Financial Stability Note

No. 18, April 2021

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The Financial Stability Note falls within the tasks that the CNMV carries out in monitoring financial stability conditions in the areas that it supervises. In particular, the Note assesses the stress level of Spanish securities markets during the last quarter, flags any changes in the level of the various financial risks and identifies the main sources of risk.

The Spanish National Securities Market Commission (CNMV) distributes its reports and publications via the Internet at www.cnmv.es

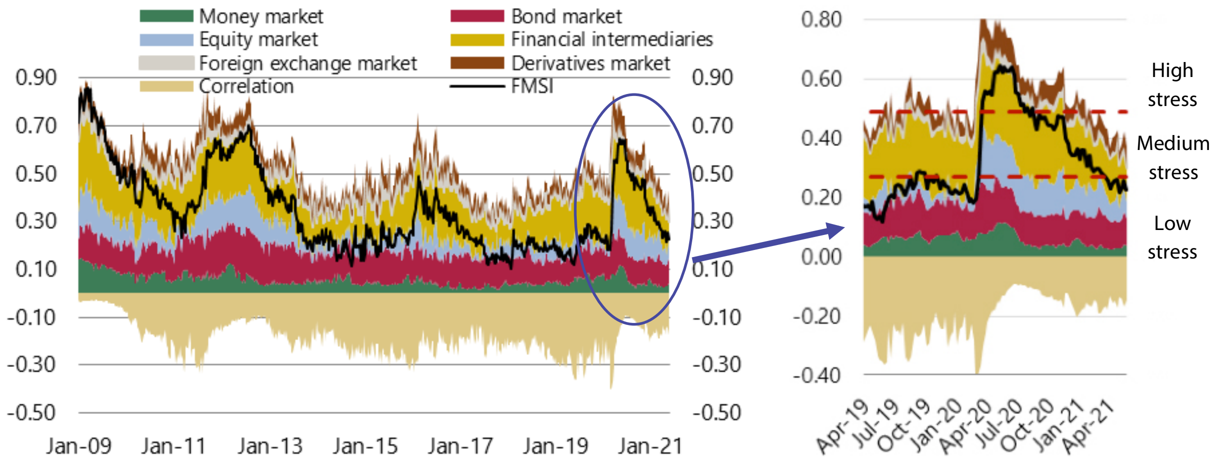
ISSN (digital edition): 25030-7827

Layout: Comisión Nacional del Mercado de Valores (CNMV)

Summary

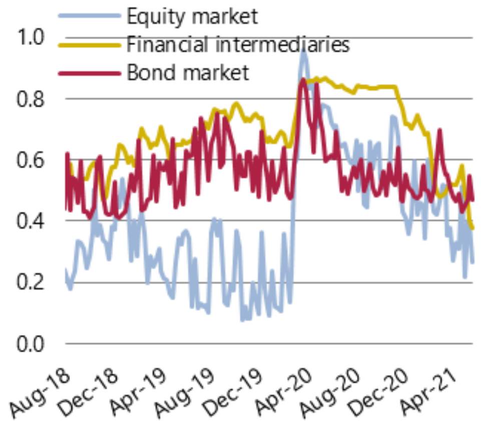
✓ Since the publication of the last financial stability note, **the stress indicator** for the Spanish financial markets has continued to decline,[1] extending a trend that began in November 2020 and that has shown few variations. At the end of May, the indicator stood at 0.23, a level corresponding to the low stress regime (below 0.27), which it entered in mid-March. The fall in the stress indicator, which is at pre-pandemic levels, was contributed to by the favourable performance of all the different types of indicators that it comprises and of all segments. Regarding the types of indicators, the last few weeks have seen a particularly positive performance from those relating to the recovery in share prices, and to levels of liquidity and volatility, although there have been some slight upticks in volatility. With regard to the segments of the system, all have shown a notable decrease in their stress level over the last few months, the highest levels corresponding to fixed income (0.47) and financial intermediaries (0.38). The degree of correlation of the system, similar to that of February, continues to be high.

Stress indicator of the Spanish financial markets FIGURE 1



Total stress indicator

Indicators in the bonds, financial intermediaries and equities segments



Source: CNMV.

For further details on recent movements in this indicator and its components, see the CNMV's statistical series (market stress indicators), 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,* Vol. 14, No. 1 pp. 23-41 or as CNMV Working Document No. 60 available at: http://www.cnmv.es/DocPortal/Publicaciones/MONOGRAFIAS/Monografia_60_en.pdf.

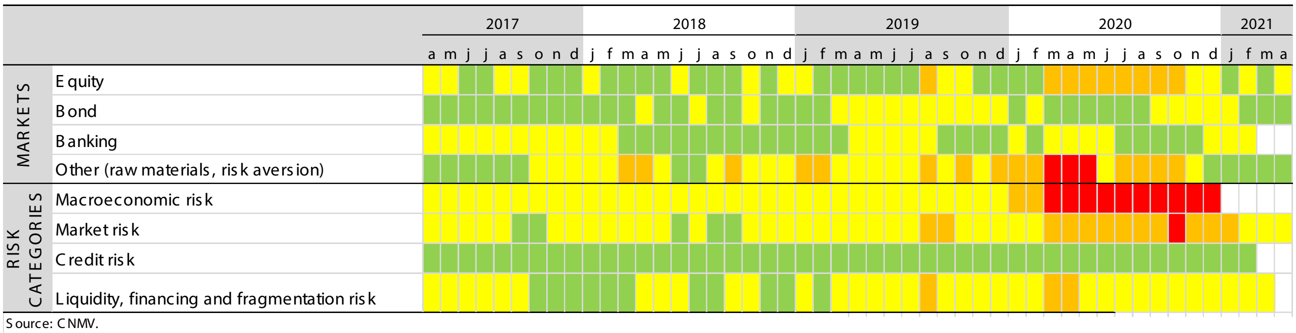
[1] The closing date of the note is 30 April, except for the stress indicator and certain other specific data, for which it is 21 May.

- ✓ The evolution of **national financial markets in recent months** has been marked by the increase in both stock prices and returns on public debt assets. In the equity markets, the Ibex 35 shows a 14% increase to 21 May, a similar behaviour to that of the main European indices, thanks to the recovery of the banking sector and of stocks in the services sector. Almost all sectors showed gains, although we note weaker performance of the sectors and companies that had performed better in 2020. Market volatility and liquidity conditions continue to be satisfactory, but trading volumes are low. In fixed income markets, the increase in yields, which interrupts the downward trend of 2020, responds to certain fears relating to a possible increase in inflation in the euro area and also to a contagion effect deriving from the rise in yields on US debt assets, where this risk is much more significant. In this context, the yield on Spanish sovereign bonds shows an increase of 51 basis points (bp) in the year (to 0.56%), while the risk premium stands at 69 bp. (63 bp at the end of 2020).

- ✓ The most prominent **risks of a financial nature** identified in this note are market and liquidity risks, especially on certain fixed income assets. Renewed bouts of volatility or an abrupt change in growth expectations could give rise to a general increase in risk premiums – and, consequently, price declines – which would be negative for both the issuers of the assets and their holders. In addition, it is worth highlighting the financial vulnerabilities that derive in the medium term from the increase in agents' indebtedness during the crisis, including that of the public administrations.

- ✓ The **most significant sources of risk** in terms of financial stability continue to evolve unevenly: those of political origin at the international level are decreasing, while those deriving from the interest rate context and from the increase in non-contact activities, including the search for yield, with investments in highly volatile and sometimes unregulated assets, have held steady and, finally, others are taking on increased importance. Prominent among these last-named are the macroeconomic risk deriving from doubts about the intensity of the recovery, cybersecurity risks in the new digital environment and the risks relating to the promotion of sustainability, which are many and varied. Some of them come from the difficulty of valuing these assets in a context of disparate information, and also from the vulnerabilities that may be generated by the strong demand for these assets, in view of the possibility that prices may deviate from the fundamentals as well as the risk of greenwashing being encouraged.

Heat map: summary by market and risk categories[1] FIGURE 2



Source: CNMV. See article Cambón, M.I. (2015). "Identification of vulnerabilities in the Spanish financial system: an application of heat maps". *CNMV Bulletin*, Quarter I, pp. 109-121.
1 Data to 30 April.

Sources of risk

Macroeconomic environment

- Spain' s GDP contracted by 10.8% in the whole of 2020, after a last quarter in which growth was zero. This places Spain among the euro area economies most affected by the coronavirus crisis (the euro area as a whole posted a decrease of 6.8%). This was due above all to the decline in activities that make very important contributions to the Spanish economy, such as the tourism and hospitality industries, which had a significant impact on a large number of companies. Preliminary data for the first quarter of 2021 indicate a slight worsening in activity, with a variation of -0.5% compared with the previous quarter (-4.3% year-on-year, see Figure 21). This decline in the first three months of 2021 was the consequence of the contraction of national demand (-0.9% quarterly), within which the decrease in investment (gross capital formation) stood out (-2.2%).

  The forecasts of the main institutions for 2021 and 2022 continue to be subject to uncertainty deriving from both the appearance of new strains of the virus and the evolution of the vaccination process. For example in its March macroeconomic projections the Bank of Spain envisages that, depending on short-term progress with vaccination and patterns of private consumption and tourism in the wake of the pandemic, GDP could grow by 3.2%, 6.0% or 7.5% this year in the adverse, baseline and moderate scenarios respectively.[2] For its part, the International Monetary Fund (IMF) published its forecasts in mid-April, with an upward revision, in general terms, of growth rates for 2021 and 2022, as a result of higher than expected growth in the second half of 2020 and of the additional fiscal policies implemented in some large economies.[3] For Spain, the revision for this year was 0.5 percentage points (pp), bringing the GDP growth rate to 6.4%, while the 4.7% advance for 2022 remains unchanged. The figure presented by the IMF in April for 2021 exceeds the forecasts of the European Commission in May, which estimates growth of 5.9% for Spain. Conversely, the figure presented by the European Commission for 2022 (6.8%) is higher than the IMF forecast.

