Indicators of monetary policy stance and financial conditions: an overview

Nikolay Iskrev
Banco de Portugal

Rita Lourenço
Banco de Portugal

Carla Soares
Banco de Portugal

Abstract
The article discusses different indicators that can be used by central banks, market participants, and other economic agents to evaluate the monetary policy stance at each moment in time. This discussion considers that monetary policy aims at stabilizing the economy, and the position of the underlying indicators along to the business cycle are an indication of its stance. First, we describe some simple monetary policy rules and examine how unconventional measures and the lower bound on interest rates could be taken into account in assessing monetary policy stance through balance-sheet and shadow rates approaches. Second, we discuss how financial conditions can be assessed using disaggregated data as well as composite indicators. We also develop and estimate financial conditions indices for the euro area, the four largest economies, and Portugal. Overall, the set of indicators presented in the article is helpful in both supporting the policy decision and in understanding central banks' reaction function. However, these indicators alone are not able to fully rationalize the monetary policy decisions since policy makers' interpretation and judgment play a crucial role in the decision process. (JEL: E43, E44, E52, E58)

How can one infer whether monetary policy is stimulating or constraining the economy? An important goal of monetary policy is to stabilize the economy and thus improve welfare. Behind this argument is the idea that there is a first-best that can be approximated with policy intervention. However, this first-best situation is only a theoretical construct and is not observed in reality. Moreover, central banks are usually assigned with a mandate, which can differ depending on countries and their institutional setup. One could consider a benchmark ideal state that the monetary authority aims to achieve and that would result from a neutral monetary policy. However, setting policy optimally to achieve this benchmark is not feasible for two main reasons. First, it is not possible to infer the benchmark state of the economy because it is not observable. This benchmark depends on the model interpretation of the economy and the shocks driving it which is not possible to fully understand and disentangle. Second, it is also not feasible to determine the true state of the economy in real-time and relate it to the benchmark. If those states were observable, one could

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E-mail: niskrev@bportugal.pt; rmlourenco@bportugal.pt; csoares@bportugal.pt

determine the appropriate policy response, i.e., whether monetary policy should be accommodative or contractionary. Monetary policy stance can then be considered as the contribution that it gives to economic developments in order to reach the central bank objective.

The monetary policy stance is therefore hard to measure. There are many potential informative indicators, but none is sufficient on its own. These indicators can be used as part of the information set available to policy decision-makers, who also apply their own interpretation and judgment. This article discusses several indicators, that can be useful for central banks, market participants, and other agents in the economy to assess monetary policy stance at each moment in time. The objective is to show how these indicators are used by central bankers, such as in the Eurosystem, and how they should be interpreted. We will focus on the euro area, although a great part of the discussion can be easily extended to other economies. In section 1, we discuss policy rules as the more traditional way to infer stance when interest rates are the main policy instrument. We also discuss the drawbacks of the rules in a very low-interest rate environment and the extensive use of unconventional policy. Policy rules are complemented by an analysis of the financial conditions and how policy is supporting these. In practice and especially since the crises, central banks look at a broad range of information that is explored in section 2. This reflects the importance of financial intermediation in the transmission mechanism and the ability of the Eurosystem to influence it. We present new financial conditions indices for the euro area, the four largest economies, and Portugal. The article ends with some concluding remarks.

1. Assessing the monetary policy stance through policy rules

1.1. Policy rules on interest rates

Central banks in developed economies in general have a mandate for price stability and to promote real economic growth. If there were a simple way to establish the relationship between the policy instrument and the policy objectives, the central bank role would be easy to implement and be followed by participants in the economy. This is the idea behind policy rules and the reason for their popularity. In practice, it is not easy to understand such a relationship and to adequately measure the intended objectives, as will be discussed in this section.

Policy rules describe a relationship between the policy rate, the primary policy instrument, and measures of real economic activity and inflation, in line with central banks' mandates. The most common policy rule was first developed by Taylor (1993) and became quite popular for being able to closely replicate policy decisions of the US Federal Reserve. The Taylor rule foresees the policy rate i_t to be set according to

$$i_t = r^* + \pi_t + \alpha(\text{inflation gap}_t) + \beta(\text{output gap}_t) \tag{1}$$

where r^* is the equilibrium real rate, i.e., the real interest rate consistent with the economy in the long-run, π_t is the current inflation rate, the inflation gap is given by the deviation of observed inflation from the inflation target and the output gap is given by the deviation of observed output from potential output. The parameters α and β were set by Taylor (1993) equal to 0.5, but over time other values have been used in the economic literature. Such parametrization is consistent with the Taylor principle, as the total coefficient associated with inflation $(1 + \alpha)$ is greater than 1, warranting a greater response of policy to inflation deviations and avoiding persistent deviations in inflation expectations from the objective (Woodford 2001). Whenever the interest rate estimated from the policy rule is above the current policy rate, it suggests that monetary policy is too accommodative and that an increase in the rate should follow.

There have been different adjustments to this simple rule, in order to account for institutional and other differences among central banks, as well as to make the rules more robust to the complex environment in which central banks operate. For instance, the Federal Reserve uses several policy rules as a means of communicating to the public this complex decision process that is subject to uncertainty (Garciga *et al.* 2016).

In order to reflect the uncertainty that a real-time decision process is subject to, central banks usually opt for a conservative approach, which can be translated into incorporating inertia into the policy rule. The respective adjustment to the policy rule (1) consists of keeping the policy rate by a ρ share at the previous value and $1 - \rho$ adjusting at the rule. Empirical studies find an improvement in the estimates with this specification and usually find an inertia parameter at high levels, around 0.8 and 0.9 for quarterly data (Goodhart 1998; Smets and Wouters 2003; Canzoneri *et al.* 2015). The incorporation of inertia can also be rationalized in models where volatility is considered undesirable and expectations are forward-looking (Sack and Wieland 2000; Gertler *et al.* 1999).

The rule in equation (1) sets policy according to past or current values of inflation and output, which could mean that monetary policy is only reactive. However, in reality, monetary policy decisions influence future outcomes; past inflation only matters for its information power about future inflation. Thus, forward-looking policy rules may be better suited, i.e., rules where $(inflation\ gap_t)$ and $(output\ gap_t)$ in equation (1) are replaced by their future expected values $E_t(inflation\ gap_{t+i})$ and $E_t(output\ gap_{t+i})$ and where the adequate forward-looking time period *i* can be discussed depending, in particular, on the lags between policy decisions and their effects on real and nominal variables (Gertler *et al.* 1999). This seems to be the rationale behind the quantitative definition of price stability of the ECB of "inflation rates below, but close to, 2% over the medium term". The medium-term orientation relies on the evidence that policy transmission takes time thus policy decisions should be based on a forward-looking assessment and price stability should be aimed over long periods of time.[1]

The incorporation of gradualism and forward-looking nature in the policy rule implies a revision of equation (1) to the following expression, considered closer to the reaction function of the Eurosystem:

1. See https://www.ecb.europa.eu/mopo/strategy/princ/html/orientation.en.html

$$i_t = \rho i_{t-1} + (1-\rho)[r^* + \pi_t + \alpha(\pi_{t+i} - \pi^*) + \beta(y_{t+j} - y^P_{t+j})] \quad (2)$$

where i and j are the relevant forward-looking horizons for inflation and output, respectively.

The Taylor rule makes use of unobservable variables, namely the natural rate of interest and the output gap. Both variables are defined relative to the potential of the economy, a state that corresponds to a theoretical construct that would be the state of the economy where there are no nominal frictions such as rigidities in price-setting, and there are no unexpected shocks that take the economy out of this state. The output gap is of great interest for policy makers and several organizations compute estimates of it, including the Eurosystem, despite the difficulty in estimating this unobservable variable according to its model definition. An overestimation of the output gap would imply a tighter policy than desirable, as the estimated potential output would be lower than the effective potential and the economy would be interpreted as "overheating".

