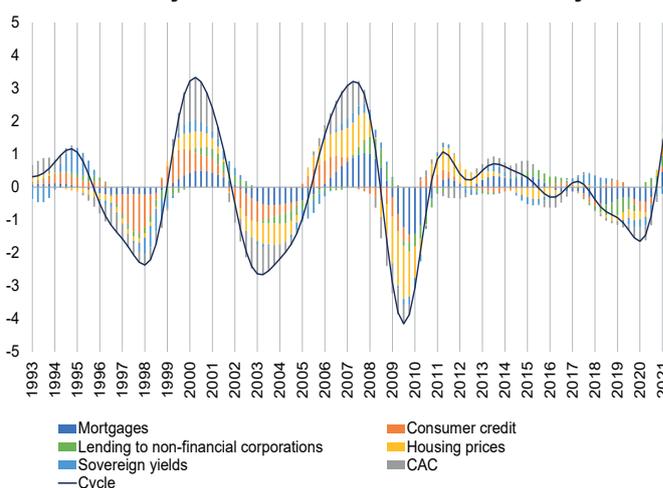


## An indicator of the financial cycle in France since the beginning of the 2000s

*Riccardo Russo*

- The 2008-2009 financial crisis accentuated the focus on financial stability and highlighted the need to develop new tools and indicators, particularly in terms of macroprudential policy, to better understand the development of financial risks.
- Economic authorities – central banks, national Treasuries, market authorities, etc. – along with the academic community acknowledged the role of the financial cycle as an important proxy of these weaknesses. An indicator of the cycle can help understand its current state and the corresponding level of financial risk, based on the evolution of the variables underlying it. Yet, a number of different techniques can be used to develop this indicator.
- The Directorate General of the Treasury developed two indicators to measure the financial cycle in France, with one covering short cycles (2 to 8 years) and the other covering longer cycles (8 to 25 years). This approach is used to analyse the build-up or reduction of financial risks over different timeframes and provide insights into the various factors driving the cycle, such as credit to corporates and households, share and housing prices and bond yields.
- As an example, the 2-to-8-year French financial cycle indicator hit a high between end-2007 and early 2008, driven by mortgages, residential housing prices and the equity market (see Chart). Their downturn and subsequent swift plunge into negative territory coincided with the subprime crisis in the United States, which then spread to Europe. After a low in late 2009 and a clear recovery until 2011, there was a relatively stable period that included the sovereign debt crisis in 2011-2012. The short-cycle indicator staged a clear rebound from 2021, fuelled by mortgages and housing prices.

**Financial cycle indicator in France over 2 to 8 years**



Source: Banque de France data, DG Trésor calculations.

Note: Each of the sub-indicators is used to develop the financial cycle composite indicator.

# 1. Analysis of the financial cycle and its applications<sup>1</sup>

## 1.1. Definition of financial cycle

There is no universally accepted definition of financial cycle, but the term is generally used to define cyclical co-movements in variables that gauge general financial conditions. According to Kindleberger (2006),<sup>2</sup> these co-movements throughout the cycle can be broken down into five phases:

- (i) Boom: After a recession, the economic recovery boosts credit creation. The prices of some assets increase.
- (ii) Euphoria: The increase in asset prices further boosts credit, momentum becomes self-sustaining.
- (iii) Climax and crisis: A shock, either endogenous or exogenous (rise in interest rates, international crises, natural disaster, etc.), brings this momentum to an end.
- (iv) Ebb and pessimism: Prices plummet, credit conditions tighten due to the loss of collateral value.
- (v) Debt deflation: The real value of debt increases.<sup>3</sup> Economic agents with excess debt try to sell their assets, pushing prices down further, or can go bankrupt: this is referred to as the “Minsky moment”.<sup>4</sup> Fire sales lead to panic, which can then result in illiquid markets due to wariness among economic agents. Growth then grinds to a halt.

