MR07

MONTHLY REPORT • ECONOMIC AND FINANCIAL MARKET OUTLOOK

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ECONOMIC & FINANCIAL ENVIRONMENT

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CaixaBank Research

MONTHLY REPORT - ECONOMIC AND FINANCIAL MARKET OUTLOOK
July-August 2019

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CaixaBank Research
www.caixabankresearch.com
research@caixabank.com
Enric Fernández
Chief Economist
Oriol Aspachs
Director of the Research Department
Sandra Jódar
Director of Banking Strategy

BPI Research (UEEF)
www.bancobpi.pt /
http://www.bancobpi.pt/grupo-bpi/estudos-e-mercados/mercados-financeiros
deef@bancobpi.pt
Paula Carvalho
Chief Economist

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Technology and progress

Technological change lies at the root of the economic and social progress we have experienced since the first industrial revolution. Yet despite this, the current technological revolution, in addition to fascination, does not cease to generate anxiety. Joseph Schumpeter stated that «in a capitalist society, economic progress implies disorder», and we know that disorder, among humans, leads to unrest. This is why the progress of the past few centuries has been accompanied by the development of public institutions and policies that, to a certain extent, have allowed this disorder to be redirected or governed. The great challenge lies in adapting these institutions and policies to the changes that are currently taking place.

One of the key elements for ensuring that technological change can bring prosperity for the vast majority of the population is the educational system. Besides reaching specific technical knowledge, above all this system must teach people how to learn. To this end, skills such as critical thinking, communication skills and teamwork are important, as are values such as hard work, creativity, rigour, collaboration, honesty and diversity. It is good that various teaching models currently coexist that are moving in this direction, in order to learn best practices from them and extend them across the system as a whole.

Public policies must also take into consideration the effects of technological change on employment and wages. Change produces winners, but also losers. The challenge lies in compensating the latter so that the differences between one and the other are not too marked and so that no groups of the population are excluded from the train of progress.

In this context, active labour market policies, which facilitate the reallocation of labour, must play an increasingly important role. For those workers on the lowest incomes, an optimal mix must be found between a minimum wage policy, a negative tax rate on low incomes (to supplement their income) and a housing policy that facilitates access at a reasonable cost. In the labour market, it is also necessary to clarify the status of new forms of labour relations, such as between technology platforms and those who offer their services through them. Legal security is an essential ingredient for promoting new technologies and new business models.

Other policies can also help to promote the adoption of new technologies and, in this way, increase the productivity of the economy as a whole. For companies, for example, the degree of flexibility to reorganise their operations and to redefine their different job positions is particularly important, and these are aspects that depend, in part, on the legal framework. There are also regulations that penalise companies that reach a certain size, which ends up preventing many of them from acquiring an adequate scale to invest in new technologies and to get the most out of them. Finally, policies that encourage competition can also serve as a catalyst for innovation, both in terms of reducing the number of sectors protected by regulations and through measures that prevent technology giants from abusing positions of dominance.

The nature of the progress generated by technological change will also depend on whether we use it responsibly. In this regard, the legal framework that we define will constrain certain uses which, as a society, we consider undesirable. But beyond what these formal standards might dictate, business ethics – the conduct of business owners, managers and employees – will be of even greater importance. In the field of data, for instance, there will be companies that adopt business models based on responsible and transparent use of their clients' data, while others will not. Corporate social responsibility is therefore key for combining technological change and economic progress.

Given the date of this edition, I will sign off by wishing you all the best for the holiday season and hoping that you enjoy a good read. When you do so, remember Gutenberg, the father of one of the most influential technologies for the history of mankind.

Enric Fernández
Chief Economist
30 June 2019

Chronology

JUNE 2019

7 Theresa May resigns as leader of the Conservative Party in the United Kingdom and remains as interim prime minister until a new leader is chosen at the end of July.
30 Donald Trump and Xi Jinping agree to resume trade negotiations between the US and China following their meeting at the G-20 summit.

APRIL 2019

10 The EU delays Brexit until 31 October 2019.
28 General elections are held in Spain.

FEBRUARY 2019

28 The US suspends the tariff increase on imports of products from China, which was due to come into force on 1 March.

MAY 2019

10 The US implements the tariff hike from 10% to 25% on 200 billion dollars of imports from China (previously suspended in late February). In response, China announced that it will raise tariffs on 60 billion dollars of imports from the US.
23-26 European Parliament elections are held.

MARCH 2019

7 The ECB announces a new round of targeted longer-term refinancing operations (TLTRO), due to begin in September.
15 The rating agency S&P improves Portugal's credit rating from BBB– to BBB.
21 The EU delays Brexit until 12 April 2019.

JANUARY 2019

15 The UK Parliament rejects the withdrawal agreement signed between the Government and the EU by 432 votes to 202.
25 The longest partial government shutdown in US history comes to an end after 35 days.

Agenda

JULY 2019

2 Spain: registration with Social Security and registered unemployment (June).
4 Portugal: Portuguese banking system.
10 Portugal: international trade (May).
15 Spain: financial accounts (Q1).
19 Portugal: coincident indicators (June).
22 Spain: loans, deposits and NPL ratio (May).
25 Spain: labour force survey (Q2).
Governing Council of the European Central Bank meeting.
26 US: GDP (Q2).
29 Spain: CPI flash estimate (July).
30 Spain: state budget execution (June).
Portugal: employment and unemployment (June).
Euro area: economic sentiment index (July).
30-31 Federal Open Market Committee meeting.
31 Spain: GDP flash estimate (Q2).
Portugal: CPI flash estimate (July).
Euro area: GDP (Q2).

AUGUST 2019

2 Spain: registration with Social Security and registered unemployment (July).
7 Portugal: international trade (June).
9 Japan: GDP (Q2).
Portugal: international trade (June).
14 Portugal: GDP flash estimate (Q2).
21 Spain: foreign trade (June).
22 Spain: loans, deposits and NPL ratio (June).
27 Portugal: Portuguese budget execution (July).
29 Spain: CPI flash estimate (August).
Portugal: employment and unemployment (July).
Euro area: economic sentiment index (August).
30 Portugal: CPI flash estimate (August).
GDP of Portugal (Q2).

The question marks over the global economic outlook

Moderation in growth and persistent uncertainty: for how much longer? In recent quarters, there has been a moderation in global growth. This has been partly driven by expected factors, such as the fading of the fiscal boost in the US and China's transition towards more sustainable growth rates. It has also partly been driven by other, more troubling factors, such as the rise of uncertainty in the geopolitical environment and vulnerabilities in some emerging economies, as well as the difficulties currently being faced by some industrial sectors and by the automotive sector in particular. Against the onslaught of these uncertainties, global economic activity has stood up reasonably well, with a slight moderation in growth in the year to date and resilience in the services sector. Nevertheless, notwithstanding the support for short-term economic sentiment that could be offered by the resumption of trade negotiations between the US and China, the roots of the uncertainty run deep and are likely to persist in the medium term.

Financial markets, decoupling or in a sweet spot? In this environment of heightened uncertainty, prices of financial assets have proven to be more sensitive to political statements, to certain unfavourable economic figures and, of course, to the messages of the central banks. Thus, so far this year there have been successions of periods of optimism and episodes of risk aversion and volatility. All in all, the semester has produced two clear trends: a sustained rise in the stock markets (the main indices have amassed gains slightly above 15%, with the US stock market beating its all-time highs) and an astonishing sinking of interest rates (10-year sovereign bond yields in the US and Germany have fallen by between 60 and 70 bps, reaching a level not seen since 2016 in the first case, and reaching an all-time low of –0.3% in the second). These two trends, although clear, could hide contradictions, since stock market gains tend to be supported by a favourable economic outlook, whereas the low interest rates point towards expectations of more accommodative monetary policy (which, in turn, would reflect the need to tackle a deterioration in the economic environment). One possible explanation to reconcile these two trends is that investors expect monetary policy to hit a sweet spot that sustains the expansion. But this leads us to the next question.

How far will the central banks go? After pausing the tightening of their monetary policies at the beginning of the year, both the Fed and the ECB have ended up doing a U-turn by signalling that, in the coming months, they will once again implement expansionary measures. Thus, the prices of financial assets assign a high probability of the Fed cutting interest rates in July and of the ECB doing the same in September. Although these expectations tie in reasonably well with the clues given by both central banks, the market prices go further and indicate that the monetary easing will be more significant in what remains of 2019 and throughout 2020. Nevertheless, the Fed and the ECB accompanied their accommodative messages by reiterating that, as the economic activity indicators also suggest, the economic outlook for the US and the euro area remains favourable, especially in the medium term. So, a more balanced reading of the U-turn by the central banks suggests that they are seeking to take preventive measures in order to fight the escalation of risks, rather than preparing for a new cycle of expansionary monetary policy (as the movements of the financial markets might indicate).

Spain and Portugal, from the periphery to the core? The Spanish and Portuguese economies have weathered the slowdown in the global economy better than their partners. Whereas in Q1 the euro area as a whole grew by 1.2% year-on-year, GDP growth in Spain and Portugal stood at 2.4% and 1.8%, respectively. In addition, they continue to perform well and the indicators suggest similar levels of growth for Q2. In the financial markets, Spain and Portugal's good macroeconomic performance has resulted in a significant reduction in their risk premiums (of approximately –45 and –70 bps in the semester as a whole, respectively), narrowing the gap between their sovereign yields and those of the core euro area economies. In both cases, however, there is still a long way to go. In contrast with the strong performance of domestic demand, which is well supported by the buoyancy of both labour markets, in recent months we have witnessed a loss of steam in the foreign sector, which has been moderate in Spain and somewhat more accentuated in the case of Portugal (intensified by investment, which has driven up imports). Furthermore, both economies should take advantage of their cyclical performance to continue the correction of the public deficit that allowed them to exit the excessive deficit procedure (Portugal in 2017 and Spain in 2019) and to continue to reduce their public debt ratios, which remain very high.

Average for the last month in the period, unless otherwise specified

Financial markets

	Average 2000-2007	Average 2008-2016	2017	2018	2019	2020	2021
INTEREST RATES							
Dollar							
Fed funds (upper limit)	3.43	0.48	1.50	2.50	2.50	2.50	2.25
3-month Libor	3.62	0.70	1.61	2.79	2.60	2.55	2.40
12-month Libor	3.86	1.20	2.05	3.08	2.65	2.60	2.55
2-year government bonds	3.70	0.73	1.84	2.68	2.30	2.40	2.50
10-year government bonds	4.70	2.61	2.41	2.83	2.55	2.65	2.70
Euro							
ECB depo	2.05	0.40	–0.40	–0.40	–0.40	–0.25	0.00
ECB refi	3.05	1.00	0.00	0.00	0.00	0.25	0.50
Eonia	3.12	0.65	–0.34	–0.36	–0.35	–0.20	0.15
1-month Euribor	3.18	0.79	–0.37	–0.37	–0.33	–0.18	0.18
3-month Euribor	3.24	0.98	–0.33	–0.31	–0.32	–0.15	0.20
6-month Euribor	3.29	1.14	–0.27	–0.24	–0.25	–0.05	0.35
12-month Euribor	3.40	1.34	–0.19	–0.13	–0.17	0.05	0.50
Germany							
2-year government bonds	3.41	0.69	–0.69	–0.60	–0.40	–0.10	0.35
10-year government bonds	4.30	1.98	0.35	0.25	0.30	0.67	1.20
Spain							
3-year government bonds	3.62	2.30	–0.04	–0.02	–0.14	0.17	0.64
5-year government bonds	3.91	2.85	0.31	0.36	0.25	0.53	1.00
10-year government bonds	4.42	3.82	1.46	1.42	1.30	1.47	1.90
Risk premium	11	184	110	117	100	80	70
Portugal							
3-year government bonds	3.68	4.42	–0.05	–0.18	0.13	0.56	1.22
5-year government bonds	3.96	5.03	0.46	0.47	0.78	1.15	1.72
10-year government bonds	4.49	5.60	1.84	1.72	1.45	1.82	2.35
Risk premium	19	362	149	147	115	115	115
EXCHANGE RATES							
EUR/USD (dollars per euro)	1.13	1.30	1.18	1.14	1.15	1.19	1.23
EUR/JPY (yen per euro)	129.50	126.36	133.70	127.89	124.95	126.14	130.38
USD/JPY (yen per dollar)	115.34	97.50	113.02	112.38	108.65	106.00	106.00
EUR/GBP (pounds per euro)	0.66	0.83	0.88	0.90	0.88	0.87	0.86
USD/GBP (pounds per dollar)	0.59	0.63	0.75	0.79	0.77	0.73	0.70
OIL PRICE							
Brent ($/barrel)	42.3	85.6	64.1	57.7	70.0	66.0	63.0
Brent (euros/barrel)	36.4	64.8	54.2	50.7	60.9	55.5	51.2

Forecasts

Percentage change versus the same period of the previous year, unless otherwise indicated

International economy

	Average 2000-2007	Average 2008-2016	2017	2018	2019	2020	2021
GDP GROWTH							
Global	4.5	3.3	3.8	3.6	3.2	3.4	3.4
Developed countries	*2.7*	*1.2*	*2.4*	*2.2*	*1.9*	*1.7*	*1.6*
United States	2.7	1.4	2.2	2.9	2.4	1.7	1.7
Euro area	2.3	0.4	2.5	1.9	1.3	1.5	1.4
Germany	1.6	1.1	2.5	1.5	0.8	1.4	1.6
France	2.0	0.6	2.3	1.6	1.4	1.5	1.5
Italy	1.5	–0.7	1.8	0.7	0.4	0.8	0.7
Portugal	1.5	–0.4	2.8	2.1	1.8	1.7	1.7
Spain	3.8	0.0	3.0	2.6	2.3	1.9	1.7
Japan	1.5	0.4	1.9	0.8	1.0	0.7	0.8
United Kingdom	2.8	1.0	1.8	1.4	1.5	1.5	1.5
Emerging countries	*6.5*	*5.2*	*4.8*	*4.5*	*4.1*	*4.6*	*4.6*
China	11.7	8.4	6.9	6.6	6.2	6.0	5.8
India	9.7	6.9	6.9	7.4	6.4	6.2	6.0
Indonesia	5.5	5.7	5.1	5.2	4.9	4.8	5.9
Brazil	3.6	1.7	1.1	1.1	1.2	1.8	2.1
Mexico	2.4	2.1	2.1	2.0	1.6	2.1	2.5
Chile	5.0	3.2	1.3	4.0	3.2	3.0	2.8
Russia	7.2	1.0	1.6	2.2	1.2	1.9	1.8
Turkey	5.4	4.8	7.3	2.9	–2.5	2.3	3.0
Poland	4.0	3.2	4.9	5.2	3.7	2.9	2.4
South Africa	4.4	1.8	1.5	0.7	0.5	1.8	1.9
INFLATION							
Global	4.2	3.8	3.2	3.6	3.5	3.5	3.4
Developed countries	*2.1*	*1.5*	*1.7*	*2.0*	*1.5*	*1.7*	*1.8*
United States	2.8	1.6	2.1	2.4	1.8	2.0	1.8
Euro area	2.1	1.4	1.5	1.8	1.3	1.5	1.8
Germany	1.7	1.3	1.7	1.9	1.4	1.6	1.9
France	1.8	1.2	1.2	2.1	1.2	1.6	1.8
Italy	1.9	1.5	1.3	1.2	0.9	1.3	1.6
Portugal	3.0	1.2	1.4	1.0	0.8	1.1	1.4
Spain	3.2	1.3	2.0	1.7	1.1	1.5	1.7
Japan	–0.3	0.3	0.5	1.0	0.7	1.4	1.3
United Kingdom	1.9	2.3	2.7	2.5	2.0	2.0	2.1
Emerging countries	*6.8*	*5.8*	*4.3*	*4.8*	*4.9*	*4.6*	*4.5*
China	1.7	2.6	1.6	2.1	2.5	2.4	2.6
India	4.5	8.5	3.3	3.9	3.8	5.0	5.1
Indonesia	8.4	5.7	3.8	3.2	2.5	2.6	2.8
Brazil	7.3	6.4	3.5	3.7	3.8	3.9	4.0
Mexico	5.2	3.9	6.0	4.9	3.9	3.7	3.5
Chile	3.1	3.5	2.2	2.7	2.2	2.8	3.1
Russia	14.2	9.3	3.7	2.9	5.0	4.2	4.0
Turkey	27.2	8.1	11.1	16.2	17.0	13.0	10.0
Poland	3.5	2.1	1.6	1.2	2.0	2.5	2.5
South Africa	5.3	6.2	5.3	4.6	4.6	5.4	5.3

Forecasts

Percentage change versus the same period of the previous year, unless otherwise indicated

Spanish economy

	Average 2000-2007	Average 2008-2016	2017	2018	2019	2020	2021
Macroeconomic aggregates							
Household consumption	3.6	–0.7	2.5	2.3	1.8	1.7	1.6
Government consumption	5.0	0.8	1.9	2.1	1.7	1.5	1.4
Gross fixed capital formation	6.0	–3.4	4.8	5.3	3.5	2.9	2.5
Capital goods	5.3	0.3	6.0	5.4	4.9	3.0	2.6
Construction	6.2	–6.1	4.6	6.2	3.2	2.9	2.5
Domestic demand (vs. GDP Δ)	4.6	–1.2	2.9	2.9	2.1	1.9	1.7
Exports of goods and services	4.8	2.7	5.2	2.3	1.5	3.7	3.6
Imports of goods and services	7.1	–1.0	5.6	3.5	0.8	3.9	3.7
Gross domestic product	**3.8**	**0.0**	**3.0**	**2.6**	**2.3**	**1.9**	**1.7**
Other variables							
Employment	3.4	–1.3	2.8	2.5	2.4	1.9	1.6
Unemployment rate (% of labour force)	10.5	20.8	17.2	15.3	13.4	11.8	10.5
Consumer price index	3.2	1.3	2.0	1.7	1.1	1.5	1.7
Unit labour costs	3.3	0.2	0.2	0.8	1.8	2.3	2.5
Current account balance (% GDP)	–6.0	–1.6	1.8	0.9	0.6	0.6	0.6
External funding capacity/needs (% GDP)	–5.3	–1.2	2.1	1.4	0.8	0.8	0.8
Fiscal balance (% GDP)[1]	0.4	–7.0	–3.0	–2.5	–2.3	–1.5	–1.1

Note: *1. Excludes losses for assistance provided to financial institutions.*

Forecasts

Portuguese economy

	Average 2000-2007	Average 2008-2016	2017	2018	2019	2020	2021
Macroeconomic aggregates							
Household consumption	1.7	–0.2	2.3	2.6	2.1	1.8	1.7
Government consumption	2.3	–0.6	0.2	0.8	0.6	0.3	0.2
Gross fixed capital formation	–0.3	–3.5	9.2	4.5	6.4	4.5	4.0
Capital goods	1.3	0.0	13.7	6.4	7.9	5.9	5.9
Construction	–1.6	–6.3	8.3	3.1	5.0	2.5	2.5
Domestic demand (vs. GDP Δ)	1.4	–1.0	3.1	2.8	3.3	2.1	1.9
Exports of goods and services	5.2	3.5	7.8	3.7	4.2	4.3	4.5
Imports of goods and services	3.6	1.6	8.1	4.9	7.0	4.6	4.4
Gross domestic product	**1.5**	**–0.4**	**2.8**	**2.1**	**1.8**	**1.7**	**1.7**
Other variables							
Employment	0.4	–1.1	3.3	2.3	0.8	0.5	0.3
Unemployment rate (% of labour force)	6.1	12.2	8.9	7.0	6.5	6.2	6.0
Consumer price index	3.0	1.2	1.4	1.0	0.8	1.1	1.4
Current account balance (% GDP)	–9.4	–4.2	0.5	–0.6	–1.8	–1.7	–1.4
External funding capacity/needs (% GDP)	–7.9	–2.9	1.4	0.4	–0.7	–0.6	0.0
Fiscal balance (% GDP)	–4.4	–6.3	–3.0	–0.5	–0.4	–0.3	0.1

Forecasts

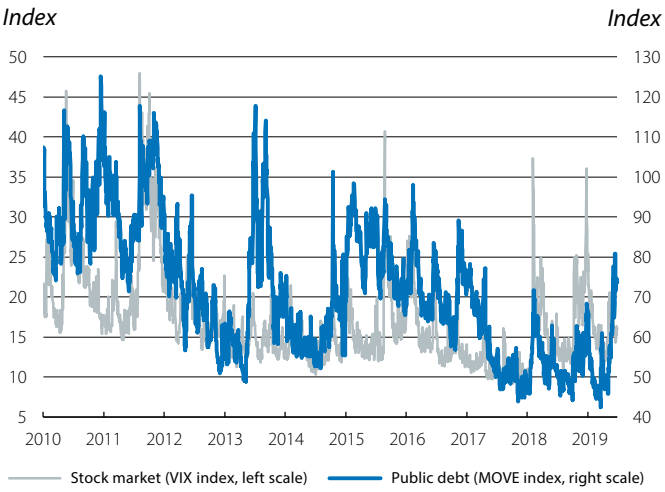
The financial markets complete a semester of contrasts

Stock markets on the rise, interest rates at minimum levels and central banks set to close an eventful semester. In June, the financial markets closed an eventful semester, marked by successive alternations between periods of calm and episodes of risk aversion and volatility, with a constructive tone. In particular, following an end of 2018 with significant stock market losses and falling interest rates, in the first months of 2019 the markets exhibited a constructive tone. This was supported by the alleviation of trade tensions, the slowdown in the tightening of monetary policy by the major central banks and some encouraging economic data. Nevertheless, the serenity and the significant stock market gains took a sharp decline in May when the trade negotiations between the US and China broke down and fears of a marked slowdown in the global economy returned. This led to a rebound in risk aversion, with the resulting stock market losses and sinking interest rates. In this context, in June the major central banks opened the door to the possibility of relaxing monetary policy as a preventive measure to combat the intensification of the risks to economic activity. Although these messages were received with a recovery of sentiment in the markets, stock prices reflect expectations of a much more accommodative monetary policy than what the central banks are currently indicating, and such an imbalance could lead to renewed episodes of volatility over the coming quarters.