The natural rate of interest is usually interpreted as the real interest rate that is consistent with an economy at its potential in the absence of any frictions or transitory shocks. It is a theoretical concept of high relevance for monetary policy. Given the relationship between interest rates and inflation, if the objective of the central bank is price stability, nominal and real interest rates should move one-to-one in the long-run. Assuming that the natural rate of interest is determined solely by structural factors exogenous to monetary policy,[2] the central bank should set nominal interest rates in order to steer real rates towards the natural rate of interest. As the natural rate changes, so should the trend in the policy rate. It is widely accepted that in the last decades there has been a decreasing trend in the natural rate of interest due to factors such as demographic changes or changes in preferences for savings (Banco de Portugal 2019; Brand *et al.* 2018). Despite the common trend, estimates of the natural rate of interest vary widely. Holston *et al.* (2017) estimates, based on a semi-structural model, are one of the most widely used and are available for some of the larger developed economies, in particular for the euro area (henceforth referred to as HLW). Figure 1 shows the current estimates (2020Q1) and the real-time estimates available since 2015Q4. The difference between the two estimates reveals the difficulties posed to policy makers when making decisions: besides the uncertainty related to being an estimated variable, even if we consider the model as accurate, the real-time estimates could lead to an underestimation of the natural real rate that could go up to 1 p.p., given the absence of accurate real-time information. This difference advises in favour of a cautious approach when using this information, preferably a more qualitative input. Along these lines, one could argue that the period between 2011 and 2016 of decreasing estimates to historically low levels would have suggested monetary policy to be more accommodative, which

2. The exogeneity of monetary policy to the natural rate of interest is not entirely consensual. Juselius *et al.* (2017) argue that, besides the "usual" business cycle, there is a financial cycle, influenced by monetary policy through its impacts on asset prices. Taking this into account, it is possible to define the "finance-neutral natural rate", which is estimated above the most common estimates of the natural rate.

may have happened with some delay with policy rate cuts and the launch of several unconventional policy measures.

We can incorporate the estimates on the natural real interest rate into the policy rule. Figure 2 shows the resulting real policy rates by applying different estimates of r^* of the euro area in equation (1) and comparing with the EONIA rate in real terms.[3] Overall, the effective rate follows closely the recommended policy, especially prior to 2012, the height of the sovereign debt crisis and the period when interest rates in the euro area reached the zero level. Based on this assessment, one could argue that monetary policy was too restrictive in the period 2013-2014, while from 2017 onward it was too loose. However, for the first period, this policy assessment does not take into account the many unconventional policy measures aiming at providing accommodation that were implemented at the time. In 2020, the large negative pandemic shock led to a strong fall in the real rates implied by the Taylor rule, that reached levels around -4% and -5% in the second quarter, while policy rules remained unchanged. Therefore, given that we are close to the effective lower-bound on interest rates and policy rates are not the primary policy instrument currently, the policy advice from these rules is quite limited.

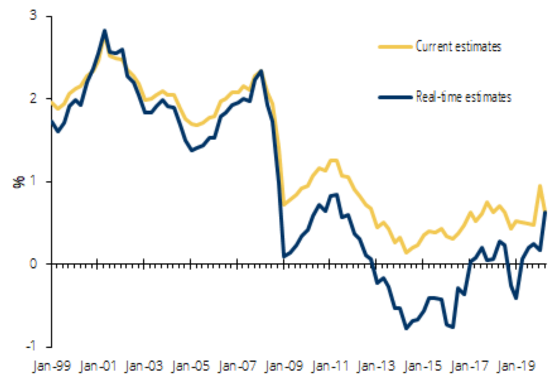

FIGURE 1: HLW estimates for the euro area natural rate of interest

Source: Federal Reserve Bank of New York

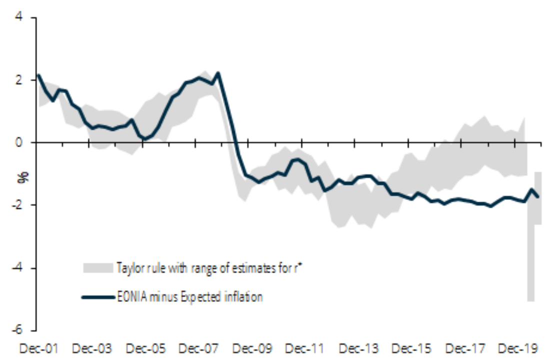

FIGURE 2: Observed short-term real rate and implied by Taylor rule for different estimates of the natural rate of interest

Note: Expected inflation is Eurosystem inflation forecast 18-months ahead; r^* based on current and real-time HLW estimates and Fiorentini *et al.* (2018); Taylor rules based on Eurosystem forecasts.

In order to overcome the difficulty in using unobservable variables in the policy rule, Orphanides (2003) suggested using instead a rule based on the changes in the policy rate instead of the level of the rate itself. The first-differences rule is thus set as

$$\Delta i = 0.5(inflation\ gap) + 0.5(\Delta output\ - \Delta potential\ output) \tag{3}$$

where the parameters of the rule are the same as in Taylor (1993). Orphanides and Wieland (2013) show that this rule is able to characterize quite well the ECB's policy

3. EONIA is the benchmark overnight unsecured interest rate for the euro area and is seen as the implicit operational target of monetary policy.

without the need of an estimate of the natural rate of interest and of the output gap in real-time, which is especially useful in times of uncertainty and a wide dispersion of forecasts, more common in crisis periods. Hartmann and Smets (2018) perform a further exercise confirming the robustness of this rule by using ECB/Eurosystem forecasts, showing that the estimated coefficients are not significantly different from 0.5. Nonetheless, they find that the performance of the rule weakens as the euro area approached the zero-lower bound. This can be either due to a too benign interpretation of the sovereign debt crisis that left the policy too restrictive or to the non-incorporation of the unconventional policy measures taken at the time.

Figure 3 shows a range of prescriptions for the policy rate in the euro area were the ECB to follow an estimated Orphanides rule up to 2012Q2 and extrapolated afterward.[4] For such estimates, we use several possible combinations of forecasters, namely ECB/Eurosystem, European Commission, IMF, SPF, Consensus Economics and The Economist, and several possible combinations of forecast horizons, taking into account the information available ahead of each Governing Council meeting. Similarly to Hartmann and Smets (2018), we confirm the relatively tight interval of our estimates. As seen before, in the period 2013-2015, the rule suggested a looser policy stance. However, this recommendation is not able to account for the policy easing from the unconventional measures.

With the Global Financial Crisis (GFC), concerns about financial stability and the interactions with nominal stability have regained interest. There are studies showing that a central bank can be more effective in responding to financial shocks if it incorporates financial variables in its reaction function, even without an explicit mandate for financial stability (Gilchrist and Zakrajsek 2012; Verona *et al.* 2017; Juselius *et al.* 2017). In practice, interpreting the conclusions from such rules can be quite complex, as the conflict between two objectives with solely one instrument may easily arise. The ECB includes in its strategy a cross-check with monetary analysis, which means that such information is taken into account ahead of policy decisions, without the need to be explicitly incorporated in the policy reaction function (Smets *et al.* 2011).

1.2. Limitations of interest rate rules and alternatives

Policy rules focus on the policy rate as the only policy instrument, meaning that they are not able to fully capture the unconventional policy measures implemented during the last decade. Unconventional measures include negative rates and forward guidance, which can be captured in some way by policy rules given the impact in market rates, and measures that work through the expansion of the central bank balance sheet, in particular lending operations and asset purchase programs. In the euro area, such measures were used in a first phase with the aim of curbing financial markets stress and ensuring policy transmission, and in a second phase at providing monetary

4. As mentioned before, reaching the zero-lower bound on interest rates and the implementation of unconventional policy measures alters the relationship between inflation and output and the implied policy rate.

accommodation simultaneously with the reduction of fragmentation in the euro area that was impairing the transmission mechanism within the monetary union.[5]

The evolution of the central bank balance sheet over time, in particular the items related to monetary policy implementation, is useful to assess the policy stance. In the case of the Eurosystem, the relevant items on the asset side are the ones relative to lending operations and to monetary policy portfolios (Figure 4). These can still be disaggregated according to the operation. For lending operations, currently, it is useful to monitor the TLTRO (Targeted Longer-Term Refinancing Operations), refinancing operations for maturities up to four years with attractive conditions to banks in order to ease private sector credit conditions and stimulate bank lending to the real economy. In June 2020, the allotted amount in these operations reached a new maximum, due to the high demand for liquidity amid the pandemic crisis and the extremely favourable lending conditions. The outright portfolio for monetary policy purposes is also divided according to the different programs, namely the ones currently active in purchases: the APP (Asset Purchase Programme), set in 2014 and encompassing different subprograms according to the assets purchased (public sector bonds, corporate bonds, covered bonds, and asset-backed securities), and the PEPP (Pandemic Emergency Purchase Programme), both aiming at supporting financial market functioning and the adequate functioning of the transmission mechanism, with the final objective of price stability. Purchases under these programmes following the Governing Council response to the large negative shock induced by the covid pandemic have also induced a historic balance sheet expansion, contributing to the necessary monetary accommodation, besides providing a backstop that contributed to ensuring the monetary transmission in the monetary union.