In line with this breakdown of phases and the characteristics commonly attributed to indicators of financial cycles, there is a high degree of synchronisation between the credit cycle and the real estate price cycle.<sup>5</sup> Other variables such as share prices and bond market indicators do not necessarily display such a high degree of synchronisation as

compared with the credit cycle and housing prices.<sup>6</sup> However, these relationships differ depending on the frequency of the analysed cycle<sup>7</sup> and the geographical regions under consideration.<sup>8</sup> Aikman *et al.* (2015), Drehmann *et al.* (2012) and Borio (2012)<sup>9</sup> also ascertain a close correlation between peaks in their respective cycle indicators and systemic banking crises.

## 1.2. Central role of the financial cycle after the 2008 financial crisis

Since the 1980s and until the 2008 financial crisis, the institutional framework of the so-called “Great Moderation” (see Box 1) linked financial stability to price stability. This institutional framework was based on predictable decisions from independent central banks as well as on (micro)prudential supervision focused on financial institutions’ individual risk. In Europe, just like other developed countries, the severity of the crisis put an end to this period of stability and triggered major institutional and regulatory changes.<sup>10</sup>

The 2008-2009 financial crisis highlighted the interconnections of the global financial system and the systemic weaknesses that these may entail. The macroeconomic-policy balance had to be reviewed and attributed greater importance to financial stability, of which prudential – particularly macroprudential – policy has become an important guarantor (Baker (2013); Dell’Ariccia *et al.* (2015); Calvo *et al.* (2018)).

This context led to two new challenges: (i) the assignment of macroprudential responsibilities to a given institution and (ii) the identification of a specific financial-stability mandate for this institution. Academic literature does not provide a conclusive response to the first point, and in practical terms, macroprudential policy is now conducted on the basis of an institutional framework that is specific to each

(1) This work was conducted by the *Lab Trésor*.

(2) Kindleberger C. (2006), “Histoire mondiale de la spéculation financière”, *Valor Editions Paris*.

(3) Fisher I. (1988), “La théorie des grandes dépressions par la dette et la déflation (1933)”, *Revue Française d’Économie*, 3(3), 159-182.

(4) Minsky H. P. (1986), “Stabilising an unstable economy”, *Yale University Press*.

(5) Aikman D., Haldane A., Nelson B. (2015), “Curbing the credit cycle”, *The Economic Journal*, 125 (585), 1072-1109; Claessens S., Kose M. A., Terrones M. E. (2011a), “Financial cycles: What? How? When?”, *IMF Working Paper* no. WP/11/76; Claessens S., Kose M. A., Terrones M. E. (2011b), “How do business and financial cycles interact?”, *IMF Working Paper* no. WP/11/88.

(6) Drehmann M., Borio C., Tsatsaronis K. (2012), “Characterising the financial cycle: Don’t lose sight of the medium term!”, *BIS Working Paper* no. 380.

(7) Schuler Y. S., Hiebert P. P., Peltonen T. A. (2015), “Characterising the financial cycle: A multivariate and time-varying approach”, *ECB Working Paper* no. 1846.

(8) Stremmel H. (2015), “Capturing the financial cycle in Europe”, *ECB Working Paper* no. 1811.

(9) Borio C. (2012), “The financial cycle and macroeconomics: what have we learnt?”, *BIS Working Paper* no. 395.

(10) Baker A. (2013), “New political economy of the macroprudential ideational shift”, *New Political Economy*, 18(1), 112-139; Dell’Ariccia G., Habermeier K., Haksar V., Mancini-Griffoli T. (2015), “Monetary policy and financial stability”, *IMF Policy Paper*, August; Calvo D., Cristiano J. C., Hohl S., Gutiérrez O. P. (2018), “Financial supervisory architecture: What has changed after the crisis?”, *BIS Working Paper* no. 8.