The Fed opens the door to lowering interest rates. At its June meeting, the Fed gave a positive assessment of the US economy and reiterated the favourable outlook for the economic scenario in the medium term. As such, it maintained its reference interest rates within the 2.25%-2.50% range. Nevertheless, the members of the Fed placed greater emphasis on the persistence and intensification of risks (such as the resurgence of trade tensions and the uncertainty surrounding the slowdown in the global economy). With these concerns, and in view of the fact that inflationary pressures remain moderate, the Fed opened the door to the possibility of lowering its reference rates over the coming months, stating that it is prepared to offer new stimulus in the event that the risks continue to undermine economic confidence. In particular, at the meeting the Fed also presented the quarterly update of its macroeconomic forecasts. Although this did not include any major changes to the projections for economic activity and inflation, there was a significant reduction in the interest rate forecasts: almost half of the members of the Fed now foresee at least one rate cut this year (see second chart). Therefore, stock prices reflect a 100% probability that the Fed will reduce interest rates by 25 bps in July. Although this expectation is consistent with the clues given by the Fed itself, the stock prices go even further and suggest a high probability that interest rates will have been lowered by around 100 bps by late 2020 (a much more aggressive reduction than that reflected by the expectations of the members of the Fed).

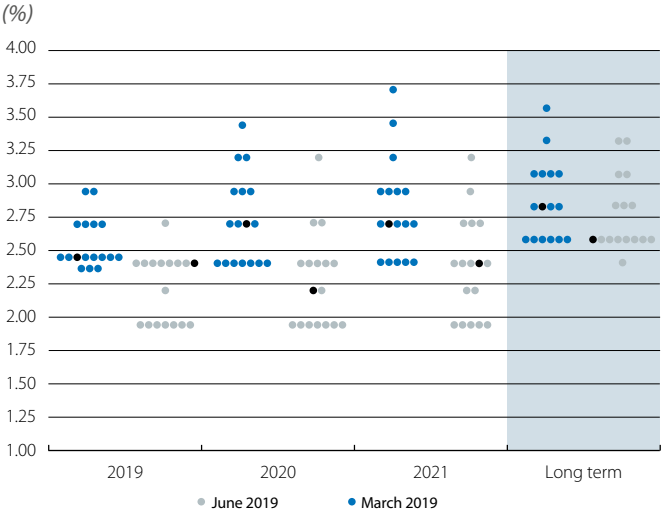
The ECB emphasises the uncertainties and stresses the accommodative message. Much like the Fed, at its June

Implicit volatility in the financial markets



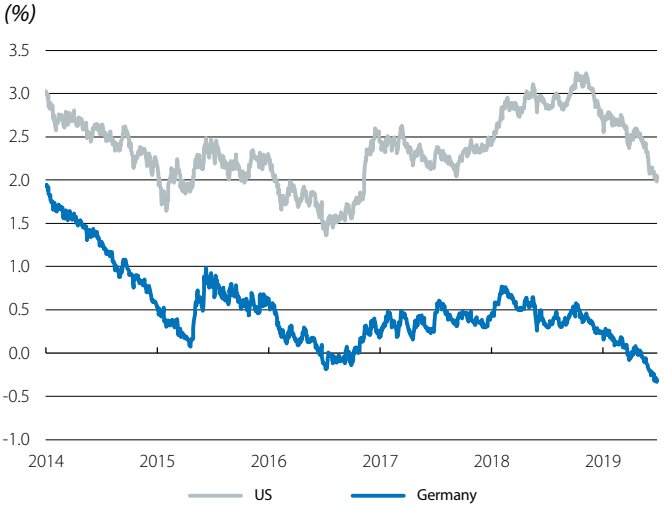
Source: *CaixaBank Research, based on data from Bloomberg.*

US Federal Reserve: expected trend in interest rates of each member of the FOMC



Note: *Each point represents a voter from the Federal Reserve's Federal Open Market Committee. The median voter is marked in black.*
Source: *CaixaBank Research, based on data from the Federal Reserve.*

Yield on 10-year sovereign bonds



Source: *CaixaBank Research, based on data from Bloomberg.*

meeting the ECB maintained a relatively positive view of the medium-term outlook but stressed the need to preserve an accommodative financial environment to support domestic demand and inflation, in the face of the persistence and escalation of risks. Thus, the ECB reiterated that it will continue to be present in the markets for a long time to come through asset reinvestments, it postponed the indicative date for the first rate rise until December 2020, and it specified a more favourable-than-expected cost for the new round of TLTROs due to begin in September (which will lie somewhere between the refi rate +10 bps and the depo rate +10 bps, depending on the extent to which certain new lending targets are met). Furthermore, a few days later at the ECB's annual conference in Sintra (Portugal), the president Mario Draghi went a step further and stated that if the risks do not subside, the ECB must intensify its monetary stimulus. In particular, Draghi pointed out that the ECB may once again delay the first rate rise, or even cut interest rates (something that would possibly be linked to measures that mitigate the potential adverse effects of negative interest rates), and/or resume net purchases of assets.

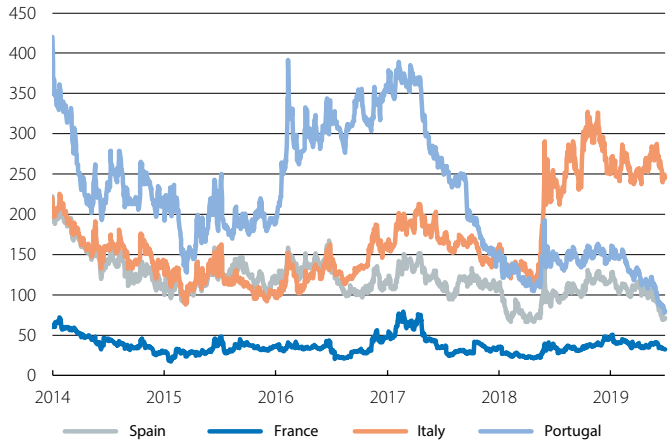
Sovereign yields remain at minimum levels. The accommodative messages from the central banks led sovereign yields to fall even further (having already reached a low point in May, due to growing risk aversion and the resulting demand for safe haven assets). Specifically, yields on 10-year US and German sovereign bonds fell by over 10 bps, reaching 2.0% (a level not seen since late 2016) and –0.3% (an all-time low), respectively. The risk premiums of the euro area periphery, meanwhile, fell sharply and the yield of 10-year debt in Spain and Portugal fell below 0.4% and 0.5%, respectively. Italy's differential also experienced a decline, although it remains at substantially higher levels than those of neighbouring economies.

The stock markets recover. After suffering substantial losses in May, the main stock market indices rose steadily in June, propped up by the accommodative messages of the central banks and moderate optimism over the meeting between the presidents of the US and China at the G-20 summit at the end of the month. As such, in the US the S&P 500 rose by 6.9%, while in Europe the Eurostoxx 50 climbed 5.9%, with more sustained gains in the central economies than in the periphery (+5.7% in the German DAX and +6.4% in the French CAC, compared to +2.2% in the Ibex 35 and +1.9% in the PSI-20). In the emerging bloc, meanwhile, the MSCI index for all emerging economies as whole registered gains of around 6%.

The oil price settles at around 65 dollars. In the context of a recovery in investor sentiment, and awaiting confirmation from OPEC and its partners regarding the extension of the oil production cuts for the second half of the year, the price of a barrel of Brent oil fluctuated around 65 dollars and suffered some ups and downs due to the tensions between the US and Iran (with conflicting statements regarding the sabotage of oil tankers sailing through the Strait of Hormuz, a strategic enclave through which 20% of the world's oil passes).

Euro area: risk premiums of 10-year sovereign bonds

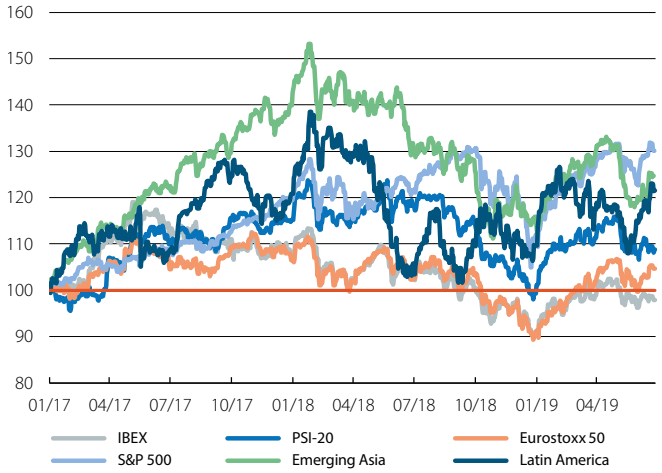
(bps)



Source: *CaixaBank Research, based on data from Bloomberg.*

Main international stock markets

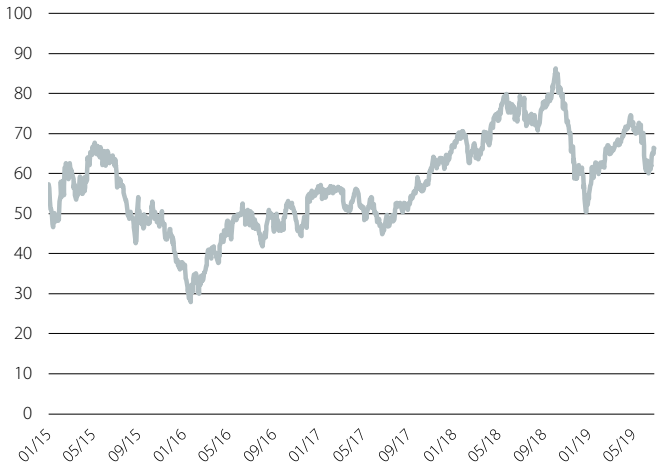
Index (100 = January 2017)



Source: *CaixaBank Research, based on data from Bloomberg.*

Brent oil price

(Dollars per barrel)



Source: *CaixaBank Research, based on data from Bloomberg.*

The US credit cycle: how much should it concern us? Part III

- **Vulnerabilities in the US credit cycle will probably not be the trigger for the next recession. However, they could amplify the slowdown in the US economy.**
- **Specifically, we estimate that if these vulnerabilities are activated, they could result in a tightening of financial conditions that would subtract between 0.3 and 0.7 pps from GDP growth in 2020.**

Having analysed the state of private credit in the US in two previous articles,[1] we close the series by answering the most frequently asked questions regarding the business cycle and the US credit cycle.

What is the current situation of the US economy?

Since this July, the US economy has been in the longest expansionary phase in its history, with the unemployment rate at its lowest in 50 years and inflation close, though slightly below, the target rate of 2%. Due to the very maturity of the business cycle and the fading of the fiscal stimulus of late 2017, economic growth is expected to fa decelerate towards its potential over the coming quarters. In fact, the most recent indicators suggest that this slowdown is already gradually occurring. However, in recent quarters the downside risks (especially those of a geopolitical nature) have intensified, and this is undermining economic sentiment at present.

What is the current situation of private debt?

On the one hand, households have undertaken a major deleveraging process, led mainly by mortgage debt. In addition, new issuance of mortgages has fallen and has been steered towards households with a reasonably solvent credit profile. Thus, the situation is much less worrying than in the years leading up to the Great Recession and the vulnerabilities are to be found in areas that are quantitatively of less importance (such as student debt).

As for non-financial corporations, debt has increased substantially in recent years and has surpassed the levels seen prior to the Great Recession. Normally, significant debt growth is associated with greater risk-taking and a deterioration in the quality of the debt, which can lead to vulnerabilities. Indeed, the current case of the US is no exception. Based on our prior analyses, we can highlight three vulnerabilities: the increase in debt with a BBB rating, the reduction in the use of covenants that protect the investor and the increase in lending to companies that are already highly leveraged.

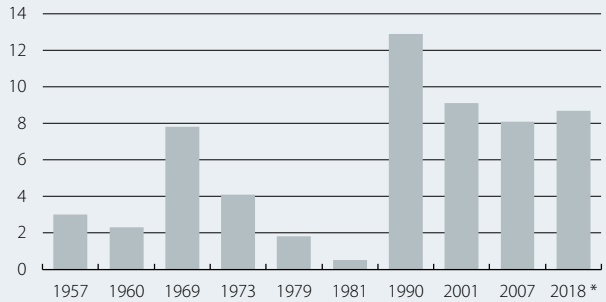
1. See «The US credit cycle: how much should it concern us?» in the MR04/2019 and «The US credit cycle: how much should it concern us? Part II» in the MR06/2019.

Will private credit be the trigger for the next recession in the US?

Several factors suggest that, at present, the trigger for the next recession is less likely to be the credit cycle itself than on prior occasions. On the one hand, as we have discussed, the status of household debt is relatively comfortable. On the other hand, the increase in non-financial corporate debt has been significant but, nevertheless, relatively more moderate than in previous episodes (and supported by an environment of low interest rates that makes the debt burden more bearable). As an example, the ratio between non-financial corporate debt and GDP has risen by 8.7 pps between 2009 and 2018, whereas it increased by 9.1 pps between 1991 and 2001 (see first chart). In addition, the regulatory changes motivated after the financial crisis have forged a financial system that is more robust and has more liquidity, making it better prepared to deal with episodes of stress. Finally, despite having highlighted some vulnerabilities in specific sectors, a very large portion of the corporate sector is enjoying somewhat healthier finances.

US: growth of non-financial corporate credit prior to recessions

(pps)



Notes: *Cumulative growth of non-financial corporate debt as a percentage of GDP between the minimum and maximum point of the business cycle, as defined according to the NBER.*
** Latest available data for Q4 2018.*
Source: *CaixaBank Research, based on data from the Bank for International Settlements and the National Bureau of Economic Research.*

So how can private debt determine the economic outlook?

Of the 33 recessions that have occurred in the US since 1857, few have been triggered by private debt. Nevertheless, this class of debt tends to have a significant

role in most of them: there is consensus in the economic literature that private debt amplifies adverse shocks. In this regard, the risks surrounding US corporate debt should be considered sources of vulnerability that could be activated by the economic slowdown, such that they could accentuate the moderation of growth.[2]

How does the amplifying role work?

Credit can amplify adverse shocks through a reduction in new lending, which in turn restricts consumption and investment. For instance, if the deterioration in the economic outlook is accompanied by a reduction in the price of assets, it will also decrease the value of the guarantees that borrowers can use to back their borrowing and, therefore, their borrowing capacity will be reduced. On the other hand, in the final stages of economic expansions credit conditions tend to be tightened, since there is a reduction in growth expectations and, therefore, a higher likelihood of default is expected.

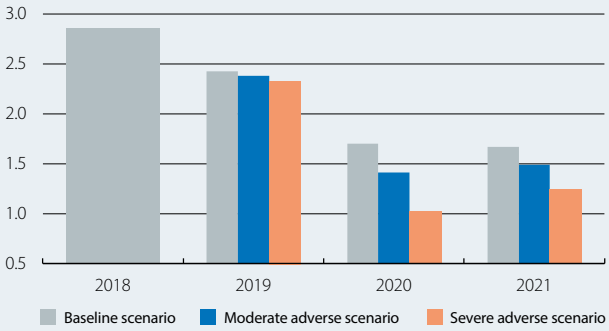
How can the vulnerabilities identified affect the financial conditions of the economy as a whole?

On the one hand, a widespread reduction in the valuation of corporate debt driven by the loss of investment grade status (a common phenomenon during economic recessions) tends to provoke forced sales of this type of debt. Among other consequences, this increases risk premiums and the cost of debt for firms.[3] On the other hand, the rise in the debt of firms that are already highly leveraged, as well as the reduced use of clauses that protect the investor, can accentuate defaults.

With these two mechanisms in mind, we built two scenarios involving a tightening in the financial conditions, based on the historical relationship between the Federal Reserve Bank of Chicago's National Financial Conditions Index (NFCI), on the one hand, and the percentage of debt with a BBB rating and the delinquency rate of the corporate sector, on the other. In particular, if we assume that the BBB ratio and the delinquency rate will follow a similar path to those seen in other episodes of financial stress, the NFCI would increase by around 0.4 and 0.8 pps in the moderate and adverse scenarios, respectively. To put these figures into context, they are similar to those of the Asian crisis of 1997, in the first case, and half as severe as the Great Recession, in the second.

US: GDP growth scenarios

Annual change (%)



Note: *In the «moderate adverse» scenario, a 0.4-pp tightening of financial conditions is estimated, derived from a 4-pp drop in the BBB-rated debt ratio and a 1-pp increase in the delinquency rate. The «severe adverse» scenario contemplates shocks of approximately twice the magnitude. The shock begins in Q3 2019.*
Source: *CaixaBank Research, based on data from the Federal Reserve Bank of Chicago, the Federal Reserve and the Bureau of Economic Analysis.*

How much would a tightening of financial conditions undermine economic growth?

Assuming these shocks in the NFCI, and based on the historical sensitivity of US GDP growth to financial conditions, the resulting tightening of financial conditions could subtract between 0.3 and 0.7 pps from GDP growth over the next year (see second chart) and accentuate the slowdown in the economy. Although these figures alone do not seem sufficient to drag the US economy into a recession, if they were to interact with other risks threatening the economy (such as trade tensions),[4] we could end up seeing negative growth rates.

Finally: how much should the US credit cycle concern us?

We should not be complacent with the current levels of private credit. However, our analysis suggests that, rather than being the trigger for the next recession, we should consider them a vulnerability that could amplify the slowdown in the economy. In other words, this role as an amplifier of adverse shocks makes the US economy less resistant to a potential deterioration in the economic outlook. Such a deterioration could be triggered, for instance, by an intensification of the trade tensions or further US government shutdowns. It is this last point that represents the main source of concern for the credit cycle.

Ricard Murillo Gili

2. Jorda, Schularick and Taylor show that recessions that have been preceded by sharp increases in non-financial corporate debt have proved to be more severe and longer. See 0. Jorda, M. Schularick and A. Taylor (2013). «When Credit Bites Back», Journal of Money, Credit, and Banking 45(s2): 3-28. And J. Bridges and C. Jackson (2017), «Down in the Slumps: The Role of Credit in Five Decades of Recessions», Bank of England Working Paper n° 659.
3. See S. Çelik, G. Demirtas and M. Isaksson (2019). «Corporate Bond Markets in a Time of Unconventional Monetary Policy», OECD Capital Markets Series, Paris.
4. See «The threat of protectionism in the global economy» in this same *Monthly Report*.

