS)

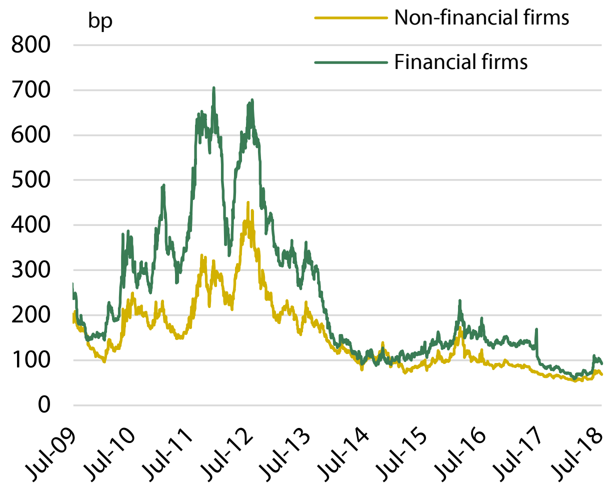


Figure 13: House prices (year-on-year change)

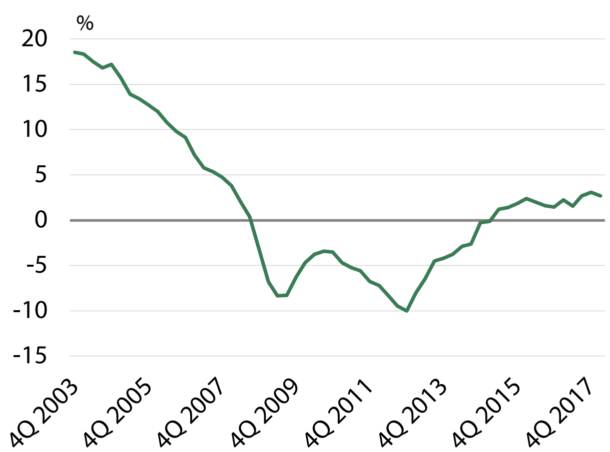
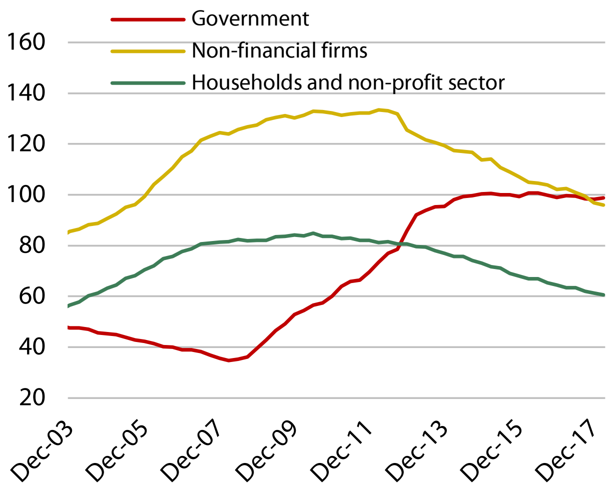
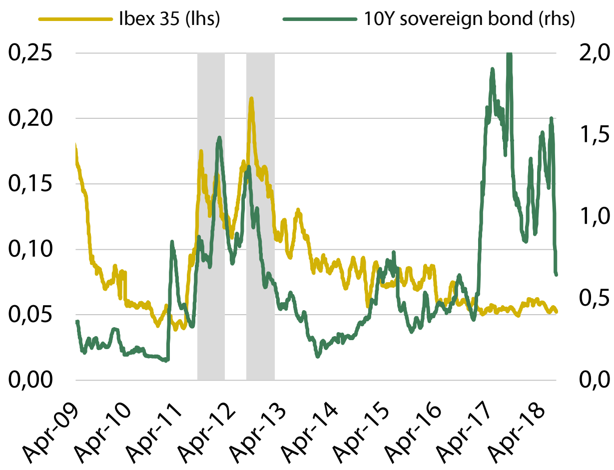


Figure 14: Borrowing (% GDP)



Liquidity, financing and fragmentation risk: yellow

Figure 15: Liquidity (bid-ask spread, %)



The shaded area corresponds to periods when short-selling was banned.