## Box 1: The Great Moderation

The term “Great Moderation” denotes the period ranging from the mid-80s until the 2008 financial crisis.<sup>a</sup> In developed countries, this period was characterised by lesser fluctuations of the business cycle and the inflation rate than the previous decade, when the oil crises had represented a major factor of instability. Three institutional or structural factors seem to have contributed to this stability:

- (i) Central banks’ independence, which enhanced their credibility by clarifying goals and reducing the potential effects of political influence.
- (ii) Lesser sensitivity to domestic shocks following globalisation, and an increase in the contribution to growth from the service sector as compared to manufacturing, characterised by greater cyclical volatility.
- (iii) Technological progress that enabled the central banks to access reliable and relevant data to pursue effective monetary policy.

However, a conspicuous strand of the literature also considers this phenomenon as fortuitous, particularly for the stability of GDP rather than inflation, in what is known as the good luck hypothesis. In any case, the 2008-2009 financial crisis, and subsequently the COVID-19 crisis and the war in Ukraine, brought this period of low volatility to an end.<sup>b</sup>

a. Stock J. H., Watson M. W. (2002), “Has the business cycle changed and why?”, NBER Macroeconomics Annual 2002.

b. BlackRock (2022), «Back to a volatile future», Mid-year outlook; Schnabel I. (2022), «Monetary policy and the Great Volatility», Speech at Jackson Hole, 27 August.

country. This approach often involves interactions between government and central bank, whose actions affect financial conditions to meet monetary and financial stability goals, which can lead to tensions.<sup>11</sup>

The financial stability objective translates into preserving resilient financing conditions throughout the financial cycle (this goal also has a structural dimension). To limit the likelihood of a potential financial crisis – and where necessary absorb its cost –, macroprudential policy relies on various tools depending on the economy’s position in the cycle. In principle, this involves building up protective reserves – so-called countercyclical capital buffers or CCyB – followed by a potential easing of these measures during the contraction phase with the aim being to avoid the risk of a credit crunch, i.e. a contraction in the supply of credit from the banking system to the real economy.

### 1.3. Interactions between monetary policy and macroprudential policy

Monetary and macroprudential policies should not necessarily move in the same direction, as financial and business cycles are not always synchronised. Yet, there are still synergies between the two policies, in terms of either complementary goals (price stability and financial stability, respectively) or operational terms (collecting and analysing the same data, shared know-how, etc.). Financial stability is a prerequisite for preserving price

stability and an effective transmission mechanism of monetary policy. At the same time, keeping inflation under control contributes to financial stability.

However, the fact that inflation and the financial cycle are not always synchronised implies that it is necessary to calibrate monetary and macroprudential policies taking into account their interactions.

For example, when inflation is low, but the financial cycle is on an upswing, key interest rates should be eased, and countercyclical capital buffers increased. This kind of situation can make it more difficult for the central bank to set each instrument and simultaneously pursue both goals. However, no conflicts would emerge when the outlook for these two target variables aligns. The use of unconventional monetary policy instruments helps reduce tensions that can sometimes arise between these two policies. When monetary policy has a range of tools at its disposal, it will seek a combination that minimises the impact on financial stability for any given inflation target.

Therefore the CCyB’s ability to smooth out the financial cycle – limited in practice – can be further lessened by monetary policy. In light of this situation, certain stakeholders (for example, Sam Woods<sup>12</sup> from the Bank of England, during a proposal for radical reform) have put forward a new doctrine for the use of CCyB as a source of resilience in the event of crises rather than for smoothing the financial cycle. The High

(11) Chortareas E. G., Logothetis V., Magkonis G., Zekente K. (2016), “The effect of banking supervision on central bank preferences: Evidence from panel data”, *Economics Letters*, 140, 11-13.

(12) Woods S. (2022), “Bufferati”. Speech at City Week.

Council for Financial Stability (*Haut Conseil de stabilité financière* or HCSF), the French macroprudential authority, shares this view and sees the countercyclical capital buffer as a credit protection reserve and a way to support credit supply during periods of crisis.<sup>13</sup> Some European countries<sup>14</sup> and authorities take this analysis further and have identified or promoted the advantages of a positive neutral buffer: the CCyB would thus remain above 0 most of the time and be brought to 0 only in the event of a negative turnaround of the financial cycle, with the sole aim of ensuring that banks have adequate capital to support credit supply (particularly for households and small and medium-sized enterprises). The literature – both theoretical and empirical – highlights the fact that banks that are closest to their regulatory requirements and hence have the least capital leeway allocate less credit than their competitors<sup>15</sup> (Buffer usability and cyclicity in the Basel Framework, BCBS, October 2022).