Interest rates (%)

	30-June	31-May	Monthly change (bp)	Year-to-date (bp)	Year-on-year change (bp)
Euro area					
ECB Refi	0.00	0.00	0	0.0	0.0
3-month Euribor	–0.35	–0.32	–2	–3.6	–2.4
1-year Euribor	–0.21	–0.17	–5	–9.7	–3.3
1-year government bonds (Germany)	–0.65	–0.62	–4	–8.5	–1.5
2-year government bonds (Germany)	–0.75	–0.66	–9	–14.0	–8.5
10-year government bonds (Germany)	–0.33	–0.20	–13	–56.9	–62.9
10-year government bonds (Spain)	0.40	0.72	–32	–102.1	–92.6
10-year government bonds (Portugal)	0.48	0.81	–33	–124.6	–131.1
US					
Fed funds	2.50	2.50	0	0.0	50.0
3-month Libor	2.32	2.50	–18	–48.8	–1.6
12-month Libor	2.18	2.51	–33	–82.7	–58.6
1-year government bonds	1.93	2.20	–27	–67.1	–38.7
2-year government bonds	1.75	1.92	–17	–73.3	–77.3
10-year government bonds	2.01	2.12	–12	–67.9	–85.5

Spreads corporate bonds (bps)

	30-June	31-May	Monthly change (bp)	Year-to-date (bp)	Year-on-year change (bp)
Itraxx Corporate	53	71	–19	–36.1	–21.7
Itraxx Financials Senior	64	92	–28	–44.7	–26.2
Itraxx Subordinated Financials	133	187	–54	–95.2	–47.2

Exchange rates

	30-June	31-May	Monthly change (%)	Year-to-date (%)	Year-on-year change (%)
EUR/USD (dollars per euro)	1.137	1.117	1.8	–0.8	–2.7
EUR/JPY (yen per euro)	122.660	120.960	1.4	–2.5	–5.2
EUR/GBP (pounds per euro)	0.896	0.884	1.3	–0.4	1.2
USD/JPY (yen per dollar)	107.850	108.290	–0.4	–1.7	–2.6

Commodities

	30-June	31-May	Monthly change (%)	Year-to-date (%)	Year-on-year change (%)
CRB Commodity Index	407.9	416.0	–1.9	–0.3	–7.1
Brent ($/barrel)	66.6	64.5	3.2	23.7	–16.2
Gold ($/ounce)	1,409.5	1,305.5	8.0	9.9	12.5

Equity

	30-June	31-May	Monthly change (%)	Year-to-date (%)	Year-on-year change (%)
S&P 500 (USA)	2,941.8	2,752.1	6.9	17.3	8.2
Eurostoxx 50 (euro area)	3,473.7	3,280.4	5.9	15.7	2.3
Ibex 35 (Spain)	9,198.8	9,004.2	2.2	7.7	–4.4
PSI 20 (Portugal)	5,137.5	5,044.0	1.9	8.6	–7.1
Nikkei 225 (Japan)	21,275.9	20,601.2	3.3	6.3	–4.6
MSCI Emerging	1,054.9	998.0	5.7	9.2	–1.4

The global expansion continues, but the risks are amplified

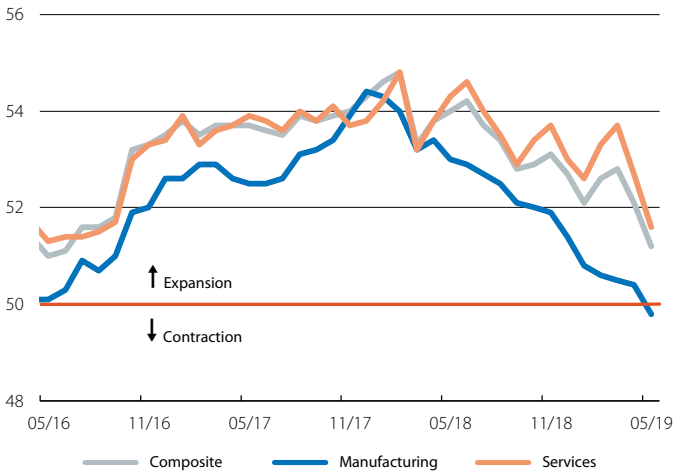
Slight deterioration of the global macroeconomic scenario. On the one hand, the Q1 growth data for some of the major emerging economies (India, Brazil and Turkey) proved somewhat worse than expected, leading us to slightly reduce our growth forecast for 2019 (from 3.3% to 3.2%) and confirming that the global economy will shift down a gear this year (considering that in 2018 growth stood at 3.6%). On the other hand, we have seen a significant deterioration in the global sentiment indicators in Q2: the global PMI composite indicator fell to 51.2 points in May (52.1 in April), while the manufacturing index stood below 50 points (the threshold that separates the expansive and recessive territories). Thus, the data indicate that global economic activity has embarked on a somewhat weaker path, affected by greater global uncertainty.

Heightened uncertainties. One of the main reasons we assign a greater likelihood of the downside risks materialising is the fact that the protectionist tensions between the US and China reappeared in May and, as suggested by all the indicators, this time are here to stay. As such, the global economy remains on high alert, as demonstrated by the spike in the geopolitical risk indices. This is despite the tempering of the situation in the short term, as trade negotiations resumed following the meeting between Trump and Xi Jinping at the G-20 summit in Osaka in late June. Therefore, although some form of agreement between the two powers can be expected, it is unlikely to be an ambitious one. In addition, there are two reasons that reinforce the view that uncertainty has come to stay. Firstly, there is a significant risk that, in the end, no such agreement will be reached: underlying disagreements remain unresolved and China has published a white paper in which it rejects having taken advantage of forced technology transfers, one of the key points of the litigation. The second reason is that, even if an agreement is reached, uncertainty will not fade overnight: the tariffs imposed are unlikely to be withdrawn immediately and, in a conflict as complex and with so many edges as this one, some latent pockets of uncertainty will persist. If these risks materialise, the slowdown could prove much more abrupt than we expect, largely due to the indirect effects of heightened uncertainty. In particular, both China and the US would pay a heavy toll in terms of growth (for exact figures, see the Focus «The threat of protectionism in the global economy» in this same *Monthly Report*).

In Europe, political uncertainty rises once again. On the one hand, if the Italian government fails to present a credible fiscal plan in July, the European Commission is likely to recommend to the European Council to impose an excessive deficit procedure (EDP) on the country. This would oblige the Italian cabinet to include adequate adjustment measures in its budget for 2020, which is to be presented by mid-October 2019, in order to streamline the national accounts but without

Global economic activity indicators: PMI

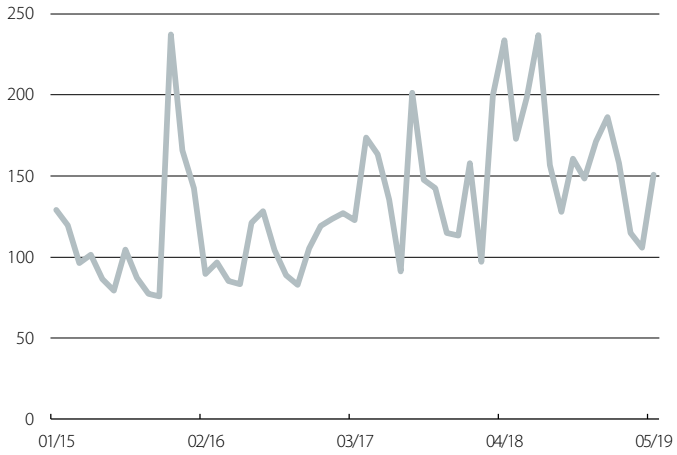
Level



Source: *CaixaBank Research, based on data from Markit.*

Global geopolitical risk index

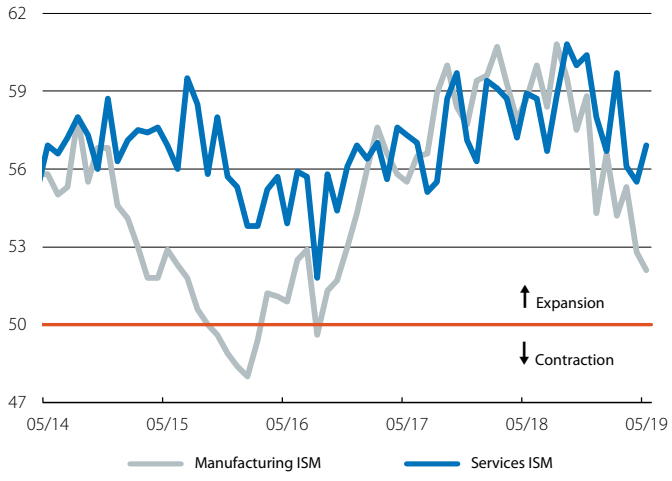
Level



Source: *Database by the economists Iacovello and Caldara, based on the percentage of articles relating to geopolitical uncertainty in the major international media.*

US: economic activity indicators

Level



Source: *CaixaBank Research, based on data from the ISM.*

harming economic growth, which is already scarce. The negotiations between Rome and Brussels will be drawn out (the EDP is essentially a gradual, political process which offers a lot of leeway for affected countries to take corrective measures), but the tensions are likely to gain prominence over the coming months. Furthermore, the Italian government still has the option to call new elections at the end of the year, which could lengthen the whole process and intensify the conflict. In the United Kingdom, the situation is not looking much brighter: Boris Johnson is emerging as the favourite to become the new Prime Minister and, although the difficulties that the British Parliament is experiencing to agree on an exit strategy should pave the way for another extension to Article 50 at the end of October, his statements reiterating the commitment to leave the EU in October highlight the risk of a no-deal Brexit.

US

The economic indicators are holding up relatively well. In particular, the economic activity indicators for Q2 overall remain reasonably positive and their slight decline is consistent with the gentle slowdown we expect for this year. The business sentiment indicators (ISM) reflected this trend, as they remained comfortably within expansive territory in May (i.e. above 50 points), although the manufacturing index fell by 0.7 points. On the other hand, the strength of the labour market showed signs of softening, with the creation of 75,000 jobs in May (223,000 on average in 2018). Nevertheless, this is still a reasonable figure given that the US economy is in a situation of full employment and in a more mature phase of the cycle. On this note, the unemployment rate remains at a very low 3.6%, while wages grew by a buoyant 3.1% year-on-year.

Inflationary pressures remain contained. In particular, inflation in the US stood at 2.0% in May, the same figure as in April, while core inflation stood at 1.8% (2.1% in April). Looking ahead to the coming months, we expect core inflation to remain at the current levels. As such, the absence of significant inflationary pressures could enable the Fed to implement a rate cut if the economic context were to deteriorate.

EUROPE

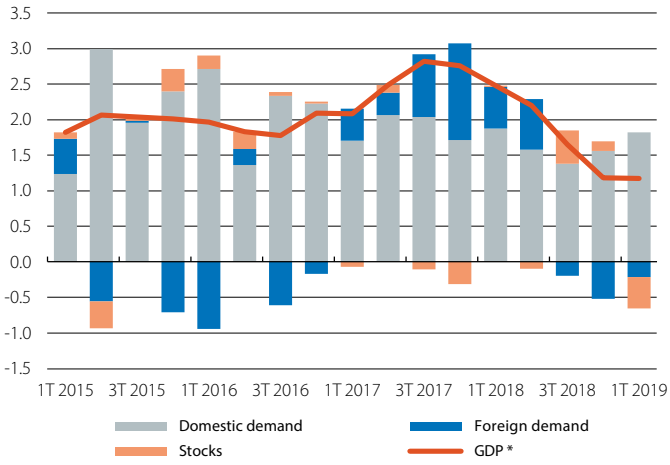
Economic activity moderates in Q2. Following a higher than expected GDP in Q1 (0.4% quarter-on-quarter), reflecting the resilience of domestic demand, recent indicators suggest that in the second quarter the euro area economy will have grown at a more moderate rate (0.2%-0.3% quarter-on-quarter) and that it will be more in line with the slowdown that we witnessed in the second half of last year. The decoupling between a service sector that remains buoyant, thanks to the endurance of domestic demand, and an industrial sector that is suffering the effects of global uncertainty and the slowdown in trade flows was once again reflected in the Purchasing Managers' Index (PMI): in June, the services PMI rose, while

US: labour market

Source: *CaixaBank Research, based on data from the Bureau of Labor Statistics.*

Euro area: GDP

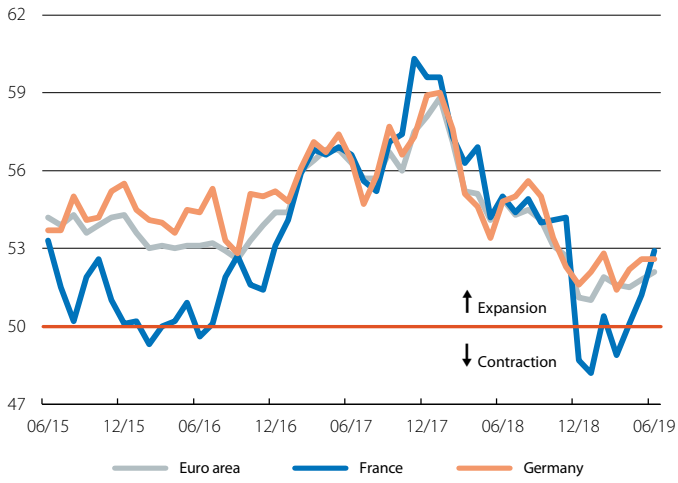
Contribution to year-on-year growth (pps)



Note: ** Year-on-year change (%).*
Source: *CaixaBank Research, based on data from Eurostat.*

Euro area: composite PMI economic activity indicator

Level



Source: *CaixaBank Research, based on data from Markit.*

the manufacturing index remained stranded in recessive territory (47.8 points). The ECB's own forecasts, which in its June update point towards a growth projection for 2019 of 1.2% (a figure similar to our forecast of 1.3%), reflect the expectation of moderate growth. In part, this is the result of a more adverse global environment that is penalising foreign demand. Therefore, both a subsiding of the protectionist tensions and the dissipation of the factors that have adversely affected the automotive sector could give euro area growth some more traction. Inflation, meanwhile, remains at modest levels, standing at 1.2% in both May and June, after the seasonal effects that had temporarily boosted it in April due to Easter subsided.

Germany fails to pull out of the rut. The importance of the foreign sector for the German economy (in 2018, German exports of goods and services accounted for 47% of GDP, compared to just 34% in Spain, for example) explains why it is being particularly affected by the uncertainty and the slowdown in the global economy. The industrial sector, which is highly reliant on exports, is experiencing widespread adverse effects far beyond those experienced by the automotive sector, as reflected in the industrial production figures for April (–1.9% year-on-year). In addition, the Bundesbank stated in its June update that it expects GDP to contract slightly in Q2. All this has led us to revise Germany's growth forecasts for 2019 and 2020 down by –0.2 pps, to 0.8% and 1.4%, respectively.

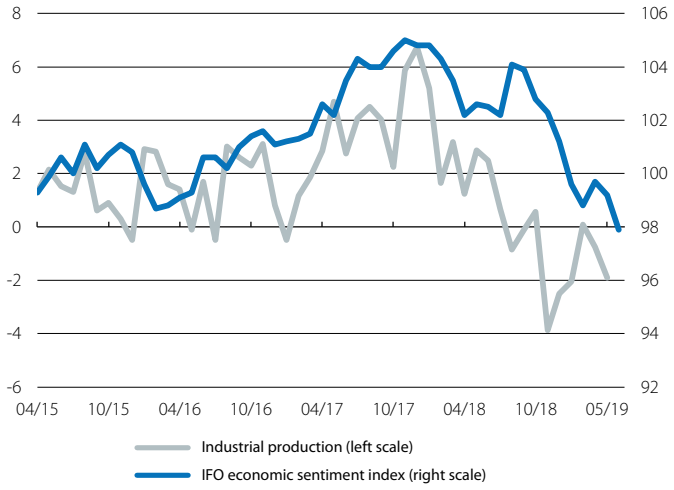
REST OF THE WORLD

China: economic activity indicators continue to suggest a slowdown. In particular, in May industrial production and investment slowed down once again, while our growth indicator, which reflects the state of economic activity based on the performance of the sectors and variables that are most representative of the real economy, continued to paint a picture of gradual deceleration. All this indicates that the county's economic authorities are following a reactive approach, which consists of stimulating the economy when they detect a worsening of the slowdown, followed by immediately lifting the foot off the accelerator when this stimulus produces an improvement in the economic data. In this sense, China has a relatively wide margin in monetary policy (less so in fiscal policy) to implement new expansionary measures in order to avoid an abrupt slowdown. On this note, the governor of the central bank, Yi Gang, has already announced that they are prepared to act if necessary.

Among the emerging economies, Turkey remains at a low point. After three quarters with significant declines, Turkey's GDP enjoyed somewhat of a breather in Q1 2019 with quarter-on-quarter growth of 1.3%, although in year-on-year terms the country's growth rate remained in negative territory (–2.6%). All in all, we maintain our forecast for 2019 at –2.5%, given that the Turkish economy remains in a difficult context, with significant imbalances that are still very present.

Germany: economic activity indicators

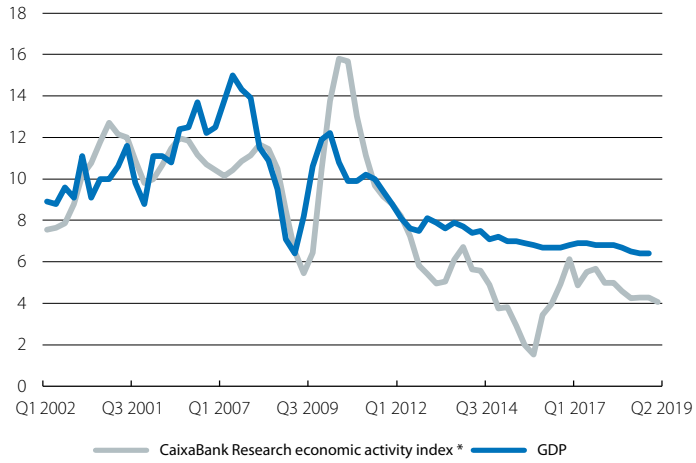
Year-on-year change (%) *Level*



Source: *CaixaBank Research, based on data from the German Statistics Office and the IFO Institute.*

China: economic activity index versus *official GDP*

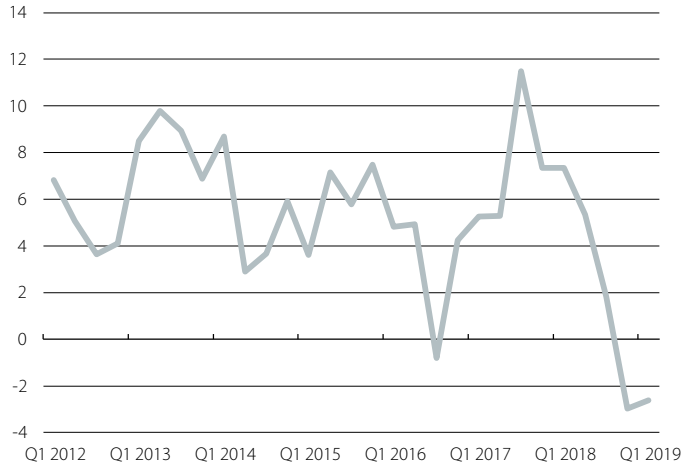
Year-on-year change (%)



Note: ** Moving average for the last four quarters of the economic activity index.*
Source: *CaixaBank Research.*

Turkey: GDP

Year-on-year change (%)



Source: *CaixaBank Research, based on data from Thomson Reuters.*

The threat of protectionism in the global economy

- **Trade tensions between the US and China pose a risk to growth, both for the US and China themselves and for the rest of the world.**
- **Under a moderate tariff stress scenario, we estimate that average annual global growth over the next three years could be 3 decimal points lower than anticipated (3.1% versus 3.4%), largely due to greater uncertainty.**
- **Under a high tariff stress scenario, growth could be 8 decimal points lower than forecast (2.6%), due to trade and uncertainty in equal measure.**

Since the beginning of 2018, the Trump Administration has adopted a more belligerent tone in trade policy: for example, it has increased tariffs on Chinese imports worth 250 billion dollars, it has added Huawei to the list of companies that require government approval to purchase US technology, and it is studying tariffs on auto imports (see first chart). So far, the tariffs adopted represent a small percentage of global trade (less than 3%).[1] However, their economic consequences go much further than what it might seem, since effects are transmitted through uncertainty and disruption to global supply chains. Below, we analyse and quantify the economic impact of the trade tensions between the US and China.