- The latest labour market figures indicate that 137,500 jobs were destroyed in the first quarter of the year,[4] thus interrupting the trend of the last two quarters of 2020, in which 737,100 jobs were created.[5] However, both the number of unemployed and the unemployment rate have shown decreases in the first quarter, with 65,800 fewer people looking for work and an unemployment rate of 15.98% (16.13% at the end of last year), due to the transfer of people from the working to the inactive population. In year-on-year terms, the number of people in employment decreased by 474,500, 2.4% of the total. As already mentioned on other occasions, these figures do not include those affected by "ERTE" furloughing schemes,[6] who numbered 638,283 at the end of April.[7] The Bank of Spain' s forecasts for the end of 2021 indicate an unemployment rate, depending on the

[2] These forecasts have been revised downwards relative to the December report, which envisaged a recovery of between 4.2% and 8.6%. In 2022, activity would recover by between 4.6% and 5.5%.
[3] The IMF thus estimates that the global economy will grow by 6% this year (the previous forecast was 5.5%), and by 4.4% in 2022 (4.2% in the previous estimate). In the case of the euro area, following a significant downward revision in the January report, a slight improvement of 0.2% in growth is forecast for both this year and next, to 4.4% and 3.8% respectively.
[4] Data from the EPA (Labour Force Survey).
[5] This figure represents around 55% of the jobs that were destroyed during the first half of 2020.
[6] In accordance with Eurostat and International Labour Organisation (ILO) methodology these workers are considered employed.
[7] This figure has fallen steadily since the end of January, when it stood at more than 900,000.

various possible scenarios, of between 15.9% and 18.3%, which is lower than the forecasts made in December, of between 17.1% and 20.5%.

As for Social Security affiliation, data for April show a slight decrease of 9,808 (seasonally adjusted), to 19.02 million, which extends the negative trend of the previous two months, albeit at a much slower pace.[8] Despite this decline, the number of people registered with the social security has increased by almost 600,000 since April last year, one of the worst moments of the coronavirus crisis.

- The leading inflation indicator for April shows an increase in prices of 1.2% during the month, bringing the year-on-year increase to 2.2% (1.3% in March), a figure that had not been reached since October 2018. This behaviour had its origin, especially, in the rise in the price of electricity and in the stabilisation of the prices of fuels, which had registered significant drops a year earlier. In fact, the core inflation rate, which excludes the most volatile elements (energy and fresh food), showed a gradual decrease from January to April: from 0.6% to 0.0%. Comparison with the euro area as a whole using the data for the harmonised CPI for March shows a notable decrease in Spain' s negative differential, down to just 0.1 pp (it had ranged between 0.5 pp and 1 pp in previous months).

- The COVID-19 crisis also had a significant impact on the accounts of the public administrations in 2020. The deficit at the end of the year stood at 11.0% of GDP,[9] well above the figure of 2.9% of 2019, due to both the sharp increase in spending and the decline in income, and the level of public debt rose to 120% of GDP (95.5% one year earlier). Data provided by the Ministry of Finance for the first two months of this year show that the accounts continue to deteriorate: the consolidated deficit of the public administrations[10] stood at 1.51% of GDP (1.04% in February 2020), with an increase in spending in all administrations (central government, autonomous regions and social security).[11]

  Looking to the end of 2021, the Bank of Spain' s forecasts would place the public deficit between 6.8% and 9.1% of GDP, in the same range as those of the IMF (9% of GDP) and the Government (8.4%). In all cases, the figures are between 0.7 and 0.8 pp worse than the projections made a few months ago, as a result of the reduction in growth estimates. For its part, public debt would be between 117% and 119.5% of GDP. In the medium term, a gradual reduction in the deficit is foreseen, although according to the Government's forecast it will not be possible to bring it to below the 3% of the Stability Pact until 2025 at the earliest.

- According to data from the Financial Accounts for 2020, households' financial decisions were also strongly conditioned by the effects of the pandemic. The most obvious consequence has been the increase in the saving rate, reflecting an increase in "precautionary savings", which also occurred in the middle years of the financial crisis that started in 2008, and also the impossibility of making certain consumption decisions in the context of the restrictions imposed. At the end of the year, Spanish households' savings stood at 14.7% of gross disposable income, the highest value in the entire

[8] This decline was mainly due to the services sector, which had 27,827 fewer members (111,000 fewer since January), with the primary and secondary sectors showing slight increases in the number of contributors.
[9] The deficit is reduced to 10.1% if Eurostat's reclassification of the SAREB bank asset restructuring agency as a government entity is excluded.
[10] Excluding local authorities and aid to financial institutions.
[11] In the case of the autonomous regions, there was a significant increase in social and health spending, while in Social Security funds the increase had its origin in the work-related measures adopted to combat the effects of the coronavirus crisis, notably the aid relating to "ERTE" furloughing schemes.

historical series (see Figure 29).[12] This high level of saving by Spanish households, although lower than the euro area average, was reflected in the acquisition of financial assets, which reached, in net terms, 6.9% of GDP, the highest figure since 2006 (see Figure 27). The composition of this investment followed the same patterns as in previous years: the divestment of term deposits and fixed income securities continued, reaching 2.5% of GDP, as did the investment of a large part of savings in means of payment,[13] with inflows of resources exceeding €100 billion, 9.2% of GDP. Although with much lower values, households also used part of their savings to acquire shares and units in investment funds (0.9% of GDP).

The data available on the funds registered with the CNMV show that, from the middle of the second quarter of 2020, net subscriptions started to gradually recover following the relatively high redemptions of about €5.5 billion (around 2% of total fund assets)[14] made in the most critical months of the pandemic (March and April of last year), with inflows in net terms of €621 million for the year as a whole. By category, the funds that received the largest inflows of resources throughout 2020 were fixed income funds, with almost €3.9 billion, international equity funds and mixed fixed income funds, with net subscriptions in excess of €2.6 billion in both cases. The most favourable evolution over time occurred in fixed income funds, which saw inflows of more than €5 billion between April and December. It is worth mentioning that these movements reinforce the polarisation that we started to see in 2019: one group of investors opts for risky funds in search of yield, while the other, more risk-averse and influenced by current uncertainty, prefers safer formulas.

Context of low interest rates

- The monetary policy of the European Central Bank (ECB) continues to be aimed at alleviating the effects of the pandemic on the economy and the financial system of the euro area. With this effort, the pace of asset purchases accelerated during the second quarter; this may be revised in the third quarter depending on how the economic situation unfolds. In any case, the ECB points out that the medium and long-term inflation outlook will continue to require a very accommodative monetary policy to reach its target of a level close to, albeit below, 2%, so interest rates are likely to remain at low levels and the bank' s interventions in the debt markets are likely to continue for quite some time.

  Despite the ECB' s large volume of debt purchases,[15] there have been slight upticks in interest rates,[16] somewhat greater in the longer terms, due to the fear among investors of a possible increase in inflation as a result of the increase in the money supply and the stimulus programmes, and also due to a certain contagion effect deriving from the rise in yields in the United States. In that economy the risk of inflation seems to be more significant and where it is starting to be suggested that the Federal Reserve will have to consider altering its accommodative policy aimed at supporting recovery and hiking interest rates in the medium term in order to keep inflation under control and avoid overheating.

[12] This level of savings is almost 3 pp higher than the figure reached in the worst moments of the financial crisis and is more than 8 pp higher than in 2020.
[13] Cash and demand deposits.
[14] The highest redemptions occurred in the fixed income category, where outflows amounted to €2.7 billion in March alone.
[15] Euro area public debt accumulated by the ECB represents around 30% of the zone's GDP.
[16] The 1-year Euribor rose to -0.484% in April, the fourth consecutive month in which it has increased.

- In this context, the risks already covered in previous notes remain fully in force, the most prominent being the continuation of yield-seeking strategies, which accentuate investors' propensity to acquire assets with higher yield expectations[17] where the risk is greater, in a context of low yields and increasing costs of holding positions in liquid or risk-free assets. These types of assets generally show high levels of volatility (equity, emerging market or cryptocurrency assets) and credit risk (they have worse credit ratings – subordinated debt and high yield assets), and are less liquid (subordinated debt and high yield assets, private equity funds or real estate assets). Also, financial institutions continue to find it very difficult to increase their profitability in a context of economic deterioration and financial problems for companies, and this may constitute an ever greater incentive to assume higher risks in order to obtain an additional return. However, some vulnerabilities are being moderated by the greater difficulties of some agents and the disappearance of their incentives to borrow, while at the same time the continuing low cost of financing of indebted agents favours the control of bad debts.

Sources of political uncertainty

- Political uncertainty in the United States was greatly lessened with the inauguration of Joe Biden as president at the beginning of the year. In addition to the challenge relating to the incidence and spread of COVID-19 in the country, which has been significantly reduced due to the accelerated rate of vaccination carried out,[18] doubts persist on trade matters, especially on the future relationship with China. Recently, the US trade representative announced that she hopes to meet with the Chinese authorities to assess the performance of the first phase of the agreement reached between the two powers more than a year ago. However, the negotiation of the next phases of the agreement between the two countries is pending, as is determining the future relationship with the European Union (EU). In this last regard, March saw an easing of tensions, with the agreement to suspend for four months the tariffs that the United States and the EU had imposed on each other as a result of the dispute over state aid granted in the past to Boeing and Airbus. Uncertainty has also been reduced in relation to this administration's stance on climate change, following the return of the United States to the Paris Agreement and the rapprochement with China on this matter. Therefore, some sources of uncertainty persist in the political sphere, but the risk that these will be transferred to financial markets and generate turbulence has diminished considerably.

- With the agreement reached in December between the EU and the United Kingdom, one of the main sources of uncertainty that was being watched at the European level, the possibility of a hard Brexit, was significantly reduced. With regard to market infrastructures, a reorganisation process was observed in relation to trading venues before the end of 2020, with British entities opening centres and shifting part of the volumes to EU countries. For the moment, activity in the markets has developed normally, with no risks being identified in terms of financial stability. The most important sources of uncertainty are observed in the general area of the operation of the new Trade and Cooperation Agreement between the two economies, since there are still certain disagreements, the most recent one relating to fishing restrictions.

[17] Net subscriptions to investment funds in the first quarter of the year were high, close to €7 billion, and were more focused on high-risk categories. For example, net subscriptions to global equity funds accounted for 30% of the total.
[18] Around 250 million vaccines have been administered in the United States, and it was recently announced that the new goal of the vaccination plan is for 70% of the US adult population to be vaccinated by 4 July.

