BANCA D'ITALIA
EUROSISTEMA

Temi di discussione

(Working Papers)

Is ECB monetary policy more powerful during expansions?

by Martina Cecioni

Number 1202

December 2018

BANCA D'ITALIA
EUROSISTEMA

Temi di discussione

(Working Papers)

Is ECB monetary policy more powerful during expansions?

by Martina Cecioni

Number 1202 - December 2018

The papers published in the Temi di discussione *series describe preliminary results and are made available to the public to encourage discussion and elicit comments.*

The views expressed in the articles are those of the authors and do not involve the responsibility of the Bank.

ISSN 1594-7939 (print)
ISSN 2281-3950 (online)

Printed by the Printing and Publishing Division of the Bank of Italy

IS ECB MONETARY POLICY MORE POWERFUL DURING EXPANSIONS?

by Martina Cecioni*

Abstract

This paper tests whether the effects of ECB monetary policy vary over different phases of the business cycle. It uses local projections to estimate the state-dependent impulse responses of economic activity and prices to monetary policy shocks. These are identified through high-frequency financial market responses after Governing Council meetings. While the impact of monetary policy on economic activity is roughly similar during recessions and expansions, prices respond more strongly during booms. The result holds when the state of the economy is based on measures of resource utilization, rather than on GDP growth rates. Nominal wages also respond more strongly to monetary policy during expansions and when there is no slack in the economy. The empirical findings are consistent with the presence of downward rigidity on nominal wages.

JEL Classification: E52, E32.
Keywords: monetary policy, business cycle.

Contents

* Bank of Italy, Economic Research and International Relations.

1. Introduction

This paper tests empirically the common conviction, which dates back to the Great Depression, that the effects of monetary policy vary over phases of the business cycle.[1] The analysis focuses on the euro area and estimates responses to monetary policy shocks of economic activity and consumer prices in different states of the economy.

Understanding whether monetary policy has different effects along the business cycle is important both for its policy implications and for informing the choices of models through which policies are analyzed and designed. For example, knowing that during an expansion monetary policy has stronger effects on output and/or inflation might help the monetary policy authority to appropriately calibrate the timing and pace of the official interest rates lift-off.

Typically, the effects of monetary policy are studied, both theoretically and empirically, with models that ignore asymmetries and state-dependence. However, the question of whether monetary policy has unequal effects over the business cycle has been recently revived and empirically tested. Tenreyro and Thwaites (2016) have analyzed this issue for the United States finding that the effects of monetary policy on both output and inflation have been stronger in expansions than in recessions. Barnichon, Matthes and Sablik (2017), in a similar study, focus on whether a tighter monetary policy has stronger effects on output than a looser one. They find that this is indeed the case and that there is some state-dependence on the response of inflation: when unemployment is high, expansionary policies have smaller effects. To the best of my knowledge, there is no recent evidence for the euro area on the subject. The only paper that investigates the issue for some of the euro area countries is Peersman and Smets (2001); they find that monetary policy is more effective in a recession than in a boom, but their sample period ends in 1999 leaving out the years of the common currency.

The methodology adopted in this study mostly draws on Tenreyro and Thwaites (2016).[2] It uses local projection methods (Jordà, 2005) to estimate state-dependent impulse response functions in the period from 1999 to 2017. The monetary policy shock is identified through changes of prices of financial contracts on the overnight interest rate during monetary policy events, as in Cecioni (2018). The state of the economy is a measure of the economic cycle related to either how fast the economy is growing or to the degree of resource utilization.

[1] The view that the central bank has a harder time to end a severe contraction than to stop an expansion became widespread during the Great Depression leading many economists to conclude that loose monetary policy was like "pushing on a string" (Morgan, 1993).

[2] This methodology has been used also by Ramey and Zubairy (2018) for the quantification of fiscal multipliers in recessions and expansions.

The analysis finds that, while the impact on economic activity of monetary policy is very similar across different phases of the business cycle, the impact on prices is stronger during expansions than during recessions, as in Tenreyro and Thwaites (2016). This means that, for the same impact on output, in recession the central bank has a harder time in affecting inflation than in expansion.

A story, that would be consistent with the findings, is one of capacity utilization and the presence of downward nominal wage rigidities.[3] When the degree of capacity utilization is low, after a shock that reduced output below potential but with little impact on nominal wages due to the unwillingness or impossibility of firms to reduce them, the increase in output, induced by the expansionary monetary policy, is carried out through the use of idle capacity without the need for wage increases. Conversely, when the economy is running close to its potential, an expansionary monetary policy affects more markedly nominal wages, as firms are competing to attract workers in a tight labor market. This would be akin to the phenomenon of "pent-up wage deflation" (Daly and Hobijn, 2014) according to which downward nominal wage rigidities in recessions flatten the wage inflation Phillips curve.[4]

Two caveats must be taken into account when interpreting the results. First, the "recession sample" of the analysis is dominated by the exceptional downturns occurred as a consequence of the financial and sovereign debt crises, that led to a prolonged period of low inflation. The results are thus in large part capturing the peculiarities of the 2008-09 and 2011-13 recessions, both preceded by disruptions in financial markets. Second, in 2015 the ECB, whose official rates were close to their effective lower bound, started to use non-standard measures to stimulate the economy. The analysis verifies the robustness of the results to the lower bound on interest rates and to the adoption of unconventional monetary policies.[5]

The rest of the paper is organized as follows. Section 2 describes the econometric methodology and the data. Section 3 illustrates the results. Section 4 provides some robustness analysis. Section 5 concludes.

---

[3] Evidence of wage rigidity is relatively well established and supports the finding that cutting wages is more difficult than raising them. See Babecký et al. (2010) and Holden and Wulfsberg (2008).

[4] See also Benigno and Ricci (2011)

[5] Debortoli, Galì and Gambetti (2018) found that in the US economy there has been no differences in the transmission of a broad range of structural shocks to output and inflation in the zero lower bound and outside it, suggesting that there has been "perfect substitutability" between conventional and unconventional monetary policies.

2. Methodology and data

Impulse response functions (IRF) to a monetary policy shock are estimated through local projection method (Jordà, 2005). The impulse response to a shock ε_t of variable y_t at horizon $h \in \{0, H\}$ in state $j \in \{e, r\}$, which corresponds to expansion and recession respectively, is the estimated coefficient β_h^j of the following equation

$$y_{t+h} = \alpha_h + F(z_t)(\beta_h^e \varepsilon_t + \gamma_h^e \boldsymbol{X_t}) + [1 - F(z_t)](\beta_h^r \varepsilon_t + \gamma_h^r \boldsymbol{X_t}) + \delta_{\boldsymbol{h}} t + u_{\boldsymbol{t+h}}$$

where t is a linear time trend, α_h is a constant and $\boldsymbol{X}_t$ are controls. As in Auerbach and Gorodnichenko (2011) and Tenreyro and Thwaites (2016), $F(z_t)$ is a logistic function of an indicator of the state of the economy z_t

$$F(z_t) = \frac{e^{\theta \frac{z_t - \bar{z}}{\sigma_z}}}{1 + e^{\theta \frac{z_t - \bar{z}}{\sigma_z}}}$$

where $\bar{z}$ and σ_z are the average and standard deviation of the state variable z_t and θ is a parameter that determines how rapidly the economy switches from one state to the other. We set z_t equal to the lagging moving average of the quarterly real GDP growth over 7 quarters and θ equal to 3. Section 4 checks the robustness of the results to these choices.

For each variable I estimate with OLS *H+1* equations of the IRF at horizon 0, …, H. The estimated sequence of β_h^e and β_h^r are the impulse responses and measure the average impact of a monetary policy shock on y_t h quarters after the shock.[6]

In the baseline specification the variables y_{t+h} of our interest are the log level of real GDP, the log level of HICP prices and the 1-year interest rate as policy indicator.[7] The controls $\boldsymbol{X}_t$ include 4 lags of each of the dependent variables. The data are quarterly and the sample period runs from 1999Q1 to 2017Q4.

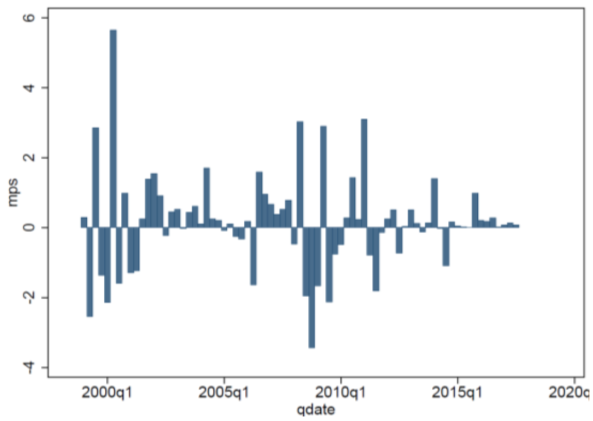
The monetary policy shocks are the surprises obtained from financial market data. I computed daily changes of overnight interest rate swap at 1-year maturity after Governing Council monetary policy meetings. The interest rate swaps are very sensitive to monetary policy news and incorporate expectations about future policy moves. I consider the 1-year horizon so as to include

[6] Leading of the dependent variable can induce serial correlations in the error terms; therefore I estimate Newey-West standard error with maximum autocorrelation equal to *H+1*.
[7] More precisely, I use the overnight interest rate swap 1-year ahead.

not only unexpected decision on official interest rates, but also information about the future path of policy rates.[8] Since there is more than one monetary policy meeting per quarter I aggregate the surprises by summing them.