Furthermore, ineffective central bank actions can jeopardise their credibility. As explained by Borio (2011,<sup>16</sup> 2012), policies that do not fully and

successfully meet their goals, for example as a result of conflict between the various monetary and macroprudential instruments, further increase pressure on central banks to step up their actions. If the problems behind this initial lack of effectiveness are not sorted out, the gap between what central banks can do and what they are asked to do – referred to as the expectations gap – would increase and ultimately lead to a loss of credibility.

However, the way that financial and monetary cycles interact is not just a matter of the organisation of prudential and monetary policies: there are also interactions between the financial cycle and monetary policy at international level. Decisions from the Federal Reserve and the European Central Bank also have spillover effects on other countries via the global financial cycle,<sup>17</sup> whatever their exchange rate set-up. For example, a hike in US interest rates pushes global financial intermediaries to reduce their debt, and entails an increase in risk aversion, a deterioration in asset prices, corporate bond spreads and global credit, thereby affecting national financial cycles.

## 2. Financial cycle indicators

### 2.1. Usefulness of indicators

Financial cycle indicators summarise the cyclical movements of the underlying financial variables. A positive level of the cycle reflects an expansionary phase for these variables with respect to their historical trend, while a negative level reflects a contractionary phase. The sign of the cycle thus depends on the variables used to develop the indicator, the maximum/minimum length of the cycles considered, and the econometric methodology used to obtain the cyclical components. An excessively rapid increase of the indicator usually implies an excessive build-up of risks, and their realisation can then lead to a more severe phase of contraction. As a result, this tool is a crucial indicator for authorities in charge of financial stability.

As noted by the HCSF in its 2022 annual report, each national authority uses its own financial cycle indicator.

Germany relies on an indicator showing whether current macroeconomic and financial conditions resemble the ones that have led to crises in the past. The Czech Republic<sup>18</sup> uses a two-stage set-up to ascertain the optimal level of CCyB, accounting for both macroeconomic variables such as trends in credit and the external balance, and intrinsic risk in the banking system. The Netherlands<sup>19</sup> uses an adapted version of the ECB's financial stress indicator.

In France, the HCSF is responsible for the prevention of systemic risk. As noted in its 2022 annual report,<sup>20</sup> it uses a quarterly financial cycle indicator as part of its decision-making framework on the countercyclical capital buffer, which accounts for credit conditions, financial and housing markets, as well as the projections from the *Banque de France* of the underlying variables.

(13) HCSF, 2022 annual report, chapter 3, <https://www.economie.gouv.fr/hcsf/rapports-annuels>

(14) United Kingdom, Austria, Netherlands, Sweden, Ireland, Denmark in particular; Basel Committee on Banking Supervision (2022).

(15) Couaillier C., Lo Duca M., Reghezza A. Rodriguez d'Acri C. (2022), "Caution: do not cross! Capital buffers and lending in Covid-19 times", ECB Working Paper n° 2644, and Bank for International Settlements (October 2022) *Buffer usability and cyclicity in the Basel Framework*, Basel Committee on Banking Supervision Implementation Report.

(16) Borio C. (2011), "Central banking post-crisis What compass for uncharted waters?", *BIS Working Paper* no. 353.

(17) Miranda-Agrippino S., Rey H. (2021), "The global financial cycle", *NBER Working Paper* no. 29327.

(18) [The CNB's approach to setting the countercyclical capital buffer](#), Financial Stability Department, 2022.

(19) [Analytical framework for setting the Countercyclical Capital Buffer in the Netherlands](#), De Nederlandsche Bank, February 2022.

(20) See [economie.gouv.fr/hcsf/publications](https://www.economie.gouv.fr/hcsf/publications).