- At the national level, risks related to the coordination and management of the health crisis continue to stand out. On 9 May, the state of alarm that had entered into force in October 2020 ended, increasing the uncertainty around the restrictions that each autonomous region can impose on its citizens and, in many cases, the effectiveness of these will remain in the hands of the relevant courts. Therefore, the materialisation and duration of new measures is uncertain, as is the economic impact that these may have. Added to this situation is the current high degree of parliamentary fragmentation, which could generate tensions and make it difficult to reach agreements.

Other sources of uncertainty

- The gradual process of vaccinating the population against the coronavirus has led to an improvement in the outlook for the world economy. However, there is still uncertainty about how long the crisis period will last, since new strains of the virus continue to appear and the vaccination process is irregular between different jurisdictions and also in time. Therefore, the imposition of new restrictions and isolation measures on the population cannot yet be ruled out,[19] and these could lead to episodes of turbulence in some areas and temper expectations of a greater economic and health recovery in the short and medium term.

- In the current context, in which non-face-to-face activities, especially working from home, video-conferencing, Zoom, etc. have become widespread worldwide, cybersecurity continues to be one of the most important risks faced by organisations and business. In an increasingly interconnected environment, in which most companies are completely dependent on digital systems, contagion from one to another due to any kind of security breach could be relatively easy. If this were to affect a sufficient number of agents, there could even be a general loss of confidence in the system, affecting financial markets and their infrastructures and, therefore, financial stability. The importance of dedicating resources to cybersecurity is ever greater, since limiting and managing this operational risk is a vital issue for companies, users and supervisors. In this regard, it is worth mentioning the European Commission' s draft Digital Operational Resilience Act (DORA) for financial services. The act will entail the establishment of a common framework of obligations, principles and requirements regarding cybersecurity: all financial institutions will be subject to a set of rules for mitigating and managing the security risks of networks and computer systems.

- Regarding the risks associated with sustainability, it should be noted that the effects of climate change on economies and financial markets can involve high direct costs[20] and transitional costs,[21] although the amounts will depend largely on the measures that can be adopted as a preventive measure to alleviate them. Currently, financial markets are rapidly directing their interest and investments towards assets that meet sustainability

[19] In order to advance the vaccination process worldwide, certain countries have submitted proposals to the World Trade Organisation (WTO) to try to bring about the temporary lifting of the intellectual property protection of patents for vaccines against COVID-19. The US Government recently communicated its support for this proposal to the WTO. Theoretically, this measure would allow developing countries to manufacture their own vaccines. Following this, the EU announced that it would discuss how vaccine patent liberalisation could help in providing an effective response to the health crisis. However, expectations of the effectiveness of this proposal have been tempered by the fact that, even with the lifting of intellectual property, the manufacture of vaccines is a complex and expensive process, and furthermore, not all vaccines are manufactured in these countries, so this measure could affect only some of them.

[20] The direct costs of climate change have already become apparent in recent years as a consequence of the events associated with it. These costs have shown an increasing trend as a consequence of losses relating to disasters linked to droughts, floods and extreme weather events (insurers estimate that more than 80% of losses related to catastrophes already correspond to climatic events).

[21] In the form of costs of mitigation and adaptation to a low carbon economy.

(ESG) criteria[22] as a result of strong investor demand, although there appear to be certain difficulties in correctly assessing[23] risks associated with climate change due to incomplete and heterogeneous information about them.

The markets for green and sustainable assets show high growth and many companies and governments are preparing to issue green bonds,[24] while at the same time greater numbers of asset managers are incorporating new assets that meet sustainability criteria to their portfolios and rating agencies include them in their analyses. In this transition process, as a consequence of the sharp increase in investor demand for sustainable assets – which can sometimes exceed supply – and the lack of a homogeneous comprehensive regulatory framework, there is the potential for distortions to occur in the price formation process and the valuation assigned to them is inadequate,[25] which could lead to sharp price corrections in the future, as well as to greenwashing[26] with assets that do not actually meet the ESG criteria established.

In the case of financial institutions, the risk is higher for those that concentrate a significant percentage of loans to carbon-intensive companies on their balance sheets, since they will have to make a significant transition in the coming years if they are to stay in business. It is therefore possible that financial institutions will have to assume losses as a consequence of the credit risk associated with the transition process of their borrowers, as well as downgrades in their credit rating, which would increase their financing costs.[27]

On the other hand, investments associated with adaptation to climate change offer opportunities from the point of view of employment and productivity incentives associated with new technologies, in parallel with superior development and growth of financial markets that progressively incorporate assets linked to sustainability.

[22] In accordance with environmental, social and corporate governance (ESG) criteria.
[23] The carbon pricing mechanism does not allow a correct assessment of the negative externalities associated with the climate.
[24] Estimates of the size of the green bond market indicate that they barely represent 5% of the global bond market.
[25] It is possible that bubbles could be generated in some classes of these assets given the current tightness of supply.
[26] Greenwashing is the practice whereby an entity tries to make its products or activities seem sustainable when in reality they are not, in order to attract the interest of potential investors or customers.
[27] See the work published in March 2021 by the ECB (The ECB Blog) on this matter: "Shining a light on climate risks: the ECB's economy-wide climate stress test".

Risk categories

Market risk: yellow

- The international equity markets, which had ended 2020 with some financial centres recovering all the losses accumulated in the year thanks to the announcement from November of the effectiveness of the vaccines, began 2021 with new advances, with an eye on the economic recovery, the beneficial effects of the vaccination programmes and the arrival of new doses. In this context, progress slowed down in most markets from March, although it still extended to April, as a result of delays in the vaccination schedule in Europe, fears of renewed outbreaks in some regions and the pace of recovery, still slow, of the European economy. Also, whisperings are starting to be heard in the market to the effect that both the Federal Reserve and the ECB might consider a change of strategy in the latter part of the year, reducing the size of their stimuli as the recovery takes hold.

- In the first quarter, all the international stock indices posted significant advances,[28] which in most cases were consolidated in April, performances of the European and US markets being similar, while that of Asian markets was somewhat weaker.

  All the US indices returned to positive territory, ending April at record highs on the back of a notable economic recovery in the first quarter of the year[29] and an intense fiscal stimulus programme.[30] However, contrary to what was seen in 2020, the biggest gains were in the more general indices, as opposed to the technology-heavy Nasdaq. The Dow Jones index, with a greater weight of companies in the traditional economy, industrial and financial companies, has gained 10.7% so far this year, while the more general S&P 500 index has gained 11.3%. As for the Nasdaq, although the major technological companies continue to benefit from the changes in consumption, work and leisure habits adopted by society as a result of the pandemic, the technology-heavy index advanced by "only" 8.3% – having gained 43.6% in 2020 – which implies a certain slowdown relative to the growth expectations of some companies[31] once the situation returns to normal.[32]

  All the European indices showed gains,[33] in some cases allowing them to recoup almost all the cumulative losses of 2020. The recovery of the European markets is underpinned by the improvement in industrial activity and expectations that the economic reactivation will be consolidated in the second half of the year as the vaccination programme reaches a significant proportion of the European population from summer on. Gains ranged from 7.9% for the UK' s FT 100 index to 12.9% for France' s Cac 40, with the most cyclical

[28] The US indices posted cumulative increases in the first quarter of between 2.8% and 7.8%, which extended in April to between 8.3% for the Nasdaq and 11.3% for the S&P 500; for their part, the European indices posted advances to March of between 3.9% and 10.9%, extending in April to between 7.9% for the UK's FT 100 and 12.9% for France's Cac 40. At the same time Japan's Nikkei 225 advanced by 5% to the end of April.

[29] The US GDP grew in the first quarter of 2021 by 6.4% in annual terms and the Federal Reserve indicates that it could do so by up to 7% in full-year 2021.

[30] In March the US Senate approved the third bailout package since the pandemic began, consisting of a stimulus plan worth US$1.9 trillion which includes new direct payments of US$1,400 to taxpayers, in addition to funds for local and regional governments and aid for various sectors such as airlines.

[31] Shares of the main US technology companies – known as "FAANG" (Facebook, Apple, Amazon, Netflix and Google) – have posted mixed performances so far this year, with gains of 19%, 6.5% and 34.3% for Facebook, Amazon and Google respectively and losses of 1.7% and 5% for Apple and Netflix respectively.

[32] Year-to-date 21 May, the Dow Jones had gained 11.8%, the S&P 500 10.6% and the Nasdaq 4.5%.

[33] All European indices rose in the first quarter: the euro area's Eurostoxx 50 by 10.3%, Germany's Dax 30 by 9.4%, France's Cac 40 by 9.3%, Italy's Mib 30 by 10.9% and Spain's Ibex 35 by 6.3%. All these advances extended through April, giving four-month YTD gains of 11.9%, 10.3%, 12.9%, 8.6%, 3% and 9.2% respectively.

companies such as industrials and those of the traditional economy leading the recovery.[34]

- In Spain, the Ibex 35 advanced by 9.2% to the end of April,[35] presenting a behaviour similar to that of the main European indices thanks to the recovery of the banking sector and of stocks of the services sector. Almost all sectors show gains, although weaker performance is observed in those sectors and companies that had performed better in 2020, a trend that could be attributed to the rotation of investor portfolios from defensive stocks to cyclical and growth stocks, which tend to benefit more from recovery scenarios. The intensity of the advances has been uneven among companies and sectors, depending on prospects, with the largest increases seen in financial services companies, mainly banks, consumer services companies, among which the good performance of the IAG airline group and leisure, tourism and hospitality companies stood out,[36] and companies that produce raw materials or are dedicated to engineering, as well as the main company in the oil sector, Repsol, which was favoured by the recovery in oil prices.[37] On the other hand, the weakest performance corresponded to companies in the energy sector and the electric utilities, which may be due to the greater preference for securities of renewable energy companies and companies with higher growth.

- As a result of the advance in stock prices in the first months of the year, which was accompanied by a somewhat more intense recovery in the growth of corporate earnings expected for the coming months, the price-earnings (P/E) ratio of the Ibex 35 fell from 17.9[38] in mid-January to 17.4 in April. (Its historical average is 13.6). (See Figure 4). It is foreseeable that the value of this indicator will gradually adjust in the coming months, as earnings estimates factor in the positive impact of the progress of vaccination campaigns and the progressive recovery of business activity.