US company stock prices

Index (100 = March 2018)

Source: *IMF («The Impact of US China Trade Tensions», IMF Blog, 23 May 2019).*

The effects of protectionism on economic activity

The rise of protectionism in the US is affecting the economic activity of the country itself and that of the world through different channels.

Trade channel (or direct). A tariff hike raises the price of imports (from China in the case of the current escalation of protectionism) and leads to an increase in the prices paid by consumers and companies. These higher prices have a detrimental impact on consumption and investment and, therefore, on the economic activity of the «protectionist» country.

Certain factors, however, can either exacerbate or alleviate this direct impact on the US, as well as producing a knock-on effect on other economies:

i) The boost to tax revenues generated by the new tariffs can partially offset the detrimental economic impact, although the increase is usually limited.

ii) Chinese exporters could cut their prices (squeezing their profit margin), which would reduce the detrimental impact on consumers and businesses. However, this has not occurred in the current tariff escalation, in which most of the detrimental impact has been borne by US consumers. According to a recent study, the current measures will cost US households an average of 620 dollars a year.[2]

iii) If the consumption of imported goods is replaced by goods produced domestically, there is a boost to the country's economic activity (to the detriment of the original exporting country, in this case China).[3] However, this comes with a cost at the global level, since the original exporters are being replaced by less efficient producers.

In net terms, estimates suggest that the positive effect on US economic activity is less than the direct negative impact. One of the reasons for this is that, as has occurred in the current situation, the foreign

1. This refers to the total exports of goods affected by the tariffs since 2018, relative to the overall total exports of goods at the global level. Based on IMF and US Foreign Trade data.

2. See M. Amiti, S.J. Redding and D. Weinstein (2019). «The Impact of the 2018 Trade War on US Prices and Welfare» National Bureau of Economic Research n° w25672; and the most recent numerical update in the Blog of the Federal Reserve Bank of New York («New China Tariffs Increase Costs to U. S. Households», Liberty Street Economics, 23 May 2019).

3. The exchange rate is another factor to consider. If the yuan depreciates (as has happened, by 9.5% against the dollar since April 2018), the effect of the tariffs on US consumers is lower. On the contrary, an appreciation of the dollar (like the one that has occurred, amounting to 7.4% against a whole series of currencies) depresses foreign demand for US exports.

Impact of protectionism on economic activity

Source	Protectionism	Main assumptions of the analysis	Impact on GDP (deviation relative to GDP in a central scenario - without protectionist measures)			
				Global	US	Euro area	China
IMF (WEO, October 2018)	Moderate	• Tariff increase in line with that already witnessed (US, 25% tariffs on 250 billion dollars of Chinese imports, and China, on 110 billion dollars) • Tariff increase on the rest of Chinese imports (China responds) • Tariff increase on the automotive sector	Total (after 3 years)	–0.8	–1.0	–0.4	–1.6
			Trade	*–0.4*	*–0.6*	*–0.1*	*–1.2*
			Uncertainty	*–0.4*	*–0.4*	*–0.3*	*–0.4*
Bank of England (July 2018)	High	• 10-pp tariff increase on all imports by the US • Reciprocal response by all trading partners	Total (after 3 years)	–2.0	–4.0	–2.0	–
			Trade	*–1.2*	*–2.8*	*–1.0*	*–*
			Uncertainty	*–0.8*	*–1.2*	*–1.0*	*–*
ECB (Economic Bulletin, March 2019)	High	• 10-pp tariff increase on all imports by the US • Reciprocal response by all trading partners • Increase of non-tariff measures as well	Total (after 1 year)	–0.8	–2.2	–0.1	0.5
			Trade	*–0.1*	*–1.5*	*0.2*	*0.6*
			Uncertainty	*–0.7*	*–0.7*	*–0.3*	*–0.1*

Note: *All the analyses use general equilibrium models to calculate both the direct impact (trade) and the more indirect impact (uncertainty) of the protectionist measures.*
Source: *CaixaBank Research, based on data from the IMF (WEO, October 2018), the ECB (Economic Bulletin Issue 3/2019, «The economic implications of raising protectionism: a euro area and global perspective») and the Bank of England (speech given by Mark Carney on 5 July 2018).*

countries that have been the subject of the tariff rise tend to respond by imposing similar measures on the US.

iv) Some countries may temporarily benefit since, faced with rising prices of some Chinese imports, US consumers and businesses can replace a portion of these purchases with imports from other countries (which are cheaper, after factoring in the tariffs). This is known as a «trade diversion» effect, although it is becoming less and less important in a world dominated by global supply chains.

Uncertainty channel (or indirect). Faced with a more uncertain outlook, households tend to postpone their spending decisions, and companies, their investment decisions: a «wait and see» approach that depresses economic activity at the global level. Furthermore, a climate of heightened uncertainty tends to drive up the costs of financing for both households and companies. This, again, affects spending and investment decisions and, ultimately, has a detrimental impact on economic activity.

Estimates of the impact of the trade tensions

Given the multiplicity of mechanisms discussed, in order to estimate the economic impact of an escalation of protectionism like the one that might occur between the US and China, we need to use general equilibrium models, i.e. models that seek to capture all the relationships of supply and demand that occur in the different markets at both the country level and between different countries. In the summary table, we present the results reached by the IMF, the Bank of England (BoE) and the European Central Bank (ECB) with this type of exercise.[4] In all three cases, the results take into account both the direct impact through trade and the indirect impact of a climate of greater uncertainty.

This latter channel, uncertainty, is no doubt the most relevant in a situation like the current one (with protectionist measures that are still relatively moderate in global terms, but with many threats). That said, it is also the most difficult one to determine. For this reason, we use the simulations performed by the above institutions, together with an analysis of our own. In particular, our estimates suggest that a spike in uncertainty similar to that seen in 2018 would cause global GDP growth rates to fall by 2 decimal points compared to those forecast under a scenario in which the two powers reach an agreement in the coming months.[5] In the event of shocks considerably greater than those that occurred in 2018, annual growth rates would be some 4 decimal points lower than forecast (as a result of the indirect channel).[6]

4. See the IMF (WEO, October 2018), the ECB - Economic Bulletin Issue 3/2019, «The economic implications of raising protectionism: a euro area and global perspective» and the Bank of England (speech given by Mark Carney on 5 July 2018).
5. In our scenario, we are assuming that the two powers reach an agreement during the second half of 2019 or in early 2020. The agreement would possibly contain very specific measures on products, making it possible to ensure that it is complied with (it will be a highly technical document). In addition, we envision certain elements in the field of technology transfer and intellectual property. However, the agreement will not entail an immediate withdrawal of the tariffs imposed to date, but rather a gradual removal.

Following this analysis of uncertainty and of the results of the aforementioned simulations by the IMF, the BoE and the ECB, we built two adverse scenarios relating to how the trade conflict between the US and its various trading partners could develop over the period 2019-2021, i.e. three years (see the last chart):

Scenario of moderate tariffs. This scenario assumes a slightly higher level of protectionism than we have seen to date. In this context, the average annual growth of global GDP in the period 2019-2021 would be 3.1%, compared to the 3.4% forecast by CaixaBank Research. This would be mainly as a result of the uncertainty channel (accounting for 2 decimal points of the reduction). By country, the impact in the US and China would be substantially greater than the impact in the euro area. In Europe, on the other hand, while the uncertainty channel would clearly have a detrimental impact, the trade channel could be favoured by what we referred to as «trade diversion». However, as the trade tensions grew in 2018, Europe suffered a major slowdown in growth (from 0.7% quarter-on-quarter in Q4 2017 to 0.2% in Q4 2018). As such, this «trade diversion» effect does not appear to have made an impact so far.

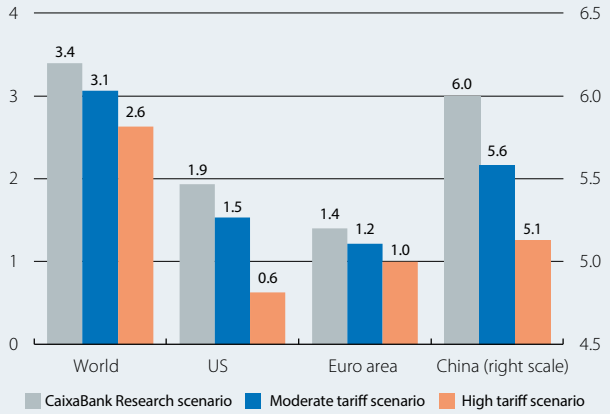
Scenario of high tariffs. This scenario assumes a much greater escalation of protectionism than that witnessed at present, with measures imposed on all US imports and a response of the same calibre imposed against the US by the countries affected. In this case, the average annual growth of global GDP in the period 2019-2021 could fall to 2.6% (8 decimal points below the expected scenario). In this case, trade and uncertainty would contribute equally to lower growth. Again, the US and China would be the most adversely affected economies, although the US economy more so, since it would suffer all the replicas of the tariffs imposed by its various trade partners.

However, the risk posed by this potential escalation of tariffs goes beyond the negative short and medium-term effects. The major fear is that this escalation could lead to non-tariff protectionist measures that affect international trade and investment more directly, such as restrictions on foreign technology companies, with potentially far greater impacts both at the economic and the institutional level. Furthermore, in the long term, all these economic obstacles represent a toll on productivity, since they impose barriers for the spread of knowledge and the establishment of network economies, trends that are key in an increasingly digital world.

Clàudia Canals

GDP growth scenario

Annual average for 2019-2021 (%)



Note: *Analysis performed based on estimates by the IMF, the ECB, the Bank of England and our own. The «moderate tariff» scenario assumes the current measures carried out by US and existing replicas, plus some additional measures (tariffs on all Chinese imports, some from Mexico and some related to the automotive sector). The «high tariff» scenario assumes more extensive measures against all the US' trading partners, as well as a response of the same calibre from those same trading partners towards the US. The uncertainty effect is relatively high in both scenarios, in line with the analysis described in the Focus. It is worth mentioning that neither scenario involves a fully-fledged global trade war, since the trading partners do not impose tariffs on trade between one another.*
Source: *CaixaBank Research.*

6. We take the global economic policy uncertainty index developed by Steven J. Davis («An Index of Global Economic Policy Uncertainty», Macroeconomic Review, 2016) based on the analysis performed by Baker, Bloom and Davis. A vector autoregression (VAR) of order three is estimated using quarterly data on global GDP growth, global CPI, the short-term (3-month) global interest rate and the global economic policy uncertainty (GEPU) index. The GEPU index reflects global uncertainty, as measured by the relative frequency of news and newspaper articles containing terms related to the economy, uncertainty, politics and public policy in a set of countries that represent two-thirds of the world's GDP.

Year-on-year (%) change, unless otherwise specified

UNITED STATES

	2017	2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	04/19	05/19
Activity								
Real GDP	2.2	2.9	2.9	3.0	3.0	3.2	–	...
Retail sales (excluding cars and petrol)	4.5	4.7	5.2	5.4	3.4	3.4	3.7	2.5
Consumer confidence *(value)*	120.5	130.1	127.2	132.6	133.6	125.8	129.2	131.3
Industrial production	2.3	3.9	3.4	5.0	4.0	2.8	0.9	2.0
Manufacturing activity index (ISM) *(value)*	57.4	58.8	58.7	59.7	56.9	55.4	52.8	52.1
Housing starts *(thousands)*	1,209	1,250	1,261	1,234	1,185	1,213	1,281	1,269
Case-Shiller home price index *(value)*	200	211	211	212	214	215	216	...
Unemployment rate *(% lab. force)*	4.4	3.9	3.9	3.8	3.8	3.9	3.6	3.6
Employment-population ratio *(% pop. > 16 years)*	60.1	60.4	60.4	60.4	60.6	60.7	60.6	60.6
Trade balance [1] *(% GDP)*	–2.8	–2.4	–2.9	–2.9	–3.1	–3.0	–3.0	...
Prices								
Headline inflation	2.1	2.4	2.7	2.6	2.2	1.6	2.0	1.8
Core inflation	1.8	2.1	2.2	2.2	2.2	2.1	2.1	2.0

Note: *1. Cumulative figure over last 12 months.*
Source: *CaixaBank Research, based on data from the Department of Economic Analysis, Department of Labor, Federal Reserve, Standard & Poor's, ISM and Thomson Reuters Datastream.*

JAPAN

	2017	2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	04/19	05/19
Activity								
Real GDP	1.9	0.8	1.4	0.1	0.3	0.9	–	...
Consumer confidence *(value)*	43.8	43.6	43.7	43.4	42.8	41.3	40.4	39.4
Industrial production	2.9	1.0	1.3	–0.1	0.5	–1.1	–1.6	0.4
Business activity index (Tankan) *(value)*	19.0	20.8	21.0	19.0	19.0	12.0	–	...
Unemployment rate *(% lab. force)*	2.8	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Trade balance [1] *(% GDP)*	0.5	–0.1	0.4	0.1	–0.2	–0.3	–0.5	–0.6
Prices								
Headline inflation	0.5	1.0	0.6	1.1	0.9	0.3	0.9	0.8
Core inflation	0.1	0.3	0.3	0.3	0.3	0.4	0.6	0.5

Note: *1. Cumulative figure over last 12 months.*
Source: *CaixaBank Research, based on data from the Communications Department, Bank of Japan and Thomson Reuters Datastream.*

CHINA

	2017	2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	04/19	05/19
Activity								
Real GDP	6.8	6.6	6.7	6.5	6.4	6.4	–	...
Retail sales	10.3	9.0	9.0	9.0	8.3	8.5	7.2	8.6
Industrial production	6.6	6.2	6.6	6.0	5.7	6.4	5.4	5.0
PMI manufacturing *(value)*	51.6	50.9	51.6	51.1	49.9	49.7	50.1	49.4
Foreign sector								
Trade balance [1] *(value)*	420	352	377	349	352	382	369	388
Exports	7.9	9.9	11.5	11.7	4.0	1.3	–2.7	1.1
Imports	16.3	15.8	20.6	20.4	4.4	–4.6	4.1	–8.5
Prices								
Headline inflation	1.6	2.1	1.8	2.3	2.2	1.8	2.5	2.7
Official interest rate [2] *(value)*	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Renminbi per dollar *(value)*	6.8	6.6	6.4	6.8	6.9	6.8	6.7	6.9

Notes: *1. Cumulative figure over last 12 months. Billion dollars. 2. End of period.*
Source: *CaixaBank Research, based on data from the National Bureau of Statistics of China and Thomson Reuters Datastream.*

EURO AREA

Activity and employment indicators

Values, unless otherwise specified

	2017	2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	04/19	05/19
Retail sales *(year-on-year change)*	2.5	1.6	1.8	1.2	1.8	2.4	1.5	...
Industrial production *(year-on-year change)*	3.0	0.9	2.2	0.5	–2.0	–0.4	–0.4	...
Consumer confidence	–5.4	–4.9	–4.7	–5.1	–6.4	–7.0	–7.3	–6.5
Economic sentiment	110.1	111.2	111.8	110.9	108.8	106.0	103.9	105.2
Manufacturing PMI	57.4	55.0	55.5	54.3	51.7	49.1	47.9	47.7
Services PMI	55.6	54.5	54.6	54.4	52.8	52.4	52.8	52.9
Labour market								
Employment (people) *(year-on-year change)*	1.6	1.5	1.6	1.4	1.4	1.3	–	...
Unemployment rate *(% labour force)*	9.1	8.2	8.3	8.0	7.9	7.8	7.6	...
Germany *(% labour force)*	3.8	3.4	3.4	3.4	3.3	3.2	3.2	...
France *(% labour force)*	9.4	9.1	9.1	9.0	8.9	8.7	8.7	...
Italy *(% labour force)*	11.3	10.6	10.7	10.3	10.6	10.4	10.2	...
Real GDP*(year-on-year change)*	2.5	1.8	2.2	1.6	1.2	1.2	–	...
Germany *(year-on-year change)*	2.5	1.5	2.0	1.2	0.6	0.7	–	...
France *(year-on-year change)*	2.4	1.7	1.9	1.5	1.2	1.2	–	...
Italy *(year-on-year change)*	1.8	0.7	1.0	0.5	0.0	–0.1	–	...

Source: *CaixaBank Research, based on data from the Eurostat, European Central Bank, European Commission and Markit.*

Prices

Year-on-year change (%), unless otherwise specified

	2017	2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	04/19	05/19
General	1.5	1.8	1.7	2.1	1.9	1.4	1.7	1.2
Core	1.1	1.2	1.2	1.2	1.2	1.1	1.4	1.0

Source: *CaixaBank Research, based on data from the Eurostat, European Central Bank, European Commission and Markit.*

Foreign sector

Cumulative balance over the last 12 months as % of GDP of the last 4 quarters, unless otherwise specified

	2017	2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	04/19	05/19
Current balance	**3.5**	**3.2**	**3.7**	**3.4**	**3.2**	**3.0**	**2.9**	**...**
Germany	8.0	7.3	8.1	7.5	7.3	7.1	7.1	...
France	–0.6	–0.3	–0.3	–0.5	–0.3	–0.4	–0.6	...
Italy	2.6	2.5	2.7	2.6	2.5	2.7	2.7	...
Nominal effective exchange rate[1] *(value)*	**96.5**	**98.9**	**98.5**	**99.2**	**98.5**	**97.3**	**96.7**	**97.3**

Note: *1. Weighted by flow of foreign trade. Higher figures indicate the currency has appreciated.*
Source: *CaixaBank Research, based on data from the Eurostat, European Commission and national statistics institutes.*

Credit and deposits of non-financial sectors

Year-on-year change (%), unless otherwise specified

	2017	2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	04/19	05/19
Private sector financing								
Credit to non-financial firms	2.5	3.8	3.7	4.2	4.0	3.6	3.9	...
Credit to households[1,2]	2.6	3.0	2.9	3.1	3.2	3.3	3.4	...
Interest rate on loans to non-financial firms[3] *(%)*	1.3	1.2	1.2	1.2	1.2	1.2	1.2	...
Interest rate on loans to households for house purchases[4] *(%)*	1.7	1.6	1.6	1.6	1.6	1.6	1.6	...
Deposits								
On demand deposits	10.1	7.9	8.0	7.3	7.1	7.0	7.8	...
Other short-term deposits	–2.7	–1.5	–1.5	–1.4	–1.0	–0.4	0.5	...
Marketable instruments	1.4	–4.5	–3.2	–5.6	–3.4	–3.1	–5.9	...
Interest rate on deposits up to 1 year from households *(%)*	0.4	0.3	0.4	0.3	0.3	0.3	0.3	...

Notes: *1. Data adjusted for sales and securitization. 2. Including NPISH. 3. Loans of more than one million euros with a floating rate and an initial rate fixation period of up to one year. 4. Loans with a floating rate and an initial rate fixation period of up to one year.*
Source: *CaixaBank Research, based on data from the European Central Bank.*

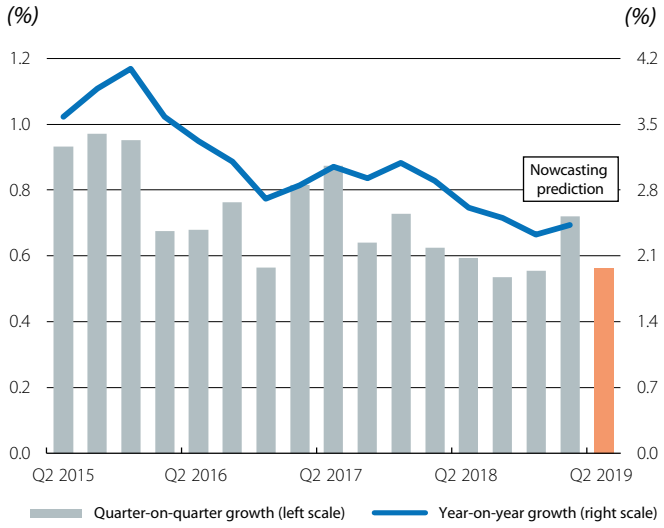
The Spanish economy shows strength in a demanding semester

Economic activity continues to grow at a steady pace. In the more adverse external environment described in the section on the economic outlook for the international economy of this same *Monthly Report*, the indicators show that the Spanish economy is weathering the slowdown in the global economy better than its European partners. In particular, after growing by a solid 0.7% quarter-on-quarter (2.4% year-on-year) in Q1 2019, CaixaBank Research's short-term GDP forecasting model suggests a quarter-on-quarter growth of 0.6% in Q2 (the first GDP estimate will be published on 31 July). This growth rate reflects the high level of job creation, the improvement in consumer confidence and the steady growth of turnover in both the services sector (+5.4% year-on-year in April, three-month moving average) and the industrial sector (+2.4% year-on-year). In addition, industrial production rebounded in April with growth of 1.7% (in March it had fallen by 3.0%, held back by the energy sector, which is especially volatile). On the other side of the scales, there has been a certain weakening of business confidence (in May, the manufacturing and services PMIs fell by 1.7 and 0.3 points down to 50.1 and 52.8 points, respectively), as well as of the foreign sector. Nevertheless, for the time being they are not holding back growth rates, which remain at considerable levels. As such, although growth continues to moderate towards levels that are more in line with the economic potential, and thus more sustainable, Spain remains one of the countries with the best growth rates in the euro area, driven particularly by the contribution from domestic demand and investment. This is also reflected in the latest macroeconomic forecasts by the ECB, which in the breakdown by country suggest that Spain's GDP will grow by 2.4% in 2019 as a whole, a figure in line with the scenario foreseen by CaixaBank Research (forecast of 2.3%).