Figure 16: Volatility (1m moving average)

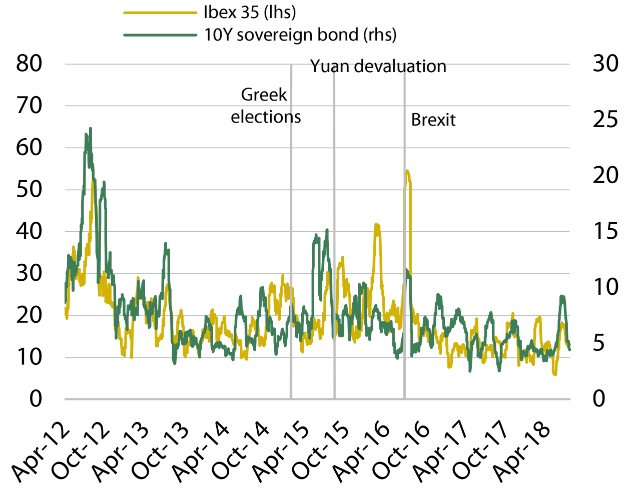


Figure 17: SIBE trading (1m moving average)

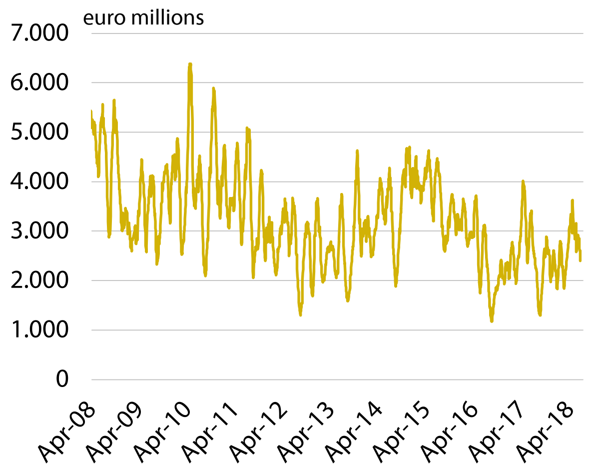


Figure 18: Interbank spread (LIBOR-OIS)