## 2.2. Developing a financial cycle indicator for France

As part of a broader process to further improve this assessment and in the same vein, the Directorate General of the Treasury has also

developed two indicators of the financial cycle for France (see Box 2). Depending on the variables under consideration and their trends, these indicators help characterise short cycles (< 8 years) and medium-term cycles (> 8 years).<sup>21</sup>

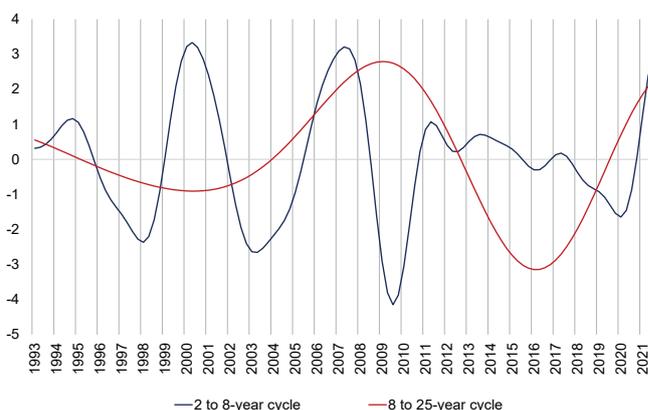
### Box 2: Econometric estimation of the financial cycle

After determining the variables of interest based on the academic literature, the process adopted for estimating the cycles (of either short or medium term – see Chart 1) includes three stages:

1. **Filtering:** the cyclical component is extracted from each data series. Various filters could be used, and their effectiveness can be ascertained by analysing the related periodograms.<sup>a</sup> Based on this analysis, we selected the Christiano and Fitzgerald band pass filter,<sup>b</sup> applied to 2 to 8 and 8 to 25 year periods. This filter is the most widely used in the literature (Borio (2012); Merler (2015)), and its effectiveness as compared to the Hodrick-Prescott (HP) and Baxter-King (BK) filters has been confirmed in several studies.<sup>c</sup> The last two quarters of data are not included to avoid any distortions resulting from the filtering process.
2. **Standardisation:** the filtered series are then standardised to ensure that the following stage does not assign weights that depend on the initial units of measurement of the variables. The new series then have an average of 0 and move approximately in the same interval.
3. **Principal Component Analysis (PCA):** a PCA is a way to develop a single indicator (our financial cycle indicator) based on the underlying variables,<sup>d</sup> and to obtain the contributions from each of them. The effectiveness of this indicator in describing cyclical similarities for the underlying variables is confirmed by a KMO statistics<sup>e</sup> larger than 0.6.

The values of the indicator, as well as the weights of its determinants, vary depending on the length of the financial cycle under consideration (short term < 8 years, or medium term > 8 years), even when these indicators are estimated using the same variables (see section 2.2). This is due to filtering: the trend and differences with the trend, whose values depend on the filter used, differ depending on the timeframe under consideration. For example, during the period 2000-2001, the indicator of the medium-term cycle is negative while the short-cycle indicator is positive. These results are not contradictory: the difference with the trend is positive if we consider cycles between 2 and 8 years, and negative if we consider cycles from 8 to 25 years. In the second case, the indicator reflects medium-term variations (particularly on residential property) that do not take account of higher frequency components, which are reflected in the short cycle: the short cycle incorporates several other variables, particularly relative to sovereign yields and the financial markets.

Chart 1: Financial cycle indicators, France Q2 1993-Q4 2021



Source: Banque de France data, DG Trésor calculations.

How to read this chart: A positive cycle corresponds to an expansionary phase of the underlying variables, a negative cycle corresponds to a contractionary phase.

- a. Periodograms are tools that rely on spectral analysis to analyse the effectiveness of a filter in extracting the cyclical component from a series in a given time window.
- b. This filter (like all band pass filters) detects cycles that develop over a given time window (in this report, 2 to 8 years for the short-cycle indicator and 8 to 25 years for the medium-term cycle indicator), while the other best known filter, Hodrick-Prescott, only seeks to minimise high frequency components.
- c. Christiano L. J., Fitzgerald T. J. (2003), "The band pass filter", *International Economic Review*, 44, 435-465; Aikman et al. (2015), op. cit.
- d. By way of reminder: debt of non-financial corporations and households, housing prices, 10-year sovereign yields and share prices for the short cycle; debt of non-financial corporations and households and housing prices for the medium-term cycle.
- e. The Kaiser-Meyer-Olkin test (KMO) measures sampling adequacy for each variable in the model.