- International debt markets, on which interest rates had progressively declined for most of 2020 under the influence of the ultra-expansive policies of central banks, reaching all-time record lows in many of the euro area economies in December, started the year with slight increases along the entire curve, concentrated to a greater extent in the longer terms. Although the ECB' s substantial purchase programmes of both public[39] and private debt in the secondary markets[40] are being maintained, and despite the ECB' s having indicated in March its commitment[41] to increasing its purchases in the second quarter of the year, the increases are due to economic agents' fears of a possible increase in inflation in the euro area, as well as a certain contagion effect deriving from the uptick in yields on US debt assets. In the euro area, this expectation is a reaction to the growth of the money supply that has taken place in recent years, the impact of the public spending expansion packages and the possibility that the ECB will consider reducing the size of its purchases in the latter part of the year as vaccination programmes advance and the economic

[34] As at 21 May the YTD revaluations of the European stock exchanges ranged between 8.6% for the UK's FT 100 and 15% for France's Cac 40.
[35] The revaluation of the Ibex 35 to 21 May 21 amounts to 14%.
[36] The main companies linked to the airline and tourism sector have seen significant gains so far this year: IAG (29%), Meliá (19%), NH Hotel Group (15%) and Aena (1%).
[37] The price of oil ended April at US$67.25 per barrel, accumulating a revaluation of 29.8% so far this year.
[38] In the same period, the P/E ratio of the US S&P 500 stock index fell back to 22.3x, while that of the euro area's Eurostoxx 50 index rose to 18x, both in their maximum ranges since 2000 and 2002 respectively.
[39] At the end of April the ECB's asset purchase programme (APP) had assets of more than €2.98 trillion, including public debt (€2.39 trillion), corporate debt (€271 billion), covered bonds (€289.4 billion) and securitisations (€28.4 billion). To this amount must be added the €1.017 trillion accumulated on the same date by the pandemic emergency purchase programme (PEPP). Purchases with data to the end of March were distributed between public debt (€893.8 billion), commercial paper (€12.7 billion), corporate bonds (€27 billion) and covered bonds (€4 billion).
[40] A portion of the purchases also takes place in the primary markets, more significantly in the case of purchases of corporate bonds and notes, which at the end of March 2021 represented 38.19% and 91.78% respectively of total purchases.
[41] The ECB reiterated in April that it would maintain the pace of the PEPP programme, at least throughout the second quarter of the year, at a *significantly higher* rate than the previous quarter and indicated that in its June meeting it would reassess the situation.

recovery takes hold. Even so, the ECB's forecasts point to a temporary increase in inflation this year, which would tend to dissipate over the course of 2022.[42]

- In this context, the yields on public debt of most European economies ended April moving away from their historical lows at the end of 2020 and with positive values of the 10-year rates, with negative values remaining only in Germany and the Netherlands. The increases so far this year range between 34 bp in Italy and 52 bp in Belgium, that of Spain being 43 bp. Specifically, Austria, Belgium, Finland, France and Ireland reach values close to zero or slightly positive; in Spain[43] and Portugal they are around half a percentage point, while in Italy and Greece they remain close to 1%.[44]

- In the case of corporate debt yields, slight increases are also observed in some sections of the curve,[45] which were somewhat more prominent in the case of those issues with the worst credit rating. Despite this, their yields are also kept low by the search for yield, which has significantly reduced the yield and risk premiums of those issues with the worst rating or a higher degree of subordination, due to the poor returns on risk-free assets.

- Although rates will be expected to remain at low levels for a relatively long term, the market risk of debt assets remains very high, exacerbated in the case of lower-rated high-yield corporate debt and subordinated debt, which do not have the direct support of the ECB's purchases and the liquidity of which is usually lower. The current context of deterioration in economic activity could have weakened the financial structure of some companies, so that a scenario of tightening financial conditions could translate into rises in the risk premiums required for these types of assets. Thus, any increase in interest rates would particularly affect companies with greater financial difficulties and greater leverage, which could find it difficult to obtain financing at a reasonable cost, but it could also spread to the most vulnerable economies and those with the greatest fiscal imbalances, which have strongly increased their debt levels to face the increase in public spending deriving from the pandemic.

  In the sphere of entities under the supervision of the CNMV, the risk of a possible rebound in risk premiums and, therefore, of a fall in asset prices is especially significant in the case of certain investment funds – especially fixed income funds – which, on occasions, may be exposed to assets that are illiquid,[46] complex and with credit ratings below investment grade. Furthermore, market risk increases significantly with exposure to assets with very long maturities, the prices of which are highly sensitive to adverse changes in the yields required of them.[47]

Credit risk: green

- Despite having the support of the ECB, sovereign risk premiums and risk premiums of Spanish private sector issuers have exhibited a mixed behaviour in recent months, with slight increases for the former and decreases for the latter, which are favoured by the prospects of a gradual recovery of economic activity. The sovereign risk premium, which

[42] According to the latest ECB forecasts, inflation will increase from 0.3% in 2020 to an average of 1.5% in 2021, showing a maximum of 2.0% in the fourth quarter of the year and a subsequent decline to 1.2% in 2022 and 1.4% in 2023.

[43] 10-year rates stood at 0.482% at the end of April, their highest level since the beginning of July 2020.

[44] With data to 21 May, yield increases ranged from 52 bps for Italy to 61 bps for Belgium. Only the yield of the German sovereign bond remained in negative territory, with that of the Spanish bond standing at 0.56%.

[45] Corporate debt presents greater dispersion in its yields depending on the type of asset (senior or subordinated debt), its credit rating and whether or not it is eligible for purchase by the ECB.

[46] The abundant purchases of corporate debt and some types of debt issued by financial institutions in both the primary and secondary markets by the ECB could be affecting the liquidity of those issues with smaller volumes or ownership of which is concentrated in a limited number of investors.

[47] For example, an upward variation of 50 bps in the required yield of a 10-year bond implies a decrease in its price of more than 4.5%.

had been declining progressively for much of the previous year, has halted its downward trend in a context in which a certain slowdown in central bank purchases in the second half of the year has been discounted and in which the financial vulnerabilities of economies with the largest public deficits and highest levels of debt increase. The value of the risk premium – measured as the difference between the yield on 10-year public debt in Spain[48] and Germany – ended April at 68 bp, 5 bp above the value at which it started the year (see Figure 11).

- Risk premiums in the sub-sectors of the economy maintained a downward trend, with the greatest decreases concentrated in financial institutions. In the case of the latter, although there are still some uncertainties that affect the development of their business,[49] the further decline in risk premiums is due both to the maintenance of support measures by the ECB[50] and to the improved prospects of economic recovery, which will allow a greater generation of income in the sector, while at the same time contributing to mitigate the foreseeable deterioration in non-performing loans. Risk premiums of non-financial companies reduced less markedly, since although they also benefit from the positive effect of the ECB' s purchase programmes,[51] they are suffering the deterioration of their businesses as a result of the crisis and the uncertainties about their future development. Thus, the average CDS of financial institutions at the end of April stood at 64 bp, below the figure of 78 bp at which they started the year, and the average CDS for non-financial companies stood at 56 bp, barely 3 bp below.

- The information on the credit ratings of the debt of the Spanish issuers corresponding to the first quarter of 2021 reveals that there is still no appreciable deterioration in their credit quality.[52] During the first months of the health crisis, these ratings suffered slight deterioration, which tended to stabilise later, and although there have been some downgrades of the ratings of certain issuers, these continue not to be generalised. Most Spanish debt continues to be high quality, investment grade (96.4% of the total outstanding balance, of which a large part corresponds to issues of the various public administrations). The proportion of investment grade debt in the notch prior to being considered high yield[53] remains small, but has increased slightly compared with previous quarters. In March of last year this represented 3.2% of the total outstanding debt and, subsequently, in June it increased to 4.4%, a value at which it remained until December. In the first quarter of 2021, this group of debt represented 5.2% of total debt, an increase that is explained by the deterioration in the credit rating of some issues of non-financial companies, although new issues assigned this rating were also registered, along with improvements in the credit quality of certain issues of financial institutions. For its part, high-yield debt represents 3.6% of the total outstanding, practically the same proportion as in 2020 (around 3.5%).

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[48] The ECB acquires Spanish public debt through its PSPP and PEPP asset purchase programmes, accumulating a balance of more than €401 billion, around 40% of the outstanding balance of long-term government debt.

[49] The most significant are the persistently low interest margin reduced as a consequence of the context of very low interest rates, and the foreseeable deterioration of the delinquency rate.

[50] They include both specific programmes for the purchase of assets issued by banks and various financing operations on favourable terms. The ECB, through its covered bond purchase programme (CBPP3) and the asset backed securities purchasing programme (ABSPP), had accumulated purchases up to the end of April of €289.41 billion and €28.44 billion respectively, of which more than 36% and 58% respectively were carried out in the primary market. At the end of April the ECB had also accumulated covered mortgage bonds for €4.06 billion, acquired under the PEPP programme. As regards financing operations on favourable terms, the various targeted long-term refinancing operations (TLTROs) and pandemic emergency longer-term refinancing operations (PELTRO) stand out.

[51] The ECB, through its corporate sector purchase programme (CSPP), which has been extended to all issuers that meet the conditions of the programme (minimum rating of BBB-), accumulated purchases for an amount until the end of April of €271.08 billion, of which more than 21% was acquired in the primary market. In addition, at the end of March it accumulated corporate bonds and commercial paper amounting to €27.06 billion and €12.77 billion respectively, acquired under the PEPP programme.

[52] In addition to the reviews in the ratings of the debt issues that are discussed in the main body, it should be noted that few companies (among them, OHL and Codere) have experienced a cut in their credit ratings in 2021 and others (Enagás and Energy) in their outlook.

[53] BBB- level for Fitch and S&P or Baa3 for Moody's.

Even so, some observations about the level of credit risk of Spanish issuers must be taken into account: i) the low level of risk premiums is largely explained by the effects of the ECB's purchase programmes, which place downward pressure on the size of the premiums of all issuers in the euro area that are the subject of these purchases; ii) the risk premiums of high-yield issuers not included in the above programmes are indirectly reduced by investors' search for yield in the absence of profitable alternatives with little risk; iii) the ratings and risk premiums analysed correspond mostly to large and medium-sized companies that have either been less affected by the current crisis, or have greater financial strength to face it. On the other hand, the measures adopted by the authorities such as public guarantees, moratoriums or direct aid have so far prevented a considerable increase in company insolvencies, but it is likely that the financial problems of many of them will worsen in the near future as the measures are phased out. In this regard, we see increasing credit risk in the coming months that may lead to financial restructuring processes, especially in smaller companies or those belonging to the sectors most affected by the pandemic.