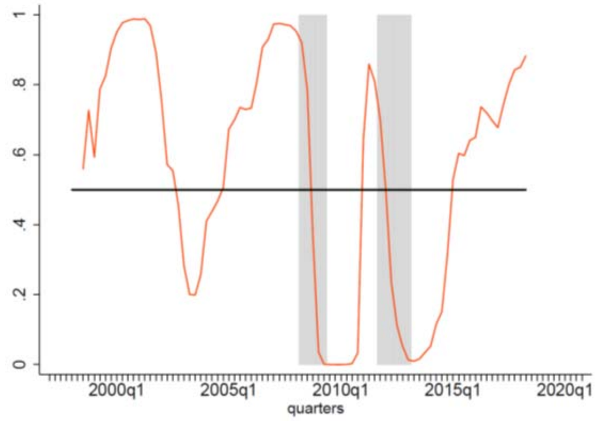
The high-frequency identification of the shock is particularly suitable for the proposed exercise as it imposes a minimal set of restrictions on the data and it is not extracted from models that assume that the behavior of the economy is linear, which is exactly what is to be tested. Shocks are very small (figure 1), as is typically found, given the high degree of predictability of monetary policy in the last 20 years.

Figure 1 – Monetary policy shocks
(basis points)



Notes: Surprises extracted from daily changes of OIS contracts at horizon up to 1 year after Governing Council meetings. For details see Cecioni (2018).

Figure 2 – State of the economy



Notes: Grey bars are CEPR recessions; the red line can be interpreted as the probability of an expansion. The indicator is the logistic function $F(z_t)$, in which z_t is the lagging moving average over 7 quarters of the quarterly real GDP growth.

Figure 2 shows the state variable that defines the phase of the business cycle in the euro area economy, as a smooth {0, 1} indicator based on real GDP quarterly growth rate, along with CEPR recession bands. In the sample there are two recessions (2008-09 and 2011-13) and a "prolonged pause in growth", as defined by CEPR, in 2003. Our sample has more episodes of expansion than recession, a feature that shows up in the precision of the IRFs' estimates in the two states.

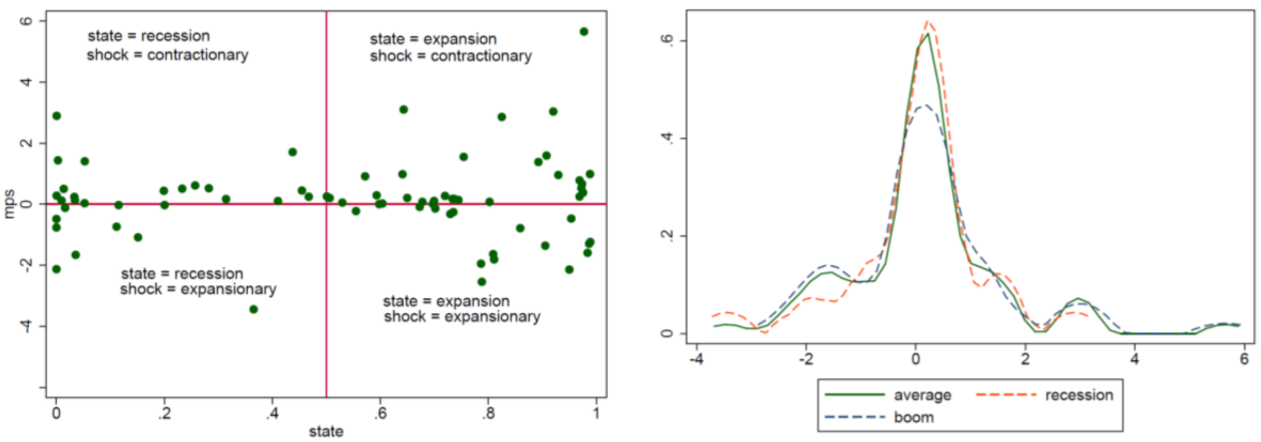
From a theoretical point of view it would be more appropriate to measure the state of the economy on an indicator of the gap in the level of output with respect to its potential, instead of the growth rates. Figure A1 in the Appendix compares the evolution of the state variable based either

[8] Gurkaynack et al. (2005) and Brand et al. (2010) found that announcements about future monetary policy intentions are as important as actions, respectively in the United States and in the euro area. See Cecioni (2018) for further details on the time-series of the monetary policy surprises.

on an indicator of the labor shortage or on the output gap with the indicator based on growth rates.[9] The latter is more correlated with the ECB policy rates; the indicator of slackness in the labor market is lagged with respect to growth rates, reflecting the delayed responses of labor market to the economy; the one based on output gap divide the sample in two long phases, one in which output was above potential (before 2010) and one afterwards in which it was below, complicating the identification of the effects of monetary policy. Given that the ECB focuses the economic analysis supporting monetary policy decisions in the Introductory Statement on real GDP growth and taking into account that there is not a unique indicator of the slack in the economy, the paper considers the indicator on growth rates as the benchmark and provides robustness of the results to this choice.

Figure 3 – The monetary policy shocks during expansions and recessions

Panel A – Raw shocks | Panel B – Estimated distribution



Notes: monetary policy shocks on the y-axis (in basis points) and state of the economy in the x-axis (1= expansion; 0 = recession).

Notes: distribution estimated with a Gaussian kernel of the monetary policy shock ("average") and of the monetary policy shocks weighted by F(z) ("boom") and [1-F(z)] ("recession").

Figure 3 shows that the distributions of the monetary policy shocks in the two states are not remarkably different: it is not more frequent to have positive or negative shocks in one of the two states. This is a desirable feature of the data since it makes the experiment cleaner.[10] Indeed, an

[9] The EC indicator of labor shortage is taken from the quarterly business survey coordinated by the European Commission and consists of the share of firms indicating labor shortage as one of the factors limiting production. For its use as a measure of labor market slack see Bulligan, Guglielminetti and Viviano (2017). The output gap is the one estimated by the Eurosystem.

[10] A priori, one might argue that contractionary (expansionary) monetary policy shocks during recessions (expansions) are less frequent episodes and, in any case, less intuitively relevant. However, it must be recalled that the large part of the fluctuations in the policy instrument happen as a result of the reaction of monetary policy to economic conditions. The shocks are defined as random disturbances to the systematic response of monetary policy to the evolution of the

additional dimension over which monetary policy could have asymmetric effects is the sign of the shock. Having positive and negative shocks almost evenly distributed across states allows one to draw more robust conclusions on the state-dependent effects of monetary policy. The paper provides also an analysis of the asymmetric effects of negative and positive monetary policy shocks in Section 4.[11]

3. Results

The baseline estimates of the impulse responses show that a contractionary monetary policy shock, which raises the 1-year interest rate by 1 percentage point, reduces output after 4 to 6 quarters both in recessions and expansions (figure 4). The estimated drop of output is roughly of the same magnitude in both states, although not statistically significant during recessions. The effects are slightly stronger when the economy is expanding, but the difference is not statistically different than zero at 90% confidence level after 6 and 8 quarters from the shock. The same contractionary shock reduces prices after about two-three years during an expansion, while it has no significant effects on prices during recessions.

The shocks are normalized to have the same initial impact on the 1-year interest rate in all regimes and the estimated persistence of the interest rates is comparable across regimes.[12] Confidence bands around the responses of all three variables are larger in the recession state of the economy as there are few episodes of recessions in the sample considered. Figure 5 compares the responses to the same shock across different states and with the "linear" model, in which it is imposed that $\beta_h^e = \beta_h^r$. Table A1 in Appendix cumulates the impulse response functions for the level of real GDP and of prices and shows an estimate, based on Driscoll- Kraay standard errors, of the significance of the difference in the two regimes. Such difference is remarkable in the responses of prices.

According to these findings, monetary policy has a similar impact on output in both states, but it is easier to affect prices when the economy is expanding than when it is contracting. Evidence of the uneven impact of monetary policy over the business cycle might be consistent with several theoretical reasons such as, for example, downward nominal wage or price rigidities and financial constraints.

---

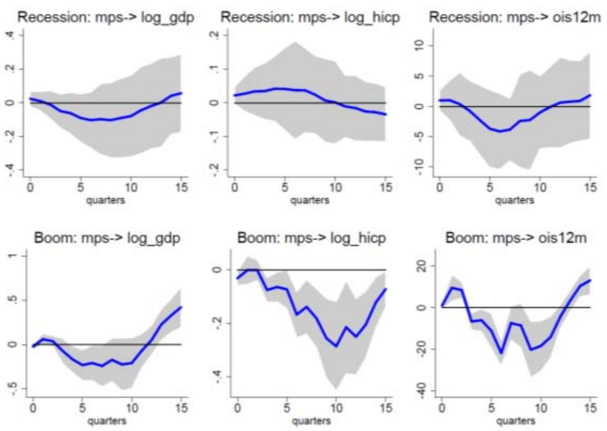
economic outlook. As such they permit to uncover the causal effects of monetary policy on the economic activity and prices.

[11] The relatively short length of the sample does not permit an analysis along the two dimensions at the same time, that is the presence of possible asymmetries in recessionary and expansionary states of both positive and negative shocks.