The large expansion in the liquidity provision has, as a counterpart on the liability side of the central bank balance sheet, an expansion of the excess reserves (in the strict sense and including those at the deposit facility) (Figure 4). The way this excess liquidity is distributed across the euro area is a way to measure the fragmentation. A well-functioning interbank market would redistribute this liquidity evenly, as banks face a cost on holding it with the central bank.[6] As we can observe from Figure 5, the distribution of liquidity is quite asymmetric and persistent, where more vulnerable economies and more hardly hit by the sovereign debt crisis have a lower share of excess liquidity relative to the size of the banking sector. This suggests that risks of excessive fragmentation in the euro area persist and should continue to be monitored, especially following the large pandemic shock that may have different implications for these more vulnerable countries. Risks of fragmentation can be considered as an additional task of monetary policy exclusive to the euro area, but are not possible to measure in the same way as the policy stance. Without a common monetary area where policy

5. See, for instance, Hartmann and Smets (2018) or Banco de Portugal (2015) for further details on the measures taken.

6. From October 2019 onwards, the ECB implemented an exemption scheme on excess reserves with the objective of reducing the potential negative impact of a prolonged negative interest rate policy on banks and consequently on the transmission of monetary policy.

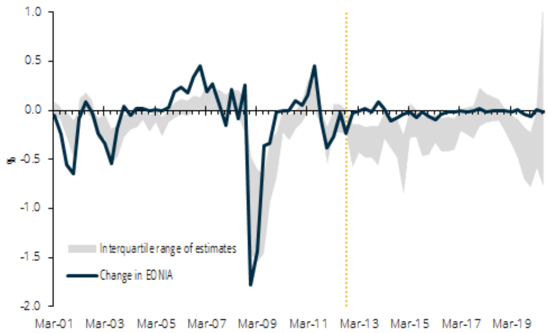

FIGURE 3: Orphanides rule prescription for the euro area

Interquartile range of estimates based on all possible combinations of forecasts on inflation an output from Eurosystem, European Commission, IMF, SPF, Consensus Economics and The Economist and using European Commission potential output or SPF long-run GDP growth. We selected only regressions that yielded positive estimates for inflation and output parameters and implied inflation target between 0% and 3%. Estimation uses data up to 2012Q2, marked by the vertical line.

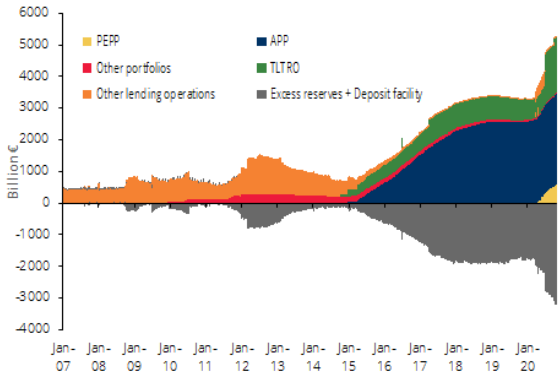

FIGURE 4: Eurosystem balance sheet items related to monetary policy

Source: Refinitiv

is transmitted uniformly, indicators of stance are not very informative of the actual conditions. Therefore, the ECB needs to monitor also the transmission mechanism across the euro area with different indicators and intervene whenever necessary in order to guarantee a uniform stance through the entire area.

In the last decade, most advanced economies central banks reached the zero lower-bound on interest rates, or even crossed it, as the ECB, raising the question about the exact effective lower bound. 'Shadow rates' are a way to use the short-term interest rate as the primary indicator of monetary policy stance, overcoming the lower bound constraint. They can be interpreted as the hypothetical nominal interest rate that would prevail in the absence of the lower bound that leads individuals to replace holdings of interest-bearing assets with cash. There are several possible methodologies to estimate shadow rates. However, results differ substantially across methodologies, which weakens their usefulness for policy purposes. Figure 6 shows the output for the euro area of two commonly used methodologies, namely those of Krippner (2013) and Wu and Xia (2017). Both estimates are based on term structure models where the lower bound is imposed through a non-linearity that could be equivalent to a call option on bonds. Given the consecutive cuts in the deposit facility rate in negative territory, estimates include the possibility of a time-varying effective lower bound.[7] The estimated rates fall below zero in 2012, when the ECB policy rate reached the zero-level, and stay at negative levels since then, suggesting that the information available about the state of the economy implies a worse outlook than the one implied by the nominal effective

7. Differences in the estimates can be due to both the methodologies and the data used (Wu and Xia (2017) uses the AAA-government bond yield curve while Krippner (2013) uses the OIS yield curve).

short-term interest rate. Again, unconventional measures are expected to have been filling this gap.

More broadly, and in practice, central banks look at an array of indicators to assess the monetary policy stance and do not focus specifically on policy rules. This is the subject of the next section.

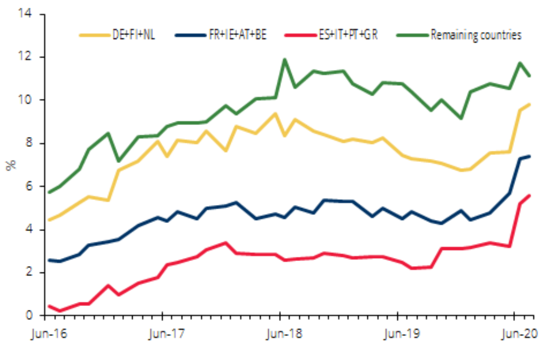

FIGURE 5: Excess reserves and deposit facility over total MFI assets

Source: ECB and author calculations

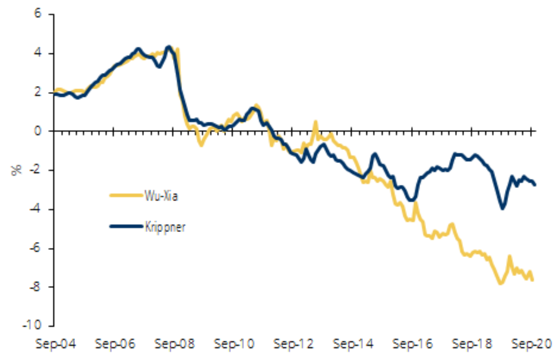

FIGURE 6: Shadow rate estimates for the euro area

Source: Refinitiv and LJKmfa

2. Financial conditions

Financial conditions are a relevant factor to understand the state of the economy, the spillovers of financial shocks to the real economy, and the transmission of monetary policy. For instance, tighter financial conditions per se, without any changes in the non-financial part of the economy, may call for policy makers to loosen policy. In reality, interactions in the economy are complex, and there are financial and nominal stability objectives that may not be compatible and may not imply a unique policy response. Consider for instance the case of an asset price boom following a productivity shock without risks to price stability. In this case, there is no reason for monetary policy to react as financial conditions may have eased significantly.

There are several channels of the transmission mechanism of monetary policy that work through the financial system (see, for instance, Boivin *et al.* 2010). Firstly, a change in interest rates changes consumers' incentives to save, and firms' investment decisions. Asset prices respond to changes in interest rates, and responses may differ depending on other factors, such as the degree of risk aversion. If we consider market imperfections, such as information asymmetries as in Bernanke and Gertler (1995), credit markets can amplify the effects of economic shocks. The idea is that an increase in interest rates increases the external finance premium of firms by reducing firms' net worth and by constraining credit supply. During the past decade, increased frictions in financial markets have generated financial stress and contributed to a significant impairment of financial conditions. Central banks expanded their sets of unconventional measures, both aiming at containing financial tensions and improving economic activity, and promoting price stability. Unconventional policy effects rely on the assumption of market frictions such as investors preferred habitats (Vayanos and Vila 2009). Assets are not perfect substitutes, thus the effect on prices of the purchases by central banks is not proportional across different types of assets. The pandemic crisis of 2020 has raised new challenges to policy makers and has, thus far, shown that a quick and determined policy response can contain financial market stress that can have real consequences.