- Financing to non-financial sectors[54] of the economy continued to expand as a whole, the slower rate of expansion of financing to companies being offset by a less pronounced slowdown in lending to households, despite which it marked a whole year of declines. In this latter case, its value fell by 0.5% in March (-0.6% at the beginning of the year), due to the lesser slowdown in credit for home purchases (from -1.1% in December to -0.6% in March), which was enough to offset the drop in consumer credit (from 0.6% in December to -0.1% in March, its biggest drop since 2015). In the case of non-financial companies, total financing showed high amounts in aggregate terms, although there was a certain slowdown in growth (from 6.1% in December to 5.6% in March), which is explained by lower growth in credit to companies (5.6% in March, its slowest growth rate since September). This trend is consistent with the latest data available from the Bank Lending Survey, which indicates that banks are tightening the criteria for granting credit to smaller companies. Other means of financing for non-financial companies saw increased growth rates: financing via debt issues increased by 11.9% (its highest rate since February 2020) and foreign loans increased by 2.5% in March (2.2% in December).

Liquidity, financing and fragmentation risk: yellow

- Fixed income issues registered with the CNMV up until April totalled €28.44 billion, 14.7% less than in the same period of 2020; prominent among them were two SAREB bond issues for €9.47 billion and one issue of internationalisation bonds for €823 million. Also notable were the increase in issues of securitisation bonds, which are favoured by the use of this instrument as collateral in ECB financing operations, and the decline in issues of covered bonds, which are limited by the outstanding balance of mortgage loans.[55] Issues of Spanish companies abroad also grew by 14% annually in the first quarter, reaching €31.2 billion, once again exceeding the issues registered with the CNMV.[56] Meanwhile the equity markets welcomed two new entrants, insurer Línea Directa by means of a listing process and renewable energy company Grupo Ecoener[57] by means of a public subscription offering (OPS); the market expects similar operations from other companies in the same sector such as Opdenergy during 2021.

[54] Source: Bank of Spain economic indicators.
[55] The outstanding balance of mortgage loans stood at €511.58 billion in March, a level similar to that at the end of 2020, a year of declining trend.
[56] In 2020, issues registered with the CNMV exceeded those registered abroad, so the trend observed in 2019 was reversed.
[57] Línea Directa and Grupo Ecoener went public on 29 April and 4 May respectively.

- The financing requirement of the Spanish economy reached €1.4 billion in February,[58] compared with the financing capacity of €1.8 billion registered in the same period of 2020. The sharp deterioration in the balance of tourism and the balance of primary and secondary income led the Spanish economy to register a need for financing in this month, although in 12-month cumulative terms it shows a financing capacity of €9.2 billion, far below the €31.4 billion reached in the same month of 2020. Capital outflows[59] amounted to €7.8 billion in February, while the net balance of the financial account in cumulative 12-month terms was €110 billion.

- Household deposits grew by 7.1% year-on-year in March to stand at €923.04 billion, their highest value in the historical series, while those of non-financial companies grew by 10.9% to €291.22 billion, also very close to their all-time highs.[60] Households (whose deposits grew every month last year except in August) and companies are both continuing to accumulate liquidity in deposits (between them, €110.56 billion more from the end of February 2020 to the end of March 2021) in order to meet the extraordinary needs that could arise in a near future[61] characterised by lower economic activity and higher unemployment and uncertainty about future income,[62] added to which is the lack of any profitable low-risk investment alternatives.

- In the first four months of the year, average daily trading on the continuous market[63] was €1.46 billion, 22.6% less than in the same period of 2020 and also below the average (€1.65 billion). The decline in daily trading continued throughout the quarter in a context of moderate volatility. The decline in daily trading on the continuous market can be attributed in part to the decline in volatility, which discourages some forms of trading such as algorithmic or high-frequency trading, as well as to increased competition from other markets and rival trading venues.

- Market fragmentation reached a new all-time high in the first quarter in a context of moderate volatility,[64] with trading of Spanish shares on venues other than the market of origin representing 48.4% of trading subject to market rules (lit plus dark). Preliminary data for April show a partial reversal of this trend, accompanied by a decline in trading volumes. These trading venues have shown a slightly increasing trend in their market share for some time due to the high level of competition they exercise, a trend that is accentuated at times of greater volatility and which could also increase with the introduction in January of the Financial Transaction Tax, the effect of which is still uncertain. On the other hand, trading in Spanish shares carried out through systematic internalisers – and, therefore, outside the scope of the trading venues – presented a significant decline, to less than 7.5% of total trading[65] so far this year, which represents around half, in relative terms, of the proportion usually traded in this way, which had remained relatively stable at around 15% of the total during 2020.

[58] According to Bank of Spain monthly advance balance of payments data.
[59] The data reflect the financial account excluding the Bank of Spain.
[60] Deposits of non-financial companies reached their all-time high in September 2020, when they stood at €296.29 billion, similar levels to those reached in December of the same year.
[61] Part of the increase in household savings is related to the impossibility of making some consumption decisions in the harshest moments of the pandemic as a result of the restrictions imposed.
[62] According to data from the National Institute of Statistics (INE), the savings rate of Spanish households stood at 19% of their disposable income in the fourth quarter of 2020. See more information under the heading "Macroeconomic environment".
[63] In the first quarter of the year, it came to €1.47 billion, the lowest volume for that quarter in recent years, representing a year-on-year decline of 26.5%.
[64] This trend and its all-time high occurred in a context of gradual moderation in volatility, which discourages algorithmic and high-frequency trading operations, most of which take place on trading venues other than the home market.
[65] Total trading defined in this context as the sum of trading subject to non-discretionary market rules and trading carried out through systematic internalisers.

- The Ibex 35 liquidity indicator (measured by the bid-ask price differential), which had progressively improved since the second half of 2020, continued to show further progress, although its values are still lightly higher than those existing before the start of the crisis. The advances in the liquidity indicator are favoured by the decrease in volatility levels, but they continue to be weighed down by the fall in volumes traded. In the case of the sovereign bond, the spread held relatively steady[66] throughout the period thanks to the intensity of the ECB' s purchases, which increased market liquidity. Although the range is very small in absolute terms (less than 1 bp) and has contracted in relative terms, it continues to be significant in the current environment of such low interest rates (see Figure 15).

- Interest rate spreads between loans to Spanish companies and those to companies in the euro area as a whole evolved unevenly, narrowing on loans of less than €1 million and widening on those of more. The spread on the former returned to negative values in March (-2 bp, from 0 bp in December), while that of the latter increased to 15 bp. (from 7 bp in December), bringing it to its highest level in the past six months. The Bank Lending Survey for the first quarter of the year shows that there has once again been a slight contraction in the supply of credit in almost all segments, both in Spain and in the euro area as a whole, due to the increase in the risks perceived by financial institutions, in a context of uncertainty about the economic situation and the solvency of some borrowers. In parallel, there has also been a further decline in the demand for credit, more significant in Spain. Apart from this, banks have apparently tightened their lending criteria in all segments of financing to companies and households in the consumer branch, while relaxing them for home purchase loans. Also, in the euro area as a whole the tightening of lending criteria apparently affected both large companies and SMEs, whereas in Spain it was relevant only in the case of the latter. In addition, financial institutions indicated that the expansionary monetary policy measures adopted by the ECB would had favoured relaxation of the conditions applied to new loans and an increase in the volumes of credit granted.

Risk of contagion: orange

- The correlation among the daily returns on the different types of Spanish assets continues to decline progressively from the highs recorded in March of last year (when the median of these correlations reached 0.75), although it remains at levels higher than those observed before the onset of the pandemic. This value had fallen to 0.23 at the end of April, lower than that registered at the end of January (0.32) and than the average for 2020 as a whole (0.42). The minimum values of these correlations have also decreased compared with the beginning of the year and are at levels close to those registered before the beginning of the COVID-19 crisis (-0.41 at the end of April), as are the maximum values, which in January were close to 0.60 and at the end of April had decreased to 0.53. The continuation of the current downward trend is the result of a slight decrease in the uncertainty associated with the health crisis, which has resulted in a significant fall in the correlation between certain equity sectors (with rising prices, such as financials) and those of public debt (with rising yields and falling prices). There has also been a significant decrease in correlation between some equity sectors whose prices have evolved unevenly (for example, between the financial sector and utilities). It should be

[66] The spread has held steady in absolute terms, although it has narrowed in relative terms thanks to the increase in interest rates. Even so, it is conditioned by the transaction costs of agents, which are still very significant in an environment of low interest rates.

noted that higher levels of correlation increase the chances of contagion among different types of assets and hinder the diversification of portfolios.

- With regard to movements in European public debt assets, an increase in the already high level of correlation between the performance of these assets has been observed since the end of January. In particular, the correlation between the yield on the Spanish sovereign bond and that of the core EU countries, which had decreased in the first weeks of the year to 0.71, increased and has remained stable since mid-February at around 0.97. This increase is especially driven by the increase in correlation between the yield of the Spanish sovereign bond and that of the German and Dutch bonds. Similarly, the correlation between the yield on the Spanish sovereign bond and that of other peripheral euro area countries also showed an uptick relative to the end of January (see Figure 32). Thus, this indicator went from 0.77 to 0.87 at the end of April, albeit with some fluctuations due to the evolution of the partial correlation indicator between the Spanish and Greek bonds.