[12] The IRF of the 1-year interest rate is much larger in expansion than in recession likely because on average during expansion (first part of the sample) interest rates were higher.

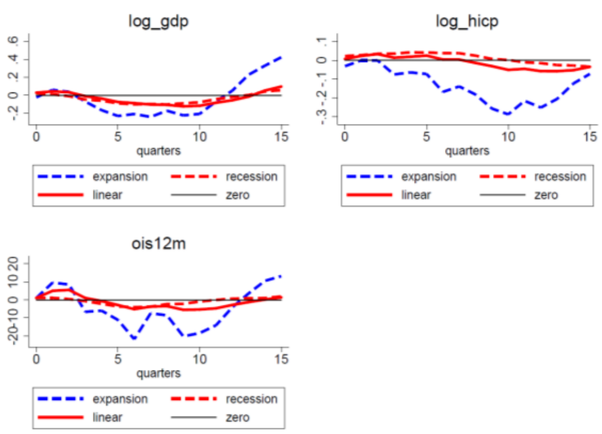
The most plausible explanation is one due to the presence of downward nominal wage rigidities and capacity utilization.[13] During a recession many firms are either unable or unwilling to lower compensation. Therefore expansionary monetary policy increases output without the need to increase wages, when the degree of capacity utilization in the economy is low; conversely, when the economy is running close to its potential, an expansionary monetary policy affects more markedly wages as firms are competing to attract workers in a tight labor market.[14]

Figure 4 – Impulse responses to a monetary policy shock



Notes: The top row shows the IRFs of log of GDP, log of HICP and 1-year overnight interest rate swap during recessions; the bottom row shows the same IRFs during expansions. Grey area is 90% confidence bands (computed with Newey-West standard errors); output and prices in log points, interest rates in percentage points.

Figure 5 – Comparisons across models and states



Notes: "linear" is a model in the impulse response is restricted to be the same in an expansion or a recession.

As a first check for this hypothesis IRFs are estimated using a state variable based on the degree of resource utilization, instead of real GDP growth rates. The same result holds when the state indicator is based either on the European Commission Survey indicator of labor shortage (figure 6, panel A) or on a measure of the output gap (figure 6, panel B).[15] Moreover, Figure 7 shows that the IRFs of nominal wages to a monetary policy shock in the two states of the economy, using both the quarterly growth rate of real GDP and the labor shortage indicator to construct the

[13] If the structural source of the asymmetry is the presence of borrowing constraints, which become binding during a recession, also the response of output would have to be lower in recession than in expansion.

[14] Schmitt-Grohé and Uribe (2013) found that after the financial crisis in some euro area countries nominal wages remained unchanged despite the sharp contraction of aggregate demand, suggesting that nominal rigidities were at play at that time.

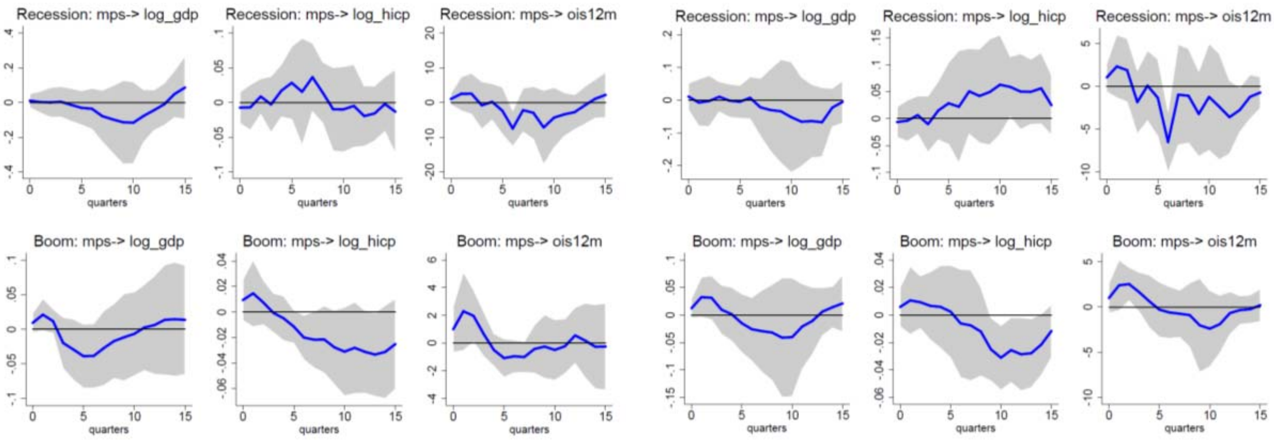
[15] The responses of HICP prices and interest rates during booms are much lower when the state variable is expressed in terms of labor shortage. This is likely due to a phase shift of expansions around 2011 according to the different state indicators (see figure A1 in Appendix). The state indicator based on real GDP growth rate marks an expansion when interest rates were raised in the first half of 2011, while the one based on labor shortage signals an expansion only some quarters afterwards when, following the intensification of the sovereign debt crisis, interest rates were being lowered. They then capture a weaker response of monetary policy and thus a smaller reaction of prices in expansion when compared to the indicator based on how fast the economy is growing.

state variable, mimic the behavior of prices. These results indicate that, as theory would suggest, also the degree of resource utilization is the dimension over which monetary policy effects are asymmetric.

Figure 6 – The role of the indicator of the state of the economy

Panel A - State variable = labor shortage

Panel B – State variable = output gap



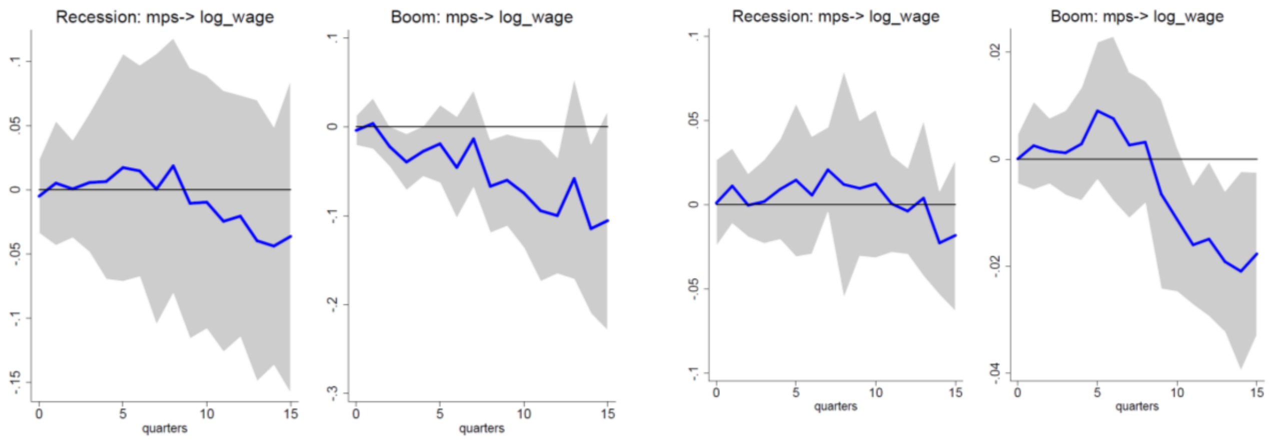
Notes: The top row shows the IRFs of log of GDP, log of HICP and 1-year overnight interest rate swap during recessions; the bottom row shows the same IRFs during expansions. Grey area is 90% confidence bands (computed with Newey-West standard errors); output and prices in log points, interest rates in percentage points. The state variable is based on the European Commission survey indicator of labor shortage.

Notes: The top row shows the IRFs of log of GDP, log of HICP and 1-year overnight interest rate swap during recessions; the bottom row shows the same IRFs during expansions. Grey area is 90% confidence bands (computed with Newey-West standard errors); output and prices in log points, interest rates in percentage points. The state variable is based on the Eurosystem output gap.

Figure 7 – The response of nominal wages

Panel A - State variable = growth rate

Panel B – State variable = labor shortage



Notes: IRFs of log of nominal compensation per hour. Grey area is 90% confidence bands (computed with Newey-West standard errors); in log points. The state variable is based on the quarterly growth rate of real GDP. The controls are lags of log of real GDP, of log of HICP, of log of wages and of the 1-year interest rate.

Notes: IRFs of log of nominal compensation per hour. Grey area is 90% confidence bands (computed with Newey-West standard errors); in log points. The state variable is based on the European Commission survey indicator of labor shortage. The controls are lags of log of real GDP, of log of HICP, of log of wages and of the 1-year interest rate.

4. Robustness

Effective lower bound of official interest rates and unconventional monetary policy - On March 2016 the ECB reached the effective lower bound on policy rates; since mid-2014 the ECB has been using non-standard measures to stimulate the economy. In order to understand how much these exceptional circumstances and measures are affecting the results, figure 8 (panel A) provides estimates of the IRFs in a sample that ends in 2016Q1, when the ECB reached the effective lower bound. The responses of both prices and output are more marked in expansion than in recession. The larger response of output in expansion is not observed in the baseline results. The sample used in figure 8, panel A feature expansionary phases only before the crises when output was at potential. The latest data, during which the euro area economy is in expansion but with remaining slack, dampen the response of output.[16] This confirms that the degree of slackness in the economy is the relevant dimension over which monetary policy effects might differ.