In order to understand these relationships at each moment in time, central banks monitor financial conditions through several indicators. In what follows, we discuss in more detail why monitoring financial markets is relevant, and what type of information they reveal for policy assessment. The information set is quite extensive, so we present it in buckets that we will use later to compute a composite financial conditions indicator for the euro area, the four largest economies, and Portugal.

2.1. A selection of financial markets indicators

2.1.1. Money market

Traditionally, monetary policy is implemented in a way to steer short-term interest rates. The money market comprises transactions with maturities up to 1 year. This includes borrowing of liquidity between banks and other financial institutions, either secured (against collateral) or unsecured, but also includes derivatives transactions such as interest rate swaps or forward agreements. Arbitrage between the different instruments should ensure interest rates for the same maturity would be close, except for premia covering risk or liquidity. Very short-term unsecured transactions are those more similar to primary liquidity, so we would expect its rates to follow the policy rate closely. In the euro area, the benchmark rate usually monitored for this purpose was the EONIA (Euro Overnight Index Average), which is currently in the process of being discontinued and to be replaced by the €STR (euro short-term rate) by 2022. Unsecured interest rates for maturities of 3- or 6-month are also followed in order to assess the steering ability of policy and financing conditions to the economy, as these are usually benchmark rates to other financial instruments and to loans to households and non-financial corporations (Figure 7).

2.1.2. Bond market

Besides short maturities, longer maturities interest rates are also relevant to assess financial conditions in the economy. The yield curve, i.e., the relationship between the yields of a given debt security for different maturities, is a very relevant piece of information in this regard. Both the level and the slope of the yield curve provide information on financial conditions. The level at shorter maturities is usually given by money market rates like the ones discussed above. The slope is usually positive, reflecting the fact that investors seek higher yields for longer-term investments. When the spread between long and short-term interest rates narrows, this flattening of the yield curve typically indicates that investors expect economic weakness as it may signal that inflation and interest rates are expected to stay low for a long time.

Monetary policy aims firstly at influencing the risk-free yield curve, i.e., does not aim at influencing directly the credit risk component of bond yields, which reflects fundamentals that should be borne by investors and not be distorted by policy. In the euro area, the reference risk-free rates are given by the Overnight Index Swap (OIS), an agreement to exchange cash-flows against a predetermined benchmark overnight rate at the maturity of the contract. In OIS there is no exchange of the principal amount, which minimizes risk implied in the instrument. According to the expectations hypothesis, longer-term risk-free yields include two components: expectations component, and a term premium. The expectations component represents the average expectation of short-term interest rates over the maturity of the yield. The term premium represents compensation for investors for the risk of unexpected future changes in the short term yield. There are many different approaches used to separate the two components, and, unfortunately, they usually lead to different results. One popular approach is to estimate an affine term structure model imposing no-arbitrage conditions. A particular implementation, the results of which are shown in Figure 8, builds on the work of Joslin *et al.* (2011). Figure 8 shows the risk free yield curve for the euro on two recent dates, 18 March 2020, the announcement day of the Pandemic Emergency Purchase Programme (PEPP), and 5 June 2020, the day after the Governing Council where further measures were decided in response to the pandemic crisis. The yield curve shows a decrease in the slope, due to the decrease in the term premium component. This movement was a consequence of the PEPP announcement and implementation, which acts mostly by extracting duration risk with flexibility across jurisdictions. In shorter maturities, there was an increase in yields as a consequence of an increase in expectations. This was also in line with anecdotal evidence at the time when market participants began to anticipate in the early phase of the pandemic a cut in policy rates, which was reverted afterward following ECB officials' statements.

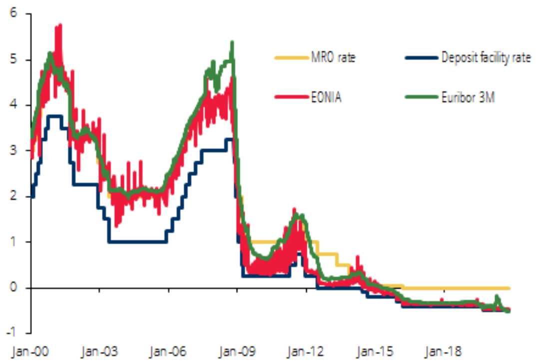

FIGURE 7: Policy and money market rates for the euro area

Sources: ECB and Refinitiv

FIGURE 8: Risk-free yield curve for the euro area (OIS rates) and decomposition of changes between the dates

Source: Refinitiv and authors' calculations

The euro area has the particularity that the risk-free yield curve does not coincide with the sovereign debt yield curve, as in other major economies. Sovereign yields are relevant as indicators of financial conditions for the sovereign and benchmarks for the financial conditions of private agents. In the euro area, there is one yield curve for each government and the curves may differ substantially over time reflecting factors such as credit risk or 'flight-for-safety' movements. The relevance of monitoring these different market segments became clear during the sovereign debt crisis (Figure 9). The Governing Council of the ECB intervened in order to ensure policy transmission and the unity of the monetary union. Sovereign spreads in the euro area declined effectively following the President of the ECB, Mario Draghi's "whatever it takes" speech on the preservation of the euro in June 2012 and the launch of the Outright Monetary Transactions (OMT) programme. Thus, intra-area yield spreads are also relevant indicators of fragmentation and impairments in the transmission mechanism of monetary policy.

So far we have been discussing nominal rates but what is relevant for firms and households decisions is the real cost of funding, i.e. the nominal cost adjusted for inflation. In order to infer correctly the incentives for saving and investment, we need to either look at prices set in real terms or, as is more common, nominal prices deflated by the relevant deflator. In the euro area, there are inflation-indexed bonds that allow measuring the real interest rate as priced in the secondary markets. Alternatively, we may want to deflate nominal bonds by market expectations of inflation over the relevant term. Both are shown in Figure 10, where it is possible to observe a decreasing trend in these rates at least over the last decade.

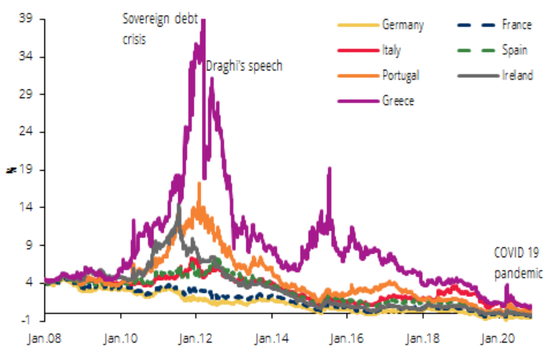

FIGURE 9: 10-year government bond yield rates in selected euro area countries

Source: Refinitiv

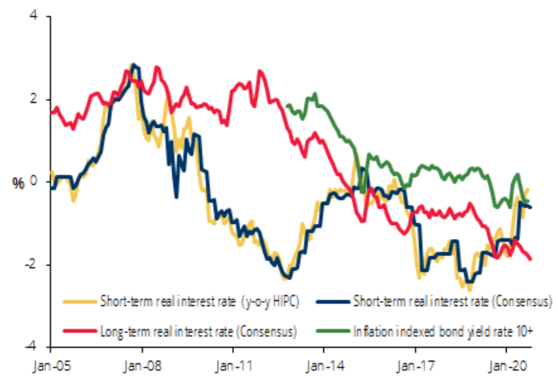

FIGURE 10: Real interest rates for the euro area

Sources: Bloomberg, Consensus Economics, Eurostat, Refinitiv and authors calculations
Note: Short-term deflated by the HICP y-o-y quarterly forecast or by the Consensus quarterly expectations; Long-term deflated by the average of Consensus inflation expectations over 10 years; IBOXX euro-inflation linked yield over 10 years.

