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## Article

Are we riding the waves of a global financial cycle in the euro area? : = Surfons-nous sur les vagues d'un cycle financier mondial dans la zone euro?

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# Are we riding the waves of a global financial cycle in the euro area?

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## Introduction

Following financial liberalisation, deregulation and innovations, financial markets have become significantly more integrated since the 1990s. This is the case for both emerging and advanced economies. Various authors (Rey, 2015; Miranda-Agrippino and Rey, 2019; Habib and Venditti, 2019) have found that this has contributed to the emergence of a “global financial cycle”. The concept broadly refers to the idea that fluctuations in financial markets occur on a global scale, consisting in co-movements of cross-border capital flows, asset prices, credit flows and leverage across countries.

This article relates to the burgeoning literature<sup>1</sup> on the importance of the global financial cycle (GFC) that has so far mainly focused on the effects of the GFC on capital flows of emerging markets. We contribute to this literature by analysing the impact of the GFC on domestic financial conditions in the euro area countries.

Our results show that domestic financial conditions in the euro area are, on average, strongly correlated with a measure of the global financial cycle. Furthermore, we link the cross-country sensitivity to the global cycle to various determinants, including the size and the composition of the external financial position. A key finding is that sensitivity to the GFC depends on the net international investment position. Countries with net liabilities seem to react twice as strongly to the GFC as countries that have net assets.

Several policy implications can be drawn from these findings. First, the strong correlation between financial conditions in the euro area and the global financial cycle makes it useful for macroprudential policy to monitor this global cycle and/or to help address extreme sensitivity to its boom/bust profile. Secondly – and importantly in view of the current debate in the literature – this correlation tends to suggest the presence of a “financial dilemma” in the euro area, along the lines of Rey (2015) for emerging economies. Such a dilemma implies that whenever the financial account is open, monetary and financial conditions are largely in the hands of global factors and less in those of an independent monetary policy. We show that this dilemma in the euro area is particularly present when countries have a negative net external position. This calls for co-ordination between

\* We would like to thank P. Butzen and P. Ilbas for useful comments and suggestions. We are very grateful to M. Habib and F. Venditti for sharing their measure of the global financial cycle and to H. Dewachter for developing an earlier version of the financial conditions index used in this article.

<sup>1</sup> The concept of the “global financial cycle” was introduced in the 2015 Rey paper and presented at the 2013 Kansas City FED Jackson Hole Symposium. Follow-up work was presented at the 2014 IMF Mundell-Fleming lecture. The paper attracted attention and responses from academics and policymakers, such as B. Bernanke at the 2015 IMF Mundell-Fleming lecture. A growing literature followed, concentrating on evidence in favour of or against the global financial cycle.

macroeconomic (structural), macroprudential and monetary policy in the euro area so that their respective objectives can be better attained.

The remainder of this article is structured as follows. First, we review the current literature on the global financial cycle and its implications. In section 2 we construct, for the euro area countries, a composite measure of their domestic financial conditions (Financial Conditions Index – FCI) and analyse to what extent the FCI is correlated with the global financial cycle. Section 3 sheds some light on cross-country heterogeneity in sensitivity to the GFC which we link to various determinants, including the size and composition of the external financial position. Section 4 presents our methodology and empirical results. Given these results, we evaluate recent developments in section 5. Section 6 draws several policy implications before we conclude.

## 1. The global financial cycle: evidence, drivers and implications

Following financial liberalisation, deregulation and innovations, financial markets have become significantly more integrated since the 1990s. This is the case for both emerging and advanced economies (see box 1). Various authors (Rey, 2015; Miranda-Agrippino and Rey, 2019 and Habib and Venditti, 2019) have found that this has contributed to the emergence of a “global financial cycle” (GFC). The concept broadly refers to the idea that fluctuations in financial markets occur on a global scale, consisting in co-movements of cross-border capital flows, asset prices, credit flows and leverage across countries.

In the literature, the global financial cycle is in general proxied by the common component of a large panel of asset returns (e.g. 858 asset price series in Miranda-Agrippino and Rey, 2018; stock market returns in 63 economies in Habib and Venditti, 2019). It is usually shown to be related to two main drivers: the degree of global risk aversion and “centre” country economic policies, in particular, US monetary policy<sup>1</sup>. The latter might influence financial conditions and capital flows around the world through the international role of the dollar in credit markets (BIS, 2017) and the leverage of global banks (Bruno and Shin, 2015a,b).

The literature on the effects of the financial cycle has concentrated on the impact on capital flows and domestic financial conditions. Examples of the former include contributions by Habib and Venditti (2019) and Davis *et al.* (2019). These contributions confirm the findings of Forbes and Warnock (2012) stressing the role of global factors, such as US interest rates or global investors’ risk aversion in international gross capital flows, and episodes of extreme capital flows. Habib and Venditti (2019) point out that “financial” shocks matter more than US monetary policy, while Davis *et al.* (2019) find that global factors also determine net capital flows. Along the same lines, Avdjiev *et al.* (2018) highlight the importance of distinguishing capital flows across financing instruments and sectors. Most of the research finds evidence of a global cycle in capital flows, in particular for emerging markets (Ghosh, Qureshi, Kim and Zalduendo, 2014). These findings have been somehow challenged by Cerutti, Claessens and Rose (2017), who indicate that global factors do not explain more than 25 per cent of capital flow variations across countries.

Although the impact of the GFC on domestic financial conditions forms part of the original analysis by Rey (2015), the literature on that subject is scarcer. Apart from the contributions by Rey (2015), Obstfeld *et al.* (2017) also look into the transmission of global factors to domestic financial and macroeconomic outcomes. Again, the largest effects are found for emerging countries.

The analysis of the sensitivity of domestic financial conditions to global factors is closely related to the discussion regarding the validity of the classical Mundell-Fleming “trilemma” in international economics, which postulates that countries face a trade-off amongst the objectives of exchange rate stability, free capital mobility and

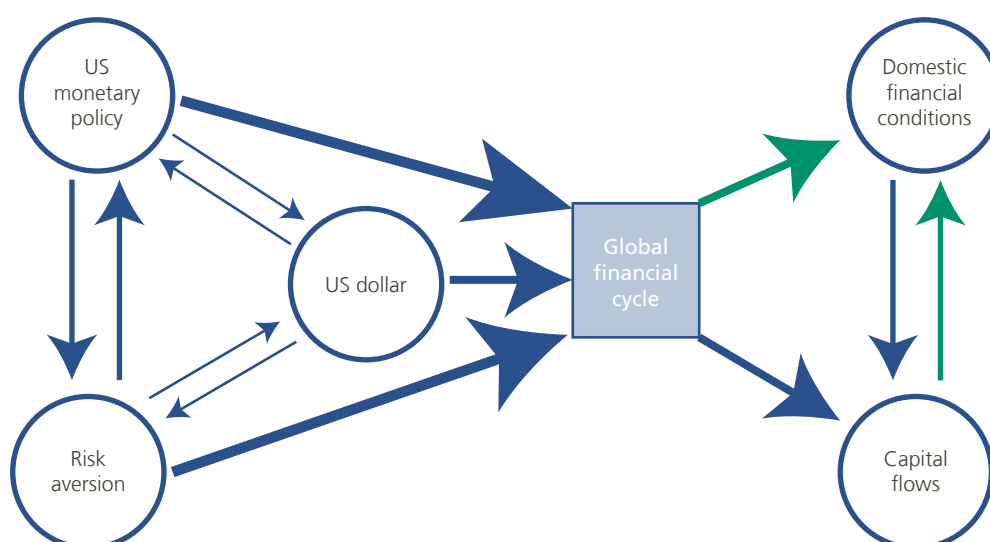
<sup>1</sup> The global financial cycle is sometimes also linked to conventional measures of investors’ risk aversion, such as the VIX. Note that this measure rather captures one of the drivers of the global financial cycle and not the cycle as such.

independent monetary policy<sup>1</sup> (i.e. in a world of free capital mobility, to run an independent monetary policy is feasible if and only if the exchange rate is floating). According to Rey (2015), the existence of a global financial cycle transforms this “trilemma” into a “dilemma”: running an independent monetary policy or allowing capital to flow freely. Thus, while it remains true that fixed exchange rates do not allow for an independent monetary policy, cross-border capital flows would transmit the monetary policy stance of the “centre” economy worldwide, even to economies with floating exchange-rate regimes. This boils down to spill-over effects of US monetary policy (with the US being the “centre”) on monetary and financial conditions in other economies and thus limiting monetary independence<sup>2</sup> in those countries. Rey (2019) therefore characterises the FED as a “hegemon”, essentially describing the FED as the de facto central banker of the world. On the other hand, several authors provide evidence in favour of the trilemma, based on the finding that floating exchange rates insulate economies’ monetary and domestic financial conditions from global factors (Shambaugh, 2004; Obstfeld, Shambaugh and Taylor, 2005; Klein and Shambaugh, 2015; Obstfeld, Ostry and Qureshi, 2017). So far, most of the literature has looked into the evidence for EMEs, as EMEs are in principle more subject to the swings of the global cycle given their dependence on dollar borrowings.

Our article contributes to this burgeoning literature in several ways. We aim to fill in a gap by concentrating on the effects of the GFC on financial conditions in the euro area countries. Given the specific features of the euro area, i.e. the single currency, and the high degree of financial integration, we link the cross-country sensitivity to the global cycle to various determinants, including the size and the composition of cross-border financial holdings. Furthermore, we analyse whether the evidence favours a financial trilemma or dilemma in the euro area. Finally, we draw conclusions for the various economic policy domains in the euro area.