Figure 8 (panel B) provides estimate of the IRFs adding among the controls the time series of unconventional monetary policy shocks, obtained as daily changes of long-term interest rates after the Governing Council meeting orthogonal with the monetary policy shock (Cecioni, 2018). The results do not change, suggesting that estimated IRFs of economic activity and prices are not capturing the effects of unconventional monetary measures.

Price and policy indicators - Figures 9 and 10 show that the results are robust to other price and policy indicators, that is if we substitute the HICP price index with the GDP deflator and we use the Eonia as policy indicator instead of the 1-year interest rate.[17]

Distribution of positive and negative monetary policy shocks across states - Looking at figure 3 (panel A) one may notice that during expansionary phases contractionary shocks are more frequent.[18] If contractionary shocks are more effective than expansionary ones, the results obtained above would not be ascribable to the state of the economy but to the type of shock observed in that state. Constraints due to the relatively short length of the sample make it impossible to estimate the effects of monetary policy conditioning on both the sign and the state of the economy, therefore, as Tenreyro and Thwaites (2016), the responses of output and prices to negative and positive monetary

[16] Indeed, in the same experiment but using the labor shortage indicator or the output gap to construct the indicator of the state of the economy, there are no differences between the response of output in the entire sample and the one in the sample trimmed at 2016q1.

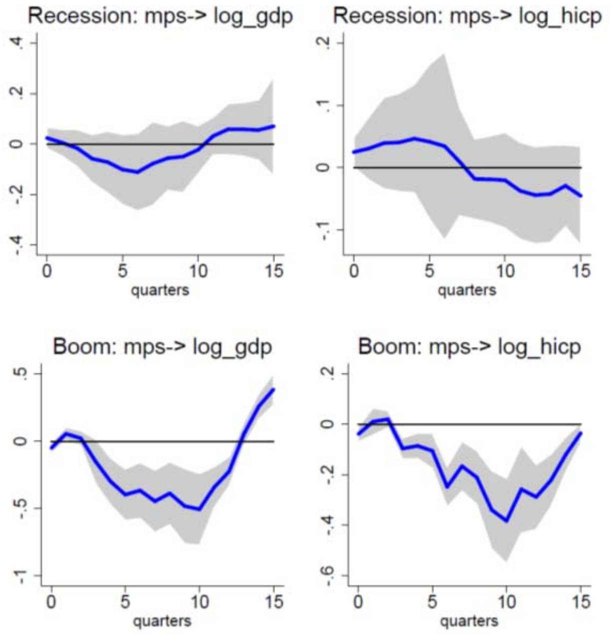
[17] The monetary policy shocks in this case are the surprises extracted from the 1-month OIS contract.

[18] The sample has 32 (17) positive (negative) shocks in expansions and 18 (10) in recessions.

policy shocks are estimated.[19] The results do not show a clear distinction of the effects of the shocks depending on their sign in the sample under analysis.

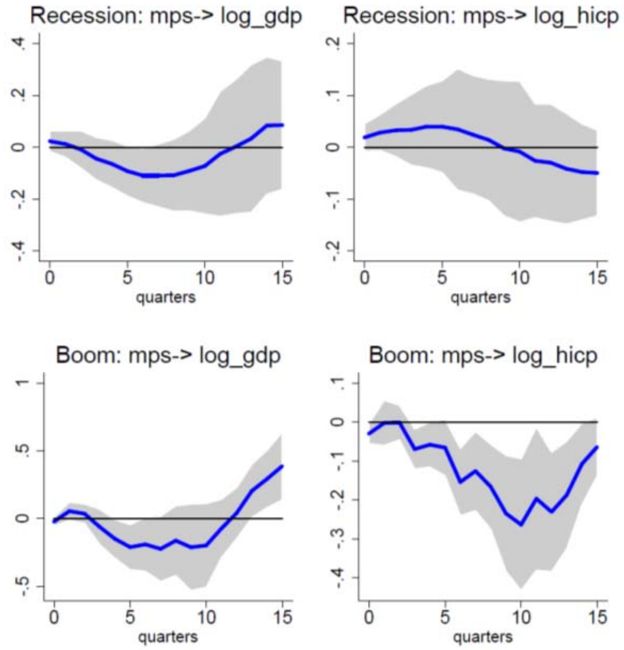
Figure 8 – The effects of the ZLB and of unconventional monetary policies

Panel A – Sample ending in 2016Q1



Notes: The top row shows the IRFs of log of GDP, log of HICP and 1-year overnight interest rate swap during recessions; the bottom row shows the same IRFs during expansions. Grey area is 90% confidence bands (computed with Newey-West standard errors); output and prices in log points, interest rates in percentage points. The state variable is based on the real GDP growth rate.

Panel B – Controlling for unconventional monetary policy shock



Notes: The top row shows the IRFs of log of GDP, log of HICP and 1-year overnight interest rate swap during recessions; the bottom row shows the same IRFs during expansions. Grey area is 90% confidence bands (computed with Newey-West standard errors); output and prices in log points, interest rates in percentage points. The state variable is based on the real GDP growth rate.

Distribution of large monetary policy shocks across states – During expansions the range of sizes of the shocks is larger than in recessions (Figure 3, panel B). If larger shocks have a stronger impact on prices and these are more frequent during expansions, then the findings presented in previous section can be driven by the composition of the size of the shocks in different states of the economy. As a check I estimate an equation with the cubed value of the policy shock following Tenreyro and Thwaites (2016). If the value of the coefficient for the cubed shock is significantly positive, then this would be evidence that large shocks are more powerful. This is indeed the case,

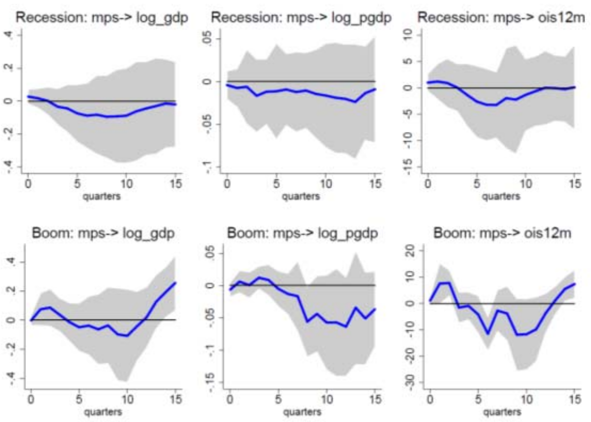
[19] The estimated equation is $y_{t+h} = \alpha_h + \beta_h^+ \varepsilon_t^+ + \beta_h^- \varepsilon_t^- + \gamma_h \boldsymbol{X_t} + \delta_{\boldsymbol{h}} t + u_{\boldsymbol{t+h}}$ where $\varepsilon_t^+ = \max\{0,\ \varepsilon_t\}$ and $\varepsilon_t^- = \min\{0,\ \varepsilon_t\}$.

as shown in figure 11, for the responses of prices, suggesting an interesting additional non-linearity of the effects of monetary policy.

However, the extent to which the baseline evidence tends to overestimate the stronger response of prices during expansions is limited since the frequency of large monetary policy surprises is quite evenly distributed across states of the economy with the exception of a single episode that lies outside the common range of the distribution. This occurred on 8 June 2000, when the ECB President W. Duisenberg surprised the markets with a 50 bp increase of key policy rates, while only a 25 bp rise was expected based on a testimony of the President itself few days before in Bruxelles. In order to understand whether this large shock is driving the result of a stronger response of prices during expansions, I estimate the IRFs when dropping that event from the sample (figure 12).

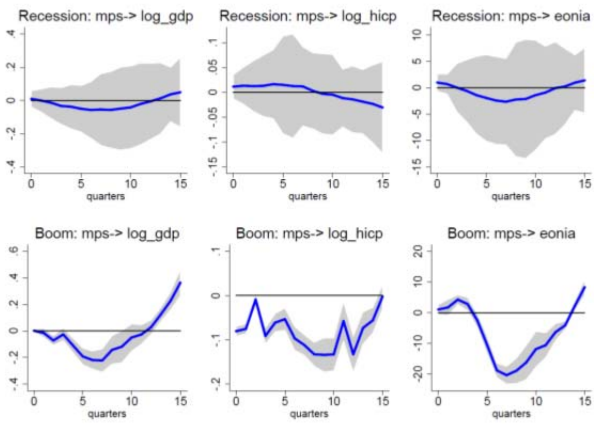
Sensitivity analysis - Figures in the Appendix shows that the results in the baseline estimation described in the previous section are robust to the number of lags (figure A2), to the removal of the time trend (figure A3), to changes of the parameters of the logistic function $F(z_t)$ (figure A4): θ, the parameter that regulates how fast the economy switches from on state to the other and $\bar{z}$, the one that influences the frequency of the recessions in the sample (increased to 35%, from around 25% in the baseline).

Figure 9 – IRFs to a monetary shock – alternative price indicator



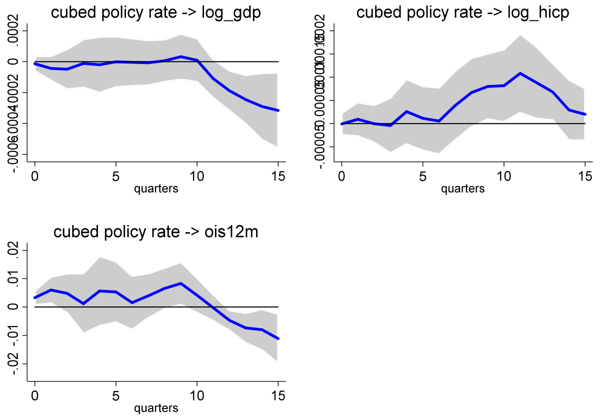
Notes: The top row shows the IRFs of log of GDP, log of GDP deflator and 1-year overnight interest rate swap during recessions; the bottom row shows the same IRFs during expansions. Grey area is 90% confidence bands (computed with Newey-West standard errors); output and prices in log points, interest rates in percentage points.