The labour market shows dynamic growth. Employment growth stood at 2.8% year-on-year in May (seasonally adjusted data). This represents a good pace of job creation, albeit slightly lower than the 3.0% registered in April (on the other hand, this moderation is consistent with the trend towards more moderate growth in economic activity discussed earlier). Thus, the total number of people affiliated with Social Security stood at 19,442,113, very close to the all-time high reached in July 2007. By sector, the increased affiliation in services was of particular note, especially in tourism (+3.4%). On the other hand, the latest quarterly labour cost survey shows that, in the first quarter, the effective labour cost per hour rose by 2.4% year-on-year. This represents a 0.5-pp acceleration compared to the second half of 2018. This can partly be explained by the increase in company contributions at the beginning of the year (increase in the minimum wage and the removal of the contribution limit). Furthermore, this trend in labour costs is consistent with the wage increases agreed in collective agreements (2.2% on average from January to May).

Spain comes out of the excessive deficit procedure, after reducing its deficit to below 3% in 2018 (specifically, to 2.5%),

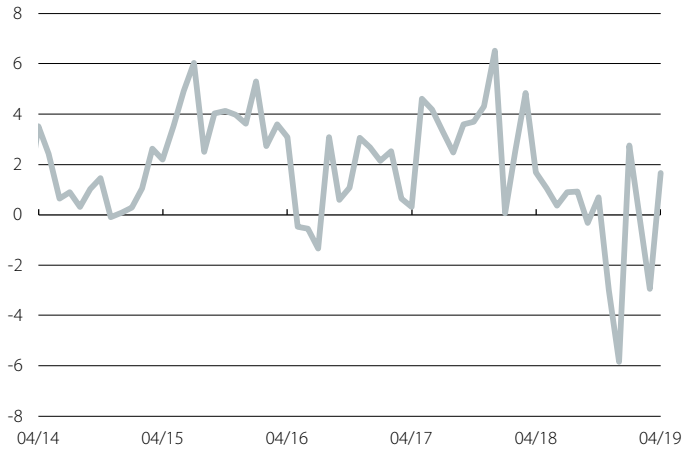
Spain: GDP growth



Source: *CaixaBank Research, based on data from the National Statistics Institute.*

Spain: industrial production

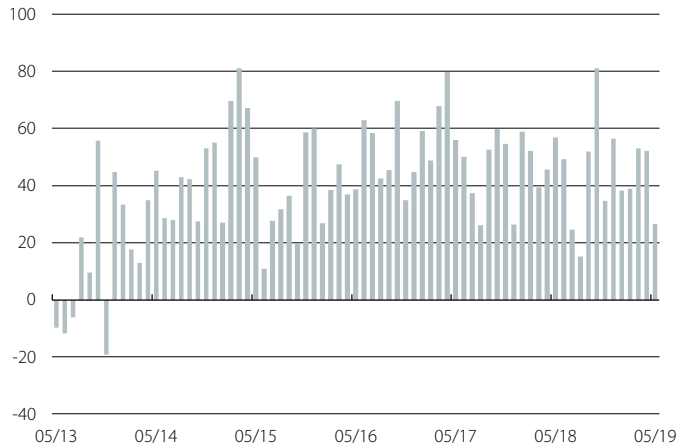
Year-on-year change (%)



Note: *Seasonally adjusted series.*
Source: *CaixaBank Research, based on data from the National Statistics Institute.*

Spain: registered workers affiliated with Social Security

Monthly change (thousands of people)



Note: *Seasonally adjusted series.*
Source: *CaixaBank Research, based on data from the Ministry of Employment and Social Security.*

and enters the preventive phase of the Stability and Growth Pact. This entails a change in the European Commission's approach to monitoring the public accounts, shifting towards medium-term goals such as the structural deficit, which allows the long-term fiscal position of the general government to be assessed (regardless of where the economy currently lies in the business cycle). Thus, the European Commission has requested from Spain a reduction in its structural deficit of 0.65% of GDP by 2020, slightly greater than the adjustment planned by the government in the Stability Plan (0.5% of GDP). As part of the reforms, the European authorities recommended reducing the duality of the labour market, maintaining the sustainability of the pension system and reducing regulatory fragmentation. The Commission also recommended that any one-off tax revenues should be used to reduce the level of public debt, which remains high (98.7% in Q1 2019).

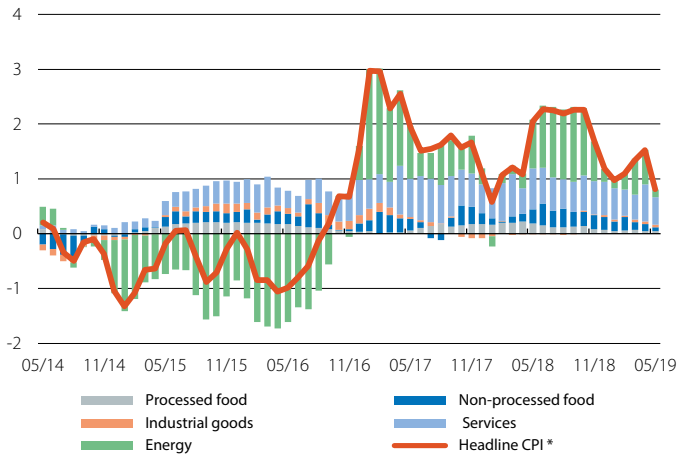
Inflation remains very contained and in June moderateto 0.4% (0.8% in May). Although the breakdown by component is not yet known, the fall in fuel prices suggests that the energy component would explain the bulk of the reduction. Core inflation, meanwhile, stood at 0.7% in May (the figure for June is not yet known), representing a 0.2-pp slowdown relative to April. This is partly the result of the fall in the prices of tourist packages and the calendar effect of Easter.

Respite in the deterioration of the current account balance. The current account balance improved in April, climbing to 0.7% of GDP (12-month cumulative balance), versus 0.6% in March. However, compared to April 2018 this figure still represents a reduction in the surplus of 0.9 pps. This deterioration is mainly attributable to the balance of non-energy goods (0.4 pps), the balance of services (0.3 pps) and, to a lesser extent, the energy balance (0.2 pps). The net international investment position (NIIP), meanwhile, stood at -77,7% of GDP in Q1 2019, which represents a slight deterioration compared to the previous quarter. All in all, over the past 12 months there has been a substantial improvement (of 6.1 pps), largely thanks to the revaluation of instruments in the debt portfolio.

The real estate sector, in a more mature phase of the cycle. The price of housing based on transactions (published by the NSI) grew by a considerable 6.8% year-on-year in Q1 2019, driven by the rise in the price of new housing (10.4%, compared to 8.0% in Q4), while second-hand housing slowed its pace of growth (6.2% in Q1, 6.4% in Q4). Over the coming quarters, the growth in housing prices will remain high, albeit with a slight moderation (around 5% on average in the period 2019-2020, according to CaixaBank Research) due to the real estate sector entering a more mature phase of the cycle. In line with this trend, the growth of home sales moderated in April, standing at 5.7% year-on-year (in 12-month cumulative terms), following four years of double-digit growth. As is the case in housing prices, sales of new and second-hand homes are following different trends. In particular, new home sales continued to go from strength to strength, registering 10.7% growth in April, compared to 4.6% growth in the case of second-hand homes (12-month cumulative figures).

Spain: contribution to inflation by component

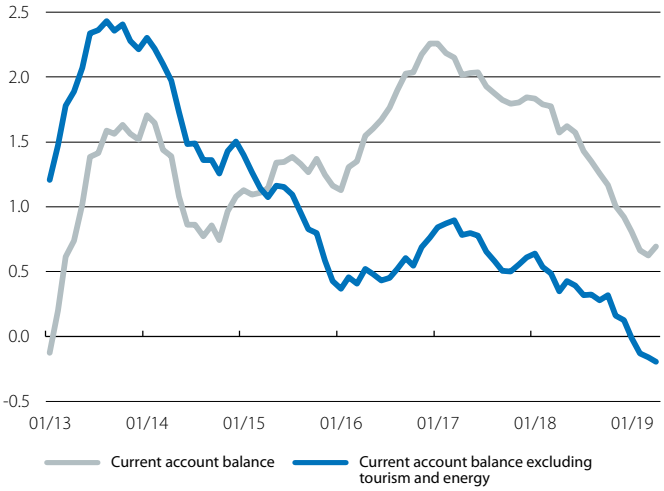
(pps)



Note: ** Year-on-year change (%).*
Source: *CaixaBank Research, based on data from the National Statistics Institute.*

Spain: current account balance

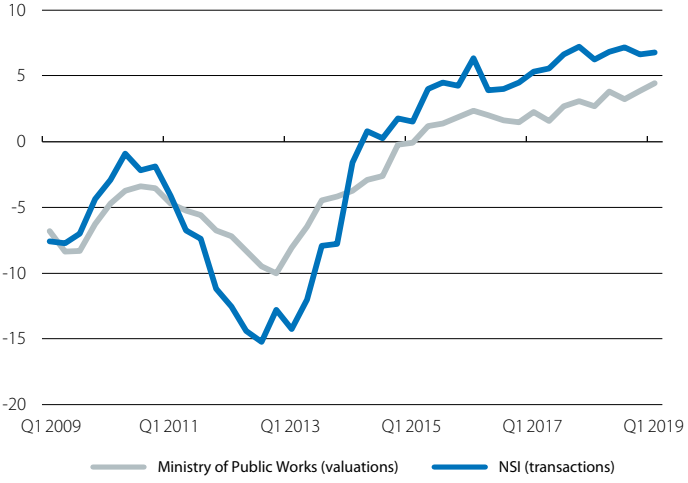
12-month cumulative balance (% of GDP)



Source: *CaixaBank Research, based on data from the National Statistics Institute.*

Spain: price of housing

Year-on-year change (%)



Note: *CaixaBank Research, based on data from the National Statistics Institute and the Ministry of Public Works.*

From lettuce to cars (part II): the complexity of exports influences the quality of employment

- What a country or region produces is an indication of its productive capacities and is intimately linked to the characteristics of the labour market.
- In this article, we show that workers employed in more complex sectors are less likely to have a temporary contract.
- This is particularly relevant for workers with a lower level of education, suggesting that these individuals benefit the most from a shift in productive specialisation towards more complex goods.

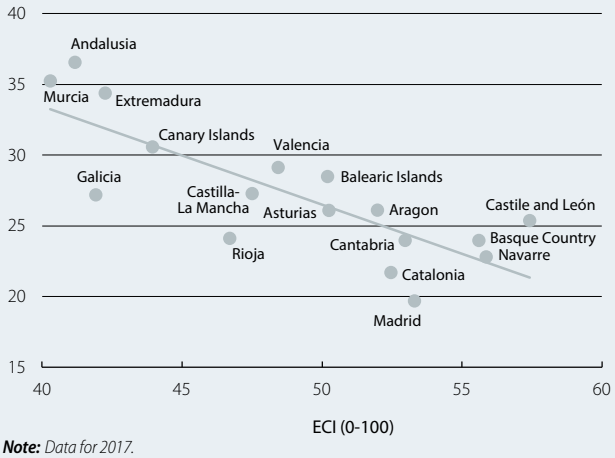
In a previous article,[1] we showed that there are major differences between the goods exported by Spain's various autonomous community regions. These differences can be measured using an export complexity index (ECI) at the regional level: an indicator that measures the degree of sophistication of the products exported by each Autonomous Community (AC) and provides an indication of that AC's productive capacity.[2] In this article, we go a step further by analysing how the complexity of the products that are exported is intimately linked with the characteristics of the labour market and, in particular, with the quality of the jobs generated by each region.

Relationship between the complexity of exports and the quality of employment

Several studies show that there is a close relationship between the incidence of temporary employment[3] and workers' productivity, since both employees and employers have fewer incentives to invest in specific human capital when the employment relationship is short-lived.[4] As a result, the production of more complex goods destined for the export markets is often associated with tasks that require more company or job-specific knowledge. We would therefore expect to see an inverse correlation between the complexity of the goods produced and temporary labour: the greater the complexity, the lower the incidence of temporary employment. This is precisely what the first chart illustrates at the AC level. As we can see, the temporary employment rate is below the Spanish average in Castile and Leon, Navarre and the Basque Country, the three ACs that top the export complexity list. At the other end of the scale, Murcia, Andalusia and Extremadura have a high rate of temporary employment and low export complexity.

Relationship between the complexity of exports (ECI) and temporary employment

Temporary employment rate (%)



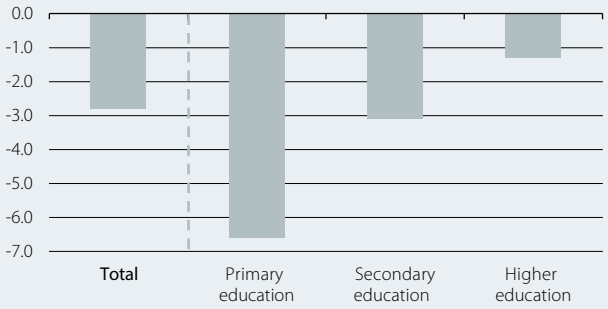
Note: *Data for 2017.*
Source: *C. Canals and J. Montoriol (2018).*

This simple relationship, though clearly illustrative, oversees the fact that having a temporary contract (as opposed to a permanent one) also largely depends on workers' specific characteristics, such as their level of education and age. Therefore, there may be other factors influencing the relationship we see in the chart between these two elements. To overcome this problem, we use a regression model at the individual level with information on workers provided by the labour force survey (LFS).[5] The second chart (first bar) shows the results of the model on the probability of having a temporary contract. Besides taking into account each worker's specific characteristics, each

1. See the Focus «From lettuce to cars: an analysis of the complexity of Spanish exports», available at www.caixabankresearch.com.
2. This index is developed based on the complexity index at the product level (PCI), developed by the MIT's Atlas of Economic Complexity, and the value of exports of each product from the various ACs (using data obtained from Datacomex). For a formal definition, see the Focus referenced in the first note.
3. The temporary employment rate refers to the percentage of workers with temporary contracts relative to the total number of workers.
4. See R. Sánchez and L. Toharia (2000). «Temporary workers and productivity: the case of Spain». Applied Economics, 32(5), 583-591; A. Cabrales, J.J. Dolado and R. Mora (2013). «Dual Labour Markets and (Lack of) On-The-Job Training: Evidence for Spain using PIAAC data». National report of the Programme for the International Assessment of Adult Competencies, 2, 9-38; and S. De la Rica, J.J. Dolado and V. Llorens (2008). «Ceilings or floors? Gender wage gaps by education in Spain». Journal of Population Economics, 21(3), 751 776.
5. All the results presented are based on C. Canals and J. Montoriol (2018). «La complejidad de las exportaciones y la calidad del empleo». Papeles de Economía Española, (158), 116.

Impact of greater export complexity on the incidence of temporary employment, according to the worker's education level

Probability of having a temporary contract (pps)



Note: *We use a probit model in which the dependent variable takes a value of 1 if the worker has a temporary contract and 0 if it is permanent. The first bar (Total) represents the impact that an increase of one standard deviation in the export complexity index (ECI), which measures the complexity of the products exported by each sector and autonomous community, has on the probability of having a temporary contract. The bars for Primary, Secondary and Higher education represent the impact of an increase of one standard deviation in the ECI according to the worker's level of education. Control variables are included, relating to the socio-demographic characteristics of the worker, as well as autonomous community fixed effects. The data includes workers in the primary and secondary sectors. Data for 2017.*
Source: *CaixaBank Research, based on data from C. Canals and J. Montoriol (2018).*

worker is also assigned the ECI for the AC where they live and the sector they work in.[6] The results leave no room for doubt: the complexity of the goods produced has a significant impact on the probability of having a temporary employment contract. For instance, the probability of having a temporary contract in Madrid is 2.8 pps lower than it is in Extremadura, due to differences in the complexity of the products produced in each of these ACs.[7,8]

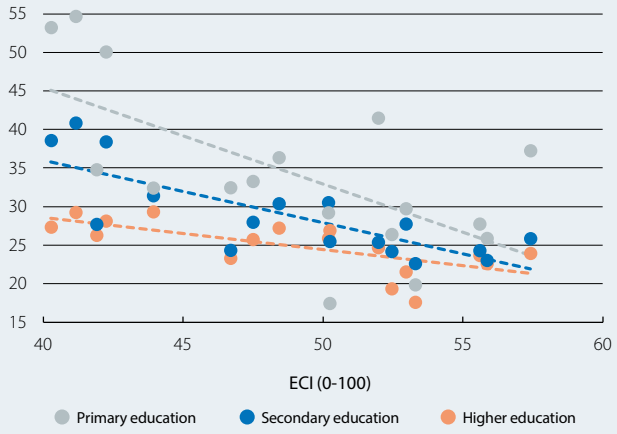
Education matters

As mentioned earlier, a product's complexity index reflects its degree of sophistication, meaning that it provides an indication of the level of technology needed to produce it. *A priori*, if human capital and technological capital complement one another, we would expect more complex production processes to require a higher level of human capital. Thus, companies that produce complex goods should incentivise long-term employment relations. In addition, they should also offer permanent contracts to workers with a lower educational level, in order not only to give them more incentives to work hard, but also to endow them with professional experience, continuous training and other elements that are key to boosting human capital.

In order to corroborate this hypothesis, we extended the regression analysis to assess the interaction between export complexity and workers' level of education. Before presenting the main results, however, it is worth illustrating the relationship at the AC level between the ECI and the rate of temporary employment according to the worker's level of education.[9] The third chart shows that ACs with a higher ECI tend to have a lower rate of temporary employment, although this inverse correlation is weaker for workers with a higher level of education. In other words, workers with a lower education level are those who benefit the most from working in sectors that produce more complex goods, since they have a lower incidence of temporary employment. Similarly, the results of the regression (second chart, bars 2, 3 and 4) corroborate the hypothesis that, for individuals with primary education or below, an increase in the complexity of exports – like that observed between the ACs of Extremadura and Madrid – reduces the probability of having a temporary contract by 6.6 pps. For those with a secondary education, the reduction is of 3.1 pps, while for those with higher education there is only a 1.3-pp reduction (furthermore, in the latter case, the coefficient is not far off 0 in some cases).

Relationship between export complexity (ECI) and the incidence of temporary employment according to the worker's education level

Temporary employment rate (%)



Note: *Each point on the chart represents an autonomous community. Data for 2017.*
Source: *C. Canals and J. Montoriol, (2018).*

6. The ECI by AC and sector is calculated in the same way as the ECI by AC, using the exports of different products as a measure to produce a weighted index. The main analysis considers workers in the primary and secondary sectors, since these are the sectors for which the ECI is available. For further details, see Canals and Montoriol (2018) referenced above.
7. The difference between the ECI of Extremadura and that of Madrid corresponds to approximately one standard deviation of the ECI.
8. The results also hold up when using other alternative variables to approximate the quality of employment, such as involuntary part-time work or workers who would like to work more hours.
9. Education levels, according to the CNED for 2014, are grouped into: primary (1, 2 and 10), secondary (21-41) and higher (51-81).