## Chart 1

### Mechanism of the global financial cycle and our contribution<sup>1</sup>



<sup>1</sup> Based on Habib and Venditti (2018). The relations on which we focus in this article are indicated in green.

<sup>1</sup> Economic system configurations have been designed in line with the “trilemma” throughout history: during the gold standard (approximately from the 1870s to the 1930s), exchange rate stability and free capital mobility were assured, at the expense of monetary autonomy. By contrast, the Bretton Woods era (in the aftermath of WWII) was characterised by monetary independence and exchange rate stability, while capital mobility was restricted. The period thereafter (since 1973) has seen an increase in economies with free capital mobility, monetary autonomy and exchange rate flexibility.

<sup>2</sup> In the context of the trilemma/dilemma discussion, monetary independence goes further than the setting of the short-term policy rate, and also includes the fact that monetary policymakers can steer the broader domestic financial conditions.

## Financial globalisation: a state of play

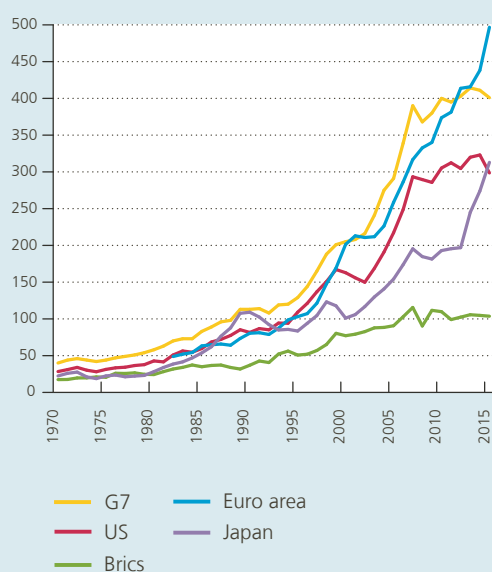
The three decades preceding the global financial crisis of 2008-2009 were marked by a massive increase in gross capital flows worldwide. This was the result of capital controls being taken down, a decrease in both financial regulation and transaction costs, and the emergence of financial innovations (Gourinchas and Rey, 2014 & BIS, 2017). Consequently, cross-border holdings of financial assets and liabilities (expressed as a ratio of GDP) – which can be referred to as a measure of “financial globalisation” or international financial integration (Lane and Milesi-Ferretti, 2001) – underwent a remarkable surge. In Europe in particular, financial openness accelerated more markedly from the late 1990s, after the introduction of the euro helped boost cross-border transactions.

Thus, between 1980 and 2007, the sum of cross-border financial claims and liabilities, scaled by annual GDP, rose from around 60 % to almost 400 % for advanced economies (G7 average), and from roughly 25 % to more than 110 % for emerging market economies (BRICS average).

### Real and financial globalisation

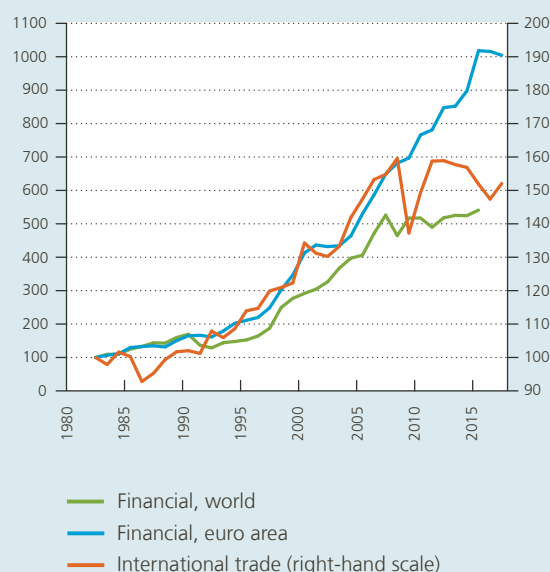
#### Financial globalisation<sup>1,2,3</sup>

(selected countries, total external assets and liabilities, in % GDP)



#### Real<sup>4</sup> and financial<sup>5</sup> globalisation

(total exports and imports & external assets and liabilities, in % GDP, index 1982 = 100)



Sources: Lane and Milesi-Ferretti, World Bank, NBB.

1 The G7 countries are Canada, France, Germany, Italy, Japan, the UK and the US.

2 The Brics countries are Brazil, Russia, India, China and South Africa.

3 The euro area figures relate to the euro area as a whole and do not include intra-euro area assets or liabilities.

4 Total exports and imports, in % of GDP.

5 Total external assets and liabilities, in % of GDP.

Financial globalisation is in part related to real globalisation since international trade both depends on and generates financial linkages. Trade needs to be financed and it therefore induces cross-border payment flows. It may also require hedging, when denominated in foreign currency or when conducted in a risky environment. Finally, it can boost foreign direct investments, for instance when companies decide to establish global value chains to optimise production costs. Trade thus induces the accumulation of international assets and liabilities and, usually, countries that are more involved in trade are also more financially open.

Nevertheless, financial globalisation is also characterised by intricate financial links established solely for financial purposes (BIS, 2017). As the demand for, and supply of, financial products and services increases with the wealth of businesses and households, financial openness tends to increase with the income level. It is therefore no surprise that financial globalisation has grown much more rapidly than international trade since the 1980s. However, in some countries, part of the financial integration might contain an “artificial” component related to tax-optimisation strategies which inflate assets and liabilities to a similar extent (e.g. through cross-border intragroup loans, see also section 3). Since the global financial crisis of 2008-2009, the growth in cross-border asset positions in relation to GDP (i.e. capital flows) has slowed down significantly<sup>1</sup>. Three factors may be put forward to explain this development. The first is precisely a deceleration of international trade and a demand-induced weakness in trade-intensive physical investments. The second is a decline in cross-border activity by banks, concentrated in bank loans, and largely confined to European banks (BIS, 2017). And the third is simply an increase in the relative weight of emerging market economies in global GDP while, at the same time, these economies tend to be less financially integrated (i.e. hold lower external assets and liabilities) compared to advanced economies.

Nonetheless, the outstanding external assets and liabilities of both emerging and developed economies remain close to their highest level. Like Rey (2015), we take this as a starting point to analyse whether this has implications for the evidence in favour of the global financial cycle and its transmission.

<sup>1</sup> For a detailed description of the evolution of financial globalisation since the global financial crisis, see Lane and Milesi-Ferretti (2017).

## 2. Financial cycles in the euro area

### 2.1 Financial conditions index

The previous section showed that the literature finds evidence of a global financial cycle in both capital flows and financial conditions. Our work mainly relates to this second branch of literature (e.g. impact of the GFC on asset prices and credit growth, as in Obstfeld *et al.*, 2017). Since we want to broaden our scope as much as possible, this also raises the question concerning which financial conditions we should consider; that question is closely linked to the discussion on exactly what a financial cycle is.

Although there is currently no generally accepted definition of the financial cycle, it is often described as a cyclical movement common to multiple financial sector segments, such as credit and real estate markets (see e.g. Borio, 2012 and Drehmann *et al.*, 2012). To operationalise this definition, composite indicators are a useful tool for extending the standard univariate approach (e.g. credit-to-GDP gap as financial cycle measure)

to more holistic approaches where the financial cycle is extracted from a large range of relevant data. The methodology behind our composite indicator, the financial conditions index (FCI), is described in box 2.

The FCI offers a view on the properties of the financial cycles in the euro area countries. Understanding the development of the financial cycle is key for macroprudential policy. The literature suggests that the financial cycle is subject to a boom/bust profile. During the boom phase, systemic risks are building up and the peaks of the cycle can serve as early warning signals for financial crises.

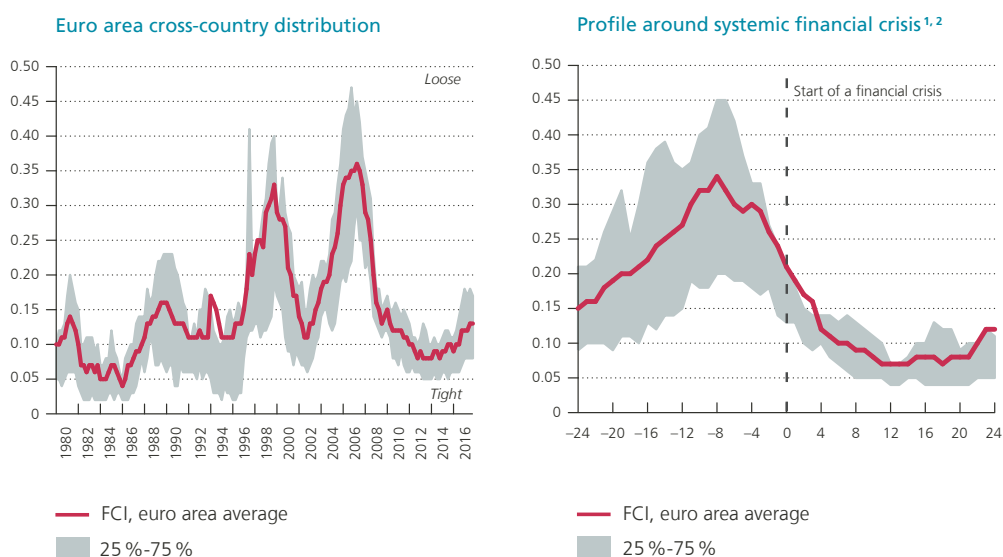
Notwithstanding its importance, empirical analysis regarding the features of the financial cycle in Europe is scarce. A limiting factor is the lack of a consensus definition for the financial cycle, regarding both its composition and its methodology. The difficulty of obtaining harmonised long-term series in Europe also plays a role. Merler (2015) and Schüller *et al.* (2015) were among the first to characterise the financial cycle in Europe. Both authors find – as “stylised facts” – that financial cycles are in general longer than the traditional business cycle, thereby confirming the findings of Borio *et al.* (2012). Both authors point to the existence of a financial cycle in the euro area with a clear boom/bust profile around financial crises, illustrating its early warning capabilities. However, financial cycles show strong heterogeneity/divergence across euro area countries, with varying amplitudes and different cyclical positions<sup>1</sup>.