Figure 10 – IRFs to a monetary shock – alternative policy indicator



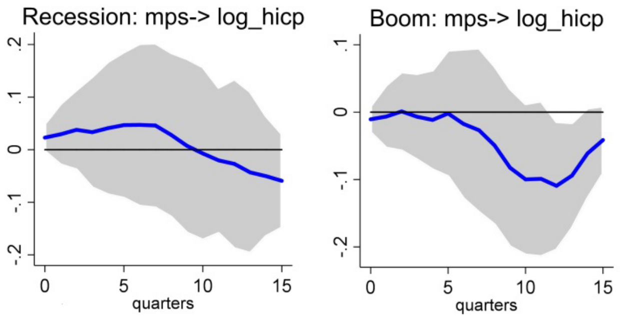
Notes: The top row shows the IRFs of log of GDP, log of HICP price level and overnight interest rate (Eonia) during recessions; the bottom row shows the same IRFs during expansions. Grey area is 90% confidence bands (computed with Newey-West standard errors); output and prices in log points, interest rates in percentage points. The monetary policy shock is computed from surprises on the 1-month overnight interest rate swap.

Figure 11 – IRF to cubed monetary policy shocks



Notes: The estimated equation is the following $y_{t+h} = \alpha_h + \beta_h \varepsilon_t + \beta_h^l \varepsilon_t^3 + \gamma_h X_t + \delta_h t + u_{t+h}$. The figure reports the coefficient β_h^l with 90% confidence bands. The dependent variables are the log of the real GDP, log of HICP prices and the 1-year interest rate.

Figure 12 – IRF of HICP prices to a monetary policy shock – dropping June 2000 surprise



5. Conclusion

The paper provides evidence for the euro area that the effects of monetary policy on the economy are different depending on the phase of the business cycle. Evidence is particularly strong for the responses of consumer prices, which are shown to be more responsive to monetary policy shocks when the economy is in a boom, measured either as an expansion of real GDP growth or as a period in which measures of resource utilization are increasing. Indications for a stronger response of economic activity during booms are instead less robust.

These findings are consistent with a story of downward wage rigidity and capacity utilization. In a recession, when the degree of resource utilization is low but nominal wages have not fully adjusted due to the presence of downward nominal wage rigidities, an expansionary monetary policy shock can increase economic activity through the use of idle capacity without rising wages. Conversely, during an expansion firms increase wages in order to attract workers in a tight labor market.

The results are robust to a series of checks regarding the way in which the state of the economy is measured; moreover they do not seem to depend on the pattern of the series of monetary policy shocks. An interesting extension, planned for future work, would be to analyze the extent to which fiscal policy plays a role in explaining the different sensitivity of macroeconomic variables to monetary policy across the phases of the business cycle.

The evidence presented for the euro area is similar to the one provided by Tenreyro and Thwaites (2016) for the United States. Differences emerge in that the recession sample available with euro area data is smaller than the one in expansions and largely ruled by the exceptional downturns occurred as a consequences of the financial and sovereign debt crisis, thus uncertainty around the responses is larger and the findings might capture some specificities of the 2008-09 and 2011-13 recessions.

References

Auerbach, A. J. and Y. Gorodnichenko (2011), "*Fiscal multipliers in Recession and Expansion*", NBER working paper no. 17447

Barnichon, R., C. Matthes and T. Sablik (2017), "*Are the Effects of Monetary Policy Asymmetric?*" Economic Brief, Federal Reserve of Richmond

Babecký, J., P. Du Caju, T. Kosma, M. Lawless, J. Messina and T. Rõõm (2010), "*Downward Nominal and Real Wage Rigidity: Survey Evidence from European Firms*", Scandinavian Journal of Economics, vol. 112 (4): 884-910

Benigno, P. and A. Ricci (2011), "*The Inflation-Output Trade-Off with Downward Wage Rigidities*" American Economic Review, 101 (4): 1436-66

Brand, C., D. Buncic and J. Turunen (2010), "*The impact of ECB decisions and communications on the yield curve*", Journal of European Economic Association, 8(6): 1266-1298

Bulligan, G., E. Guglielminetti and E. Viviano (2017), "*Wage growth in the euro area: where do we stand?*", Questioni di Economia e Finanza, n. 413

Cecioni, M. (2018), "*ECB monetary policy and the euro exchange rate*", Temi di discussione, n. 1172

Daly, M. and B. Hobijn (2014) "*Downward Nominal Wage Rigidities Bend the Phillips Curve*", Journal of Money Credit and Banking, vol. 46 (S2): 51-93

Debortoli, D., J. Galì and L. Gambetti (2018), "*On the empirical (ir)relevance of the zero lower bound constraint*", mimeo

Gurkaynack, R., B. Sack and E. Swanson (2005), "*Do Actions Speak Louder Than Words? The Response of Asset Prices to Monetary Policy Actions and Statements.*", International Journal of Central Banking, 1 (1)

Jordà, O. (2005), "*Estimation and Inference of Impulse Responses by Local Projections*", American Economic Review, 95 (1): 161 {18}

Holden, S. and F. Wulfsberg (2008). "*Downward Nominal Wage Rigidity in the OECD.*" B. E. Journal of Macroeconomics: Advances 8 (1): Article 15

Morgan, D. P. (1993), "*Asymmetric Effects of Monetary Policy*", Federal Reserve Bank of Kansas City Economic Review, vol. 78 (2)

Peersman, G. and F. Smets (2001), "*Are the effects of monetary policy in the euro area greater in recessions than in booms?*", ECB working paper no. 52

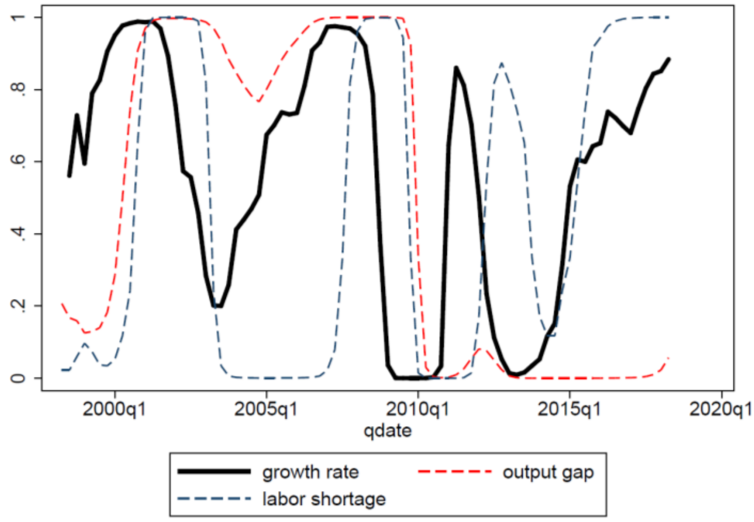
Ramey, V. and S. Zubairy (2018), "*Government spending multipliers in good times and bad: Evidence form U.S. historical data*", Journal of Political Economy, vol. 126 (2)

Schmitt-Grohé, S. and M. Uribe (2013), "*Downward Nominal Wage Rigidity and the Case for Temporary Inflation in the Eurozone*", Journal of Economic Perspectives, vol. 27: 193-212

Tenreyro, S. and G. Thwaites (2016), "*Pushing on a String: US Monetary Policy Is Less Powerful in Recessions*", American Economic Journal: Macroeconomics, 8 (4): 4

Appendix

Figure A1 – State variables



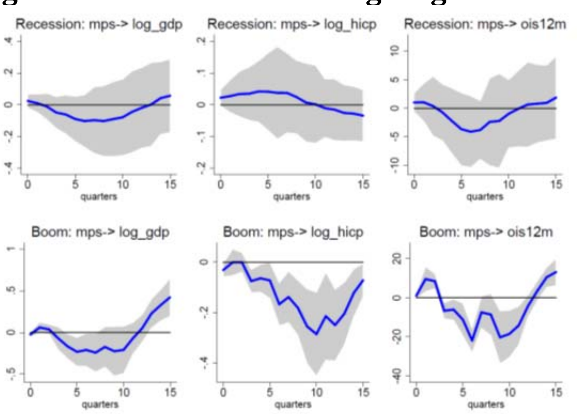
Notes: The solid black line is the state variables based on the quarterly real GDP growth rate; the red dashed line is the one based on the output gap and the blue dashed line is the one based on the EC indicator of labor shortage.