(21) Drehmann M., Borio C., Tsatsaronis K. (2012), "Characterising the financial cycle: don't lose sight of the medium term!", *BIS Working Paper*.

In line with Schuler's approach (2015), the variables selected to develop the indicator of the short-term cycle include debt of non-financial corporations and households (mortgages and consumer credit), housing prices, 10-year sovereign yields and share prices. The variables used to depict the medium-term cycle are debt of non-financial corporations and households as well as housing prices (Borio (2012);

Merler (2015)).<sup>22</sup> Using positive post-estimation tests (see Box 2) and a certain degree of factual consistency, these estimates can be viewed as reliable indicators of the financial cycle. The last available observation usually has a time lag of two quarters. Based on these financial cycle estimates, it is possible to observe different sequences of acceleration and turnaround, on both short- and medium-term cycles.

### 3. Interpretation of the financial cycle indicator in France

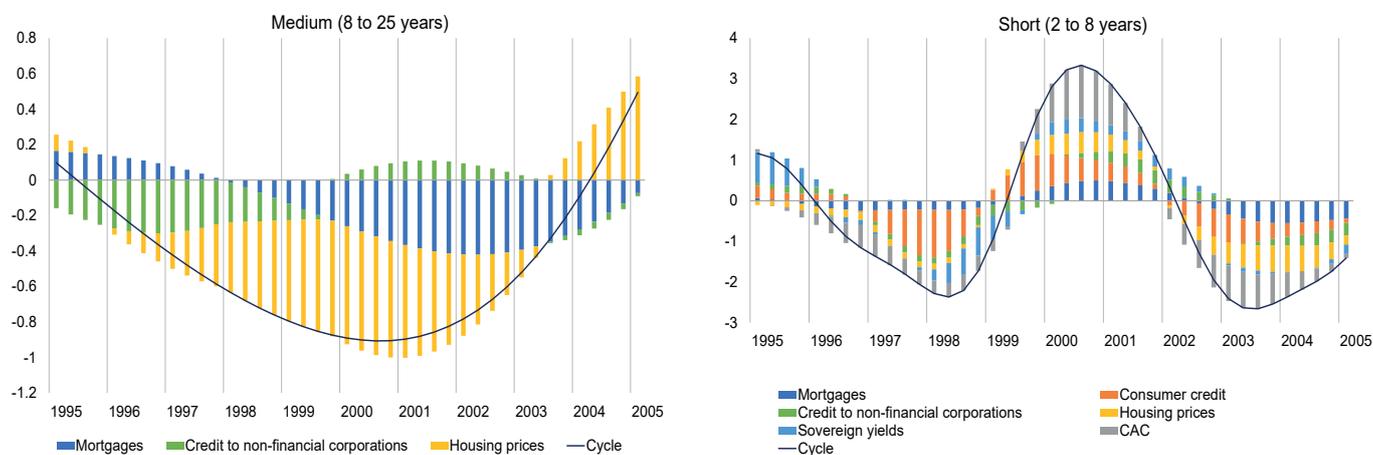
#### 3.1. Birth of the euro and the internet bubble: a turnaround in the short-term cycle

In terms of medium-term cycle, the 1990s were characterised by a downward correction in housing prices and mortgages in France, which in OECD countries had previously been boosted by the deregulation from the 1980s.<sup>23</sup> These trends can be seen in the medium-term cycle indicator (see Chart 2, left).