As shown in Chart 2, the FCI largely confirms these findings. Note that our financial cycle measure is more broadly defined than the concepts utilised in Merler (credit and house prices) and Schüller (credit, house, equity and bond prices). The average FCI in the euro area (Figure 2 – left panel) shows evidence of a boom-bust profile and reaches its highest peak before the global financial crisis of 2008. On average, the FCI results in persistent cycles that operate at lower frequencies than the classic business cycle. Figure 2 (right panel) depicts how the

1 Germany’s “safe-haven” status is likely to contribute to its diverging financial cycle, resulting in higher demand for German government bonds when global risk aversion increases. Furthermore, in the first part of the sample, German house prices deviated from the general rising trend due to the oversupply caused by house-building incentives after German reunification. These elements might explain the “atypical” behaviour of the German FCI.

Chart 2

### Financial conditions index as a measure of the financial cycle



Sources: ECB, NBB.

1 Number of quarters before (–) or after (+) the start of a financial crisis.

2 Crisis events as in Lo Duca *et al.* (2017) and defined as all systemic crises with at least partly domestic origin and considered by European national authorities as relevant from a macroprudential perspective.

FCI starts to increase well ahead of systemic crises and reaches its peak around 2 years before a crisis starts. It can be shown that the FCI has good early warning properties (AUROC <sup>1</sup> above 0.85), that outperform those of univariate financial cycle measures such as the credit-to-GDP gap<sup>2</sup>. These properties hold for a majority of countries, although the FCI shows some cross-country heterogeneity (in particular in the build-up phase). The following section analyses this in more detail.

1 Area Under the Receiver Operating Characteristics. This measure roughly captures the probability of correct prediction, with 1 corresponding to perfect prediction and 0.5 to no predictive power (equivalent to tossing a coin).

2 For more details regarding the early warning performance of the FCI relative to other methods measuring cyclical systemic risk, see “Cyclical systemic risk measurement” (2019), ECB Occasional Working Paper, forthcoming.

## BOX 2

### Financial conditions index (FCI)

The FCI is a broad-based composite indicator of domestic financial conditions, aggregating five financial risk dimensions<sup>1</sup> (credit developments, real estate, private sector debt, banking sector and financial market conditions) into an overall indicator using time-varying weights based on the data correlation structure. The current version of the indicator contains 17 variables.

In a first step, the variables are transformed by means of order statistics<sup>2</sup> such that higher values indicate looser financial conditions and lower values correspond to tighter financial conditions. The order statistic of variable  $x_{i,t}$  at time  $t$  is denoted by  $z_{i,t}$ , and  $x_{i,[k]}$  denotes the  $k$ -th value in the (ascending) series of the variable  $x_i$ . These order statistics are calculated on the basis of the empirical distribution function and take a value between 0 (bust) and 1 (boom).

$$z_{i,t} = F(x_{i,t}) := \begin{cases} \frac{k}{T} & \text{for } x_{i,[k]} \leq x_{i,t} < x_{i,[k+1]} \\ 1 & \text{for } x_{i,t} \geq x_{i,[T]} \end{cases}$$

In a second step, the sub-indices are compiled on the basis of an unweighted average of the order statistics of all the variables assigned to the specific sub-indices, where  $N_j$  denotes the number of variables assigned to the sub-index  $S_j$  and  $z_{i,t}$  denotes the order statistic for each of these variables.

$$S_{j,t} = \frac{1}{N_j} \sum_{i=1}^{N_j} z_{i,t}, \quad j = 1, \dots, 5$$

1 The selection of risk dimensions is based on the categories suggested for monitoring cyclical systemic risk in ESRB recommendation ESRB/2014/1, with the exception of the risk category “external imbalances”. The exclusion of this category benefits the analysis in the rest of this article, as we avoid endogeneity issues between our measure of domestic financial conditions and international capital flows.

2 The use of order statistics is relevant as it makes the resulting statistic(s) less sensitive to extreme realisations of the variable (see Holló *et al.*, 2012).





In a third step, the sub-indices are aggregated into an overall indicator of the financial cycle by applying both an index-specific and a time-varying weighting function, following Holló *et al.* (2012). Denoting the vector of index-specific weights by  $w$  and the vector of the value for the sub-indices at time  $t$  by  $S_t$ , the financial cycle indicator,  $FCI_t$ , can be constructed as the weighted quadratic form of the sub-indices.

$$FCI_t = (w \circ S_t)' Q_t (w \circ S_t)$$

with  $\circ$  the Hadamard-product and  $Q_t$  a time-varying weighting matrix reflecting the time-varying (positive) bilateral co-movement between the respective variables. The latter is constructed by taking – element-wise – the maximum between zero and the time-varying pair-wise correlations between each combination of sub-indices. The pair-wise correlations are constructed using an exponentially weighted moving average (EWMA) filter for the variance-covariance matrix. In operationalising this statistic, the index-specific weights are equal to 0.2 (or  $1/\text{number of } S_t$ ).

### FCI composition: 17 data series

Series (17)	Transformation	Sample (max)
<b>Sub-index 1: Credit developments (3 series)</b>		
Bank credit gap NFPS	gap, % points	1970 Q4
HH bank loan growth	y-o-y %	1998 Sep
NFC bank loan growth	y-o-y %	1998 Sep
<b>Sub-index 2: Real estate (5 series)</b>		
Price-to-income ratio, level	level	1970 Q1
Price-to-income ratio, gap	gap, % points	1971 Q1
Affordability <sup>(1)</sup> , level	level	1996 Q1
Affordability <sup>(1)</sup> , gap	gap, % points	1997 Q1
Nominal house prices, gap	gap, % points	1970 Q1
<b>Sub-index 3: Private debt (3 series)</b>		
Debt-to-GDP ratio NFPS	y-o-y difference	1971 Q4
Debt service ratio HH	y-o-y difference	1981 Q4
Debt service ratio NFC	y-o-y difference	1981 Q4
<b>Sub-index 4: Banking sector (4 series)</b>		
Financial sector assets	y-o-y %	2000 Q1
Bank lending margin	level (-)	2003 Q1
Credit spread HH loans (vs 10Y sovereign)	level (-)	2003 Jan
Credit spread NFC loans (vs 10Y sovereign)	level (-)	2003 Jan
<b>Sub-index 5: Financial markets (2 series)</b>		
Real equity prices	y-o-y %	1981 Q1
Bond yield: 10Y sovereign	level (-)	1970 Q1

Sources: ECB, NBB.

Note: Gap measures calculated using a Hodrick-Prescott filter consistent with the Basel credit gap ( $\lambda = 400\,000$ ).

1 Estimates of the over/undervaluation of residential property prices: average of different valuation measures for all types of property.



Next, we use a weight of 0.98 in the EWMA for the variance-covariance matrix which assigns a significantly larger weight to more recent observations. In any given period, the FCI maximum (minimum) value of 1 (0) can be attained only if each of the sub-indices reaches the maximum (minimum) value at a time where the cycles are also perfectly coincident.

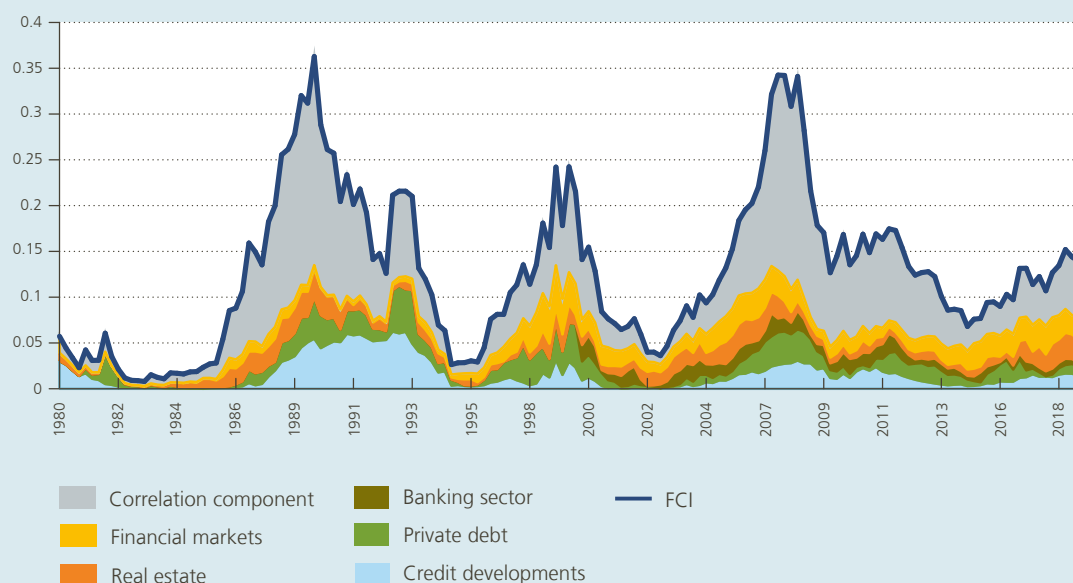
### Input and output

As an input, 17 variables are used which are presumed to be relevant for shaping the financial cycle. The selection is based on the empirical literature and availability over a longer time period. Our sample contains the euro area countries. The data go back as far as 1970Q1, but the length of the time series varies across series and countries<sup>1</sup>. The data set is mixed in terms of frequency (monthly and quarterly), nominal and real variables, levels, data in differences and gap measures (using a recursive HP-filter). The indicators with quarterly frequency are transformed to a monthly frequency using standard linear interpolation<sup>2</sup>.