Table A1 – Cumulative impulse response of GDP and prices in the two regimes

Cumulative impact on	At horizon h =	Recession	Expansion	Significance level of the difference
log of real GDP	4	-0.0255	0.0026	0.0106
	8	-0.3714	-0.7824	0.3158
	12	-0.6837	-1.4081	0.3599
	16	-0.6060	-0.4587	0.0123
log of HICP prices	4	0.1159	-0.1001	0.7623
	8	0.2712	-0.5072	0.9790
	12	0.2926	-1.3712	0.9993
	16	0.1910	-1.9704	0.9999

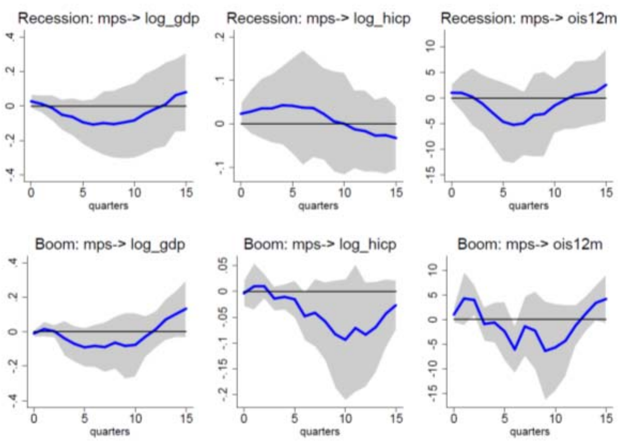
Notes: The significance level of the difference is computed using Driscoll-Kraay standard errors that control for possible correlation of errors across horizons of the impulse responses (*h*).

Figure A2 – Robustness to lag length



Notes: lag length is equal to 1 instead of 4

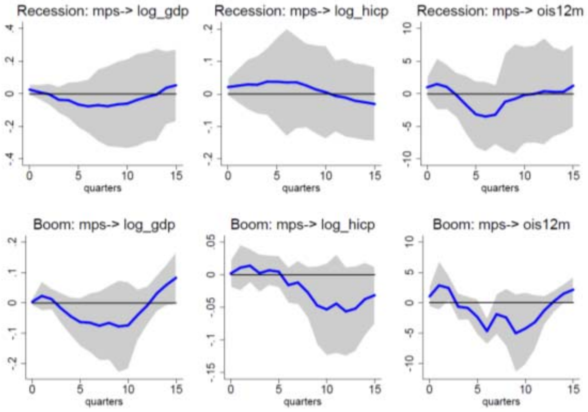
Figure A3 – Robustness to time trend



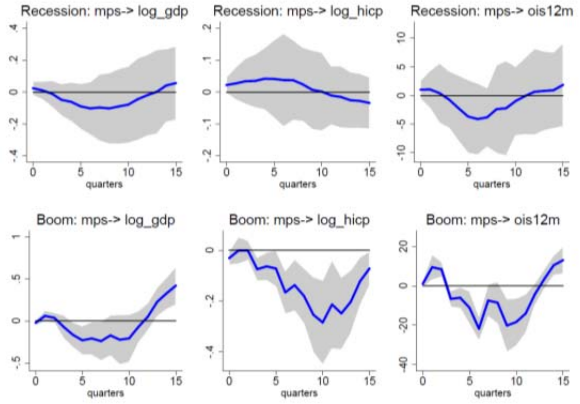
Notes: no time trend in the estimation

Figure A4 – Robustness to the parameters of logistic function of the state variable

Panel A - θ = 10



Panel B – $\bar{z}$ = 35%



RECENTLY PUBLISHED "TEMI" (*)

N. 1179 – *Labor market and financial shocks: a time varying analysis*, by Francesco Corsello and Valerio Nispi Landi (June 2018).

N. 1180 – *On the unintended effects of public transfers: evidence from EU funding to Southern Italy*, by Ilaria De Angelis, Guido de Blasio and Lucia Rizzica (June 2018).

N. 1181 – *Always look on the bright side? Central counterparties and interbank markets during the financial crisis*, by Massimiliano Affinito and Matteo Piazza (July 2018).

N. 1182 – *Knocking on parents' doors: regulation and intergenerational mobility*, by Sauro Mocetti, Giacomo Roma and Enrico Rubolino (July 2018).

N. 1183 – *Why do banks securitise their assets? Bank-level evidence from over one hundred countries in the pre-crisis period,* by Fabio Panetta and Alberto Franco Pozzolo.

N. 1184 – *Capital controls spillovers*, by Valerio Nispi Landi (July 2018).

N.1185 – *The macroeconomic effects of an open-ended asset purchase programme*, by Lorenzo Burlon, Alessandro Notarpietro and Massimiliano Pisani (July 2018).

N.1186 – *Fiscal buffers, private debt and recession: the good, the bad and the ugly*, by Nicoletta Batini, Giovanni Melina and Stefania Villa (July 2018).

N. 1187 – *Competition and the pass-through of unconventional monetary policy: evidence from TLTROs*, by Matteo Benetton and Davide Fantino (September 2018).

N. 1188 – *Raising aspirations and higher education: evidence from the UK's Widening Participation Policy*, by Lucia Rizzica (September 2018).

N. 1189 – *Nearly exact Bayesian estimation of non-linear no-arbitrage term structure models*, by Marcello Pericoli and Marco Taboga (September 2018).

N. 1190 – *Granular Sources of the Italian business cycle*, by Nicolò Gnocato and Concetta Rondinelli (September 2018).

N. 1191 – *Debt restructuring with multiple bank relationships*, by Angelo Baglioni, Luca Colombo and Paola Rossi (September 2018).

N. 1192 – *Exchange rate pass-through into euro area inflation. An estimated structural model*, by Lorenzo Burlon, Alessandro Notarpietro and Massimiliano Pisani (September 2018).

N. 1193 – *The effect of grants on university drop-out rates: evidence on the Italian case*, by Francesca Modena, Enrico Rettore and Giulia Martina Tanzi (September 2018).

N. 1194 – *Potential output and microeconomic heterogeneity*, by Davide Fantino (November 2018).

N. 1195 – *Immigrants, labor market dynamics and adjustment to shocks in the Euro Area*, by Gaetano Basso, Francesco D'Amuri and Giovanni Peri (November 2018).

N. 1196 – *Sovereign debt maturity structure and its costs*, by Flavia Corneli (November 2018).

N. 1197 – *Fiscal policy in the US: a new measure of uncertainty and its recent development*, by Alessio Anzuini and Luca Rossi (November 2018).

N. 1198 – *Macroeconomics determinants of the correlation between stocks and bonds*, by Marcello Pericoli (November 2018).

N. 1199 – *Bank capital constraints, lending supply and economic activity*, by Antonio M. Conti, Andrea Nobili and Federico M. Signoretti (November 2018).

N. 1200 – *The effectiveness of capital controls*, by Valerio Nispi Landi and Alessandro Schiavone (November 2018).

N. 1201 – *Contagion in the CoCos market? A case study of two stress events*, by Pierluigi Bologna, Arianna Miglietta and Anatoli Segura (November 2018).

(*) Requests for copies should be sent to:
Banca d'Italia – Servizio Studi di struttura economica e finanziaria – Divisione Biblioteca e Archivio storico – Via Nazionale, 91 – 00184 Rome – (fax 0039 06 47922059). They are available on the Internet www.bancaditalia.it.

2016

ALBANESE G., G. DE BLASIO and P. SESTITO, *My parents taught me. evidence on the family transmission of values,* Journal of Population Economics, v. 29, 2, pp. 571-592, **WP 955 (March 2014).**

ANDINI M. and G. DE BLASIO, *Local development that money cannot buy: Italy's Contratti di Programma,* Journal of Economic Geography, v. 16, 2, pp. 365-393, **WP 915 (June 2013).**

BARONE G. and S. MOCETTI, *Inequality and trust: new evidence from panel data,* Economic Inquiry, v. 54, pp. 794-809, **WP 973 (October 2014).**

BELTRATTI A., B. BORTOLOTTI and M. CACCAVAIO, *Stock market efficiency in China: evidence from the split-share reform,* Quarterly Review of Economics and Finance, v. 60, pp. 125-137, **WP 969 (October 2014).**

BOLATTO S. and M. SBRACIA, *Deconstructing the gains from trade: selection of industries vs reallocation of workers,* Review of International Economics, v. 24, 2, pp. 344-363, **WP 1037 (November 2015).**

BOLTON P., X. FREIXAS, L. GAMBACORTA and P. E. MISTRULLI, *Relationship and transaction lending in a crisis*, Review of Financial Studies, v. 29, 10, pp. 2643-2676, **WP 917 (July 2013).**

BONACCORSI DI PATTI E. and E. SETTE, *Did the securitization market freeze affect bank lending during the financial crisis? Evidence from a credit register,* Journal of Financial Intermediation, v. 25, 1, pp. 54-76, **WP 848 (February 2012).**

BORIN A. and M. MANCINI, *Foreign direct investment and firm performance: an empirical analysis of Italian firms,* Review of World Economics, v. 152, 4, pp. 705-732, **WP 1011 (June 2015).**

BRAGOLI D., M. RIGON and F. ZANETTI, *Optimal inflation weights in the euro area,* International Journal of Central Banking, v. 12, 2, pp. 357-383, **WP 1045 (January 2016).**

BRANDOLINI A. and E. VIVIANO, *Behind and beyond the (headcount) employment rate,* Journal of the Royal Statistical Society: Series A, v. 179, 3, pp. 657-681, **WP 965 (July 2015).**

BRIPI F., *The role of regulation on entry: evidence from the Italian provinces,* World Bank Economic Review, v. 30, 2, pp. 383-411, **WP 932 (September 2013).**

BRONZINI R. and P. PISELLI, *The impact of R&D subsidies on firm innovation,* Research Policy, v. 45, 2, pp. 442-457, **WP 960 (April 2014).**