However, this period of weak momentum for the medium-term financial cycle was simultaneously

characterised by growth and a turnaround in the short cycle as a result of the internet bubble during 2000-2002, as shown by the short-cycle indicator (see Chart 2, right). At the start of the 2000s, euphoria on tech and telecoms sector companies led to a massive surge in their share prices in the United States. This phenomenon then spread to Europe, including France, where the CAC40 reached record highs for the time. This trend took a downturn from 2001 and the CAC lost 21.9% that year, followed by 33.75% in 2002. In France, the equity market was the main contributor to the short cycle in both the growth phase in 2000 and the downturn between 2001 and 2002.

Chart 2: Focus on period Q1 1995-Q1 2005



Source: Banque de France data, DG Trésor calculations.

Note: Each of the sub-indicators is used to develop the financial cycle composite indicator.

(22) Merler S. (2015), "Squaring the cycle: Financial cycles, capital flows and macroprudential policy in the Euro Area", *Bruegel Working Paper* no. 2015/14.

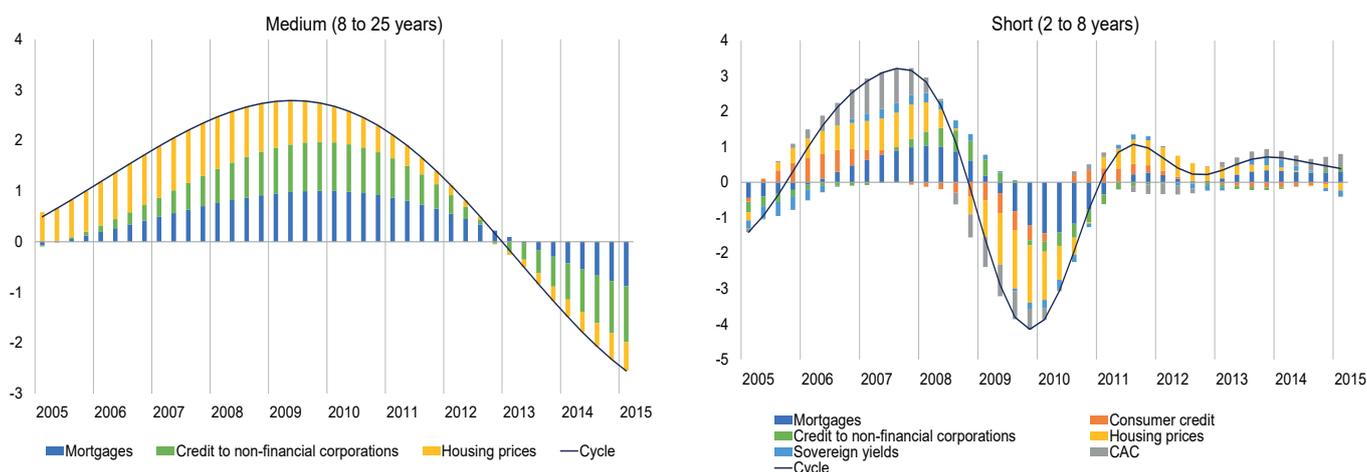
(23) Grjebine T. (2014), "Globalisation des cycles immobiliers et déséquilibres financiers", *Éditions La Découverte*.

### 3.2. The financial crisis and the sovereign debt crisis: simultaneous downturns in the short cycle and the medium-term cycle

In response to international disinflationary pressures, the Fed and the ECB cut their key rates considerably after the 2001 crisis. From 2002 (see Chart 2, left), housing prices and mortgages grew in France (see Chart 3, left), exceeding their medium-term trend in 2004 and then pursuing their uptrend. At that point, faced with rising inflation in the United States, the Fed started a series of interest rate hikes, contributing among other factors to the bursting of the housing bubble resulting from subprime loans. The following financial crisis spread to Europe,<sup>24</sup> where high sovereign debt in some countries represented an exacerbating factor which then fuelled the sovereign debt crisis.