- 1 Provided the financial cycle can take more than 20 years, preference was given to long-term series. In the case of missing variables, the sub-indicators take the average over the other variables. If data are missing at the level of the sub-indicators, weights are adjusted (1/number of sub-indicators). The use of order statistics and weighted averages limits the impact of this changing composition on the aggregate index.
- 2 The indicator is calculated using a balanced sample at the end. To cater for different publication lags, missing observations are replaced by the latest observation.

### Financial conditions index (FCI) for Belgium and sub-components

(1980Q1-2019Q2)



Source: NBB



The main output is the composite FCI indicator on a monthly or quarterly basis (transformed by taking averages). The chart below illustrates the FCI and its sub-components for Belgium.

By construction, the FCI offers an absolute interpretation for financial conditions, as the variable is contained between 0 and 1. In any given period, the maximum (minimum) value of 1 (0) can be attained only if each of the sub-indices reaches the country-specific maximum (minimum) value at a time where the cycles are also perfectly coincident. Moreover, increases in the FCI can arise because of either an increase in (some of) the individual sub-indices (risk dimensions) or because of an increase in the co-incidence in the cycles of the respective sub-indices. The financial conditions indicator thus explicitly takes into account the correlation between the financial variables. This correlation or co-movement is an essential feature of financial cycles and tends to be strong around financial crises. As an intermediate product, the (unweighted) sub-indices – which average the order statistics of the variables – can be used to monitor tensions in the specific risk categories.

## 2.2 Synchronisation and correlation of the FCI with the global financial cycle

Based on the correlation between the individual countries' FCI and the average euro area FCI, synchronisation of financial cycles is – on average – relatively high (average bilateral correlation of 0.74). However, there is substantial cross-country heterogeneity, with weaker correlations for some countries (0.18 for Germany) and stronger correlations for others (0.94 for France). Note that in contrast to the business cycle, large economies may deviate markedly from the average euro area financial cycle.

The key question we raise in this article concerns the degree of synchronisation between the financial cycle in the euro area and the global financial cycle. As a starting point, we therefore calculate the correlation between the average euro area FCI<sup>1</sup> and a measure of the global cycle. For the latter we use the “Global Stock Market Factor” of Habib and Venditti (2019). This factor is extracted from a global panel of stock market returns. Alternative measures include the Miranda-Agrippino and Rey factor (2019) which captures the common component in 858 asset price series. Since the various measures of the GFC tend to be highly correlated (Habib and Venditti, 2019), the results are in general robust to the choice of GFC measure.

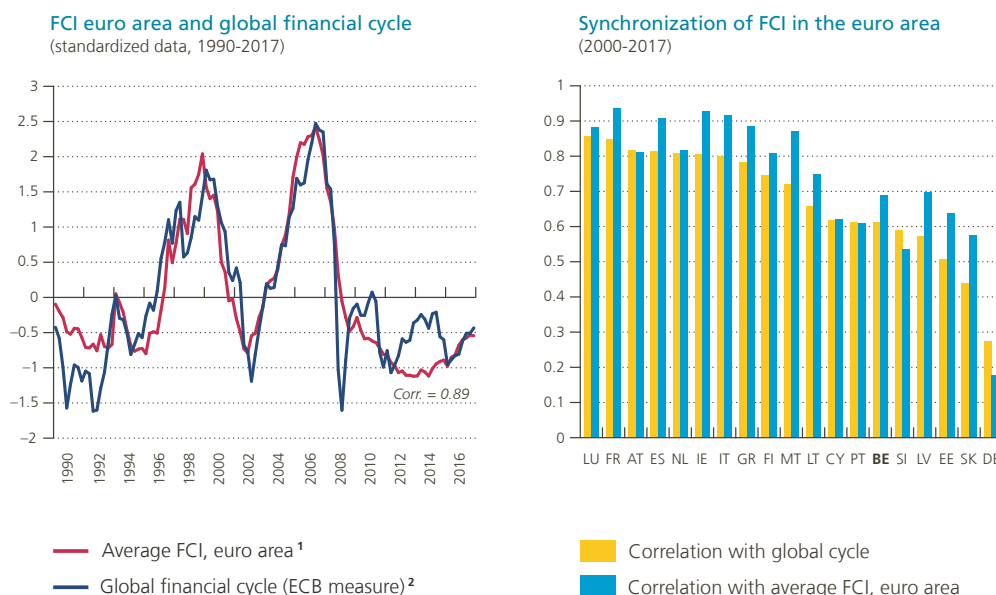
It turns out that the average euro area FCI and the global financial cycle measure are highly correlated (0.89). The high correlation is remarkable, given that the two measures have different purposes (domestic financial conditions versus global financial cycle), are derived from completely different datasets (broad spectrum of macrofinancial series versus stock market returns) and are based on different methodologies (composite index versus factor analysis).

The strong correlation with the global financial cycle also holds at the level of the individual countries, albeit to varying degrees. The correlation ranges from 0.27 (Germany) to 0.86 (Luxembourg) and is largely in line with the synchronicity of each country's cycle within the euro area.

<sup>1</sup> Throughout this paper we use the average FCI as representing the euro area financial cycle. Alternatively, one could apply a principal component analysis. The variance of our euro area average largely corresponds with the result of a principal component analysis (selecting two factors) and has the advantage of being simple.

### Chart 3

#### Are financial conditions in the euro area correlated with the global financial cycle?



Sources: ECB, NBB.

<sup>1</sup> Financial conditions index, euro area cross-country average.

<sup>2</sup> Global financial cycle measure from Habib and Venditti (2019).

### 3. How sensitive are euro area countries to the global financial cycle?

So far, we have shown that domestic financial conditions in the euro area are closely linked to the global financial cycle. At the same time, the correlation with the GFC differs across countries, suggesting that the countries' co-movement with the GFC is influenced by country-specific factors. Which features can magnify or attenuate countries' sensitivity to the GFC? The most natural candidates are the policy variables of the financial trilemma, i.e. financial account openness and the exchange rate.

Most of the literature analysing the sensitivity of financial conditions to the GFC has been concentrating on these variables, and in particular on the exchange rate regime (Rey, 2015; Obstfeld *et al.*, 2017). In general, the evidence is mixed, resulting in varying conclusions regarding the existence of a financial trilemma (the exchange rate matters) or dilemma (the exchange rate is irrelevant). Since euro area countries share the euro as single currency, the exchange rate cannot explain the differences in the impact of the GFC across countries. The only remaining variable is the financial account openness (i.e. the degree of financial integration).

In fact, the external assets and liabilities form a key channel through which global financial conditions are transmitted to an economy. Apart from financial openness, which we can quantify by means of the gross position defined as the sum of external assets and liabilities scaled by GDP, we add other dimensions of the countries' external funding as potential determinants for their sensitivity to the GFC.

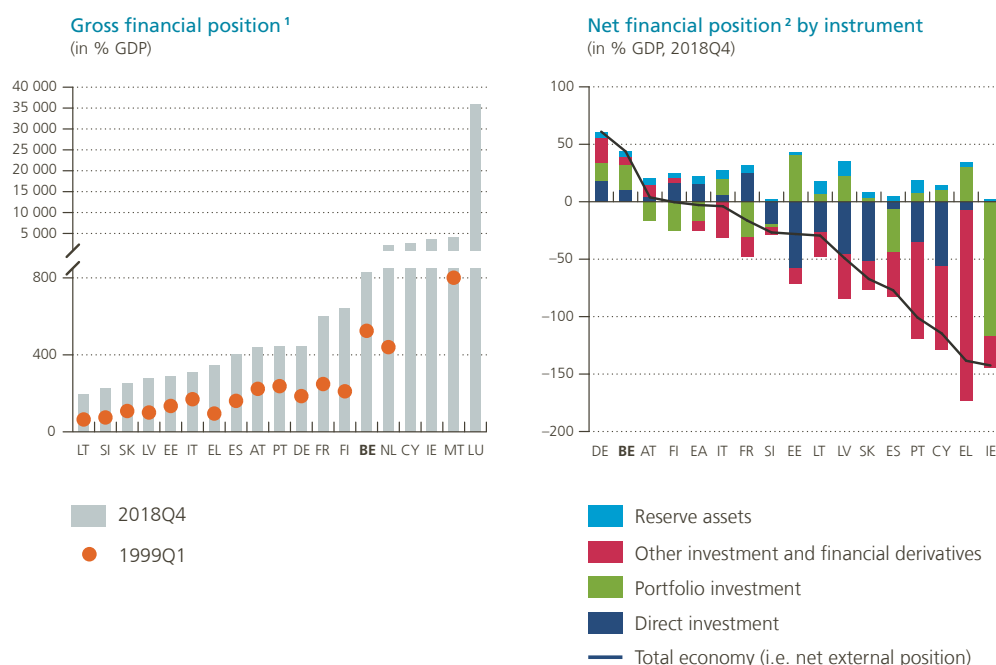
These other dimensions include the composition of the external funding in terms of instruments (direct, portfolio and other investment). Also, apart from the gross position, we analyse the possible role of the net position, which equals the difference between the external assets and liabilities scaled by GDP (i.e. the net international investment position – NIIP). A last dimension, as a complement to the stocks, comprises the gross and net capital flows, including their breakdown by instrument.