Central bank rates and sovereign yields can be considered as benchmarks for the pricing of private sector assets. Corporations can finance themselves in bond markets and the costs at which they do so are an indication of the financial conditions they face. A type of indicator of this information is corporate bond spreads, i.e., the spread between the corporate bond yields and a benchmark or risk-free yield, usually government bonds. Given the importance of bank funding in the euro area and that these are the first link in the monetary policy transmission mechanism, it is particularly important to monitor banks' funding conditions through debt markets. The financial crisis of 2008 and the current pandemic crisis showed an immediate spike on corporate spreads, signaling tighter borrowing constraints, particularly for firms with a low rating (Figure 11).

2.1.3. *Equity market*

Firms can finance themselves via debt securities as mentioned above or via capital as equity issuance in public markets. Thus, information on equity markets is relevant to assess firms' financial conditions. Moreover, equity prices reflect also the expected value of the firm, so there is a relationship between the economic outlook and firms' net worth as given by their equity. This is the reason behind the fall in stock markets immediately after crises, in particular the recent pandemic crisis (Figure 12). But it should also be stressed that the prompt and effective reactions from monetary authorities by boosting liquidity contributed to stabilizing financial markets quite rapidly.

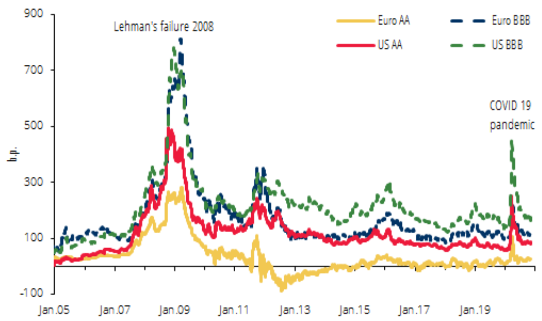

FIGURE 11: Corporate bond spreads in the US and euro area

Sources: Bloomberg - Merrill Lynch. 7-10 year corporates and government bond yields

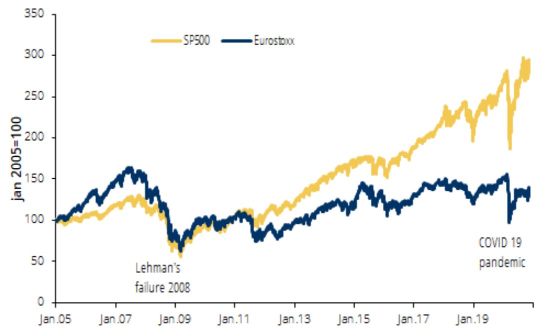

FIGURE 12: Equity indices in the US and euro area

Sources: Refinitiv

2.1.4. *Foreign exchange market*

Exchange rates influence financial conditions by affecting net exports and capital flows between countries. In the euro area, it is relevant to follow both the main currency pairs, as well as the effective exchange rates that aggregate bilateral exchange rates according to each currency's relevance for international trade. A euro appreciation against the US dollar, which is the currency denomination for oil prices, will turn oil cheaper, which can have a large and immediate impact on inflation. A euro appreciation against a basket of currencies turns euro area exports more expensive and imports cheaper.

2.1.5. *Risk and uncertainty*

Financial conditions can also be driven by risk considerations. For example, if the probability of default increases broadly following a negative shock, it is likely that this increase should be reflected in the cost of borrowing. There are some financial instruments that allow observing directly a market price for risk. Corporate Default Swaps (CDS) are one such instrument and represent a type of insurance against several default events by firms or sovereign entities. The CDS spread, i.e., the premium paid over the capital "insured" gives thus an indication of the level of credit risk of the entity.

Sometimes, it may happen that there is no change in the risk, i.e., the average probability of default in the future is the same, but there may be changes in the distribution of such events and investors may want to insure against a wider distribution. When uncertainty is higher, the number of possible states in the future is higher. In a world where we could cover all possible states by financial instruments, this would imply a larger number of transactions. This could be visible in the increased dispersion of prices of the financial assets, which by itself is costly. Uncertainty about the future thus normally contributes to the worsening of current conditions. The pricing model of options on financial instruments, such as equity or interest rate options, allows us to infer measures of future uncertainty, namely the implied volatility of the underlying asset. The VIX and VSTOXX are such measures of implied volatility for the S&P500 and the Eurostoxx50 equity indices, respectively, and are widely used as measures of expected market volatility in the near future.

2.1.6. Bank credit developments

Bank funding is of greater importance than market funding for euro area firms, especially SMEs. By focusing only on capital and bond markets, one would be ignoring this source of funding, that may counteract what happens in these markets, given that many firms and households have limited access to arbitrage in between financial and banking systems. An increase in the cost of borrowing through banks for firms and households could imply greater difficulties in funding their projects. The observed prices could reflect different compositions of credit portfolios, for instance, a greater demand for credit for riskier projects, but could also reflect changes in credit supply. The first factor (demand related) would reflect the usual credit business without the need for changes in pricing, while the second factor (supply related) may reflect changes in banks' preferences that may be needed to be taken into account by policy makers, as they could imply an unwanted tightening of credit standards. For example, in the current pandemic crisis banks reported in the Bank Lending Survey (BLS) broadly unchanged credit supply conditions to firms, thanks in large part to fiscal and monetary policy measures (ECB 2020). Thus, in the absence of such measures we we would have likely experienced an unwanted tightening in financial conditions through bank loan supply.

2.2. Financial conditions indices for the euro area, the four major euro area economies and Portugal

We develop financial conditions indices for the euro area as a whole, the four largest economies (Germany, France, Italy, and Spain) and Portugal. The indices aggregate information from 48 monthly financial series that are grouped into six categories: bank credit, bonds, equities, money markets, foreign exchange, and risk and uncertainty.

The selection of the variables and categories reflects the discussion in the previous subsection. The full list of variables is shown in Table A.1 of the appendix.[8] The country-specific indices are obtained similarly with some minor differences due to data availability. The FCIs can be seen primarily as a summary indicator for financial conditions, that can be used to describe the common developments among a wide set of financial market developments in a concise manner. As such, the FCIs are useful regardless of how much they tell us about other developments in the real economy or inflation or other objective variable.

The FCIs are constructed using principal component analysis, which is a standard method for constructing uncorrelated factors that represent common variations in multivariate data. Prior to estimation of the factors, most of the variables we use are transformed in some way, in order to make them more stable over time and improve the interpretability of the estimated factors. For instance, most of the interest rates we consider are expressed as spreads vis-a-vis the relevant benchmark rate (for example, the 10-year OIS in the case of long-term yields), while monetary and credit variables are expressed in terms of growth rates. Furthermore, all variables are normalized to have mean zero and standard deviation of one. The transformed variables are then used to extract a number of common factors that explain around 80% of the variability of the full data set. In the case of the euro area, the number of factors needed is 5, while for the individual countries we need 7 common factors.[9]

In addition to the aforementioned standard transformations of the data, we also consider a version of our data set where financial variables are orthogonalized with respect to measures of economic activity. This is achieved by regressing each financial variable on the current and lagged rates of inflation and industrial production growth and using the residuals in the construction of common factors. This step was pioneered by Hatzius *et al.* (2010) (see also Moccero *et al.* 2014) and is an attempt to remove the effect of the economic cycle on financial variables. In particular, it results in a measure of financial conditions that is relative to the typical economic conditions at the given stage of the business cycle.

Each FCI represents a weighted average of the extracted factors. We consider two weighting schemes that have been proposed in the literature: first, weighting the individual factors with the fraction of total variance explained by each one of them, and second, using the relative importance of each factor in jointly forecasting a-quarter-ahead GDP and inflation, following a Taylor rule-type of argument. As a result, we obtain three versions of FCI: two indices with financial variables unfiltered for macroeconomic developments and with different weights meaning the indices can be read as a summary of financial developments or by its potential impact on the

8. In addition to monthly series, our data set includes daily and quarterly series. We use monthly averages for the former and linearly interpolate the latter.