Spillovers into the wider economy

The analysis presented thus far only includes workers in goods-producing sectors. The reason for this is that, by design, the export complexity index can only be computed for goods and is not defined for services. Nevertheless, 76% of the Spanish workforce work in the services sector, so in order to complete the analysis, we examined whether there is a spillover effect from the primary and secondary productive sectors (i.e. natural resources such as agriculture and industry) into the tertiary sector (services). In particular, the hypothesis put forward is whether specialisation in the production of complex goods in a particular AC has a positive impact on the quality of employment in the services sector in the region. There are several channels through which this relationship could operate (for instance, greater competition between companies to attract workers could encourage hiring on permanent contracts), although analysing them in detail is beyond the scope of this article.

The results presented in the fourth chart appear to support this hypothesis. That is, there is a strong inverse correlation between temporary employment and complexity, not only in the primary and secondary sectors but also in the services sector. Specifically, an increase in the ECI[10] like the one outlined above results in a 3.5-pp reduction in the probability of having a temporary contract in the services sector (somewhat less than the 5.4-pp reduction seen in the primary and secondary sectors).[11] In other words, the empirical evidence suggests that there is a positive spillover between the complexity of the goods produced and the quality of employment in services.

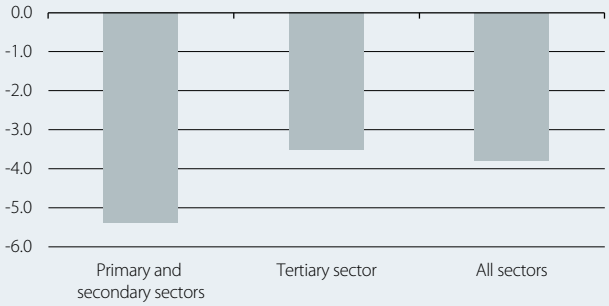
In conclusion: productive specialisation influences the quality of employment

The existence of notable differences in the productive specialisation of the various ACs has major implications for the labour market at the regional level. Those ACs specialising in the production and export of more complex goods have lower rates of temporary employment, especially among workers with a lower education level who tend to endure a more precarious employment situation. Therefore, not only is the volume of exports important, but what is exported also matters. What a country or region produces is a display of its productive capacities, and this is intimately linked to employment conditions and to labour productivity. In this regard, encouraging the production of more complex products can help to reduce the high rate of temporary employment in the Spanish economy and, at the same time, boost productivity growth in the long term.

Clàudia Canals and Judit Montoriol

Spillovers: impact of greater export complexity on the probability of having a temporary contract by sector

(p. p.)



Note: *We use a probit model in which the dependent variable takes a value of 1 if the worker has a temporary contract and 0 if it is permanent. The bars represent the impact of an increase of one standard deviation in the export complexity index (ECI), which measures the complexity of products exported in each sector and autonomous community. Control variables are included relating to the socio-demographic characteristics of the worker. Autonomous Community fixed effects are not included. Data for 2017.*
Source: *CaixaBank Research, based on data from C. Canals and J. Montoriol (2018).*

10. Note that ECI is defined at the AC level (without taking the sector into account), since it cannot be calculated for services.
11. Note that the main difference between the current estimates for the primary and secondary sectors and the previous estimates is that, before, the ECI was defined at the sector and AC level, whereas this is not the case in the current estimates.

Activity and employment indicators

Year-on-year change (%), unless otherwise specified

	2017	2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	04/19	05/19	06/19
Industry									
Industrial production index	3.2	0.3	0.5	–2.7	–0.1	...	1.7	...	...
Indicator of confidence in industry *(value)*	1.0	–0.1	–2.6	–1.9	–3.8	–4.6	–4.9	–4.1	–4.8
Manufacturing PMI *(value)*	54.8	53.3	52.4	51.8	51.1	...	51.8	50.1	...
Construction									
Building permits *(cumulative over 12 months)*	22.9	25.7	25.8	23.9	25.8	...	24.6	...	...
House sales *(cumulative over 12 months)*	14.1	14.1	13.3	11.2	7.9	...	5.7	...	...
House prices	6.2	6.7	7.2	6.6	6.8	...	–	–	–
Services									
Foreign tourists *(cumulative over 12 months)*	10.0	4.0	1.5	0.9	1.0	–8.3	1.6	...	...
Services PMI *(value)*	56.4	54.8	52.6	54.0	55.3	...	53.1	52.8	...
Consumption									
Retail sales	1.0	0.7	–0.4	1.4	1.3	...	1.3	2.4	...
Car registrations	7.9	7.8	17.0	–7.6	–7.0	...	2.6	–7.3	...
Consumer confidence index *(value)*	–3.4	–4.2	–3.7	–6.2	–4.8	–4.0	–6.1	–3.7	–2.1
Labour market									
Employment [1]	2.6	2.7	2.5	3.0	3.2	...	–	–	–
Unemployment rate (% labour force)	17.2	15.3	14.6	14.4	14.7	...	–	–	–
Registered as employed with Social Security [2]	3.6	3.1	2.9	3.0	2.9	...	3.0	2.8	...
GDP	**3.0**	**2.6**	**2.5**	**2.3**	**2.4**	**...**	**–**	**–**	**–**

Prices

Year-on-year change (%), unless otherwise specified

	2017	2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	04/19	05/19	06/19
General	2.0	1.7	2.2	1.7	1.1	0.9	1.5	0.8	0.4
Core	1.1	0.9	0.8	0.9	0.7	...	0.9	0.7	...

Foreign sector

Cumulative balance over the last 12 months in billions of euros, unless otherwise specified

	2017	2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	04/19	05/19	06/19
Trade of goods									
Exports *(year-on-year change, cumulative over 12 months)*	8.9	2.9	4.5	2.9	2.4	...	1.9	...	...
Imports *(year-on-year change, cumulative over 12 months)*	10.5	5.6	6.2	5.6	6.1	...	4.6	...	...
Current balance	**21.5**	**11.1**	**15.0**	**11.1**	**7.6**	**...**	**8.5**	**...**	**...**
Goods and services	33.6	23.4	26.7	23.4	20.6	...	21.9	...	...
Primary and secondary income	–12.1	–12.3	–11.7	–12.3	–13.0	...	–13.4	...	...
Net lending (+) / borrowing (–) capacity	**24.2**	**17.4**	**18.8**	**17.4**	**13.8**	**...**	**14.8**	**...**	**...**

Credit and deposits in non-financial sectors [3]

Year-on-year change (%), unless otherwise specified

	2017	2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	04/19	05/19	06/19
Deposits									
Household and company deposits	2.8	3.2	3.4	3.7	5.3	...	6.2	...	...
Sight and savings	17.6	10.9	10.3	10.0	11.3	...	11.6	...	...
Term and notice	–24.2	–19.9	–18.7	–16.8	–13.7	...	–12.5	...	...
General government deposits	–8.7	15.4	10.4	16.9	17.8	...	19.9	...	...
TOTAL	**1.9**	**3.8**	**3.8**	**4.5**	**6.0**	**...**	**7.0**	**...**	**...**
Outstanding balance of credit									
Private sector	–2.2	–2.4	–2.3	–2.2	–2.1	...	–1.2	...	...
Non-financial firms	–3.6	–5.5	–5.6	–5.7	–5.5	...	–3.3	...	...
Households - housing	–2.8	–1.9	–1.7	–1.4	–1.1	...	–1.1	...	...
Households - other purposes	3.7	5.1	5.5	4.7	4.1	...	3.8	...	...
General government	–9.7	–10.6	–8.9	–11.8	–10.4	...	–8.9	...	...
TOTAL	**–2.8**	**–2.9**	**–2.7**	**–2.8**	**–2.6**	**...**	**–1.7**	**...**	**...**
NPL ratio *(%)* [4]	**7.8**	**5.8**	**6.2**	**5.8**	**5.7**	**...**	**5.7**	**...**	**...**

Notes: *1. Estimate based on the Active Population Survey. 2. Average monthly figures. 3. Aggregate figures for the Spanish banking sector and residents in Spain. 4. Period-end figure.*

Source: *CaixaBank Research, based on data from the Ministry of Economy, the Ministry of Public Works, the Ministry of Employment and Social Security, the National Statistics Institute, the State Employment Service, Markit, the European Commission, the Department of Customs and Special Taxes and the Bank of Spain.*

Portugal proves resilient in a demanding global environment

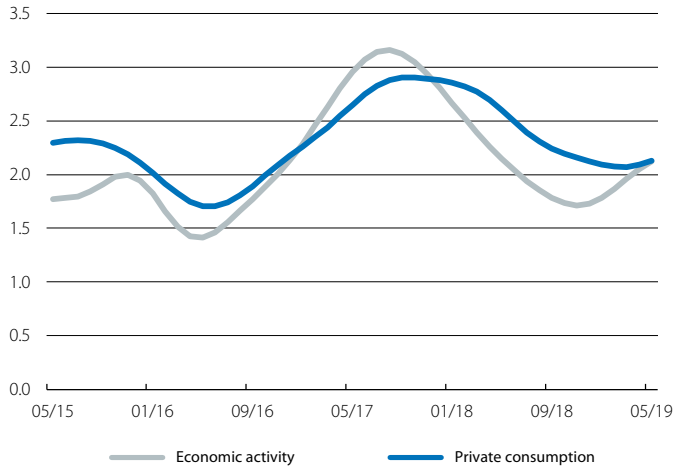
Economic activity grows at a steady pace. In May, the coincident economic activity indicator developed by the Bank of Portugal (which has a strong correlation with GDP) stood at 2.1%. This follows the figure of 2.0% registered in April and points towards economic activity growth of around 2% in Q2 2019 (i.e. very much in line with GDP growth of 1.8% in the first quarter of the year). In terms of components, domestic demand remains the main driver of growth, as is clearly reflected in most of the indicators. For example, in addition to the encouraging labour market data discussed below, the coincident indicator for household consumption also stood at 2.1% in May (in line with the figure for April and the average for Q1 2019), while the synthetic indicator for investment accelerated at the beginning of the second quarter. The Bank of Portugal itself highlighted the strength of domestic demand, and of investment in particular, in its Economic Bulletin of June. In this Bulletin, it presented an update of its economic forecasts (GDP growth of 1.7% in 2019 and of 1.6% for 2020-2021), which is consistent with the scenario forecast by CaixaBank Research. However, some sentiment indicators suggest a more cautious performance of industry, trade and construction over the coming quarters (for instance, the confidence index for industry has declined to –3.3 points for the average for Q2 2019, versus the –1.4 points registered in Q1). These indices also point out that the Portuguese economy is operating in a more adverse external environment.

The external financing needs reached 0.2% of GDP in Q1 2019 (4-quarter cumulative balance). This represents a deterioration of 1.3 pps compared to the net lending capacity of Q1 2018 (+1.1% of GDP) and reflects differing behaviour among sectors. On the one hand, the public sector stood out as having performed particularly well, with external borrowing needs that fell to 0.1% of GDP (–0.6 pps compared to Q1 2018). This was largely thanks to the reduction in financing costs and the increased tax revenues (boosted in turn by the strong performance of the labour market). On the other hand, the external borrowing needs of non-financial corporations and the net lending capacity of households deteriorated substantially. In particular, the borrowing of non-financial corporations is being held back by the strong recovery of investment and stood at 2.4% of GDP (+1.6 pps). The net lending capacity of households, meanwhile, decreased to 0.4% (–0.4 pps), in a context in which the household savings rate remains at almost minimum levels (4.5% in the March 2019).

The deterioration in the current account balance eased in April, when the current account deficit stood at 1.0% of GDP (12-month cumulative balance). This figure represents a slight improvement over March (1.2%), thanks to the moderation in the income balance deficit (which fell from 1.6% in March to 1.2% in April). Meanwhile, the balance of services maintained a surplus of 8.2% and the deficit in the balance of goods

Portugal: coincident economic activity indicators

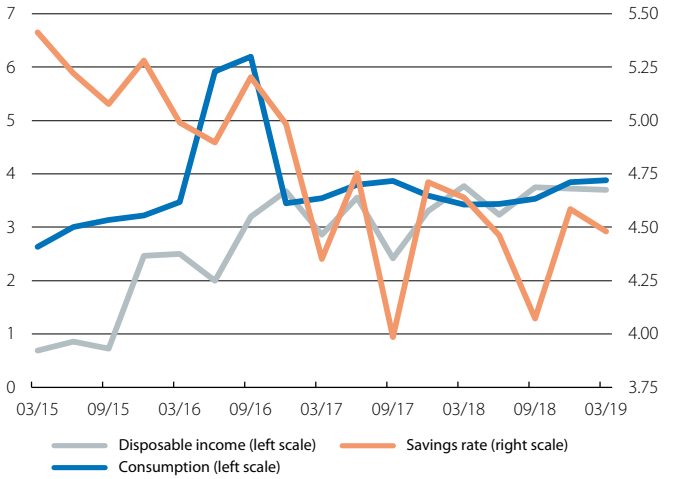
Year-on-year change (%)



Source: *CaixaBank Research, based on data from the Bank of Portugal.*

Portugal: household savings, income and consumption

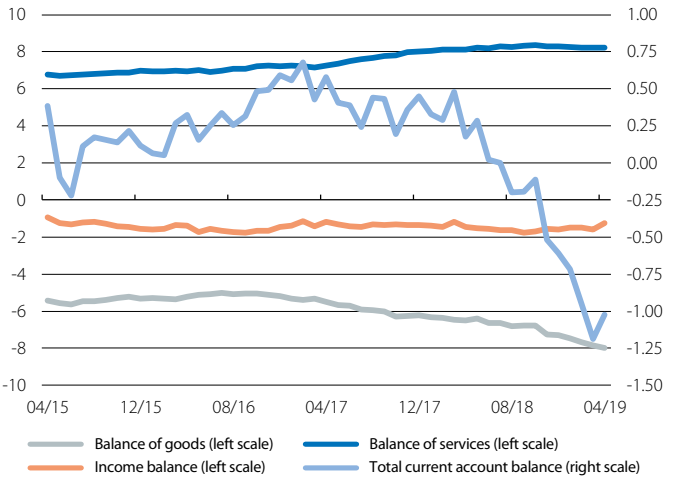
Year-on-year change (%) *(% of disposable income)*



Source: *CaixaBank Research, based on data from the National Statistics Institute of Portugal.*

Portugal: current account balance

(% of GDP) *(% of GDP)*



Source: *CaixaBank Research, based on data from the Bank of Portugal.*

increased to 8.0% (7.8% in March). The deterioration in the current account balance so far this year is mainly due to the combination of slower growth in exports (in a more adverse external environment) and greater investment in machinery and transport equipment (with the resulting knock-on effect on imports). This trend is likely to persist over the coming quarters (we anticipate a current account deficit of around 1.8% for 2019 as a whole).

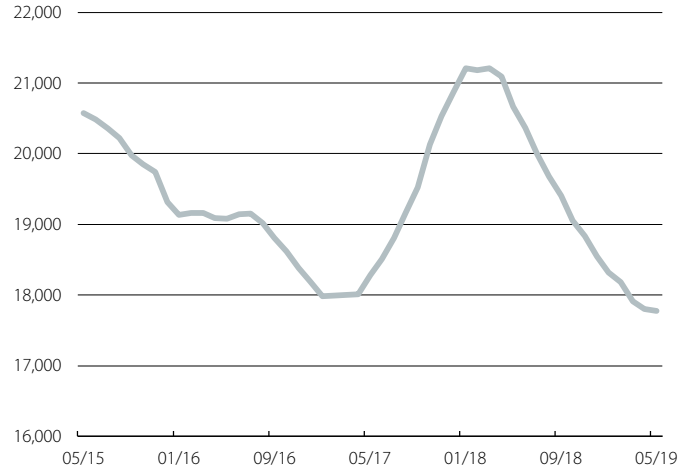
The labour market shows a positive performance. In May, the unemployment rate remained at 6.6% (in seasonally adjusted terms), the same figure as in April and –0.5 pps below that of May 2018. The population in employment, meanwhile, continued to rise (0.8% year-on-year), albeit much more moderately than in the past (2.5% in May 2018 and 2.3% on average in 2018). This moderation suggests that, after several years of recovery, the labour market is entering a more mature phase, as well as being in line with the economy's convergence towards more moderate growth rates. Similarly, job offers received by the Institute for Employment and Vocational Training (known as the IEFP in Portuguese) stood at slightly below 18,000 in May (12-month moving average), which represents a reduction of some 3,000 offers compared to the figure for May 2018.

The real estate market remains buoyant. In Q1 2019, the price of housing rose by a solid 9.2% year-on-year, only 1 decimal point below the rate observed in Q4 2018. This slight moderation was due to the slowdown in the growth rate of new housing prices (6.0% in Q1 2019, compared to 8.5% in Q4 2018), since the prices of second-hand homes accelerated (10.0% versus 9.5%). Housing construction, meanwhile, continued to recover and in Q1 2019 around 3,000 new homes were completed (+8.4% year-on-year). This is still a considerable growth rate (despite the significant moderation compared to previous quarters, when growth rates of over 20% were recorded). Furthermore, coupled with the increase in construction permits granted (+16.5% year-on-year in the first four months of 2019), this will facilitate the narrowing of the gap between supply and demand for housing and will contribute to curbing price growth.

New lending transactions increased by 0.4% in the first four months of the year. Yet, this figure is strongly affected by the fall in new loans to firms and, in particular, due to a base effect related to a very large lending transaction carried out in January 2018. Correcting for this effect, total new lending would have grown by 5.5% year on year. In the case of households, new lending transactions for housing slowed in the first four months as a whole (5.6% year-on-year, compared to 19.6% in 2018) and fell in the case of consumer credit (–2.9%, versus +9,3% in 2018). The Bank of Portugal, meanwhile, gave a positive assessment of credit institutions' compliance with the macroprudential recommendations that had come into force in July 2018 with the aim of promoting financial stability.