The external funding is a natural candidate to influence the impact of the GFC, not only because a strong relationship between domestic credit growth and international capital flows is an established fact (Lane and McQuade, 2013) but also because the literature has shown that the global financial cycle has a significant influence on capital flows themselves (Forbes and Warnock, 2012), be it in gross or net terms (Davis *et al.*, 2019) or by type of capital flow (Avdjiev *et al.*, 2018). Global factors, such as US interest rates or global risk aversion act as “gatekeepers” for capital in- and outflows to and from emerging economies (Ghosh, Qureshi, Kim and Zalduendo, 2014). Habib and Venditti (2019) provide evidence of a “global capital flows cycle”. Moreover, it has been shown that, during financial crises, some capital flows tend to be more volatile than others (Bussière, 2016). As such, we expect that the size and composition of the external funding plays an essential role in determining countries’ sensitivity to the GFC, particularly in the euro area, where there are wide cross-country variations in the size and composition of the external funding, whereas the exchange rate is the same for all countries.

Figure 4 shows the cross-country variation in the gross and net external position. As advanced economies, the euro area countries show a high degree of financial integration. In all economies the stock of external assets and liabilities exceeds GDP. As explained in box 1, financial integration has increased markedly, particularly in the euro area where the euro acted as a catalyst for cross-border financial flows since the creation of the EMU. Although that process has come to a halt since the financial crisis, with lower capital flows, the outstanding stocks are still close to their highest levels. As mentioned in box 1, apart from the macroeconomic fundamentals, the fiscal regime and presence of large multinationals in some countries contributes to “accounting-inspired” flows that inflate assets and liabilities to a similar extent (e.g. cross-border intragroup loans), making part of the integration artificial and volatile. In these “financial centres”, the gross position takes extreme values (above 1000% GDP).

Chart 4

### Gross and net financial position



Sources: ECB, IMF, NBB.

1 Sum of the external assets and liabilities.

2 Difference between the outstanding assets and liabilities, by financing instrument.

The net position is unaffected by these “artificial” flows, insofar as they drive up assets and liabilities to the same extent. Nonetheless, the NIIP also shows substantial cross-country differences, ranging at the end of 2018 from –143 % (Ireland) to 61 % GDP (Germany). Most of the countries in the euro area are net debtors (liabilities exceed assets). The NIIP is the aggregate net wealth of the domestic sectors, and large negative values are considered unsustainable. The NIIP is monitored closely within the enhanced European economic governance framework (European Semester) since it is one of the indicators included in the Macroeconomic Imbalance Procedure (MIP). Values below –35 % GDP can be considered as an excessive imbalance. The chart further decomposes the NIIP according to the type of funding. Among the net debtors, a large part of the funding consists of other investment, which is mainly bank-related funding.

In the next section, we analyse whether the size and composition of the external position of the euro area countries can explain the difference in sensitivity to the GFC. For this purpose, we constructed a dataset for the 19 euro area countries on a quarterly basis since 1990, relying on Eurostat/ECB and on the IMF Balance of Payments Statistics for historical data. The dataset contains both external assets and liabilities, capital in- and outflows and a breakdown by main “functional” categories (direct, portfolio and other investment). Series that showed a break between the two sources were retropolated. Where necessary we interpolated the annual observations linearly to obtain quarterly data.

#### 4. Empirical results on sensitivity to the global financial cycle

This section provides empirical evidence on (i) whether domestic financial conditions in the euro area countries move in line with the global financial cycle and (ii) to what extent this co-movement is magnified or attenuated by features of their external funding. Therefore, we let various variables “interact” with the GFC, such as the gross and net external position, as well as the gross and net capital flows. To that end, we estimate the following panel regression specification:

$$FCI_{it} = \alpha_i + \beta GFC_t + \delta GFC_t \times Z_{it} + \sum_{k=1}^K \gamma_k x_{it,k} + \varepsilon_{it}$$

in which  $FCI_{it}$  denotes the domestic financial conditions index of country  $i$  and  $GFC_t$  is the global financial cycle (taken from Habib and Venditti, 2019). To gain insight into what drives countries’ sensitivity to the GFC,  $Z_{it}$  captures the various features of their external funding, which we let interact, one-by-one, with  $GFC_t$ . E.g. if  $Z_{it} = NIIP_{it}$ , defined as assets minus liabilities scaled by GDP,  $\delta$  indicates the degree to which countries’ sensitivity to the GFC depends on their net international investment position. We make a similar assessment in the other regressions that test for the relevance of the gross external position ( $Z_{it} = GIIP_{it}$ , sum of external assets and liabilities scaled by GDP), gross flows ( $Z_{it} = \text{Gross flows}_{it}$ , average of in- and outflows scaled by GDP) and net flows ( $Z_{it} = \text{Net flows}_{it}$ , difference between out- and inflows scaled by GDP).  $\alpha_i$  captures country fixed effects and  $x_{it}$  is a vector of lagged macroeconomic control variables taken from the literature (domestic and global inflation, domestic and global real growth, real and financial openness of the country; see Rey, 2015; Obstfeld *et al.*, 2017; Davis *et al.*, 2019; Habib & Venditti, 2019 who use a similar framework to analyse the impact of the GFC).

All models are estimated using ordinary least squares on a sample of euro area countries. Standard errors are clustered at the country level. All variables are at the quarterly frequency running from 1990Q1–2017Q4. Stationarity is verified along the lines of Im, Pesaran & Shin (2003). We drop the countries identified as “financial centres” from the analysis as their gross capital flows materially exceed GDP and are typically very volatile.<sup>1</sup>

<sup>1</sup> We consider Luxemburg, Malta, Cyprus, Ireland and the Netherlands as financial centres since the sum of their external asset and liabilities exceeds 1000 % GDP. Note that Belgium is a borderline case with the gross position amounting to 826 % GDP at the end of 2018 (due to a large share of intragroup loans). Also, Slovenia is excluded from our analysis due to a lack of sufficiently long series.

All models include quarterly dummies and a linear time trend. In unreported results, we document the results presented below to be robust to various modifications to aforementioned set-up.<sup>1</sup>

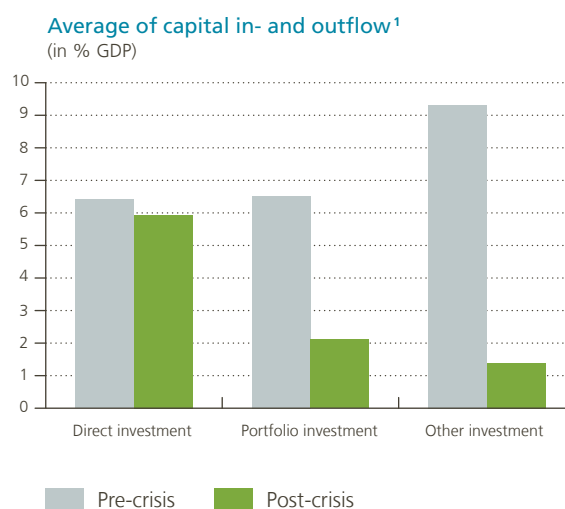
Table 1 (in annex) summarises the main results. Column (1) shows that domestic financial conditions in the euro area are positively related to the global financial cycle. Quantitatively, a 1.0 standard deviation (s.d.) increase in  $GFC_t$  is associated with a 0.27 s.d. increase in the  $FCI_{it}$ . It is worth emphasising at this point that the regression coefficient indicates correlation – not causality (see also Rey, 2015 for a discussion). Importantly, column (2) reveals that this co-movement is stronger for countries that have a negative net external position (negative coefficient). In order to better appreciate the quantitative significance of this result, specification (3) replaces the interaction term with  $GFC_t \times NIIP_{it,<0}$ , where

$$NIIP_{it,<0} = \begin{cases} 1 & \text{if } NIIP_{it} < 0 \\ 0 & \text{if } NIIP_{it} \geq 0 \end{cases}$$

The interaction term in column (3) indicates that this increased co-movement is sizeable: in absolute terms, a 1.0 s.d. increase in the  $GFC_t$  is on average associated with a 0.43 s.d. (0.21 s.d.) increase in the  $FCI_{it}$  for countries with a negative (positive) net external position. In other words, the domestic financial conditions of countries that have a negative net external position comove approximately twice as strong with the global financial cycle than in the countries with a non-negative net position. Specification (4) suggests that this is more generally true for countries with a relatively small net external position<sup>2</sup>. Countries with a relatively large net position seem to be insulated from the global financial cycle.

## Chart 5

### Other investment less stable than other funding sources



Sources: ECB, NBB.