9. Factor loadings are rotated so that the correlation of each variable with one factor is maximized.

economic situation and one index with financial variables filtered by macroeconomic developments and aggregated according to factors' contribution to overall volatility.[10]

Figure 13 shows the three FCIs for the euro area, where an increase in the index corresponds to a tightening in financial conditions. The zero-level can be interpreted as the average financial conditions over the estimation period, i.e. since 2004. All indices capture major movements in the perceived financial conditions during the last 16 years, in particular, the GFC and the sovereign debt crisis. Nonetheless, some differences are worth highlighting. Indices weighted by the factors' contribution to overall volatility have a greater contribution from credit variables. Thus, the evolution of both indices is quite similar and captures both the GFC and the sovereign debt crisis in a similar way. On the other hand, when using unfiltered data with weights based on the forecasting performance, the sovereign debt crisis is interpreted as a period with greater tightening in financial conditions, due mainly to the evolution of bond markets, while the tightening during the GFC was mainly due to money market developments. This suggests a strong interaction between bond markets and macroeconomic conditions, where it may be difficult to disentangle the direction of influence between bond markets and macroeconomic conditions.

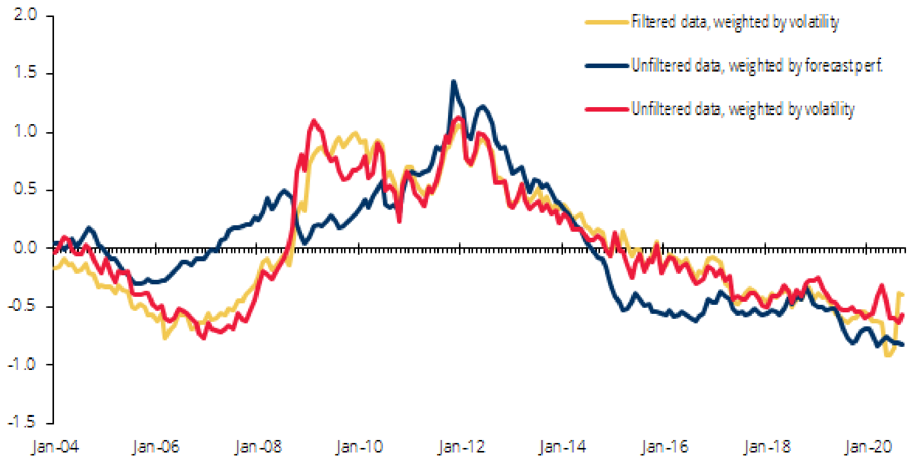

FIGURE 13: Financial conditions indices for the euro area
Last observation: September 2020.

The evolution of the indices in 2020 and the effect of the pandemic crisis is also different. Figure 14 shows the decomposition between categories of the changes in the FCIs between January and September 2020. The filtered FCI, better suited to measure "pure" financial conditions relative to the state of the economy, points to a tightening in conditions, coming mainly from bond market variables. Given the large negative shock to economic activity following the pandemics, past regularities would have suggested a stronger fall in yields in this market. The low interest rate environment close to the

10. There would be a fourth possible index with filtered values and factors weights based on forecasting performance. However, we find that the factors with filtered data contain very little information about future macroeconomic developments and we disregard this hypothesis.

effective lower bound is likely limiting the extent of the changes in these variables. The tightening coming from bond markets does not show up in the unfiltered FCIs. Comparing to the beginning of the year, the unfiltered weighted by volatility FCI, better suited to captures the agnostic summary of financial conditions, points to unchanged financial conditions. This reflects opposite evolution of different variables: risk and uncertainty measures point to a tightening in financial conditions, while the significant expansion of bank credit counterweighted such impact. When taking into account the different impact that the financial variables are likely to have on prices and real activity, captured by the third FCI shown in the figure, it seems that financial conditions were easier in September, relatively to January. This easing was mainly due to the low bond yields and spreads, especially in comparison to the historical average, while the easing contribution from bank credit is more muted then the other two indices.

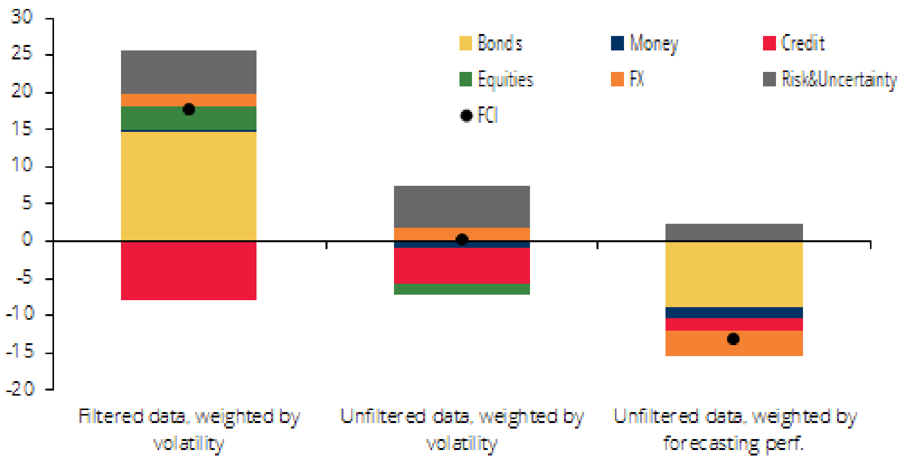

FIGURE 14: Decomposition of the changes in the financial conditions between January and September 2020

The country-specific indices are computed individually, meaning that levels are not comparable across countries, since the variables are normalized over the estimation period for each country. Figure 15 shows the computed FCI based on filtered data and using weights based on factors' contribution to overall volatility. The three indices share similarities with the euro area indices, so for exposition purposes we show here only one of the indices. The complementary of the analysis between the three indices also applies to the countries. The overall trend of the FCI is similar across countries, capturing the tighter period of the GFC and the sovereign debt crisis and the easing period that began with the launch of the ECB's Outright Monetary Transactions (OMT) in the second half of 2012. In all countries, credit conditions are very relevant as a driver for the financial conditions, but there are some differences in some periods. For instance, indicators of risk and uncertainty and bond markets were quite relevant for Spain and Italy between 2008 and 2012, reflecting the fact that these countries were more adversely hit by the sovereign debt crisis. Recently, since the beginning of the pandemic crisis, financial conditions, after taking into account macroeconomic developments have tightened in all countries. As mentioned before, this reflects the relatively muted evolution especially in bond markets and risk measures relative to the large economic shock to real activity and when compared with past regularities. On the other hand, credit conditions were particularly relevant for an easing contribution, reflecting the huge credit expansion that occurred since March, in large part thanks to government and monetary policy measures such as loan guarantees and the easing in TLTRO-III conditions.

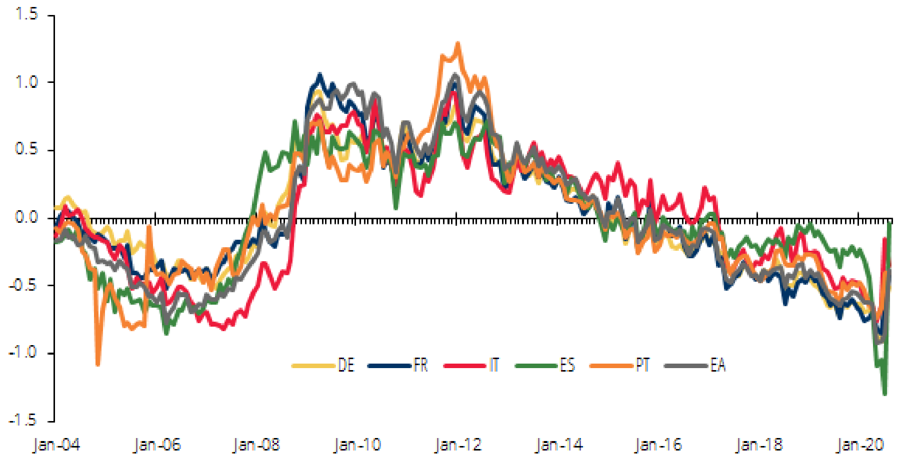

FIGURE 15: Financial conditions indices for selected countries of the euro area, based on filtered data and volatility weights

Note: The levels are not comparable between countries. Last observation: August 2020.