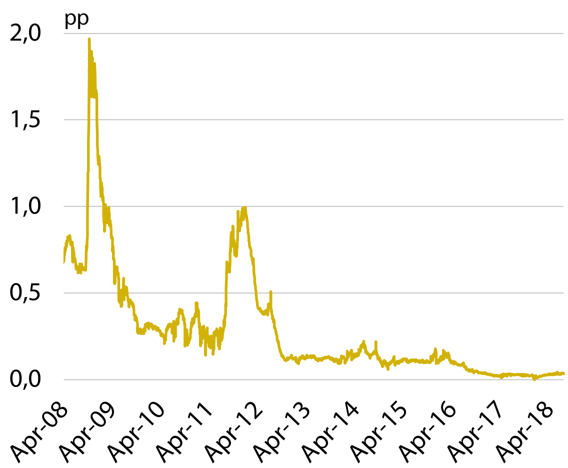


Figure 19: Spain-EU spread on corporate lending rates

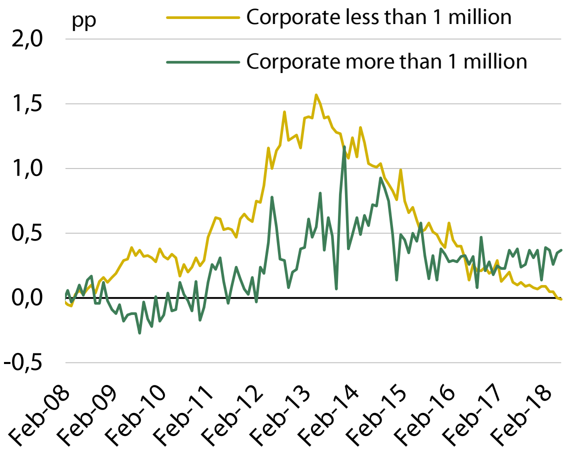
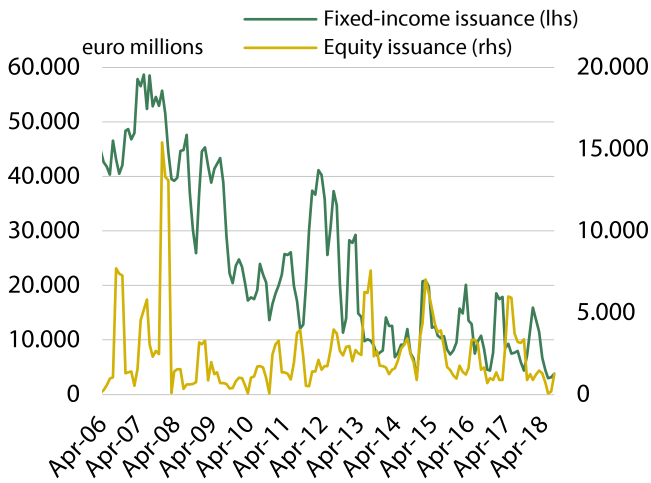


Figure 20: Issues (3m moving average)



Macro-economic risk: yellow

Figure 21: GDP (year-on-year change)

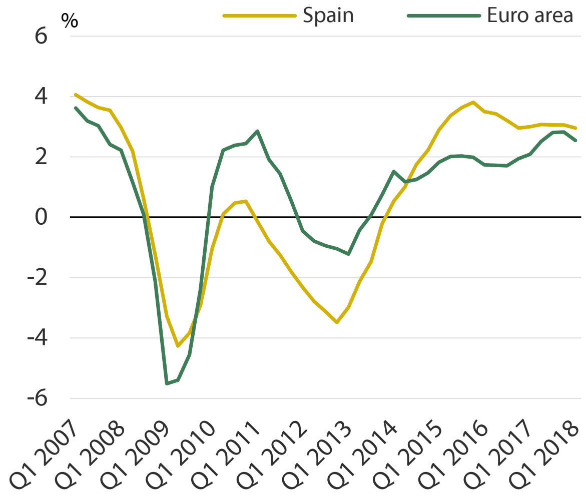


Figure 22: HCPI and core CPI (year-on-year change)

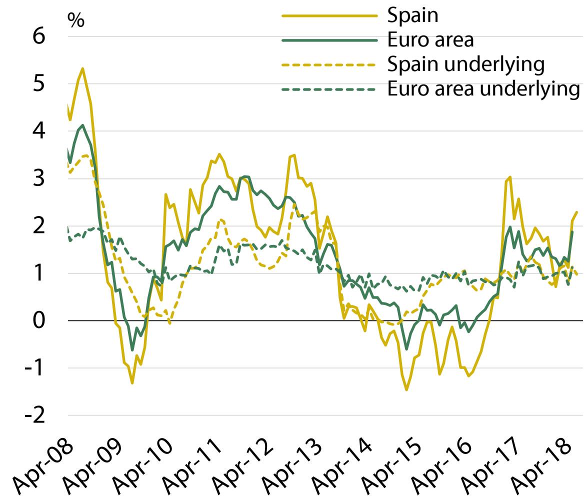


Figure 23: Employment (year-on-year change)