1 Averages over pre-crisis (2002Q4-2007Q4) and post-crisis (2008Q1-2018Q4) period for euro area capital in- and outflows.

1 A battery of robustness tests all confirm our baseline results: e.g. (i) trimming, (ii) the inclusion of financial centres, (iii) the use of an alternative measure for  $GFC_t$  taken from Miranda-Agrippino and Rey (2019), (iv) inclusion of lags of the dependent variable and (v) Driscoll-Kraay standard errors (to account for possible cross-sectional and temporal dependence in the error term  $\epsilon_{it}$ ).

2 Countries with a net external position below the first quartile are considered to have a relatively small position. We also tested the co-movement with the GFC of countries with  $NIIP < -35\%$  GDP as this is the threshold used in the MIP to identify macroeconomic imbalances. It turns out that those countries are the most sensitive to the GFC, which provides an additional justification for close monitoring of these countries.

The importance of the gross position ( $Z_{it} = GIIP_{it}$ ), for the euro area countries' sensitivity to the GFC is analysed in column (5). Contrary to our expectations and the literature (Rey, 2015), we find the gross position insignificant for the co-movement of domestic financial conditions with the GFC. A possible explanation might be that financial integration in the euro area has reached such a high level that an additional increase or decrease makes no difference for the transmission of global factors. This might also explain the differences in relation to the findings in the literature which mainly hold for emerging economies, which are far less financially integrated than the euro area countries.

In Table 2, we disentangle the net external position of the country into three sub-categories: other investment (OI), direct investment (DI) and portfolio investment (PI). Column (2) reveals that the increased co-movement arises mainly as a result of net positions in OI and – to a smaller extent – DI<sup>1</sup>. The crucial role of other investment in countries' sensitivity to the GFC is not surprising as the literature also found that the GFC had the strongest impact on the other investment capital flows (Habib and Venditti, 2019). Moreover, Broner *et al.* (2013) and Bussière *et al.* (2016) showed that, around crises, other investment experiences the sharpest drop. In particular, the banks' debt funding flows proved the most sensitive to the "sudden stop" during the 2008 financial crisis (Milesi-Ferreti and Tille, 2011). Consistent with the findings of Bussière *et al.* (2016), other investment displayed the highest volatility of all capital flows in the euro area during the financial crisis, while direct investment was far more stable (see Chart 5). Consequently, financial conditions in countries that finance themselves more through other investment are more likely to reflect an inherent boom/bust profile.

While an advantage of our analysis is that we aggregate all financial conditions into one figure, it might also be relevant to look at the reaction of the various financial sub-indexes. Remember that the  $FCI_{it}$  is a composite indicator which aggregates five risk dimensions (credit developments, real estate, private sector debt, banking sector and financial market conditions). We therefore decompose our results from Table 1 column (3) and replace  $FCI_{it}$  with each of these five risk dimensions. Figure 6 plots the coefficient of  $\hat{\beta}$  and  $\hat{\beta} + \hat{\delta}$  for each subcategory of  $FCI_{it}$ . Coefficient  $\hat{\beta}$  ( $\hat{\beta} + \hat{\delta}$ ) then quantifies the co-movement of the various financial conditions with the global financial cycle for countries with a positive (negative) net external position.

Interestingly, the decomposition shows a diverse picture. Credit developments and private sector leverage tend to respond as expected: lending and leverage increase in countries with a negative NIIP and the impact of an upturn in the GFC is magnified. Note that the "shielding" of countries with a positive NIIP is strongest for credit developments, although the coefficient is not significant. Also, real estate markets in countries with a negative NIIP are more vulnerable to GFC movements. However, the response is smaller than in the case of credit and leverage developments. Moreover, as shown by the countercyclical reaction in countries with a positive NIIP, house prices in the euro area tend to behave differently, which confirms the evidence that these markets in the euro area are "separated along national lines". The most counter-intuitive results are found for the banking sector and the financial markets. For the banking sector, statistical significance might play a role as this sub-indicator holds less observations than the other indices. In the case of financial markets, safe-haven flows addressed to countries with a positive NIIP, in particular Germany, might play a role.

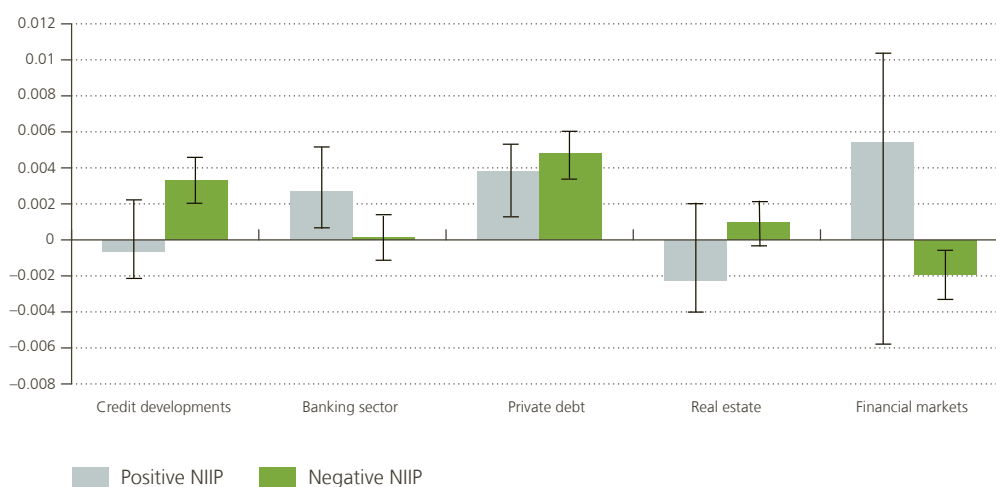
In sum, our results presented in this section show that domestic financial conditions in the euro area tend to co-move strongly with the global financial cycle, in particular in those countries that have a negative net international investment position and finance themselves through other investment. The impact of capital flows on sensitivity to the GFC is analysed in the next section against the background of recent developments.

<sup>1</sup> We performed a similar estimate with the breakdown of the gross position. All detailed gross positions are insignificant and thus confirm the result for the total gross position.



Chart 6

### Some financial conditions are more sensitive than others<sup>1</sup>



Source: NBB.

<sup>1</sup> Y-axis shows the coefficient on the global financial cycle, calculated as  $\hat{\beta} (\hat{\beta} + \hat{\delta})$ . Vertical bars indicate the 95% confidence interval surrounding the estimated coefficients.

## 5. Recent developments and role of capital flows

The effects of the GFC and sensitivity to its boom/bust profile were most evident during the financial crisis of 2008. To estimate the impact of a future global shock, it is worthwhile to analyse whether policies in the euro area since then have (intentionally or unintentionally) contributed to a reduction in sensitivity to the GFC.

Regarding the NIIP, Chart 7 (left panel) shows a mixed picture, with about half of the countries recording an improvement since the crisis. While in the majority of countries a flow adjustment took place (i.e. an improvement in the current account), stock imbalances as measured by the NIIP have been persistent in the euro area. Some of the largest net debtors even saw a further deterioration in their negative NIIP, given slow economic growth and the cost of the debt burden<sup>1</sup>. In the light of this, as mentioned before, the NIIP is monitored under the Macroeconomic Imbalance Procedure (MIP), and NIIP < -35% GDP can be considered as excessive. Despite this monitoring framework, large negative NIIP values continue to exist.

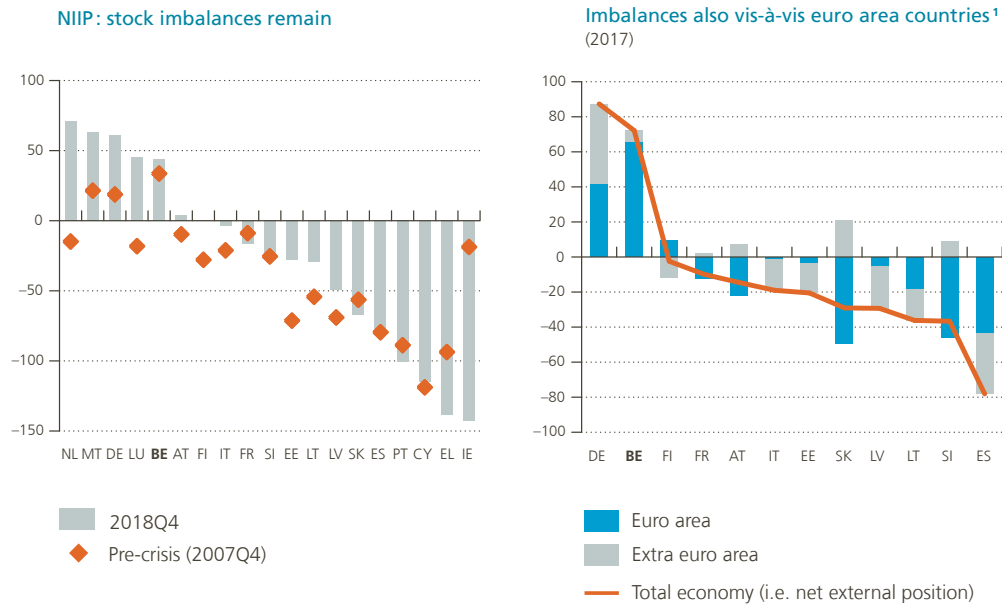
A geographical breakdown, shows that a large part of the net claims and liabilities is vis-à-vis other euro area countries<sup>2</sup>, which also explains why at the level of the euro area, the consolidated NIIP is only slightly negative. This is important, as it shows that the significance of the NIIP for sensitivity to the GFC is rather due to debt sustainability issues (the overall NIIP figure), than to spill-over effects coming from the direct holdings of external assets and liabilities (the extra-euro area part of the NIIP). So, even if a country does not hold extra-euro area assets, most likely it would still find itself vulnerable to the global financial cycle due to debt sustainability issues. The importance of intra-euro area balances and capital flows for financial conditions has also been raised by Merler (2015).