Market risk: yellow

Figure 3: Stock market prices

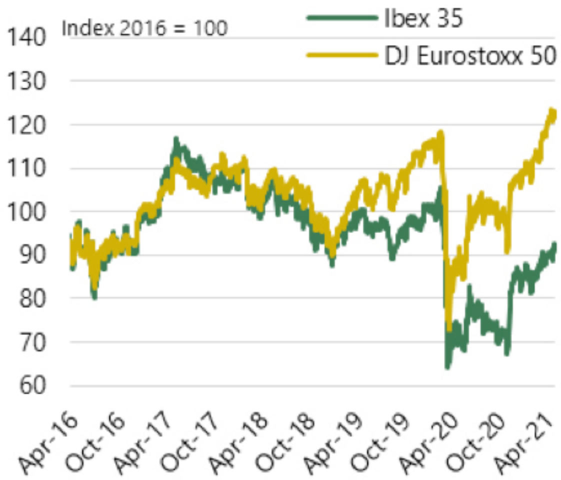
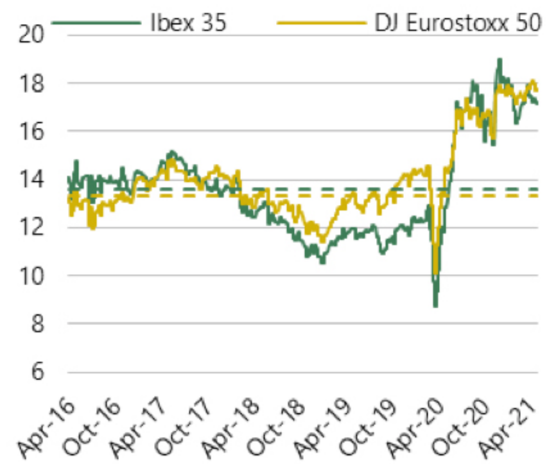


Figure 4: Price-earnings (P/E) ratio



The dashed lines correspond to the average P/E ratio calculated since 2000.

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

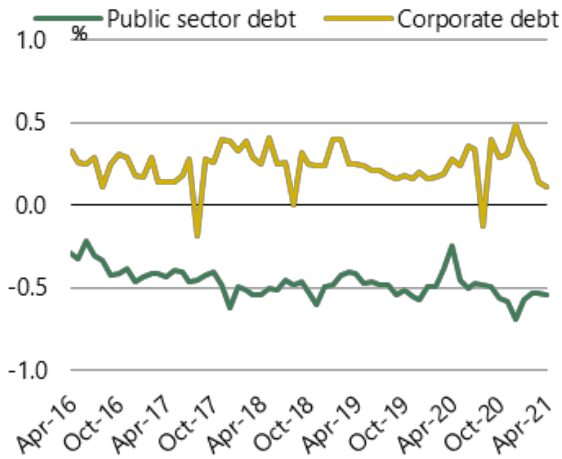


Figure 6: Long-term interest rates (10 years)

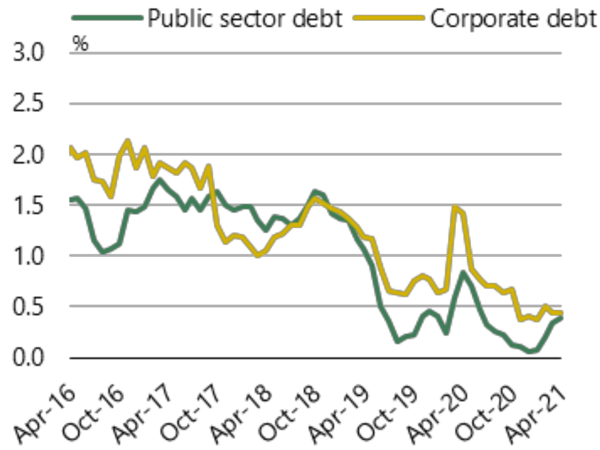
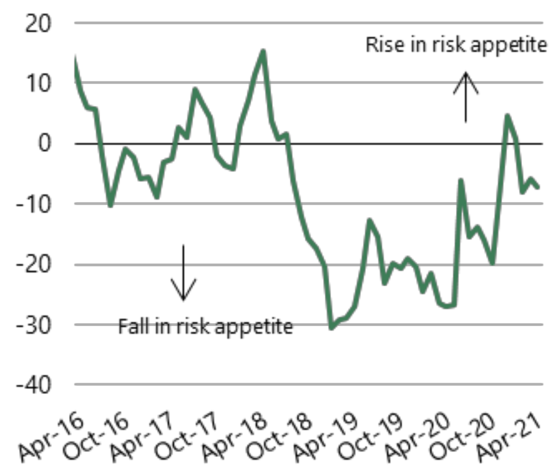


Figure 7: Oil prices

Figure 8: Risk appetite (State Street)



Credit risk: green

Figure 9: Financing of the non-financial sector

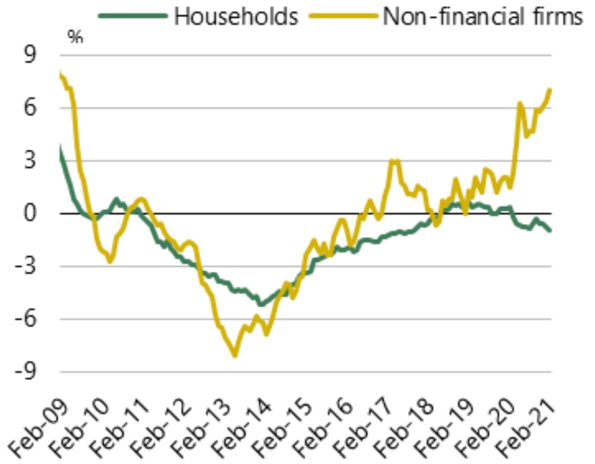


Figure 10: NPL (delinquency) ratio and unemployment rate

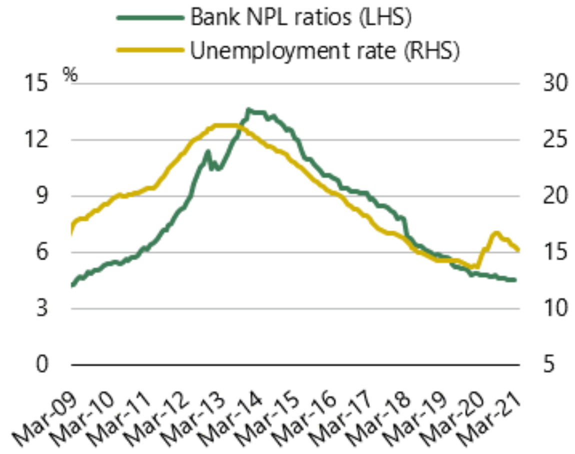


Figure 11: 10-year government debt risk premium (rate differential with Germany)

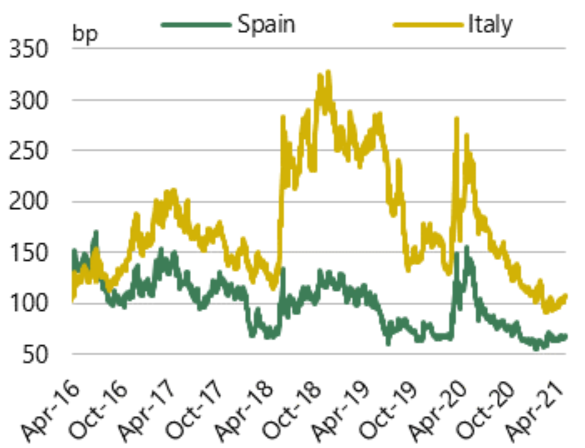


Figure 12: Private debt risk premium (5-year CDS)

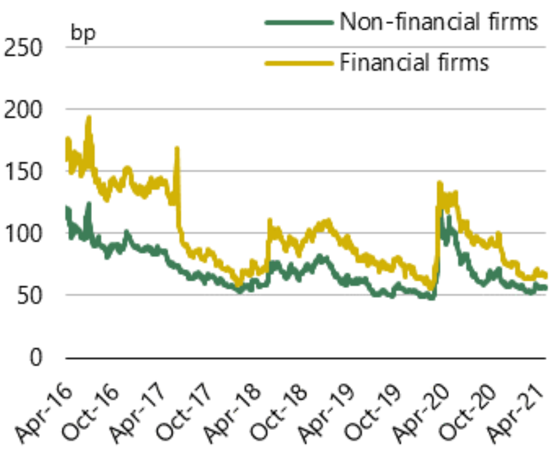


Figure 13: Housing prices (year-on-year change)

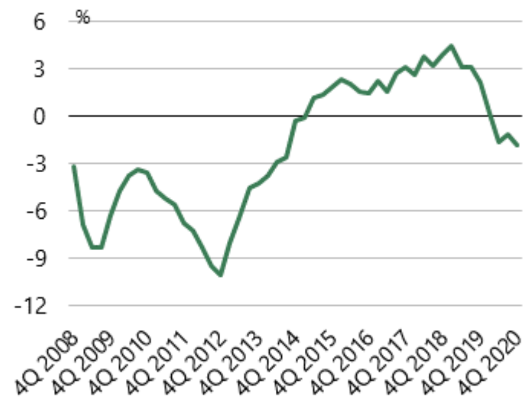
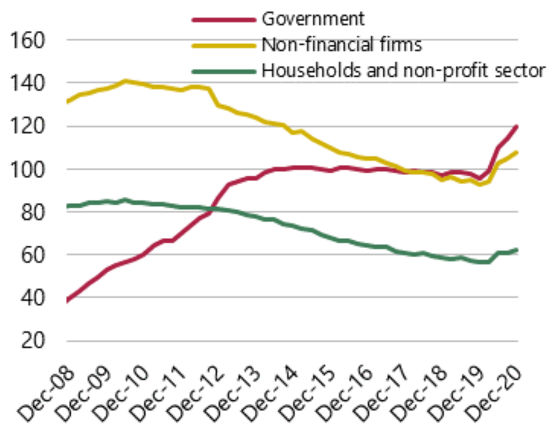
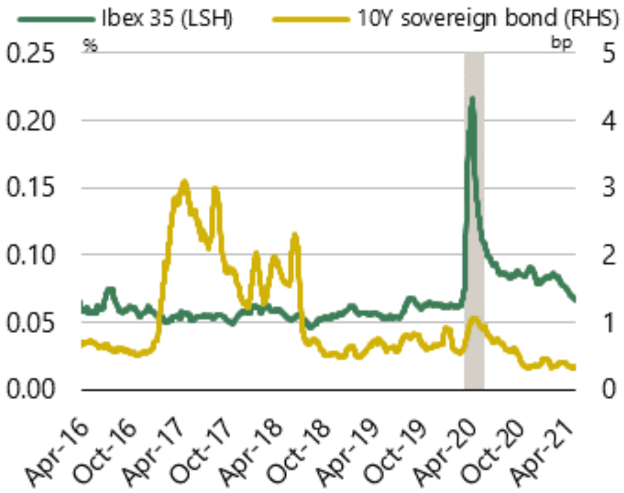