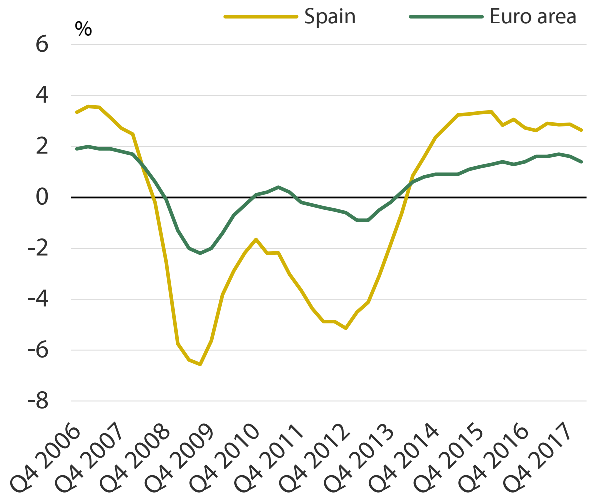
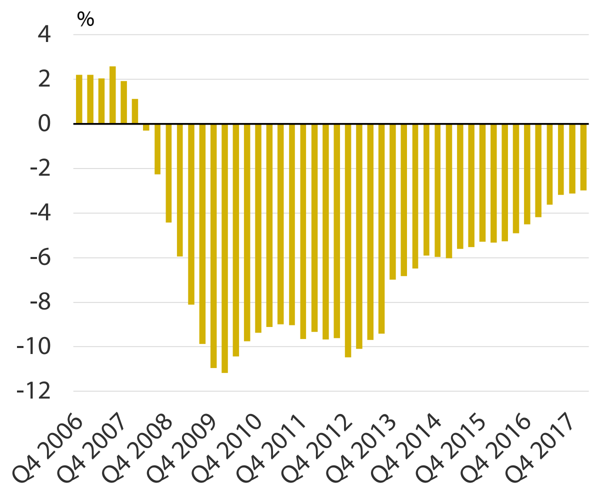


Figure 24: Government balance (% GDP)



Cumulative data four quarters.

Figure 25: Exchange rates

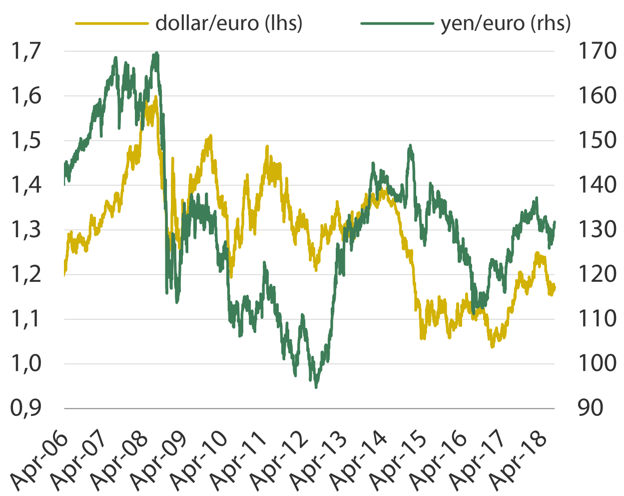
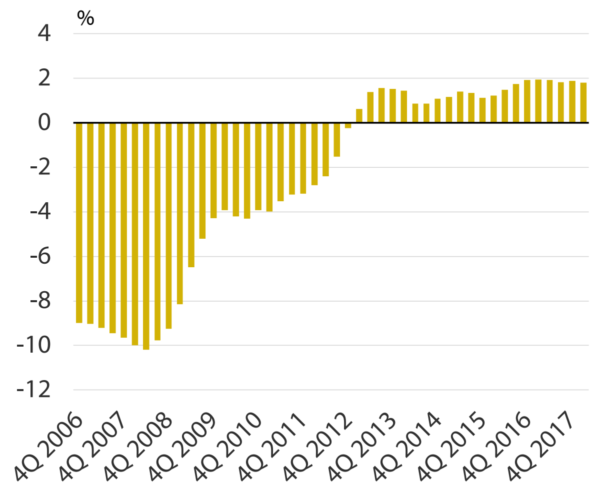
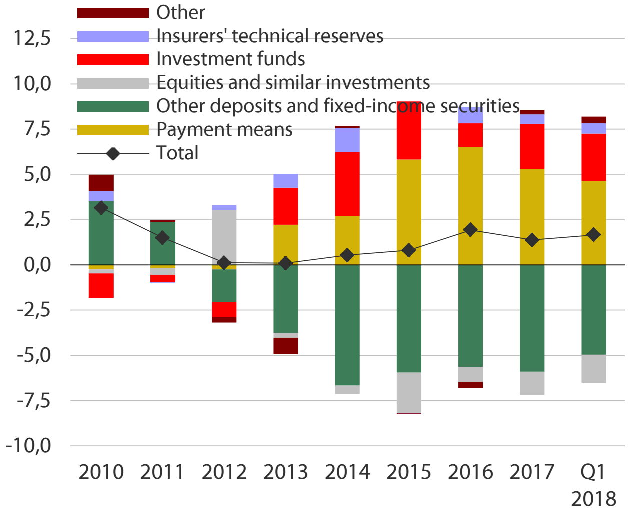