<sup>1</sup> This cost is reflected in development of the investment income balance (part of the balance of payments). It should be noted that in the aftermath of the financial and sovereign debt crisis, policies in the euro area limited these costs for the net debtors via monetary policy and the "official" ESM funding.

<sup>2</sup> Based on the Finflows database of the European Commission (JRC-ECFIN), pre-release version of July 2019. The Finflows database contains yearly bilateral financial investment positions between OECD, EU, and offshore countries (stocks and flows) from 2001 to 2017.

## Chart 7

### Has the net financial position improved since the financial crisis?

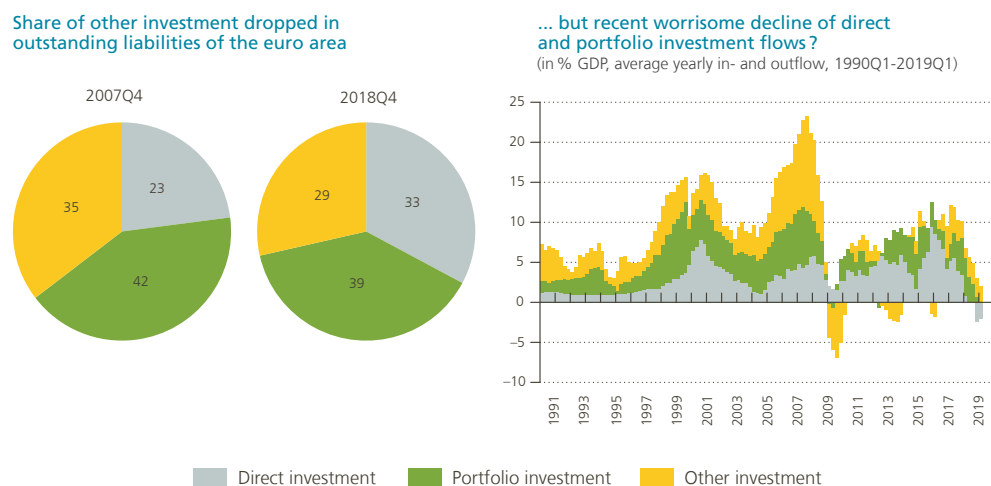


Sources: EC, ECB, NBB.

1 Geographical breakdown based on "Finflows database" of the European Commission (JRC-ECFIN). Pre-release version of July 2019.

## Chart 8

### Has the financing mix improved since the financial crisis?



Sources: ECB, NBB.

While the NIIP did not improve, adjustment in the financing instruments might have contributed to a lower sensitivity. Since the financial crisis, we have seen a drop in the dependence on other investment. Both capital in- and outflows of other investment declined relative to other financing instruments. As a result, the share of other investment in the outstanding liabilities of the euro area was down from 35 % at the end of 2007 to 29 % in 2018. Most of this reduction can be related to the drop in the cross-border funding of banks, with the latter re-focusing on their domestic markets. While this is a positive trend in view of our results, the development of the other funding sources is not irrelevant. In that context, we notice a recent setback in all (gross) capital flows, with negative flows for direct and portfolio investment.

In order to shed some light on the importance of the recent capital flows we perform additional estimations, where we let the different flows interact with the global financial cycle. We run estimations for both gross and net flows, and for their breakdown by instrument (Table 3). The results confirm that sensitivity to the GFC is mainly driven by other investment (flows). In line with the result for the positions, it is the net rather than the gross flows which are significant. Viewed in terms of exposure to the GFC, the current setback in gross capital flows is therefore not necessarily good or bad news, although it does indicate a decline in financial integration.

The finding that net flows are more significant corroborates the idea that sustainability issues are at the root of sensitivity to the GFC. Gross flows, together with the gross position, are less important. These findings contrast with those of Farhi *et al.* (2012) and Rey (2015) for a sample of emerging and advanced countries. We attribute our finding to the fact that gross flows and positions might lose some of their significance in the euro area given the level of financial integration reached and the smaller potential for mismatches between assets and liabilities (e.g. no exchange risk on the euro area exposures).

## 6. Policy implications

Besides the fact that domestic financial conditions in the euro area seem strongly linked to the global financial cycle (GFC), our econometric results show that cross-country sensitivity to the GFC depends crucially on the net international investment position. Countries with net liabilities react twice as strongly as countries that have net assets. Moreover, especially those which finance themselves by other investment (mainly debt funding of banks) prove vulnerable to the boom/bust profile of the global financial cycle.

These observations have various important policy implications for macroprudential, monetary and structural policies and the co-ordination between these domains. In this section we discuss the rationale behind these lessons.

First, the importance of the global financial cycle for euro area financial conditions adds a new “target” for macroprudential policy: mitigating and preventing exposure to the boom/bust profile of the global financial cycle<sup>1</sup>. An effective macroprudential policy indeed requires close monitoring of the global factors influencing domestic financial conditions. Moreover, it provides support to the idea that macroprudential policy in the euro area should be differentiated across member states, taking into account cross-country variations in sensitivity to the GFC.

While national policies can in general not influence the global cycle, they certainly can take measures to influence their exposure to this cycle. Our results clearly show that if a country wishes to reduce its exposure to the GFC, it could either limit the size of its net liabilities or change its financing mix. The most efficient way to improve the NIIP might be by reducing other investment liabilities, i.e. the cross-border debt funding of domestic banks.

<sup>1</sup> Macroprudential policies are still at the development stage, and in practice still largely in search of clear targets. According to Smets (2014), macroprudential policy should have four targets: i) mitigate and prevent excessive credit growth and leverage, ii) mitigate and prevent excessive maturity and liquidity mismatch, iii) limit excessive exposure concentrations and iv) limit bail-out expectations. We thus add to this: mitigate and prevent exposure to the boom/bust profile of the global financial cycle.

Note that for both remedies (i.e. improving the NIIP and making its composition more robust), there are already policies in place within the EU, although they do not intentionally “target” the exposure to the GFC. These policies are part of the structural macroeconomic framework within the EU: the European Semester (within the MIP, NIIPs <35 % GDP can be qualified as excessive) and initiatives such as the banking union or the Capital Markets Union (CMU), which aim to broaden the financing sources in the EU and make them more robust.

Given the challenges macroprudential policy might experience to directly influence the NIIP and its composition due to the limited macroprudential toolkit and the difficulty of going beyond bank-related flows, these other (structural) policies have an important role to play. It should also be noted that within the EMU, the measures should be in line with the free movement of capital and should thus differ from capital flow management measures (CFM)<sup>1</sup>.

Secondly, the strong correlation between domestic financial conditions in the euro area and the global financial cycle tends to confirm a financial dilemma for the euro area, along the lines of Rey (2015) for emerging economies<sup>2</sup>. Such a dilemma implies that whenever the financial account is open, monetary and financial conditions are largely in the hands of global factors and less in those of an independent monetary policy. We show that this dilemma in the euro area is particularly present when countries have a negative net external position.

Consequently, as a third lesson, apart from the call by some for international monetary policy co-ordination (Rajan, 2014), this calls in the euro area for co-ordination between macroeconomic (structural), macroprudential and monetary policy in order to reach their objectives. Addressing the negative external position and, more broadly, ensuring debt sustainability, as is currently done under the European Macroeconomic Imbalance Procedure (MIP), would most likely help to insulate the countries during risk-on/risk-off global regimes, thereby also contributing to financial stability objectives and independent monetary conditions in the euro area.

Finally, our work offers an interesting basis for further analysis in the domain of international finance, and in particular the transmission of global shocks and the policy implications for the euro area. It encourages research that looks into the need for co-ordination between policy domains as well as the need for international co-operation. Also, it illustrates the potential of closing the data gaps, such as a detailed geographical and sectoral breakdown of the NIIP. Based on the latter, additional insights might be obtained regarding countries’ sensitivity to the GFC and the associated transmission mechanisms.

1 CFMs (IMF, 2012) are defined as measures that are designed to limit capital flows via administrative and price-based restrictions on capital flows.

2 In a recent update (Miranda-Agrippino and Rey, 2019) also questions the monetary independence of large and advanced economies, such as the euro area.

## Conclusion

In this article, we analysed whether domestic financial conditions in the euro area countries are driven by a global financial cycle. To measure this effect, we constructed a financial conditions index (FCI) for the euro area countries, summarising their domestic financial conditions, and compared this index with a measure for the global financial cycle relying on the recent literature (Habib and Venditti, 2019).

Our results contribute to a burgeoning literature on the global financial cycle (GFC), which mainly looks into the effect of the GFC on capital flows of emerging economies. We complement these results with findings regarding the impact of the GFC on domestic financial conditions in the euro area countries.

First, we find a clear financial cycle for the euro area, with peaks that can be related to crisis events. There is, however, substantial heterogeneity across the euro area countries.

Secondly, financial conditions in the euro area are strongly linked to the global financial cycle. However, euro area countries show varying sensitivities to the global cycle.