These dynamics are even clearer when looking at the short-term financial cycle (see Chart 3, right). The indicator reflects the same events as the medium-term cycle indicator (rebound post-2001, the bursting of the housing bubble in the United States in 2007, sovereign debt crisis in the euro area), but thanks to its higher sensitivity, it helps identify such sudden events more clearly. Between 2005 and 2007, it reflects the major contribution from the equity markets, the housing market and mortgages in the positive phase of the cycle, as well as the downturn in 2008-2009 after the housing bubble burst in the United States (related to trends in the global financial cycle proposed by Miranda-Agrippino and Rey (2021)). The effects of the sovereign debt crisis, less prominent than the global financial crisis, are also identifiable in 2011-2012 with a decline in the short-cycle indicator, although it still remained in positive territory.

**Chart 3: Focus on the period Q1 2005-Q1 2015**



Source: Banque de France data, DG Trésor calculations.

Note: Each of the sub-indicators is used to develop the financial cycle composite indicator.

(24) European economies were also hit by an economic shock with the combination of rising energy prices and a sharp drop in international trade. In France, the contribution from the financial component of the crisis was limited, with the economic shock playing a key role (Cabannes *et al.* (2013)).

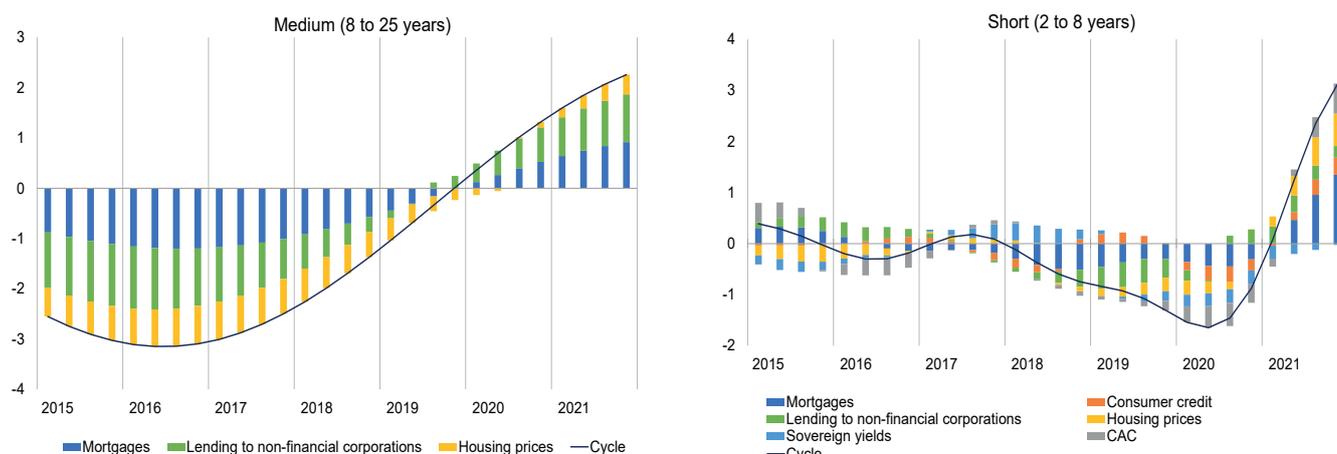
### 3.3. The COVID-19 crisis: limited effect on medium-term cycle momentum but a clear rebound in the short term

The outbreak of the pandemic in 2020 was too sudden for it to affect medium-term financial cycle trends (see Chart 4, left). Rather it came at a time of recovery in the medium-term cycle (which moved out of negative territory in 2019), without affecting it to the point of turning it around. Additionally, the swift response from the monetary and fiscal authorities both in France and

the rest of Europe to support corporate and household credit helped prevent a potential credit crunch.

However, the short-term cycle indicator's sensitivity to exogenous shocks allows it to more clearly reflect the effects of the pandemic in 2020 and the rebound driven by the intervention of public authorities (see Chart 4, right). The decline involved all variables considered in a comparable way, but the rebound that started from the last quarter of 2020 was mainly driven by the rise in housing prices and mortgages.

Chart 4: Focus on the period Q1 2015-Q4 2021



Source: Banque de France data, DG Trésor calculations.

Note: Each of the sub-indicators is used to develop the financial cycle composite indicator.

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