Figure 26: Current-account balance (% GDP)



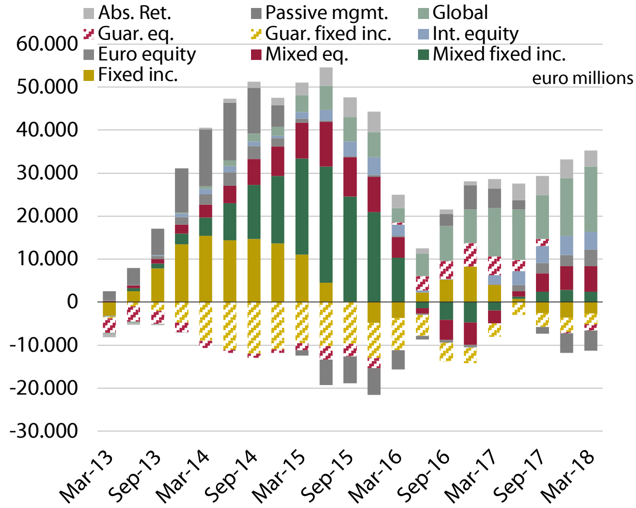
Investors

Figure 27: Households: net financial asset acquisitions (% GDP)



Cumulative data four quarters.

Figure 28: Net subscriptions to investment funds



Cumulative data four quarters (million euros)

Figure 29: Bitcoin price and searches

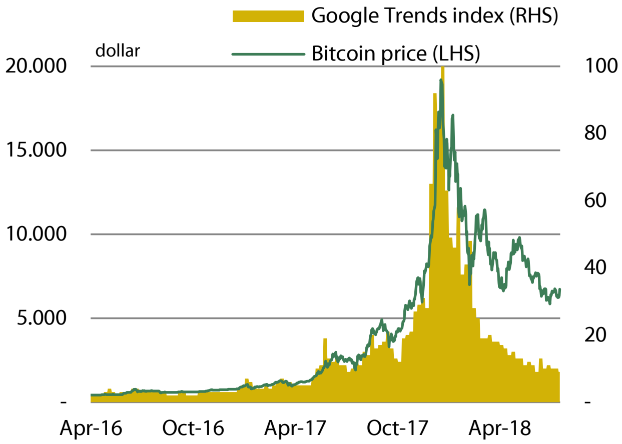
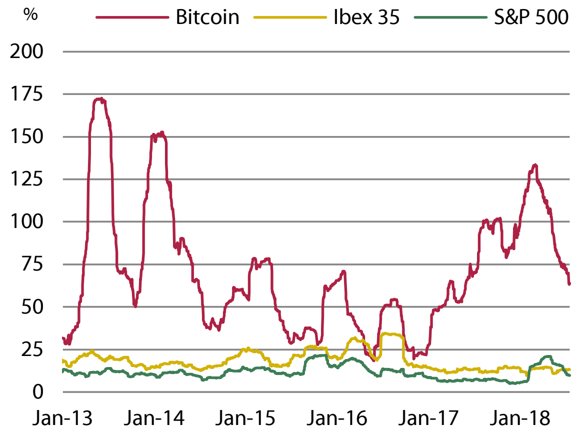