In this article we link this cross-country sensitivity to the global cycle to various determinants, including the size and composition of the external financial position. A key finding is that sensitivity seems to depend crucially on the net international investment position. Countries with net liabilities seem to react twice as strongly as countries that have net assets. Among the countries with net liabilities, especially those which finance themselves by other investment (mainly debt funding of banks) prove vulnerable to the boom/bust profile of the global financial cycle.

Our results have several policy implications. First, it is useful for macroprudential policy to monitor the global financial cycle and/or help to address extreme sensitivity to its boom/bust profile. Secondly, the strong correlation between financial conditions in the euro area and the global financial cycle tends to confirm a financial dilemma for the euro area, along the lines of Rey (2015) for emerging economies. Such a dilemma implies that whenever the financial account is open, monetary conditions are largely in the hands of global factors and less in those of an independent monetary policy. We show that this dilemma in the euro area is particularly present when countries have a negative net external position.

At the same time, our results call for co-ordination between macroeconomic (structural), macroprudential and monetary policy to reach their objectives. Addressing the negative net external position and, more broadly, ensuring debt sustainability, as is currently done under the European Macroeconomic Imbalance Procedure (MIP), would most likely help to insulate the countries during risk-on/risk-off global regimes, thereby also contributing to financial stability objectives and independent monetary conditions in the euro area.

## Annex: Tables

Table 1

### Co-movement of the domestic/global financial cycle and role of NIIP

Dependent variable	Baseline	NIIP level	Negative NIIP	High vs. Low NIIP	GIIP Level
$FCI_{it}$	(1)	(2)	(3)	(4)	(5)
$GFC_t$	0.058*** (0.01)	0.037*** (0.01)	0.028** (0.01)	0.041*** (0.01)	0.050** (0.02)
$NIIP_{it} \times GFC_t$		-0.0005** (0.00)			
$NIIP_{it,<0} \times GFC_t$			0.030** (0.01)		
$NIIP_{it,low} \times GFC_t$				0.041* (0.02)	
$NIIP_{it,high} \times GFC_t$				-0.032 (0.03)	
$GIIP_{it} \times GFC_t$					0.000 (0.00)
Domestic inflation $_{it-1}$	-0.686 (0.56)	-0.413 (0.57)	-0.487 (0.59)	-0.358 (0.55)	-0.544 (0.60)
Domestic growth $_{it-1}$	-0.270 (0.20)	-0.409* (0.22)	-0.473* (0.23)	-0.369 (0.21)	-0.531** (0.22)
World inflation $_{t-1}$	0.045 (0.14)	0.041 (0.14)	0.028 (0.14)	0.087 (0.13)	-0.006 (0.15)
World growth $_{t-1}$	-0.511 (0.82)	-1.002 (0.94)	-0.894 (0.92)	-1.029 (0.91)	-0.789 (0.89)
N	1.454	1.136	1.136	1.136	1.136
R <sup>2</sup> adj.	0.399	0.410	0.396	0.428	0.388
Countries	13	13	13	13	13
Macroeconomic controls	x	x	x	x	x
Country fixed effects	x	x	x	x	x

Notes: The asterisks \*, \*\*, and \*\*\* indicate statistical significance at the 10 %, 5 % and 1 % level, respectively. Standard errors are reported in parentheses. The dependent variable,  $FCI_{it}$ , is the domestic financial conditions indicator.  $GFC_t$  proxies the global financial cycle and is taken from Habib and Venditti (2019).  $NIIP_{it} = (External\ assets_{it} - External\ liabilities_{it}) / GDP_{it}$  quantifies the net external position of country  $i$ .  $NIIP_{it,<0}$  is a dummy variable taking the value 1 if  $NIIP_{it} < 0$ . Indicator variable  $NIIP_{it,low}$  ( $NIIP_{it,high}$ ) takes the value 1 if the country has a net position below (above) the first (third) quartile.  $GIIP_{it} = (External\ assets_{it} + External\ liabilities_{it}) / GDP_{it}$  quantifies the gross external position of country  $i$ . The set of national control variables also includes  $Financial\ openness_{it} = (External\ assets_{it} - External\ liabilities_{it}) / GDP_{it}$  and  $Real\ openness_{it}$ , which is a dummy variable if the sum of a country's exports and imports (over GDP) is larger than the cross-sectional mean. All specifications include a linear time trend and quarterly dummies.

Table 2

## Sensitivity to GFC and type of external funding

Dependent variable	Net position	Negative net position
$FCI_{it}$	(1)	(2)
$GFC_t$	0.042*** (0.011)	0.020 (0.023)
$Net\ OL_{it} \times GFC_t$	-0.001 (0.000)	
$Net\ DI_{it} \times GFC_t$	-0.000 (0.000)	
$Net\ PI_{it} \times GFC_t$	-0.000 (0.000)	
$Net\ OL_{it,<0} \times GFC_t$		0.049** (0.017)
$Net\ DI_{it,<0} \times GFC_t$		0.026* (0.015)
$Net\ PI_{it,<0} \times GFC_t$		0.004 (0.016)
N	858	858
R <sup>2</sup> adj.	0.598	0.556
Countries	13	13
Macroeconomic controls	x	x
Country fixed effects	x	x

Notes: The asterisks \*, \*\*, and \*\*\* indicate statistical significance at the 10 %, 5 % and 1 % level, respectively. Standard errors are reported in parentheses. The dependent variable,  $FCI_{it}$ , is the domestic financial cycle indicator.  $GFC_t$  proxies the global financial cycle and is taken from Habib and Venditti (2019).  $Net\ PI_{it}$  is the net portfolio investment position of country  $i$ , scaled by GDP. A similar definition applies to  $Net\ DI_{it}$  (direct investment) and  $Net\ OL_{it}$  (other investment).  $Net\ PI_{it,<0}$  is an indicator variable taking the value 1 if  $Net\ PI_{it}<0$  (similarly for DI and OI). All specifications include a linear time trend and quarterly dummies.

Table 3

## Co-movement of the domestic/global financial cycle and role of net capital flows

Dependent variable	Direct investment (DI)	Portfolio investment (PI)	Other investment (OI)	Total investment
$FCI_{it}$	(1)	(2)	(3)	(4)
$GFC_t$	0.036*** (0.01)	0.038*** (0.01)	0.036*** (0.01)	0.034*** (0.01)
$Net\ flows_{it} \times GFC_t$	-0.004*** (0.00)	-0.004*** (0.00)	-0.001 (0.00)	0.003 (0.00)
$Net\ DI\ flows_{it} \times GFC_t$	0.001 (0.00)			-0.003 (0.00)
$Net\ PI\ flows_{it} \times GFC_t$		0.003 (0.00)		-0.004 (0.00)
$Net\ OI\ flows_{it} \times GFC_t$			-0.004** (0.001)	-0.008** (0.00)
N	1.105	1.105	1.105	1.105
R <sup>2</sup> adj.	0.430	0.443	0.457	0.460
Countries	13	13	13	13
Macroeconomic controls	x	x	x	x
Country fixed effects	x	x	x	x

Notes: The asterisks \*, \*\*, and \*\*\* indicate statistical significance at the 10 %, 5 % and 1 % level, respectively. Standard errors are reported in parentheses. The dependent variable is the domestic financial cycle indicator,  $FCI_{it}$ .  $GFC_t$  proxies the global financial cycle and is taken from Habib and Venditti (2019).  $Net\ flows_{it}$  is the difference between out- (+) and inflows (-).  $Net\ DI\ flows_{it}$ ,  $Net\ PI\ flows_{it}$  and  $Net\ OI\ flows_{it}$  break down the net capital flows into net flows of direct, portfolio and other investment, respectively.



Table 4

## Co-movement of the domestic/global financial cycle and role of gross capital flows

Dependent variable	Direct investment (DI)	Portfolio investment (PI)	Other investment (OI)	Total investment
$FCI_{it}$	(1)	(2)	(3)	(4)
$GFC_t$	0.028* (0.01)	0.028* (0.01)	0.030* (0.01)	0.029* (0.01)
$Gross\ flows_{it} \times GFC_t$	0.002** (0.00)	0.002 (0.00)	0.000 (0.00)	0.011 (0.01)
$Gross\ DI\ flows_{it} \times GFC_t$	-0.002 (0.00)			-0.011 (0.01)
$Gross\ PI\ flows_{it} \times GFC_t$		-0.001 (0.00)		-0.010 (0.01)
$Gross\ OI\ flows_{it} \times GFC_t$			0.002 (0.00)	-0.009 (0.01)
N	1.105	1.105	1.105	1.105
R <sup>2</sup> adj.	0.420	0.418	0.420	0.427
Countries	13	13	13	13
Macroeconomic controls	x	x	x	x
Country fixed effects	x	x	x	x

Notes: The asterisks \*, \*\*, and \*\*\* indicate statistical significance at the 10 %, 5 % and 1 % level, respectively. Standard errors are reported in parentheses. The dependent variable is the domestic financial cycle indicator,  $FCI_{it}$ .  $GFC_t$  proxies the global financial cycle and is taken from Habib and Venditti (2019).  $Gross\ flows_{it}$  is the average of the in- and outflows (% GDP) of country  $i$ .  $Gross\ DI\ flows_{it}$ ,  $Gross\ PI\ flows_{it}$  and  $Gross\ OI\ flows_{it}$  break down the total gross capital flow into direct, portfolio and other investment, respectively.

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