A comparison with our FCIs with other widely used FCI, such as the FCI by Bloomberg and Goldman Sachs, shows that all indices follow broadly a similar trend, with the exception of the pandemic period (Figure 16). The Bloomberg FCI is a simple average of variables on euro area money, bond, and equity markets to help assess the availability and cost of credit. The index is normalized relative to its pre-crisis levels, such that a negative (positive) level is interpreted as tighter (easier) conditions relative to the period before the crisis. The index computed by Goldman Sachs follows another common methodology of weighting variables according to their impact or their predictive power on a target variable, for instance, real GDP growth or inflation (Stehn *et al.* 2019).[11] Differences in the evolution between our FCIs and these indices reflect not only the wider set of variables that we include but also the methods applied in the computation, namely the procedure to take into account the feedback effect from macroeconomic conditions on financial variables and the weighting schemes.

There are several other FCI for the euro area, differing in the variables considered, the methodology used, and the frequency, for which some examples are mentioned next. Petronevich and Sahuc (2019) uses time-varying component weights, thus a change in the index can be due to either changes in the factors or to changes in their relative importance. Angelopoulou *et al.* (2014) construct an FCI for the euro area covering wide set of measures, going from prices to volumes, risk premia, and volatility and

11. The euro area Goldman Sachs index is a weighted average of nine countries FCIs, all constructed with the same methodology. Each country index is the weighted average of short and long-term rates, sovereign and corporate bond spreads, equity prices, and the euro exchange rate. The weights capture the effects of the variables on real GDP growth over a one-year horizon from a VAR model.

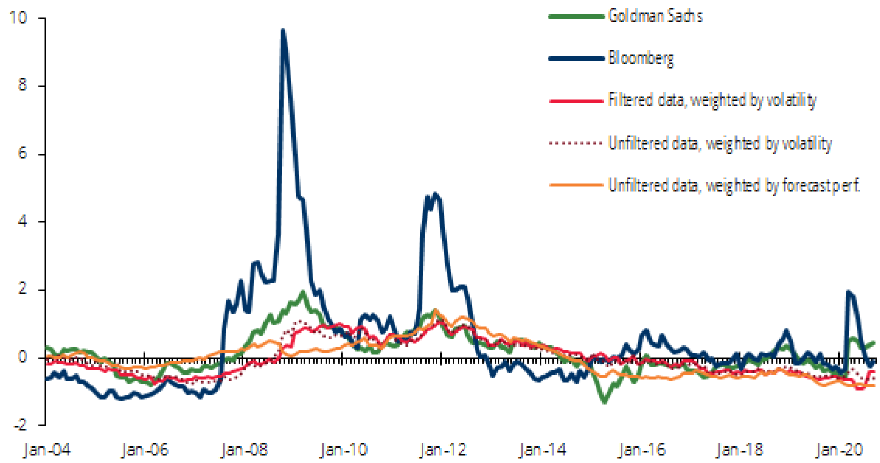

FIGURE 16: Comparison with Bloomberg and Goldman Sachs FCI for the euro area
Last observation: September 2020.

as well as qualitatively data from surveys, and monetary policy data. In this case, the interpretation of the FCI must take into account monetary policy itself, and it is not able to extract purely financial shocks. Moccero *et al.* (2014) try to overcome the latter issue by following Hatzius *et al.* (2010) methodology in computing a FCI for the euro area isolated from the impact of non-financial factors and based on the main sources of firms' external finance, i.e. the banking sector, the fixed income market, and equity markets. Kapetanios *et al.* (2018) go further ahead in the incorporation of macroeconomic factors by considering a large set of such variables, which they find to improve forecasts of real GDP.

3. Concluding remarks

Central banks take decisions on monetary policy based on their assessment of the policy stance at each moment in time. In this context, monetary policy stance can be considered as the contribution that monetary policy gives to economic developments in order to reach the central bank objective. Such contribution is also based on the several channels of the monetary policy transmission, i.e. the ways that monetary policy passes its impulses to the rest of the economy, whose interpretation can be based on a set of economic models. The real-world economy is far more complex than stylized economic models, and a great deal of uncertainty exists about the shocks hitting the economy, and how to measure them properly. Thus, a more conservative approach, making use of a wide set of information, is advisable. In this way, central banks make use of several indicators when assessing the policy stance, instead of relying on one simple rule. A rule-based approach has large benefits and can be complemented with the combination of different indicators that provide additional information. This has been especially useful in the last decade, as the GFC and the sovereign debt crisis have pushed policy rates to the effective lower-bound and monetary policy instruments have expanded greatly beyond interest rates, encompassing different types of unconventional measures.

We discussed policy rate rules and how different specifications may be useful to describe monetary policy decisions of central banks. A major shortcoming of such rules is the difficulty to account for the lower-bound of interest rates and unconventional monetary policy. This type of policy can be taken into account through balance-sheet and shadow rates approaches. Another lesson from the last decade was the importance of financial markets for policy transmission, reinforcing the need to follow and monitor financial conditions. We discussed how this can be done through both directly observed data and composite indicators. We have also presented new financial conditions indices that have the advantage of using a common methodology for the euro area, its four largest economies, and Portugal, and incorporating information from a wider set of variables than other indices.

Overall, the set of policy stance indicators discussed in this article is helpful in both supporting the policy decision and in understanding central banks' reaction function, but it is by no means exhaustive and the analysis is always subject to expert judgment. Moreover, the Eurosystem works under specific institutional circumstances that justify the need to have a different perspective on monetary policy stance relative to other major central banks. The different member states can be affected differently from economic shocks, in particular related to non-fundamental factors, that can lead to fragmentation within the euro area and impair the transmission mechanism. In order to ensure that monetary policy adequately transmits through the entire euro area, the Eurosystem has taken unprecedented decisions to respond to these challenges, which should also be taken into account when analysing the euro area monetary policy stance.

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Appendix

A.1. *Variables used in the FCI*

Variable	Geo	Source	Category	EA	DE	FR	IT	ES	PT
10Y yield Gov bond AAA	EA	SDW	Bonds	X					
	DE	Refinitiv	Bonds		X				
	FR	Refinitiv	Bonds			X			
10Y yield Gov	IT	Refinitiv	Bonds				X		
	ES	Refinitiv	Bonds					X	
	PT	Refinitiv	Bonds						X
	DE	Derived from Refinitiv	Bonds	X	X				
	FR	Derived from Refinitiv	Bonds	X		X			
10Y Gov spread to OIS	IT	Derived from Refinitiv	Bonds	X			X		
	ES	Derived from Refinitiv	Bonds	X				X	
	PT	Derived from Refinitiv	Bonds	X					X
Gov spread AAA 10Y 3M	EA	SDW	Bonds	X					
	DE	Derived from Refinitiv	Bonds		X				
	FR	Derived from Refinitiv	Bonds			X			
Gov spread 10Y 3M	IT	Derived from Refinitiv	Bonds				X		
	ES	Derived from Refinitiv	Bonds					X	
	PT	Derived from Refinitiv	Bonds						X
Corp AAA bond spread Gov	EA	Refinitiv	Bonds	X	X	X			
Corp BBB bond spread Gov	EA	Refinitiv	Bonds	X			X	X	X
Corp fin bond spread Gov	EA	Refinitiv	Bonds	X	X	X	X	X	X
Corp NFC bond spread Gov	EA	Refinitiv	Bonds	X	X	X	X	X	X
ILS 1Y	EA	Refinitiv	Bonds	X	X	X	X	X	X
ILS 5Y	EA	Refinitiv	Bonds	X	X	X	X	X	X
	EA	SDW	Bonds	X					
	DE	SDW	Bonds		X				
MFI debt sec growth	FR	SDW	Bonds			X			
	IT	SDW	Bonds				X		
	ES	SDW	Bonds					X	
	PT	SDW	Bonds						X
	EA	SDW	Bonds	X					
	DE	SDW	Bonds		X				
NFC debt sec growth	FR	SDW	Bonds			X			
	IT	SDW	Bonds				X		
	ES	SDW	Bonds					X	
	PT	SDW	Bonds						X
M1	EA	SDW	Credit	X	X	X	X	X	X
M2	EA	SDW	Credit	X	X	X	X	X	X
M3	EA	SDW	Credit	X	X	X	X	X	X
	EA	SDW	Credit	X					
	DE	SDW	Credit		X				
NFC loans growth	FR	SDW	Credit			X			
	IT	SDW	Credit				X		
	ES	SDW	Credit					X	
	PT	SDW	Credit						X
	EA	SDW	Credit	X					
	DE	SDW	Credit		X				
Housing loans growth	FR	SDW	Credit			X			
	IT	SDW	Credit				X		
	ES	SDW	Credit					X	
	PT	SDW	Credit						X
	EA	SDW	Credit	X					
	DE	SDW	Credit		X				
Consumption loans growth	FR	SDW	Credit			X			
	IT	SDW	Credit				X		
	ES	SDW	Credit					X	
	PT	SDW	Credit						X
	EA	Derived from Refinitiv and SDW	Credit	X					
	DE	Derived from Refinitiv and SDW	Credit		X				
NFC (CoB) credit spread	FR	Derived from Refinitiv and SDW	Credit			X			
	IT	Derived from Refinitiv and SDW	Credit				X		
	ES	Derived from Refinitiv and SDW	Credit					X	
	PT	Derived from Refinitiv and SDW	Credit						X
	EA	Derived from Refinitiv and SDW	Credit	X					
	DE	Derived from Refinitiv and SDW	Credit		X				
NFC (up to 0.25ml) credit spread	FR	Derived from Refinitiv and SDW	Credit			X			
	IT	Derived from Refinitiv and SDW	Credit				X		
	ES	Derived from Refinitiv and SDW	Credit					X	
	PT	Derived from Refinitiv and SDW	Credit						X
	EA	Derived from Refinitiv and SDW	Credit	X					
	DE	Derived from Refinitiv and SDW	Credit		X				
Housing (CoB) credit spread	FR	Derived from Refinitiv and SDW	Credit			X			
	IT	Derived from Refinitiv and SDW	Credit				X		
	ES	Derived from Refinitiv and SDW	Credit					X	
	PT	Derived from Refinitiv and SDW	Credit						X
	EA	Derived from Refinitiv and SDW	Credit	X					
	DE	Derived from Refinitiv and SDW	Credit		X				
Consumption credit spread	FR	Derived from Refinitiv and SDW	Credit			X			
	IT	Derived from Refinitiv and SDW	Credit				X		