Figure 30: Bitcoin volatility



Contagion risk: yellow

Figure 31: Correlations between asset classes

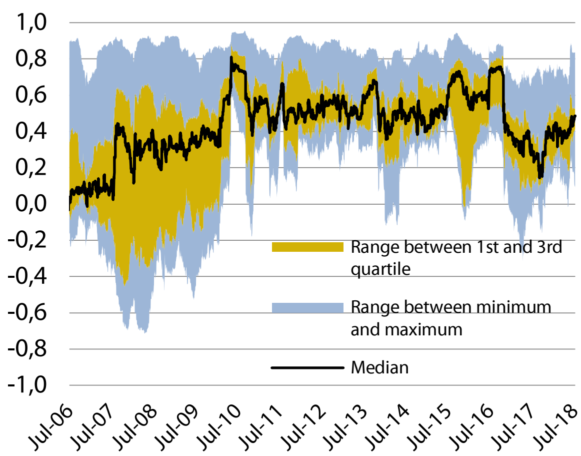
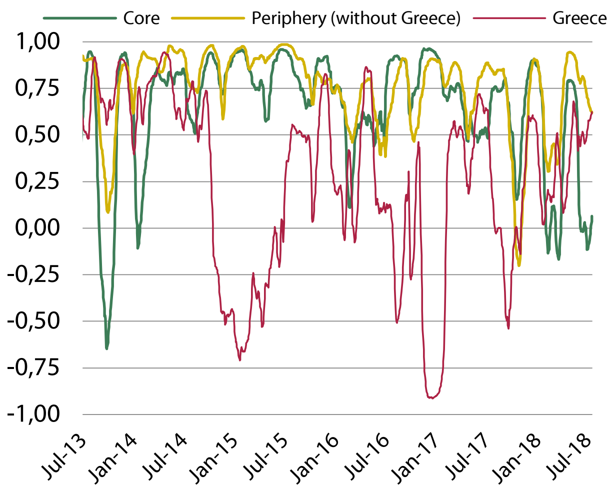
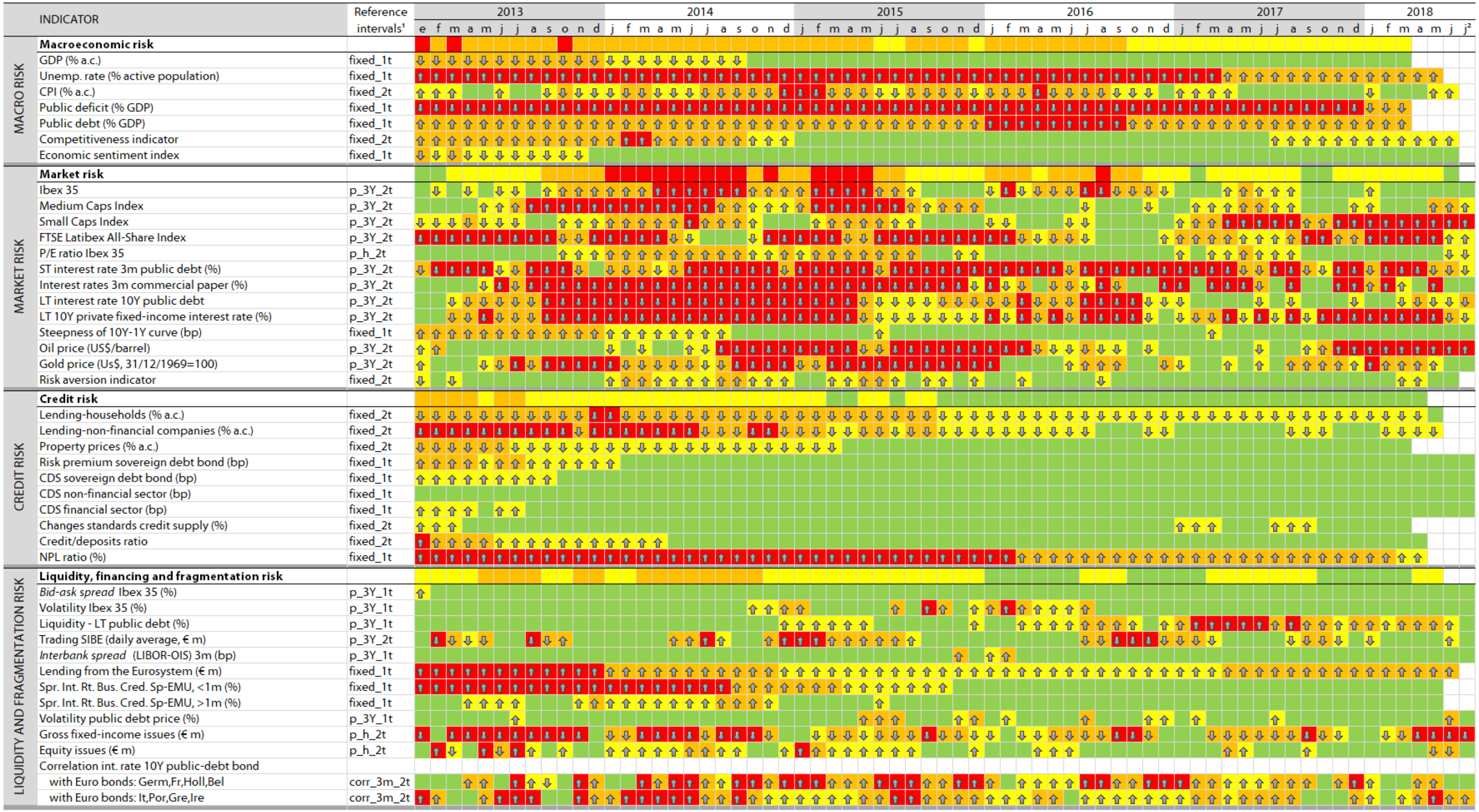