BURLON L. and M. VILALTA-BUFI, *A new look at technical progress and early retirement,* IZA Journal of Labor Policy, v. 5, **WP 963 (June 2014).**

BUSETTI F. and M. CAIVANO, *The trend–cycle decomposition of output and the Phillips Curve: bayesian estimates for Italy and the Euro Area,* Empirical Economics, v. 50, 4, pp. 1565-1587, **WP 941 (November 2013).**

CAIVANO M. and A. HARVEY, *Time-series models with an EGB2 conditional distribution,* Journal of Time Series Analysis, v. 35, 6, pp. 558-571, **WP 947 (January 2014).**

CALZA A. and A. ZAGHINI, *Shoe-leather costs in the euro area and the foreign demand for euro banknotes,* International Journal of Central Banking, v. 12, 1, pp. 231-246, **WP 1039 (December 2015).**

CESARONI T. and R. DE SANTIS, *Current account "core-periphery dualism" in the EMU,* The World Economy, v. 39, 10, pp. 1514-1538, **WP 996 (December 2014).**

CIANI E., *Retirement, Pension eligibility and home production,* Labour Economics, v. 38, pp. 106-120, **WP 1056 (March 2016).**

CIARLONE A. and V. MICELI, *Escaping financial crises? Macro evidence from sovereign wealth funds' investment behaviour,* Emerging Markets Review, v. 27, 2, pp. 169-196, **WP 972 (October 2014).**

CORNELI F. and E. TARANTINO, *Sovereign debt and reserves with liquidity and productivity crises,* Journal of International Money and Finance, v. 65, pp. 166-194, **WP 1012 (June 2015).**

D'AURIZIO L. and D. DEPALO, *An evaluation of the policies on repayment of government's trade debt in Italy,* Italian Economic Journal, v. 2, 2, pp. 167-196, **WP 1061 (April 2016).**

DE BLASIO G., G. MAGIO and C. MENON, *Down and out in Italian towns: measuring the impact of economic downturns on crime,* Economics Letters, 146, pp. 99-102, **WP 925 (July 2013).**

DOTTORI D. and M. MANNA, *Strategy and tactics in public debt management,* Journal of Policy Modeling, v. 38, 1, pp. 1-25, **WP 1005 (March 2015).**

GERALI A., A. NOTARPIETRO and M. PISANI, *Macroeconomic effects of simultaneous implementation of reforms,* International Finance, Wiley Blackwell, v. 19, 1, pp. 42-65, **WP 997 (December 2014).**

LIBERATI D., M. MARINUCCI and G. M. TANZI, *Science and technology parks in Italy: main features and analysis of their effects on hosted firms*, Journal of Technology Transfer, v. 41, 4, pp. 694-729, **WP 983 (November 2014).**

MARCELLINO M., M. PORQUEDDU and F. VENDITTI, *Short-Term GDP forecasting with a mixed frequency dynamic factor model with stochastic volatility,* Journal of Business & Economic Statistics, v. 34, 1, pp. 118-127, **WP 896 (January 2013).**

RODANO G., N. SERRANO-VELARDE and E. TARANTINO, *Bankruptcy law and bank financing,* Journal of Financial Economics, v. 120, 2, pp. 363-382, **WP 1013 (June 2015).**

ZINNA G., *Price pressures on UK real rates: an empirical investigation,* Review of Finance, v. 20, 4, pp. 1587-1630, **WP 968 (July 2014).**

2017

AABERGE, R., F. BOURGUIGNON, A. BRANDOLINI, F. FERREIRA, J. GORNICK, J. HILLS, M. JÄNTTI, S. JENKINS, J. MICKLEWRIGHT, E. MARLIER, B. NOLAN, T. PIKETTY, W. RADERMACHER, T. SMEEDING, N. STERN, J. STIGLITZ, H. SUTHERLAND, *Tony Atkinson and his legacy,* Review of Income and Wealth, v. 63, 3, pp. 411-444, **WP 1138 (September 2017).**

ACCETTURO A., M. BUGAMELLI and A. LAMORGESE, *Law enforcement and political participation: Italy 1861-65,* Journal of Economic Behavior & Organization, v. 140, pp. 224-245, **WP 1124 (July 2017).**

ADAMOPOULOU A. and G.M. TANZI, *Academic dropout and the great recession,* Journal of Human Capital, v. 11, 1, pp. 35–71, **WP 970 (October 2014).**

ALBERTAZZI U., M. BOTTERO and G. SENE, *Information externalities in the credit market and the spell of credit rationing,* Journal of Financial Intermediation, v. 30, pp. 61–70, **WP 980 (November 2014).**

ALESSANDRI P. and H. MUMTAZ, *Financial indicators and density forecasts for US output and inflation,* Review of Economic Dynamics, v. 24, pp. 66-78, **WP 977 (November 2014).**

BARBIERI G., C. ROSSETTI and P. SESTITO, *Teacher motivation and student learning,* Politica economica/Journal of Economic Policy, v. 33, 1, pp. 59-72, **WP 761 (June 2010).**

BENTIVOGLI C. and M. LITTERIO, *Foreign ownership and performance: evidence from a panel of Italian firms,* International Journal of the Economics of Business, v. 24, 3, pp. 251-273, **WP 1085 (October 2016).**

BRONZINI R. and A. D'IGNAZIO, *Bank internationalisation and firm exports: evidence from matched firm-bank data,* Review of International Economics, v. 25, 3, pp. 476-499 **WP 1055 (March 2016).**

BRUCHE M. and A. SEGURA, *Debt maturity and the liquidity of secondary debt markets,* Journal of Financial Economics, v. 124, 3, pp. 599-613, **WP 1049 (January 2016).**

BURLON L., *Public expenditure distribution, voting, and growth,* Journal of Public Economic Theory,, v. 19, 4, pp. 789–810, **WP 961 (April 2014).**

BURLON L., A. GERALI, A. NOTARPIETRO and M. PISANI, *Macroeconomic effectiveness of non-standard monetary policy and early exit. A model-based evaluation,* International Finance, v. 20, 2, pp. 155-173, **WP 1074 (July 2016).**

BUSETTI F., *Quantile aggregation of density forecasts,* Oxford Bulletin of Economics and Statistics, v. 79, 4, pp. 495-512, **WP 979 (November 2014).**

CESARONI T. and S. IEZZI, *The predictive content of business survey indicators: evidence from SIGE,* Journal of Business Cycle Research, v.13, 1, pp 75–104, **WP 1031 (October 2015).**

CONTI P., D. MARELLA and A. NERI, *Statistical matching and uncertainty analysis in combining household income and expenditure data,* Statistical Methods & Applications, v. 26, 3, pp 485–505, **WP 1018 (July 2015).**

D'AMURI F., *Monitoring and disincentives in containing paid sick leave,* Labour Economics, v. 49, pp. 74-83, **WP 787 (January 2011).**

D'AMURI F. and J. MARCUCCI, *The predictive power of google searches in forecasting unemployment,* International Journal of Forecasting, v. 33, 4, pp. 801-816, **WP 891 (November 2012).**

DE BLASIO G. and S. POY, *The impact of local minimum wages on employment: evidence from Italy in the 1950s,* Journal of Regional Science, v. 57, 1, pp. 48-74, **WP 953 (March 2014).**

DEL GIOVANE P., A. NOBILI and F. M. SIGNORETTI, *Assessing the sources of credit supply tightening: was the sovereign debt crisis different from Lehman?,* International Journal of Central Banking, v. 13, 2, pp. 197-234, **WP 942 (November 2013).**

DEL PRETE S., M. PAGNINI, P. ROSSI and V. VACCA, *Lending organization and credit supply during the 2008–2009 crisis,* Economic Notes, v. 46, 2, pp. 207–236, **WP 1108 (April 2017).**

DELLE MONACHE D. and I. PETRELLA, *Adaptive models and heavy tails with an application to inflation forecasting,* International Journal of Forecasting, v. 33, 2, pp. 482-501, **WP 1052 (March 2016).**

FEDERICO S. and E. TOSTI, *Exporters and importers of services: firm-level evidence on Italy,* The World Economy, v. 40, 10, pp. 2078-2096, **WP 877 (September 2012).**

GIACOMELLI S. and C. MENON, *Does weak contract enforcement affect firm size? Evidence from the neighbour's court,* Journal of Economic Geography, v. 17, 6, pp. 1251-1282, **WP 898 (January 2013).**

LOBERTO M. and C. PERRICONE, *Does trend inflation make a difference?,* Economic Modelling, v. 61, pp. 351–375, **WP 1033 (October 2015).**

MANCINI A.L., C. MONFARDINI and S. PASQUA, *Is a good example the best sermon? Children's imitation of parental reading,* Review of Economics of the Household, v. 15, 3, pp 965–993, **D No. 958 (April 2014).**

MEEKS R., B. NELSON and P. ALESSANDRI, *Shadow banks and macroeconomic instability,* Journal of Money, Credit and Banking, v. 49, 7, pp. 1483–1516, **WP 939 (November 2013).**

MICUCCI G. and P. ROSSI, *Debt restructuring and the role of banks' organizational structure and lending technologies,* Journal of Financial Services Research, v. 51, 3, pp 339–361, **WP 763 (June 2010).**