Figure 14: Indebtedness (% GDP)



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 (1-month moving average)

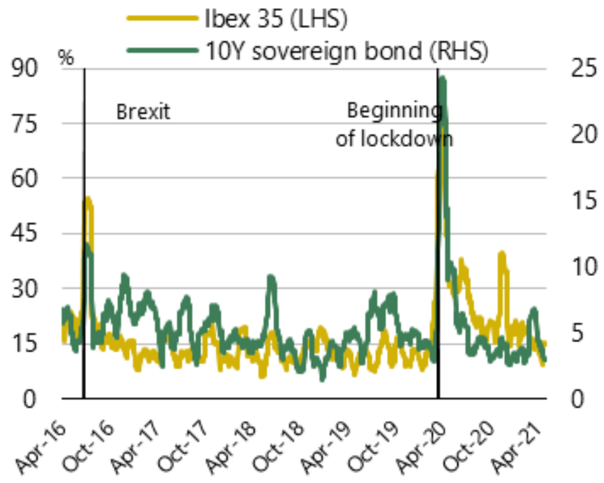


Figure 17: SIBE trading (1-month moving average)

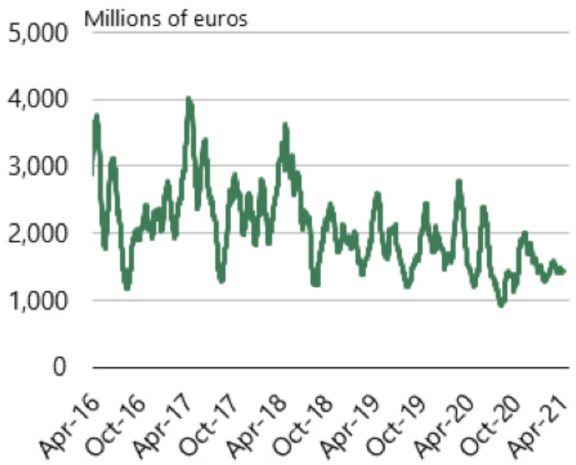


Figure 18: Interbank spread (LIBOR-OIS)

Figure 19: Spread (Spain-EMU) on corporate lending rates

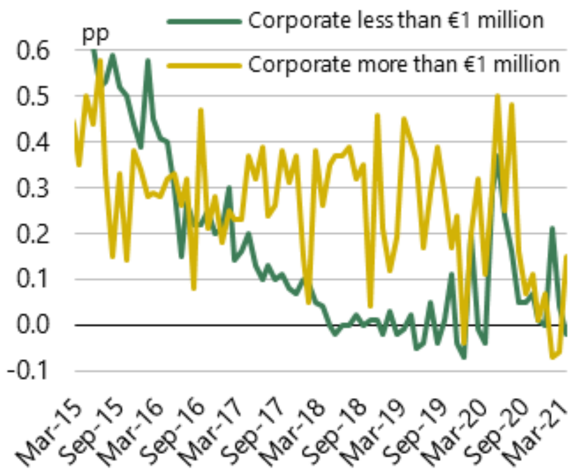
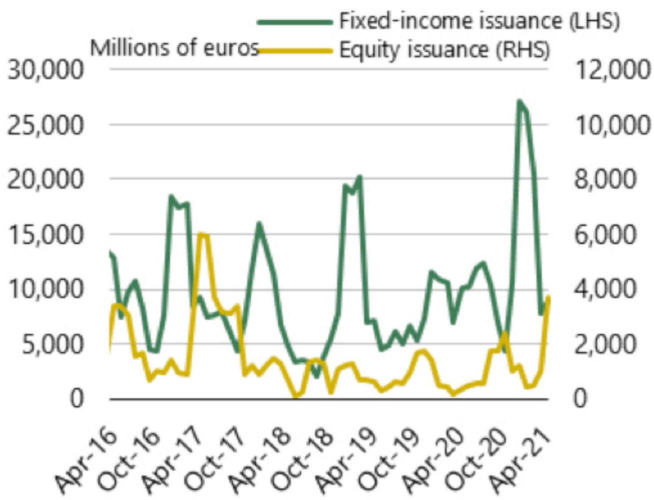


Figure 20: Issues (3-month moving average)



Macroeconomic risk: red

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

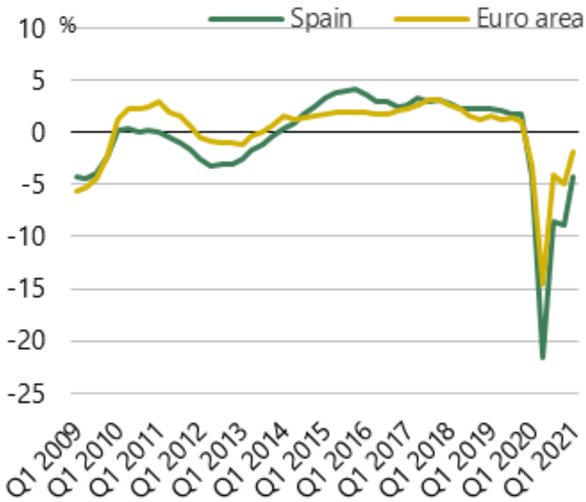


Figure 22: HCPI and core CPI (year-on-year change)

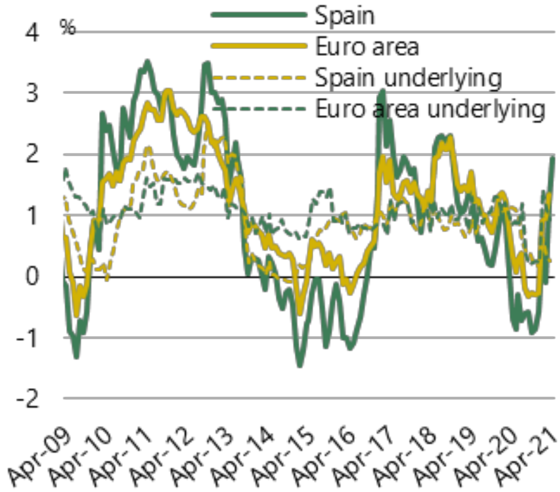


Figure 23: Employment (year-on-year change)

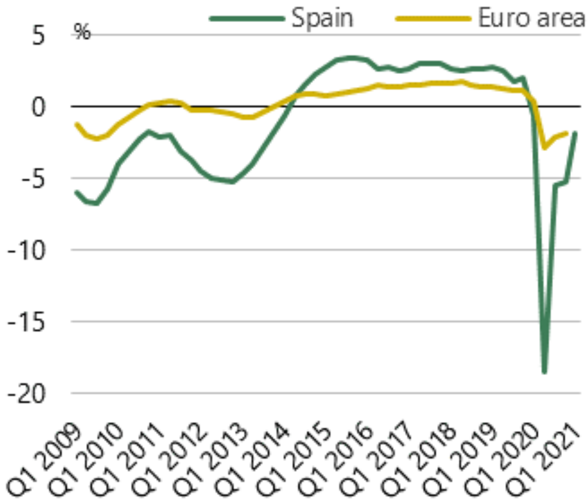
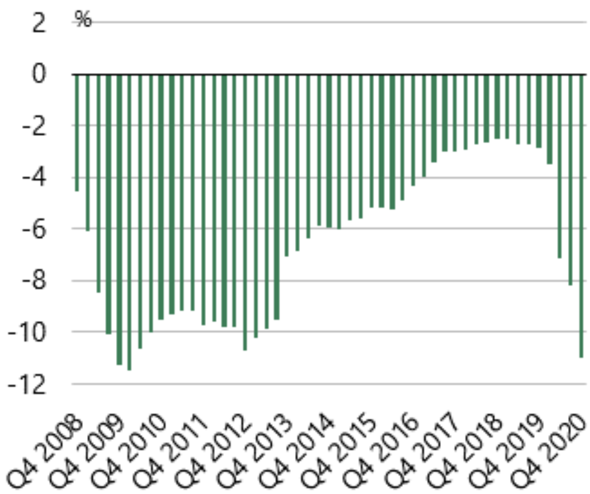


Figure 24: Public deficit (% GDP)



Cumulative data for four quarters.

Figure 25: Exchange rates

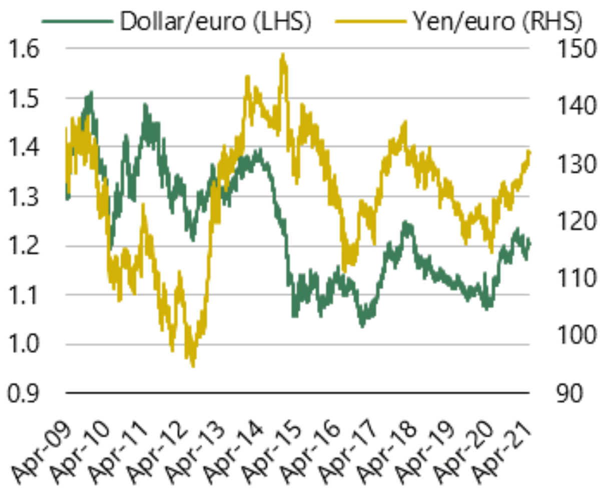
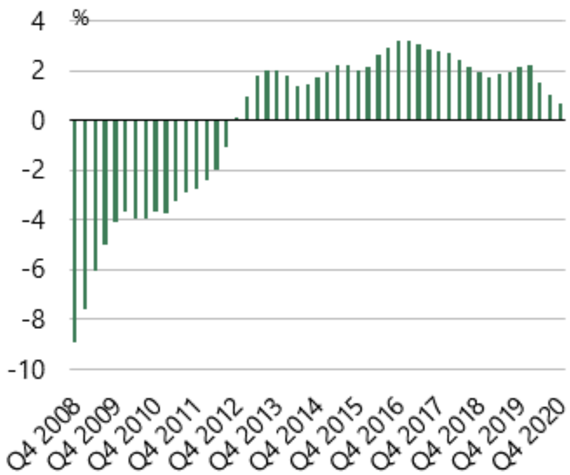
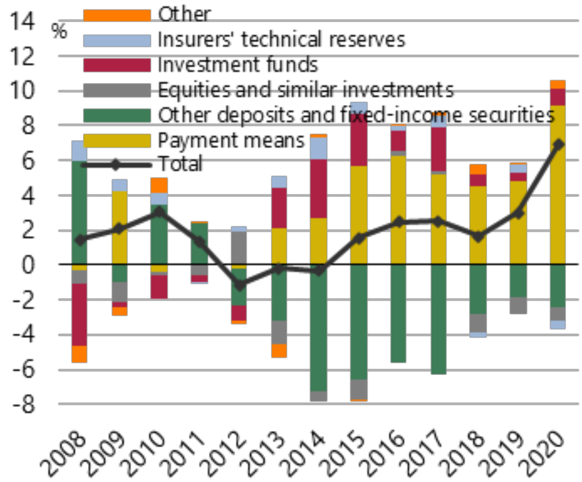