Portugal: job vacancy offers

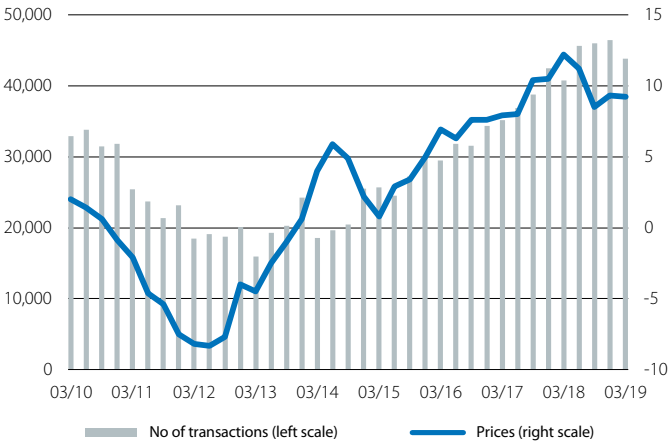
(12-month moving average)



Source: *CaixaBank Research, based on data from the Bank of Portugal and the Social Security institute of Portugal.*

Portugal: prices and transactions in the residential real estate market

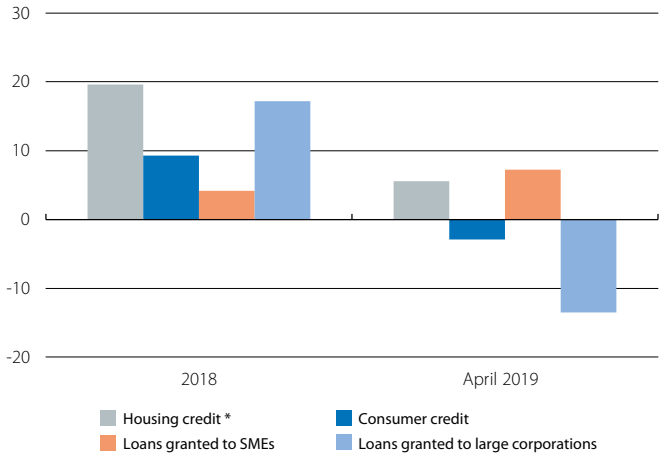
Number *Year-on-year change (%)*



Source: *CaixaBank Research, based on data from the National Statistics Institute of Portugal.*

Portugal: new lending

Year-on-year change (%)



Note: ** Housing credit excludes refinancing transactions.*
Source: *CaixaBank Research, based on data from the Bank of Portugal.*

Activity and employment indicators

Year-on-year change (%), unless otherwise specified

	2017	2018	Q4 2018	Q1 2019	Q2 2019	02/19	03/19	04/19	05/19	06/19
Coincident economic activity index	2.9	2.1	1.7	1.9	...	1.9	2.0	2.0	2.1	...
Industry										
Industrial production index	4.0	0.1	–1.3	–3.9	...	–2.0	–7.1	–1.6	...	...
Confidence indicator in industry *(value)*	2.1	0.8	–0.8	–1.4	–3.3	–1.2	–2.1	–2.9	–3.7	–3.4
Construction										
Building permits *(cumulative over 12 months)*	16.6	19.1	19.1	20.0	...	...	20.0	...	...	...
House sales	20.5	16.8	9.4	7.6	...	...	7.6	...	...	...
House prices *(euro / m² - valuation)*	5.1	5.8	6.1	6.9	...	6.8	6.9	7.3	7.6	...
Services										
Foreign tourists *(cumulative over 12 months)*	16.0	3.0	3.5	2.6	...	2.8	1.9	2.8	...	...
Confidence indicator in services *(value)*	13.3	14.1	13.0	15.3	14.2	15.8	14.8	13.7	14.4	14.5
Consumption										
Retail sales	4.1	4.2	5.2	4.3	...	5.0	2.0	9.4	4.7	...
Coincident indicator for private consumption	2.7	2.5	2.2	2.1	...	2.1	2.1	2.1	2.1	...
Consumer confidence index *(value)*	–5.4	–4.6	–5.4	–8.3	–8.9	–8.3	–9.5	–9.3	–9.0	–8.3
Labour market										
Employment	3.3	2.3	1.6	1.5	...	1.4	1.2	1.0	0.8	...
Unemployment rate (% labour force)	8.9	7.0	6.7	6.8	...	6.5	6.5	6.6	6.6	...
GDP	**2.8**	**2.1**	**1.7**	**1.8**	**...**	**...**	**1.8**	**...**	**...**	**...**

Prices

Year-on-year change (%), unless otherwise specified

	2017	2018	Q4 2018	Q1 2019	Q2 2019	02/19	03/19	04/19	05/19	06/19
General	1.4	1.0	0.8	0.8	0.6	0.9	0.8	0.8	0.4	0.4
Core	1.1	0.7	0.5	0.8	0.6	1.0	0.7	0.8	0.5	0.6

Foreign sector

Cumulative balance over the last 12 months in billions of euros, unless otherwise specified

	2017	2018	Q4 2018	Q1 2019	Q2 2019	02/19	03/19	04/19	05/19	06/19
Trade of goods										
Exports *(year-on-year change, cumulative over 12 months)*	10.0	5.3	5.3	5.8	...	4.8	5.8	4.7	...	...
Imports *(year-on-year change, cumulative over 12 months)*	13.5	8.0	8.0	9.5	...	8.6	9.5	9.4	...	...
Current balance	**0.9**	**–1.2**	**–1.2**	**–2.4**	...	**–1.8**	**–2.4**	**–2.1**	**...**	**...**
Goods and services	3.5	2.0	2.0	0.8	...	1.1	0.8	0.4	...	...
Primary and secondary income	–2.6	–3.2	–3.2	–3.2	...	–2.9	–3.2	–2.5	...	...
Net lending (+) / borrowing (–) capacity	**2.7**	**0.9**	**0.9**	**–0.3**	**...**	**0.4**	**–0.3**	**0.0**	**...**	**...**

Credit and deposits in non-financial sectors

Year-on-year change (%), unless otherwise specified

	2017	2018	Q4 2018	Q1 2019	Q2 2019	02/19	03/19	04/19	05/19	06/19
Deposits [1]										
Household and company deposits	1.7	3.8	4.2	4.9	...	4.7	4.9	4.8	...	...
Sight and savings	15.7	14.3	14.6	14.2	...	13.4	14.4	14.2	...	...
Term and notice	–5.8	–3.0	–3.1	–1.9	...	–1.6	–2.1	–2.3	...	...
General government deposits	1.3	–1.9	–9.9	–11.6	...	–12.4	–6.6	–5.2	...	...
TOTAL	**1.6**	**3.5**	**3.4**	**4.1**	**...**	**3.9**	**4.3**	**4.4**	**...**	**...**
Outstanding balance of credit [1]										
Private sector	–4.0	–1.7	–1.8	–2.6	...	–2.5	–2.5	–2.4	...	...
Non-financial firms	–6.5	–3.8	–4.5	–5.7	...	–5.6	–5.3	–5.0	...	...
Households - housing	–3.1	–1.5	–1.3	–1.5	...	–1.4	–1.5	–1.4	...	...
Households - other purposes	0.9	4.5	5.2	3.1	...	3.4	2.4	1.9	...	...
General government	9.3	2.4	–11.6	–12.5	...	–13.4	–10.4	–11.4	...	...
TOTAL	**–3.5**	**–1.6**	**–2.3**	**–3.0**	**...**	**–3.0**	**–2.9**	**–2.8**	**...**	**...**
NPL ratio *(%)* [2]	**13.3**	**9.4**	**9.4**	**...**	**...**	**...**	**...**	**...**	**...**	**...**

Notes: *1. Aggregate figures for the Portuguese banking sector and residents in Portugal. 2. Period-end figure.*
Source: *CaixaBank Research, based on data from the National Statistics Institute, Bank of Portugal and Datastream.*

The digital economy: the challenge of measuring a technological revolution

The digital economy, or new economy, has come of age. The statistics which, as we shall see later, have so many caveats in capturing the extent of digitisation have at least been able to clearly detect the «core» of that process, i.e. the dissemination of information and communication technologies (ICT) since the mid-1990s. Yet there are still great difficulties in measuring the full extent of digitisation, primarily because part of it (perhaps most of it, in fact) falls outside traditional market exchanges and, consequently, is not captured in the conventional statistics. In this article, we will start by looking at the existing measures that are used to build these statistics, before offering some examples of additional measures. Considering these measures as a whole, it emerges a vision of the economy that is, perhaps, somewhat different to what we are used to: we are no doubt now living in a world with more growth, less inflation and greater well-being.

Measuring the «core»: the digital economy, in the strict sense of the term, represents less than 10% of the total economy

- In most countries with modern national statistics, starting in the mid-1990s an acceleration occurred in the diffusion of ICT, which constitutes the technological core of the digital economy.
- The most ambitious measurement effort to date was undertaken by a team of economists from the Bureau of Economic Analysis (BEA) in the US (Barefoot *et al.*, 2018),[1] which has developed a satellite set of the US national accounts that measures the digital economy.[2] Its methodological approach, which probably anticipates what other statistical institutes will do in the future, is as follows:
  - They define the digital economy as that which integrates ICT infrastructure, the exchange of digital goods and services (e-commerce) and digital content.
  - Using information from the supply side of the economy, they use the 5,000 categories of goods and services and select 200 types of products and services that they consider to be digital.
  - Finally, they identify the sectors that produce these 200 goods and services and, for each of these sectors, they disentangle the part that is authentically digital from that which is conventional. Then, for each sector they estimate the value added and other economic measures of the digital segment.
- As a result of this exercise, Barefoot *et al.* (2018) obtained three key results:
  - If the sum of the digital segments from all sectors that provide digital goods and services are added together and compared with the conventional sectors, they concluded that, in 2016, the digital economy represented 7% of GDP in the US, ahead of sectors such as retail. This estimate is consistent with another by the IMF (2018), in which it is noted that, in many countries, the digital sector represents less than 10% of the value added, income or total employment.[3]
  - The digital economy is more dynamic than the conventional one: between 2006 and 2016, the latter grew at an average annual rate of 1.5%, while the digital economy did so at an average of 5.6%.
  - The digital economy is less inflationary than the traditional one: in the same period from 2006 to 2016, while the prices of conventional goods and services grew at an annual average of 1.5%, those of digital goods and services fell by 0.4% per year.

If we correct for the undervaluation of digital goods and services, GDP growth could be significantly higher than conventional estimates suggest

- These figures, and in particular that of the weight of the digital sector in the economy as a whole, may seem somewhat disappointing to the readers, who perceive that the digital world pervades virtually all areas of the economy and society. The truth is that, despite these figures having the virtue of being methodologically rigorous and, therefore, the ability to be integrated into a national accounting system without any problems, they do not address the two essential problems for adequately measuring the digital economy:
  - Many digital transactions do not have an explicit market price.
  - Digital products and services are subject to rapid changes in quality and obsolescence, which makes it difficult to correctly calculate prices (for instance, is the first smartphone, which is not only worth many times more than any previously existing mobile phone but also has many times the performance, the same product as a conventional mobile phone? How should this, then, be incorporated into the basket of goods for determining the CPI?).
- In order to compensate for these limitations, at least partly, attempts have been made to calculate additional measures. At this point, let us explore two alternatives that seek to monetise that part of the digital economy that has no explicit price:
  - The first alternative is to treat «free» goods in the same way as free public services, i.e. valuing them at their cost of production. An example of such an approach is that used by Nakamura *et al.* (2018)[4], which estimates the production costs of free digital media and other similar services based on the income generated from advertising and marketing (the idea

1. K. Barefoot, D. Curtis, W.A. Jolliff, J.R. Nicholson and R. Omohundro (2018). «Defining and Measuring the Digital Economy». US Department of Commerce Bureau of Economic Analysis, Washington, DC, 15.
2. The satellite set of the national accounts are used to segregate specific areas or sectors and to reflect all the relevant economic information in them.
3. IMF (2018). «Measuring the digital economy». Staff Report, Policy Papers, April.
4. L.I. Nakamura, J. Samuels and R.H. Soloveichik (2017). «Measuring the 'Free' Digital Economy within the GDP and Productivity Accounts», Working Paper n° 17-37, Federal Reserve Bank of Philadelphia.

is that, in fact, there is a transaction in which the consumer enjoys the free digital good in exchange for consuming the advertisements and marketing material). On this basis, this approach estimates that the annual GDP growth of the US in the period 2005-2015 would have been 0.10 pp higher than the conventional estimate.

- The second major alternative is to simulate a hypothetical market and use it to try to infer the value of certain digital goods. This approach, which is frequently used in environmental economics to value intangible goods such as landscape, is that followed, among others, by Brynjolfsson and co-authors (2018).[5] These authors conducted different experiments with a sample of users of digital applications in order to estimate how much they would be willing to pay for the free services they enjoyed, based on the value they extracted from using such applications. In the case of Facebook, for instance, it was estimated that it had added more than 1 decimal point per year to GDP growth between 2007 and 2013.

- As can be seen, these figures suggest that the undervaluation of digitisation in GDP could be significant, since even these exercises conducted for specific digital goods indicate a sizable impact.

Spain and Portugal have made progress in the dissemination of digitisation, but remain mid-way in the European ranking

- Among the approaches that seek to complement conventional measures, specific efforts are being made to better approximate the penetration rate of digitisation using new indicators. This approach highlights, for example, the work that has been done in the EU through the so-called digital economy and society index (DESI), which calculates a measure of the dissemination of digitisation by taking into consideration five factors: i) connectivity (25% weight in the total index), ii) human capital (25%), iii) internet use (15%), iv) integration of digital technology (20%) and v) digital public services (15%). One of the main virtues of the DESI is that it allows us to make an approximation for Spain and Portugal, two economies where there are few statistics on digitisation.

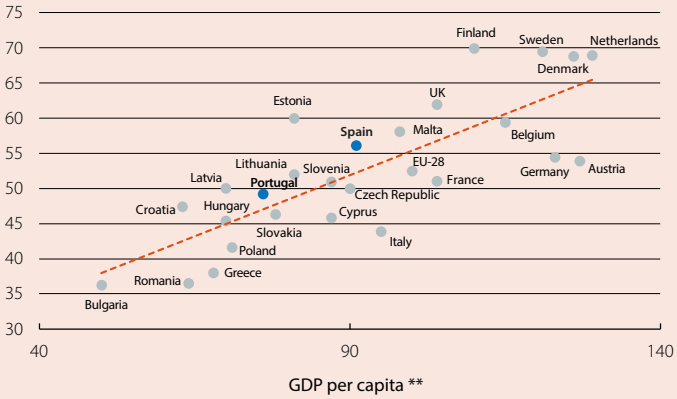
- Although the DESI covers only a relatively short period of time (2014-2018), some initial conclusions can nevertheless be drawn:

  - In 2018, Spain's position in terms of digital distribution was slightly above the EU average, while that of Portugal was slightly below. In recent years, Spain has tended to climb the ranking, while Portugal has dropped down.

  - Based on the degree of economic development in Spain and Portugal, what ought to be their level of digital penetration? The data suggest that both Spain and Portugal have a level of digitisation that is slightly higher than would be expected for their level of income. In any case, both countries trail far behind the economies whose degree of digitisation is significantly higher than that of their relative prosperity, such as the Nordic countries and the Netherlands.

Level of relative digitisation and prosperity in the EU

*DESI index * (points)*



Notes: ** Data for 2018. ** GDP per capita for 2018 in PPP terms, index EU-28 = 100.*
Source: *CaixaBank Research, based on data from the Digital Scoreboard of the European Commission and from Eurostat.*

- It is also important to identify relative strengths and weaknesses. Both countries stand higher in the ranking in the field of digital public services (Spain is the fourth best in the EU and Portugal, the ninth), while Spain also scores well in connectivity, an area which has seen a significant improvement over the past four years. The weakest point in the Iberian economies is human capital, although it should be recognised that Portugal and, to a lesser extent, Spain have improved since 2014.

In conclusion: we are living in a world of faster growth and lower inflation and, in this world, very few sectors will be unaffected by digital disruption

- If the measures of the digital sector were more accurate, it would probably become more clear that we are, in fact, in an economy with an effective growth that may be higher than that conventionally considered, which could be operating with levels of inflation below those published and which could also be generating higher well-being among consumers than previously thought.

- In this digital economy, the view we had just four years ago (Masllorens and Ruiz, 2015), in which we differentiated between «pure» sectors (that operate entirely in the digital world), «revolutionised» sectors (whose value chain has undergone a complete transformation due to digitisation) and «traditional» sectors (whose value chain has not undergone any significant disruption), may have lost much of its meaning: it is increasingly difficult to identify «traditional» sectors, and it will probably become even more so in the future.[6]

Àlex Ruiz

5. E. Brynjolfsson, W.E. Diewert, F. Eggers, K.J. Fox and A. Gannamaneni (2018). «The Digital Economy, GDP and Consumer Welfare: Theory and Evidence». ESCoE Conference on Economic Measurement, Bank of England.
6. See the article «The digital economy: the global data revolution», in the Dossier of the MR07/2015.

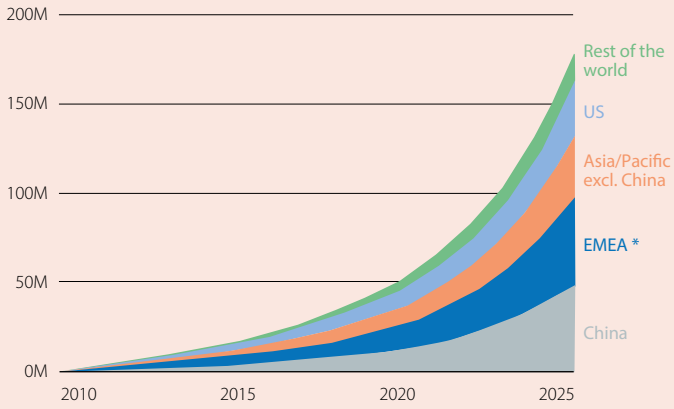
The data revolution: competition and responsible use

In recent years, the importance of data for the economy has become even more evident (see first chart). With digitisation, everything we do leaves a trace on the internet. When, for example, we open a mobile app or make a purchase online, we generate data that detail what we have done or where we have been. In fact, it is estimated that more data were generated in 2017 than in the previous 5,000 years.[1] In other words, the digital world is becoming increasingly capable of accurately describing what goes on in the physical world. This abundance of digital information, together with the use of new technologies – such as greater computing power – that make it possible to get more out of the data, generates significant competitive advantages for all the companies that know how to make use of it. However, this intensive use of digital information is also the focus of many debates because, inter alia, it raises fundamental questions about data ownership and privacy.

In this article, we look at two key aspects that emerge with the use of digital information by firms: on the one hand, changes in the nature of competition, and on the other, responsible and ethical use of data and of artificial intelligence.

Global data growth

The volume of data has increased exponentially in the digital economy and will accelerate over the next decade (Zettabytes)



Note: ** EMEA stands for Europe, Middle East and Africa.*
Source: *CaixaBank Research, based on data from the Bank of England («The Future of Finance»).*

On the nature of competition

- **Data, in themselves, are non-rival assets**. That is to say, they can be used simultaneously by different parties without the amount of data available for the rest being affected. For instance, it is technologically possible for all researchers in the field of medicine to use the aggregate stock of medical data of patients at the same time. Due to this non-rivalry, the exchange of data flows can convey enormous benefits for society.
- **The ability to extract value from data provides significant competitive advantages**. Data, in themselves, have no value: the challenge is converting that information into value. In other words, it is useless to have data from millions of interactions if this information cannot be used to better understand the consumer or user, to find out what they need or how to improve their customer experience. However, converting information into value requires specific capabilities. These include having an adequate infrastructure to store and process the data, experience in data analysis and having specialised talent (capable of posing the right questions and articulating the answers to such questions).
- Given that data can provide major information advantages over competitors, companies do not have incentives **to share the data they have accumulated with third parties**. In this context, information can become concentrated – and disproportionately so – among a relatively small number of large companies.
- In addition, the **joint exploitation of network effects and large amounts of information can amplify the position of market dominance held by some firms**. This explains, for example, why large technology firms can process such vast amounts of data. In particular, the more users a digital platform has, the more attractive it is for other users to register and to operate on that platform – the so-called network effect. As the platform in question amasses more information about its users, it is in a better position to improve its products and services and to attract even more users (thus widening its competitive advantage over rival companies and consolidating its dominant position in the market).
- **The accumulation and intensive use of information** offer the possibility to come to dominate a market through the success of a product or service. In this case, there is a risk that this position can be abused in order to undertake anti-competitive practices. In this context, **it is important to ensure that it is possible to enter or exit the market with ease – the so-called market contestability – and to prosecute any anti-competitive behaviour.**[2] Unfortunately, **identifying and proving cases of abuse of market position**[3] in this new digital environment **is no easy task**. Among other reasons, this is because the position of dominance can be established relative to other competitors, rather than to the traditional consumer,[4] and because the line

1. Bank of England (2019). «The Future of Finance».
2. Competition incentivises firms to become more efficient, to innovate and to constantly improve the quality of their products and services. It also directly benefits consumers, who can enjoy a wider range of goods and services, which are of better quality and at lower prices.
3. The abuse of a dominant position occurs when a company that holds a dominant position undertakes any commercial conduct that is considered to be abusive.
4. For example, some digital platforms operate as intermediaries, while at the same time holding a position of control over the infrastructure that their rivals depend on.

between legitimate practices and anti-competitive practices is not always clear cut. As an example, digital platforms have a clear incentive to prioritise growth above profits, hence low price strategies become particularly important. However, establishing artificially low prices in order to drive a competitor out of a particular market is a practice that can be considered abusive. Furthermore, it is sometimes difficult to clearly determine the relevant market in which an abuse of power can occur, given that the boundaries of the market in which digital service providers operate tend to be blurry.[5]

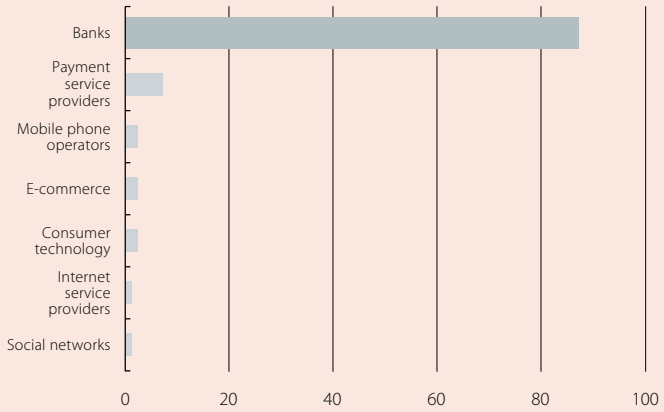
On the responsible use of data

- **Although there are different ways to extract value, the responsible use of data must be present in all of them**. The ethical and transparent use of data is an area that is attracting ever more attention from consumers and society in general, especially following several cases of misuse of personal data and as the use of digital information and artificial intelligence models by companies becomes widespread. In this context, ensuring that companies operate with ethical criteria and that individual rights are guaranteed is vital for maintaining society's trust in digital services.