Figure 32: Correlation between the yield on the Spanish and European 10Y bonds



Heat map: risk categories



(1) Reference intervals could be: (i) "fixed": predetermined numerical tresholds, one (1t) or two-tailed (2t); (ii) "corr_3m": 3 months windows correlation coefficients; (iii) "p_3Y": percentiles obtained from 3 past years distribution, one (1t) or two-tailed (2t) or (iv) "p_h": percentiles obtained from historical distribution. (2) Data until July 13th. Source: CNMV, Bloomberg and Thomson Datastream.

Explanatory notes

Spanish financial markets stress index (Figure 1): The stress index provides a measurement in real time of the systemic risk facing the Spanish financial system, ranging from between zero and one. To this end, stress is evaluated in six segments of the financial system (equity income, fixed income, financial intermediaries, the money market, derivatives, and the exchange markets) which are then aggregated to obtain a single figure. The stress for each segment is evaluated by means of cumulative distribution functions and the subsequent aggregation takes into account the correlation between segments, in such a way that the index places greater emphasis on stress situations in which correlations are very high. In general terms, the stress variables chosen for each segment (three for each one) correspond to volatilities, risk premiums, liquidity indicators, and sudden loss of value. These variables are good indicators of the presence of stress in the markets. Econometric estimates indicate that index values below 0.27 correspond to periods of low stress in the financial system, while scores between 0.27 and 0.49 correspond to periods of medium stress, and values above 0.49 indicate periods of high stress. The methodology of this index follows the work of Holló, Kremer and Lo Duca in 2012 to propose a similar index for the euro area. For further details on recent movements in this index and its components, see the CNMV's statistical series (market stress indices), available at http://www.cnmv.es/portal/Menu/Publicaciones-Estadisticas-Investigacion.aspx. For further information on the methodology of this index, see Cambón M.I. and Estévez, L. (2016) A Spanish Financial Market Stress Index (FMSI). Spanish Review of Financial Economics 14 (January (1)), 23-41 or CNMV Working Paper 60 (http://www.cnmv.es/portal/Publicaciones/monografias.aspx).