Figure 26: Current account balance (% GDP)



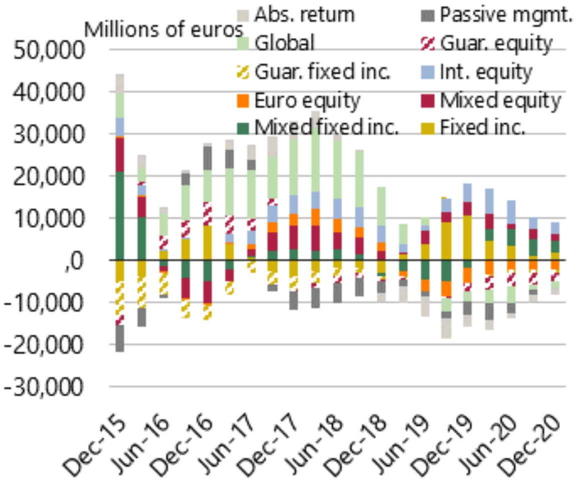
Investors

Figure 27: Households: net acquisition of financial assets (% GDP)



Cumulative data for four quarters.

Figure 28: Net subscriptions to investment funds



Cumulative data for four quarters (millions of euros).

Figure 29: Households: savings (% disposable income)

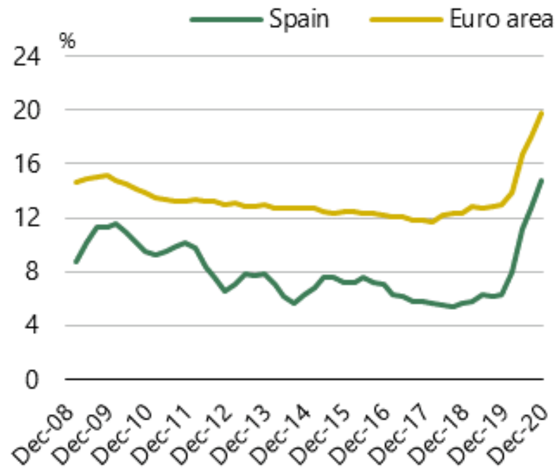
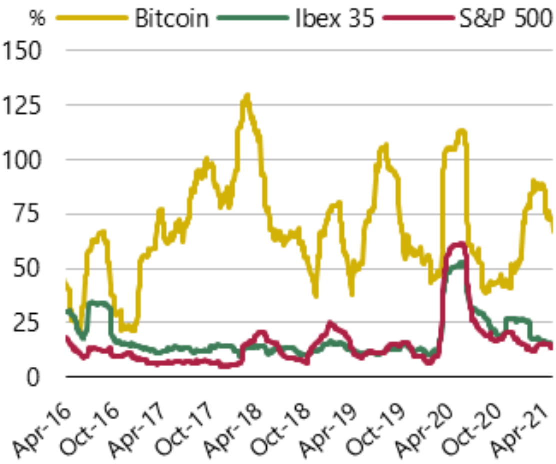


Figure 30: Bitcoin volatility



Risk of contagion: orange

Figure 31: Correlations among asset classes

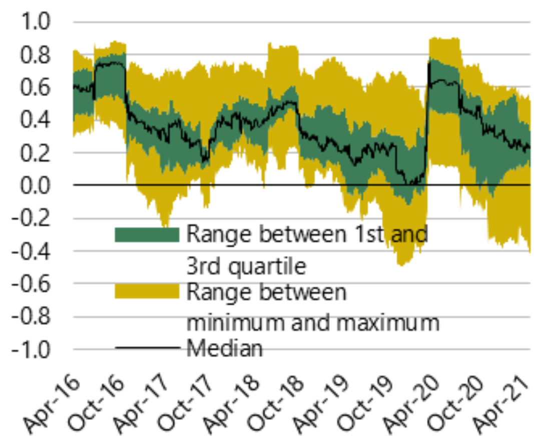
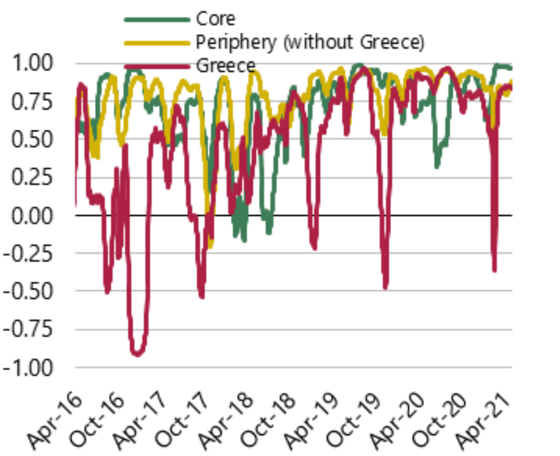
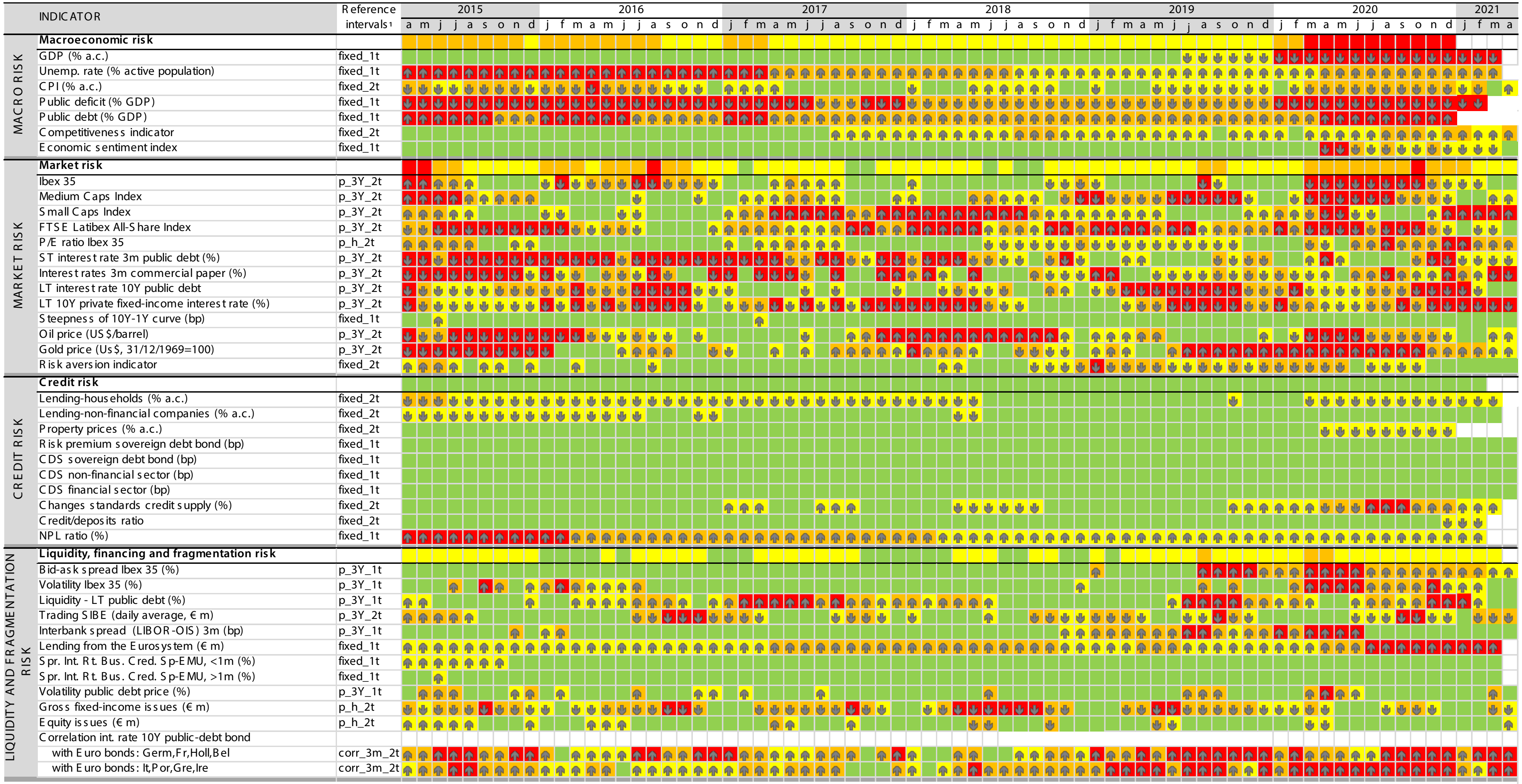


Figure 32: Correlation between the yield on Spanish and other European 10-year bonds



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. Source: CNMV, Bloomberg and Thomson Datastream. (2) Data until 15 July.

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 (equities, 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 indicators), 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,* Vol. 14, No. 1 pp. 23-41 or as CNMV Working Document No. 60 available at: http://www.cnmv.es/DocPortal/Publicaciones/MONOGRAFIAS/Monografia_60_en.pdf.

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 includes 43 indicators,[67] 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 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 detail on the methodology and analysis of these maps, see Cambón, M.I. (2015). "Identification of vulnerabilities in the Spanish financial system: an application of heat maps". *CNMV Bulletin*, Quarter I, pp. 109-121.

[67] Since June 2017, the heat map has included an additional indicator: the bid-ask spread of the 10-year sovereign debt bond.

Bitcoin historical volatility (Figure 30): Annualised standard deviation of daily price variations in 90-day windows.

Risk of contagion: The indicators that make up this block are of somewhat higher 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 other European 10-year bonds (Figure 32). The correlation is calculated using daily data in three-month windows. The countries of the core group are Germany, France, the Netherlands and Belgium and the peripheral countries are Portugal, Italy, Greece and Ireland.