MOCETTI S., M. PAGNINI and E. SETTE, *Information technology and banking organization,* Journal of Journal of Financial Services Research, v. 51, pp. 313-338, **WP 752 (March 2010).**

MOCETTI S. and E. VIVIANO, *Looking behind mortgage delinquencies,* Journal of Banking & Finance, v. 75, pp. 53-63, **WP 999 (January 2015).**

NOBILI A. and F. ZOLLINO, *A structural model for the housing and credit market in Italy,* Journal of Housing Economics, v. 36, pp. 73-87, **WP 887 (October 2012).**

PALAZZO F., *Search costs and the severity of adverse selection,* Research in Economics, v. 71, 1, pp. 171-197, **WP 1073 (July 2016).**

PATACCHINI E. and E. RAINONE, *Social ties and the demand for financial services,* Journal of Financial Services Research, v. 52, 1–2, pp 35–88, **WP 1115 (June 2017).**

PATACCHINI E., E. RAINONE and Y. ZENOU, *Heterogeneous peer effects in education,* Journal of Economic Behavior & Organization, v. 134, pp. 190–227, **WP 1048 (January 2016).**

SBRANA G., A. SILVESTRINI and F. VENDITTI, *Short-term inflation forecasting: the M.E.T.A. approach,* International Journal of Forecasting, v. 33, 4, pp. 1065-1081, **WP 1016 (June 2015).**

SEGURA A. and J. SUAREZ, *How excessive is banks' maturity transformation?,* Review of Financial Studies, v. 30, 10, pp. 3538–3580, **WP 1065 (April 2016).**

VACCA V., *An unexpected crisis? Looking at pricing effectiveness of heterogeneous banks,* Economic Notes, v. 46, 2, pp. 171–206, **WP 814 (July 2011).**

VERGARA CAFFARELI F., *One-way flow networks with decreasing returns to linking,* Dynamic Games and Applications, v. 7, 2, pp. 323-345, **WP 734 (November 2009).**

ZAGHINI A., *A Tale of fragmentation: corporate funding in the euro-area bond market,* International Review of Financial Analysis, v. 49, pp. 59-68, **WP 1104 (February 2017).**

2018

ADAMOPOULOU A. and E. KAYA, *Young Adults living with their parents and the influence of peers,* Oxford Bulletin of Economics and Statistics, v. 80, pp. 689-713, **WP 1038 (November 2015).**

BARONE G., G. DE BLASIO and S. MOCETTI, *The real effects of credit crunch in the great recession: evidence from Italian provinces,* Regional Science and Urban Economics, v. 70, pp. 352-59, **WP 1057 (March 2016).**

BELOTTI F. and G. ILARDI *Consistent inference in fixed-effects stochastic frontier models,* Journal of Econometrics, v. 202, 2, pp. 161-177, **WP 1147 (October 2017).**

BERTON F., S. MOCETTI, A. PRESBITERO and M. RICHIARDI, *Banks, firms and jobs,* Review of Financial Studies, v. 31, 6, pp. 2113-2156, **WP 1097 (February 2017).**

BOFONDI M., L. CARPINELLI and E. SETTE, *Credit supply during a sovereign debt crisis,* Journal of the European Economic Association, v.16, 3, pp. 696-729, **WP 909 (April 2013).**

BOKAN N., A. GERALI, S. GOMES, P. JACQUINOT and M. PISANI, *EAGLE-FLI: a macroeconomic model of banking and financial interdependence in the euro area,* Economic Modelling, v. 69, C, pp. 249-280, **WP 1064 (April 2016).**

BRILLI Y. and M. TONELLO, *Does increasing compulsory education reduce or displace adolescent crime? New evidence from administrative and victimization data,* CESifo Economic Studies, v. 64, 1, pp. 15–4, **WP 1008 (April 2015).**

BUONO I. and S. FORMAI *The heterogeneous response of domestic sales and exports to bank credit shocks,* Journal of International Economics, v. 113, pp. 55-73, **WP 1066 (March 2018).**

BURLON L., A. GERALI, A. NOTARPIETRO and M. PISANI, *Non-standard monetary policy, asset prices and macroprudential policy in a monetary union,* Journal of International Money and Finance, v. 88, pp. 25-53, **WP 1089 (October 2016).**

CARTA F. and M. DE PHLIPPIS, *You've Come a long way, baby. Husbands' commuting time and family labour supply,* Regional Science and Urban Economics, v. 69, pp. 25-37, **WP 1003 (March 2015).**

CARTA F. and L. RIZZICA, *Early kindergarten, maternal labor supply and children's outcomes: evidence from Italy,* Journal of Public Economics, v. 158, pp. 79-102, **WP 1030 (October 2015).**

CASIRAGHI M., E. GAIOTTI, L. RODANO and A. SECCHI, *A "Reverse Robin Hood"? The distributional implications of non-standard monetary policy for Italian households,* Journal of International Money and Finance, v. 85, pp. 215-235, **WP 1077 (July 2016).**

CECCHETTI S., F. NATOLI and L. SIGALOTTI, *Tail co-movement in inflation expectations as an indicator of anchoring,* International Journal of Central Banking, v. 14, 1, pp. 35-71, **WP 1025 (July 2015).**

CIANI E. and C. DEIANA, *No Free lunch, buddy: housing transfers and informal care later in life,* Review of Economics of the Household, v.16, 4, pp. 971-1001, **WP 1117 (June 2017).**

CIPRIANI M., A. GUARINO, G. GUAZZAROTTI, F. TAGLIATI and S. FISHER, *Informational contagion in the laboratory,* Review of Finance, v. 22, 3, pp. 877-904, **WP 1063 (April 2016).**

DE BLASIO G, S. DE MITRI, S. D'IGNAZIO, P. FINALDI RUSSO and L. STOPPANI, *Public guarantees to SME borrowing. A RDD evaluation,* Journal of Banking & Finance, v. 96, pp. 73-86, **WP 1111 (April 2017).**

GERALI A., A. LOCARNO, A. NOTARPIETRO and M. PISANI, *The sovereign crisis and Italy's potential output,* Journal of Policy Modeling, v. 40, 2, pp. 418-433, **WP 1010 (June 2015).**

LINARELLO A., *Direct and indirect effects of trade liberalization: evidence from Chile,* Journal of Development Economics, v. 134, pp. 160-175, **WP 994 (December 2014).**

NUCCI F. and M. RIGGI, *Labor force participation, wage rigidities, and inflation,* Journal of Macroeconomics, v. 55, 3 pp. 274-292, **WP 1054 (March 2016).**

SEGURA A., *Why did sponsor banks rescue their SIVs?,* Review of Finance, v. 22, 2, pp. 661-697, **WP 1100 (February 2017).**

FORTHCOMING

ACCETTURO A., W. DI GIACINTO, G. MICUCCI and M. PAGNINI, *Geography, productivity and trade: does selection explain why some locations are more productive than others?,* Journal of Regional Science, **WP 910 (April 2013).**

ALBANESE G., G. DE BLASIO and P. SESTITO, *Trust, risk and time preferences: evidence from survey data,* International Review of Economics, **WP 911 (April 2013).**

APRIGLIANO V., G. ARDIZZI and L. MONTEFORTE, *Using the payment system data to forecast the economic activity,* International Journal of Central Banking, **WP 1098 (February 2017).**

BELOTTI F. and G. ILARDI, *Consistent inference in fixed-effects stochastic frontier models,* Journal of Econometrics, **WP 1147 (October 2017).**

CIANI E. and P. FISHER, *Dif-in-dif estimators of multiplicative treatment effects,* Journal of Econometric Methods, **WP 985 (November 2014).**

COVA P., P. PAGANO and M. PISANI, *Domestic and international macroeconomic effects of the Eurosystem Expanded Asset Purchase Programme,* IMF Economic Review, **WP 1036 (October 2015).**

D'AMURI F., *Monitoring and disincentives in containing paid sick leave,* Labour Economics, **WP 787 (January 2011).**

D'IGNAZIO and C. MENON, *The causal effect of credit guarantees for SMEs: evidence from Italy,* Scandinavian Journal of Economics, **WP 900 (February 2013).**

ERCOLANI V. and J. VALLE E AZEVEDO, *How can the government spending multiplier be small at the zero lower bound?,* Macroeconomic Dynamics, **WP 1174 (April 2018).**

FEDERICO S. and E. TOSTI, *Exporters and importers of services: firm-level evidence on Italy,* The World Economy, **WP 877 (September 2012).**

GERALI A. and S. NERI, *Natural rates across the Atlantic,* Journal of Macroeconomics, **WP 1140 (September 2017).**

GIACOMELLI S. and C. MENON, *Does weak contract enforcement affect firm size? Evidence from the neighbour's court,* Journal of Economic Geography, **WP 898 (January 2013).**

GIORDANO C., M. MARINUCCI and A. SILVESTRINI, *The macro determinants of firms' and households' investment: evidence from Italy,* Economic Modelling, **WP 1167 (March 2018).**

NATOLI F. and L. SIGALOTTI, *Tail co-movement in inflation expectations as an indicator of anchoring,* International Journal of Central Banking, **WP 1025 (July 2015).**

RIGGI M., *Capital destruction, jobless recoveries, and the discipline device role of unemployment,* Macroeconomic Dynamics, **WP 871 (July 2012).**

SEGURA A., *Why did sponsor banks rescue their SIVs?,* Review of Finance, **WP 1100 (February 2017).**