Variable	Geo	Source	Category	EA	DE	FR	IT	ES	PT
	ES	Derived from Refinitiv and SDW	Credit					X	
	PT	Derived from Refinitiv and SDW	Credit						X
Credit standards to NFC	EA	SDW	Credit	X					
	DE	SDW	Credit		X				
	FR	SDW	Credit			X			
	IT	SDW	Credit				X		
	ES	SDW	Credit					X	
	PT	SDW	Credit						X
Credit standards for house	EA	SDW	Credit	X					
	DE	SDW	Credit		X				
	FR	SDW	Credit			X			
	IT	SDW	Credit				X		
	ES	SDW	Credit					X	
	PT	SDW	Credit						X
Credit standards for consumption	EA	SDW	Credit	X					
	DE	SDW	Credit		X				
	FR	SDW	Credit			X			
	IT	SDW	Credit				X		
	ES	SDW	Credit					X	
	PT	SDW	Credit						X
Eurostoxx to GDP	EA	Derived from Refinitiv and SDW	Equities	X					
Eurostoxx Consumer services ratio	EA	Derived from Refinitiv	Equities	X					
Eurostoxx Financials ratio	EA	Derived from Refinitiv	Equities	X					
Eurostoxx Technology ratio	EA	Derived from Refinitiv	Equities	X					
Eurostoxx Telecom ratio	EA	Derived from Refinitiv	Equities	X					
Eurostoxx Utilities ratio	EA	Derived from Refinitiv	Equities	X					
DAX to GDP	DE	Derived from Refinitiv and SDW	Equities		X				
DAX AUTOMOBILE ratio	DE	Derived from Refinitiv	Equities		X				
DAX CONSTRUCTION ratio	DE	Derived from Refinitiv	Equities		X				
DAX FINANCIAL SERVICES ratio	DE	Derived from Refinitiv	Equities		X				
DAX INDUSTRIAL ratio	DE	Derived from Refinitiv	Equities		X				
DAX TECHNOLOGY ratio	DE	Derived from Refinitiv	Equities		X				
CAC to GDP	FR	Derived from Refinitiv and SDW	Equities			X			
EURONEXT CAC CONSUMER SVS ratio	FR	Derived from Refinitiv	Equities			X			
EURONEXT CAC FINANCIALS ratio	FR	Derived from Refinitiv	Equities			X			
EURONEXT CAC TELECOM ratio	FR	Derived from Refinitiv	Equities			X			
EURONEXT CAC UTILITIES ratio	FR	Derived from Refinitiv	Equities			X			
MIB to GDP	IT	Derived from Refinitiv and SDW	Equities				X		
FTSE ITALY CONSUMER SVS ratio	IT	Derived from Refinitiv	Equities				X		
FTSE ITALY FINANCIALS ratio	IT	Derived from Refinitiv	Equities				X		
FTSE ITALY INDUSTRIALS ratio	IT	Derived from Refinitiv	Equities				X		
FTSE ITALY TELECOM ratio	IT	Derived from Refinitiv	Equities				X		
IBEX to GDP	ES	Derived from Refinitiv and SDW	Equities					X	
SPAIN-DS Consumer Staples ratio	ES	Refinitiv	Equities					X	
SPAIN-DS Financials ratio	ES	Refinitiv	Equities					X	
SPAIN-DS Industrials ratio	ES	Refinitiv	Equities					X	
SPAIN-DS Technology ratio	ES	Refinitiv	Equities					X	
PSI to GDP	PT	Derived from Refinitiv and SDW	Equities						X
EURONEXT PSI CONSUMER SVS ratio	PT	Derived from Refinitiv and SDW	Equities						X
EURONEXT PSI FINANCIALS ratio	PT	Derived from Refinitiv and SDW	Equities						X
EURONEXT PSI INDUSTRIALS ratio	PT	Derived from Refinitiv and SDW	Equities						X
EURONEXT PSI UTILITIES ratio	PT	Derived from Refinitiv and SDW	Equities						X
NFC shares growth	EA	SDW	Equities	X					
	DE	SDW	Equities		X				
	FR	SDW	Equities			X			
	IT	SDW	Equities				X		
	ES	SDW	Equities					X	
	PT	SDW	Equities						X
EER-19	EA	SDW	FX	X	X	X	X	X	X
USD/EUR	EA	SDW	FX	X	X	X	X	X	X
GBP/EUR	EA	SDW	FX	X	X	X	X	X	X
CHF/EUR	EA	SDW	FX	X	X	X	X	X	X
JPY/EUR	EA	SDW	FX	X	X	X	X	X	X
USD volatility 3M	EA	Refinitiv	FX	X	X	X	X	X	X
GBP volatility 3M	EA	Refinitiv	FX	X	X	X	X	X	X
EONIA	EA	Refinitiv	Money	X	X	X	X	X	X
3M Euribor	EA	Refinitiv	Money	X	X	X	X	X	X
3M Euribor-OIS spread	EA	Derived from Refinitiv	Money	X	X	X	X	X	X
CDS Europe	EA	Refinitiv	Risk & Uncertainty	X	X	X	X	X	X
CDS senior financial	EA	Refinitiv	Risk & Uncertainty	X	X	X	X	X	X
Sov CDS	DE	Refinitiv	Risk & Uncertainty		X				
	FR	Refinitiv	Risk & Uncertainty			X			
	IT	Refinitiv	Risk & Uncertainty				X		
	ES	Refinitiv	Risk & Uncertainty					X	
	PT	Refinitiv	Risk & Uncertainty						X
EUR volatility	EA	Refinitiv	Risk & Uncertainty	X	X	X	X	X	X
Vstoxx	EA	Refinitiv	Risk & Uncertainty	X			X	X	X
VDAX	DE	Refinitiv	Risk & Uncertainty		X				
CAC40 VOLATILITY INDEX	FR	Refinitiv	Risk & Uncertainty			X			

Note: Country columns marked mean that the variable is used for the country FCI.