Heat map: summary by market and risk category (Figure 2 and final annex). The heat maps provided in this release show the monthly trend of the most important indicators in the Spanish financial system in recent years. They contain information on domestic securities markets, the banking sector, and also some macro-economic variables. The main purpose behind the production of these maps is to provide an idea of the position of the reference indicators in relation to their recent history (in most cases three years) or with some predetermined limits, by associating this position with a certain colour. When an indicator changes from green to a warmer colour (orange or red), it does not necessarily mean the existence of risk; rather it indicates a movement towards an extreme value (very high or very low) in the period or range of values used as a reference. If an indicator remains at extreme values for a prolonged period, it may suggest the need for a more detailed analysis; that is to say, it may be interpreted as an alarm signal. The most comprehensive heat map (see page 13) includes 43 indicators[20], five of which are prepared by the CNMV. The large number of indicators taken into consideration allows us to make an analysis of vulnerabilities for each segment of the financial markets (equity income, fixed income, banking sector, etc.) or for different risk categories (macro, market, liquidity, credit, etc.), as illustrated in Figure 2. The colours of these aggregates (markets or risk categories) are assigned by calculating a weighted average of the values of the individual indicators they

[20] Since June 2017, the heat map includes an additional indicator: the bid-ask spread of the ten-year sovereign bond.

comprise. In each aggregate, one of the individual indicators determines the generation of the overall colour: for example, in macro-economic risk, the indicator used to calculate the aggregate is GDP. This means that until this is published, the macro-economic risk block is not given any colour in the map. For more detailed information on the methodology and the analysis of these maps, see the article "Identification of vulnerabilities in the Spanish financial system: an application of heat maps", published in the Quarterly Bulletin of the CNMV corresponding to the first quarter of 2015.

Short positions (Figure 3): The figure for aggregate net short positions includes the sum, to the reference date, of the individual positions declared (0.5% or higher), plus the total for positions of 0.2% or higher but lower than 0.5%. The series only reflects the positions declared at each date and is therefore not recalculated to take into account any later changes or exceptional inclusions of notifications of positions at a date previous to that of each aggregation.

Bitcoin price and searches (Figure 29): The Google Trends index reflects users' interest in the Google search engine for a specific subject in a certain region and period. In this case, the index shows the term "bitcoin" globally from 2016 up to the reporting date of the Stability Note.

Bitcoin Historical volatility (Figure 30): Annualised standard deviation of the daily changes in prices in 90-day windows.

Contagion risk: The indicators making up this block are of somewhat greater complexity. We set out the most important of these indicators below:

- Correlation between assets (Figure 31). The correlation pairs are calculated using daily data in three-month windows. There are six asset classes: sovereign debt, private fixed income from financial institutions, fixed income from non-financial firms and Ibex 35 securities, financial companies, utilities, and other sectors. A high correlation between the different classes of Spanish assets would indicate the possible existence of herding behaviour by investors. This situation could lead to high volatility in periods of stress. Meanwhile, diversification would offer fewer advantages since, in this context, it would be more difficult to avoid exposure to sources of systemic risk.

- Correlation between the yield on the Spanish and European 10Y bond (Figure 32). The correlation is calculated using daily data in three-month windows. The countries of the core group are Germany, France, Holland and Belgium, and the peripheral countries are Portugal, Italy, Greece and Ireland.