- **Within this area, one of the most important issues has to do with confidentiality and data protection**. In particular, data are generated by users when using digital services, but they are used by firms and online service providers, which sometimes fail to properly respect consumers' privacy.[6] In addition, the consumer is often unaware of what data are collected about them and for what purposes, and they have no control over their use. On this note, there are studies that show that it would take the average user up to 76 days to review all the terms and conditions they accept in just one year.[7]
  - In this context, it is **important to find mechanisms that help consumers better understand how their data can be used and which tools they have at their disposal to protect their privacy**. In this regard, the EU is at the forefront when it comes to establishing clear rules on data protection, following the entry into force in 2018 of legislation that seeks to ensure that the consumer retains control over the information they provide.[8] On the other hand, in the US, an increasing number of voices both inside and outside the technology sector are calling for legislators to adopt a similar approach to that of the EU at the federal level.[9]
  - In addition, **responsible and transparent data management by firms can emerge as a source of competitive advantage**. In the end, consumers will be more willing to share their data with companies that are transparent in how they use the data and that make sure data are not accessible to third parties. In this regard, some surveys show that financial institutions enjoy a greater degree of trust among consumers than companies in other sectors when it comes to managing their personal information (see second chart).

Data and trust

Which type of business do you trust the most to securely manage your personal data?
(% of respondents)



Source: *CaixaBank Research, based on data from the Bank of England («The Future of Finance»).*

- **Another equally critical aspect is the responsible application of artificial intelligence techniques to data**. In particular, machines are usually responsible for analysing large amounts of data, using algorithms created by programmers (since we are dealing with many more dimensions than a human mind can conceive). This approach, known as machine learning, allows companies to extract value from data in an automated and scalable manner (for instance, by identifying patterns). However, **the ethical implications of these techniques are complex since, if they are used incorrectly, they can perpetuate biases or prejudices that are present in the data on which these models are based**. As an example, in the application of artificial intelligence techniques to staff selection processes, if the historical data contain an under-representation of women, the algorithm could be biased against this group when searching for candidates. For this reason, it is important to know the biases that exist in the databases that are used, to correct them when designing algorithms that run the machines and to incorporate ethical considerations into the use of such algorithms.

Roser Ferrer

5. See, for example, Lina M. Khan (2016). «Amazon's antitrust paradox». 126 The Yale Law Journal.
6. See, for example, C. Jones and C. Tonetti (2018). «Nonrivalry and the Economics of Data». Stanford GSB and NBER.
7. Bank of England (2019). «Future of Finance».
8. The General Data Protection Regulation (GDPR) sets out how European companies (and global companies that serve the European market) must handle consumer information and determines how to ensure that the consumer gives their consent to the use of those data.
9. In fact, in the state of California, in 2020 an initiative will come into force that is broadly similar to the European GDPR and which has served to launch the debate in the North American country.

Would a digital boost to productivity put an end to low interest rates?

The low interest rate environment in which the major advanced economies currently find themselves reflects deep economic transformations.[1] As we have recently[2] seen, the bulk of the studies point out that demography is the most important of these forces and, most likely, the ageing of the population will continue to constrain interest rates over the coming decades. In the face of this restriction, **the future of productivity is one of the keys to driving up interest rates**. Let us take a look at how and with what constraints.

Productivity and interest rates

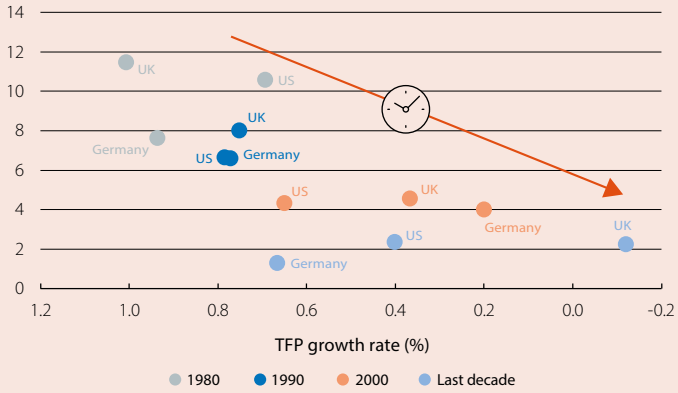
Interest rates and productivity growth have a close relationship: as the main source of long-term economic growth, productivity determines the extent to which new investment opportunities or savings needs arise. As such, lower productivity growth drives interest rates down for two major reasons:

- From the point of view of consumers, the prospect of lower growth in wages and household income induces an increase in savings, which tends to reduce interest rates.
- From the point of view of companies, a reduction in investment opportunities depresses the demand for credit, thus driving down interest rates.

It therefore comes as no surprise that, as can be seen in the first chart, **the slowdown in productivity has gone hand in hand with a sustained decline in interest rates over the past 30 years** in the major advanced economies.

Interest rates and total factor productivity (TFP): averages of recent decades

10-year sovereign interest rates (%)



Note: *For Germany, the 1990s exclude the initial years of reunification.*
Source: *CaixaBank Research, based on data from the Penn World Tables and the OECD.*

Looking to the future, there is a debate over how productivity will evolve, between those who are pessimistic and optimistic about new technologies. On the one hand, the pessimists emphasise the low productivity growth in recent years and its downward trend over the past few decades. On the other hand, the optimists point out the multitude of technological advances related to automation and the so-called Fourth Industrial Revolution, and suggest that the low growth observed can be explained by measurement problems and the transition time required for these advances to spread to the economy as a whole.[3]

This debate is unlikely to be resolved in the immediate future. If it falls in favour of the pessimists, the weakness of productivity will be added to demography as one of the constraints on interest rates. But what would happen if digital technologies were to boost productivity?

The impact of a (digital) boost to productivity

As we have seen, **faster productivity growth would drive interest rates upwards**, to the extent that this translates into:

- Growth in wages and household incomes, which takes pressure off the need to save.
- An increase in investment opportunities for companies, which leads them to increase their demand for credit.

However, **there are various factors related to new technologies that could hold back these dynamics**.

Market failures

On the one hand, there may be factors that prevent the full potential of new technologies from being harnessed and that limit the boost to productivity and, therefore, to interest rates. In this regard, **the presence of «market failures» can prevent the full potential of new technologies from materialising**:

1. In addition to the cyclical constraints inherited from the Great Recession, such as high indebtedness and less optimism towards future growth.
2. See the article «Low interest rates: for how much longer?» in the MR02/2019.
3. We summarize this discussion in a table that the reader can find in the extended version of this article, available on the web of CaixaBank Research: www.caixabankresearch.com

- Digitisation generates network effects (forces that make consumer interest in a product increase as its user base grows), and this could lead to winner-takes-all situations. If this reduces competition, it could hinder the improvement in productivity.[4]
- Digital products are essentially «non-rival»[5] in nature (i.e. their use by one person does not limit others' use of them). The economic literature has shown that non-rivalry leads to market failures and that, when non-rival products are involved, market mechanisms can operate at a sub-optimal level. That is to say, the full production potential of new technologies is not harnessed.

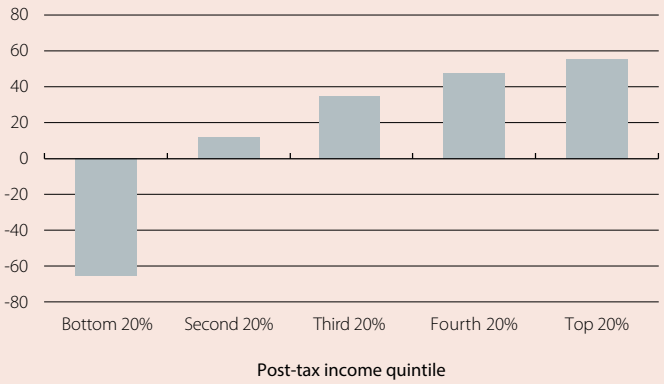
The distribution of productivity improvements

One of the most frequently repeated concerns regarding new technologies is that they cause an increase in inequality, especially in the short term (over the long term, if the technology has spread throughout the economy, it is more plausible that it will benefit society as a whole). This is particularly relevant for interest rates, given that **various studies also name the rise in inequality in recent decades as one of the phenomena that has contributed to the reduction in rates**:[6] as shown in the second chart, savings rates increase with income levels,[7] so an increase in inequality raises the supply of savings by shifting resources towards those who save more.

In order to analyse the relationship between productivity, inequality and interest rates, three factors must be taken into consideration.

US: household savings by income quintile

(% of post-tax annual income)



Notes: *Data for 2017. Savings are calculated as the difference between after-tax income and consumption. As pointed out by K.E. Dynan* et al. *(2004), «Do the rich save more?», Journal of Political Economy, consumption is calculated as total expenditure + income allocated to housing - mortgage payments - capital improvements for housing - insurance (health, personal and pensions) - expenditure on vehicles.*
Source: *CaixaBank Research, based on data from the Consumer Expenditure Survey, conducted by the US Bureau of Labor Statistics.*

1. *Winner-takes-all dynamics*. As well as (potentially) reducing competition, these dynamics facilitate **the emergence of «superstar» firms and professionals** and, therefore, can increase inequality.
2. *Complementarity or substitution*.[8] An improvement in productivity due to new technologies leads to these technologies receiving a greater volume of investment. When digital technologies and automation substitute all other productive factors (such as labour),[9] this greater volume of investment in these technologies occurs to the detriment of all other factors and, therefore, can lead to an increase in inequality. If, on the other hand, **new technologies complement labour**,[10] then an improvement in the productivity of robots translates into an increase in the demand for both robots and all other factors. This, in turn, results in **income growth for all productive factors**, including labour. Furthermore, as Acemoglu and Restrepo remind us (2018),[11] although the automation of tasks can depress employment and increase wage inequality (as it benefits workers with skills that are complementary to robots and harms those who have been replaced), we must not forget that **new tasks continue to be created, in a process that stimulates the demand for labour and wages**. Indeed, this process can cause improvements in the productivity of robots to translate into higher incomes for all the productive factors.
3. *Scarce» productive factors*.[12] **If new technologies are complemented with scarce productive factors that are essential in the production process, these factors can «capture» the bulk of the improvements in productivity**. Thus, various researchers argue that, in a Fourth Industrial Revolution dominated by digital technologies, productive factors such as «superstar workers» and intangible assets (like a company's organisational capital or intellectual property) would gain importance and could become those scarce factors that are essential in the production process. In fact, several current studies indicate that intangible assets are already receiving a growing fraction of national income.[13] This would explain the apparent contradiction between the significant technological advances and the containment of interest rates.

4. See the Dossier «Supercompanies: a global phenomenon» in the MR03/2019.
5. See C. Jones and C. Tonetti (2018). «Nonrivalry and the Economics of Data». 2018 Meeting Papers (vol. 477). Society for Economic Dynamics.
6. See L. Rachel and T.D. Smith (2017). «Are low real interest rates here to stay?». International Journal of Central Banking, 13(3), 1-42.
7. See K.E. Dynan, J. Skinner and S.P. Zeldes (2004). «Do the rich save more?». Journal of Political Economy, 112(2), 397-444.
8. See J.D. Sachs, S.G. Benzell and G. LaGarda (2015). «Robots: Curse or blessing? A basic framework». National Bureau of Economic Research n° w21091.
9. For example, when an industrial robot substitutes tasks that were previously carried out by a worker, such as the assembly of parts.
10. Either directly in the same production process (think of a computer and a computer engineer), or indirectly, since the products developed by «robots» can be complemented with products produced by workers: such as in the case of a TV and a film starring people.
11. D. Acemoglu and P. Restrepo (2018). «The race between man and machine: Implications of technology for growth, factor shares, and employment». American Economic Review, 108(6), 1488-1542.
12. See S.G. Benzell and E. Brynjolfsson (2019). «Digital Abundance and Scarce Genius: Implications for Wages, Interest Rates, and Growth». National Bureau of Economic Research n° w25585.
13. See D. Koh, R. Santaeulalia-Llopis and Y. Zheng (2016). «Labor share decline and intellectual property products capital». Barcelona GSE Working Paper.

Education and the economy of the future

Technology is a key element in the improvement of people's living standards: it is thanks to technology that we live longer and healthier lives, that we work fewer hours and that we enjoy whims that not even our grandparents could have imagined. Yet, despite all this, we are still scared by the effects that the machines of the future may have on our lives. The reason for this is that, despite the clear benefits of technology, its adoption can lead to significant costs in the short and medium term.

These costs could be bigger in the current phase of technological revolution. Big data, artificial intelligence or the new age of hyper-connected robotics could be transformations that prove even more disruptive than those of the previous three innovation waves of the past.[1] By way of illustration, several empirical studies provide estimates on the jobs that could be potentially affected or lost due to the new wave of automation. Even the most conservative estimates suggest a considerable impact: between 10% and 50% of current workers worldwide will be substantially affected.[2]

Institutions as a force for enhancing profits and controlling costs

Daron Acemoglu, an expert in political economics at MIT, and Andrew G. Haldane, chief economist at the Bank of England, consider that technological advances (or «ideas», in the words of Haldane) need another ingredient in order to make a substantial positive and lasting contribution to economic growth: institutions that aim to enhance the benefits of technological advances, but also mitigate their costs.[3]

- To the extent that this new industrial revolution marked by the digital economy has the potential to be enormously disruptive, our institutions will need to incorporate changes that are also disruptive in most areas: education, labour, tax and regulation, among others (see «The data revolution: competition and responsible use» in this very Dossier for a discussion of regulation relating to competition).

The following table provides a summary of some of the needs and proposed changes in the field of education, since this is the area we will focus on in the rest of the article.[4]

Educating in creative, social and emotional aspects... without forgetting knowledge... and throughout life

The education system is one of the institutions that will need to undergo the biggest changes. The acquisition of knowledge will be marked by two overarching trends: demography and the nature of the technological revolution. Although the focus of this article is on the technological revolution, the extension of life expectancy will no doubt lead to an extension of our working lives, so continuing to learn throughout our lives will be essential.

By focusing on the second trend, the nature of the technological revolution, in a world of «thinking machines», the workers of the future must have a greater balance between knowledge, creativity and social and emotional skills:

- Machines will be able to solve a large number of problems, but solving complex problems will still be left to humans. Abstract and creative thinking will be essential in solving these complex problems.

  An example of this can be found in the confrontation between the supercomputer AlphaGo and the grand master of the highly complicated game of Go, Lee Sedol. Although AlphaGo won overall in the five games they played, the fourth game teaches us the importance of human creativity. In move number 78, Lee Sedol took a decision that was completely unexpected by the machine and by most experts of the game. It was a rather rare move (and, therefore, unlikely according to the machine). After the move, AlphaGo began to play erratically and lost the game. The supercomputer was not prepared for a move that we could define as «imaginative» or «creative». Our brain's extensive capacity for change and adaptation, which is known as neuroplasticity, is an inimitable characteristic (for the time being, at least).

Institutions: proposals for change

Field of action	Change towards...	Proposals
Education	• Interdisciplinary. • Intergenerational. • Greater balance between knowledge, creativity, social and emotional skills. • Closer relationship with the workplace.	• Promoting creativity at all times. • Education from 0 to 3 years (key in emotional and social development). • Higher studies: – more interdisciplinary studies – accessible to different ages – with the option of shorter and more flexible programmes.

Source: *CaixaBank Research.*

1. See E. Brynjolfsson and A. McAfee (2014). «The second machine age: Work, progress, and prosperity in a time of brilliant technologies». WW Norton & Company.
2. See Adrià Morron (2016). «Will the Fourth Industrial Revolution come to Spain?» in the MR02/2016, for the case of Spain, based on C.B. Frey and M.A. Osborne (2017). «The future of employment: how susceptible are jobs to computerisation?». Technological Forecasting and Social Change, 114, 254-280.
3. See D. Acemoglu and J. Robinson (2012). «Why nations fail: The origins of power». Prosperity, and Poverty, 2. And also A.G. Haldane (2018). «Ideas and Institutions – A Growth Story». Speech at the Guild Society on 23 May 2018.
4. There is a more extended version of the article, which also includes some detail in the field of labor market, available on the CaixaBank Research: www.caixabankresearch.com

- Social skills will also be needed in solving complex problems, since these will require collaboration among people.
- An environment of greater complexity can generate situations of stress that are easier to handle with a good level of emotional development.

  As an example, in a recent empirical study based on surveys of Japanese workers, it was noted how the use of artificial intelligence and information technology in companies generates greater satisfaction in the type of work being performed, but also higher levels of stress. Technologies allow workers to focus on tasks that are intellectually more complex, which are more satisfying but also more stressful.[5] The higher levels of stress associated with the use of ICTs has also been observed in Spain. In particular, according to a 2016 study covering Spain and Latin America, 32% of workers believe that ICTs oblige them to work to much tighter deadlines, and 25%, to work against the clock.[6] Furthermore, according to a report by the OECD, performing tasks under pressure is the main cause of stress in the workplace.[7]
- But more technical and analytical knowledge must not be set aside. In this regard, the US Bureau of Labor Statistics points out that occupations that will require scientific and/or engineering knowledge (the so-called STEM occupations, which is an abbreviation for *Science, Technology, Engineering and Mathematics*) will continue to experience a much higher than average growth.
- Furthermore, philosophy and ethics will play a fundamental role in the era of artificial intelligence. The inappropriate use of drones, biases or prejudice generated by machines when learning from our own history, or decisions over which lives an automated car should protect (the occupants, pedestrians or does it depend?) are just some examples of areas in which these disciplines must intervene.[8]
- Social and emotional skills will take on a substantially bigger role in professions like those in the health or care sectors, among others. This is because machines will be able to assume the more mechanical aspects: with a technology that can provide very good diagnostics, we will probably want to discuss our options with a human professional who can provide a large dose of empathy.

The educational proposals of the future

Various educational proposals seek to cover the needs mentioned above. These include the following:

- The public provision of education from 0 to 3 years. At this early age, important aspects are developed that will determine many of the non-cognitive skills and abilities that are more related to emotion, socialisation, the individual.[9] This is especially important in a world in which these skills will play an increasingly important role - a phenomenon which, in fact, we have already begun to see.
- Providing education in emotional and social aspects, beyond the early years and educating in creative skills in all stages of learning in order to encourage and stimulate them. We are all born with creative gifts and the educational stages should enhance this gift.
- In the field of higher education, we can consider the concept of «multiversities», proposed by Andrew G. Haldane, as a much more open and flexible form of institution than the universities of today. These new higher education institutions should be:
  - More interdisciplinary, to help us to solve complex problems like those mentioned above and to facilitate the leap between professional careers, in a context of technological change that could render some occupations obsolete.
  - More open to all ages, to facilitate the continuous learning that is needed with shorter and more flexible programmes, which should also be better adapted to different types of prior knowledge. In increasingly changing times, very long programmes do not make as much sense.
  - Combining study and work should also be encouraged, especially if we have to go back to university during our professional life.
- Finally, companies must also partake in the education of citizens, especially in their adulthood. The World Economic Forum stresses the role of companies in this regard and, among other factors, proposes the idea of partnerships with local universities and educational institutions that enable their employees to undertake both theoretical and practical training.[10]

Clàudia Canals

5. See Isamu Yamamoto (2019). «The impact of AI and information technologies on worker stress». VoxEU (19 March 2019).
6. See the 2016 study by the Observatory for Workplace Risk Prevention in collaboration with the Jaume I University, «Informe sobre tecnoestrés».
7. See the «OECD Employment Outlook 2014».
8. In June 2019, Stephen Schwarzman, president of the Blackstone Group, donated 188 million dollars to the University of Oxford for the study of ethics in artificial intelligence. This is the biggest contribution that the University of Oxford has received in its history.
9. See J.J. Heckman and Y. Rubinstein (2001). «The importance of noncognitive skills: Lessons from the GED testing program». American Economic Review, 91(2), 145-149. We have also addressed this topic on more than one occasion in our *Monthly Report*: «Education as a lever for inclusive growth», in the Dossier of the MR01/2019, and «Measures to improve equality of opportunities» in the Dossier of the MR03/2018.
10. See World Economic Forum (2017). «Accelerating Workforce Reskilling for the Fourth Industrial Revolution». White Paper.

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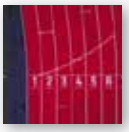

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